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DRIVERS OF MANUFACTURING PERFORMANCE IN MEDIUM AND LARGE SCALE FIRMS IN ETHIOPIA (EVIDENCE FROM ADDIS ABABA AND ITS PERIPHERY)

by

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DECLARATION

"I declare that DRIVERS OF MANUFACTURING PERFORMANCE IN MEDIUM AND LARGE SCALE FIRMS IN ETHIOPIA (EVIDENCE FROM ADDIS ABABA AND ITS PERIPHERY) is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references."

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ABSTRACT

Manufacturing performance measures the extent to which the manufacturing plant has built capabilities like low cost, high quality, delivery, and flexibility. The importance of identifying drivers of these capabilities has been underscored by many scholars although limited evidence exists so far regarding this issue. The available evidence is also primarily based on data obtained from manufacturing firms operating in developed and emerging economies and not from firms in developing economies. This study, therefore, bridges this gap by exploring key internal and external drivers of manufacturing performance taking evidence from the manufacturing sector of a developing economy - Ethiopia. A quant-emphasis mixed method approach was used along with cross-sectional survey design to gather data and answer the research questions in the study. The unit of analysis is the manufacturing plant, and hence primary data was collected using multidimensional questionnaires at plant level from 197 medium and large scale firms from Addis Ababa and its periphery. Secondary data was obtained from census reports, the country's Growth and Transformation Plan (GTP), and report on the performance of the Ethiopian economy, which were analyzed qualitatively and the implications to manufacturing performance drawn in the study.

A series of scale checks and analyses were made to test unidimensionality, reliability, and validity of measures and then structural equation modeling (SEM) was used to analyze hypothesized relationships. The main finding is that environmental dynamism significantly influences competitive priorities and firm's strategic orientation, which in turn significantly influence manufacturing decisions. Structural and infrastructural manufacturing decisions eventually significantly influence manufacturing performance when firms place increased emphasis on quality or delivery. The competitive priorities also significantly influence external learning capability of the manufacturing plant, although the influence of strategic orientation on this variable was not significant even at the 0.1 level except in the delivery priority model. Both the competitive priorities and strategic orientation, however, play little role in guiding leadership practices of manufacturing managers. The study further indicates that government support directly influences manufacturing performance, though it does not significantly influence external learning capability. Based on the findings, it is suggested that manufacturing firms should give due attention to what is going on in their external environment and accordingly align their competitive priorities, strategic orientation, and investments in structural and infrastructural resources to enhance plant performance. They should exhaustively utilize the supports provided by government as well.

Key terms: Operations management, Competitive priorities, Strategic orientation, Environmental dynamism, Institutional environment, Government support, Manufacturing decisions, Leadership, Learning capability, Manufacturing performance, Medium and large scale firms, Ethiopia.

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ABBREVIATIONS AND ACRONYMS

a.k.a.	also known as
AMOS	Analysis of Moment Structures
AVE	Average Variance Extracted
AVISC	Average Interscale Correlations
BSO	Business Strategy Orientation
CAD	Computer-Aided Design
CBC	Competence-Based Competition
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CMV	Common Method Variance
COLP	Change-Oriented Leadership
CSA	Central Statistical Agency
CT	Competency Theory
CVA	Covariance Structure Analysis
DCV	Dynamic Capabilities View
d.f.	Degree of freedom
EDI	Electronic Data Interchange
EEA	Ethiopian Economics Association
EFA	Exploratory Factor Analysis
FMS	Flexible Manufacturing Systems
GDP	Gross Domestic Production
GT	Group Technology
GTP	Growth and Transformation Plan
HRM	Human Resource Management
ICC	Inter-Class Correlation
IFI	Incremental Fit Index
IMD	Infrastructural Manufacturing Decisions
IO	Industrial Organization
ISIC	International Standard Industrial Classification
LP	Leadership Practices
MoFED	Ministry of Finance and Economic Development
MoI	Ministry of Industry
MP	Manufacturing Performance
MPS	Managerial Practices Survey

NFI	Normed Fit Index
NNFI	Non-Normed Fit Index
NSIC	National Standard Industrial Classification
OM	Operations Management
OS	Operations Strategy
PCA	Principal Component Analysis
RBV	Resource-Based View
R&D	Research and Development
RMSEA	Root Mean Square Error of Approximation
RO	Resource Orientation
ROLP	Relationship-Oriented Leadership
SBL	School of Business Leadership
SBU	Strategic Business Unit
SEM	Structural Equation Modeling
SIC	Standard Industrial Classification
SMD	Structural Manufacturing Decisions
SO	Strategic Orientation
TLI	Trucker-Lewis Coefficient
TOLP	Task-Oriented Leadership
UNCTAD	United Nations Conference for Trade and Development
UNISA	University of South Africa

CHAPTER 1

ORIENTATION

1.1. Introduction

1.1.1. Theoretical Context and Background of the Research

The contemporary business environment for manufacturing firms is characterized by massive changes and 'globalized competition' that occurred, among other things, due to technological advancements; frequent innovations; as well as ‘rapid developments in supply chains’ and increasing trend of ‘outsourcing’ of manufacturing activities to external (specialized) entities (Bourne, Mills & Faull, 2003). These changes and developments basically require managers of manufacturing firms to design strategies and make astute operational decisions in order to enhance the competitiveness of their firms, ensure survival, and eventually achieve growth objectives. In this regard, managers are often advised to craft and implement strategies at various levels in view of their analysis of the market and the external environment (Porter, 1980, 1985) or on the basis of firm's internal resources and capabilities (Skinner, 1985; Hayes and Pisano, 1994; Urgal-Gonza´lez and Garcı´a-Va´zquez, 2007; Pisano and Shih, 2009) so that the firm can develop the capabilities required to obtain competitive advantage in the market.

Firms operating in the context of developed economies often attempt to improve their operations in view of their analysis of the requirements of the marketplace and hence "by addressing specific needs in order to cope with increasing competitive intensity in the global marketplace" (Hallgren and Olhager, 2009: 976). Firms in emerging economies also seem to follow the same and upgrade their operations and capabilities as necessary to cope with the challenges in the global market. It seems from Hallgren and Olhager's (2009) writing that the starting point for internally building improvement capabilities, and/or choosing the path to do so, is the external environment, especially customers and competitors. However, the importance of acquiring innovative practices or building specific operational capabilities (internally) for improving manufacturing operations is also evident from their argument.

Early manufacturing strategy scholars (Skinner, 1969; Wheelwright, 1984; Wheelwright and Hayes, 1985) in fact emphasize the importance of internal operations capabilities to realize or achieve superior market performance. These scholars argue that manufacturing firms need to have "the capacity (or capabilities) to more effectively serve customers than rivals" to get competitive advantage. The discussion on competitive advantage, in this regard, has been influenced by various externally- or internally-oriented theoretical perspectives. Among the wide range of theoretical perspectives in the area, the influence and/or role of industrial organization (IO) theory and the resource-based approach respectively are mentionable.

The external (market-based) perspectives (for instance, the IO theory) generally consider competitive forces as key drivers for competitiveness (Porter, 1980). With this view, many earlier researchers tried to explore and/or identify different environmental factors affecting firms' strategies and performance and accordingly provided their suggestions about what firms should do to remain competitive in the market. On the contrary, other scholars later found that the competitive forces (especially industry structure or attractiveness) have little or insignificant influence on firm profitability (Grant, 1991; Barney, 1991, 2001). Researchers recognized that 'differences in profitability within industries are much more important than differences between industries' (Grant, 1991: 117), and in view of this, scholars started to explore internal sources of competitive advantage in light of the resource-based (Barney, 1991, 2001; Rumelt, 1984) and capabilities-based theoretical perspectives (Teece, Pisano & Shuen, 1997). The resource-based approach, in particular, helps in analyzing how internal resources and competencies contribute to competitive advantage (Grant, 1991) or customers' value (Hall, 1993), and hence has attracted many operations strategy scholars in recent years (for example, Pandza, Horsburgh, Gorton & Polajnar, 2003; Schroeder, Bates & Junttila, 2002; Ketokivi and Schroeder, 2004a; Voss, 2005; Peng, Schroeder & Shah, 2008, 2011).

Whatsoever the theoretical orientation may be, 'the source of sustainable competitive advantage [ultimately] lies in fulfilling or consistently meeting the key buying criteria of majority of customers in the target market' (Hall, 1993: 610). 'Competitive advantage' is likely to be obtained by satisfying the needs of majority of current as well as future customers in the market (Hall, 1993). According to Hall, "the 'recipe' of attributes which constitutes advantage in the eyes of one customer will not, necessarily, appeal to another" (1993: 610), and in spite of this, 'companies providing products appealing to a current or emergent majority of customers in the target market will achieve competitive advantage' (Hall, 1993).

For a manufacturing firm, in this regard, the primary source of competitive advantage lies in the firm's manufacturing capabilities such as cost, quality, delivery, and flexibility dimensions (Wheelwright, 1984). Schroeder, *et al.* (2002) describe firms' strengths in each of these dimensions as manufacturing-based competitive advantage because these aspects are directly related to competitive advantage, which is to mean 'superior market performance' (Juntilla, 2000).

Since competitive advantage is related to firm's manufacturing performance (Juntilla, 2000; Schroeder, *et al.,* 2002), one can argue that manufacturing firm's ability to achieve competitive advantage primarily lies in its manufacturing performance. Although the resources and capabilities in other functional areas of the firm also affect competitive advantage (Juntilla, 2000), manufacturing capabilities seem to be major determinants. Manufacturing performance, in turn, seems to be affected by various plant specific factors such as competitive priorities and manufacturing choices/decisions (Miller and Roth, 1994; Kathuria, 2000; Christiansen, Berry, Bruun & Ward, 2003; Acur, Gertsen, Sun & Frick, 2003; Ward, McCreery & Anand, 2007) as well as innovative manufacturing practices (Juntilla, 2000; Schroeder, *et al.*, 2002; Ketokivi and Schroeder, 2004a; Hallgren and Olhager, 2009; Peng, *et al.*, 2011). These aspects constitute manufacturing strategy content (Acur, *et al.*, 2003; Ward and Duray, 2000; Schroeder, *et al.*, 2002; Ward, *et al.*, 2007; Peng, *et al.*, 2011), and their "effect on manufacturing or market performance" has been studied in a fragmented way in the literature (Miller and Roth, 1994). Researchers often take either external- or internal- oriented theoretical perspectives and did not integrate these issues together in their empirical studies.

Porter (1991) and Amit and Schoemaker (1993) in fact proposed frameworks, though did not explicitly argue, that integrate external and internal views of competitive advantage. De Toni and Tonchia (2003), however, explicitly argued about the need to integrate the two approaches as well as proposed a framework that could enhance the analysis of the determinants of competitive manufacturing performance, and hence competitive advantage. In this regard, both the pursuit of proper manufacturing strategy (that fits with the requirements of the external environment and/or the market) as well as the development of unique and inimitable internal resources and capabilities seems to contribute to the realization of competitive performance (De Toni and Tonchia, 2003). This, in turn, may lead to the assertion that firms can achieve superior manufacturing performance (or manufacturing-based competitive advantage) when the activities/practices identified under the external- and internal oriented- theoretical perspectives strategically coincide or support each other. With this view, the purpose of this study is to determine the impact of interactions between external and internal factors on manufacturing performance taking evidence from the manufacturing sector of a developing economy - Ethiopia.

1.1.2. The Manufacturing Sector in Ethiopia

Until the 1991 political and economic transition in the country, Ethiopia had been under socialist militaristic rule for nearly two decades and before that under imperial regime for many decades. Different economic and industrial policies had been adopted in the country during these periods, which were characterized, among other things, by staggering economic problems and/or poverty. Since 1991, however, diverse policies and strategies have been issued and implemented and a market-oriented economic policy has been officially adopted in the country. In spite of this, the 2011 report of the Ethiopian Economics Association (EEA) indicates that the industrial sector, among others, has been playing a passive role over the two decades after the transition with the economic strategy adopted being agriculture-led industrialization (EEA, 2007, 2011). The EEA's (2011) report, however, acknowledges that the contribution of the industrial sector to the nation's economic development has been increasing year after year. At present, the government seems to have given increased attention to the industrial sector, especially to manufacturing, as it is expected to take the lead in the economy as of the year 2014/15 (EEA, 2011).

It is only since the year 2002 that the industrial development strategy of Ethiopia has been in place (EEA, 2011), and the main focus of this strategy is to encourage industries having direct linkage to agriculture, which, in turn, provide support to agricultural growth through demand effect (EEA, 2011). The nation's industrial development strategy specifically "promotes the implementation and/or expansion of selected industrial groups, regarded as strategic for their labor intensiveness and export potential, including Textiles, Wearing Apparel, Leather Tanning, and Footwear" by providing various incentives and support (EEA, 2011). Due to these incentives (or supports) and socio-economic developments in the context, private investments in existing manufacturing industries as well as new establishments in fact has significantly increased especially since the year 2002 (EEA, 2011).

Although investment in prioritized as well as other industries has substantially increased, thereby increasing the potential of the overall industrial production capacity (EEA, 2011), the EEA's report yet indicates that the existing manufacturing industries more or less "operate at less than full capacity" for years (2011: 83-84). It is learned that "production for all industries did not exceed two-thirds of full capacity" in four different years in the period 1997/98 – 2007/08 (EEA, 2011). The 2011 report of Central Statistical Agency (CSA) of Ethiopia on 'Large and Medium Scale Manufacturing and Electricity Industries Survey' also confirms this fact. The main reasons cited for such significant underutilization of capacity in the aforementioned period include 'shortage of raw materials, shortages of intermediate inputs, and lack of market, which in effect implying lack of competitiveness' (EEA, 2011: 85). Although production has increased since the year 2002 in almost all industries, the growth in production in the prioritized industries such as Textiles, Leather tanning, Footwear and Wearing apparel is again relatively less (EEA, 2011). The report rather indicates that "high performing industries with significant production shares are in fact those non-prioritized, but market driven ones, including Sugar, Basic Iron and Steal, Malt Liquor, and Cement" (EEA 2011: 86). These industries are capital intensive as compared to the industrial sectors prioritized in the nation's industrial development strategy.

As EEA (2011: 92) states, 'competitiveness has become a critical factor for business survival', and hence 'entrepreneurs in the country have also shown a tendency to shift from labor to capital intensive production techniques in order to become competitive in the local and foreign markets'. In this regard, industries are moving increasingly towards capital intensive mode of production in the country; and currently government is heavily investing in the Textiles industry to upgrade their technology capacity (EEA, 2011: 92-93). As capital (technology) is a critical factor for enhancing productivity and competitiveness, the inevitable trend for [the] prioritized industries is to shift from labor- to capital- intensive production, as industries are required to meet competition challenges both at home and abroad (EEA, 2011: 93). And with markets given the central role of economic management, and also given that the government is aspiring to be a member of the World Trade Organization (WTO), this shift would be inevitable, EEA argues.

With respect to export capacity, EEA (2011) indicates that export capacity has been increasing since the year 2002 due to internal and external favorable policies and incentives. In spite of this, the export of manufactured merchandise by the Ethiopian manufacturing industries is still insignificant as compared to neighboring countries (EEA, 2011). For instance, for the five years period (2005-2009), "the average merchandise export as a proportion of GDP in Ethiopia (6.4 percent) is two to five times less than that … [of] Kenya (15.6 percent), Uganda (13.7 percent), Tanzania (12.6 percent), and Mauritius (28.5 percent)" (UNCTAD, 2010 as cited in EEA, 2011: 98). The government started the implementation of a new five year development plan, known as 'Growth and Transformation Plan (GTP)', in the year 2010/11 (Ethiopia. Ministry of Finance and Economic Development [MoFED], 2010), which foresees the development of the industrial sector as a key driver of economic growth (EEA, 2011). In this regard, it is expected that the contribution of the industrial sector to the nation's GDP would rise from 11.7 percent (which is the average) for the period 2004/05 - 2009/10 to 28 percent under the GTP, that is, for the period 2010/11 - 2014/15 (Ethiopia. MoFED, 2010; EEA, 2011).

The GTP requires, among other things, that the existing manufacturing firms improve and/or upgrade their manufacturing operations, capabilities, practices, and technologies so as to become competitive both in the local and foreign markets (Ethiopia. MoFED, 2010). It also encourages the establishment (or expansion) of various new industries in the country, the main objective being for industry (manufacturing) play key role in the economy (Ethiopia. MoFED, 2010). In order to realize this objective, however, it is also imperative that existing (including newly established) manufacturing firms develop, strategize, and economize their operations in a way to achieve manufacturing-based competitive advantage. Developing relatively strong capabilities as compared to the competition in terms of the dimensions of manufacturing performance, in this regard, can be seen as an important prerequisite for competitiveness and survival in the contemporary business environment.

1.2. Statement of the Problem

The economic role of the manufacturing sector in general and the strategic role of firm's manufacturing operations in particular has been emphasized in wide range of manufacturing strategy literatures (Skinner, 1969; Schonberger, 1986, 1996; Wheelwright, 1981; Drucker, 1981; Hayes and Wheelwright, 1984; Schroeder, 1985). Since the work of Skinner (1969), many scholars also started to emphasize the strategic role of manufacturing and hence using manufacturing strategy as a competitive weapon in the market. Manufacturing strategy is an important functional level strategy that contributes to the development of (or improvements in) manufacturing capabilities, which in turn leads to competitive advantage (Skinner, 1969; Hayes and Wheelwright, 1984; Wheelwright, 1984; Schroeder, 1985; Miller and Roth, 1994; Juntilla, 2000; Devaraj, Hollingworth & Schroeder, 2004; da Silveira, 2005; Ketokivi and Schroeder, 2004a; Hallgren and Olhager, 2009).

The extant operations management (OM) literatures, in spite of the differences in the theoretical perspectives, underscore the contributions of manufacturing strategy for achieving or realizing competitive capabilities (Devaraj, *et al.*, 2004; da Silveira, 2005; Kroes and Ghosh, 2010). Early manufacturing strategy research and practice was anchored mainly in the market-based view that emphasizes the importance of aligning manufacturing goals and strategic choices with external (environmental) requirements for competitiveness (Skinner, 1969; Boyer and Lewis, 2002; Kim and Arnold, 1996; Frohlich and Dixon, 2001), while contemporary scholars emphasize the strategic role of process, implementation of innovative manufacturing practices, as well as development of resources and capabilities (Ketokivi and Schroeder, 2004a; Brown, Squire & Blackmon, 2007; Peng, *et al.*, 2008). The different theoretical perspectives as well as empirical studies have provided invaluable insights both to manufacturers and researchers in the area.

Since the economic environment for manufacturing enterprises has been rapidly changing and competition become global in the contemporary period, manufacturing firms in the industrialized as well as emerging economies seem to continually attempt to smooth out the threats and remain competitive through strategizing and economizing their manufacturing operations. Firms operating in these contexts seem to have been using their manufacturing capabilities and relevant strategies as competitive weapons in the market (Wheelwright, 1984; Hayes and Wheelwright, 1984; Skinner, 1985). On the contrary, manufacturing firms found in developing and/or less-developed economies seem to be challenged by the increasing level of competitive pressure exerted from foreign counterparts even in their home market.

Manufacturers from the developed as well as emerging economies have been dominant market players and providers of most industrial (manufactured), state-of-the-art goods in the global marketplace, and especially in the context of less developed and/or developing economies such as in Africa at large and Ethiopia in particular. It is the high performance, "world-class" manufacturers from the developed and emerging economies that have been shaping global competition, markets, and industries for many decades (Teece, 2007; Hagel III, Brown & Davison, 2008), and firms from developing economies simply are followers (Hagel III, *et al.*, 2009). In this regard, the key for the success of “world-class” and other manufacturers in the developed and emerging economies lies, among other things, on the capabilities of their manufacturing plants. This in turn depends on the extent to which the activities and practices in the firms’ operations function are strategized and economized. Superior manufacturing performance (or capabilities) is a prerequisite for competitiveness and/or achieving competitive advantage in the global marketplace (Juntilla, 2000; Schroeder, *et al.*, 2002).

In the context of Ethiopia, the situation is somehow different as the industrial sector itself is at its fledgling stage of development with small number of manufacturing firms operating in the context relative to other developing countries (EEA, 2011). The existing manufacturing firms in the country largely are small and medium scale operators with limited number of employees (Ethiopia. CSA, 2011) as well as limited scope of operations and technologies. Majority of the local manufacturing firms, hence, seem to be facing lingering competitive pressures and irresistible challenges from advanced foreign manufacturers (EEA, 2011).

Despite lots of opportunities said to exist for manufacturing firms located in developing economies such as in Africa at large, including “tapping their local market” (Raman, 2009), it currently appears in Ethiopia that firms from developed economies as well as emerging economies like China outperform the local manufacturers even in the domestic markets. The local manufacturers’ ability or potential to create and/or achieve competitive advantage, thus, is highly a suspect as firms seem to be giving up even their local customers and markets to foreign competitors (EEA, 2011). While almost all manufacturing firms in Ethiopia have been operating at less than full capacity for years (EEA, 2011; Ethiopia. CSA, 2011), the nation’s increasing import intensity even in basic goods, of course, reveals this fact.

The underlying reason for the local firms’ lack of competitiveness and/or inability to enjoy good market acceptance (EEA, 2011), in this regard, might relate to either the lack of suitable strategies, capabilities, leadership, or a combination of some of these factors. This research particularly argues that the central problem resides in the manufacturing plant and the associated capabilities, that is, in the manufacturing practices and capabilities, the degree of alignment between the competitive priorities and practices/capabilities, as well as the kind of leadership managers (particularly manufacturing managers) exercise, each of which could be linked with measures of plant performance. What makes the Ethiopian manufacturing context unique is that nothing is known about the impact of the aforementioned variables on manufacturing performance. The aspect of leadership and its implications in the context of the manufacturing plant is in fact a key issue that remained under researched or obtained limited coverage in the extant literature at large (Skinner, 1969; Kathuria and Partovi, 1999; Kathuria, Partovi & Greenhaus, 2010), and Ethiopia is not an exception in this regard.

The other important (contextual) variable that is worth considering in studying manufacturing performance in the context of developing as well as emerging economies relates to the institutional environment, specifically the level of government intervention in the sector. In this regard, the importance and/or role of government in enhancing the competitiveness of firms by providing financial, technical, institutional, and policy support is underscored in Ethiopia (EEA, 2011) as in other developing and emerging economies (Mesquita, Lazzarini & Cronin, 2007; Malik and Kotabe, 2009; Cai, Jun & Yang, 2010). Yet, little is known about how (or in what way) such support affects plant performance in the context of manufacturing in Ethiopia. In short, it is the aforementioned problems and gaps in the literature that have instigated the current research, and this thesis, therefore, tries to answer the following main question:

- How do environmental dynamism, aspects of manufacturing strategy, leadership practices, and government support together influence firms' manufacturing performance?

Specifically, the study provides the answers to the following questions:

1) Does environmental dynamism significantly influence the competitive priorities and strategic orientation of medium and large scale manufacturing firms in Ethiopia?

2) How do the competitive priorities and strategic orientation influence structural and infrastructural manufacturing decisions, plant learning and improvement capabilities, as well as leadership practices of manufacturing managers?

3) How do structural and infrastructural manufacturing decisions, plant learning and improvement capabilities, as well as manufacturing managers' leadership practices influence manufacturing performance?

4) Does government support directly influence manufacturing performance or indirectly through plant learning and improvement capabilities?

1.3. Objectives of the Study

Given the above problem statement and research questions, the main objective of this study was to determine key external and internal drivers of manufacturing performance, and accordingly highlight significant relationships that lead to competitive manufacturing performance among medium and large scale firms in Ethiopia. With this view, attempt was made in the study to analyze how external/environmental factors (mainly environmental dynamism and government support) and internal drivers (such as competitive priorities, strategic orientation, manufacturing decisions, leadership, and plant learning and improvement capabilities) together influence firm's manufacturing performance.

The specific objectives of the study include the following:

1) To investigate the extent to which environmental dynamism influences competitive priorities and strategic orientation of medium and large scale manufacturing firms.
2) To show the impact of competitive priorities and strategic orientation on structural and infrastructural manufacturing decisions, plant learning and improvement capabilities, as well as manufacturing manager's leadership practices.
3) To assess the impact of structural and infrastructural manufacturing decisions, manufacturing manager's leadership practices, as well as learning and improvement capabilities on firms' manufacturing performance.
4) To identify the direct and indirect effects of environmental dynamism, competitive priorities, and strategic orientation on firms' manufacturing performance.
5) To provide insights about the role of government support (an institutional contingency) in the context of the manufacturing plant.

1.4. Rationales for the Study

There are theoretical and empirical rationales for focusing on this area in the current thesis. From theoretical perspective, in this regard, the continued debate among scholars vis-à-vis the sources of competitive advantage in general and sustainable competitive advantage in particular for manufacturing firms triggers the need to undertake a research that integrates external and internal drivers or variables. It is also noted from the extant literature that the arguments and implications of many of the theoretical perspectives vis-à-vis competitive strategy, manufacturing strategy, and competitive advantage heavily draws from the operations, capabilities, routines, and practices of manufacturing firms found in developed economies. This may raise questions as to the relevance and/or applicability of the various theories especially in the context of firms in less developed economies. It is, therefore, important to undertake a research in view of such theoretical perspectives and see the utility to firms in developing economies.

From empirical perspective, the lack of evidence with respect to aspects of manufacturing strategy, leadership practices, government support, and their impact on operational performance of manufacturing firms operating in developing economies like Ethiopia also necessitates research in this area. It is, therefore, important to explore the influence of the level of environmental dynamism on the competitive priorities and strategic orientation of the local manufacturing firms and, in turn, the influence of these aspects on manufacturing decisions, learning and improvement capabilities, leadership practices, and ultimately on plant performance. The role of government support for enhancing manufacturing performance or leading to the development of plant capabilities (such as learning or improvement) also needs to be empirically verified. Without the contributions of this and similar studies in the area, it appears that government's recent initiatives, policy directives, and/or incentive packages designed to support industries in working towards the objective of making manufacturing hold the key for economic growth in a few years time might become difficult, if not impossible, to realize/attain.

1.5. Delineation of Field and Scope of the Study

This study falls into the Operations Management (OM) field drawing heavily on manufacturing strategy, leadership, and institutional literatures as well as relevant theoretical perspectives in these areas. The study addresses aspects of manufacturing strategy, leadership practices, government support, and performance focusing only on the manufacturing plant and respective function (i.e. the manufacturing function). The effects of other business functions on manufacturing performance as well as the impact of manufacturing performance on market and business performance, thus, was not considered in this study. The impact of alignment (or fit) between manufacturing decision areas and plant learning and improvement capabilities, or with respect to leadership practices was not examined in this thesis as well. The impact of corporate and business strategy on manufacturing strategy, or the impact of fit between these aspects also is not assessed in the current study.

Furthermore, the study only considered competitive priorities and strategic orientation as influencing factors or drivers for manufacturing manager's leadership practices, and ignored other contingencies or "employee characteristics such as subordinates' prior experience, training, or skills that are also likely to influence the behavior a manufacturing manager demonstrates" in a particular context (Kathuria, *et al.*, 2010: 1080). An important contextual factor (contingency) the study considered, however, relates to institutional support, in particular, government support provided to manufacturing firms. The impact of government support was examined only at the level of the manufacturing plant, and not on the organization as a whole (or on market or business performance).

With regard to coverage, the study only considered medium- and large-scale manufacturing firms operating in Addis Ababa and its periphery, and not in the regions or other developing countries. These industries often have been categorized, on the bases of nature of products, into distinct groups as per National Standard Industrial Classification (NSIC) or International Standard Industrial Classification (ISIC) codes. The CSA in Ethiopia adopts a similar taxonomy and categorizes medium and large scale manufacturing industries into fifteen strata (Ethiopia. CSA, 2011). Most manufacturing strategy researchers use these classifications (or codes) to determine which industries to include in their study rather than considering firms from all the categories. In this regard, most focus on specific or limited industrial categories, such as on business units (plants) with the metal industry as their main activity (Peng, *et al.*, 2011; Vazquez-Bustelo, *et al.*, 2007; Urgal-Gonzalez and Garcia-Vazquez, 2007; Martı´n-Pen˜a and Dı´az-Garrido, 2008; Boyer, Ward & Leong, 1996; Ward and Duray, 2000), and only a few consider plants from wide range of industries (e.g. Kathuria, 2000; Kathuria and Partovi, 1999; Zhao, *et al.*, 2006; Amoako-Gyampah and Meredith, 2007).

In view of the above, this research focused on firms selected from ten industrial categories, which are either prioritized in the nation's industrial development strategy (EEA, 2011) or given particular emphasis in the country's Growth and Transformational Plan (GTP) being implemented in the period 2010/11 - 2014/15 (Ethiopia. MoFED, 2010), or both. These industries include: Food products and Beverages, Textiles, Wearing Apparel, Tanneries and

Leather products, Chemical/Chemical products, Non-Metallic Mineral Products, Iron and Steel, Fabricated Metal Products, Machinery and Equipment, and Assemblers of Vehicles and Trailers/Semi-Trailers (Ethiopia. CSA, 2011).

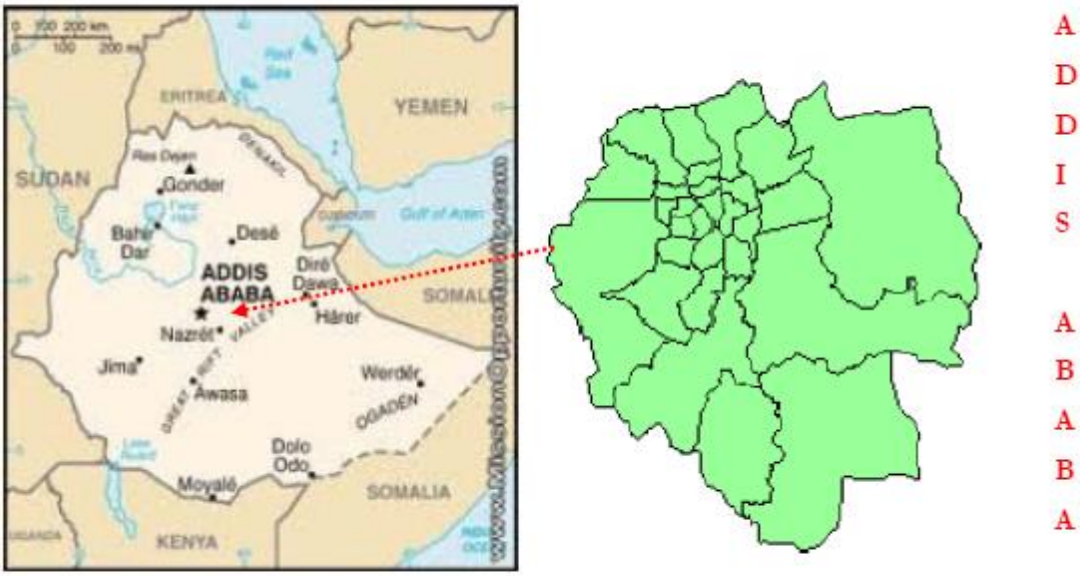
1.6. The Study Environment

This study focuses on manufacturing firms located in Addis Ababa and its periphery, which is known for its industrial concentration in the country. Addis Ababa is the capital and largest city of Ethiopia and is an autonomous administrative region in the country. “Operating in the city are many printing industries and manufacturers of footwear, clothing, processed foods, beverages, furniture, chemicals, asbestos and metal products, equipments, and assembled vehicles” (Addis Ababa in Microsoft Encarta, 2009). “Flourishing handicraft industries in the city also produce leather, metal, and textile goods” (Addis Ababa in Microsoft Encarta, 2009). According to the CSA’s recent report, more than 40% of large and medium scale manufacturing firms in Ethiopia are concentrated in and around this city (Ethiopia. CSA, 2011). These firms seem to have relatively long years of operations experience, bigger capacities, better technologies and practices, and higher labor productivity when compared to “manufacturing enterprises located in rural areas” in the country (Rijkers, Soderbom & Loening, 2010)[1]. (Figure 1.1 depicts map of the study area).

1.7. Significance of the Study

The primary significance of this research lies in its contribution to knowledge through exploring the drivers of manufacturing performance based on evidence from Ethiopia. In this regard, the study identifies important drivers of strategic goals as well as strategic orientation and explicates how the interplay or interrelationships between these aspects and manufacturing decisions, learning and improvement capabilities, manufacturing manager’s leadership practices, and government support ultimately influence manufacturing performance. The study also contributes to a better understanding of manufacturing strategy content by exploring the performance impact of alignment between competitive priorities and aspects of manufacturing decisions, learning and improvement capabilities, as well as leadership practices. The findings in the study, thus, might help to fill the gap in the manufacturing strategy literature regarding the drivers of manufacturing performance.

[1] Rijkers, *et al.* (2010) in fact conducted a comparative study of urban and rural firms in Ethiopia and obtained important differences in the performance of rural firms and urban firms in the context.



Source: *Internet (www.addisababacityadministration.org.et)*

Figure 1.1: Map of the Study Area

The current study also might help to highlight the mechanisms (or strategies) manufacturing firms in developing economies need to adopt in order to achieve manufacturing-based competitive advantage. In this regard, the findings might help to provide relevant insights to managers of manufacturing firms about the factors that need to be considered in setting the competitive priorities and in turn strategic choices and practices to be implemented in order to develop relevant manufacturing (plant) capabilities. The outcomes in the study, moreover, would be of interest to other researchers and policymakers in Ethiopia, Africa, and/or developing economies at large. In particular, this study is essential to uncover what is going on inside the local manufacturing firms as well as help them find ways for learning, improvement, and competitiveness. The government can also use the document as a stepping ground and to find ways for intervention including taking new strategic initiatives for enhancing the existing institutional support provided to manufacturing firms as well as creating awareness about the role of institutional forces among various stakeholders. The study might also serve as a basis for further research, consultancy, and training in the area.

1.8. Limitations of the Study

This study may have different limitations associated with its design and coverage. In this regard, the study did not include small-scale manufacturing enterprises as well as samples from all industrial categories and regions in Ethiopia. As a result, the findings and/or outcomes reported in this thesis might not fully represent or reflect the situation in the manufacturing sector in Ethiopia as a whole. The study also did not explain or address performance differences across manufacturing firms operating in other developing economies as samples were only selected from Ethiopia. The findings and conclusions, therefore, would not be taken as generalizations for manufacturing firms in developing economies as a whole. There is also difficulty in forming causality between variables as the study adopted a cross-sectional data collection design.

The researcher was also limited to analyzing the responses of individuals as proxy for plant level strategies, practices, and performance. In particular, manufacturing performance was assessed using perceptual measures (i.e. proxies) alone owing to the difficulty associated with obtaining objective measures of manufacturing performance from firms participated in the study as well as the difficulty associated with analyzing such objective measures of performance and making comparisons across firms in different industries. Potential biases would have been completely avoided, however, had objective measures of performance been used along with the perceptual ones. Manufacturing performance also was considered as a single, latent construct in the study though it was measured in terms of multiple dimensions. And due to this reason, it was not possible to determine which specific dimension (or element) of manufacturing performance is being affected by the different antecedents considered in the study.

1.9. Clarification of Concepts and Constructs

For the sake of clarity, the major concepts and constructs involved in the study are defined or explained as presented next.

Environmental dynamism. Environmental dynamism is a frequently used measure of the external environment (Ward and Duray, 2000; Butt, 2009), that refers to 'the rate and unpredictability of environmental change' (Butt, 2009). Accordingly, Butt defines the concept of environmental dynamism as 'the rate at which customers' tastes and preferences change, new products and services become outdated and innovative products, services and processes are introduced' (2009: 150). This definition is adopted in this thesis too. Environmental dynamism is likely to influence the choice of or level of emphasis given to the competitive priorities (a.k.a. strategic goals), which are key elements of manufacturing strategy. This variable also seems to influence firm's strategic orientation as well.

Strategic orientation. Strategic orientation is a term that is often used to describe various (but related) issues or aspects that reflect firms' competitive culture and/or their intention towards winning the competition (Yang, Zhu & Wu, n.d.; Darmanto, Runing, Harsono, & Haryono, 2014). It seems to comprise multiple dimensions such as market orientation, customer orientation, technology orientation, competitor orientation, inter-functional coordination, entrepreneurship orientation, innovation orientation, and so on as scholars use this term in referring to each of the above aspects (Narver and Slater, 1990; Gatignon and Xuereb, 1997; Noble, Sinha & Kumar, 2002; Li, Liu & Zhao, 2006; Darmanto, *et al.*, 2014). Strategic orientation can be considered as key 'organizational resource' (Yang, et al. n.d.; Darmanto, *et al.*, 2014), which is likely to influence the aspects of manufacturing strategy (i.e. structural and infrastructural choices/decisions and plant capabilities like learning, improvement, etc.) as well as leadership practices of concerned managers in the firm.

Manufacturing strategy. Manufacturing strategy is a functional level strategy that links the manufacturing function with the overall corporate strategy (Wheelwright, 1984; Martı´n-Pen˜a and Dı´az-Garrido, 2008), and is often viewed in terms of content and process dimensions (Leong, Synder & Ward, 1990; Das, Zahra & Warkentin, 1991; Voss, 1995; Swink and Way, 1995; Acur, *et al.*, 2003). Content comprises the strategic goals, manufacturing choices/decisions, and action programs or practices that eventually lead to improved manufacturing performance and competitive advantage (Hayes and Wheelwright, 1979a, 1979b; Voss, 1995; Swink and Way, 1995; Miller and Roth, 1994); whereas process indicates the way the content is determined (Swink and Way, 1995; Acur, *et al.*, 2003).

The competitive priorities and strategic choices (or decisions), in this regard, are viewed as key elements of manufacturing strategy in many earlier literatures (Skinner, 1969, 1978; Wheelwright, 1984; Voss, 1995). A few scholars even in their recent writings (for example, Martı´n-Pen˜a and Dı´az-Garrido, 2008) support this view and argue that 'any definition of manufacturing strategy must include [these] two key elements, i.e. competitive priorities and manufacturing decisions'. These earlier views of manufacturing strategy seem to be rooted in the market-based ("outside-in" oriented) perspectives of strategy (De Toni and Tonchia, 2003).

From a resource-based view point, however, 'manufacturing strategy is no longer assumed to be driven from "out there" in the market or in generic and widely diffused models, but emerges in making choices between options' (Tranfield and Smith, 1998: 116). This is a more "inside-out" oriented approach, which focuses on how manufacturing plants develop capabilities and resources in pursuit of better performance (Schroeder, *et al.*, 2002) and/or which routines, practices, or capabilities enhance operational performance (Ketokivi and Schroeder, 2004a; Peng, *et al.*, 2008). Under this approach, it is the manufacturing resources, practices, capabilities, or underlying routines that define firm's manufacturing strategy.

The concept of manufacturing strategy, thus, has been operationalized either from market-based or resource-based perspectives in the majority of the extant literature (Butt, 2009). As Thun (2008) cited in Butt (2009: 23) suggests, however, the "contemporary period's highly competitive markets require an integration of the external-oriented and internal-oriented approaches since either approach followed in isolation will have its weaknesses" (Butt, 2009: 23). This thesis also argues in favor of integrating the two approaches in conceptualizing this concept, and hence defines manufacturing strategy as:

> *a set of strategic manufacturing objectives/priorities, decisions, as well as resources and capabilities that determine the capability of the manufacturing plant*

This definition contains or implies to concepts like competitive priorities, manufacturing decisions, and capabilities (like learning, improvement, etc), each of which is explained next:

Competitive priorities. Competitive priorities refers to the strategic emphasis the firm gives to developing competitive capabilities such as cost, quality, delivery and flexibility capabilities (Nair and Boult, 2008). Setting the competitive priorities is an important concern of manufacturing strategy (Leong, *et al.*, 1990; Ward, Bickford & Leong, 1996; Peng, *et al.*, 2011). The competitive priorities, in turn, seem to be affected by external/environmental factors like environmental dynamism or uncertainty.

Manufacturing decisions. Manufacturing decisions (a.k.a. strategic choices) are key components of the content of manufacturing strategy (Hayes and Wheelwright, 1984; Martı´n-Pen˜a and Dı´az-Garrido, 2008; Ward, *et al.*, 2007; Urgal-Gonzalez and Garcia-Vazquez, 2007). "Structural" and "infrastructural" decisions are two broad dimensions or elements of manufacturing decisions (Buffa, 1984; Boyer, 1998; Ward, *et al.*, 2007; Martı´n-

Pen˜a and Dı´az-Garrido, 2008), which "contribute to the achievement of manufacturing objectives in particular and corporate objectives in general" (Diaz-Garrido, Martin-Pena & Garcia-Muina, 2007).

Learning and improvement capabilities. Learning and improvement capabilities are among the capabilities manufacturing firms develop through implementing different practices or developing systems and processes. Ability to learn is an important capability firms need to develop to compete successfully in the market. Schroeder, *et al.* (2002) sub-divide this capability into two: internal learning capability and external learning capability. Improvement capability is, on the other hand, 'reflected in practices such as continuous improvement, process management, and leadership involvement in quality' (Peng, *et al.*, 2011). These three plant capabilities, i.e. internal learning, external learning, and improvement capabilities, can be considered as integral elements of manufacturing strategy, each of which in turn measured in terms of specific practices or routines as identified from the literature.

Leadership practices. Researchers study leadership practices or styles in different ways. It is common in the literature to classify leaders as participative or authoritative as well as transformational or transactional leaders (Kathuria, *et al.*, 2010). Contemporary scholars (Kathuria, and Partovi, 1999; Kathuria, *et al.*, 2010) rather prefer more detailed ways of viewing or evaluating leadership styles. In this regard, Yukl (1989) identified detailed characteristics or activities a leader can perform in his/her interaction with employees and day-to-day duties. These practices then reflect 14 managerial practices or behaviors (Yukl, 1989). Yukl (2009) in fact recently refined the earlier measures of leadership by adding three more practices. From the 17 practices, two managerial behaviors (problem solving and leading by example) are considered mixed and the rest fifteen behaviors fall into three meta-categories: task-oriented, relations-oriented, and change-oriented practices[2] (Yukl, 2009).

Because differences exist in the leadership function or form of leadership at the top and in the middle of the organization (Aylor, 2009), leadership practices in this thesis refer to the practices of middle level managers applicable to all organizations (Kathuria, *et al.*, 2010).

[2] Task-oriented behavior includes short-term planning, clarifying responsibilities, and monitoring activities and performance; relations-oriented behavior includes supporting, recognizing, encouraging participation, empowering, developing, and encouraging cooperation and change-oriented managerial behavior includes external monitoring, explaining need for change, envisioning change, encouraging innovative thinking, facilitating collective learning, and promoting change (Yukl, 2009).

Some of the change behaviors such as external monitoring and promoting change are more relevant for top executives than for middle-level managers or low-level supervisors, and hence were excluded from Yukl's (2009) version of Managerial Practices Survey (MPS) instrument that was used in this study to assess the practices of middle-level managers.

Government support. Government support refers to the range of institutional, policy, technical, financial, or other supports and incentives the federal or regional governments provide to manufacturing firms (Meyer, et al., 2009; Malik and Kotabe, 2009; Cai, *et al.*, 2010). Such support is common both in emerging as well as developing economies due to their 'weak institutional characteristics' and lack of essential facilities for manufacturing investments and successful operations. Considering the context or realties of developing economies, government support can be viewed as an important institutional force that is likely to influence firms' capabilities or decisions and eventually manufacturing performance.

Manufacturing performance. Performance is a wide concept that is often assessed at different levels and using different measures in empirical studies. For instance, researchers assess performance from the perspective of the manufacturing plant, customers, or the organization as a whole (i.e. organizational/business performance) (Junttila, 2000). These three performance dimensions are interrelated, though each dimension has its own unique measures. Manufacturing performance, therefore, refers to the immediate outcome of factory operations that is often used to evaluate the performance of the manufacturing plant (Junttila, 2000; Hallgren and Olhager, 2009; Dal Pont, Furlan & Vinelli, 2008).

It is measured in terms of multiple plant capabilities ranging from three to seven or more dimensions. The frequently used measures of manufacturing performance, however, include cost, quality, delivery, and flexibility dimensions (Wheelwright, 1984; Ward, *et al*., 1996; Ferdows and De Meyer, 1990; Ward and Duray, 2000; Noble, 1995; Schroeder, *et al.,* 2002; Amoako-Gyampah and Meredith, 2007; Hallgren, Olhager & Schroder, 2011). Strengths in these areas or capabilities often become a basis for obtaining competitive advantage in the market. The scope of manufacturing performance is narrow, however, as it focuses only on the measures of plant performance, while business performance is an overall measure. As Junttila (2000) indicates, 'business performance is directly affected by market performance and indirectly by manufacturing performance'.

1.10. Organization of the Thesis

This thesis is organized into seven chapters following the SBL's guideline for writing a DBL thesis (University of South Africa, 2012)[3]. The first chapter, which was already presented, provides general orientation about the study. The contents presented in this chapter include introduction/background of the study, overview of the manufacturing sector in Ethiopia, problem statement, objectives of the study, rationales for the study, scope and delimitations, description of the study area, significance of the study, limitations, as well as clarification of concepts and constructs.

The remaining six chapters were organized as follows: Chapter two provides theoretical foundation of the study through exploring the arguments of different theoretical perspectives such as industrial organization, strategic contingency, resource-based, and routine-based theories. Behavioral and situational leadership theories as well as institutional theory are also explored in this part. The third chapter provides extensive review of the literature vis-à-vis manufacturing strategy, leadership, institutional forces, and performance. The gap(s) in the extant literature is highlighted in this part that could be addressed in the current or future research.

The fourth chapter provides detailed statement of the problem, conceptual framework, and research hypotheses developed based on extensive analysis of the literature. The fifth chapter presents the research design and methodology including research paradigm, population and sampling, unit of analysis, sources of data and collection strategy, instruments and measures, reliability and validity of measures, as well as methods of data analysis. Based on preliminary tests of data and a series of scale checks and analyses, the measures and their respective indicators were refined along with revising the proposed conceptual framework and hypotheses. In the sixth chapter, the results obtained in the analyses are presented and interpreted, and in chapter seven, the major findings of the study are discussed, conclusions and recommendations provided, along with limitations and directions for further research. In the following chapter, relevant theoretical perspectives are discussed and their implications to the current study drawn.

[3] University of South Africa. Graduate School of Business Leadership. 2012. Guidelines for Writing a DBL Proposal and a Thesis, Updated Document 2012. Unpublished.

CHAPTER 2

THEORETICAL FOUNDATION OF THE STUDY

Numerous theories have been developed that explain the role manufacturing strategy, leadership, and institutional support play in enhancing the competitiveness of firms. This chapter discusses the insights and arguments of those theories that underpin the analysis of drivers of manufacturing performance. Accordingly, the notions of industrial organization (IO), strategic contingency, as well as resource-based and routine-based theories are explored and their implications to manufacturing strategy and performance studies discussed in this chapter. The insights and implications of behavioral and situational leadership theories and institutional theory are also explored in this part, which provide important theoretical foundation to the issues of leadership practices and government support respectively in the study.

2.1. Industrial Organization and Strategic Contingency Theories

Industrial organization (IO) economics theory is one of the economic theories of the firm (Ross, 2003), which gives particular emphasis to industry-related, external "drivers of competition" (Porter, 1980). Porter's (1980) framework actually builds on the insights of this theory, and hence posits that 'firm performance is determined by industry attractiveness' (Foss, 2007: 19). In his 1980 framework, Porter actually identified five key forces that, he argued, determine the performance of the firm. These forces include 'threat of entry, rivalry among existing competitors, pressure from substitute products, as well as bargaining power of buyers and suppliers' (Foss, 2007). "Profit potential relates directly to the combined strength of these forces" (Herrmann, 2005: 115). The IO theory is, therefore, heavily concerned with the external environment and its relationships with the firm (Furrer, Thomas & Goussevskaia, 2008).

Following Porter (1980, 1985), in this regard, researchers started to test the relationship between environment and strategy and its implications to performance (Butt, 2009). Also grounded in the IO theory is the competing through manufacturing (or capability) paradigm of manufacturing strategy[4] (Voss, 1995, 2005). This approach emphasizes the idea that 'the firm should compete through its manufacturing capabilities' (Voss, 1995: 6). In order to achieve competitive performance, in this regard, 'the firm should align its capabilities with the key success factors, its corporate and marketing strategies and the demands of the marketplace' (Voss, 1995: 6). Numerous manufacturing strategy researchers actually followed this root in explaining the relationships between environment and different aspects of manufacturing strategy. These studies lie in what is described as the competing through manufacturing paradigm (Voss, 1995, 2005), which is heavily influenced by IO theory.

The IO theory, however, considers or views the firm as a profit-maximising production 'black box' with output decisions based on assumptions about human behavior (Ross, 2003; Herrmann, 2005). It does not state anything about the internal workings of the firm - ignores what is happening inside the firm (Ross, 2003; Herrmann, 2005). And this is as a serious drawback of the IO theory. Hence, Foss (2007) writes the following critique about it:

> "The firm as has so often been observed is completely black boxed in this approach. Managers are mentioned, but only as the agents that have to carry out the analysis of industries and position the firm in the chosen industries" (Foss, 2007: 19).

Although the best strategy is one tailored to the individual capabilities of a firm, IO theorists [especially Porter, 1980] identifies 'generic strategies' firms should adopt to earn superior returns, including 'overall cost leadership, differentiation, and focus' (Herrmann, 2005: 115). Subsequent scholars (e.g. Grant, 1991; De Toni and Tonchia, 2003) thus criticized Porter's (1980) model, who argue that 'social and organizational dynamics, rather than technical logic, select industry standards' (Herrmann, 2005). In view of this limitation, strategy researchers started to adopt other theories, and one such theory that takes into consideration what is happening inside the firm ("in the black box") in addition to environmental factors is strategic contingency theory (Ross, 2003). The "structures and processes" of an organization is influenced or shaped by the environment in which it operates (Flynn, Huo & Zhao, 2010), and this suggests that 'organizations should match their structures and processes to their environment in order to maximize performance' (Flynn, *et al.*, 2010: 59). According to the strategic contingency theory, therefore, superior performance and/or competitive advantage

[4] Voss (1995) in fact indicates the existence of three distinct (but interrelated) manufacturing strategy paradigms in the extant literature: competing through manufacturing, strategic choices, and best practices.

can be achieved when a firm maintains fit between environmental factors and internal structure/practices (Zott and Amit, 2008; Flynn, *et al.*, 2010).

As Voss (1995) states, the strategic choices paradigm of manufacturing strategy is ‘a contingency-based approach that emphasizes the need for internal and external consistency between choices in manufacturing strategy’. This ‘manufacturing strategy paradigm’ argues that choices are contingent on context and strategy (Voss, 1995), and the choices this approach refers to are the aspects of manufacturing decisions in the structural and infrastructural areas (Voss, 1995, 2005). Voss (2005) in fact suggests the need to widen the scope of these strategic choices as well as the importance of examining contingencies that lie behind choices. Sousa and Voss (2008) also call for increased attention for contingencies in future international Operations Management (OM) practices studies. These contemporary writings reflect the utility of the strategic contingency theory for future studies in the OM field. Rather than considering contingencies alone, however, Voss (1995) suggests the importance of integrating at least two paradigms together, for instance, competing through manufacturing and strategic choices or with best practices approaches.

The above discussion basically explicates the nature and arguments of IO and contingency theories. The insights of these theories can be integrated in empirical studies. The discussion about alternative paradigms of manufacturing strategy (Voss, 1995, 2005; da Silveira and Sousa, 2010) also highlight the need to integrate these theories (and hence the alternative approaches) in order to have a comprehensive understanding on the aspects of manufacturing strategy and their impact on performance. Both theories provide important background for examining drivers of competitive priorities and strategic orientation, and subsequently the impact of these variables on strategic choices, learning and improvement capabilities, as well as leadership practices.

2.2. Resource-Based and Routine-Based Views

The resource-based view (RBV) emphasizes the critical role of resources for gaining competitive advantage. RBV tries to give a theoretical explanation for the question ‘why firms are different and how they achieve and maintain a competitive advantage as a result of those differences’ (Ross, 2003: 8). Barney (1991) is among the leading proponents of the resource-based approach and argues that a firm's resources and competencies can be the sources of competitive advantage if they are 'valuable, rare, inimitable, and non-substitutable'. Others also explain how resources become the source of competitive advantage (Rumelt, 1984, Grant, 1991; Kroes and Ghosh, 2010). According to Penrose (1959) cited in Ross (2003: 8), resources are broadly defined as 'the physical things a firm buys, leases, or produces for its own use, and the people hired on terms that make them effectively part of the firm' (Ross, 2003: 8). She further underscores the importance of 'interactions between the material and human resources' (Ross, 2003: 8) for enhancing performance. Very recently, Kroes and Ghosh (2010) continued to emphasize the importance of 'unique firm resources such as capital assets, capabilities, and processes', which can enable firms to successfully implement strategies and hence 'lead to efficiency and effectiveness improvements'.

Different organizational strategies have been analyzed using the resource-based approach, and one of these strategies is manufacturing strategy. It is viewed or analyzed using RBV (Schroeder, *et al.*, 2002), and in this regard, scholars identify different practices or capabilities possessed by the firms operations that can enhance performance. Manufacturing decisions or investments are among the aspects of operations that are analyzed using this approach (Colotla, Shi & Gregory, 2003). For instance, Colotla, *et al.* (2003) adopted this approach in their international manufacturing strategy study and specifically employed Makadok's (2001) "resource picking" and "resource deployment" rent creation concepts in explaining the strategic role of structural and infrastructural manufacturing resources.

While the "resource picking" mechanism (Makadok, 2001) suggests the Ricardian view of rent creation (Ricardo, 1817 as cited in Colotla, *et al.*, 2003: 1186), whereby firms create economic rents by selecting superior resources (Colotla, *et al.*, 2003: 1186), the "resource deployment" mechanism (Makadok, 2001) suggests the Schumpeterian view of rent creation, whereby firms create economic rents by more effectively deploying resources than rivals (Colotla, *et al.*, 2003: 1187). The structural elements/decisions (i.e. physical configuration of the operations resources), in this regard, are related to Makadok's (2001) "resource picking" mechanisms (Colotla, *et al.*, 2003), whereas decisions that influence the 'operations infrastructure' (activities that take place within the structure) relate to Makadok's (2001) "resource deployment" (or capability building) mechanisms (Colotla, *et al.*, 2003). These resources (or decisions) may lead to competitive manufacturing performance and hence competitive advantage (Colotla, *et al.*, 2003). As Ross (2003: 8) argues, therefore, "the resource-based view is [] distinctly different from the traditional microeconomic view of the firm as a homogenous black box. It recognizes resource differences and uses them to explain performance differentiation amongst firms within markets."

The other theoretical perspective that is more or less similar with or related to the resource-based approach is "the routine-based view" (Ketokivi and Schroeder, 2004a). It emphasizes the importance of routines for competitiveness. The 'routine-based view fundamentally builds on an earlier economic theory, i.e. the evolutionary theory of the firm' (Nelson and Winter, 1982 as cited in Ketokivi and Schroeder, 2004a: 174). Organizations develop various routines in an evolutionary path. That is, routines evolve overtime and through the evolutionary process, firms select and retain critical and/or beneficial routines and eliminate the bad ones (Ketokivi and Schroeder, 2004a). So something built in this way in an organization cannot be easily taken over or copied by others. With this view, Ketokivi and Schroeder state that routines are "shaped over time and are subject to path dependency and inertia" (2004a: 174). Because they are 'embedded in the organisational context', it is not possible for others to copy organizational routines, which include systems, culture, practices, processes, and/or relationships that are built over time and taking a certain path (Ketokivi and Schroeder, 2004a). The "routine-based view", therefore, underlines on the view that it is these routines that are more important than physical resources alone for competitiveness.

The study of routines in fact helps to identify or measure higher level (basically elusive) routines, which are described or defined as capabilities (Junttila, 2000). It may also help to answer the frequently asked question in the manufacturing strategy literature: what contributes to competitive (manufacturing) performance? In view of the preceding insights and discussions, therefore, the current study adopts the resource-based and routine-based perspectives as well in assessing (or examining) the effects of manufacturing decisions as well as routines related to learning and improvement capabilities on firm's manufacturing performance.

2.3. Integrating "Outside-In" and "Inside-Out" Strategy Perspectives

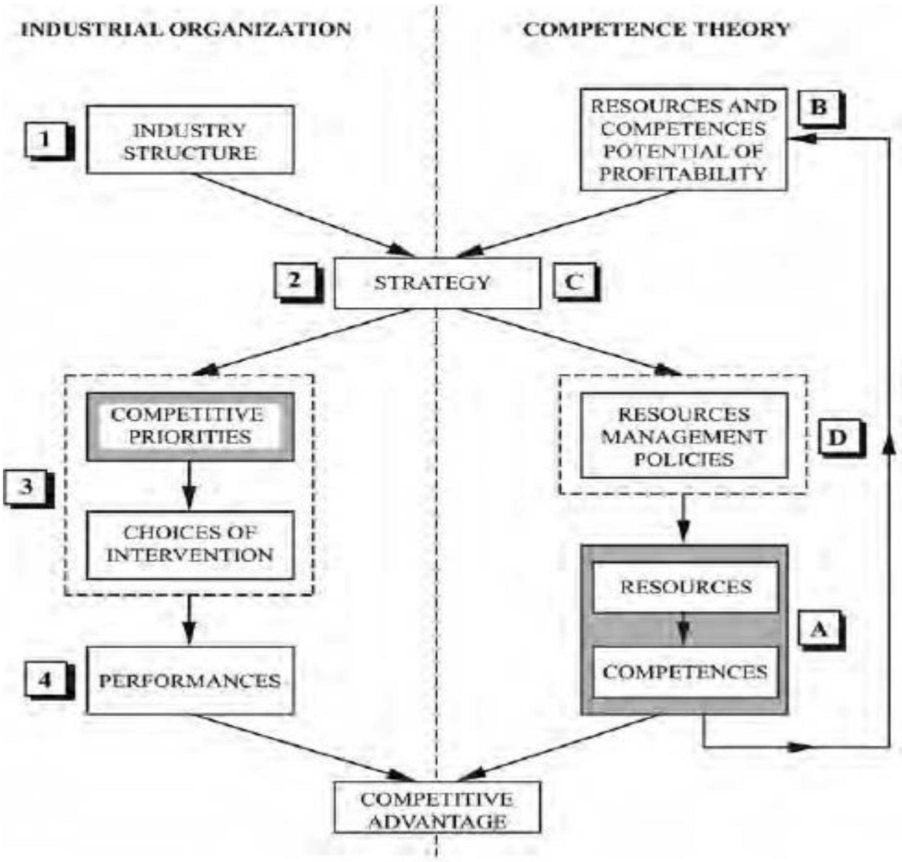
The theoretical insights discussed in the preceding two sections are actually heavily influenced by the writings or contributions of scholars mainly from two opposing schools of strategy (thought). And, as De Toni and Tonchia (2003) state, the arguments of scholars from these two schools of thought can be simply viewed as “outside-in” and “inside-out” perspectives. The “outside-in” approach (mainly rooted in the “positioning school” of thought) ‘analyzes the source of competitive advantage starting from outside the firm, that is, from the industry’ (De Toni and Tonchia, 2003: 957-958), and this can be traced to Porter’s (1980, 1985) competitive models (in the positioning school). Following this root, the importance of alignment between corporate, business and functional strategies for achieving greater performance has been increasingly recognized in the literature (Wheelwright, 1984). According to this approach, firms are advised to develop their overall (corporate and/or business) strategy first and then develop their manufacturing strategy ‘within the broader context of organizational level strategy’ (Butt, 2009: 3). ‘The choice of specific strategy dimensions is also influenced by the demands of customers as well as the situation of competitors in the market’ (Butt, 2009). As Butt states, ‘the role of manufacturing strategy is then to align a company's capabilities and resources with its competitive strategy’ (2009: 4).

Contemporary writings, on the other hand, advocate the superiority of the “inside-out” view of strategy and sources of competitive advantage (De Toni and Tonchia, 2003). According to this approach, the source of competitive advantage starts from inside the firm may be from its internal resources and competencies (De Toni and Tonchia, 2003). This argument is rooted in the resource-, routine-, and/or capabilities-based perspectives that emerged after the IO theory. As De Toni and Tonchia (2003: 958) argue, however, there is a need to construct a theory which considers the firm (“the inside-out” view) and the industry (“the outside-in” view) jointly and in a balanced manner. Other researchers (Thun, 2008; Butt, 2009) also argue in favor of integrating the “outside-in” and “inside-out” perspectives for better understanding the sources of “competitive advantage”. Figure 2.1 then depicts a framework proposed by De Toni and Tonchia (2003) integrating IO theory with competence theory (CT)[5].

As the framework suggests, the analysis of strategy or competitive advantage should begin from two distinct theoretical perspectives (in this case the IO and CT approaches) and then attempt should be made to reconcile the two towards goals and practices that together lead to the same end, which is competitive advantage (De Toni and Tonchia, 2003). With this view,

[5] “Competence theory” (CT) is an aggregate term used in the work of De Toni and Tonchia (2003) to describe the resource-based view (RBV), competence-based competition (CBC), and dynamic capabilities view (DCV) together as these approaches, though with some fine distinctions, emphasize internal resources and capabilities.

De Toni and Tonchia (2003) tries to "relate the various elements that distinguish the two (i.e. IO and CT) theories" as well as show the need to consider both to make a complete analysis. As they further indicate, the scheme of the strategic analysis according to IO (left side in Figure 2.1) resumes Porter's (1980, 1985) well-known sequence known as "structure-conduct-performance" (De Toni and Tonchia, 2003: 966).



Source: *De Toni and Tonchia (2003)*

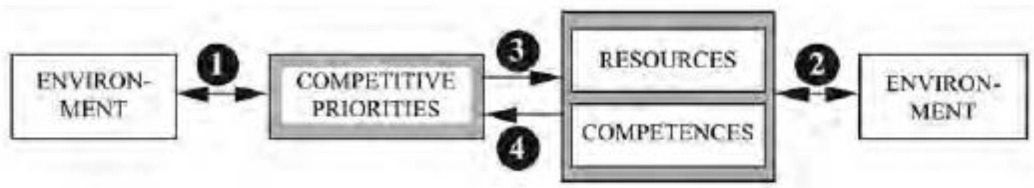
Figure 2.1: Strategy and Competitive Advantage: Integration of IO and CT Approaches

The situation in the environment (i.e. 'industry structure') guides the development of competitive strategy, which in turn shapes the activities, practices, and decisions of firms (De Toni and Tonchia, 2003). Identification of competitive priorities (key success factors) and implementation of intervention choices consistent with these priorities is critical here. The competitive priorities and the intervention/strategic choices (indicated by number 3 in the figure), in this regard, constitute manufacturing strategy content (Voss, 1995; Acur, *et al.*, 2003). There is a sequence in analyzing these two content elements, however (De Toni and Tonchia, 2003). That is, first the competitive priorities need to be identified which then lead to the identification and analysis of the "intervention choices" (De Toni and Tonchia, 2003). As De

Toni and Tonchia state, eventually "the conduct determines the firm's performances and thus the competitive advantage" (2003: 967).

The strategic process according to "CT approach", on the other hand, begins from analysis of resources/competencies rather than the environment or the market. Following this, "profitability potential" of resources and competencies evaluated based on which a strategy is developed. Finally, relevant policies will be issued to manage the resources and implement the strategy (De Toni and Tonchia, 2003). Hence, resources and competences lead to competitive advantage as well as determine firm's "strategic direction" (De Toni and Tonchia, 2003: 967).

Two approaches to strategy are, therefore, identified in De Toni and Tonchia's (2003) model, that is, in terms of "competitive priority/intervention choices" as well as 'management policies regarding resources/competencies'. These two dimensions can be 'integrated' as they argue, and hence suggest that "both the competitive priorities and the resources/competencies [need to be analyzed] in two ways: "in respect to the environment and between each other" (De Toni and Tonchia, 2003: 968). They also propose the framework depicted in Figure 2.2 below, which highlights the aspects that need to be considered in the decision making processes of management vis-à-vis competitive priorities and resources/competencies. In short, it is the interactions between the internal aspects and the environment that determines performance.



Source: *De Toni and Tonchia (2003)*

Figure 2.2: Environment, Competitive Priorities, and Resources/Competencies

In view of the above framework, De Toni and Tonchia put forward the following idea:

> "… every manager must analyze the suitability of the competitive priorities selected by his firm (and of the consequent choices/intervention levers) for the environment in which the firm operates; analyze the value of the resources/competencies possessed by the firm, not only in regard to itself but also to the environment (competitors and industries); verify if these competitive priorities are adequately supported by the resources/competencies possessed, and if necessary improve or manage them in a different way, or even modify the competitive priority; and verify the true values of these resources/competencies, which do not depend only on the comparison with the competitors, but also on their suitability for the competitive priorities selected" (De Toni and Tonchia, 2003: 968).

The “competitive priorities and resources and competencies” depicted in Figure 2.2 above are, therefore, important constituents of firm’s manufacturing strategy that are in turn linked to performance and competitive advantage (De Toni and Tonchia, 2003). Apparently, integrating the “outside-in” and “inside-out” oriented theoretical perspectives might help to better understand the sources or determinants of competitive manufacturing performance and/or competitive advantage. In the following two sections, additional theoretical perspectives relevant for this study vis-à-vis leadership and the institutional environment are further discussed.

2.4. Behavioral and Situational Leadership Theories

Leadership is an important element in organizations especially in business organizations, whose competitiveness and success in part depends on the strategic role of leaders at various levels in the firm. Due to the changes and developments in the business environment, different leadership theories have actually emerged and conceptual models developed in the recent decades (Herkness, 2005). In this regard, Herkness (2005) classifies the various leadership theories, models and/or researches in the area into the following four categories: ‘trait, behavioral, contingency or situational, and transformational leadership’. ‘Trait theory’ is the oldest among these theories and suggests emphasizing on personal traits of leaders for explaining their effectiveness (Herkness, 2005). Subsequent theorists realized the need for a broader approach for leadership effectiveness and began studying leaders’ behaviors (behavioral approach), role of environment/context on the pursuit of leadership (situational/contingency approach), and visionary and inspirational capacity of leaders (transformational leadership) (Herkness, 2005).

The preceding leadership theories have been used by researchers in different fields of studies for explaining the role and effectiveness of leaders (Simon, 2007). As Bryman (1992) cited in Simon (2007: 12) states, with the shift from trait leadership theories and extend the development of leadership research to behavioral theories, ‘researchers aim to identify effective leader behaviors’ (Simon, 2007: 12). The behavioral model of leadership, thus, seeks to understand ‘the relationship between leader behaviors and employee reactions’ (Herkness, 2005: 31) and/or ‘concerned with studying how a leader behaves in work situation’ (Yukl and Van Fleet, 1992 as cited in Simon, 2007: 12). Early researchers who adopted behavioral approach to leadership (Fleishman, 1953; Halpin and Winer, 1957, both cited in Simon, 2007: 12) classified leaders into 'task-oriented behaviors (initiating structure) and relationship-oriented behaviors (consideration)' (Simon, 2007: 12). 'Initiating structure' explains a leader who initiates group activity and organization, and outlines the manner in which tasks are to be completed. Consideration describes the concern the leader demonstrates towards members of the group (Bass, 1990 as cited in Simon, 2007: 13).

In identifying the complexity of leadership and how effective leadership varies according to the context, some researchers viewed leadership from a situational approach (Simon, 2007: 13). Since 'the choice of leadership type is contingent on employee population and type of work' (Aylor, 2009), the situational approach considers or examines different factors that are likely to influence leadership practices such as "the authority of a leader, the nature of the job/task, the attributes of the followers, and the nature of the external environment" (Yukl and Van Fleet, 1992 as cited in Simon, 2007: 13).

In the context of manufacturing, the operations function is among those areas wherein the role and effectiveness of top- and middle-level leaders (managers) have been studied, although the coverage given to it and available empirical evidence regarding this issue appears to be limited. Skinner (1969) in fact emphasized the importance of "manufacturing leadership practices to successfully pursue operations strategies or goals" and since his earlier writing in the area, there has been a call for integrating relevant leadership theories in operations management studies, and accordingly a few OM researchers tried to use behavioral or situational leadership theories in their studies (Kathuria and Partovi, 1999; Ahmad and Schroeder, 2003; Kathuria, *et al.*, 2010; Bendoly, Donohue & Schulz, 2006). Kathuria and Partovi (1999) and Kathuria, *et al.* (2010) even considered leadership practices of manufacturing managers as an integral element of manufacturing strategy, and hence suggest managers should use proper leadership practices to influence followers and eventually enhance group performance.

Kathuria and Partovi (1999) used the term workforce management practices in referring to the managerial practices identified by Yukl (1989), while Kathuria, *et al.* (2010) described these practices as leadership practices. There is no conceptual difference between the two - both studies refer to the practices of middle-level (manufacturing) managers or leaders as evaluated from the perspective of their followers. However, there is a difference in the theoretical perspective adopted in the two studies – the former used the situational approach and the latter used the behavioral approach. Since different factors (contingencies) seem to influence the behavior a leader exhibits in the organization, integrating the situational and behavioral approaches might provide further insights regarding the role and effectiveness of leadership. This thesis, therefore, synthesizes the literature on manufacturing strategy and leadership (the latter in light of behavioral and situational approaches) in examining the influence of competitive priorities and strategic orientation on manufacturing managers' leadership practices and in turn the impact of these practices on plant performance.

2.5. Institutional Theory and Its Implications

Because institutions provide the 'rules of the game' (Meyer, Estrin, Bhaumik & Peng, 2009) that structure human and organizational interactions in societies (Cai, *et al.*, 2010; Oliver, 1997), the role of the institutional environment (or institutional forces) also seems to be increasingly recognized in recent years in researches conducted especially in the context of emerging and developing economies (Mesquita, *et al.*, 2007; Malik and Kotabe, 2009; Cai, *et al.*, 2010; Meyer, *et al.*, 2009). The increased recognition of institutions or institutional forces in the contemporary studies, in this regard, emanates from institutional theory. It considers 'economic, social, cultural, and political forces' as important environmental contingencies that influence firms' decisions and practices (Cai, *et al.*, 2010: 257). According to this theory, culture is also a key factor that needs to be considered (Cai, *et al.*, 2010). Consistent with this view, Sousa and Voss (2008) particularly suggest the importance of considering 'culture' in empirical studies conducted in 'multi-cultural settings'.

The institutional environment is, therefore, a relevant factor that needs to be considered along with resources and capabilities in conducting business researches. In particular, the institutional environment of developing economies needs special attention because governments, among other institutional forces, are key actors and exert direct influence on firms' decisions and explicitly provide various kinds of technical, financial, and institutional supports (Cai, *et al.*, 2010). With this view, the current study adopts the institutional theory, along with the other theories discussed earlier, in examining the extent to which government support influences manufacturing performance or the development of plant learning and improvement capabilities.

2.6. Summary

In this chapter, the notions and arguments of industrial organization theory, contingency theory, resource-based and routine-based theories, behavioral and situational leadership theories, and institutional theory are widely explored and their implications to manufacturing strategy and performance studies are specifically discussed. Early manufacturing strategy studies and practices seem to be heavily influenced by the views of industrial organization and contingency theorists. Both approaches underscore the importance of external (environmental) factors for competitiveness such as industry attractiveness, market and customers' requirements, etc. and aligning internal capabilities or practices with the needs of the external environment. The two earlier manufacturing strategy paradigms (i.e. competing through manufacturing/capabilities and strategic choices paradigms) were rooted in these theories, and hence they were more "outside-in" oriented.

Subsequent theoretical developments, particularly the resource-based view and its extension - the routine-based approach, rather brought a paradigm shift in conceptualizing 'as to what contributes to competitive advantage'. As per these internal-oriented perspectives, manufacturing strategy is conceptualized in terms of operations resources and capabilities that underlie competitive manufacturing performance. It seems, however, that there is consensus between market-based (externally-oriented) and resources- and routine-based (internally-oriented) theoretical perspectives regarding the fact that manufacturing strategy should contribute to the development of manufacturing capabilities, and hence realization of competitive manufacturing performance. The insights and arguments of industrial organization, contingency, resource-based, and routine-based theories, in this regard, lay important theoretical foundation for further exploring the determinants of manufacturing capabilities or competitive manufacturing performance.

From another vantage point, behavioral and situational leadership theories provide relevant theoretical insights regarding leadership practices of manufacturing managers and their contribution to competitive manufacturing performance. The behavioral approach of leadership seeks to understand the relationship between leader behaviors and employee reactions, and the situational approach considers various contingencies that affect leader's behavior. Researchers could integrate these two leadership theories in their particular studies. Institutional theory, on the other hand, provides relevant explanations about the role and influence of the institutional environment (consisting of economic, social, and political forces) on the decisions, practices, and/or capabilities of business firms in a particular context. Institutional forces, especially the role of federal or regional governments, are more relevant in emerging as well as developing economies, and hence increasingly recognized in contemporary studies in the area.

To conclude, the detailed discussions made in this chapter regarding the different theories are believed to provide important theoretical background for the current study and substantiate its argument(s). A comprehensive understanding of the drivers of manufacturing performance seems to require integrating these theoretical perspectives, which may also help to develop a more robust conceptual framework for the study. In the next chapter, a detailed review and synthesis of the literature is made and existing empirical gap(s) identified.

CHAPTER 3

LITERATURE REVIEW

Diverse literatures have been written about corporate, business, and functional strategies and their impact on business, market, and/or manufacturing performance. The strategic role of manufacturing operations, practices, and capabilities, in particular, has been widely discussed in the literature, which provided important insights to researchers and practitioners in the area. The importance of alignment between firm's manufacturing strategy and environmental factors (i.e. external alignment) as well as within the basic elements of manufacturing strategy (i.e. internal alignment) also has been widely explored. In this chapter, therefore, a critical review of the literature is made regarding these and related issues. The review hence begins by explaining the aspects and implications of manufacturing performance, competitive advantage, and the strategic role of manufacturing operations, followed by defining the meaning and dimensions of manufacturing strategy. The role and implications of leadership practices of manufacturing managers as well as institutional forces (particularly government support) for enhancing plant performance is also examined in this chapter. Eventually, the gap(s) in the extant literature is highlighted which the current thesis tries to address or fill up.

3.1. Manufacturing, Market, and Business Performance

Performance is a wide concept and can be assessed at different levels and using different measures. In the context of manufacturing, for instance, researchers study the influence of strategies, priorities, activities, decisions, actions, etc. on firm's manufacturing performance, market performance, and/or business performance. These three performance dimensions are interrelated, while each dimension has its own unique measures. Manufacturing performance is a smaller sub-segment of performance, which focuses only on the manufacturing plant (Junttila, 2000). For the sake of clarity and its significance in this study, the nature of each type (or level) of performance, particularly the concept of manufacturing performance, is explained in this section.

To begin with, Junttila (2000: 30) provides the following definitions regarding each of these performance dimensions:

MANUFACTURING (a.k.a. OPERATIONAL) PERFORMANCE =

The immediate outcome of factory operations often used for factory performance appraisal: manufacturing cost, productivity, efficiency, conformance quality, cycle time and manufacturing flexibility. Manufacturing performance is not directly relevant from the customers' point of view.

MARKET PERFORMANCE =

The outcomes directly relevant to the customer (customer not being restricted to the end user): price, delivery (place, speed and dependability), performance quality of the product, and market flexibility. Market performance is directly affected by manufacturing performance; however, there are other important antecedents as well, such as marketing strategy.

BUSINESS PERFORMANCE =

The competitive and financial outcomes for the business, not directly relevant to the customer: return on investment, growth, and market share. Business performance is indirectly affected by manufacturing performance and directly by market performance.

Source: *Junttila (2000: 30)*

The above definitions indicate that the three measures of performance are interrelated, though their scope varies. The scope of manufacturing performance is the narrowest as it focuses only on the measures of plant (operational) performance, while business performance is an overall measure that is directly affected by market performance and indirectly by manufacturing performance (Junttila, 2000). Manufacturing performance measures performance only from plant perspective; market performance is a measure of performance from customers' perspective, and business performance is a measure of performance from the perspective of the firm (business) as a whole (Junttila, 2000). The terms manufacturing performance and operational performance are used interchangeably in the literature (and hence in this thesis) as both referring to the same thing, i.e. factory/plant performance.

Given that different factors external to the plant may distort the degree to which resources in manufacturing processes affect the economic outcome of the firm (or financial performance measures such as sales and profits) (Hallgren, *et al.,* 2011), many OM researchers opt to assess competitive advantage through manufacturing performance (Junttila, 2000; Schroeder, *et al.*, 2002; Ketokivi and Schroder, 2004a; Peng, *et al.*, 2011), the primary determinants of which seem to be rooted in plant level factors or variables such as strategic goals, intervention choices, and operations practices or capabilities. Manufacturing performance in turn directly affects firm's market performance, though other factors also affect the latter (Junttila, 2000). Marketing performance, in this regard, is determined by market share performance and growth performance (Leachman, Pegels & Shi, 2005). Business performance rather seems to be an overall measure that is affected by manufacturing, market, and financial performance combined together (Junttila, 2000; Leachman, *et al.,* 2005), and is often measured in terms of return on asset (ROA) (Leachman, *et al.*, 2005).

3.2. The Measures of Manufacturing Performance

Manufacturing performance, also called manufacturing capabilities or operational performance in the literature, measures the extent to which firms actually performed as intended vis-à-vis the dimensions of competitive priorities, which are key elements of manufacturing strategy (Hayes and Wheelwright, 1984; Wheelwright, 1984; Ferdows and De Meyer, 1990; Miller and Roth, 1994; Noble, 1995; Ward, *et al*., 1996; Ward and Duray, 2000; Acur, *et al.*, 2003; Hallgren and Olhager, 2009; Peng, *et al.*, 2011). As a measure of performance, it emphasizes on or is concerned with the immediate outcome of factory operations (Junttila, 2000; Schroeder, *et al.*, 2002), and hence is often used only for the purpose of factory performance appraisal rather than overall, market or business, performance (Junttila, 2000). It has narrow scope as compared to the other measures of performance because it measures performance only from plant perspective (Junttila, 2000; Schroeder, *et al.*, 2002; Ketokivi and Schroder, 2004a).

This concept is frequently measured in terms of multiple dimensions in the literature often ranging from three to nine or ten measures. For instance, Narasimhan, Swink & Kim (2006) measure operational performance in terms of ten dimensions (variables), while Matsui (2007) used seven dimensions in measuring this concept in their study. According to Leachman, *et al.* (2005), the measures of manufacturing performance include aspects like "waste reduction, operating efficiency, timely delivery, superior quality, motivated employees, customer satisfaction, etc." The use of six measures of manufacturing performance is also common in the literature. For example, Ketokivi and Schroeder (2004a) used six performance measures: low cost, conformance quality, fast delivery, cycle time, volume flexibility, and design flexibility in their study. Va´zquez-Bustelo, Avella & Ferna´ndez (2007) use the term "manufacturing strength" instead of operational performance, which they operationalize also in terms of six dimensions: cost, quality, delivery, flexibility, service, and environment dimensions. They in turn measure each of these dimensions using at least four items (Va´zquez-Bustelo, *et al.*, 2007).

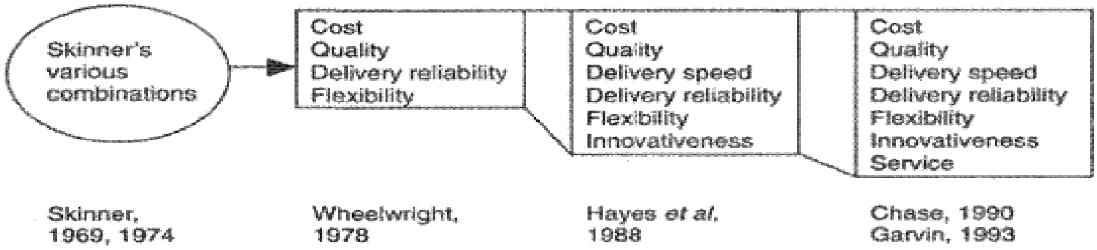
According to Dal Pont, *et al.* (2008), the measures of operational performance include the following five aspects/dimensions: manufacturing cost performance, quality, delivery performance, flexibility to change product mix, and flexibility to change volume. Others (for example, Leong, *et al.*, 1990; Nair and Boulton, 2008; Peng, *et al.*, 2011) also measure operational performance in terms of five dimensions: cost, quality, delivery, flexibility, and innovativeness (or innovation). Hayes, Wheelwright & Clark (1988), on the contrary, underscore quality, cost, and innovation as key criteria for competitiveness. In the majority of the literature, however, it is measured in terms of cost, quality, delivery, and flexibility dimensions (Hayes and Wheelwright, 1984; Ferdows and De Meyer, 1990; Noble, 1995). Hallgren, *et al.* (2011) use the term "competitive capabilities" instead of operational performance, which they operationalize also in terms of four dimensions: conformance to product specifications, on-time delivery, unit cost, and flexibility to change volume.

The above review indicates that the specific measures of manufacturing performance vary from literature to literature, and in spite of these variations, it is noted that there is consensus in the literature with regard to the use of multiple measures of this concept. In addition to this, each dimension is also frequently measured in terms of multiple indicators/items in many literatures (Devaraj, *et al.* 2004; Va´zquez-Bustelo, *et al.*, 2007; Peng, *et al.*, 2011). It is, therefore, logical to use multiple measures of this concept in future studies in view of the extant literature; the question remains, however, is (i) how many or which measures to use, and (ii) what factors contribute to improvements in these measures/capabilities that become a basis for competitive advantage. The first question can be easily answered by adopting the four frequently used measures of manufacturing performance, i.e. manufacturing cost, conformance quality, delivery, and flexibility dimensions. In order to answer the second question, however, an extensive review of the literature, or perhaps a new research, is needed.

3.3. Competitive Priorities vs. Manufacturing Performance

Competitive priorities …, also called competitive strategy in the literature (Butt, 2009: 83), are key elements of firm's manufacturing strategy (Wheelwright, 1984; Swink and Way, 1995; Acur, et al., 2003; Voss, 1995). They refer to the capabilities with which the firm intends to compete in the market (Hayes and Wheelwright, 1984; Boyer and Lewis, 2002; Peng, *et al.*, 2011) and consist of the group of objectives pursued by the manufacturing function (Martı´n-Pen˜a and Dı´az-Garrido, 2008). Different terms are used interchangeably in the literature in referring to this same concept such as 'manufacturing priority', 'strategic goals', 'manufacturing strategy dimensions', 'competitive capabilities', and so on (Swamidass and Newell, 1987; Frohlich and Dixon, 2001; Ketokivi and Schroeder, 2004a; Butt, 2009; Hallgren, *et al.*, 2011).

The competitive priorities must be designed in accordance with firms' competitive strategy (Martı´n-Pen˜a and Dı´az-Garrido, 2008), which in turn guide strategic actions and/or resource allocation decisions of the manufacturing plant (Flynn and Flynn, 2004; Nair and Boulton, 2008). They indicate the strategic emphasis the firm gives for developing competitive capabilities such as cost, quality, delivery and flexibility (Boyer and Lewis, 2002), and Peng, *et al.* (2011) add innovation as key priority. Spring and Dalrymple (2000) cited in Butt (2009: 86) also 'argue that [the] competitive criteria (manufacturing strategy dimensions) have evolved over time and that innovation is the most recent addition'. These scholars also provide the graph depicted in Figure 3.1, as adopted from Butt (2009: 86), showing the change in the dimensions of this concept.



Source: *Adopted from Butt (2009)*

Figure 3.1: Evolution of the Dimensions of Competitive Priorities

Although the dimensions of competitive priorities are increasing from time to time, as depicted in the figure, this concept is also frequently measured in terms of four variables in many literatures, i.e. cost, quality, delivery, and flexibility dimensions (Miller and Roth, 1994; Flynn and Flynn, 2004; Naor, Linderman & Schroeder, 2010; Fynes, Voss & de Bu´rca, 2005). The low cost competitive priority requires efficiency in all operations so as to produce and deliver products cheaply to customers and quality priority refers to both conformance and performance dimensions (Nair and Boulton, 2008; Zhao, *et al.*, 2006;

Hallgren and Olhager, 2009). Delivery priority on the other hand refers to delivery dependability and fast delivery (or speed) (Nair, 2005 as cited in Nair and Boulton, 2008: 754) and flexibility priority refers to flexibility in inputs, flexibility in processes, and flexibility in outputs (Sawhney, 2006 as cited in Nair and Boulton, 2008: 754).

As Nair and Boulton (2008: 752) then state, "operations strategy has been evaluated in terms of its relative performance on the [aforementioned] competitive priorities" dimensions. In a similar way, Peng, *et al.* indicate that the "competitive priorities are the intended levels [] (a priori goals) and operational performance is the actual level of achievement of these same [goals] (a posteriori)" (2011: 485). Competitive priorities and manufacturing performance, hence, could be taken as two sides of a coin as they are measured using more or less similar dimensions in the literature (Ferdows and De Meyer, 1990; Boyer and Lewis, 2002; Ward and Dury, 2000; Flynn and Flynn, 2004; Naor, *et al.*, 2010; Fynes, *et al.*, 2005). Their difference, however, relates to the fact that manufacturing performance measures/indicates the extent to which firms actually performed as intended vis-à-vis the specific competitive priorities dimensions or goals.

In order to realize the competitive priorities (or achieve competitive manufacturing performance), hence, firms need to take practical steps or actions such as implementing supportive programs, choices or decisions. Accordingly, Nair and Boulton (2008) indicate that the 'competitive priorities require supportive strategies and capabilities, which evolve into a firm's actual competitive strength, relative to its primary competitors in its targeted markets' (2008: 752). Firms' 'emphasis on the competitive priorities is [actually] expected to guide decisions regarding management practices, technology, production process and capacity' (Peng, *et al.*, 2011: 485). These key decisions (a.k.a. strategic choices) are also important elements of manufacturing strategy (Martı´n-Pen˜a and Dı´az-Garrido, 2008; Ward, *et al.*, 2007).

3.4. Competitive Advantage and the Role of Manufacturing Operations

3.4.1. The Meaning and Sources of Competitive Advantage

As Mukerji (2008) states, it is Porter (1985) who coined the concept of "competitive advantage", which is to mean "something unique or special a firm does or possesses that gives it an edge over competitors" (Belch and Belch, 1993 as quoted in Butt, 2009: 30). In this regard, "a firm's competitive advantage enables it to distinguish itself and its offering from the rest of the offerings" (Butt, 2009: 30), and hence "an organization must offer a product or service that is different from that of the competitors" in order to compete successfully in the marketplace and thus obtain competitive advantage (Butt, 2009). Selznick (1957) as cited in Mukerji (2008: 33) earlier had coined the term "distinctive competence" to describe the activities, resources, and skills of an organization that has some special strength (Mukerji, 2008: 33). "Based on a company's strengths and "distinctive competencies", it should be difficult for competitors to copy" (Butt, 2009: 30-31). As Mukerji further states, Hamel and Prahalad (1990) took Selznick's idea of distinctive competence and suggested the concept of core competencies, which are capabilities created by efficient utilization of resources (2008: 33). The three concepts (i.e. competitive advantage, distinctive competence, and core competence), however, seem to be closely related and attempt to answer the most recurring question in strategic management, i.e. how firms achieve and sustain competitive advantage (Teece, 2007; Ambrosini and Bowman, 2009).

As Mukerji (2008: 32) indicates, the idea of sustainable competitive advantage have existed since the work of Alderson (1965), who pointed out the attributes and/or basic characteristics of sustainable advantage as well as strongly advocated the necessity for firms to build unique characteristics to differentiate themselves from their competitors. Day (1984) cited in Mukerji (2008: 32) later discussed the various strategies that companies should follow to sustain a competitive advantage, and Brooksbank (1994) cited in Butt (2009: 30) suggested the idea that competitive advantage must be sustainable, offering something of value to the customer. In spite of these earlier views of the concept of sustainable competitive advantage, Mukerji (2008) indicates that this concept "had not been defined" until Barney's (1991) first formal attempt to do so. According to him,

> "[a] firm is said to have a sustainable competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors and when these other firms are unable to duplicate the benefits of this strategy" (Mukerji, 2008: 32).

The preceding Barney's (1991) definition actually reveals the fact that sustainable competitive advantage is linked with firm's strategy as well as with the resources and capabilities that augment firm's strategy. Resources in particular could become the source of sustainable competitive advantage if they are utilized differently and more efficiently than competitors (Mukerji, 2008). In this regard, firms need to continually renew the configurations of their resources and capabilities in support of their corporate, business, and functional strategies to sustain their advantage for a longer period (Teece, *et al.*, 1997; Teece, 2007).

Apart from what has been said above, it is also very important to understand the fact that competitive advantage of companies ultimately lies in “providing products or services appealing to (current or emergent) majority of customers in the target market” (Hall, 1993). This is actually a useful insight and powerful way of thinking about competitive advantage. It lies in “fulfilling or consistently meeting the key buying criteria of majority of customers in the target market, which includes product attributes such as price, specification, reliability, aesthetics, functionality, availability, image, etc” (Hall, 1993: 610). If competitive advantage lies in the eyes of customers and results from meeting customers’ key buying criteria in the market (Hall, 1993), then the capabilities required for producing and delivering those goods and services that provide competitive advantage, especially in the context of manufacturing, primarily rests in the firm’s operations (or respective function).

3.4.2. The Strategic Role of Manufacturing Operations

As most firms in the contemporary period are operating in a highly competitive and dynamic environment, they need to have capabilities and resources that competitors cannot imitate and/or develop in order to survive and/or continue to be competitive in the market. Manufacturing firms, in particular, need to possess or develop unique resources and capabilities in order to cope with the competitive challenges in the market and in turn create pressure on their competitors. The manufacturing capabilities, which are rooted or embedded in the firm’s operations function, in this regard, have the potential to provide competitive advantage, more specifically manufacturing-based competitive advantage to the firm (Hayes and Wheelwright, 1984; Schroeder, 1985; Davis, Aquilano & Chase, 1999; Junttila, 2000). These capabilities serve as an important tool for improving profits, increasing market share, and developing new markets (Schroeder, 1985), and hence are key drivers of competitive advantage. The underlying source of these capabilities, in turn, rests in the manufacturing plant, and specifically in the firm’s operations function.

The operations function is, therefore, an important business function in the context of manufacturing that presents top management the opportunities to develop competitive advantage (Skinner, 1985; Hayes and Wheelwright, 1984; Wheelwright, 1984; Schroeder, 1985; Davis, *et al.*, 1999). Contemporary OM scholars (Junttila, 2000; Schroeder, *et al.*, 2002; Ketokivi and Schroder, 2004a; Peng, *et al.*, 2008) also seem to have recognized this strategic role of manufacturing operations because they are following the footsteps of earlier scholars in the area (for example, that of Skinner, 1969, 1985; Hayes and Wheelwright, 1979a, 1979b; Hayes and Wheelwright, 1984; Wheelwright, 1981, 1984; Hill, 1989) and continued to advocate the importance of strategizing and economizing firms' operations in their recent writings and/or studies. All of these scholars emphasize the importance of strategic thinking regarding firm's operations as it serves as a weapon for gaining competitive advantage in the market. Being a source of strength, operations need a well developed functional level strategy that fit with the requirements of the context; and this strategy is referred to as operations strategy (Wheelwright, 1984).

3.5. What Is Manufacturing Strategy?

Manufacturing strategy is one of the most important functional strategies in manufacturing firms that contributes to the development of manufacturing capabilities (Wheelwright, 1984). It is Skinner (1969) who takes the credit for introducing the concept of operations strategy to the strategic management literature as well as explicating the historically hidden role of operations, which had been subordinated to other organizational functions like marketing and finance. According to Skinner, manufacturing strategy indicates firm's intent as to 'how to compete in the marketplace'. Following him, many scholars (for example, Hayes and Wheelwright, 1979a, 1979b, 1984; Wheelwright, 1984; Hill, 1989) started to write a lot about manufacturing strategy and unanimously emphasized the importance of using 'the strengths of a firm's manufacturing facilities and people as competitive weapon in the marketplace'.

Although there is no single commonly accepted definition of manufacturing strategy in the literature (Acur, *et al.*, 2003), it seems that there is wide consensus on the definitions provided by different scholars regarding this concept (for example, Hayes and Wheelwright, 1984; Hill, 1989; Slack and Lewis, 2002). Many of these scholars generally describe manufacturing strategy as a pattern of decisions in allocating resources, and the ultimate goal of these decisions is competitive advantage (Junttila, 2000). Manufacturing strategy is "a tool for effective use of manufacturing strengths as a competitive weapon for achievement of business and corporate goals" (Swamidass and Newell, 1987 as quoted in Butt, 2009: 13) and Thun (2008) argues, in this regard, that manufacturing strategy should be "regarded as a derivative of business strategy decomposing market requirements on the manufacturing level" (2008: 372). Amoako-Gyampah (2003) cited in Butt (2009: 13), on the other hand, defines this concept as the competencies that a firm develops around the operations function. 'These competencies, in turn, are meant to achieve competitive advantage' (Butt, 2009: 13). Accordingly, Butt describes manufacturing strategy as 'the competencies [] a firm develops around its operations to achieve competitive advantage' (2009: 51). Table 3.1 further depicts additional definitions of this concept as adopted from Butt (2009).

Table 3.1: Definitions of Manufacturing Strategy

Skinner, 1969	Exploiting certain properties of the manufacturing function as a competitive weapon
Hayes & Wheelwright, 1985	A sequence of decisions that over time, enables a business unit to achieve a desired manufacturing structure, infrastructure and set of specific capabilities
Fine & Hax, 1985	It is a critical part of the firm's corporate and business strategies, comprising a set of well coordinated objectives and action programs aimed at securing a long-term sustainable advantage over competitors
Swamidass & Newell, 1987	The effective use of manufacturing strengths as a competitive weapon for the achievement of business and corporate goals
McGrath & Bequillard, 1989	The overall plan as to how the company should manufacture products on a world wide basis to satisfy customer demand
Swink & Way, 1995	Decisions and plans affecting resources and policies directly related to sourcing, production, and delivery of tangible products
Berry *et al.*, 1995	The choice of firm's investment in processes and infrastructure that enables it to make and supply its products to chosen markets
Cox and Blackstone, 1998	A collective pattern of decisions that acts upon the formulation and deployment of manufacturing resources. To be most effective, the manufacturing strategy should act in support of the overall strategic directions of the business and provide for competitive advantage
Brown, 1999	A driving force for continual improvements in competitive requirements/priorities and enable the firm to satisfy a wide variety of requirements.
Ward & Duray, 2000	Manufacturing-oriented dimensions that win orders
Cagliano *et al.*, 2005	The configuration of strategic priorities the manufacturing system does or will pursue
Miltenburg, 2008	A plan for moving a company from where it is to where it wants to be

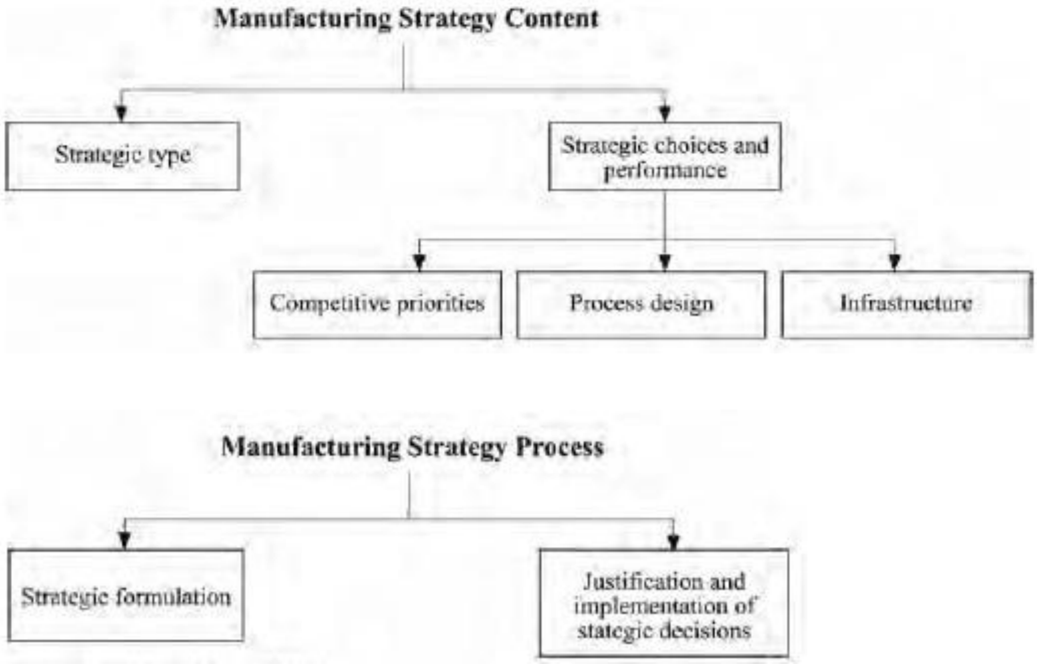
Source: *Adopted from Butt (2009)*

Manufacturing strategy links the manufacturing function with the overall corporate strategy (Wheelwright, 1984; Martı´n-Pen˜a and Dı´az-Garrido, 2008; Ward, *et al.*, 2007). While the corporate strategy is based on the corporate mission, and in essence reflects how the firm plans to use all of its resources and functions to gain competitive advantage, a firm's operations strategy specifies how the firm will employ its production capabilities to support its corporate strategy (Davis, *et al.*, 1999: 5). And in view of this, Schroeder (1985) suggests that if there is a formal business plan in the company, the operations strategy should be stated there along with the other functional strategies and the overall business strategy. It should clarify how operations will help the business achieve its objectives and contribute to the unique competitive posture of the business or to its distinctive competence (Schroeder, 1985).

According to Boyer and McDermott (1999) cited in Kroes and Ghosh (2010: 127), thus, an operations strategy "closely resembles a compass" that should guide an organization's activities, and companies that develop and implement this strategy often achieve better financial performance and/or competitive advantage (Butt, 2009). Leachman, *et al.* (2005) also underscored the role of this strategy for achieving superior manufacturing performance and hence competitiveness. Generally speaking, the literature underlines on the idea that manufacturing strategy needs to complement firms' competitive strategy and corporate objectives (Skinner, 1969; Wheelwright, 1984; Boyer and Lewis, 2002), through making consistent decisions and/or investments in key structural and infrastructural manufacturing resources (Hayes and Wheelwright 1984; Buffa, 1984; Hill, 1989), which eventually leads to the realization of manufacturing objectives and achievement competitive advantage in the market (Kim and Arnold, 1996).

3.6. Dimensions of Manufacturing Strategy

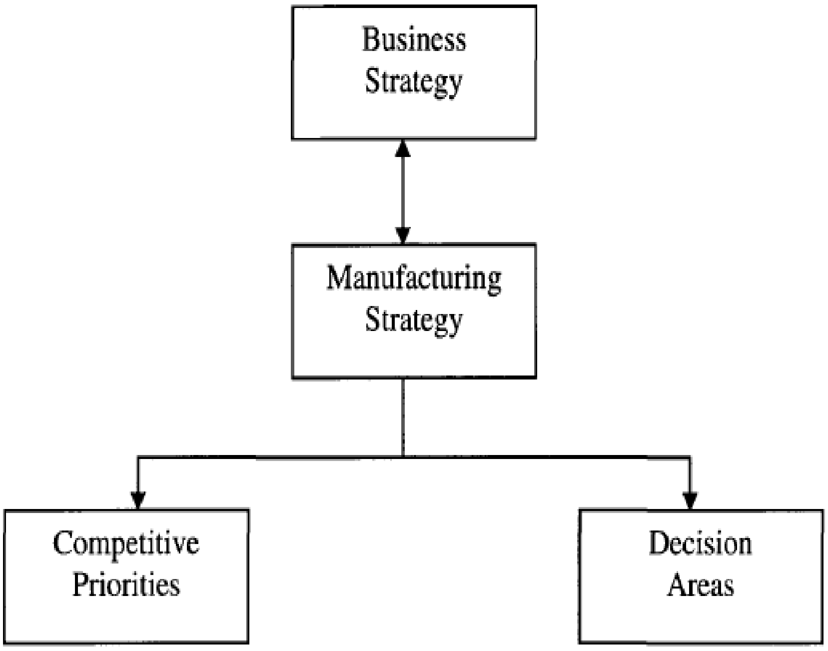
As Rytter, Boer & Koch (2007) state, it is customary to distinguish between content and process approaches within the manufacturing strategy literature. In fact, these two dimensions are the constituents of the concept of manufacturing strategy (Dangayach and Deshmukh, 2001; Leong, *et al.*, 1990; Swink and Way, 1995; Voss, 1995; Acur, *et al.*, 2003), though a common way of viewing this concept has been to separate the process of manufacturing strategy development and its content (Voss, 1995; Swink and Way, 1995; Acur, *et al.*, 2003). Manufacturing strategy content "comprise[s] the specific decisions and actions which set the operations' role, objective and activities," whereas manufacturing strategy process refers to "the method that is used to make the specific content decisions" (Slack, *et al.*, 2001 as quoted in Acur, *et al.*, 2003: 1114). Consistent with these definitions, Swink and Way (1995) then provide a framework depicted in Figure 3.2 below showing the distinctions between these two dimensions of manufacturing strategy (see also Acur, *et al.*, 2003).



Source: *Swink and Way (1995)*

Figure 3.2: Content vs. Process in Manufacturing Strategy

Manufacturing strategy content approaches deal with "how operations can create competitive advantage, by providing normative guidelines on what to include when formulating manufacturing strategy" (Rytter, *et al.*, 2007). Contents are the specific decisions and actions of manufacturing strategy (O'Regan and Ghobadian, 2002 as cited in Butt, 2009: 15), and comprises two components: competitive priority dimensions based on corporate and business unit goals and long-term (structural and infrastructural) decision areas important to manufacturing function (Skinner, 1969; Hayes and Wheelwright, 1979a, 1979b; Hayes and Wheelwright, 1984; Voss, 1995; Swink and Way, 1995; Miller and Roth, 1994; Ward, *et al.*, 2007). Leong, *et al.* (1990) as well as Butt (2009) accordingly provide a framework of the "content model" of manufacturing strategy as depicted in Figure 3.3.



Source: *Leong, et al. (1990) and Butt (2009)*

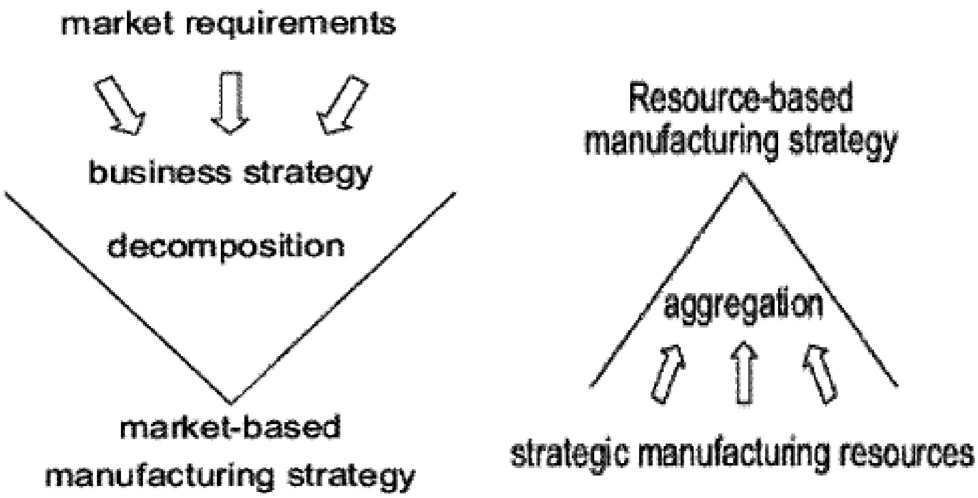
Figure 3.3: Content Model of Manufacturing Strategy

As the above framework depicts, a firm's business strategy drives its manufacturing strategy that comprises two aspects: competitive priorities and decision areas (Butt, 2009). In fact, Skinner (1969) earlier argued that corporate strategy drives operations strategy, which requires clear competitive priorities and strategic choices. In view of these insights, Nair and Boulton (2008) conclude that "corporate strategy requires a cogent understanding of competitive priorities and strategic choices" (2008: 757). The two main constituents of manufacturing strategy content, according to many of the earlier literatures in the area are, therefore, the competitive priorities and strategic choices (Martı´n-Pen˜a and Dı´az-Garrido, 2008; Butt, 2009). Contemporary scholars further consider various manufacturing practices (also called best practices) as elements of manufacturing strategy as well (Junttila, 2000; Ketokivi and Schroeder, 2004a; Voss, 2005; Shah and Ward, 2003). Many scholars and/or literatures, in this regard, associate competitive advantage with these aspects or elements of manufacturing strategy, which will be discussed later in this chapter.

Manufacturing strategy process, on the other hand, is concerned with the processes of formulation and implementation of manufacturing strategy (Rytter, *et al.*, 2007). It focuses on "the development and implementation of strategic plan" (O'Regan and Ghobadian, 2002 as cited in Butt, 2009: 22) or 'how these decisions and actions come about' (Pun, 2005 as cited in Butt, 2009: 22). The importance of manufacturing strategy process has been emphasized in many literatures (Skinner, 1969; Acur, *et al.*, 2003; Brown, *et al.*, 2007), though available empirical research regarding this issue is limited. In this regard, quite large number of articles and/or researchers have given increased attention to the issue of manufacturing strategy content alone (Dangayach and Deshmukh, 2001; Rytter, *et al.*, 2007). The resource- and capability-based views, however, suggest the importance of not only content but also the process by which operations strategy is made (Brown, *et al.*, 2007). Manufacturing strategy process is, therefore, an important area that requires more extensive studies in the future.

3.7. Approaches to Manufacturing Strategy

In discussing about the nature, dimensions and/or importance of manufacturing strategy, one may raise the following question: Is there one best way for the development of manufacturing strategy or are there alternative approaches to do so? According to Butt (2009), in this regard, there are two opposing perspectives available for the development of manufacturing strategy. These are the market-based approach and the resource-based approach (Butt, 2009). While the market-based approach takes an external perspective that regards manufacturing strategy as a derivative of business strategy and emphasizes the consideration of market requirements at the manufacturing level, the resource-based approach rather takes an internal perspective and considers a firm's assets, resources or capabilities to be key determinants of its manufacturing strategy (Thun, 2008; Butt, 2009). Figure 3.4 below comparatively depicts the nature of these two approaches to manufacturing strategy.



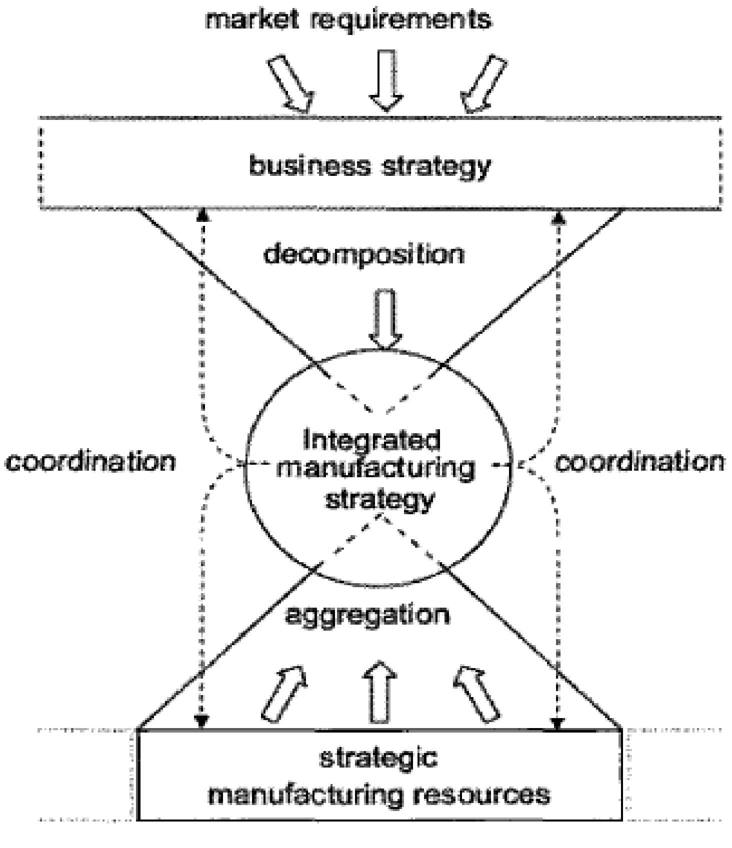
Source: *Thun (2008) and Butt (2009)*

Figure 3.4: Market-Based View vs. Resource-Based View of Manufacturing Strategy

Under the resources- and capabilities-based approach, the concept of manufacturing strategy content is viewed or operationalized in terms of operations resources/practices such as structural and infrastructural resources (Colotla, *et al.*, 2003) and manufacturing strategy process in terms of strategy development processes that lead to competitive manufacturing performance (Brown, *et al.*, 2007). Although the resources and capabilities approach seem to be a recent development, researchers in the OM field even in the 1980s actually recognized the strategic role of operations resources and capabilities (Urgal-Gonzalez and Garcia-Vazquez, 2007). As Urgal-Gonzalez and Garcia-Vazquez (2007: 606) indicate, some of the earlier scholars (for instance, Hayes and Wheelwright, 1984) emphasized the need to “create productive potentials and production practices, and acquire experience with them before rival companies realize the implications in order to obtain differential production capability”. Skinner (1985) quoted in Urgal-Gonzalez and Garcia-Vazquez (2007: 606) also suggested that “successful companies are generally those with superior resources and capabilities (e.g. technology, human and financial ability) and that the main task of management is to develop capabilities which can be basic in the company’s race for a better position than its competitors.”

The aforementioned OM scholars generally suggest that “the organizational and technological capabilities associated with the productive function” should play central role “in the design of firm’s business strategy” (Urgal-Gonzalez and Garcia-Vazquez, 2007: 606). This, in other words, means that firms should begin the process of crafting or developing their business strategy from the analysis of resources and capabilities and further plan to invest in or acquire essential capabilities that will enable the firm to be strong competitor (Urgal-Gonzalez and Garcia-Vazquez, 2007). The role of manufacturing strategy, in turn, should be “to guide manufacturing activity towards the objectives defined by business strategy” (Urgal-Gonzalez and Garcia-Vazquez, 2007: 606), the latter (i.e. the business strategy) being developed based on firm’s internal resources and capabilities. The preceding views of earlier OM researchers are actually consistent with the arguments in the resources and capabilities approach.

Apparently, the two manufacturing strategy approaches, i.e. the market-based and resource-based approaches, have been considered in isolation rather than being integrated in many of the extant operations management literatures. A few literatures, however, explicitly recognized the importance of integrating the external and internal perspectives in developing operations strategy. For instance, Slack and Lewis (2002) quoted in Butt (2009: 23) emphasized “reconciliation of market requirements with operations resources”, and Thun (2008) and Butt (2009) question the rationale of following either one of the two approaches (i.e. market-based view or resource-based view). They suggest the need to integrate the two approaches in developing manufacturing strategy (Thun, 2008; Butt, 2009). Thun (2008) even proposed an integrated manufacturing strategy model (depicted in Figure 3.5) that blends market-based and resource-based approaches together.



Source: *Thun (2008)*

Figure 3.5: The Integrated Manufacturing Strategy Model

In spite of these attempts and suggestions, there is still a lack of empirical evidence that show the utility of the proposed integrated model in terms of adopting market-based and resource-based perspectives (Thun, 2008; Butt, 2009) as well as linking the aspects of manufacturing strategy content and process together (Brown, *et al.*, 2007). The content and process of manufacturing strategy are also viewed separately in many earlier writings although these two issues are interrelated and actually measure the same concept. This is a major limitation, and hence Brown, *et al.* (2007) suggest the importance of linking the two dimensions -

manufacturing strategy content and process as well. They argue that "any investigation of manufacturing strategy should include a consideration of the strategy process by which manufacturing issues are considered and integrated with business strategy" (2007: 285).

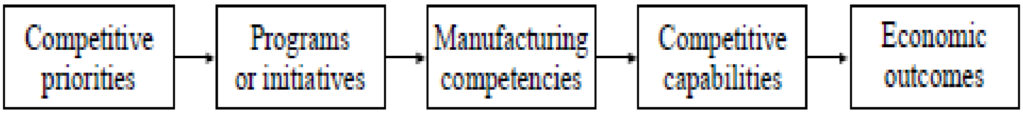
Traditionally, manufacturing strategy content has been viewed also as comprising only competitive priorities and strategic choices. The resource-based approach, however, considers specific manufacturing practices, routines, and/or capabilities as important elements of manufacturing strategy. The choice of - or the level of emphasis given to - the competitive priorities in turn seems to be affected by several factors, although there exists limited empirical evidence regarding these factors/drivers as well (Ward and Duray, 2000; Butt, 2009). In any case, identifying or understanding firm's competitive priorities and then working towards realizing these priorities is a central element both under the market-based and resource-based manufacturing strategy approaches as well as considering content and process dimensions.

3.8. What Contributes to Competitive Manufacturing Performance?

The issue of what contributes to "variations in manufacturing performance among firms" remains to be a key area for future OM research as many studies identified different factors, in light of different theoretical perspectives, that seem to influence plant performance (Leachman, *et al.*, 2005: 852). As Leachman, *et al.* further indicate, 'the available studies or insights in this area are prescriptive in nature, or propose a theory but only a handful of them empirically verify the essential factors in explaining superior, competitive manufacturing performance' (2005: 852). Hence, it seems that there is a lack of comprehensive (empirical) evidence that shows key drivers or determinants of manufacturing performance in the literature. In the following sections, the insights and empirical evidence about the determinants of competitive manufacturing performance, as available in the literature, are discussed and existing knowledge gap is highlighted accordingly.

3.8.1. The Role of Manufacturing Strategy

According to Leachman, *et al.* (2005), there are two necessary steps a firm must undertake so as to excel in manufacturing. In this regard, Leachman, *et al.* suggest that firms should identify and/or determine their competitive priorities first and also compare themselves with competitors vis-à-vis these priorities. Following this, they need to "understand what critical manufacturing practices determine superior manufacturing" so that they can design their own strategy and take practical steps to realize the same (Leachman, *et al.*, 2005: 851-852). Consistent with this view, many scholars proposed different frameworks that depict key variables leading to improved performance. One such framework is depicted in Figure 3.6 below as adopted from Hallgren, *et al.* (2011). It was proposed by other scholars and not by Hallgren, *et al.* (2011). In any case, the framework shows the link or relationship between competitive priorities, manufacturing programs or initiatives, manufacturing competencies, and competitive capabilities.



Source: *Adopted from Hallgren, et al. (2011)*

Figure 3.6: Antecedents of Competitive Capabilities and Performance Outcomes

As the above framework reveals, the competitive priorities play important strategic role as they directly guide firm's programs or initiatives and indirectly contributes to the development of manufacturing competencies and capabilities. Competitive priorities are goals and objectives that guide management actions (Hallgren, *et al.* 2011). In this regard, different 'programs and action plans are built to achieve those priorities, concerned with improvements in the manufacturing strategy decision categories' (Hallgren, *et al.* 2011: 513). When implemented effectively, these action plans foster manufacturing competencies (Koufteros, *et al.*, 2002 as cited in Hallgren, *et al.* 2011: 513).

As Hallgren, *et al.* (2011: 513) state, 'competencies refer to more internally-oriented manufacturing expertise'. They include different aspects like 'employee skills, systems, and technologies that can be linked to a specific point in the value chain or to specific strategic design choices' (Hallgren, *et al.*, 2011: 513). In short, "competencies designate how specific competitive capabilities are acquired and leveraged" (Roth and Jackson, 1995 as cited in Hallgren, *et al.,* 2011: 513). The first three variables depicted in Figure 3.6 above (i.e. competitive priorities, programs or initiatives, and manufacturing competencies), in this regard, could be viewed as the constituents of manufacturing strategy content. These aspects are actually interrelated as the figure depicts.

The implementation of 'competencies' lead to improved manufacturing performance (or competitive capabilities) and 'superior performance in terms of the competitive capabilities' then leads to increased sales, profitability and so on (Hallgren, *et al.*, 2011). In view of these insights, Hallgren, *et al.* emphasize the importance of assessing "competitive capabilities that are related to operational performance owing to the fact that they are more direct antecedents to the economic outcome of the firm" (2011: 513). The term 'economic outcome' in the preceding sentence may simply mean market and/or business performance (Junttila, 2000; Hallgren, *et al.*, 2011). It is more appropriate, hence, to study the impact of manufacturing strategy (comprising competitive priorities, manufacturing decisions, and various plant capabilities) on firm's manufacturing performance rather than on the market or aggregate measures of performance (Ketokivi and Schroder, 2004a). This is because manufacturing performance seems to be directly affected by (and/or a direct outcome of) manufacturing priorities, activities, or capabilities, while their effect on market or business performance is indirect as well as partial (Junttila, 2000; Ketokivi and Schroder, 2004a; Peng, *et al.*, 2011).

Even when we focus on manufacturing performance (or manufacturing capabilities) alone, there are diverse arguments and/or views as to what determines competitive manufacturing performance. In this regard, different approaches have been suggested in the literature, in light of different theoretical perspectives, for developing relevant plant capabilities. Earlier scholars emphasized the importance of 'aligning manufacturing goals and strategic choices with the situation in the environment' (Vickery, 1991; Bozarth and Berry, 1997; Ward and Duray, 2000). These scholars argue that firm's internal strategic choices and practices need to be made in light of external (environmental) factors, and such external and internal alignment (consistency) is key determinant of manufacturing capabilities (Bozarth and Berry, 1997; Devaraj, *et al.*, 2004) or business performance (da Silveira, 2005). More specifically, Brown, *et al.* (2007) emphasized the importance of the aspects of manufacturing strategy content vis-à-vis choice of generic strategy and strategic choices that underpin its implementation in their recent article.

The emergence of the resource-based and the related capabilities-based perspectives in the 1990s, however, provided new insights in conceptualizing and operationalizing manufacturing strategy. These contemporary perspectives emphasize the importance of acquiring, developing, or implementing internally-oriented (operations) practices, routines, or resources to build competitive capabilities. The resource-based approach, in particular, has offered new grounds to re-considering or operationalizing manufacturing strategy (Schroeder, *et al.*, 2002).

The preceding discussions, in spite of the differences in the theoretical perspectives, emphasize the strategic role of manufacturing and the associated strategy, manufacturing strategy, for achieving superior operational performance and hence competitive advantage. In this regard, the importance of considering external (environmental) factors as well as internal operations characteristics (including goals, strategic choices, and operations resources and capabilities) is underscored in the literature in studying the antecedents of manufacturing performance. In view of these insights and/or evidences, we can say that the primary determinants of superior manufacturing performance relate to plant level factors (variables) such as strategic goals, intervention choices/practices, as well as plant capabilities like learning or improvement (Junttila, 2000; Ketokivi and Schroder, 2004a). Leadership practices of manufacturing managers could also play important role in enhancing plant performance (Skinner, 1969; Kathuria and Partovi, 1999; Kathuria, *et al.*, 2010). The preceding factors seem to be related and likely to directly or indirectly affect manufacturing performance, though there is a lack of comprehensive evidence or empirical study that relates all these factors together.

3.8.2. Manufacturing Decisions and Its Implications

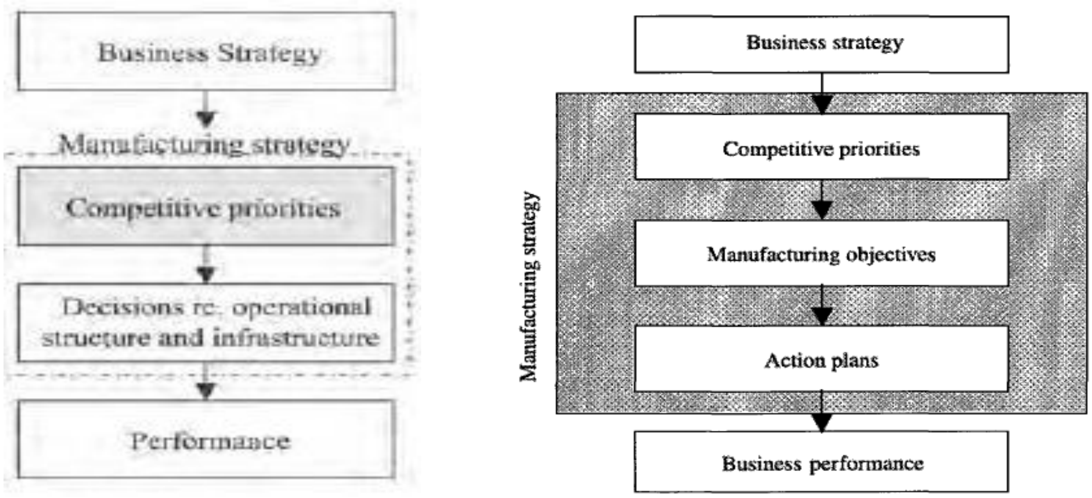
Manufacturing decisions are key elements of manufacturing strategy (Acur, *et al.*, 2003; Diaz-Garrido, *et al.*, 2007). As Hayes, *et al.* (1988) indicate, the manufacturing decisions include firm's decisions in the areas of production capacity planning, facilities/equipment installation, degree of internal production of materials, systems and services, vendor maintenance, human resource policies, performance measurement, quality control, production and inventory control, and organizational structure. These decisions in aggregate are categorized into structural and infrastructural dimensions (Wheelwright, 1984). Structural decisions comprise investment in capacity, facilities, technology, and decisions regarding sourcing/vertical integration, and the remaining aspects fall into the infrastructural category (Ward, *et al.*, 2007).

As Butt (2009) states, structural decisions are strategic in nature while decisions in the infrastructural areas are tactical. In spite of these distinctions, making integrated decisions in both (structural and infrastructural) areas is critical in building competitive advantages around manufacturing (Colotla, *et al.*, 2003; Ward, *et al.*, 2007; Martı´n-Pen˜a and Dı´az-Garrido, 2008). “Performance frontiers theorists” also emphasize the idea that firms make balanced investments in both structure and infrastructure resources so that they can achieve better plant performance (Power, Schoenherr & Samson, 2010). Firms require both an investment in “tangible assets (structure)” and “intangible [or less tangible assets] (infrastructure)”, and “the extent of investment in each of these areas determines the asset and operating frontiers” respectively (Power, *et al.*, 2010: 208).

According to Hall (1987) cited in Leachman, *et al.* (2005: 855), ‘elimination of waste, reduction in lead time and cost, increase in quality, people development, and continuous improvement are new approaches to manufacturing’. This writer also suggests the importance of focusing on or implementing innovative practices like ‘just-in-time (JIT), stockless production, total quality control, and zero defect and inventories’ so that the firm can create strong competitive capabilities (Leachman, *et al.*, 2005: 855). These aspects are often described as best practices in the literature, though sometimes considered also as elements of manufacturing decisions. The structural and infrastructural decisions, thus, seem to partially overlap with what are frequently described as manufacturing practices or best practices in the literature (Junttila, 2000).

Building on the ‘resource picking’ and ‘resource deployment’ rent creation concepts proposed by Makadok (2001), Colotla, *et al.* (2003) on the other hand indicate that the decisions that influence structural manufacturing resources or physical configuration of the operations resources (Wheelwright, 1984) can be viewed as “resource picking” and decisions that influence the operations infrastructure (mainly reflected in capabilities like systems, practices, and organizational routines) (Wheelwright, 1984) can be considered as “resource deployment” or capability building. Accordingly, they suggest that competitive advantage could be obtained from structural resources through “resource picking” mechanisms (Makadok, 2001), if these resources are valuable and unique as well as from ‘superior infrastructural practices’ (Colotla, *et al.*, 2003), which may mean from superior “resource deployment” mechanisms (Makadok, 2001) and/or implementation of best practices (Voss, 1995; Colotla, *et al.*, 2003).

Apparently, manufacturing strategy is implemented by a series of structural and infrastructural decisions/investments (Ward, *et al.*, 2007; Martı´n-Pen˜a and Dı´az-Garrido, 2008), and these decisions link the firm's operations with its business strategy (Hayes and Wheelwright, 1984; Hill, 2000; Ward, *et al.*, 2007). According to Frohlich and Dixon (2001), competitive capabilities (meaning competitive priorities) direct firm's improvement actions, i.e. decisions regarding structural and infrastructural resources and practices. Many scholars in fact follow this line of reasoning vis-à-vis manufacturing strategy (Wheelwright, 1984; Wheelwright and Hayes, 1985; Miller and Roth, 1994; Kathuria, 2000; Ward, *et al.*, 2007; Martı´n-Pen˜a and Dı´az-Garrido, 2008; Butt, 2009). A few scholars also developed frameworks linking business strategy and manufacturing strategy and in turn with performance (see Figure 3.7 below).



Source: *Boyer and Lewis (2002)* ***Source:*** *Kim and Arnold (1996)*

Figure 3.7: Linking Business Strategy to Manufacturing Strategy and Performance

The above frameworks are more or less similar in the sense that both emphasize firm's business strategy as a driver for the formulation of manufacturing strategy, which in turn leads to the achievement of improved (manufacturing or business) performance (Boyer and Lewis, 2002; Kim and Arnold, 1996). In a similar way, Frohlich and Dixon (2001) also proposed a framework linking firm's business strategy to the aspects of manufacturing strategy and performance. They operationalized manufacturing strategy in terms of competitive capabilities and improvement actions, whereby the former directs the latter and then the conduct determines performance. These and other similar frameworks were actually employed (or tested) in different empirical studies and obtained wider support.

In general, numerous manufacturing strategy literatures and/or scholars emphasize the idea that competitive priorities are accomplished through supporting structural and infrastructural decisions or investments (Nair and Boulton, 2008). Accordingly, many operations strategy researchers subsequently examined the link or relationship between competitive priorities and subsequent choices (Sum, *et al.*, 2004; Rusjan, 2005), competitive priorities and performance (Ward and Duray, 2000; Rusjan, 2005), as well as business strategy and manufacturing decisions (Ward, *et al.*, 2007). Researchers in the area specifically examined the effects of investments in the structural and infrastructural resources on firm's manufacturing performance, and obtained evidence supporting the idea that decisions in these areas or resources positively relate to operational performance (Miller and Roth, 1994; Acur, *et al.*, 2003; Christiansen, *et al.*, 2003; Devaraj, *et al.*, 2004; Narasimhan, Swink & Kim, 2005; da Silveira, 2005; Kroes and Ghosh, 2010).

Ward, *et al.* (2007) recently used a configurations approach and developed three business strategy clusters based on five competitive priorities dimensions, and then examined their relationship with wide range of structural and infrastructural decision areas. They find differences in emphasis in large number of infrastructural areas as compared to structural areas among the business strategy clusters as well as suggest, in view of their findings, the need to explore the performance effect of alignment within the strategy groups in future research (Ward, *et al.*, 2007). In a nutshell, the preceding review and empirical evidence underscores the strategic role of manufacturing decisions for achieving superior, competitive manufacturing performance.

3.8.3. Learning and Improvement Capabilities and Plant Performance

In many earlier literatures, manufacturing strategy had been operationalized from an "outside-in" perspective whereby much emphasis was given to external factors/determinants of competitiveness, and the role of operations had been simply maintaining fit with these external drivers (or environmental factors). Following the introduction of the resources- and capabilities-based perspectives, however, researchers have started to magnify the critical role of internal manufacturing resources, practices, or capabilities for competitiveness. Bates, *et al.* (2001) cited in Butt (2009: 75), for instance, underscored the significance of developing resources and capabilities around manufacturing stating that the 'manufacturing process is a result of a firm's long-term commitment to build manufacturing capabilities and resources' (Butt, 2009: 75).

Apparently, the development of the resource-based approach contributed a lot for the prosperity of manufacturing strategy research and practice (Schroeder, *et al.*, 2002). It enabled identifying and analyzing wide range of internal resources and manufacturing practices that have the potential to enhance manufacturing, market, and organizational performance (Junttila, 2000). Schroeder, *et al.* (2002) adopted this approach in their study and operationalized manufacturing strategy in terms of 'internal learning and external learning capabilities'. Because learning capability is built within the manufacturing plant, it cannot be easily copied by others and hence it is likely to influence manufacturing performance. Accordingly, Schroeder, *et al.* argue that these capabilities can be the source of sustainable competitive advantage because they are built within the manufacturing function and thus are difficult to imitate and transfer. 'Internal learning includes the training of multifunctional employees and incorporating employee suggestions into process and product development' (Hall, 1987 as cited in Schroeder, *et al*., 2002: 107). "These practices [can] lead to an adaptable work organization, [although] the performance impact of which is often underestimated" (Schroeder, *et al.*, 2002: 107).

"Organizations also regularly engage in problem solving with other organizations in ways that function as routine-changing routines [], and this leads to what is described as external learning" (Schroeder, *et al.*, 2002). They define external learning in the context of manufacturing plants as "inter-organizational learning through problem solving with customers and suppliers" (Schroeder, *et al.*, 2002: 108). They indicate that certification of suppliers' production methods by customers, and establishment of ongoing customer–supplier relations, suggests that customers are [] 'important source of routines' (Schroeder, *et al.*, 2002: 108). External learning also occurs through long-term relational contracting with suppliers (Gerwin, 1993 cited in Schroeder, *et al.*, 2002: 108). This can take many forms, including supplier input into new product or process design and supplier involvement in quality and in continuous improvement practices and routines (Schroeder, *et al.*, 2002: 108).

Schroeder, *et al.* (2002) then examined how internal and external learning capabilities of the manufacturing plant contribute to the development of proprietary equipments and processes and, in turn, affect manufacturing performance. Their study in fact indicates that these capabilities basically lead to the development of unique proprietary equipments and processes, which in turn contributes to improved plant performance. Apart from external and internal learning capabilities, firm's improvement and innovation capabilities also play important roles in enhancing performance. Peng, *et al.* (2008) identified organizational routines associated with these two capabilities, and later studied their impact on manufacturing performance (Peng, *et al.*, 2011).

Peng, *et al.* (2008) indicate that routines and practices associated with improvement capabilities are distinct from that of innovation capabilities - each developing from a different 'set of routines and practices'. Peng, *et al.* (2008) also identified a list of key practices related to improvement and innovation capabilities, and latter examined the implications of alignment (fit) between these two capabilities and competitive priorities. They examined how two types of fit (mediation and moderation) between competitive priorities and improvement or innovation capabilities affect operational performance, and have found evidence supporting the mediation effect (Peng, *et al.*, 2011). They also suggest the importance of undertaking similar studies in a different context such as in emerging economies. In short, the review in this section underscores the need to study the different aspects as well as implications of plant capabilities such as learning, improvement, innovation, and so on.

3.9. Leadership and the Institutional Environment: Are they Potential Drivers?

3.9.1. Leadership and Its Role in the Manufacturing Plant

According to Boydell (2004: 4), the concept of leadership is defined as 'getting people to do what the leader wants them to do'. The definitions of this concept and respective approaches, however, have been changing over years may be 'due to the changes taking place in the workforce, the nature of the work and the structure of organizations' (Summers, 2006: 20). In this regard, Boydell (2004) states that the approach to leadership has evolved from the "classical" sense – doing things well, to "modern" or "transformational" – doing things better, and recently to a new, more "relational" form. As organizations recognize that they are faced with complex challenges, operating in a world of accelerated change, turbulence and uncertainty, it has become clear that a new form of leadership is needed (Boydell, 2004), which is more relational in its approach and emphasizes doing better things together (Boydell, 2004).

The new concept views leadership as more relational and considers people as "…. resourceful humans – 'beings on purpose' – wanting to do good work, to delight customers, to provide a valuable service, to create and achieve something worthwhile outside of their own immediate rewards" (Boydell, 2004: 6). Boydell (2004) argues that firms need such approach to leadership in order to tackle the complex, shifting, inter-related challenges of the contemporary business environment. The kind of changes that have occurred in the business environment such as globalization, spread of information technology, increased competition, and the growing importance of information for competitiveness necessitated a new form of leadership in the contemporary period that capitalizes on the talents and intellectual potential of employees than that simply considers employees as followers (Summers, 2006; Herkness, 2005).

Organizations heavily depend upon their leaders especially in competitive business environments in order to facilitate the changes and innovations required to maintain competitive advantage (Simon, 2007). Leaders found to influence followers in many ways (Simon, 2007), and as a result scholars and academics have given great attention to the issue of leadership since it is critical for the success of organizations. Leadership is very essential for linking organization's vision developed by top management with the values and beliefs held by the respective employees (Rylander and Peppard, 2003: 321). Leadership is, therefore, an important variable that needs to be considered in studying business performance in general and manufacturing performance in particular.

The issue of leadership and strategy has been widely discussed in the strategic management literature, [especially] at the corporate and strategic business unit (SBU) level (Kathuria, *et al.*, 2010: 1082). Rylander and Peppard (2003) emphasize that leadership is a crucial factor for strategy (or strategic plans) to work in practice. As Mintzberg (1994) cited in Brown, *et al.* (2007: 285) indicates, 'strategic planning will fail if it is limited to the top management team or planning experts and excludes other relevant managers'. This is because middle level managers such as operations managers are expected to 'develop strategic initiatives and take actions that are consistent with the strategic plan' (Brown, *et al.*, 2007: 285). Many scholars in the area (for example, Skinner, 1992 cited in Voss, 1995: 9; Brown, *et al.*, 2007), hence, underscore the importance of middle management, especially the involvement of manufacturing managers, in strategic planning.

The managerial (or leadership) practices of manufacturing managers, therefore, seem to be an important element of strategic planning apart from its strategic role in the firm's operations. As Kathuria, *et al.* (2010) indicate, the issue and importance of leadership practices in operations management is first introduced through the work of Skinner (1969), who examined the competitive strategy of two manufacturers and suggested different leadership styles as their strategy is distinct. Following Skinner's suggestion, a few studies related human resource management (HRM) practices and competitive priorities (Jayaram, Droge & Vickery, 1999; Santos, 2000) as well as HRM practices and performance (de Menezes, *et al.*, 2010). In spite of these attempts, the issue of human resource practices (and/or behavioral aspects of manufacturing operations) still received a modest coverage in the literature, though it appears to be heavily linked with performance (Skinner, 1969; Kathuria and Partovi, 1999; Kathuria, *et al.*, 2010).

In particular, the potential role of leadership in the manufacturing plant for enhancing operational (plant) performance has obtained little attention in the literature as emphasis is mainly given to firm's manufacturing strategy and/or the involvement of middle-level managers in strategic planning or decisions, and not to the leadership practices thereof. In view of this limitation, Kathuria and Partovi (1999) examined the influence of 'workforce management practices on managerial performance'. They considered 'manufacturing flexibility' as a moderating variable in their study. Kathuria and Partovi's study in fact deals about how leadership practices contribute to better managerial performance, although they considered a single dimension of competitive priorities (i.e. manufacturing flexibility), which is posited to 'moderate the relationship between practices and performance'. The criterion variable in their study is also managerial performance (Kathuria and Partovi, 1999), not manufacturing (plant) performance.

Very recently, Kathuria, *et al.* (2010) simultaneously examined the effect of competitive orientation (a configuration of competitive priorities) and manufacturing manager's leadership practices on performance, specifically on manufacturing group performance. As Kathuria, *et al.* argue, "a middle-level manager [] can affect group performance by the use of specific leadership behaviors when interacting with peers, subordinates, and outside parties, the effect of which goes beyond that of strategic priorities" (2010: 1086). It is implied in their argument that making appropriate decisions about management systems and organization structure as well as determining the competitive strategy for the organization remains to be a concern of leadership at the top. Their finding indicates that the performance effect of leadership practices of manufacturing managers in fact goes beyond the fixed effect of competitive orientation. Kathuria and Partovi (1999) as well as Kathuria, *et al.* (2010) used Yukl's (1989) taxonomy of 14 leadership practices, which refers to generic behaviors applicable to all types of managers and organizations.

Yukl (2009) in fact amended the earlier taxonomy of leadership practices to include additional three managerial practices or behaviors. In this regard, from the total of seventeen managerial behaviors, two managerial behaviors (problem solving and leading by example) are considered mixed and the rest fifteen behaviors fall into three meta-categories: task-oriented, relations-oriented, and change-oriented practices (Yukl, 2009). Task-oriented behavior includes short-term planning, clarifying responsibilities, and monitoring activities and performance; relations-oriented behavior includes supporting, recognizing, encouraging participation, empowering, developing, and encouraging cooperation and change-oriented managerial behavior includes external monitoring, explaining need for change, envisioning change, encouraging innovative thinking, facilitating collective learning, and promoting change (Yukl, 2009). These practices could be used in studying the behaviors of middle level managers in all kinds of organizations, and not only in the context of manufacturing. As Kathuria, *et al.* (2010) further indicate, contemporary researchers actually favor the use of Yukl's specific leadership practices rather than the earlier dichotomies of leadership styles, such as authoritative vs. participative leadership or transformational vs. transactional leadership in their studies.

3.9.2. The Role of Institutional Forces

What are institutions or institutional forces, and are they relevant in studying manufacturing performance? The discussion in this section, of course, tries to provide the answers to these questions. To begin with, research conducted in the context of emerging and developing economies regarding, among other things, the competitiveness and performance of manufacturing firms often consider unique factors that are not usually considered in studies conducted in the context of developed economies, that is, the institutional environment of the particular context. A new stream of research, in this regard, suggests that "institutions are much more than background conditions" (Meyer, *et al.*, 2009), particularly considering the context of emerging or developing economies.

The institutional frameworks in emerging [and also in developing] economies often "differ greatly from those in developed economies" and hence their role and influence on firms' decisions and practices is "more apparent" (Meyer, *et al.*, 2009: 62). Malik and Kotabe (2009) and Cai, *et al.* (2010) similarly indicate the existence of differences in the institutional environments of emerging economies from that of industrialized ones. The various institutions, especially government and its agencies, in this regard, directly determine what firms can do in the course of identifying and investing in viable business opportunities, developing strategies, as well as investing in innovative manufacturing practices and technologies in these economies (Meyer, *et al.*, 2009).

Emerging economies display resource scarcities and a pervasive role of government institutions in economic activities (Malik and Kotabe, 2009: 422). This situation is also true for developing economies where there is direct influence of government on firms' decisions and actions. In this regard, major institutional forces that seem to affect firms' investment decisions, practices, and performance in emerging as well as developing economies usually relate to financial, technical, or institutional supports governments and associative organizations provide to manufacturing companies (Mesquita, *et al.*, 2007). Coupled with economic liberalization, the scarcity of critical resources and capabilities and the increased role of government institutions in developing and emerging economies, hence, seems to lead to firm-level changes in resources and capabilities that are different from those in industrialized economies (Malik and Kotabe, 2009).

As Meyer, *et al.*, (2009: 63) state, institutions in the context of developed economies are very strong and provide different services to businesses. However, their role is not explicit as in the context of developing and/or emerging economies. In the emerging and developing economies, the market mechanism seems to be poor, i.e. markets do not function well or they often "malfunction" (Meyer, *et al.*, 2009). With this view, Meyer, *et al.* contend that the 'absence of market-supporting institutions is conspicuous' in these contexts (2009: 63). Institutional forces are even more relevant when firms from less developed and/or developing economies considered.

Due to the lack or absence of various institutions relevant for the proper functioning of businesses and markets in many developing as well as emerging economies, in this regard, researchers recognize that 'some forms of institutional support fills a void of market imperfections' (Meyer, et al., 2009). Accordingly, different researchers (e.g. Meyer, et al., 2009; Malik and Kotabe, 2009; Cai, *et al.*, 2010) tried to consider this issue in their study and hence assessed the impact of institutional forces on firms' decisions, practices, or performance in view of evidence from emerging economies. For instance, Meyer, *et al.* (2009) 'examined the impact of market-supporting institutions on business strategies by analyzing the entry strategies of foreign investors entering emerging economies', and Malik and Kotabe (2009) examined the influence of 'input supporting and marketing supporting government policies in enhancing performance in emerging market manufacturing firms'. In their study of supply chain information integration, Cai, *et al.* (2010) also identified three major institutional forces that reflect unique characteristics of China's institutional environment: 'legal protection, government support, and importance of guanxi'[6].

Among the various institutional forces, the role of government is especially relevant in the context of a less developed or developing economy. 'This role might be reflected in the extent to which governments affect firms' decision making' (Cai, *et al.*, 2010: 258). Although 'governments in developed economies often exert their influence through established and transparent industrial policies and regulations' (Cai, *et al.*, 2010: 258), governments in emerging and developing economies, on the contrary, directly involve in firms' decision making processes and explicitly provide different types of supports and incentives especially to manufacturing firms in their context (Cai, *et al.*, 2010; Malik and Kotabe, 2009; Meyer, *et al.*, 2009). The various levels of support from government could thus greatly affect firm's competitiveness and behaviors. For instance, Malik and Kotabe (2009) found that 'organizational learning combined with input supporting government policies enhanced performance', though the 'combined effect of [or interactions between] manufacturing flexibility and marketing supporting government policies had an insignificant influence on performance'. Their findings, however, were not validated through other studies in different contexts (such as in other emerging or developing economies).

[6] The term "guanxi" refers to networks of informal, personal relationships and exchanges of favors that dominate business activities throughout China and other East Asian countries (Lovett, *et al.*, 1999 as cited in Cai, *et al.*, 2010: 260).

3.10. Summary of the Literature and Existing Knowledge Gap

In this chapter, a wide range of literatures have been reviewed and synthesized focusing on manufacturing performance, which is a measure of plant performance. Many studies indicate that manufacturing performance is directly associated with market performance and indirectly with business performance. It is an important predictor of market performance, and improvements in the measures of this variable are positively associated with competitive market and business performance. A number of OM literatures/studies heavily associate manufacturing strategy with improved manufacturing performance and/or competitiveness. It is Skinner (1969) who introduced the concept of manufacturing strategy to the strategy literature and many scholars followed his footsteps in addressing or examining the issue and/or role of this strategy.

In the extant theoretical and empirical literatures, however, the aspects of manufacturing strategy and their contributions to superior operational performance and competitive advantage have been explained and/or addressed entirely in view of the situation in high performing manufacturing firms that are having best practices and competing globally (Mackelprang and Nair, 2010; de Menezes, *et al.*, 2010). Following the seminal work of Skinner (1969), the conventional manufacturing strategy model adopted in manufacturing strategy researches vis-à-vis the study of fit/alignment between environment-strategy-performance legitimizes focusing only on high performing companies, and precluding low performing ones (Ward and Duray, 2000). The existing empirical evidence in the literature regarding environment-strategy-performance alignment, thus, is only based on high performing companies, which does not reveal the situation and/or role of manufacturing strategy in low performing companies.

The review further indicates that manufacturing strategy research and practice had been more “outside-in” oriented for many years, which was anchored mainly in the market-based view that emphasizes aligning manufacturing goals and strategic choices with external (environmental) factors/requirements. In light of internally-oriented perspectives like the resource-based and routine-based approaches, contemporary scholars rather emphasize the role of manufacturing strategy process as well as resources, routines, practices, and/or capabilities related to firm’s operations as a potential source of competitive advantage. Although scholars underscore the contributions of manufacturing strategy to improved performance and competitive advantage, the empirical evidence in view of the resource-based and routine-based approaches is still limited, however.

Most studies regarding manufacturing strategy and performance also focused on firms in developed economies, and a few in emerging economies. Hence, there is lack of evidence considering manufacturing firms in developing economies at large. Meager evidence also exists in the literature that shows the effect of competitive priorities on broad range of strategic choices, capabilities, and practices. Based on a comprehensive review of literature, Ward, *et al.* conclude that "the role of infrastructural and structural manufacturing decisions has been studied in a fragmented way in the literature" (2007: 956). The review in this chapter also reveals the lack of comprehensive evidence regarding the drivers of plant capabilities such as learning, improvement, and innovation and their impact on performance in view of evidence from developing economies.

With regard to leadership or managerial practices, the review indicates that this issue has obtained limited coverage in the extant operations strategy research. In fact, a few manufacturing strategy researchers have attempted to study the role of leadership in the context of the manufacturing plant. They tried to explicitly employ relevant leadership theories in their studies as well as obtained compelling evidence with respect to leadership practices of manufacturing managers for improving group performance. In spite of these findings, there is still a gap in comprehensively dealing with the issue of leadership practices of manufacturing managers and its impact on performance. Kathuria, *et al.* (2010) actually call for further research in this area especially with respect to examining the influence of leadership practices on plant performance as well as investigating whether leadership practices mediate the link between goals and performance.

The review of the institutional literature further reveals that researchers underscore the role of institutional forces especially that of government support in the context of developing and emerging economies. Institutional supports from government seem to contribute to improvements in organizational/business performance, though limited evidence exists so far regarding this issue. Since the role of governments and external network connections in fostering firm capabilities is gaining more research attention, Malik and Kotabe (2009: 444) in fact suggest that “future research focused on the evolution and performance impacts of specific policy and program initiatives will further knowledge of how governments can shape firm capabilities in emerging [as well as developing] economy contexts." The effect of institutional forces such as government support on plant performance as well as in enhancing the performance impacts of specific operations capabilities (such as learning or improvement capabilities) in firms from emerging and/or developing economies, thus, needs further research. Government support can be viewed as either a direct driver or an institutional contingency (i.e. a moderator) having the potential to enhance the efficacy of plant learning or improvement capabilities (Malik and Kotabe, 2009; Meyer, *et al.*, 2009).

To conclude, the review of the literature in this chapter emphasizes the need to study the drivers of manufacturing performance, especially in the context of a less developed economy. In light of the market-based and resource-based perspectives, therefore, it is important to identify and/or examine factors affecting the competitive priorities and firms' strategic orientation, and in turn their impact on manufacturing decisions (Miller and Roth, 1994; Kim and Arnold, 1996; Boyer and Lewis, 2002), development or acquisition of routines/practices related to learning, improvement, innovation, etc. capabilities (Junttila, 2000; Schroeder, *et al.*, 2002; Peng, *et al.*, 2011), as well as leadership of manufacturing managers (Kathuria, *et al.*, 2010). In this regard, the central question firms need to address in setting strategic goals, implementing strategic choices or routines, exercising leadership, and/or seeking various kinds of institutional supports should be 'to improve which manufacturing capability or performance dimension.' The extant literature fails to provide a comprehensive analysis and/or evidence about the drivers of manufacturing performance, and hence the current study tries to fill this gap. In the next chapter, the research problem is stated in a more detailed manner and a conceptual framework appropriate for the study is developed and argued.

CHAPTER 4

PROBLEM STATEMENT AND HYPOTHESES

This chapter provides detailed account of the research problem and the hypotheses to be tested in the study. A priori conceptual framework is also developed in this chapter based on the research questions proposed in chapter one. The variables in the conceptual framework are identified based on the review and synthesis of the literature vis-à-vis manufacturing strategy, best practices, leadership, and institutional forces as presented in the preceding chapter, and the hypotheses are underpinned by multiple theoretical perspectives discussed in the second chapter.

4.1. Detailed Statement of the Research Problem

Since the economic environment for manufacturing enterprises has been rapidly changing and competition become global in the contemporary period, manufacturing firms especially those found in developing economies have been experiencing increasing competition even in their home market let alone in foreign markets. Firms in the industrialized as well as emerging economies seem to continually attempt to smooth out the threats and remain competitive through strategizing and economizing their manufacturing practices, resources, and capabilities. Empirical studies regarding, among other things, the role and/or contributions of manufacturing strategy and best practices to improving performance in general and plant performance in particular were conducted in view of evidence from manufacturing firms in U.S., Europe, Canada, Japan, China, and other Asian countries (e.g. studies by Ferdows and De Meyer, 1990; Miller and Roth, 1994; Acur, *et al.*, 2003; Christiansen, *et al.*, 2003; Mellor and Gupta, 2002; Sum, *et al.*, 2004; Zhao, *et al.*, 2006; da Silveira, 2005; Jusoh and Parnell, 2008; Schroeder, *et al.*, 2002; Ketokivi and Schroeder, 2004a). The wide range of empirical studies and conceptual papers in the area has provided invaluable insights both to manufacturers and researchers in these contexts.

Firms in the industrialized as well as emerging economies seem to have been using their manufacturing capabilities and relevant strategies as competitive weapons (Hayes and Wheelwright, 1984; Skinner, 1985). Since the 1960s, high performance "world-class" manufacturers from the developed and emerging economies have been shaping global competition, markets, and industries as well (Teece, 2007; Hagel III, *et al.*, 2008). The literature also indicates that manufacturing, among other sectors, has been playing key role for the economic growth (and hence success) of the world's leading industrialized nations such as U.S., Japan, and many European countries, especially Germany, U.K., and France (Schonberger, 1986, 1996; Wheelwright, 1981; Drucker, 1981; Wheelwright and Hayes, 1985) and emerging economies like China, India, Brazil, and South Africa (Pisano and Shih, 2009; Raman, 2009). Manufacturers operating in these economies have been dominant market players and providers of most industrial (manufactured), state-of-the-art goods in the global marketplace, and especially in the context of less developed and/or developing economies such as in Africa at large and Ethiopia in particular.

In the context of Ethiopia, the situation is somehow different as the industrial sector itself is at its fledgling stage of development with less than 2,200 manufacturing firms operating in the country as a whole in the year 2009/10 (Ethiopia. CSA, 2011). Ethiopia’s economy has been led by agriculture, and the role of industry to economic growth has been less (EEA, 2007, 2011). The existing manufacturing firms in the country largely are small and medium scale operators with limited number of employees (Ethiopia. CSA, 2011) as well as limited scope of operations and technologies. Majority of the manufacturing firms in Ethiopia, thus, seem to be facing lingering competitive pressures and irresistible challenges from advanced foreign manufacturers (EEA, 2011) that excel in strategic, financial, organizational, technical, and technological aspects.

Presumably, the local manufacturers failed to achieve competitive advantage, especially manufacturing-based competitive advantage, as they are not competitive both in the domestic and foreign markets (EEA, 2011). The underlying reason for their lack of competitiveness and/or inability to enjoy good market acceptance seems to relate to, among other things, the lack of clear strategic priorities, or decisions and capabilities that augment these priorities, or both. In particular, this research argues that the central problem lies in the local firms’ existing level of manufacturing practices and capabilities, the degree of alignment between their competitive priorities and practices/capabilities, as well as the kind of leadership behaviors manufacturing managers exhibit, each of which could be linked with measures of plant performance.

What makes the Ethiopian manufacturing context unique is that nothing is known about the extent to which firms' strategic goals influence or direct the manufacturing decisions, plant learning and improvement capabilities, leadership practices, and ultimately plant performance. These issues have not yet been studied using pertinent measures in the context. In fact, there is a lack of evidence in the literature in addressing different aspects of manufacturing strategy in the context of firms in developing economies at large, and Ethiopia is not an exception, as most manufacturing strategy and performance studies focus on high performing manufacturing firms found in developed (and a few in emerging) economies (e.g. Skinner, 1969; Mackelprang and Nair, 2010; Acur, *et al.*, 2003; Christiansen, *et al.*, 2003; Miller and Roth, 1994; Swamidass and Newell, 1987; Ferdows and De Meyer, 1990; Ward and Duray, 2000; Swink and Way, 1995; Kathuria, 2000; Mellor and Gupta, 2002; de Menezes, *et al.*, 2010; Sum, *et al.*, 2004; Zhao, *et al.*, 2006). To this effect, there is a lack of evidence that explicate different aspects of manufacturing strategy in the context of manufacturing in developing economies at large.

Whatever is the case, the key for the success of "world-class" and other manufacturers in the developed as well as emerging economies still lies on the capabilities of their manufacturing plants. These in turn depend on the extent to which the activities and practices in the firms' operations function are strategized and economized. Superior manufacturing performance (or capabilities) is a prerequisite for competitiveness in the global marketplace and thus for achieving competitive advantage (Schroeder, *et al.*, 2002). Manufacturing performance is an important predictor of market performance (Junttila, 2000). Different studies indicate that manufacturing performance is directly associated with market performance and indirectly with business performance (Junttila, 2000).

The preceding discussion generally indicates the existence of a gap in the extant OM literature with respect to addressing or examining the influence of the different aspects of manufacturing strategy on performance especially in view of evidence from firms in developing economies at large. There is also meager evidence in the literature that reveals the factors considered in setting the competitive priorities and their effect on various strategic choices, capabilities, and practices. It seems, therefore, that the link between these variables as well as the impact of alignment between them needs further research.

Although studying the role and/or implications of different plant capabilities such as learning, improvement, innovation, etc capabilities seems to provide additional knowledge regarding firms' operations, focusing on the first two capabilities, i.e. learning and improvement capabilities, considering the realities of developing economies, is believed to be more appropriate for the current research. With this view and for its significance, only learning and improvement capabilities of the manufacturing plant are examined in this study. Since the basic role of managers in an organization is to translate "strategic objectives (competitive priorities) into coordinated actions and activities" (Peng, et al., 2011), it is believed to be important to examine the extent to which strategic goals affect plant learning and improvement capabilities and subsequently manufacturing performance. This may help to see the extent to which these capabilities are developed in light of firm's strategic priorities (goals) and, in turn, affect the level of manufacturing performance. It may also provide additional insights about the mediation role of learning and/or improvement capabilities.

In addition to the above issues, the role and/or implications of strategic goals to middle-level, manufacturing manager’s leadership practices and in turn the effect of leadership practices on manufacturing performance, in spite of its importance, has also obtained limited coverage in the extant literature. A few researchers in fact investigated the impact of leadership practices of manufacturing managers on manufacturing group performance as already discussed (Kathuria and Partovi, 1999; Kathuria, *et al.*, 2010), though these studies did not address the effect of such practices on manufacturing performance as a whole. Limited evidence, therefore, exists in the extant OM literature that shows the link between manufacturers’ competitive priorities, leadership practices, and plant performance. There is also lack of evidence vis-à-vis the impact of alignment between these variables on plant performance.

An important institutional contingency that is worth considering in studying firm’s manufacturing performance in developing as well as emerging economies further relates to the level of government intervention in the sector vis-à-vis providing support. In this regard, the potential contribution and/or role of government in Ethiopia in enhancing the competitiveness of firms by providing financial, technical, institutional, and policy support is underscored as in other developing economies (EEA, 2011). Yet, little is known whether or in what way such government support influence plant performance, especially in the context of developing economies. It is, therefore, important to question as well as empirically verify whether government support is linked with manufacturing performance or enhances the development of plant capabilities such as learning or improvement based on evidence from Ethiopia.

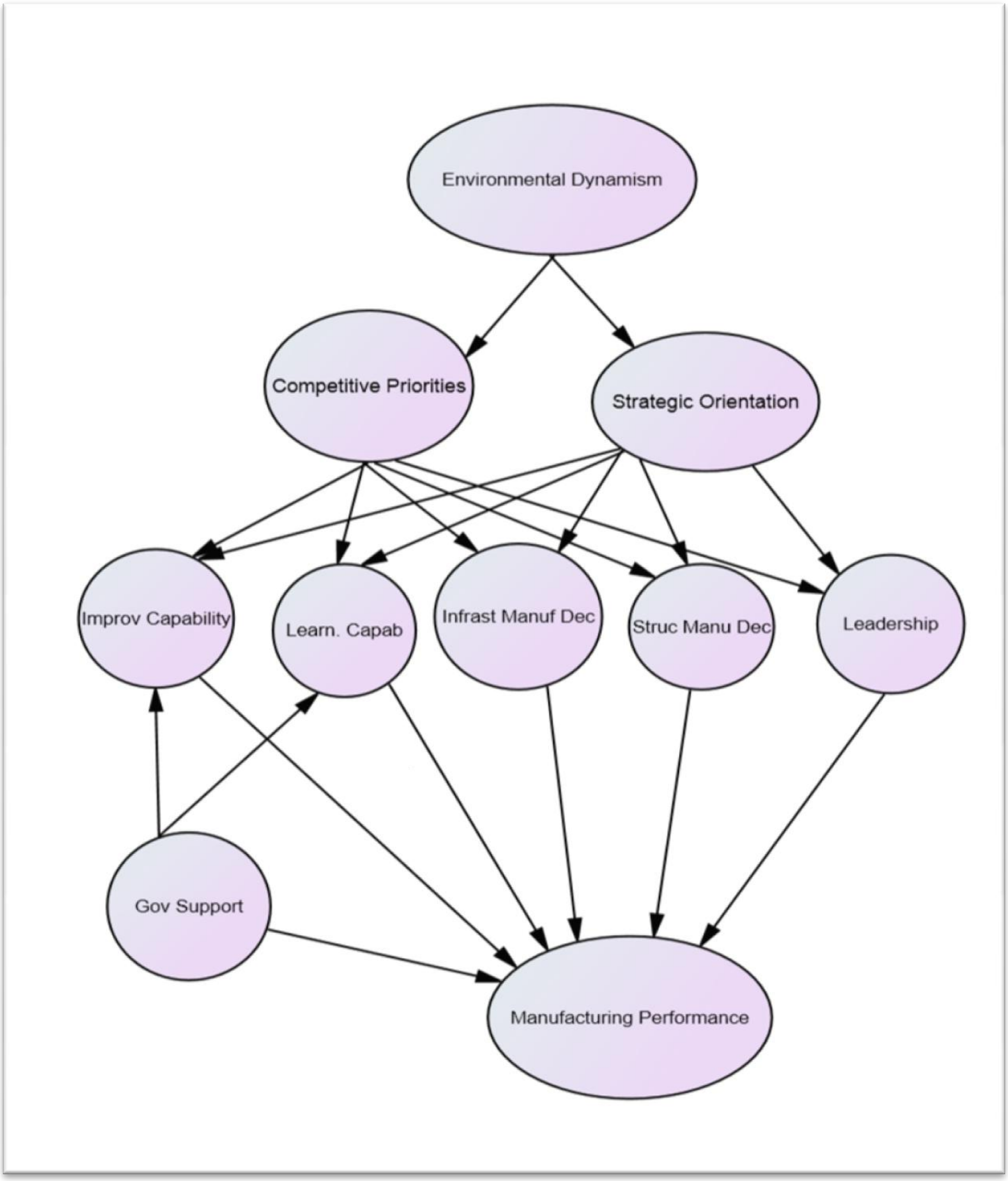
So far, no empirical study addressed the impact on plant performance of variables such as environmental dynamism, strategic orientation, aspects of manufacturing strategy, leadership, and government support altogether. In particular, the current researcher has not encountered empirical studies that adopt a comprehensive approach in studying the factors influencing the choice of competitive priorities and firm's strategic orientation and in turn their effect on manufacturing decisions, development of resources or capabilities, leadership practices of middle-level managers, and ultimately on plant performance. The foregoing problems and facts generally emphasize the need to undertake a more comprehensive study in this area, especially taking evidence from firms in developing economies. This study, therefore, attempts to provide better insights about the drivers of manufacturing performance in view of evidence from manufacturing firms in Ethiopia.

4.2. Conceptual Framework for the Study

In view of the above problem statement as well as research questions, theoretical foundations, and review of literatures presented in the prior chapters, a conceptual framework is developed as depicted in Figure 4.1. This framework posits that environmental dynamism influences the competitive priorities as well as firms' strategic orientation. These variables are in turn expected to guide strategic choices, development of learning and improvement capabilities, as well as manufacturing managers' leadership practices, each of which is then posited to be linked with manufacturing performance. Government support is viewed, on the other hand, as an external institutional contingency that is expected to directly influence manufacturing performance as well as firms' efforts to develop learning and improvement capabilities. Based on the proposed conceptual framework, relevant hypotheses are formulated and argued as presented in the following section.

4.3. Specification of Variables and Research Hypotheses

There are nine set of variables depicted in the conceptual framework: (1) environmental dynamism, (2) competitive priorities comprising (a) quality, (b) delivery, (c) cost, and (d) delivery priorities, (3) strategic orientation, (4) manufacturing decisions comprising (a) structural and (b) infrastructural elements, (5) learning capability comprising (a) external and (b) internal learning capabilities, (6) improvement capability, (7) leadership practices, (8) government support, and (9) manufacturing performance. Based on the problem statement and conceptual framework, different hypotheses are developed and argued as presented next.



Source: *Developed Based on the Literature*

Figure 4.1: Proposed Conceptual Framework for the Study

4.3.1. Environmental Dynamism – An Important External Driver

The proponents of the resource-based view argue that an individual firm's competitiveness and performance within the same industry varies due to differences in internal competencies and capabilities (Flwler, *et al.*, 2000; Tyler, 2001, both cited in Butt, 2009: 80). The impact of a firm's resources and competencies on its manufacturing strategy and performance, however, is influenced by environmental factors [as well] such as environmental dynamism (Butt, 2009: 80). Corporate leaders and management consultants have underscored the profound and rapid changes taking place in the corporate business environment (Mukerji, 2008: 39), and these changes are likely to affect firms decisions and actions. Although management decisions are often guided by the overall corporate strategy, environmental forces that are beyond a firm's control also have an impact on its functional strategies (Butt, 2009).

Contingency theory actually suggests the importance of having a proper alignment/fit between organizational strategy and the environment in order to achieve improved performance (Butt, 2009). “It is imperative that firms continually monitor their environment for changes, for instance, in buyer preferences, rapid environmental changes, and increased competition” (Butt, 2009: 80), because such environmental changes might make the firm's current strategies outdated and/or offer new growth opportunities (Butt, 2009). Accordingly, Cravens (1975) cited in Butt (2009: 80) argues that scanning of the environment provides an effective basis for linking corporate strategy to marketing strategy. It might also help to link corporate strategy to functional strategies like manufacturing strategy (Butt, 2009).

Many studies have actually pointed out that different factors, mainly "globalization and frequent technological innovation", have "led to the tremendous amount of uncertainties and turbulence prevailing in the external environment" (Mukerji, 2008: 40). "Researchers and corporate leaders alike also suggest that some embedded corporate strategies that were once successful in generating sustainable competitive advantage are not appropriate in the new environment" (Mukerji, 2008: 40). In this regard, customers demand ‘better prices, quality, and customer service at reduced costs’ (Mukerji, 2008). The success of new products in the market [hence] largely depends upon meeting customers' expectations and being able to exploit market opportunities, which is often difficult to do in an uncertain technological environment (Dechenaux, *et al.*, 2008 as cited in Mukerji, 2008: 39). This means that “companies have to keep a close tab on their commercialization costs while at the same time being innovative to survive and remain competitive in the contemporary business environment" (Mukerji, 2008: 40).

Many researchers, therefore, recognize the existence of relationship between the external environment and the aspects of manufacturing strategy (Ward and Duray, 2000; Butt, 2009). Ward and Duray (2000) found that environment uncertainity indirectly influence manufacturing strategy, and Butt (2009) obtained a positive and statistically significant relationship between 'environmental dynamism and innovation priority', which is one dimension of manufacturing strategy. The importance of the external environment, thus, has been well recognized in wide range of literatures although there is lack of consensus regarding how to conceptualize and measure this concept (Butt, 2009; Mukerji, 2008; Va´zquez-Bustelo, *et al.*, 2007).

Mukerji (2008: 39) uses the term environmental uncertainty in describing the external environment, which, he argues, is "manifested in the form of demand uncertainty and technological uncertainty". 'Competitive intensity' is also another aspect of environmental uncertainty (Mukerji, 2008). Butt (2009: 81), on the other hand, states that "environmental dynamism is one of the most frequently used measures of the external environment," and defines it as 'the rate at which customers' tastes and preferences change, new products and services become outdated and innovative products, services and processes are introduced' (2009: 150). Bierly and Daly (2007) cited in Butt (2009: 81) similarly define the concept of environmental dynamism as the "rate of environmental change and unpredictability of that change." As Butt states, the above environmental changes are often 'caused by the entrance of new competitors, changes in customer preferences and variations in the firm's technological capabilities' (2009: 81).

It seems that there is an overlap between environmental dynamism and environmental uncertainty concepts in conceptualizing or measuring the external environment as both emphasize the rate, degree, and/or intensity of environmental changes (Ward, *et al.*, 2007; Butt, 2009; Mukerji, 2008). To be more specific, this thesis adopts the concept of environmental dynamism and measures this concept in terms of the aspects included in Butt's (2009) definition. The change (or the situation) in the external environment, in this regard, could be an important driver of manufacturing strategy, which is likely to influence the competitive priorities as well as firms' strategic orientation. Accordingly, this study posits that:

$H_{1a\text{-}d}$: The level of environmental dynamism significantly influences (a) quality, (b) delivery, (c) cost, and (d) flexibility competitive priorities of manufacturing firms.

H_{1e}: The level of environmental dynamism significantly influences strategic orientation of manufacturing firms.

4.3.2. Competitive Priorities vs. Subsequent Decisions and Practices

Competitive priorities are the strategic goals or intentions firms seek to realize through their manufacturing operations (Flynn and Flynn, 2004; Peng, *et al.*, 2011). The competitive priorities direct firm's improvement actions and/or guide decisions regarding operational structure and infrastructure (Wheelwright and Hayes, 1985; Boyer, 1998; Miller and Roth, 1994; Frohlich and Dixon, 2001; Martı´n-Pen˜a and Dı´az-Garrido, 2008). They play important strategic role in directly guiding firm's programs/initiatives, decisions, or actions and indirectly influencing manufacturing performance (Hallgren, *et al.*, 2011). As Nair and Boulton (2008) indicate, the competitive priorities need to be augumented by different manufacturing investments and/or decisions that enable the firm to realize the priorities. Hence, the competitive priorities guide firms's decisions in the structural and infrastructural manufacturing resources (Junttila, 2000).

There is positive relationship between competitive strategy/priorities and manufacturing decisions (Sum, *et al.*, 2004; Rusjan, 2005; Ward, *et al.*, 2007). The competitive priorities also seem to be related with plant capabilities such as 'improvement and innovation' (Peng, *et al.*, 2011). From another vantage point, Kathuria and Partovi (1999) analyzed the moderating effect of competitive priorities on the relationship between managerial practices (also called leadership practices) and manufacturing group performance. Their study indicates that flexibility priority - an important dimension of strategic goals - moderates the relationship between managerial practices and group performance. Kathuria, *et al.* (2010), on the other hand, argue that the competitive orientation (a configuration of the competitive priorities) of the manufacturing unit can even influence the leadership practices of the manufacturing manager in the firm.

Depending on the nature of the competitive strategy being pursued, different leadership styles may be adopted by organizational managers (Skinner, 1969). It seems that managers exercise or demonstrate a specific behavior or leadership practice depending on the situation they are in (Kathuria and Partovi, 1999). They may emphasize on or show different practices or styles in different circumstances. When the emphasis is on high quality, a manger may show a specific behavior; and when this priority changes or given less attention relative to the other priorities, a different behavior or style is expected from the manager (Kathuria, *et al.*, 2010). So, leadership practices seem to be strongly related with competitive priorities and strategic orientation as well. Based on the above evidence and argument, therefore, this study posits that:

$H_{2a\text{-}f}$: Quality priority significantly influences (a) structural manufacturing decisions, (b) infrastructural manufacturing decisions, (c) leadership practices of manufacturing managers, (d) external learning capability, (e) internal learning capability, as well as (f) improvement capability.

$H_{3a\text{-}f}$: Delivery priority significantly influences (a) structural manufacturing decisions, (b) infrastructural manufacturing decisions, (c) leadership practices of manufacturing managers, (d) external learning capability, (e) internal learning capability, as well as (f) improvement capability.

$H_{4a\text{-}f}$: Cost priority significantly influences (a) structural manufacturing decisions, (b) infrastructural manufacturing decisions, (c) leadership practices of manufacturing managers, (d) external learning capability, (e) internal learning capability, as well as (f) improvement capability.

$H_{5a\text{-}f}$: Flexibility priority significantly influences (a) structural manufacturing decisions, (b) infrastructural manufacturing decisions, (c) leadership practices of manufacturing managers, (d) external learning capability, (e) internal learning capability, as well as (f) improvement capability.

4.3.3. Strategic Orientation vs. Subsequent Decisions and Practices

The situation or changes in the environment often influence the way firms develop their plan, things or activities they focus on, as well as their day-to-day routines or practices. Depending on what is happening in their surrounding, firms vary their sensitivity or orientation towards aspects like needs and preferences of customers, acts of competitors or intensity of competition, innovation and innovativeness, resources, and so on (Darmanto, *et al.*, 2014). As Yang, *et al.* (n.d.) state, "organizations use various strategies to adapt to changes in the environment and create a more favorable alignment between their internal operations and the external environment." And according to Manu and Sriram (1996) cited in Yang, *et al.* (n.d.), these strategies or efforts indicate firms' strategic orientations.

Strategic orientation is, therefore, 'an important organizational resource', though different definitions have been given regarding this concept (Yang, *et al.*, n.d.; Darmanto, *et al.*, 2014). Researchers often use this term 'to describe different aspects of competitive culture' or firms' orientations such as market-, customer-, competitor-, learning-, innovation or technical innovation-, entrepreneurship-, etc. orientations (Yang, *et al.*, n.d.; Darmanto, *et al.*, 2014). The varying level of emphasis firms place on these aspects could be considered to reflect their strategic orientation, which in turn guides firm's efforts to develop various kinds of strategies (Noble, *et al*., 2002).

It is understandable that researchers may have different interests on the strategic orientations, and hence seem to focus on various combinations of the sub-elements of this concept rather than on all of these sub-elements (Yang, *et al.*, n.d). However, it is important to come to a holistic view of this concept in order to analyze and understand its impact on subsequent decisions and/or practices. With this view, strategic orientation is thus considered as a high-level factor or concept in this study mainly reflected in or operationalized in terms of its sub-elements such as market-, customer-, competitor-, resource-, and innovation- orientation (Butt, 2009).

Market orientation can be considered as key element of strategic orientation and is defined as 'the organizational culture that most effectively and efficiently creates the necessary behaviors for the creation of superior value for buyers and thus, continuous superior performance for the business' (Butt, 2009: 76). Firms' emphasis on the situation in the market, hence, seems to be critical 'since knowledge of customer requirements and competitors' actions is necessary to compete effectively in today's highly competitive environment where customers are exposed to numerous product choices' (Butt, 2009: 76). Market orientation is more outside (external) oriented as it focuses on customers as well as aims to keep the firm close to its competitors (Butt, 2009). Customer- and competitor-orientation, on the other hand, could be considered as key components of market orientation (Butt, 2009).

Following Butt (2009), the term ‘business strategy orientation’ is used instead of market orientation in this thesis in order to distinguish this concept from the above two aspects, i.e. customer- and competitor- orientation. Business strategy orientation may simply mean market orientation given that firms develop their business and/or manufacturing strategies in view of the external environment, especially the market they are currently serving or prepared to serve in the foreseeable period. "Manufacturing strategy based on market-orientation [therefore] focuses on external factors" because it is the market structure that determines performance and competitive behavior (Butt, 2009: 76). The literature also indicates that a firm's business strategy (and hence business strategy orientation) drive the formulation of its manufacturing strategy (Butt, 2009), for instance, through guiding the manufacturing decisions and/or development of plant capabilities such as learning, improvement, and so on.

Customer focus or customer orientation is also a key issue in marketing, which is deemed to have a positive impact on business performance (Zhu and Nakata, 2007 as cited in Butt, 2009: 72). As Danneels (2003) quoted in Butt (2009: 72) suggests, creating close contact with customers “...leads to a better understanding of customers' needs, closer tailoring of products and services, higher customer satisfaction, easier forecasting of demand, and closer relationships” (Butt, 2009: 72). This in turn emphasizes the importance of understanding and/or analyzing the needs and other characteristics of customers in order to remain competitive in the contemporary marketing environment (Butt, 2009). Firms that focus on the needs, motives, behavior, etc. of customers might develop their manufacturing strategy in a way that enable them satisfy those needs and requirements, which in turn enhance performance (Butt, 2009).

Competitor orientation, on the other hand, refers to ‘the ability and the will to identify, analyze, and respond to competitors’ actions’ (Yang, *et al.*, n.d.). A firm’s emphasis on its competitors, in this regard, might lead to the development of external and internal learning capabilities, improvement capability, as well as might help firms make consistent strategic choices/decisions. This, in turn, may result in the development of unique/competitive manufacturing capabilities that would become the bases for achieving competitive advantage. ‘Analysis of existing and potential competitors [therefore] should be a fundamental step of manufacturing strategy development process' (Porter, 1980, 1985 as cited in Butt, 2009: 75). A firm might be able to protect itself from the competitive pressures of other firms by defining its competition (Porter, 1985) and properly setting or formulating its competitive priorities. Competitor orientation, thus, seems to be absolutely essential for the implementation of manufacturing strategy as well (Butt, 2009).

In addition to the aforementioned elements of strategic orientation, which are more outside-in oriented, firms may also emphasize internal aspects such as resources and capabilities. The elements of strategic orientation that could be considered as inside-out oriented, in this regard, are resource orientation and innovation orientation. While the focus of market orientation is external, resource orientation and innovation orientation seem to focus on internal factors (Butt, 2009). It has been found that "firms developing manufacturing strategies use resource orientation as their primary and preferred paradigm" (Cagilano, *et al.*, 2005 as cited in Butt, 2009: 75). Butt (2009) also indicates that increased recognition of resource orientation as key driver for manufacturing strategy.

Innovation orientation, on the other hand, is "a characteristic of the corporate culture and is normally considered as a component of a broader innovation culture" (Butt, 2009: 79). It can be defined or described as 'openness to new technologies', searching it in advance, and readiness to acquire such technologies and capabilities when it is necessary (Butt, 2009). Innovation is the "heart of firm success in today's competitive environment" (Li and Simerly, 2002 as quoted in Butt, 2009: 78) and considered to be a strong tool in combating competition and creating sustainable competitive advantage (Porter, 1990, cited in Butt, 2009: 78). Different scholars have indicated that investments in innovation, in the contemporary period of rising competition, are likely to give firms competitive advantage in global and international markets (e.g. Brown and Eisenhardt, 1995; Conner, 1991, both cited in Butt, 2009: 78). The relationship between 'competitive strategies and innovation' also seems to be well understood by researchers as well as company managers (Butt, 2009: 78). Butt (2009) for instance examined the link between innovation orientation and manufacturing strategy, and confirmed the existence of positive relationship between the two.

The preceding discussion reveals that each of the sub-elements of strategic orientation (i.e. business strategy-, customer-, competitor-, resource-, and innovation- orientation) seems to influence manufacturing decisions, learning and improvement capabilities, as well as leadership practices of manufacturing managers. This thesis further argues that strategic orientation (comprising customer, competitor, business strategy, innovation, and resource orientation dimensions) also likely to influence manufacturing decisions, learning and improvement capabilities, as well as leadership practices of manufacturing managers. Accordingly, the study posits that:

$H_{6a\text{-}f}$: Strategic orientation significantly influences (a) structural manufacturing decisions, (b) infrastructural manufacturing decisions, (c) leadership practices of manufacturing managers (d) external learning capability, (e) internal learning capability, as well as (f) improvement capability.

4.3.4. Manufacturing Performance

Manufacturing performance is concerned with the extent to which the manufacturing plant has performed with respect to the operations dimensions or capabilities like manufacturing cost, conformance quality, delivery (on-time delivery and delivery speed), and volume and mix flexibility (Ketokivi and Schroder, 2004a). The primary determinants of these capabilities often seem to be plant level factors (or variables) such as strategic goals, intervention choices, practices, as well as capabilities like learning or improvement (Junttila, 2000; Schroeder, *et al.*, 2002; Ketokivi and Schroder, 2004a; Peng, *et al.*, 2008, 2011). Leadership practices of manufacturing managers could also be important drivers of manufacturing performance. The relationship between the preceding variables and manufacturing performance is discussed in the following sections.

4.3.4.1. Manufacturing Decisions and Manufacturing Performance

Manufacturing decisions are the courses of action that involve decisions pertaining to business focus, allocation of resources for fixed assets and various facilities, product design and engineering development, and supporting infrastructure (Skinner, 1969). These decisions are broadly classified into structural and infrastructural dimensions (Wheelwright, 1984). As Ward, *et al.* (2007) and Martı´n-Pen˜a and Dı´az-Garrido (2008) argue, manufacturing strategy is implemented by a series of decisions in these areas (i.e. in the structural and infrastructural manufacturing resources). Hallgren, *et al.* (2011) also suggest that firms should “build effective programs and action plans” concerned with improvements in the aforementioned manufacturing strategy decisions in order to create manufacturing competencies.

As Colotla, *et al.* (2003) also indicate, firms can obtain competitive advantage by investing in or developing superior structural and infrastructural resources or practices. 'Performance frontiers theorists' further argue that firms need to make balanced investments in both structure and infrastructure areas in order to achieve better manufacturing performance (Power, *et al.*, 2010: 207). In view of these insights, different researchers attempted to examine the effects of investments in the structural and infrastructural resources and found that decisions in these areas positively influence operational performance (Acur, *et al.*, 2003; Christiansen, *et al.*, 2003; Devaraj, *et al.*, 2004; Narasimhan, *et al.*, 2005; da Silveira, 2005). Accordingly, this study also posits that:

$H_{7a\text{-}b}$: Manufacturing decisions in the (a) structural and (b) infrastructural areas significantly influence firms' manufacturing performance.

4.3.4.2. Leadership Practices and Manufacturing Performance

A lot has been said about leaders and/or leadership, and there is little doubt about what they can do in good or bad times in an organization. Leaders are the rope that tie altogether and guide employees to common goals or destiny. The way leaders speak, behave, interact, or act has important implications to what employees do or achieve in their day-to-day routines as well as in their long-term engagement with the firm. The issue and importance of leadership, thus, has been discussed in wide range of theoretical literatures as well as obtained a great deal of empirical attention in different contexts. Manufacturing firms are among those institutions wherein this role has been explored and/or studied by different researchers. The operations function is one of the key functional areas in the context of manufacturing that needs strong and visionary leadership practices to succeed.

The issue and/or role of leadership practices in the operations management field, and hence in the firm's operations, has been recognized since the early work of Skinner (1969). In this regard, Skinner examined the competitive strategies of two manufacturing firms and found that they pursue different strategies. And in view of this, he suggested different leadership styles to these firms as they are pursuing distinct strategies. It is implied in his argument that different strategies require different leadership. Based on this earlier insight, subsequent scholars tried to study the link between competitive priorities and human resource management (HRM) practices (Jayaram, *et al.*, 1999; Santos, 2000; Ahmed and Schroeder, 2003) as well as leadership practices and performance or group performance (Kathuria and Partovi, 1999; Kathuria, *et al.*, 2010).

Kathuria and Partovi (1999) assessed the impact of workforce management practices (meaning leadership practices) of manufacturing managers on managerial (i.e. group) performance while Kathuria, *et al.* (2010) later simultaneously examined the effect of competitive orientation and manufacturing manager's leadership practices on this same variable. The former found that 'the better performing manufacturing managers strongly demonstrate relationship-oriented leadership practices', especially when the firm places high emphasis on 'flexibility priority' (Kathuria and Partovi, 1999). Such managers also show 'participative leadership and delegation practices' when flexibility is a priority (Kathuria and Partovi, 1999). Kathuria, *et al.* (2010) on the other hand conclude that 'effective leadership is positively associated with overall manufacturing performance'. Its effect on performance actually exceeds that of 'competitive orientation and industry membership' (Kathuria, *et al.*, 2010).

There are many ways through which leaders can actually influence their subordinates and hence enable the achievement of better group or manufacturing performance (Kathuria, *et al.*, 2010). As Kathuria, *et al.* (2010) argue, effective leadership of a manufacturing manager can help to improve manufacturing performance on many fronts such as reducing manufacturing lead time (or cycle time); improving quantity produced, productivity, and efficiency; enhancing accuracy and quality of work; controlling product costs; meeting delivery schedules; as well as improving product mix and design (2010: 1086). The manufacturing managers can contribute towards the achievement of the above performance objectives through exercising or exhibiting different leadership practices or styles appropriate to the particular situation (Kathuria and Partovi, 1999; Kathuria, *et al.*, 2010). They may empower employees to take actions and implement decisions through 'delegating their work', which in turn might 'help to reduce the time spent in seeking approvals' or permissions from the concerned manager (Kathuria, *et al.*, 2010). This is likely to reduce manufacturing cycle time and hence enable the firm compete effectively on the basis of delivery speed or time (Kathuria, *et al.*, 2010). "Empowered employees can do the action planning" for day-to-day activities (Kathuria, *et al.*, 2010: 1086). They could be "authorized to identify and resolve work-related problems" as well (Kathuria, *et al.*, 2010: 1086-87). Accordingly, this might help to enhance both accuracy and quality of work (Yukl, 2006 cited in Kathuria, *et al.*, 2010: 1087).

A manufacturing manager can also proactively identify and resolve work related problems before hand, which in turn helps to avoid or minimize delays due to work interruptions (Kathuria, *et al.*, 2010: 1086). These practices actually reveal the problem solving behavior of leaders (Yukl, 1989). They can also 'enforce rules and thus control costs' by continuously monitoring of activities, i.e. checking the progress of work/activities (Kathuria, *et al.*, 2010). Strict enforcement of rules is considered necessary when the objective is to control product costs (Porter, 1980, 1985 cited in Kathuria, *et al.*, 2010: 1086). Leaders can also allow the involvement or participation of employees in the course of planning as well as decision making (Yukl, 2006 as cited in Kathuria, *et al.*, 2010: 1086). 'Participative behaviors' further encourage the development and application of new ideas as well as facilitate learning, which is a again likely to 'enhance group performance' (Kathuria, *et al.*, 2010: 1086).

Managers in general and manufacturing managers in particular are able to motivate and inspire employees by being considerate of their needs as well as becoming more supportive especially in highly challenging works and uncertain business environments, both of which lead to frustration and fatigue among employees (Kathuria, *et al.*, 2010). A supportive leader helps employees overcome the challenges and/or anxiety often associated with a new complex task or uncertainities in the business operations (Howell and Costley, 2001 as cited in Kathuria, *et al.*, 2010: 1086). "The encouraging and confidence building behavior of such a manager allows employees to more efficiently apply their collective energies toward effective performance" (Kathuria, *et al.*, 2010: 1087). The above discussion generally reveals that leadership practices are key ingredients for improving plant performance, and hence this study posits that:

H_8: Leadership practices of manufacturing managers significantly influence plant performance.

4.3.4.3. Learning and Improvement Capabilities and Plant Performance

Taking the resources- and capabilities-based perspective, learning and improvement capabilities, among others, can be viewed as important elements/dimensions of manufacturing strategy. These capabilities seem to emerge from different internal routines or distinct set of OM practices (Schroeder, *et al.*, 2002; Peng, *et al.*, 2008). Learning capability can be created through interactions among employees within the firm, training and developing skills of employees to perform multiple tasks, as well as management’s attitude towards employees’ comments and suggestions and taking it seriously to improve products, services, or processes. Such skills and interactions create what is described as internal learning capability (Schroeder, *et al.*, 2002). It is also possible that learning can be occurred through interactions and close communications with customers and suppliers as well as incorporating their comments and suggestions in product or process design, which refers to external learning capability (Schroeder, *et al.*, 2002).

According to Schroeder, *et al.* (2002), internal and external learning capabilities of the manufacturing plant together lead to the development of unique “product and process equipments” which eventually enhance ‘plant performance’. Because learning capability is built within the manufacturing plant, it cannot be easily copied by others and hence it is likely to influence manufacturing performance (Schroeder, *et al.*, 2002). Improvement capability, on the other hand, seems to arise from key routines and/or practices associated with “continuous improvement, process management, and leadership involvement in quality practices” (Peng, *et al.*, 2011). Peng, *et al.’s* (2011) study reveals the existence of relationship between firm’s improvement capability and specific dimensions of manufacturing performance. They also found that improvement capability partially mediate the relationship between competitive priorities and plant performance (Peng, *et al.*, 2011). Learning and improvement capabilities, thus, are important operations capabilities that the manufacturing plant needs to possess or develop as they are linked with measures of manufacturing performance. Accordingly, this study posits that:

$H_{9a\text{-}c}$: (a) External learning, (b) internal learning, and (c) improvement capabilities of the manufacturing plant significantly influence manufacturing performance.

4.3.5. Government Support: An Institutional Contingency

Institutional forces (or factors) are important environmental contingencies that affect firms' decisions and practices. Although institutions play critical role everywhere in the globe, it seems to be mostly invisible in developed economies where they are strong (Meyer, *et al.*, 2009). However, in developing and emerging economies where institutions are mostly weak, the role of - and supports provided to business firms by - various institutions especially the government is by far visible and/or 'explicit' as Meyer, *et al.* (2009) put it. In this regard, scholars argue that firms' investment decisions, practices, and performance in such contexts are often influenced by institutional forces such as 'institutional support from associative organizations' (Mesquita, *et al.*, 2007); 'input supporting and marketing supporting government policies' (Malik and Kotabe, 2009); as well as 'legal protection, government support, and informal networks and personal relationships' (Cai, *et al.*, 2010). The term ‘associative organizations’, according to Mesquita, *et al.* (2007), generally refers to various institutions such as ‘business associations and government agencies’ that provide different types of supports and/or incentives to business organizations.

Both developing and emerging economies often experience scarcities in some basic resources as well as lack of managerial expertise, skilled labor, and production capabilities. These resources or skills cannot be easily obtained or developed without the involvement, collaboration, and/or support of wide range of institutions, mainly the government. That is why there is often ‘a pervasive role of government institutions in economic activities’ in these economies (Mesquita, *et al.*, 2007; Malik and Kotabe, 2009). The role of government and its institutions, among other institutional forces, therefore seems to be critical in these contexts. According to Cai, *et al.* (2010), government support is reflected in implementation of policies and special projects that benefit companies; providing needed information, financial support, etc; as well as helping companies obtain resources. Malik and Kotabe (2009) rather view government support in terms of “input” and “marketing” supporting government policies.

Input supporting government policies refers to support provided by government in the search, adaptation and implementation of appropriate technologies, which is argued to enhance organizational learning (Malik and Kotabe, 2009). These researchers also argue that government support in [the] search, adaptation and implementation of appropriately fitting technologies provides a lower cost and higher productivity starting point for organizational learning efforts (Malik and Kotabe, 2009: 431). “Subsequent organizational learning efforts build upon this higher starting point in technological choice by identifying and solving implementation problems, merging new technology with organizational routines, and thereby creating superior performance” (Malik and Kotabe, 2009: 431). Marketing supporting government policies, on the other hand, are meant to encourage firms to build marketing knowledge (Malik and Kotabe, 2009). Marketing knowledge includes understanding of quality standards, market segments, and distribution systems in viable foreign markets (Malik and Kotabe, 2009: 431). By offering these services through government agencies, and linking export performance to financial rewards, governments hope to instill customer driven resource investments …, thereby facilitating more customer-oriented marketing strategies (Malik and Kotabe, 2009: 431).

Malik and Kotabe (2009) then argue that the synergetic effect of a specific plant capability (such as manufacturing flexibility) and marketing supporting government policies would result in lower costs, differentiation, and hence stronger competitive position. The results in their study revealed that the interactions between organizational learning capability and 'input supporting government policies' has significant effect on performance. However, they also obtained that the combined effect of 'manufacturing flexibility and marketing supporting government policies' on performance was not significant. Malik and Kotabe (2009) still recognize government support as an important contextual variable that needs to be considered in future empirical studies. The influence of institutional forces (particularly government support) on plant performance and/or in enhancing the performance effect of capabilities (like learning or improvement) in firms from emerging or developing economies, thus, needs further research.

Government support is especially worth considering in developing economies like Ethiopia where the federal and regional governments extend different kinds of support to manufacturing firms including market, financial, institutional, and technical supports (including training) (EEA, 2011); initiating and collaborating in the implementation of best manufacturing practices (such as kaizen, total quality management, etc); as well as taking the initiative to upgrade the technologies and processes of some (prioritized) industries (EEA, 2011). The government hence plays key roles through providing different incentives and/or supports to manufacturing firms in the context (EEA, 2011), and this role can be viewed as an institutional contingency that is likely to influence manufacturing performance or help to build external learning, internal learning, and improvement capabilities of the manufacturing plant. With this view, the study posits that:

$H_{10a\text{-}d}$: Government support significantly influences (a) manufacturing performance, (b) external learning capability, (c) internal learning capability, and (d) improvement capability of medium and large scale manufacturing firms in Ethiopia.

4.4. Summary

This chapter has provided detailed account of the research problem, conceptual framework, and hypotheses. The problems and identified gaps in the literature served as the bases for developing the conceptual framework and the research hypotheses. The major concepts depicted in the framework include environmental dynamism, competitive priorities, strategic orientation, manufacturing decisions, learning and improvement capabilities, leadership, government support, and manufacturing performance. The hypothesized relationships between these variables are underpinned by the insights or arguments of diverse theoretical perspectives and empirical studies in the area of manufacturing strategy, leadership, institutional forces, and performance.

As the conceptual framework depicts, environmental dynamism is expected to influence the competitive priorities as well as strategic orientation of manufacturing firms. These variables are then expected to be linked with manufacturing decisions, learning and improvement capabilities, and leadership practices. Manufacturing performance is the ultimate dependent variable which is posited to be influenced by each of these variables. Government support is also expected to directly influence manufacturing performance as well as contribute to the development of external learning, internal learning, and improvement capabilities of the manufacturing plant. In the next chapter, detailed discussion is made regarding the research design and methodology in the study.

CHAPTER 5

RESEARCH DESIGN AND METHODOLOGY

This chapter presents the research design, population and sampling, instruments and measures, as well as data collection strategy. The operational measures of variables obtained from various studies in the literature are presented in a tabular form and detailed assessment is made regarding non-response bias, common method variance (CMV), as well as reliability and validity of the scales and constructs. The statistical model used and procedures followed for data analyses are also explained in this chapter.

5.1. Paradigm of the Study and Research Design

This study is concerned with examining organizational factors (or variables) associated with manufacturing strategy, leadership, and manufacturing performance as well as external factors such as environmental dynamism and government support. The approach in the study is deductive as concepts have been operationalized in view of the literature and relevant theoretical perspectives. The study lies in the pragmatism paradigm and the method adopted is quantitative-emphasis mixed method. The data collection design is cross-sectional survey, and the main instrument used is a multi-dimensional questionnaire. The data was organized and coded into the SPSS 20.0 software and analyzed using descriptive as well as inferential statistical techniques. In particular, the study implemented confirmatory factor analysis (CFA) model using structural equation modeling (SEM) to analyze data and test the research hypotheses[7]. The analyses conducted using this model, however, focused only on examining relationships between variables rather than investigating cause-effect relationships owing to the study's design. The SEM technique is, therefore, used only to describe relationships between variables and draw inferences to the population, and not to form causality, in the study.

5.2. Population and Sampling

The survey report of the CSA on the distribution of large and medium scale manufacturing and electricity industries in Ethiopia indicates that 2,172 manufacturing firms operate in the

[7] AMOS 20.0 statistical software is used to implement the SEM approach for data analysis.

country in the year 2009/10, of which 138 firms are owned by the government and the rest privately owned (Ethiopia. CSA, 2011). The report stratifies the manufacturing industries into fifteen strata on the bases of nature of products as well as shows their spatial distribution (in the nine regions and two city states) in the country. In this regard, 40.3% (or 875) manufacturing firms are found in one of the city states - Addis Ababa, and the rest 59.7% (or 1,297) firms are widely distributed in the nine regions and the other city state in the country (Ethiopia. CSA, 2011). Addis Ababa is leading with industrial concentration as well as contains firms from each of the fifteen industrial strata[8], which is not the case in many regions in the country.

Manufacturing firms located in Addis Ababa and its periphery seem to have relatively long years of manufacturing and marketing experience as well as access to skilled labor, managerial expertise, and improved manufacturing technologies and practices. It is expected that firms located in this city perform better as compared to those operating in the regions and/or rural areas as Rijkers, *et al.* (2010) recently obtained important differences in the performance of rural firms and urban firms in the country. Relevant data vis-à-vis manufacturing strategy, leadership, performance, etc. is also believed to be easily obtained from manufacturing firms operating in this city than in the regions or rural areas due to the geographical spread (or remoteness of some of the areas). For its significance, therefore, this study has focused on firms selected from Addis Ababa and its periphery only.

According to the CSA in Ethiopia, "manufacturing" is defined (consistent with International Standard Industrial Classification (ISIC) Revision-3.1) as follows:

> '…. The physical or chemical transformation of materials or components into new products, whether the work is performed by power-driven machines or by hand, whether it is done in a factory or in the worker's home, and whether the products are sold at wholesale or retail. The assembly of the component parts of manufactured products is also considered as a manufacturing activity. …' (Ethiopia. CSA, 2011).

Although different studies define medium- or large-sized firms as those with 50 or more employees (Martı´n-Pen˜a and Dı´az-Garrido, 2008; Ward and Duray, 2000; Boyer, 1998; Urgal-Gonzalez and Garcia-Vazquez, 2007), the CSA's definition considers those manufacturing establishments which employ ten persons and more and use power-driven machine (Ethiopia. CSA, 2011). For the sake of consistency, CSA's definition of Large and

[8] See Appendix 15 for distribution of manufacturing firms in Addis Ababa (Ethiopia. CSA, 2011).

Medium Scale Manufacturing Industries in Ethiopia is adopted in this study (Ethiopia. CSA, 2011).

In view of CSA's definition and various studies in the area[9], the current study particularly focused on firms selected from the following ten industrial categories (strata) in the context: Food products and Beverages, Textiles, Wearing Apparel, Tanneries and Leather products, Chemical/Chemical products, Non-Metallic Mineral Products, Iron and Steel, Fabricated Metal Products, Machinery and Equipment, and Assemblers of Vehicles and Trailers/Semi-Trailers (Ethiopia. CSA, 2011). The total number of firms falling in the aforementioned industrial categories in the country as a whole in the year 2009/10 is 1,574 (Ethiopia. CSA, 2011), of which 600 firms (i.e. 38.12%) are found in Addis Ababa and its periphery. With a precision level (sampling error) of e = 0.05, a sample of 240 manufacturing firms (determined as per the optimal method) was selected for the study from this particular area.

The following formula is used in determining the sample size:

$$n = \frac{N}{1 + N(e)^2}$$

where: n = sample size; N = size of population; and e = precision level (Cochran, 1963)

A proportional stratified sampling technique, in view of the distribution of manufacturing firms in each category, is then used to determine 'how many firms' to choose from each industrial category (strata) considered in the study. Samples (firms) are eventually selected randomly from each category in light of the respective sample proportion. The names and addresses of manufacturing firms operating in Addis Ababa and its periphery are obtained from the 2011-2012 Business Directory of Addis Ababa, which was published on a CD-ROM by the Addis Ababa Chamber of Commerce and Sectoral Associations. Table 5.1 presents distribution of the population and firms actually participated in the study (i.e. firms completed and returned the survey questionnaires).

[9] Most manufacturing strategy researchers use either National Standard Industrial Classification (SIC) or International Standard Industrial Classification (ISIC) codes to determine which industries to include in their manufacturing strategy survey. The majority of researchers, in this regard, focused on specific or limited industrial categories, such as on business units (plants) with the metal industry as their main activity rather than considering all manufacturing industries (Peng, *et al.*, 2011; Vazquez-Bustelo, *et al.*, 2007; Urgal-Gonzalez and Garcia-Vazquez, 2007; Martı´n-Pen˜a and Dı´az-Garrido, 2008; Boyer, Ward & Leong, 1996; Ward and Duray, 2000). A few researchers in fact considered plants from wide range of industries as well (Kathuria, 2000; Kathuria and Partovi, 1999; Zhao, *et al.*, 2006; Amoako-Gyampah and Meredith, 2007).

Table 5.1: Distribution of Firms in the Population vs. Actual Participants

No	Category of Manufacturing Industries	Distribution			
		Firms in the Population		Firms Actually Participated	
		Freq	%	Freq	%
1	Manufacture of Food Products and Beverages	219	36.5	47	23.86
2	Manufacture of Textiles	17.0	2.83	14	7.11
3	Manuf. of Wearing Apparel, Except Fur Apparel	41.0	6.83	10	5.08
4	Tanning and Dressing of Leather, Manufacture of Luggage, Handbags, Footwear, etc	69.0	11.5	17	8.63
5	Manufac. of Chemicals and Chemical Products	55.0	9.167	34	17.26
6	Manuf. of Other Non-Metallic Mineral Products	95.0	15.83	15	7.61
7	Manufacture of Basic Iron and Steel	7.0	1.167	7	3.55
8	Manufacture of Fabricated Metal Products Except Machinery and Equipment	83.0	13.83	37	18.78
9	Manufacture of Machinery and Equipment N.E.C	10.0	1.67	7	3.55
10	Assembly of Motor Vehicles, Trailers and Semi-Trailers	4.0	0.667	3	1.52
11	Others (Foam and Plastics, Furniture Manufac., etc)			6	3.05
	Total	**600**	**100%**	**197**	**100%**

Source: *Based on Ethiopia. CSA (2011) and Own Study (2013)*

5.3. Unit of Analysis and Data for the Study

5.3.1. Unit of Analysis

The unit of analysis in this study is 'the manufacturing plant', and hence primary data was collected at the level of the manufacturing unit/plant (Kathuria, *et al.*, 2010; Peng, *et al.*, 2011). Even with the manufacturing unit/plant as the unit of analysis, however, researchers often include manufacturing plants or divisions for larger firms, and the entire organization for smaller organizations (Kathuria, *et al.*, 2010). Accordingly, many firms were actually included in their entirety in the current study because most manufacturing companies in the local context do have one 'Strategic Business Unit (SBU)', i.e. they involve in a single line of business and/or operate with a single plant. The manufacturing plant represents the entire organization in this case and manufacturing strategy is formulated at firm level in such circumstances.

5.3.2. Respondents and Data for the Study

As Forza (2002) cited in Hallgren and Olhager (2009: 984) notes, 'it is not possible for a plant to produce answers to a questionnaire; this has to be done by human respondents'. In fact, it is customary to use informants/respondents (single or multiple) in eliciting data about organizational attributes and/or practices (Miller and Roth, 1994; Kathuria, *et al.*, 2010;

Hallgren and Olhager, 2009). Use of multiple respondents, in particular, helps to ensure reliability, allows informants to address issues in their areas of expertise and/or scope, as well as reduces common method bias[10] (Miller and Roth, 1994). Common method bias is likely to occur when "responses from a single respondent are used to measure the predictor and criterion variables" (Miller and Roth, 1994). Obtaining data on the independent and dependent variables from different respondents minimizes the likelihood of this problem (Miller and Roth, 1994; Kathuria, *et al.*, 2010), and hence multiple respondents were selected and included from each sample firm in order to get the necessary data in the study.

Accordingly, primary data was elicited from three different sources, that is, from plant managers, manufacturing managers, and subordinates of manufacturing managers, which is then matched for the analyses (Kathuria, *et al.*, 2010). Different set of questionnaires (i.e. Type 1, Type 2, and Type 3 questionnaires) were prepared and used to elicit data from each of these sources. Table 5.2 depicts the target respondents on the specific measures, number required from each plant, as well as type of instruments used in eliciting data.

Table 5.2: Variables and Respondents in the Study

Variables	Target Respondent(s)	No. from Each Plant	Instruments Used
Environmental Dynamism	General Manager/CEO, Manager, or Deputy Manager	1	Type 1 Questionnaire
Strategic Orientation			
Government Support			
Manufacturing Performance			
Competitive Priorities	Operations (or Manufacturing) Manager	1	Type 2 Questionnaire
Manufacturing Decisions			
Learning and Improvement Capabilities			
Leadership Practices	Subordinates of the Manufacturing Manager	3	Type 3 Questionnaire
Total from Each Plant		**5**	

Source: *Own Study (2013)*

As the table depicts, data pertaining to the aspects or measures of environmental dynamism, strategic orientation, government support, and manufacturing performance were collected

[10] According to Spector (1987) cited in Agarwal and Selen (2011: article submitted for publication), 'common method variance [also called common method bias] is an artifact of measurement that biases results when relations are explored among constructs measured by the same method'.

from general managers/CEOs, managers, or deputy managers using Type 1 questionnaire. Data regarding competitive priorities, manufacturing decisions, and learning and improvement capabilities were collected from manufacturing managers using Type 2 questionnaire. And similar to Kathuria, *et al.* (2010), three employees who are subordinates of the manufacturing manager are selected from each plant to obtain data about leadership practices of their boss through Type 3 questionnaire[11]. The foregoing procedure is actually one mechanism to reduce common method bias in the study. However, in order to further reduce or avoid the likelihood of this problem, special steps were taken in designing the data collection instruments as well such as using multiple-item scales to measure all the constructs in the study (Dezdar and Ainin, 2011; Arendt and Brettel, 2010; Agarwal and Selen, 2011).

Apart from primary data, the study has also used secondary data from publicly available documents and reports produced by concerned government ministries or agencies like MoFED, MoI, and CSA, as well as economic and policy research institutes such as EEA. The secondary data or information used in this regard relates to census reports on medium and large scale manufacturing firms, GTP (with particular reference to the manufacturing sector), and report on the performance of the Ethiopian economy. These documents were analyzed qualitatively and important lessons or implications to manufacturing performance eventually drawn in the study.

5.4. Data Collection Instruments, Strategy, and Ethics

5.4.1. Developing Data Collection Instruments

As mentioned in the preceding section, the main instruments used to gather primary data are multi-dimensional questionnaires, which were prepared based on prior studies and extensive review of literature in the area. The questionnaires were also reviewed and approved by the supervisor and panel of academics on the methodology colloquium. Because the measures and indicators included in these instruments have been validated in different studies, content validity and reliability seems to be ensured beforehand. Yet, attempt was made to further enhance the content validity of the data collection instruments as well as their design in view of expert's review (Va´zquez-Bustelo, *et al.*, 2007; Butt, 2009; Agarwal and Selen, 2011; Dezdar and Ainin, 2011). Accordingly, the questionnaires were given to a well experienced

[11] Type 1, Type 2, and Type 3 questionnaires are depicted in Appendix 6, 7, and 8 respectively.

research expert for review and the feedback was incorporated (Appendix 4 and 5 respectively depict the request letter presented to the expert and confirmation received regarding the design and content of the survey instruments). The items in the questionnaires are relevant, clear, as well as easy to respond to, and hence these instruments were used to gather the necessary data in the study.

5.4.2. Data Collection Strategy and Ethical Considerations

The data needed for the study was gathered from medium and large scale manufacturing firms located in Addis Ababa and its periphery. The firms selected for the study are widely dispersed in and around the city, and this made the field work somehow difficult. The existing poor postal and internet services in the country coupled with firms' lack of experience in responding through such media made the use of mail survey technique less viable for the study. The distribution and characteristics of manufacturers in the context and their limited experience in participating in such manufacturing strategy studies rather necessitated the use of a face-to-face approach. Directly administering the questionnaires to respondents was believed to provide the utmost benefit than any other technique in the study, and as a result, the researcher recruited and trained enumerators for the field work apart from personally involving in the data collection process.

The field work was conducted in such a way that first 120 firms (mainly located in the different corners of the city) were contacted from six industrial sectors, and then the remaining 120 firms (many of which are located inside the city) were contacted soon after for gathering data. A drop and pick method was used, and hence each firm was visited door-to-door to distribute and collect the completed questionnaires[12]. Along with the questionnaires, a cover letter requesting firms' cooperation to provide data for the study was distributed to all the participants. The cover letter provides essential information to respondents such as objectives and significance of the study, assurance of confidentiality of the data and anonymity in reporting the results and findings, as well as ensures the absence of any risk in the study (see Appendix 1 for cover letter of the questionnaires).

[12] The contact details of the manufacturers selected for the study including their postal, telephone, fax, and e-mail addresses is actually obtained from the 2011/12 Addis Ababa Business Directory, which is available on a CD-ROM published by the Addis Ababa Chamber of Commerce and Sectoral Associations. This directory also contains the names and cell phone addresses of company managers.

Participants were told that participation in the study is based on their freewill, voluntary, and there is no obligation to do so. They were also told that they are free to withdraw at any time and without giving a reason as well as no penalty or loss of benefit for non-participation. Only willing firms and respective respondents actually completed and returned the questionnaires, and hence there is no risk in this regard. There are no foreseen risks to the participants of the study; the information they provided will not bring any harm or injury whatsoever. They have simply completed a survey questionnaire. No research-related adverse event is expected in this study. This type of research is so common and does not entail any harm, injury or damage whatsoever, and hence indemnity or compensation is not an issue in this study too.

Furthermore, responses of participants have been treated with strict confidentiality and are not going to be disclosed to any outside party. Data on personal information was not gathered at all, because such data is not needed and analyzed in this research. The questionnaires are coded and the answers are given a code number, and are referred in this way in the data, any publications, or other research reporting methods as necessary such as conference proceedings. The responses in the individual questionnaires were aggregated and only statistical summary and analysis were reported in this paper. Anonymity is also maintained in this or future reports and publications.

The targeted respondents were actually appreciable about the study and learned its potential significance for the manufacturing sector, and the nation at large, and hence well completed the questionnaires[13]. The completed questionnaires were collected directly from the respondents and this approach has resulted in high response rate in the study, which is further analyzed later in this chapter. (Recall that the actual distribution of firms participated in the study is depicted in Table 5.1). This study was actually reviewed and approved by the Research Ethics Review Committee of the Graduate School of Business Leadership (SBL) for complying with the ethical requirements stipulated by the Unisa Policy on Research Ethics during the conduct and reporting of the results (University of South Africa, 2012). [See Appendix 2 for certificate issued by SBL research ethics review committee].

[13] Ethiopia is one of the least developed economies with few manufacturing industries operating in the context. The manufacturing sector has been subdued or remained less competitive for decades, and contributing little to economic development. The government, however, started to give much attention to this sector in recent years because manufacturing/industry is expected to lead the economy in few years time (EEA, 2011). Firms and/or respondents also seem to have understood this strategic role as their feedback and cooperation during the field work reveals.

5.5. Measures in the Study and Respective Scales

"As the procedures carried out to develop measures influence the quality of inference in measurement, sound procedures recommended in the literature were adopted in developing measures" in the study (Butt, 2009: 97). Extensive review of theoretical perspectives and literatures vis-à-vis operations strategy, best practices, leadership, and so on have been made as discussed in the second and third chapters respectively, based on which the underlying constructs/measures were identified and a conceptual framework developed. All the measures and their indicators have been validated in different studies, and this enhances reliability and validity of measures in the study. The scales used to measure each construct are explained below and a complete list of the variables and their indicators is also provided in Tables 5.3 through 5.9.

Environmental Dynamism. Environmental dynamism is measured in terms of the following measures as adopted from Butt (2009): the rate at which products and services become outdated as well as rate of innovation of - new products or service, new operating processes, and change in taste and preferences of customers in the industry (Butt, 2009). Respondents were asked to indicate their view regarding each statement about the changes in their business environment in recent years (ranging from 1 = slow to 5 = rapid).

Strategic Orientation. Strategic orientation is a concept that is measured in terms of indicators like business strategy orientation, customer orientation, competitor orientation, resource orientation, and innovation orientation (Butt, 2009; Darmanto, *et al.*, 2014). Each of these indicators, in turn, is measured in terms of multiple items (see Table 5.3 for the specific items). Respondents were asked to indicate their level of agreement or disagreement regarding each statement or item on a five-point Likert scale (ranging from 1 = strongly disagree to 5 = strongly agree).

Competitive Priorities. In this study, competitive priorities are operationalized in terms of the following four dimensions: cost, quality, delivery, and flexibility. The cost priority is measured by the degree of importance of low manufacturing cost and inventory turnover; flexibility priority is measured in terms of product (changeover) flexibility and volume flexibility; and delivery priority is measured by fast delivery, on-time delivery, and short manufacturing cycle time (Peng, *et al.*, 2011; Va´zquez-Bustelo, *et al.*, 2007). In measuring the quality priority, some researchers use a single item like conformance to product specification (Peng, *et al.*, 2011**;** Va´zquez-Bustelo, *et al.*, 2007), while others use multiple-items (Ward and Duray, 2000; Ward, *et al.*, 2007; Kathuria, 2000; Kathuria, *et al.*, 2010). In view of this, quality priority is measured using multiple-items in this study, i.e. conformance to product specification (or pre-established standards), accuracy in manufacturing, and consistency in manufacturing (Kathuria, 2000; Kathuria, *et al.*, 2010). Respondents were asked to indicate on a five-point scale the level of importance given to each item in their company (1= not at all important, 2 = not very important, 3 = moderately important, 4 = quite important, 5 = very important).

Manufacturing Decisions. Manufacturing decisions is operationalized first in terms of structural and infrastructural dimensions (decision categories), and then each of these dimensions is broken down into sub-dimensions that are measured using pertinent items/indicators. The instrument developed by Ward, *et al.* (2007), based on Hayes and Wheelwright's (1984) work, is used for measuring each of the structural and infrastructural decision categories. The structural decisions include capacity, sourcing and vertical integration, facilities/manufacturing technology, and new product development (Ward, *et al.,* 2007). The infrastructural decisions include human resource systems, planning systems (manufacturing planning and control), planning systems (efficiency), planning systems (JIT emphasis), quality, delegation of authority, and cross functional activities (Ward, *et al.,* 2007). Multi-item scales were used to measure each of these aspects. Accordingly, respondents were asked to indicate on a seven-point scale the characteristics of each of these aspects in their company over the past three years. Depending on the nature of statements used, the range of scales is as follows: 1 = no emphasis, 4 = moderate emphasis, 7 = extreme emphasis; 1 = no importance, 4 = very important, 7 = absolutely critical; 1 = strongly disagree, 4 = neutral, 7 = strongly agree; or ranging from 1 = rarely to 7 = frequently (Ward, *et al.,* 2007).

Learning and Improvement Capabilities. The study has used multi-item scale to measure each practice related to learning and improvement capabilities. Learning is again seen in terms of internal and external learning capabilities/dimensions, each of which being rooted in different practices and routines (Schroeder, *et al.*, 2002). Improvement capability is measured in terms of the following three practices: continuous improvement, process management, and leadership involvement in quality (Peng, *et al.*, 2008, 2011). Each practice is measured in terms of relevant indicators (or routines) obtained from the literature, and respondents were asked to indicate their level of agreement (or disagreement) on a seven-point scale (ranging from 1 = strongly disagree to 7 = strongly agree).

Leadership Practices. The leadership practices of manufacturing managers are assessed using Yukl's managerial practices survey (MPS) instrument[14]. Although the earlier version of the MPS instrument has been used in different studies (Kathuria and Partovi, 1999; Kathuria, *et al.*, 2010), Yukl (2009) has recently revised the measures of middle-level managerial behavior (and hence the MPS instrument) to further enhance its reliability and validity. The modified MPS instrument is, therefore, used in the current study as efforts have been made to enhance its reliability and validity. This version of the MPS instrument contains 17 managerial practices, out of which two practices (problem solving and leading by example) are considered mixed and the rest 15 practices theoretically fall into three meta-categories: task-oriented, relations-oriented, and change-oriented behaviors (Yukl, 2009). (Appendix 3 depicts the permission letter obtained from the owner for using this instrument in the study).

Task-oriented behavior includes short-term planning, clarifying responsibilities, and monitoring activities and performance (Yukl, 2009). Resolving work related problems is also considered as a task-oriented behavior in Yukl's earlier taxonomy of leadership practices (Kathuria and Partovi, 1999; Kathuria, *et al.*, 2010). Relations-oriented behavior, on the other hand, includes supporting, recognizing, encouraging participation, empowering, developing, and encouraging cooperation. Practices such as external monitoring, explaining need for change, envisioning change, encouraging innovative thinking, facilitating collective learning, and promoting change constitute what we call the change-oriented behavior (Yukl, 2009).

As some of the change behaviors such as external monitoring and promoting change are more relevant for top executives than for middle-level managers or low-level supervisors, Yukl's (2009) version of the MPS instrument used to assess middle-level managerial behavior, thus, contains only 15 managerial practices that are measured in terms of forty five (45) items. Three employees who are subordinates of the manufacturing manager are selected from each plant to assess the leadership style of their boss. They were asked to describe how much their boss uses each managerial practice or behavior on a five-point scale (5 = To a Very great

[14] There are different versions of the MPS instrument as developed by Professor Gary Yukl. Yukl's (1989) taxonomy of 14 leadership practices is the earliest version and some researchers (Kathuria and Partovi, 1999; Kathuria, *et al.*, 2010) preferred this earlier version of the MPS instrument for its reliability and broad applicability. The specific measures for the leadership practices can be obtained from Professor Gary Yukl who has the copyright for this instrument, and for research purposes, the instrument is available for free (Phone: 518-442-4932; Fax: 518-442-4765; e-mail: g.yukl@albany.edu).

extent, 4 = To a Considerable extent, 3 = To a Moderate extent, 2 = To a Limited extent, 1 = Not at all) (Kathuria, *et al.*, 2010; Yukl, 2009).

Government Support. Government support is measured in terms of the role played by concerned government agencies in the country in helping manufacturing firms identify, select, and implement important product technologies (input side) (Malik and Kotabe, 2009); and extent of government support in sponsoring quality inspections for exported products, help in market research, customer contacts and distribution, and aid in attending trade and export events (marketing side) (Malik and Kotabe, 2009). Government support is also reflected in the implementation of policies and projects that benefit manufacturing firms, providing needed information, providing financial support, and helping firms obtain resources (Cai, *et al.*, 2010). Respondents were asked to indicate on a five-point scale their level of agreement about government support provided to the company in recent (3 to 5) years (ranging from 1 = strongly disagree to 5 = strongly agree).

Manufacturing Performance. Although the use of both objective and perceptual measures of performance is advisable, only perceptual measures are used in this research as the study analyzes firms from different industrial sectors (Spanos and Lioukas, 2001; Pertusa-Ortega, Molina-Azorı´n & Claver-Corte´s, 2010). Perceptual measures of manufacturing performance are frequently used in the literature (Ketokivi and Schroeder, 2004a; Hallgren and Olhager, 2009; Hallgren, *et al.*, 2011; Pertusa-Ortega, *et al.*, 2010; Arendt and Brettel, 2010), often due to 'the difficulties in collecting comparable and objective data' about the performance of manufacturing plants/firms. Such measures 'are viable alternatives in large sample studies as long as rigorous examinations of reliability are performed' (Ketokivi and Schroeder, 2004b). Accordingly, Ketokivi and Schroeder (2004b) suggest the importance of using 'multidimensional measures in order to improve reliability when perceptual measures of performance are used'. Many scholars also indicate the "adequacy of subjective measures [of performance] as opposed to objective ones (mainly accounting measures of profitability and rates of return)" especially when the study is a multi-sectorial one (Powell and Dent-Micallef, 1997; Venkatraman and Ramanujam, 1986; Pertusa-Ortega, *et al.*, 2010).

As Pertusa-Ortega, *et al.* (2010: 1289) state, "objective measures may reveal differences in firm performance that are due solely to the industry and not to real differences among firms." Arendt and Brettel (2010) also suggest the importance of using perceptual measures in assessing firm performance in view of the fact that the interpretation of subjective, relative performance data is easier and more accurate across diverse context factors such as across industries (Covin and Slevin, 1989 cited in Arendt and Brettel, 2010: 481). A few researchers (for example, Chandler and Hanks, 1993; Dess and Robinson, 1984 both cited in Arendt and Brettel, 2010: 481) even indicate the existence of high correlation between subjective and objective performance indicators. In view of these insights and for its significance, therefore, a decision is made to use perceptual measures of manufacturing performance in this study.

Accordingly, manufacturing performance is measured along the following four dimensions: cost (unit manufacturing cost, inventory turnover, and cycle time), quality (conformance quality), delivery (fast delivery and delivery reliability), and flexibility (volume flexibility and design flexibility) (Naor, *et al.*, 2010). Respondents were asked to rate on a five-point Likert scale the performance of their plant in comparison to other firms in the industry in the past three years (1 = poor or low end of the industry, 2 = below average, 3 = average or equal to the competition, 4 = better than average, 5 = superior or better than average). Tables 5.3 through 5.9 further depict the variables and their indicators as identified from the literature. For the sake of further referencing, the source(s) from which the indicators are taken is stated beneath each table as well.

In addition to the above main study variables, general information was gathered vis-à-vis respondents position and work experience in the company, category to which the industry belongs, ownership status (private vs. government owned), plant size (as measured in terms of number of employees), size of investment in fixed assets, average annual sales over the past three years, plant age (measured in terms of number of years the plants have been in operation), as well as characteristics of production process being adopted. Following Safizadeh, *et al.* (1996) cited in Shields and Malhotra (2008), the characteristics of production process is measured using a four point scale as follows: 1 = products produced in small batches, similar equipment performing the same functions grouped together; 2 = products are produced in moderately large batches, similar equipment performing the same functions grouped together; 3 = products are produced in batches, work centers are laid out in the sequence in which the products are manufactured; 4 = products are produced in large batches or in a continuous flow, work centers are laid out in the sequence in which the products are manufactured. Information about these aspects would help to establish demographic profile of firms participated in the study.

Table 5.3: Measures – Strategic Orientation and Environmental Dynamism

Variable	Indicators/Items
Customer Orientation	▪ Our commitment to serving the customer needs is closely monitored ▪ Our objectives and strategies driven by creation of customer satisfaction ▪ Our competitive strategies are based on understanding customer needs
Competitor Orientation	▪ Our salespeople regularly share information within our business concerning competitors' strategies ▪ Top management regularly discusses competitors' strengths and strategies ▪ We respond rapidly to competitive actions that threaten us
Innovation Orientation	▪ We introduce radical product innovations into the market more frequently than our competitors ▪ Our percentage of radical product innovations in the product range in the last 3 years is significantly higher compared to the competition ▪ We often use innovative technologies in the new product development ▪ We are very proactive in the development and deployment of new technologies ▪ We always rank among the first to use a new technology for new product development ▪ Our products always reflect state-of-the-art technology
Resource Orientation	▪ We gain a competitive advantage from our unique practices ▪ We believe that organizations should build and maintain core competencies and skills ▪ Our practices are unique and cannot be easily copied by others
Business Strategy Orientation	▪ Our business strategy is translated into manufacturing terms ▪ Potential manufacturing investments are screened for consistency with our business strategy ▪ At our plant, manufacturing is kept in step with our business strategy ▪ Manufacturing management is not aware of our business strategy ▪ Corporate decisions are often made without consideration of the manufacturing strategy ▪ Our components/materials make-versus-buy decisions are made to sustain or strengthen our manufacturing competence
Environmental Dynamism	▪ The rate at which products and services become outdated ▪ The rate of innovation of new products or service

	▪ The rate of innovation of new operating processes ▪ The rate of change in taste and preferences of customers in your industry

Source: Thun (2008); Ward, *et al.* (2007); Theoharakis and Hooley (2008) cited in Butt (2009); Paladino (2007) cited in Butt (2009); Herrmann, *et al.* (2007) cited in Butt (2009)

Table 5.4: Measures – Competitive Priorities Dimensions

Variable	Indicators/Items
Cost	▪ Low manufacturing unit costs ▪ Inventory turnover
Quality	▪ High conformance to product specifications (or pre-established standards) ▪ Ensuring accuracy in manufacturing ▪ Ensuring consistency in manufacturing
Delivery	▪ Fast delivery ▪ On-time delivery ▪ Short manufacturing cycle time, from raw materials to delivery
Flexibility	▪ Ability to rapidly change over products on short notice (mix flexibility) ▪ Ability to vary volume of products on short notice (volume flexibility)

Source: Peng, *et al.* (2011)**;** Va´zquez-Bustelo, *et al.* (2007); Kathuria, *et al.* (2010)

Table 5.5: Measures – Manufacturing Decisions Dimensions

Variable	Indicators/Items
Capacity	▪ Capacity expansion ▪ Plant relocation ▪ Reconditioning of physical plants
Sourcing and vertical integration	▪ Electronic data interchange (EDI) ▪ Purchasing management ▪ Reducing the number of suppliers ▪ Reducing the number of parts and components
Facilities/manufacturing technology	▪ Computer-aided design (CAD), Robotics, etc ▪ Developing new processes for new products ▪ Group technology (GT), Flexible manufacturing systems (FMS)
New product development	▪ Improve product performance, and features offered to customers ▪ Increase the number of features offered to customers

	▪ Increase product attractiveness; Eliminate design errors ▪ Improve product reliability and product conformance to specifications ▪ Improve product durability, serviceability, and manufacturability
Human resource systems	▪ Giving workers a broader range of tasks ▪ Giving workers more planning responsibility ▪ Giving workers more inspection/quality responsibility ▪ Changing labor/management relationships ▪ Improving direct labor motivation and worker safety
Planning systems (manufacturing planning and control)	▪ Production/inventory control systems, Purchasing management ▪ Integrating manufacturing information systems ▪ Integrating information systems across departments
Planning systems (efficiency)	▪ Increasing first-pass yield ▪ Increasing equipment utilization ▪ Improving performance in meeting the production schedule
Planning systems (JIT emphasis)	▪ Lead-time, setup time, and inventory reduction ▪ Reducing the number of suppliers, Improving vendor quality ▪ Reducing the number of parts and components
Quality	▪ Product attractiveness as perceived by the customer ▪ Overall product quality as perceived by the customer
Delegation of authority	▪ The organization keeps written record of employee's job performance ▪ The employee's written record is considered seriously when making employee related decisions ▪ Employees are to adhere to strict operating procedures at all times ▪ Approval signatures needed for work to proceed from stage to stage
Cross functional activities	▪ Interdepartmental committees which allow departments to engage in joint decision making ▪ Temporary task forces to facilitate interdepartmental collaboration on a specific project ▪ Liaison personnel to coordinate the efforts of several departments on a specific project ▪ Master plans used as coordinating devices ▪ Bargaining among department heads ▪ Product or service decisions concerning production, marketing, and R&D strategies ▪ Capital budget decisions: selection and financing of investments

Source: Ward, *et al.* (2007)

Table 5.6: Measures – Internal and External Learning Capabilities

Variable	Indicators/Items
Internal Learning	▪ Employees cross-trained so that they can fill in for others if necessary. ▪ Employees receive training to perform multiple tasks. ▪ Management takes product/process improvement suggestions seriously. ▪ Many useful suggestions are implemented at this plant.
External Learning	▪ We strive to establish long-term relationships with suppliers. ▪ We maintain close communication with suppliers about quality considerations and design changes. ▪ Our customers give us feedback on quality and delivery performance. ▪ Our customers are actively involved in the product design process.

Source: Schroeder, *et al.* (2002)

Table 5.7: Measures – Improvement Capability

Variable	Indicators/Items
Continuous Improvement	▪ We strive to continually improve all aspects of products and processes, rather than taking a static approach ▪ We search for continued learning and improvement, after the installation of new equipment ▪ Continuous improvement makes our performance a moving target, which is difficult for competitors to attack ▪ We believe that improvement of a process is never complete; there is always room for more incremental improvement ▪ Our organization is not a static entity, but engages in dynamically changing itself to better serve its customers.
Process Management	▪ A large percent of the processes on the shop floor are currently under statistical quality control ▪ We make use of statistical techniques to reduce variance in processes ▪ Use charts to determine whether manufacturing processes are in control ▪ We monitor our processes using statistical process control
Leadership Involvement in Quality	▪ All major department heads within the plant accept their responsibility for quality ▪ Plant management provides personal leadership for quality products and quality improvement ▪ Plant management creates and communicates a vision focused on quality improvement ▪ Plant management personally involved in quality improvement projects

Source: Peng, *et al.* (2008, 2011)

Table 5.8: Measures – Institutional Contingency

Variable	Indicators/Items
Government support	▪ Implemented policies and projects which benefit the manufacturing plant ▪ Organized and supplied technical trainings to your manufacturing plant ▪ Provided needed information (including results of technical and market studies) to your plant ▪ Provided financial support to your company ▪ Helped your company obtain resources (raw materials, components, etc) ▪ Helped your company obtain sufficient foreign currency reserves for transactions ▪ Helped your company invest in innovative manufacturing practices (kaizen, statistical process control, etc) ▪ Helped your company identify, select, and/or implement manufacturing technology ▪ Helped your company acquire/absorb manufacturing knowledge and skill

Source: Cai, *et al.* (2010) and Malik and Kotabe (2009)

Table 5.9: Measures – Manufacturing Performance

Variable	Indicators/Items
Cost	▪ Unit cost of manufacturing ▪ Inventory turnover ▪ Cycle time (from receipt of raw materials to shipment)
Quality	▪ Quality of product conformance (producing as per pre-established standards)
Flexibility	▪ Flexibility to change product mix (and design) ▪ Flexibility to change volume
Delivery	▪ Delivery performance (on-time delivery) ▪ Fast delivery (delivery speed)

Source: Hallgren, *et al.* (2011); Devaraj, *et al.* (2004); Naor, *et al.* (2010)

5.6. Data Preparation and Methods of Analyses

Once the field work is completed and the necessary data is obtained, the next logical step is to organize the data and make it ready for different kinds of analyses. Since the ‘accuracy of research outcome is considerably dependent on the quality of data’ (Butt, 2009: 111), it is important to first check and/or test the quality of the data before conducting extensive analyses. The objective of such preliminary tests and analyses is to prepare the data for advanced analysis (Butt, 2009). Accordingly, the responses in the individual questionnaires were coded into the SPSS 20.0 software, checked for data entry errors, and examined for the accuracy and validity of the assumptions of normality (Butt, 2009; Mukerji, 2008). Following this, additional statistical tests were made such as checking the data for non-response bias, common method bias, as well as reliability and validity of measures. The procedures followed and results obtained are presented in the following sections.

5.6.1. Checking Normality of Data

Prior to analyzing data using inferential statistical techniques, it is mandatory to check the normality of the data set by looking at some descriptive values such as skewness and kurtosis (Butt, 2009; Mukerji, 2008). Conducting analysis on non-normally distributed data set with increased skewness and kurtosis can lead to incorrect results (Butt, 2009), and hence the distribution of each variable was examined prior to the analysis (Butt, 2009; Mukerji, 2008). The skewness values indicate that the scores are skewed - many are negatively skewed and not that much closer to zero. However, because all the skewness values fall within the range of -2 to +2, there is no case of excessive skewness in the data (Mukerji, 2008). The kurtosis values also fall within the range of -7 to +7, and therefore do not display excessive kurtosis as well (Mukerji, 2008). These results suggest that the normality assumption is not strictly violated in the study. (Appendix 9 depicts the skewness and kurtosis values of all the variables analyzed in the study).

5.6.2. Checking Data for Non-Response Bias

Since obtaining information about the entire population (in this case manufacturing firms in the study area) is not possible, researchers suggest the importance of "evaluating the representativeness of the sample and the non-response bias" prior to conducting any kind of analysis in the study (Pertusa-Ortega, *et al.*, 2010). Non-response bias is the difference between the answers given by non-respondents and respondents in the study (Lambert and Harrington, 1990 cited in Agarwal and Selen, 2011: article submitted for publication). Such bias should not exist for the inferences and conclusions to be valid and encompass all the subjects included in the study (Arendt and Brettel, 2010; Agarwal and Selen, 2011). The high (i.e. 82.08 percent) response rate already indicates non-response bias would not be a problem in this particular study. In spite of this, additional statistical analysis was made in the study to see if such problem actually exists.

In testing non-response bias, some studies compare the industrial distribution and differences in the mean values of sales revenues, level of fixed assets, plant age, and number of employees between the responding and non-responding companies (Arendt and Brettel, 2010; Agarwal and Selen, 2011; Peng, *et al.*, 2011). But this approach is not used in this thesis because of the difficulties associated with obtaining such information from non-responding companies. Hence, the alternative approach used in the study is to compare the early respondents and late respondents based on the view that late respondents, i.e. those not very prompt in returning the completed questionnaires, are considered similar to non-respondents (Butt, 2009; Fugate, Stank & Mentzer, 2009). Armstrong and Overton (1977) cited in Butt (2009: 114) also 'compare the early respondents with late respondents, called exploration method, to determine the extent of non-response bias'.

With this view, the questionnaires collected from firms were sequentially numbered and entered into the SPSS software. In the first three months of the field work, 97 firms (from six industries) returned valid questionnaires, and in the latter two months 100 firms (mainly located inside the city) returned valid questionnaires. The dataset for each phase was grouped into two sets, and then t-test was conducted for the early respondents and late respondents in both phases to check if significant differences exist in the responses between these datasets (Butt, 2009; Fugate, *et al.*, 2009; Va´zquez-Bustelo, *et al.*, 2007). The t-test performed to check the difference in all the constructs, in this regard, did not produce significantly different scores at 5 percent confidence level. Following the assumption that late respondents are similar to non-respondents (Armstrong and Overton, 1977 as cited in Butt, 2009: 114), non-response bias does not appear to be a problem in this research.

5.6.3. Test of Common Method Variance (CMV) Problem

Apart from examining non-response bias, further attempt is made to minimize and/or avoid CMV problem in the study. The precautions taken in designing the questionnaires (i.e. use of multi-item scales) as well as identifying different respondents for the independent and dependent variables, as already done, are preliminary mechanisms to minimize this problem. In addition to these precautions, the data is further tested or checked for CMV problem before commencing data analysis via Harman's single-factor test (Ward, *et al.*, 2007; Butt, 2009). This test helps to check 'whether only a single factor or a general factor [i.e. multiple factors] accounted for the majority of the variance in the measures' (Ward, *et al.*, 2007; Butt, 2009).

The literature indicates that CMV will not become a problem if several factors with an eigen value greater than one are identified in the test (Cegarra-Navarro, Sa´nchez-Vidal & Cegarra-Leiva, 2011; Ward, *et al.*, 2007; Butt, 2009). Accordingly, all the 172 items representing the different variables in the study (i.e. environmental dynamism, competitive priorities, strategic orientation, structural and infrastructural manufacturing decisions, external and internal learning capabilities, improvement capability, leadership, government support, and manufacturing performance) are factor-analyzed in SPSS 20.0 with a principal component extraction method and varimax rotation to check "if one single factor would emerge and would account for most of the covariance in the variables" (Butt, 2009: 114). Table 5.10 depicts the result of PCA.

As the table reveals, a total of 34 factors with eigen values greater than 1 emerged in the test. The factors had variances explained ranging from 0.59% to 22.44%, and the sum of explained variance for the 34 components is 86.5 percent. Based on this result, it was concluded that common method bias also does not appear to be a problem in this study, and hence extensive statistical tests and analyses are subsequently made. In the following sections, detailed explanation is given regarding the statistical model used, data analysis procedures, and aspects of reliability and validity.

5.6.4. Statistical Model and Procedures Adopted in the Study

5.6.4.1. Structural Equation Modeling for Data Analysis

Structural equation modeling [often abbreviated as SEM][15] is "a multivariate statistical analysis methodology developed to examine a series of dependence relationships simultaneously" (Ramanathan, Black, Nath & Muyldermans, 2010: 1505). SEM is an extension of multivariate regression analysis and path analysis (Ramanathan, *et al.*, 2010), and hence considered as a second-generation instrument for data analysis (Dezdar and Ainin,

[15] 'The term structural equation modeling (SEM) does not designate a single statistical technique but instead refers to a family of related procedures' (Kline, 2011: 7). As Kline indicates, different terms are used in the literature 'such as covariance structure analysis, covariance structure modeling, or analysis of covariance structures [] to classify these techniques together under a single label' (2011: 7).

2011). It is particularly useful in testing theories involving multiple and simultaneous inter-dependence relationships (Ramanathan, *et al.*, 2010) because it is able to handle a series of interrelated research issues in an inclusive and systematic examination by modeling the relationships among several dependent and independent variables concurrently (Kline, 2011; Dezdar and Ainin, 2011; Ramanathan, *et al.*, 2010).

Table 5.10: PCA results (principal components and total explained variance)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	38.599	22.441	22.441	38.599	22.441	22.441
2	28.663	16.665	39.106	28.663	16.665	39.106
3	10.117	5.882	44.988	10.117	5.882	44.988
4	8.532	4.960	49.948	8.532	4.960	49.948
5	5.450	3.169	53.116	5.450	3.169	53.116
6	4.268	2.481	55.598	4.268	2.481	55.598
7	3.783	2.199	57.797	3.783	2.199	57.797
8	3.516	2.044	59.841	3.516	2.044	59.841
9	2.996	1.742	61.583	2.996	1.742	61.583
10	2.906	1.690	63.273	2.906	1.690	63.273
11	2.835	1.648	64.921	2.835	1.648	64.921
12	2.560	1.488	66.409	2.560	1.488	66.409
13	2.332	1.356	67.765	2.332	1.356	67.765
14	2.291	1.332	69.097	2.291	1.332	69.097
15	2.142	1.246	70.342	2.142	1.246	70.342
16	2.092	1.216	71.558	2.092	1.216	71.558
17	1.979	1.151	72.709	1.979	1.151	72.709
18	1.905	1.107	73.816	1.905	1.107	73.816
19	1.809	1.052	74.868	1.809	1.052	74.868
20	1.755	1.020	75.889	1.755	1.020	75.889
21	1.722	1.001	76.890	1.722	1.001	76.890
22	1.630	.948	77.838	1.630	.948	77.838
23	1.502	.873	78.711	1.502	.873	78.711
24	1.452	.844	79.555	1.452	.844	79.555
25	1.400	.814	80.369	1.400	.814	80.369
26	1.356	.788	81.157	1.356	.788	81.157
27	1.305	.759	81.916	1.305	.759	81.916
28	1.273	.740	82.656	1.273	.740	82.656
29	1.227	.713	83.369	1.227	.713	83.369
30	1.161	.675	84.045	1.161	.675	84.045
31	1.103	.641	84.686	1.103	.641	84.686
32	1.087	.632	85.318	1.087	.632	85.318
33	1.021	.593	85.912	1.021	.593	85.912
34	1.016	.591	**86.502**	1.016	.591	**86.502**
35	.949	.552	87.054			
-	-	-	-			

Source: *Own Study (2013)*

The SEM approach adopts a mixed methodology consisting of confirmatory factor analysis, regression, and path analysis (Dezdar and Ainin, 2011; Kline, 2011). The dependence relationships are captured in a way similar to the approach used in multivariate regression analysis, and the latent variables[16] are extracted from the indicator variables using factor analysis (Ramanathan, *et al.*, 2010). The SEM approach adopts a confirmatory rather than an exploratory approach for data analysis (Va´zquez-Bustelo, *et al.*, 2007; Kline, 2011). For its significance, therefore, the SEM approach, specifically AMOS 20.0 software, an implementation of a covariance-based approach, which conveys more information than simple association[17] (Arendt and Brettel, 2010; Kline, 2011), is chosen for data analysis in this study.

The use of covariance structure analysis (CVA) method for data analysis allows researchers to examine models using latent variables with multiple indicators (Brown, Willis & Prussia, 2000). The calculation method used is maximum likelihood, which is a default model in the AMOS software, in order to resolve any problem of non-normality of data in the study (Mukerji, 2008; Dezdar and Ainin, 2011). The specific SEM model used is the CFA technique, which is one of the core techniques included under SEM approach and its use depends on the nature of variables and relationships explored in the analysis[18]. The CFA technique is appropriate to evaluate measurement models that represent hypotheses about relations between indicators and factors (Kline, 2011). The CFA model is the synthesis of a structural model and a measurement model - it incorporates a measurement component that represents observed variables as indicators of underlying factors (latent variables). The specification of this model, thus, allows tests of hypotheses about direct and indirect causal effects (Kline, 2011).

'Structural equation models decompose the empirical correlation or covariance among the variables to estimate the path coefficients' (Shin, Collier & Wilson, 2000: 325). In this regard, Shin, *et al.* state that 'a good causal model consists of a statistically good measurement and structural models' (2000: 325). Both models should meet or fulfill the criteria of model fit set forth to reach at valid conclusions through the SEM analysis (Shin, *et al.*, 2000). "The measurement model must be based on valid and reliable scales" (Shin, *et al.*,

[16] Latent variables correspond to hypothetical constructs or factors, which are explanatory variables presumed to reflect a continuum that is not directly observable (Kline, 2011: 9).

[17] The covariance-based approach outperforms variance-based approaches in terms of parameter consistency and accuracy and enables the assessment of overall model quality (Arendt and Brettel, 2010; Kline, 2011).

[18] Other techniques involved under SEM approach include path analysis, hierarchical confirmatory factor analysis, structural regression, and exploratory structural model. The specification (and use) of these techniques varies with the type of research questions and variables that can be addressed in their analysis (Kline, 2011).

2000: 325). And "the structural model [in turn] should meet not only the requirements of statistical significance for the path-coefficient estimates, but also the requirement of 'good-fit' between the hypothesized causal model and the sample covariance" (Shin, *et al.*, 2000: 325). When we use the SEM approach, therefore, it is mandatory to test and/or refine the measurement model before analyzing the structural model, i.e. prior to assessing relationships between variables or testing the research hypothesis in the structural model (Hair, Black, Babin, Anderson & Tatham, 2006; Dezdar and Ainin, 2011). If a specific relationship cannot be verified in this process, it is omitted from the subsequent estimation of the model (Andersson, Forsgren & Holm, 2002).

Many authors in fact suggest the need to test model fit for the data before making extensive analyses and draw inferences (Hair, *et al.*, 2006; Dezdar and Ainin, 2011; Cegarra-Navarro, *et al.*, 2011; Arendt and Brettel, 2010; Pertusa-Ortega, *et al.*, 2010; Andersson, *et al.*, 2002). With this view, the SEM analysis is conducted in this study following two steps: the measurement model is modified or refined first and then the structural model is analyzed (Hair, *et al.*, 2006)[19]. In testing the measurement model, SEM fit indices are used that "measure the extent to which the covariance matrix derived from the hypothesized model is different from the covariance matrix derived from the sample" (Dezdar and Ainin, 2011: 920). The literature provides different goodness of fit statistic that can be used to check model fit for the data.

Accordingly, the following indices were used in this thesis to assess model fit for the data: chi-square (also denoted by x^2 or CMIN)[20], Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Incremental Fit Index (IFI), as well as Trucker-Lewis Coefficient (TLI), a.k.a. the Bentler-Bonett non-normed fit index (NNFI) (Bentler and Bonett, 1980; Mukerji, 2008; Arendt and Brettel, 2010; Kline, 2011; Schroeder, 2002; Cegarra-Navarro, *et al.*, 2011). Scholars also suggest the use of measures like amount of explained variance, i.e. squared factor loadings (R^2) or average variance explained/extracted

[19] 'The measurement model defines relations between the observed and unobserved variables. It provides the link between scores on a measuring instrument (i.e., the observed indicator variables) and the underlying constructs they are designed to measure (i.e., the unobserved latent variables). The structural model defines relations among the unobserved variables' (Byrne, 2010: 12-13) that represents hypotheses about variances and covariances, which is referred to as covariance structure (Kline, 2011).

[20] Chi-square is an important goodness of fit statistic which has been used in many studies but has severe limitations because it is affected by the size of the data (Mukerji, 2008). Chi-square mostly gives a significant result when the data goes beyond 200 cases (Mukerji, 2008).

(AVE) (Sila and Ebrahimpour, 2005), relative chi-square ratio (i.e. χ^2/df) (Byrne, 2010), degree-of-freedom (d.f.), and p-values. These fit indices were also used in this thesis.

The CFI index compares a proposed model with the null model assuming that there are no relationships between the measures (Sila and Ebrahimpour, 2005: 1131). CFI values close to 1 are generally accepted as being indications of well-fitting models (Raykov and Marcoulides, 2000 as cited in Sila and Ebrahimpour, 2005: 1131). "A CFI value greater than 0.90 [also] indicates an acceptable fit to the data" (Bentler, 1992 as cited in Sila and Ebrahimpour, 2005: 1131). The IFI and TLI values also could lie between zero and one, and the rule of thumb is that values close to 1 (i.e. 0.9 or greater) indicate very good fit (Bentler and Bonett, 1980; Dezdar and Ainin, 2011; Mukerji, 2008). Models with overall fit indices of less than 0.9 also indicate an acceptable fit though such models can usually be improved substantially (Bentler and Bonett, 1980; Shin, *et al.*, 2000).

RMSEA is an important measure (or index) that is "used to assess the residuals", and is "relatively insensitive to sample size" (Sila and Ebrahimpour, 2005: 1131). For an adequate model fit, the value of this index must be less than or equal to 0.08 (Hu and Bentler, 1999 as cited in Sila and Ebrahimpour (2005: 1131). Browne and Cudeck (1993), on the other hand, state that "a value of about .05 or less would indicate a close fit of the model in relation to the degrees of freedom." As they further indicate, "this figure is based on subjective judgment … it cannot be regarded as infallible or correct, but it is more reasonable than the requirement of exact fit with the RMSEA = 0.0" (Browne and Cudeck, 1993). AVE is an average measure computed from squared factor loadings (analogous to R^2) of indicators (Sila and Ebrahimpour, 2005). Both AVE and R^2 indicate the percentage of variance in an indicator explained by a factor, and these values should be high to suggest good model fit. With regard to the *relative* chi-square measure, a lower ratio (i.e. closer to 1) is deemed to be an indicator of acceptable fit (Byrne, 2010).

5.6.4.2. Developing Composite Measures

As explained earlier in this chapter, the measures and their indicators in the study were obtained from extensive review of the literature in the area and have been validated in different studies. Attempt was made to include several items (a total of 172 items) in the questionnaires that theoretically measure 14 latent constructs. The indicators for many of these constructs are reflected in or measured in terms of multiple-items and this unduly increases the number of parameters to be estimated when the SEM approach is used. Hence, an important mechanism that can be used to reduce data, among other techniques, is to introduce composite measures in the analyses.

"Composite measures are combination of items to create score aggregates that are [] subjected to confirmatory factor analysis (CFA) as indicator variables in the scale validation process" (Bou-Llusar, Escrig-Tena, Roca-Puig & Beltran-Martin, 2009: 10). The need to develop such aggregate scores emanates from the fact that this study uses the SEM approach for data analyses, and this model 'demands a high ratio of number of observations to number of parameters estimated' (known as N:q ratio) so as to generate reliable results (Huang, Kristal & Schroeder, 2008). The main objective of introducing composite measures in this study is, therefore, to reduce the number of parameters to be estimated and the complexity of the structural model. "Using summated [and/or averaged] scales to estimate the structural model represents the theoretical constructs by item parcels" (Huang, *et al.,* 2008: 722), and an item parcel, in this regard, refers to "an observed variable that is a simple mean of several items assumed to be conceptually similar to a theoretical construct" (Huang, *et al.*, 2008: 722). It is simply the average of responses on items corresponding to an indicator (Sila and Ebrahimpour, 2005).

Bou-Llusar, *et al.* (2009) state two major benefits that arise from using composite measures in CFA. One benefit is "it enables to better meet the normal-distribution assumption of maximum likelihood estimation" and the other benefit is "it results in more parsimonious models because it reduces the number of variances and covariances to estimate, thus increasing the stability of the parameter estimates, improving the variable-to-sample-size ratio and reducing the impact [of] sampling error on the estimation process" (Bou-Llusar, *et al.,* 2009: 10). Hence, given the empirical evidence of construct reliability and validity, it is possible to create summated scales for the constructs and use them in the estimation of structural relationships (Huang, *et al.*, 2008; Bou-Llusar, *et al.*, 2009). By using summated scales, it is still possible to assess theoretical relationships among constructs, while increasing the N:q ratio considerably (Huang, *et al.*, 2008).

The use of parcels will reduce the items to a manageable level as well as provide indicators with higher reliability than that of single items (Sila and Ebrahimpour, 2005). As Huang, *et* *al.* (2008) further indicate, "simulation studies have [also] shown that the use of item parceling had negligible effects on parameter bias and on the standard errors of the estimated factor correlations" (2008: 722). In view of the above insights as well as the consideration of sample size, therefore, composite measures were introduced as indicators for six constructs in the study and the remaining eight constructs were measured using items which are not composite. This procedure actually helped to reduce the number of indicators and parameters to be estimated, eases the process of data analysis, as well as enhances the validity of the findings. Table 5.11 depicts the constructs whose indicators are composite measures or parcels in the study.

Table 5.11: Constructs with Composite Indicators

Name of Construct	Composite Measures (Parcels)
Strategic Orientation	*Customer Orientation* *Competitor Orientation* *Business Strategy Orientation* *Resource Orientation* *Innovation Orientation*
Structural Manufacturing Decisions	*Capacity* *Sourcing and vertical integration* *Facilities/manufacturing technology* *New product development (Features)* *New product development (Quality)*
Infrastructural Manufacturing Decisions	*Human resource systems* *Planning systems (MPC)* *Planning systems (efficiency)* *Planning systems (JIT)* *Quality* *Delegation of authority* *Cross functional activities*
Leadership	*Task-Oriented Behavior* *Relationship-Oriented Behavior* *Change-Oriented Behavior*
Improvement Capability	*Continuous Improvement* *Process Management* *Leadership Involvement in Quality*
Manufacturing Performance	*Cost, Quality, Delivery, and Flexibility Performance*

Source: *Own Study (2013)*

Before developing the composite measures, however, preliminary tests were conducted using the Cronbach's alpha (α) measure in order to ensure scale reliabilities. The results reveal that all the items exhibit higher internal consistency in their respective scales, except for two scales whose Cronbach's α coefficients fall below 0.7. These two scales are resource orientation and flexibility performance having Cronbach's α values of 0.604 and 0.633

respectively. These values are still not too low and hence the two scales are also deemed to be reliable. See Appendix 10 for detailed results (Cronbach's α values) of all the scales used in the study. The Cronbach's α values suggest that the items have higher internal consistency in their respective scales, and based on these findings, composite measures were developed for the aforementioned (six) constructs. Accordingly, the scores for each item in the scales were added and then divided by the number of items in the respective scales to find the average (composite) scores (Sila and Ebrahimpour, 2005; Mukerji, 2008).

There is minor variation in the determination of the averaged scores for the leadership construct, however, as responses were elicited from multiple informants from each plant (Kathuria, *et al.*, 2010). Cronbach's alpha is computed first for the leadership practices to ascertain scale reliabilities for the data set, which reveals that the items measuring the 15 leadership practices have higher internal consistency (all having Cronbach's alpha value greater than 0.83). Following this, inter-rater reliability is analyzed for the scales using the inter-class correlation (ICC) method (Kathuria, *et al.*, 2010; Peng, *et al.*, 2011). ICC is a measure for inter-rater reliability for two or more raters and is a representation of the fraction of between-group variation that does not contain within-group variation[21] (Boyer and Verma, 2000 as cited in Kathuria, *et al.*, 2010: 1089).

Given that 45 items were included in the leadership questionnaire, the ICCs were calculated using the aggregate scale scores (Kathuria, *et al.*, 2010), which, for the 15 scales, ranged between 0.588 and 0.646. In view of this evidence, plant level data was then developed for leadership practices (by taking average of within-plant responses) (Kathuria, *et al.*, 2010). This was done because the unit of analysis in the study is not individuals, rather it the manufacturing plant. Accordingly, 15 scores for leadership practices were developed eventually for each manufacturing manager in the study. The correlations between these 15 practices were found to be very high (ranging from 0.713 to 0.790), and the Cronbach's alpha for these scales also found to be very high, which is 0.978. In fact, these 15 practices theoretically fall into three managerial behaviors, namely task-oriented, relationship-oriented, and change-oriented behaviors, and in order to check this, a CFA was conducted using the AMOS software (see Appendix 11 for detailed results).

[21] ICC can be calculated using the following formula: '$(MS_{between} - MS_{within})/(MS_{between} + (k - 1) * MS_{within})$, where MS stands for mean squared variance, between for between groups, within for within groups, and k for the number of raters' (Kathuria, *et al.*, 2010: 1089).

As the results reveal, practices such as clarifying, short-term planning, monitoring activities and performance, resolving work related problems, and encouraging cooperation loaded into the task-oriented behavior while supporting, encouraging participation, recognizing, delegating and empowering, developing member skills, and leading by example fall into relationship-oriented behavior. The remaining four practices (explaining need for change, envisioning change, encouraging innovative thinking, and facilitating collective learning) loaded into change- oriented managerial behavior. It is based on this evidence that three composite scores (representing the three managerial behaviors) were determined and each behavior is then taken as a parcel measuring the leadership construct in the study. Table 5.12 further provides summary of the distribution of indicators (some of which are parcels) used in the analyses to measure each of the constructs in the study.

Table 5.12: Summary of the constructs and respective number of indicators

Latent Construct	No. of Indicators	Remark
Environmental Dynamism	4	
Strategic Orientation	5	*Each Indicator is a Parcel*
Cost Priority	2	
Quality Priority	3	
Delivery Priority	3	
Flexibility Priority	2	
Structural Manufacturing Decisions	5	*Each Indicator is a Parcel*
Infrastructural Manufacturing Decisions	7	*Each Indicator is a Parcel*
Internal Learning Capability	4	
External Learning Capability	4	
Improvement Capability	3	*Each Indicator is a Parcel*
Leadership	3	*Each Indicator is a Parcel*
Government Support	9	
Manufacturing Performance	4	*Three Indicators are Parcels*
Total	**58**	

Source: *Own Study (2013)*

The aforementioned procedure generally helped to reduce the number of indicators into 58, and these indicators are in turn supposed to measure the 14 latent constructs in the study. It is these constructs and respective indicators that are utilized in the subsequent analyses. Before conducting data analysis, in fact, we need to establish the unidimensionality, reliability and validity of the measures (Bou-Llusar, *et al.*, 2009; Butt, 2009) as some of them are introduced in this thesis. As Nunnally (1978) cited in Butt (2009: 128-129) emphasize, "any measurement instrument should be reliable and valid, and should measure what it is supposed to measure." So, there is a need to undertake a series of scale checks and analyses in order to test the unidimensionality, reliability, and validity of the constructs in the study (Agarwal and Selen, 2011; Arendt and Brettel, 2010; Dezdar and Ainin, 2011). The methods used and results obtained in this regard are presented in the following sections.

5.6.5. Assessment of Unidimensionality of Measures

As explained earlier in this chapter, the measures and their indicators are taken from several conceptual and empirical literatures, and this helps to assure validity (Kathuria, *et al.*, 2010). Yet, scale dimensionality (unidimensionality) needs to be assessed for each of the multi-item scales listed in Table 5.12 above[22]. One mechanism that can be used to check scale dimensionality is to run a CFA for each construct (Sila and Ebrahimpour, 2005). In this regard, unidimensionality is said to exist when the measures (i.e. indicators) fulfill the following two conditions or criteria: (i) "the item should be significantly associated with an underlying latent variable", and (ii) "it should be associated with one and only one variable" (Huang, *et al.*, 2008: 721). These two situations can be checked in the CFA analysis (Sila and Ebrahimpour, 2005; Huang, *et al.*, 2008). In view of these insights, a CFA was conducted for each construct in the study to determine whether or not the indicators measure the construct they are assigned to adequately.

In the process of refining the measurement model, items with lower standardized factor loadings (i.e. factor loadings < 0.50) were dropped from the analysis. Accordingly, one item measuring environmental dynamism construct, two items measuring strategic orientation construct, two items measuring structural manufacturing decisions, and one item each from external learning capability and government support were all removed from the analysis[23]. The measurement model for internal learning capability has shown poor fit with the items having lower loadings to this construct. One item that was supposed to measure internal

[22] Six constructs are measured using item parcels and this also entails the need to ensure scale dimensionality.

[23] The items removed from the analysis include the following: rate at which products and services become outdated; competitor orientation; customer orientation; new product development features; new product development quality; customers are actively involved in the product design process; and government implemented policies and special projects which benefit the manufacturing plant.

learning capability (i.e. "many useful suggestions are implemented at this plant") rather loaded onto external learning capability, and this item was retained in the analysis. Although a parcel created by averaging the scores of the rest three measures of internal learning capability loaded onto improvement capability, it was excluded from the measurement model as it was not theoretically supposed to measure improvement capability. All the other indicators have significantly loaded onto their respective constructs at $p < 0.001$ level.

As explained earlier in section 5.6.3, empirical evidence in CFA, and SEM in general, is assessed using different criteria such as χ^2, χ^2/df, CFI, IFI, RMSEA, R^2, AVE, d.f., p-values, and so on (Sila and Ebrahimpour, 2005; Bou-Llusar, *et al.*, 2009; Pertusa-Ortega, *et al.*, 2010; Arendt and Brettel, 2010; Dezdar and Ainin, 2011). Table 5.13 depicts the results (goodness-of-fit statistics) obtained in the CFA analyses (and Appendix 12 provides detailed results of CFA for each construct in the study). To avoid negative degrees of freedom, a pooled measurement model [as suggested in the literature, for example, Ahire and Ravichandran, 2001 cited in Bou-Llusar, et al., 2009: 10] was executed for the constructs measured in terms of less than four indicators, with indicators loading on the corresponding criteria (Bou-Llusar, et al., 2009: 10). The constructs for which a pooled measurement model was used include the following: (a) environmental dynamism, structural manufacturing decisions, and leadership; (b) strategic orientation and improvement capability, and (c) cost, quality, delivery, and flexibility priorities.

As the analysis of the table reveals, all the CFI, IFI, and TLI values for the thirteen (13) constructs are very high (all exceed 0.9 and many are closer to 1.00), which suggests very good model fits. The RMSEA values are equal to or below 0.08 and some fall below 0.05, indicating adequate or close fit. AVE and R^2 values also suggest good fit of the measurement models. All the indicators have satisfactory squared factor loadings (R^2) to their respective constructs ranging from 0.397 (≈ 0.40) to 0.945 and AVE ranging from 0.501 to 0.935 (≈ 0.94) respectively. The χ^2, χ^2/df, d.f., and p-values also suggest better fit of the measurement models. The standardized factor loadings for all the items is also high, which range from 0.62 to 0.97, and all are statistically significant at $p < 0.001$. The CFA results generally suggest that 13 constructs (except internal learning capability) have very good fit and are all unidimensional. Following these results, reliability and validity of the measures assessed in the study, which is explained next.

Table 5.13: Summary of goodness-of-fit statistics for CFA

Factor & Indicat	Esti.	S.E.	C.R.	P	St. Est.	x^2	d.f.	P	x^2/ d.f.	IFI	TLI (NNFI)	CFI	RMSEA	R^2	AVE
Environmental Dynamism															
V1	0.82	0.07	12.1	***	0.8	38.9	27	0.07	1.44	0.99	0.94	0.99	0.05	0.64	0.63
V2	0.87	0.07	12.1	***	0.8									0.64	
V3	0.84	0.07	11.6	***	0.78									0.60	
Strategic Orientation															
V4	0.74	0.06	12.5	***	0.87	14.3	9	0.11	1.59	0.99	0.97	0.99	0.06	0.75	0.58
V5	0.63	0.06	10.1	***	0.71									0.50	
V6	0.59	0.06	10.2	***	0.71									0.51	
Delivery Priority															
V7	0.82	0.07	11.9	***	0.77	57.2	29	0.00	1.97	0.97	0.94	0.97	0.07	0.59	0.56
V8	0.82	0.07	12.3	***	0.78									0.61	
V9	0.7	0.07	10.2	***	0.68									0.47	
Quality Priority															
V10	0.75	0.07	11.5	***	0.74	57.2	29	0.00	1.97	0.97	0.94	0.97	0.07	0.54	0.62
V11	0.79	0.06	12.5	***	0.78									0.61	
V12	0.87	0.06	13.8	***	0.83									0.70	
Cost Priority															
V13	0.83	0.07	11.8	***	0.79	57.2	29	0.00	1.97	0.97	0.94	0.97	0.07	0.62	0.60
V14	0.78	0.07	11.3	***	0.76									0.57	
Flexibility Priority															
V15	0.8	0.07	12.2	***	0.86	57.2	29	0.00	1.97	0.97	0.94	0.97	0.07	0.74	0.62
V16	0.67	0.07	9.87	***	0.7									0.49	
Structural Manufacturing Decisions															
V17	0.85	0.1	8.88	***	0.66	38.9	27	0.07	1.44	0.99	0.98	0.99	0.05	0.44	0.53
V18	1.08	0.1	11.4	***	0.88									0.77	
V19	0.9	0.11	8.46	***	0.63									0.40	
Infrastructural Manufactur. Decisions															
V20	0.64	0.07	9.22	***	0.62	30.8	14	0.01	2.2	0.98	0.95	0.98	0.08	0.38	0.55
V21	0.88	0.07	12.8	***	0.79									0.62	
V22	0.98	0.07	14.5	***	0.86									0.73	
V23	0.86	0.07	11.9	***	0.76									0.57	
V24	0.92	0.08	11.5	***	0.74									0.54	
V25	0.87	0.08	10.7	***	0.7									0.49	
V26	0.77	0.07	10.8	***	0.71									0.50	
Leadership															
V27	0.59	0.03	18.7	***	0.97	38.9	27	0.07	1.44	0.99	0.984	0.99	0.05	0.95	0.94
V28	0.61	0.03	18.3	***	0.96									0.93	
V29	0.6	0.03	18.5	***	0.97									0.94	
Improvement Capability															
V30	0.97	0.07	13.6	***	0.85	14.3	9	0.11	1.59	0.99	0.97	0.99	0.06	0.72	0.70
V31	1.01	0.08	12.6	***	0.8									0.64	
V32	1.1	0.08	13.7	***	0.85									0.73	

Table 5.13 …. (Continued)

	Esti.	S.E.	C.R.	P	St. Est.	x^2	d.f.	P	x^2/ d.f.	IFI	TLI (NNFI)	CFI	RMSEA	R^2	AVE
External Learning Capability															
V33	1.07	0.1	11.2	***	0.74	2.22	2	0.33	1.11	1.00	1.00	1.00	0.02	0.54	0.60
V34	1.21	0.1	12.8	***	0.82									0.67	
V35	1.27	0.09	13.7	***	0.86									0.73	
V36	1.02	0.1	10.1	***	0.68									0.47	
Government Support															
V37	0.91	0.08	12.1	***	0.75	35.6	20	0.02	1.78	0.99	0.97	0.99	0.06	0.57	0.63
V38	0.93	0.07	13.1	***	0.8									0.63	
V39	0.95	0.08	11.9	***	0.74									0.55	
V40	0.95	0.07	13.5	***	0.81									0.66	
V41	0.86	0.08	11.4	***	0.72									0.52	
V42	1.02	0.08	13.1	***	0.8									0.63	
V43	1.06	0.07	14.8	***	0.86									0.74	
V44	1.1	0.07	14.8	***	0.86									0.74	
Manufacturing Performance															
V45	0.51	0.05	10.5	***	0.73	1.02	2	0.60	0.51	1.00	1.01	1.00	0.00	0.53	0.50
V46	0.58	0.06	9.51	***	0.67									0.45	
V47	0.56	0.05	10.6	***	0.74									0.54	
V48	0.63	0.06	9.91	***	0.69									0.48	

Source: *Own Study (2013)*

5.6.6. Reliability and Validity of Measures

Many researchers emphasize that it is important to assess and determine the validity and reliability of measures in a study prior to examining relationships between constructs and drawing conclusions regarding the same (Brown, et al., 2000; Pertusa-Ortega, *et al.*, 2010; Arendt and Brettel, 2010; Dezdar and Ainin, 2011). The two criteria frequently used to test validity and reliability, in this regard, are internal consistency and discriminant validity (Pertusa-Ortega, *et al.*, 2010). As Pertusa-Ortega, *et al.* indicate, however, these criteria "should be applied only to latent constructs with reflective indicators", and they are not appropriate when the study involves constructs with 'formative indicators'[24] (2010: 1290).

[24] A construct may have formative or reflective indicators. 'The formative specification is appropriate when the indicators help to create the construct directly, whereas the reflective specification assumes that indicators reveal various features of an underlying construct' (Chin, 1998a as cited in Pertusa-Ortega, *et al.*, 2010: 1289). A latent variable with formative indicators implies that the construct is expressed as a function of the manifest variables. A latent variable (with formative indicators) is viewed as an effect rather than as a cause of indicator responses (Pertusa-Ortega, *et al.*, 2010). In short, formative indicators determine the construct, while reflective indicators are determined by the construct (Pertusa-Ortega, *et al.*, 2010).

Since all the constructs involved in this study have reflective indicators, it is, therefore, important to apply the internal consistency and discriminant validity criteria first and then examine relationships among constructs. The nature of these two criteria is briefly discussed below.

Internal consistency. The two main criteria that show internal consistency of constructs (with 'reflective indicators') are construct reliability and convergent validity (Pertusa-Ortega, *et al.*, 2010). Construct reliability can be assessed using either Cronbach's α or composite reliability measure[25] (Schroeder, *et al.* 2002). Cronbach's alpha (α), also called Coefficient alpha, "measures internal consistency reliability, i.e. the degree to which responses are consistent across the items within a measure" (Kline, 2011: 69). Internal consistency reliability is greater as there are more items or the mean inter-item correlation is increasingly positive (Kline, 2011: 70)[26]. The general rule to ensure construct reliability is that the Cronbach's alpha value or composite reliability measure should be 0.7 or greater (Schroeder, *et al.* 2002; Pertusa-Ortega, *et al.*, 2010; Kline, 2011; Cegarra-Navarro, *et al.*, 2011).

A conceptual equation [for Cronbach's α measure] is

$$\alpha_C = \frac{n\bar{r}_{ij}}{1 + (n-1)\bar{r}_{ij}}$$

where *n* is the number of *items* (not cases) and $\bar{r}_{ij}$ is the average Pearson correlation between all pairs of items (Kline, 2011: 69-70).

Convergent validity can be assessed, on the other hand, using different measures like composite construct reliability, factor loading, average variance extracted (AVE), or Bentler–Bonett normed fit index (BBNFI) (Sila and Ebrahimpour, 2005; Bou-Llusar, *et al.*, 2009; Pertusa-Ortega, *et al.*, 2010). AVE indicates the amount of variance that a construct obtains from its indicators in relation to the amount of variance due to the measurement error (Pertusa-Ortega, *et al.*, 2010: 1290), and BBNFI is an index obtained as the ratio of the

[25] Cronbach's α measures the internal consistency of a sum of tau-equivalent or parallel measures. In the case of congeneric measures, use of composite reliabilities is preferred over Cronbach's α because α underestimates the true construct reliability (Bollen 1989 as cited in Schroeder, *et al.* 2002: 110).

[26] In manifest variable analyses where there is no direct representation of latent variables, it is generally best to analyze measures that are internally consistent. This is also generally good advice for latent variable methods, including SEM (Kline, 2011: 70).

difference between the model chi-square for the given model minus the model chi-square for the null model (Bou-Llusar, et al., 2009: 11). They both are better measures or indicators of convergence.

In using factor analysis, we need to decide whether exploratory factor analysis (EFA) or confirmatory factor analysis (CFA) is appropriate for the study. The main purpose of factor analysis is to determine whether the number of factors and the measures conform to the literature (Mukerji, 2008), and hence performing CFA is recommended instead of EFA if the measures are tested in other studies (Mukerji, 2008; Peng, *et al.*, 2011). The above measures can be used in isolation or together in a particular study, and to ensure convergent validity, the general rule is that AVE and composite construct reliabilities should exceed 0.5 and 0.70 respectively (Pertusa-Ortega, *et al.*, 2010), BBNFI should be greater than 0.90 (Bou-Llusar, *et al.*, 2009; Sila and Ebrahimpour, 2005), or items measuring the same construct should have significant (0.5 or greater) factor loadings (Dezdar and Ainin, 2011; Brown, *et al.*, 2000).

Discriminant validity. Discriminant validity is the exact opposite of convergent validity, which measures ‘the degree’ or ‘extent’ to which a construct and its indicators are different from others (Sila and Ebrahimpour, 2005; Pertusa-Ortega, *et al.*, 2010). Different techniques are available and can be used to assess discriminant validity of measures as well. One technique could be to evaluate whether the intercorrelations among the constructs fall below 0.70, which suggests the constructs had less than half their variance in common (Mackenzie *et al.*, 2005 as cited in Fugate, *et al.*, 2009: 255). Another technique is to use the AVE measure. Accordingly, discriminant validity is said to exist if AVE is “greater than the variance shared between the construct and other constructs in the model” (Pertusa-Ortega, *et al.*, 2010: 1290-92). In other words, the average variance shared between the construct and its indicators should be larger than the variance shared between the construct and other constructs in order to confirm discriminant validity (Pertusa-Ortega, *et al.*, 2010; Cai, *et al.*, 2010; Dezdar and Ainin, 2011).

Furthermore, discriminant validity can be assessed by “comparing the Cronbach’s α of a scale to its correlations with other model variables” (Sila and Ebrahimpour, 2005: 1133). According to this procedure, discriminant validity would be said to exist “if the α value is sufficiently larger than the average of its correlations with these variables” (Sila and Ebrahimpour, 2005: 1133). In general, the foregoing discussions indicate how reliability and validity of measures assessed in social science researches, and in view of these, detailed assessment of reliability and validity of measures is conducted in this study. The specific procedures adopted and results obtained are presented next.

5.6.6.1. Assessment of Reliability and Convergent Validity of Measures

Since all the variables in the study are modeled as latent constructs with reflective indicators, attempt is made to check scale reliabilities and convergent validity of each of these measures. The content validity of the items is already ensured because the scales were built on the basis of prior literatures and have been validated in different empirical studies. The questionnaires were further reviewed by an expert as well. So what matters in this thesis is scale reliabilities and convergent validity of the measures. Accordingly, Cronbach's α[27] values are used to establish construct reliability, and BBNFI and AVE are computed to establish convergent validity of the measures in the study. Table 14 depicts the results (i.e. Cronbach's α, BBNFI, and AVE) for each construct in the study.

Table 5.14: Convergent validity and reliability

Construct	Cronbach's α	BBNFI (NFI)	AVE
Environmental Dynamism	0.835	0.970 [a]	0.629
Strategic Orientation	0.802	0.971 [b]	0.584
Cost Priority	0.748	0.942 [c]	0.595
Quality Priority	0.834	0.942 [c]	0.616
Delivery Priority	0.784	0.942 [c]	0.556
Flexibility Priority	0.752	0.942 [c]	0.616
Structural Manufacturing Decisions	0.757	0.970 [a]	0.534
Infrastructural Manufacturing Decisions	0.892	0.955	0.548
Improvement Capability	0.872	0.971 [b]	0.698
External Learning Capability	0.860	0.993	0.604
Leadership	0.977	0.970[a]	0.935
Government Support	0.932	0.967	0.630
Manufacturing Performance	0.794	0.996	0.501

[a,b,c] *A pooled measurement model was executed to avoid negative degrees of freedom.*

***Source:** Own Study (2013)*

As the table depicts, the Cronbach's α values for all the (refined and unidimensional) measures exceed 0.70, and this ensures construct reliability. The BBNFI for all the constructs exceed 0.9, and for many of these constructs it is even closer to 1.0. The AVE is also high for

[27] The Cronbach's α values are computed in view of the refined items in the respective scales.

all the constructs in the study. So there is sufficient evidence of convergent validity in the study as well. Based on these results and findings, we can conclude that the specific indicators/parcels sufficiently measure or reflect the underlying first-order latent constructs, and hence we can use them in the subsequent analyses of data or examining relationships between the constructs.

5.6.6.2. Assessment of Discriminant Validity of Measures

Discriminant validity was assessed following two procedures: first by evaluating whether the intercorrelations among the constructs fall below 0.70 (Fugate, *et al.*, 2009), and then by "comparing the Cronbach's α of a scale to its correlations with other model variables" (Sila and Ebrahimpour, 2005: 1133). Appendix 13 depicts the intercorrelations between each pair of constructs as well as the average interscale correlations (AVISC) between the constructs in the study. As the results reveal, the intercorrelations between the dimensions of competitive priorities exceed 0.7, and this was actually expected as firms simultaneously emphasize each of these priorities.

Higher intercorrelations were also observed among the mediating variables such as infrastructural manufacturing decisions, structural manufacturing decisions, improvement capability, and external learning capability. For instance, the correlation between infrastructural manufacturing decisions and improvement capability is 0.83 and the correlation between improvement capability and external learning capability is 0.87, both of which are above the 0.70 threshold level. Significant correlation was also observed between structural manufacturing decisions and infrastructural manufacturing decisions (i.e. r = 0.71). Given that firms frequently implement different manufacturing decisions altogether, the higher correlation between the two elements of manufacturing decisions, i.e. structural and infrastructural manufacturing decisions, was also expected in the study.

All the remaining pairs of constructs have shown lower correlations (and hence met the 0.70 cut-off criterion). In this regard, the correlation between infrastructural manufacturing decisions and external learning capability is below 0.70 and a relatively lower correlation was also observed between structural manufacturing decisions and improvement capability (r = 0.46) and between structural manufacturing decisions and external learning capabilities (r = 0.26). The comparison of the Cronbach's α of each scale and AVISC (in other words, Cronbach's α minus AVISC) for all the constructs further reveals that adequately large differences exist between the two and this is also a confirmation for discriminant validity of the constructs in the study (Sila and Ebrahimpour, 2005). Table 5.15 depicts the results vis-à-vis discriminant validity of measures.

Table 5.15: Discriminant validity of constructs

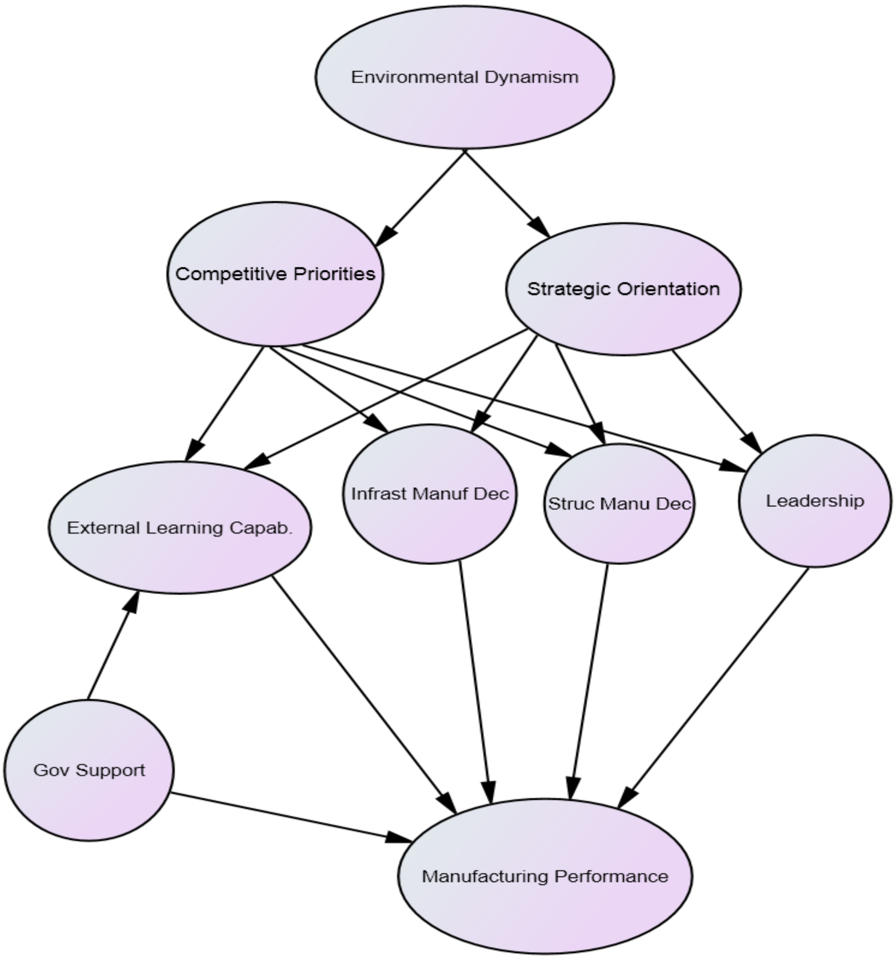
Variables/Scales	Average Interscale Correlations (AVISC)	Cronbach's Alpha	Discriminant Validity (Cronbach's Alpha - AVISC)
Environmental Dynamism	0.260	0.835	0.575
Strategic Orientation	0.273	0.802	0.530
Cost Priority	0.453	0.748	0.296
Quality Priority	0.432	0.834	0.402
Delivery Priority	0.385	0.784	0.399
Flexibility Priority	0.409	0.752	0.343
Structural Manufact. Decisions	0.318	0.757	0.439
Infrastructural Manufac. Decisions	0.468	0.892	0.424
Improvement Capability	0.436	0.872	0.436
External Learning Capability	0.372	0.860	0.488
Leadership	0.102	0.977	0.875
Government Support	0.132	0.932	0.800
Manufacturing Performance	0.321	0.794	0.473

Source: *Own Study (2013)*

Although the comparison of the α value and the average correlation of each scale with the other scales offer support for discriminant validity among the constructs, the higher intercorrelations between some of the constructs still raises concern. So, in order to avoid multicollinearity, one of the mediating variables, i.e. improvement capability, was removed from the analysis as it has higher intercorrelations especially with two of the mediating variables. However, the dimensions of competitive priorities as well as structural and infrastructural manufacturing decisions were all retained in the analysis, for their significance, regardless of the higher intercorrelations observed between these variables. This aspect is further explained in the next chapter as well.

5.7. Revised Conceptual Framework and Hypotheses

The tests and assessments made in this chapter reveal that 13 constructs and their respective indicators fulfill the reliability and validity requirements. The items measuring internal learning capability, however, did not load to this construct, and hence it was removed from the analysis. Although the measures of improvement capability significantly loaded to this construct and the measurement model showed a better fit, this construct was also removed from the subsequent analyses for reasons further explained in the next chapter. The hypothesized relationships involving these two variables were not tested in this study, and hence the conceptual framework and the research hypotheses already proposed in the previous chapter are also modified in this part. The revised conceptual framework is depicted in Figure 5.1, and the hypotheses finally tested are presented following the figure.



Source: *Developed Based on the Literature*

Figure 5.1: Revised Conceptual Framework for the Study

Environmental Dynamism vs. Competitive Priorities and Strategic Orientation

H_{1a-d}: The level of environmental dynamism significantly influences (a) quality, (b) delivery, (c) cost, and (d) flexibility competitive priorities of manufacturing firms.

H_{1e}: The level of environmental dynamism significantly influences strategic orientation of manufacturing firms.

Competitive Priorities vs. Subsequent Decisions and Practices

$H_{2a\text{-}d}$: Quality priority significantly influences (a) structural manufacturing decisions, (b) infrastructural manufacturing decisions, (c) leadership practices of manufacturing managers, and (d) external learning capability

$H_{3a\text{-}d}$: Delivery priority significantly influences (a) structural manufacturing decisions, (b) infrastructural manufacturing decisions, (c) leadership practices of manufacturing managers, and (d) external learning capability.

$H_{4a\text{-}d}$: Cost priority significantly influences (a) structural manufacturing decisions, (b) infrastructural manufacturing decisions, (c) leadership practices of manufacturing managers, and (d) external learning capability.

$H_{5a\text{-}d}$: Flexibility priority significantly influences (a) structural manufacturing decisions, (b) infrastructural manufacturing decisions, (c) leadership practices of manufacturing managers, and (d) external learning capability.

Strategic Orientation vs. Subsequent Decisions and Practices

$H_{6a\text{-}d}$: Strategic orientation significantly influence (a) structural manufacturing decisions, (b) infrastructural manufacturing decisions, (c) leadership practices of manufacturing managers, and (d) external learning capability.

Manufacturing Decisions and Manufacturing Performance

$H_{7a\text{-}b}$: Manufacturing decisions in the (a) structural and (b) infrastructural areas significantly influence firms' manufacturing performance.

Leadership and Manufacturing Performance

H_8: Leadership practice of manufacturing managers significantly influences plant performance.

External Learning Capability and Manufacturing Performance

H_9: External learning capability of the manufacturing plant significantly influences manufacturing performance.

Government Support: An Institutional Contingency

$H_{10a\text{-}b}$: Government support significantly influences (a) manufacturing performance and (b) external learning capability of the manufacturing plant.

5.8. Hypotheses Testing Procedure

The research hypotheses stated (summarized) in the previous section were tested in the study using the SEM approach. Since all the validated constructs were introduced into the structural model as latent factors, a confirmatory factor-analytic approach was implemented in AMOS 20.0. In order to reduce the complexity of the structural model as well as enhance model quality, four covariance structure models were implemented for the analysis. In this regard, Quality, Delivery, Cost, and Flexibility Priorities were entered separately into the structural model (rather than altogether) and then the hypothesized relationships analyzed. This is done due to the fact that the quality of the structural model falls significantly when the competitive priorities enter together into the analysis. All the other variables, however, were entered together into the models. In each model, direct and indirect effects of variables were analyzed and accordingly relevant inferences drawn (see the next chapter for detailed results and findings in the study).

5.9. Summary

This study lies in the pragmatism paradigm and adopts quantitative-emphasis mixed method. The design for the study is cross-sectional and the unit of analysis is the manufacturing plant. The data was gathered using a self-administered survey method and samples were selected mainly from ten industrial sectors from Addis Ababa and its periphery. Operational measures were collected from the literature and were already validated. The assessments and tests made, in this regard, indicate that twelve (12) constructs and their respective indicators or scales fulfill the criteria of reliability and validity, and hence considered in the subsequent analyses. The study specifically implements the CFA model under the SEM approach to examine relationships between variables and test the research hypotheses. The analyses, however, focus on examining relationships between variables rather than investigating cause-effect relationships owing to the study's design. In the next chapter, the results in the study are presented and interpreted.

CHAPTER 6

RESULTS

This chapter presents the results and findings obtained in the quantitative and qualitative analyses of data in the study. The analyses has four parts - the first part presents general profile of firms and respondents in the study; the second part involves descriptive analysis of data; the third part presents tests of hypotheses and results using the SEM approach; and the final section presents analysis of secondary data and additional comments of respondents (qualitative information) obtained through the questionnaires.

6.1. General Profile of Firms and Respondents in the Study

This study was conducted based on data obtained from medium and large scale manufacturing firms operating in Addis Ababa and its periphery. The initial sample size was to include 240 firms and accordingly five respondents from each firm. Three set of questionnaires (type 1, type 2, and type 3) were prepared and distributed to a total of 1200 respondents, out of which 985 valid questionnaires were returned. The data gathered relates to 197 firms and the response rate is 82.08 percent. Table 6.1 below depicts these and other technical details of the study including information about the target population, geographical area, method of data collection, as well as period of the field work.

Table 6.1: Research data

Population under study	Medium and large scale manufacturing firms
Study area	Addis Ababa and its periphery
Population census	600 firms
Sample size	240 firms
Data collection method	Survey questionnaires administered to respondents (by enumerators)
Returned questionnaires	985 questionnaires corresponding to 197 firms
Valid response rate	82.08 percent
Period of field work	Beginning of April 2013 up to End of August 2013

Source: *Own Study (2013)*

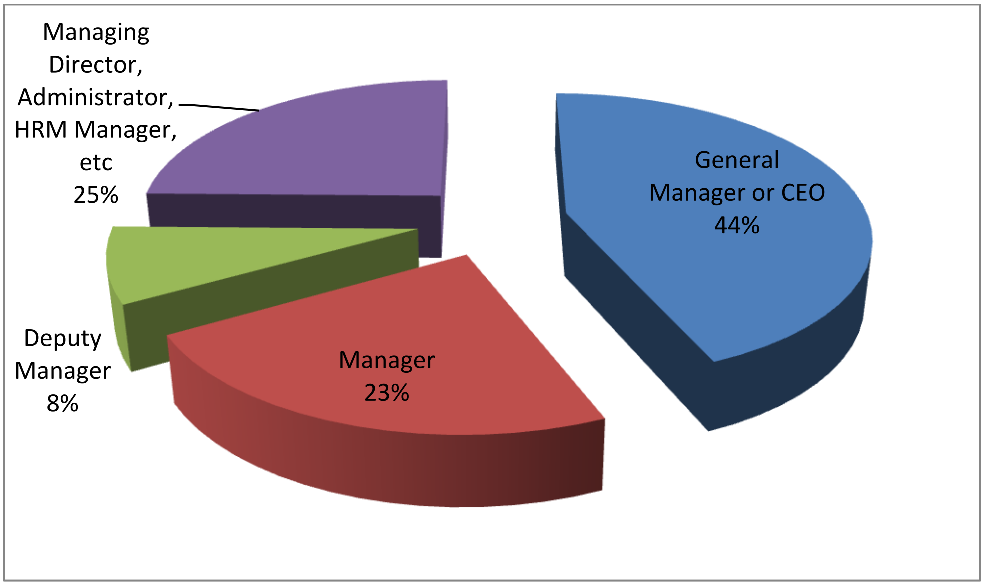
The respondents to type 1 questionnaire were general managers or CEOs, managers, deputy managers, and “others”, which includes management positions such as managing director,

director, administrator, and human resources manager. Table 6.2 and Figure 6.1 present the distribution of respondent managers in terms of their job title in the study. The analysis was conducted using the SPSS 20.0 software and the results indicate that 43.7 percent were general managers or CEOs, 23.2 percent were managers, 8.4 percent were deputy managers, and the rest 24.7 percent were having job titles such as managing director, director, administrator, or human resource manager. A few respondents (3.6 percent), however, did not indicate their job title.

Table 6.2: Job titles of respondent managers

		Freq.	Percent	Valid Percent	Cumulative Percent
Valid	General Manager or CEO	83	42.1	43.7	43.7
	Manager	44	22.3	23.2	66.8
	Deputy Manager	16	8.1	8.4	75.3
	Managing Director, Administrator, HRM Manager, etc	47	23.9	24.7	100.0
	Total	190	96.4	100.0	
Missing	0	7	3.6		
Total		197	100.0		

Source: *Own Study (2013)*



Source: *Own Study (2013)*

Figure: 6.1: Job titles of respondent managers

Table 6.3 further depicts the work experience of respondent managers in their company including in their current position. As the data reveals, 24.6 percent of the respondents have work experience of less than 3 years in the company, 37.9 percent have work experience between 3-6 years, 20.5 percent have work experience between 7-10 years, 6.2 percent have work experience between 11-15 years, 6.7 percent have work experience between 16-20 years, and 4.1 percent have more than 20 years of work experience in the company. Two respondents, however, did not indicate their work experience in the company.

Table 6.3: Work experience of respondent managers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<3years	48	24.4	24.6	24.6
	3-6years	74	37.6	37.9	62.6
	7-10years	40	20.3	20.5	83.1
	11-15years	12	6.1	6.2	89.2
	16-20years	13	6.6	6.7	95.9
	>20years	8	4.1	4.1	100.0
	Total	195	99.0	100.0	
Missing	0	2	1.0		
Total		197	100.0		

Source: *Own Study (2013)*

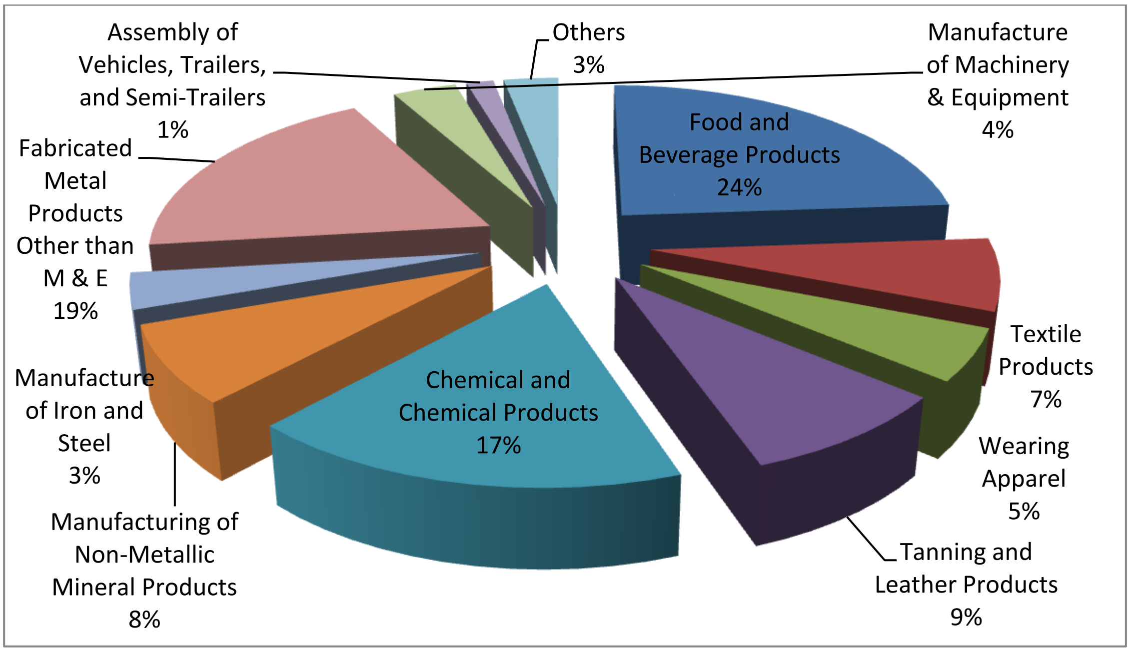
Given the position and responsibility of the above respondents, it can be deduced that they were suitable respondents and had the access to provide the information requested in the type 1 questionnaire. Type 2 and type 3 questionnaires were also administered to individuals who were deemed appropriate to provide the information requested in these instruments, i.e. manufacturing, operations, or industrial managers and employees who are subordinates of these officials respectively.

With regard to industrial distribution, the manufacturers included in the study belong to one of the following categories: Food products and Beverages, Textiles, Wearing Apparel, Tanneries and Leather products, Chemical and Chemical products, Non-Metallic Mineral Products, Iron and Steel, Fabricated Metal Products, Machinery and Equipment, Assemblers of Vehicles and Trailers/Semi-Trailers, and others (including foam and plastics manufacturers and manufacturers of wood and metal furniture/products). Because the samples were selected from different industries considering their distribution in the population, the sample proportion in the study nearly matches with the population proportion. Table 6.4 and Figure 6.2 below depict the industrial distribution of firms participated in the study.

Table 6.4: Industrial distribution of firms participated in the study

		Freq.	Valid %	Cumulat %
Valid	Food and Beverage Products	47	23.9	23.9
	Textile Products	14	7.1	31.0
	Wearing Apparel	10	5.1	36.0
	Tanning and Leather Products	17	8.6	44.7
	Chemical and Chemical Products	34	17.3	61.9
	Manufacturing of Non-Metallic Mineral Products	15	7.6	69.5
	Manufacture of Iron and Steel	7	3.6	73.1
	Fabricated Metal Products Other than Machinery and Equipment	37	18.8	91.9
	Manufacture of Machinery and Equipment	7	3.6	95.4
	Assembly of Vehicles, Trailers, and Semi-Trailers	3	1.5	97.0
	Others	6	3.0	100.0
	Total	197	100.0	

Source: *Own Study (2013)*



Source: *Own Study (2013)*

Figure: 6.2: Industrial distribution of firms

Apart from the above data, additional information was gathered regarding firms' ownership status (whether they are owned by government or private investors), level or size of fixed assets, average annual sales level, as well as type or characteristics of manufacturing process adopted. (Tables 6.5 through 6.8 depict information about these issues). With regard to ownership, we did not actually consider firms' ownership status when selecting and including them in the sample, though information about who owns them was captured through the questionnaire. Accordingly, the data indicates that significant portion of the firms participated in the study (92.9 percent) are under private ownership while only few firms (7.1 percent) are owned by the government (Table 6.5 below depicts the information about ownership status of the firms participated in the study).

Table 6.5: Ownership Condition of Firms Participated in the Study

		Frequency	Valid Percent	Cumulative Percent
Valid	Government Owned	14	7.1	7.1
	Privately Owned	183	92.9	100.0
	Total	197	100.0	

Source: *Own Study (2013)*

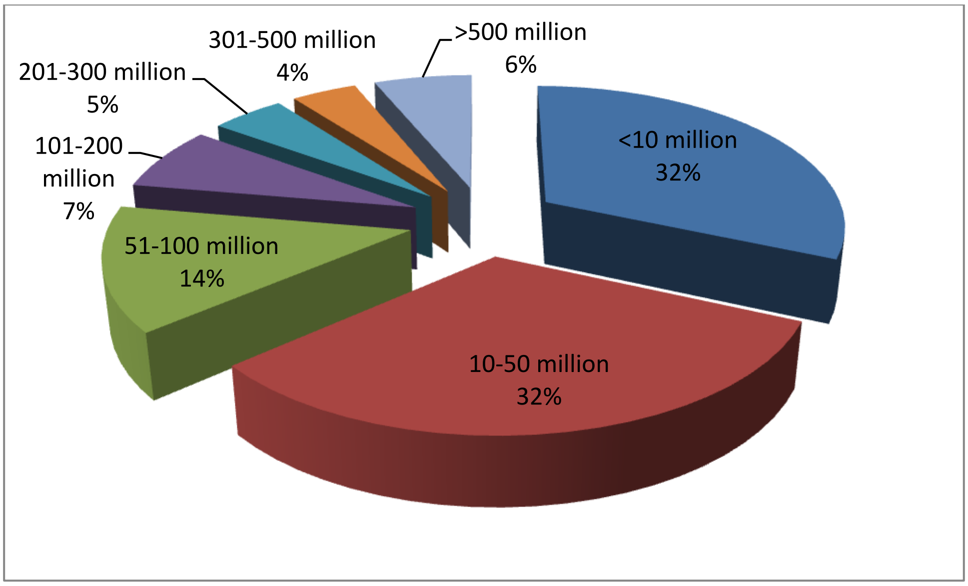
The skewed distribution towards private ownership was actually expected as the government in the country has been privatizing the state owned enterprises since the early 1990s and only few manufacturing enterprises remained hitherto under government ownership. Table 6.6 and Figure 6.3 further provide information about size of fixed assets owned by firms.

Table 6.6: Level of firms' fixed assets (in Birr)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<10million	61	31.0	31.6	31.6
	10-50million	62	31.5	32.1	63.7
	51-100million	27	13.7	14.0	77.7
	101-200million	14	7.1	7.3	85.0
	201-300million	9	4.6	4.7	89.6
	301-500million	8	4.1	4.1	93.8
	>500million	12	6.1	6.2	100.0
	Total	193	98.0	100.0	
Missing	0	4	2.0		
Total		197	100.0		

Source: *Own Study (2013)*

As the responses indicate, the majority of manufacturing companies (63.7 percent) involved in the study have invested less than birr 50 million in fixed assets. In this regard, 31.6 percent have invested less than birr 10 million in fixed assets, 32.1 percent invested birr 10-50 million, 14.0 percent invested birr 51-100 million, 7.3 percent invested birr 101-200 million, 4.7 percent invested birr 201-300 million, 4.1 percent invested birr 301-500 million, and 6.2 percent invested more than birr 500 million in fixed assets.



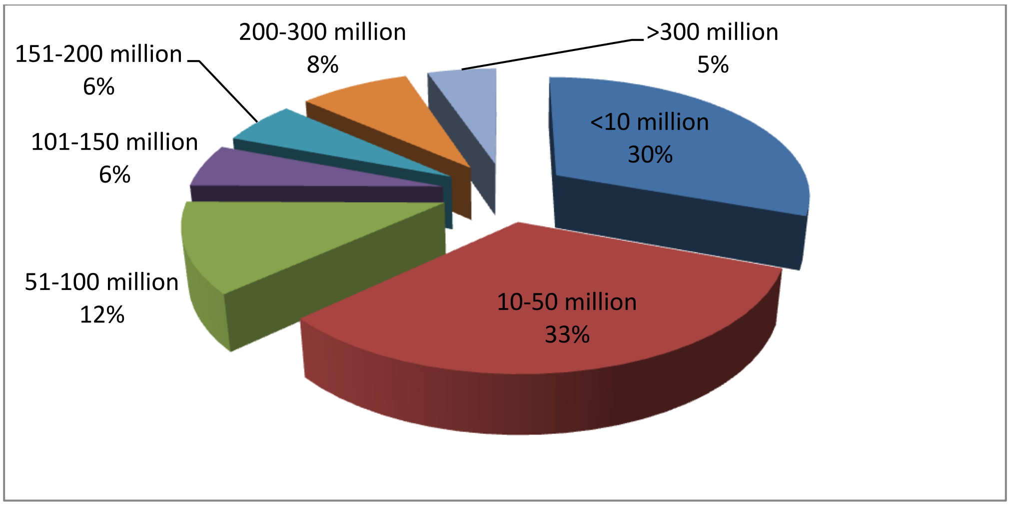
Source: *Own Study (2013)*
Figure: 6.3: Amount invested in fixed assets

The average annual sales (over the past three years) for the majority of the firms participated in the study (i.e. for 63.2 percent of firms) is also less than birr 50 million. In this regard, 30.6 percent have average annual sales of less than birr 10 million, 32.6 percent have average annual sales of birr 10-50 million, 11.9 percent have average annual sales of birr 51-100 million, 5.7 percent have average annual sales of birr 101-150 million, 5.7 percent have average annual sales of birr 151-200 million, 8.3 percent have average annual sales of birr 200-300 million, and the rest 5.2 percent have average annual sales of more than birr 300 million. A few firms, however, did not provide information about the amount of investment made in fixed assets and average annual sales. Table 6.7 and Figure 6.4 depict information about firm's average annual sales level.

Table 6.7: Average annual sales (in Birr)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<10million	59	29.9	30.6	30.6
	10-50million	63	32.0	32.6	63.2
	51-100million	23	11.7	11.9	75.1
	101-150million	11	5.6	5.7	80.8
	151-200	11	5.6	5.7	86.5
	200-300million	16	8.1	8.3	94.8
	>300million	10	5.1	5.2	100.0
	Total	193	98.0	100.0	
Missing	0	4	2.0		
Total		197	100.0		

Source: *Own Study (2013)*



Source: *Own Study (2013)*

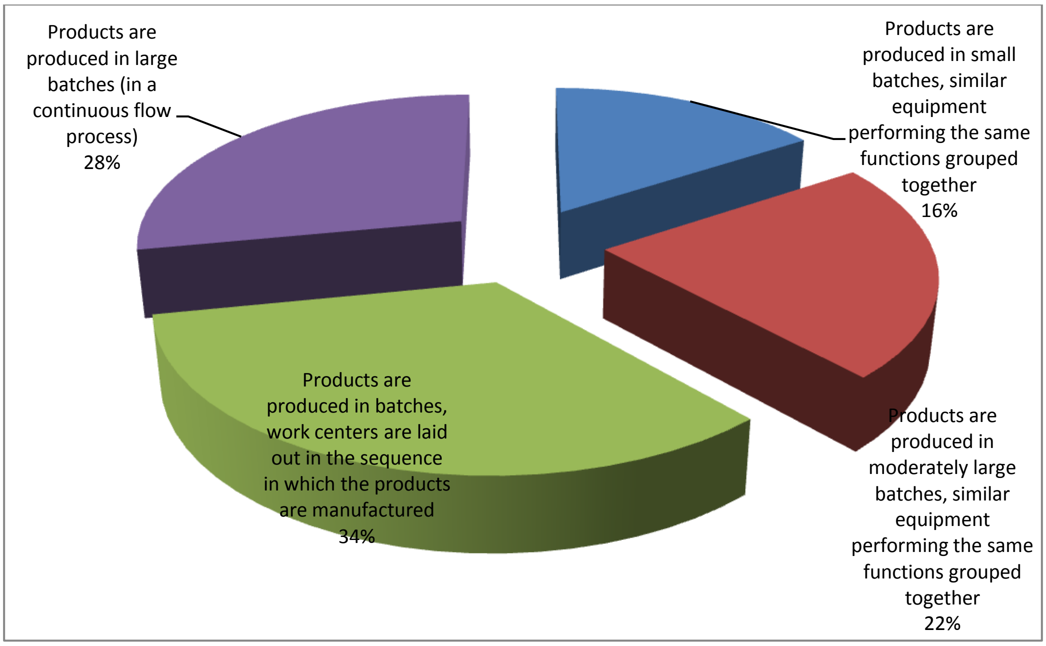
Figure: 6.4: Average annual sales

With regard to the kind of production process adopted by firms, 15.8 percent of the respondents indicate that their plant produces in small batches, 22.4 percent indicate their plant produces in moderately large batches (with similar equipment performing the same functions grouped together), and 28.1 percent indicate their plant produces in larger batches through a continuous flow production process. The majority (i.e. 33.7 percent), however, have adopted a production process in which products are produced in batches and work centers are laid out in the sequence in which the products are manufactured (see Table 6.8 for details).

Table 6.8: Production process characteristics

		Freq.	%	Valid %	Cumul.%
Valid	Products are produced in small batches, similar equipment performing the same functions grouped together	31	15.7	15.8	15.8
	Products are produced in moderately large batches, similar equipment performing the same functions grouped together	44	22.3	22.4	38.3
	Products are produced in batches, work centers are laid out in the sequence in which the products are manufactured	66	33.5	33.7	71.9
	Products are produced in large batches (in a continuous flow process)	55	27.9	28.1	100.0
	Total	196	99.5	100.0	
Missing	0	1	.5		
Total		197	100.0		

Source: *Own Study (2013)*



Source: *Own Study (2013)*

Figure: 6.5: Characteristics of production process

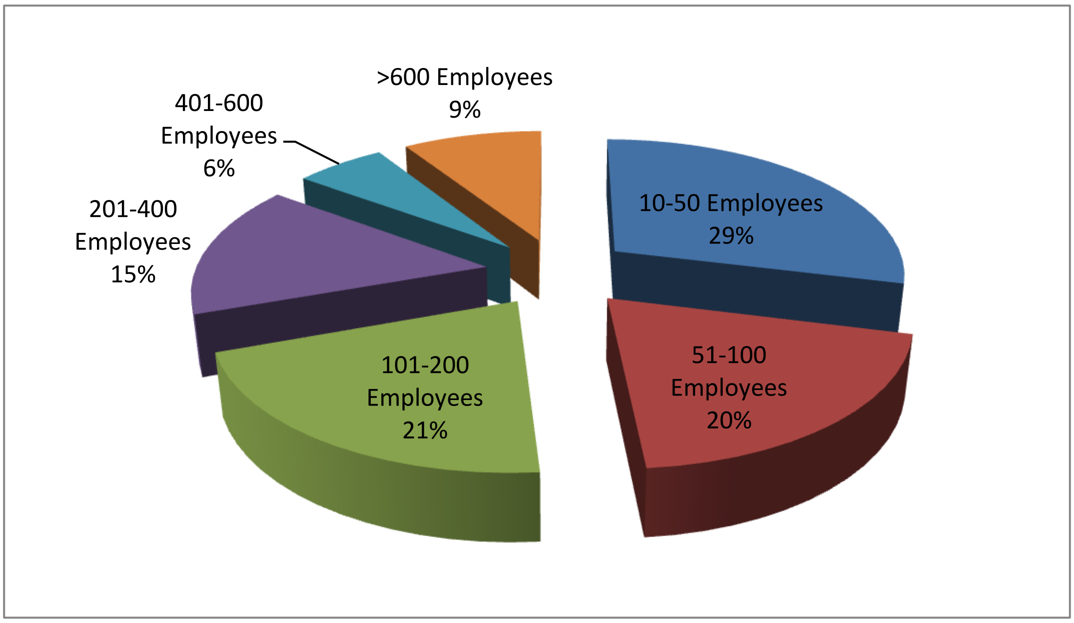
In addition to the above information, data about number of employees as well as number of years the plants have been in operation was collected through the questionnaire. Table 6.9 and 6.10 depict information about number of employees and plant age respectively.

Table 6.9: Distribution of employees in the firms participated in the study

		Frequency	Percent	Valid Percent	Cumul. Percent
Valid	10-50Employees	54	27.4	28.9	28.9
	51-100Employees	37	18.8	19.8	48.7
	101-200Employees	39	19.8	20.9	69.5
	201-400Employees	29	14.7	15.5	85.0
	401-600Employees	11	5.6	5.9	90.9
	>600Employees	17	8.6	9.1	100.0
	Total	187	94.9	100.0	
Missing	System	10	5.1		
Total		197	100.0		
Summary Statistics					
Mean		294.95			
Std. Error of Mean		62.048			
Median		103.00			
Std. Deviation		848.491			
Skewness		8.809			
Std. Error of Skewness		.178			

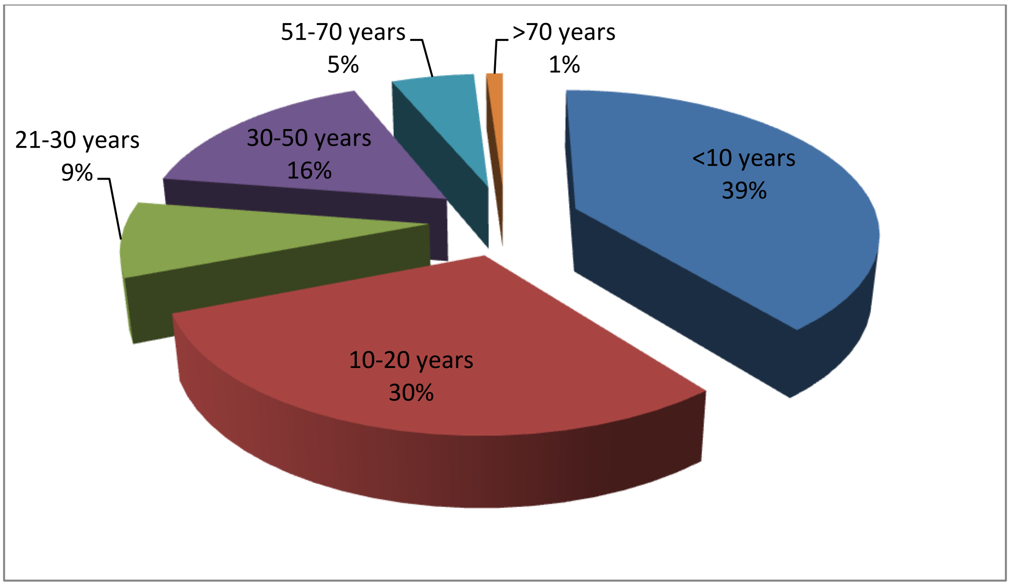
Source: *Own Study (2013)*

As Table 6.9 reveal, 28.9 percent of the firms participated in the study have a total of 10 to 50 employees, while 19.8 percent have 51 to 100 employees, and 20.9 percent have 101 to 200 employees. Only 15 percent of the firms participated in the study have more than 400 employees. From these firms, 5.9 percent have 401 to 600 employees and the remaining 9.1 percent have more than 600 employees. Some firms actually did not indicate the number of employees in their plant (with 187 valid responses and data from 10 firms missing). The available data, however, indicates that the average number of employees in the firms participated in the study is 295, with standard deviation of 848.491 and standard error of the mean equal to 62.048. Figure 6.6 further depicts the distribution of employees in the firms participated in the study.



Source: *Own Study (2013)*
Figure: 6.6: Distribution of employees

In terms of years of operation (or plant age), it is observed that the majority of the firms (69.1 percent) have aged 20 years or less. The average plant age is 19.5 years, with standard deviation of 18.197 and standard error of the mean equal to 1.317. Figure 6.7 and Table 6.10 further depict the distribution of the samples in terms of number of years they have been in operation.



Source: *Own Study (2013)*

Figure: 6.7: Distribution of firms in terms of their age (years of operation)

Table 6.10: Age of firms participated in the study

		Frequency	Percent	Valid Percent	Cumul. Percent
	<10years	75	38.1	39.3	39.3
	10-20years	57	28.9	29.8	69.1
	21-30years	16	8.1	8.4	77.5
Valid	30-50years	31	15.7	16.2	93.7
	51-70years	10	5.1	5.2	99.0
	>70years	2	1.0	1.0	100.0
	Total	191	97.0	100.0	
Missing	System	6	3.0		
Total		197	100.0		
Summary Statistics					
Mean		19.54			
Std. Error of Mean		1.317			
Median		11.00			
Std. Deviation		18.197			
Skewness		1.488			
Std. Error of Skewness		.176			

Source: *Own Study (2013)*

The data presented so far provides some background information about the samples included in the study. The remaining part of this chapter provides detailed analyses of data and results using descriptive and inferential statistical techniques.

6.2. Descriptive Statistics of the Validated Measurement Model

The mean, standard deviations, and correlations of all items included in the measurement model were computed using the SPSS software and the result is depicted in Appendix 14. The result reveals that the average item scores range between 2.7 and 5, and for many items the average score is greater than 3. It also reveals that the correlations between the items measuring the same construct were positive and statistically significant either at the 0.01 or 0.05 level, while the correlations between items measuring different constructs were relatively weak or negative. These results lay good foundation for the latent variable models used in the subsequent analysis. Table 6.11 further depicts correlation matrix of the latent constructs. The analysis was conducted using AMOS 20.0 software that allows analyzing correlations between latent variables apart from correlations between observed measures.

Table 6.11: Construct level correlation matrix

Variables	Envir Dyn	SO	Cost Prior	Deliv Prior	Quali Prior	Flex Prior	SMD	IMD	LP	Impr Cap	Exter Learn	Gov Supp	MP
Envir Dyn	1.00												
SO	**0.65**	1.00											
Cost Prior	**0.23**	0.17	1.00										
Deliv Prior	0.20	0.02	**0.75**	1.00									
Quali Prior	**0.26**	0.10	**0.88**	**0.88**	1.00								
Flex Prior	**0.21**	0.19	**0.68**	**0.71**	**0.68**	1.00							
SMDec	**0.22**	**0.34**	**0.21**	**0.24**	**0.25**	**0.49**	1.00						
IMD	**0.33**	**0.33**	**0.56**	**0.54**	**0.57**	**0.48**	**0.71**	1.00					
Leadership	0.05	0.13	0.16	0.01	0.12	0.08	0.09	0.11	1.00				
Improv. Cap	0.22	0.22	**0.64**	**0.60**	**0.58**	**0.50**	**0.46**	**0.83**	0.02	1.00			
Extern Learn	0.12	0.13	**0.58**	**0.52**	**0.53**	**0.38**	**0.24**	**0.67**	0.14	**0.87**	1.00		
Gov Support	**0.21**	**0.28**	0.16	-0.06	-0.02	0.14	**0.26**	0.14	0.18	-0.01	0.02	1.00	
Manuf. Perf.	**0.42**	**0.56**	**0.39**	0.18	**0.32**	**0.34**	**0.32**	**0.34**	0.13	**0.30**	**0.26**	**0.27**	1.00

Source: *Own Study (2013)*

As the above matrix depicts, almost all the correlations between the study variables are positive and significantly different from zero, except that only one variable, i.e. government support, negatively correlates with three variables, namely, delivery priority, quality priority, and improvement capability. The remaining constructs positively correlate with each other and some of these correlations are very high, for instance, the correlations between the dimensions of competitive priorities, between the manufacturing decision areas, as well as between external learning and improvement capability. The high correlation between the competitive priorities, among others, was expected and that is consistent with the literature. The observed high correlations between the areas of manufacturing decisions and improvement and external learning capabilities as well as with respect to the competitive priorities were also as expected because there is often high complementarity in the implementation of various manufacturing decisions or practices.

Numerous manufacturing decisions or practices are often implemented together in order to achieve strategic goals, and the high correlations between these variables in the study seem to have occurred due to this reason. The correlations between infrastructural manufacturing decisions (IMD) and improvement capability as well as between improvement capability and external learning capability, which are 0.83 and 0.87 respectively, were both above the 0.70 threshold level. The correlation between structural and infrastructural manufacturing decisions is also high (*r* = 0.71), and significant correlations (*r* = 0.67) were also observed between infrastructural manufacturing decisions and external learning capability. The high correlations among these variables were expected as firms often simultaneously implement various manufacturing decisions or practices and/or develop multiple capabilities to achieve the competitive priorities.

Apart from the aforementioned cases, relatively lower correlations were observed between some of the mediating variables as well, for instance, between structural manufacturing decisions (SMD) and external learning capability (*r* = 0.26) as well as between structural manufacturing decisions and improvement capability (*r* = 0.46). The observed high correlations between some of the variables, therefore, do not compromise the quality (especially discriminant validity) of the scales/constructs used in the study. However, as some of the scales have higher/significant correlations and including them together reduces model quality, attempt was made to implement separate models for the analysis. The procedure followed for testing the research hypotheses and results obtained, in this regard, are presented in the following section.

6.3. Test of the Research Hypotheses and Results

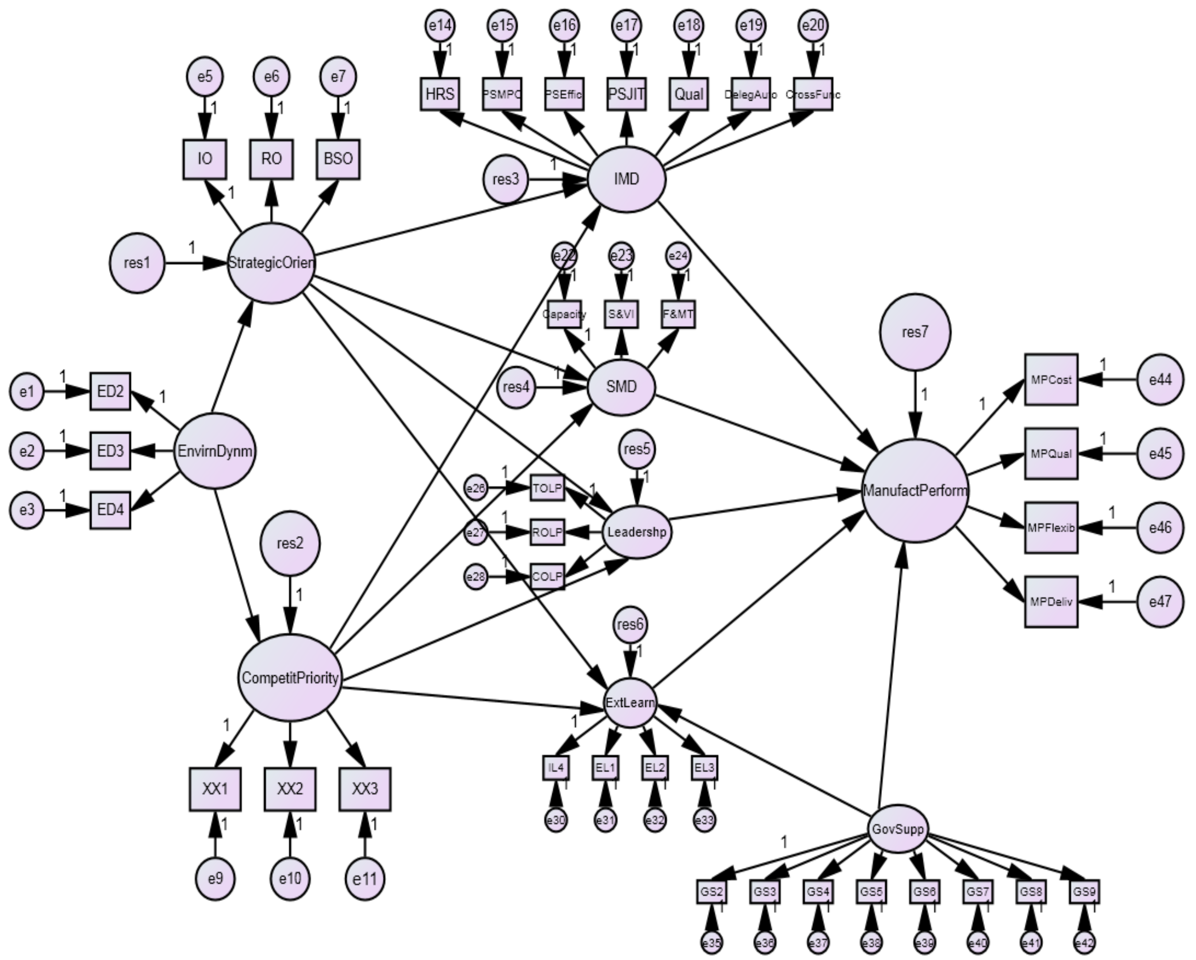
To test the research model, structural equation modeling (SEM) approach was used. The analysis was conducted using AMOS 20.0 software, within SPSS 20.0. In order to reduce the complexity of the structural model as well as enhance model quality, separate models were used to analyze relationships between the series of variables involved in the study. In this regard, the dimensions of competitive priorities were entered separately (one at a time) into the analysis, and not altogether, for the main reason that model fit (reflected in indices like

IFI, TLI, and CFI) falls significantly when these priorities enter together into the analysis. For the same reason (i.e. avoid multicollinearity), one of the mediating variables (improvement capability) was removed entirely from the analysis as it strongly correlates especially with two variables, i.e. infrastructural manufacturing decisions and external learning capability. The remaining constructs were entered together in the structural models in testing the hypothesized relationships. This procedure actually helped to maintain model quality, and hence reach at valid conclusions about the research hypotheses. Details of the data analyses and results obtained are presented next.

6.3.1. Assessment of Measurement Models and Results

In order to test the hypothesized relationships among the constructs, four covariance structure models were implemented in the study, namely Quality, Delivery, Cost, and Flexibility Priority Models. These models represent each of the dimensions of competitive priorities. Figure 6.8 depicts the structural equation model tested in the study. The difference between the four models lies in what is entered in the competitive priorities section (node) depicted in the figure. In this regard, each of the competitive priorities was entered separately into the model and then the overall fit of the measurement model assessed. The criteria used to assess model fit include chi-square (x^2), d.f., p-value, relative chi-square ($x^2/d.f.$), IFI, TLI (a.k.a. NNFI), CFI, and RMSEA. For each latent construct in the model, the regression weight of one item is fixed to “1”, and accordingly the values of the remaining items estimated.

The fit statistics and results obtained (including standardized and unstandardized estimates, critical ratios, and p-values) for the four measurement models are depicted in Tables 6.12 and 6.13. (Table 6.12 depicts the results for Quality and Delivery Priority Models and Table 6.13 depicts the results for Cost and Flexibility Priority Models). As Table 6.12 depicts, the IFI and CFI values for both models, i.e. Quality and Delivery Priority Models, either exceed or equal to 0.90, which suggest a close fit of the two measurement models. The $x^2_{(649)}$ = 1095.697 and $x^2/d.f.$ = 1.69 values for the Quality Priority Model and $x^2_{(649)}$ = 1096.717 and $x^2/d.f.$ = 1.69 values for the Delivery Priority Model suggest acceptable fit. The RMSEA p-value of a close-fit is (RMSEA $\leq$ 0.05) = 0.059 for both models also imply good model fit. The TLI values of 0.888 and 0.886 respectively for the Quality and Delivery Priority Models, on the other hand, suggest a reasonable fit of the two models. All the t-values (C.R.) in both the models are also significant at $p < 0.001$.



Source: *Own Study (2013)*

Figure 6.8: Hypothesized full structural equation model

The observed fit indices generally suggest that the two measurement models (i.e. the Quality Priority Model and Delivery Priority Model) fulfill the necessary criteria of model fit, and hence it is possible to analyze the hypothesized relationships using these two models. The analysis of the parameter estimates and p-values also indicate that the estimates for all the indicators of the latent constructs (i.e. environmental dynamism, strategic orientation, infrastructural manufacturing decisions, structural manufacturing decisions, leadership practices, external learning capability, government support, and manufacturing performance) are statistically significant at $p < 0.001$ level. Similarly, the estimates for the indicators of quality priority as well as delivery priority are statistically significant at $p < 0.001$ level in the respective models. (See Table 6.12 below for detailed results and model fit statistics for the Quality and Delivery Priority Models).

Table 6.12: Estimation of measurement model parameters - quality and delivery models

Paths			Quality Priority Model					Delivery Priority Model				
			St. Est	Est.	S.E.	C.R.	P	St. Est	Est.	S.E.	C.R.	P
HRS	<--	IMD	0.629	1				0.63	1			
PlanningMPC	<--	IMD	0.78	1.333	0.15	8.968	***	0.78	1.333	0.15	9	***
PlanningEfficiency	<--	IMD	0.862	1.526	0.16	9.612	***	0.851	1.506	0.16	9.57	***
PlanningJIT	<--	IMD	0.76	1.326	0.15	8.759	***	0.767	1.336	0.15	8.85	***
QualityInfrastDescision	<--	IMD	0.745	1.432	0.17	8.619	***	0.75	1.439	0.17	8.69	***
DelegationofAuthority	<--	IMD	0.703	1.338	0.16	8.238	***	0.713	1.355	0.16	8.36	***
CrossFunctiTraining	<--	IMD	0.694	1.167	0.14	8.157	***	0.7	1.174	0.14	8.24	***
CapacityDecision	<--	SMD	0.682	1				0.688	1			
SourcingandVerticInteg	<--	SMD	0.837	1.173	0.15	7.994	***	0.835	1.162	0.14	8.16	***
FacilityandManufTecho	<--	SMD	0.652	1.061	0.14	7.507	***	0.653	1.053	0.14	7.58	***
X113	<--	ExtLearn	0.678	0.946	0.11	8.901	***	0.691	0.967	0.11	9.08	***
X112	<--	ExtLearn	0.862	1.192	0.11	11.15	***	0.869	1.205	0.11	11.2	***
X111	<--	ExtLearn	0.817	1.126	0.11	10.67	***	0.803	1.109	0.11	10.5	***
X110	<--	ExtLearn	0.739	1				0.738	1			
X28	<--	GovSupp	0.797	1.013	0.09	11.48	***	0.797	1.013	0.09	11.5	***
X27	<--	GovSupp	0.754	1				0.754	1			
X29	<--	GovSupp	0.742	1.042	0.10	10.63	***	0.742	1.042	0.1	10.6	***
X30	<--	GovSupp	0.812	1.039	0.09	11.78	***	0.812	1.039	0.09	11.8	***
X31	<--	GovSupp	0.723	0.942	0.09	10.29	***	0.723	0.942	0.09	10.3	***
X32	<--	GovSupp	0.795	1.118	0.10	11.47	***	0.795	1.119	0.1	11.5	***
X33	<--	GovSupp	0.861	1.164	0.09	12.58	***	0.861	1.164	0.09	12.6	***
X34	<--	GovSupp	0.859	1.203	0.10	12.56	***	0.859	1.203	0.1	12.6	***
ChangeOL	<--	Leadershp	0.967	1.024	0.03	37.82	***	0.967	1.024	0.03	37.8	***
RelationshioOL	<--	Leadershp	0.962	1.033	0.03	36.48	***	0.962	1.033	0.03	36.5	***
TaskOL	<--	Leadershp	0.972	1				0.972	1			
InnovationOrientation	<--	StrategOrie	0.861	1				0.866	1			
ResourceOrientation	<--	StrategOrie	0.691	0.833	0.09	9.594	***	0.691	0.827	0.09	9.67	***
BusinessStratOrientat	<--	StrategOrie	0.723	0.812	0.08	10.03	***	0.714	0.797	0.08	10	***
X47∗ (X50)♣	<--	Comp.Prior	0.778	1.066	0.11	9.911	***	0.62	0.824	0.11	7.7	***
X46∗ (X49)♣	<--	Comp.Prior	0.797	1.057	0.11	10.08	***	0.79	1.061	0.11	9.34	***
X45∗ (X48)♣	<--	Comp.Prior	0.74	1				0.729	1			
MPCost	<--	ManufPerf	0.722	1				0.723	1			
MPQuality	<--	ManufPerf	0.67	1.145	0.15	7.908	***	0.67	1.143	0.14	7.93	***
MPFlexibility	<--	ManufPerf	0.722	1.092	0.13	8.345	***	0.723	1.092	0.13	8.38	***
MPDelivery	<--	ManufPerf	0.686	1.242	0.15	8.054	***	0.687	1.241	0.15	8.08	***
X24	<--	EnvirnDyn	0.785	0.995	0.09	10.99	***	0.784	0.991	0.09	11	***
X23	<--	EnvirnDyn	0.838	1				0.84	1			
X25	<--	EnvirnDyn	0.751	0.944	0.09	10.54	***	0.75	0.941	0.09	10.5	***

Model Fit Statistics	CMIN (or x^2)	d.f.	P	$x^2/d.f.$	IFI	TLI (NNFI)	CFI	RMSEA
Quality Model	1095.697	649	0.000	1.69	0.904	0.888	0.902	0.059
Delivery Model	1096.717	649	0.000	1.69	0.902	0.886	0.900	0.059

All of the path coefficients estimates are statistically significant at 0.1% level (i.e. p < 0.001).

∗ *Items measuring Quality Priority.* ♣ *Items measuring Delivery Priority.*

Source: *Own Study (2013)*

The measurement models for the Cost Priority and Flexibility Priority were also assessed and the results are presented in Table 6.13. As in the former two models, the estimates for all the indicators of the latent constructs were statistically significant at $p < 0.001$ level in the respective models. The cost and flexibility priorities were each measured using two items, while quality and delivery priorities were measured earlier in terms of three indicators. The number of items included in the Cost and Flexibility Priority Models is, therefore, one less than what was included in the previous two models[28]. This, among other things, seems to have resulted in some differences in the fit indices between the earlier and the latter two models. The relative differences in the factor loadings of items measuring the cost and flexibility priorities also contributed to the variations in the fit indices.

While the IFI, CFI, and RMSEA values in the Flexibility Priority Model relatively improved as compared to Quality and Delivery Priority Models, these indices were somehow deteriorated in the Cost Model. In spite of this, both Cost and Flexibility Priority Models have shown good fit for the data as the previous two models. Table 6.13 depicts the results (parameter estimates and fit indices) for these two models as well. As the table reveals, the IFI and CFI values in both models either exceed or equal to 0.90, which suggests a close fit of the two measurement models. The $x^2_{(613)} = 1054.509$ and $x^2/d.f. = 1.72$ values for the Cost Priority Model and $x^2_{(613)} = 1015.238$ and $x^2/d.f. = 1.66$ values for the Flexibility Priority Model suggest acceptable fit. The RMSEA p-value of a close-fit is (RMSEA ≤ 0.05) = 0.061 for the Cost Priority Model and 0.058 for the Flexibility Priority Model, both of which also imply good model fit.

The TLI values of 0.885 and 0.894 respectively for the Cost and Flexibility Priority Models, on the other hand, suggest a reasonable fit of the two models. All the t-values in both models are also significant at $p < 0.001$. The observed fit indices generally suggest that the two measurement models fulfill the necessary criteria of model fit, and hence it is possible to analyze the hypothesized relationships using these models as well. As the analysis of the parameter estimates and p-values further reveal, all the indicators of the latent constructs are again statistically significant at $p < 0.001$ level, which was the case in the quality and delivery priority models as well. The factor loadings of the indicators of cost and flexibility priorities are also statistically significant at $p < 0.001$ level in the respective models. As it was done in

[28] *Items X44, X43 measure Cost Priority; and items X52, X51 measure Flexibility Priority in Table 6.13.*

the earlier models, the regression weight of one item for each of the latent constructs was also fixed to "1" in both models.

Table 6.13: Estimation of measurement model parameters - cost and flexibility models

Paths			Cost Priority Model					Flexibility Priority Model				
			St. Est	Est.	S.E.	C.R.	P	St. Est	Est.	S.E.	C.R.	P
HRS	<--	IMD	0.637	1				0.628	1			
PlanningMPC	<--	IMD	0.773	1.303	0.14	9.06	***	0.778	1.329	0.15	8.95	***
PlanningEfficiency	<--	IMD	0.852	1.485	0.15	9.73	***	0.838	1.482	0.16	9.44	***
PlanningJIT	<--	IMD	0.757	1.304	0.15	8.88	***	0.777	1.355	0.15	8.91	***
QualityInfrastDescision	<--	IMD	0.746	1.413	0.16	8.77	***	0.724	1.39	0.17	8.43	***
DelegationofAuthority	<--	IMD	0.703	1.321	0.16	8.36	***	0.697	1.327	0.16	8.18	***
CrossFunctiTraining	<--	IMD	0.693	1.15	0.14	8.26	***	0.717	1.205	0.14	8.37	***
CapacityDecision	<--	SMD	0.682	1				0.677	1			
SourcingandVerticInteg	<--	SMD	0.821	1.15	0.14	8.21	***	0.805	1.135	0.14	8.44	***
FacilityandManufTecho	<--	SMD	0.665	1.083	0.14	7.60	***	0.684	1.122	0.14	7.78	***
X113	<--	ExtLearn	0.671	0.919	0.10	8.98	***	0.667	0.921	0.1	8.88	***
X112	<--	ExtLearn	0.865	1.174	0.10	11.58	***	0.873	1.193	0.1	11.5	***
X111	<--	ExtLearn	0.806	1.092	0.10	10.85	***	0.804	1.095	0.1	10.7	***
X110	<--	ExtLearn	0.753	1				0.748	1			
X28	<--	GovSupp	0.797	1.013	0.09	11.48	***	0.797	1.013	0.09	11.5	***
X27	<--	GovSupp	0.754	1				0.754	1			
X29	<--	GovSupp	0.742	1.042	0.10	10.63	***	0.742	1.042	0.1	10.6	***
X30	<--	GovSupp	0.812	1.039	0.09	11.78	***	0.812	1.039	0.09	11.8	***
X31	<--	GovSupp	0.723	0.942	0.09	10.29	***	0.723	0.942	0.09	10.3	***
X32	<--	GovSupp	0.795	1.118	0.10	11.47	***	0.795	1.118	0.1	11.5	***
X33	<--	GovSupp	0.861	1.164	0.09	12.58	***	0.861	1.164	0.09	12.6	***
X34	<--	GovSupp	0.859	1.204	0.10	12.56	***	0.859	1.203	0.1	12.6	***
ChangeOL	<--	Leadershp	0.967	1.024	0.03	37.79	***	0.967	1.024	0.03	37.8	***
RelationshioOL	<--	Leadershp	0.962	1.033	0.03	36.43	***	0.962	1.033	0.03	36.4	***
TaskOL	<--	Leadershp	0.972	1				0.972	1			
InnovationOrientation	<--	StrategOrie	0.855	1				0.867	1			
ResourceOrientation	<--	StrategOrie	0.698	0.846	0.09	9.60	***	0.7	0.836	0.09	9.64	***
BusinessStratOrientat	<--	StrategOrie	0.727	0.823	0.08	9.98	***	0.716	0.799	0.08	9.86	***
X44 (X52)	<--	Comp.Prior	0.667	1.251	0.20	6.14	***	0.471	0.982	0.2	4.94	***
X43 (X51)	<--	Comp.Prior	0.518	1				0.496	1			
MPCost	<--	ManufPerf	0.725	1				0.726	1			
MPQuality	<--	ManufPerf	0.672	1.143	0.14	7.98	***	0.672	1.142	0.14	8	***
MPFlexibility	<--	ManufPerf	0.724	1.092	0.13	8.44	***	0.725	1.091	0.13	8.46	***
MPDelivery	<--	ManufPerf	0.688	1.24	0.15	8.13	***	0.689	1.241	0.15	8.16	***
X24	<--	EnvirnDyn	0.783	0.992	0.09	10.98	***	0.785	0.996	0.09	11	***
X23	<--	EnvirnDyn	0.839	1				0.837	1			
X25	<--	EnvirnDyn	0.749	0.941	0.09	10.52	***	0.749	0.943	0.09	10.5	***

Model Fit Statistics	CMIN (or x^2)	d.f.	P	$x^2/d.f.$	IFI	TLI (NNFI)	CFI	RMSEA
Cost Model	1054.509	613	0.000	1.72	0.902	0.885	0.900	0.061
Flexibility Model	1015.238	613	0.000	1.66	0.909	0.894	0.908	0.058

Source: *Own Study (2013)*

In assessing the relationships between each construct and its indicators (or dimensions), the coefficient of determination (R^2), also called percentage of explained variance, was computed for every indicator in the study as well. Table 6.14 depicts the R^2 values for the items in the quality, delivery, cost, and flexibility models.

Table 6.14: Percentage of explained variance - quality, delivery, cost, and flexibility models

Paths/Model			Squared factor loadings (R^2)			
			Quality Model	Delivery Model	Cost Model	Flexibility Model
HRS	<--	IMD	0.396	0.397	0.406	0.394
PlanningMPC	<--	IMD	0.608	0.608	0.598	0.605
PlanningEfficiency	<--	IMD	0.743	0.724	0.726	0.702
PlanningJIT	<--	IMD	0.578	0.588	0.573	0.604
QualityInfrastDescision	<--	IMD	0.555	0.563	0.557	0.524
DelegationofAuthority	<--	IMD	0.494	0.508	0.494	0.486
CrossFunctiTraining	<--	IMD	0.482	0.490	0.480	0.514
CapacityDecision	<--	SMD	0.465	0.473	0.465	0.458
SourcingandVerticInteg	<--	SMD	0.701	0.697	0.674	0.648
FacilityandManufTechn	<--	SMD	0.425	0.426	0.442	0.468
X113	<--	ExtLearn	0.460	0.477	0.450	0.445
X112	<--	ExtLearn	0.743	0.755	0.748	0.762
X111	<--	ExtLearn	0.667	0.645	0.650	0.646
X110	<--	ExtLearn	0.546	0.545	0.567	0.560
X28	<--	GovSupp	0.635	0.635	0.635	0.635
X27	<--	GovSupp	0.569	0.569	0.569	0.569
X29	<--	GovSupp	0.551	0.551	0.551	0.551
X30	<--	GovSupp	0.659	0.659	0.659	0.659
X31	<--	GovSupp	0.523	0.523	0.523	0.523
X32	<--	GovSupp	0.632	0.632	0.632	0.632
X33	<--	GovSupp	0.741	0.741	0.741	0.741
X34	<--	GovSupp	0.738	0.738	0.738	0.738
ChangeOL	<--	Leadershp	0.935	0.935	0.935	0.935
RelationshioOL	<--	Leadershp	0.925	0.925	0.925	0.925
TaskOL	<--	Leadershp	0.945	0.945	0.945	0.945
InnovationOrientation	<--	StrategOrie	0.741	0.750	0.731	0.752
ResourceOrientation	<--	StrategOrie	0.477	0.477	0.487	0.490
BusinessStratOrientat	<--	StrategOrie	0.523	0.510	0.529	0.513
X47, X50, X44, X52	<--	Compet.Prior.	0.605	0.384	0.445	0.222
X46, X49, X43, X51	<--	Compet.Prior.	0.635	0.624	0.268	0.246
X45, X48 _ _	<--	Compet.Prior.	0.548	0.531	_	_
MPCost	<--	ManufPerfo	0.521	0.523	0.526	0.527
MPQuality	<--	ManufPerfo	0.449	0.449	0.452	0.452
MPFlexibility	<--	ManufPerfo	0.521	0.523	0.524	0.526
MPDelivery	<--	ManufPerfo	0.471	0.472	0.473	0.475
X24	<--	EnvirnDynm	0.616	0.615	0.613	0.616
X23	<--	EnvirnDynm	0.702	0.706	0.704	0.701
X25	<--	EnvirnDynm	0.564	0.563	0.561	0.561

Items X47, X46, X45 measure Quality Priority; X50, X49, X48 measure Delivery Priority; X44, X43 measure Cost Priority; and X52, X51 measure Flexibility Priority

Source: *Own Study (2013)*

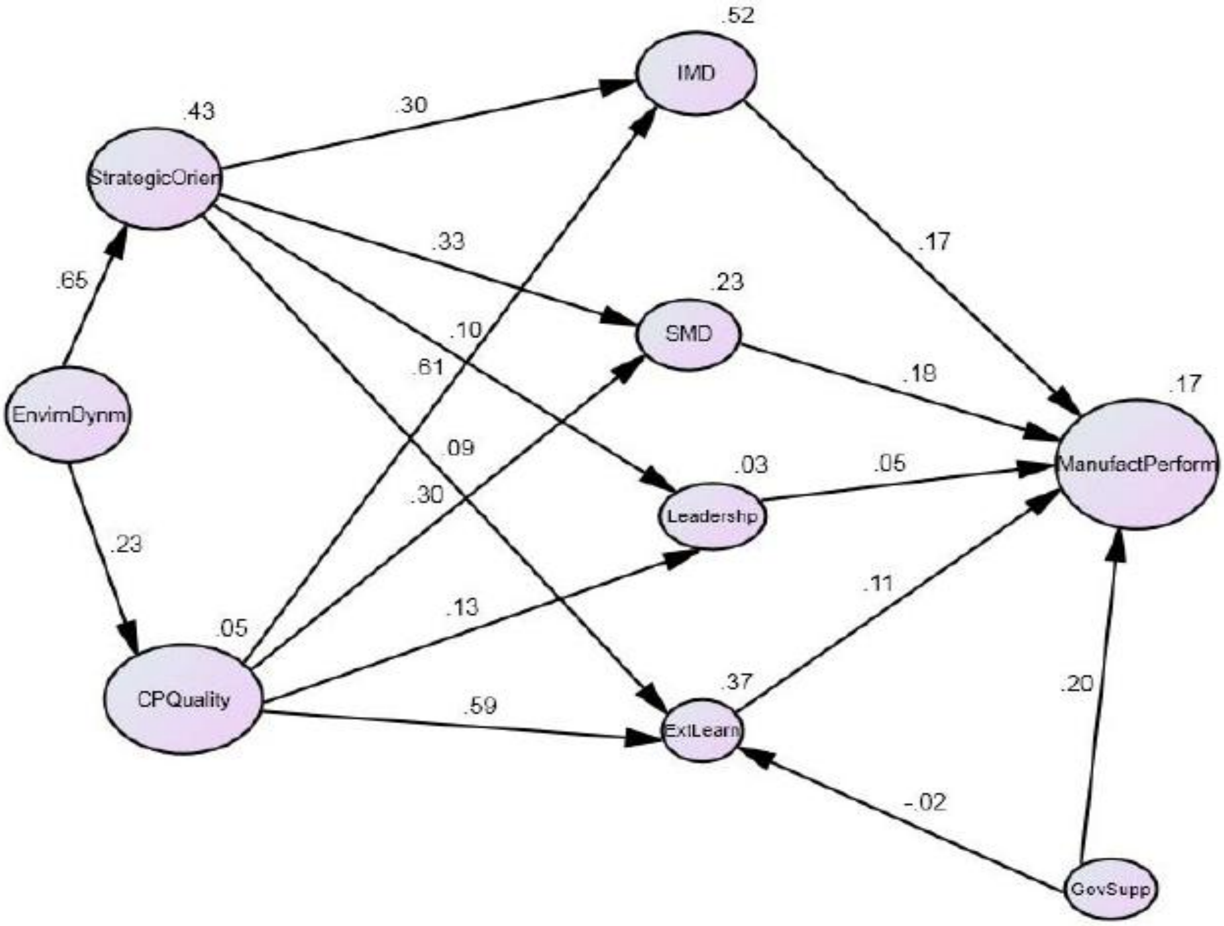
Except the measures of competitive priorities (quality, delivery, cost, and flexibility), the remaining items are the same across the four models. Hence, the R^2 values for those items included in the four models are more or less similar. All these items have relatively higher R^2 values, and this indicates that the constructs/factors explain higher degree of variances in the respective items. All the error variances and t-values were also significant at $p < 0.001$ level in the four models. The R^2 values for the measures of quality priority and delivery priority were also high as Table 6.14 depicts, though lower R^2 values were observed for the measures of cost and flexibility priorities. The items measuring the cost priority have 26.8% and 44.5% of explained variance. In this regard, the explained variance for the first item measuring the cost priority is low, while for the other item it is relatively higher. The two items measuring the flexibility priority, on the other hand, have lower percentage of explained variance, i.e. 22.2% and 24.6% respectively. In spite of this, the error variances and t-values for these items (measuring the cost and flexibility priorities) were still significant at $p < 0.001$ level.

Overall, the four measurement models analyzed in this section fulfill the necessary criteria of model fit, and based on these results the hypothesized (causal) relationships between the latent variables were analyzed. The results obtained from each of the structural models analyzed in the study are presented in the next section.

6.3.2. Analyses and Results of the Structural Models

The first structural model analyzed is the quality model. The AMOS 20.0 software was employed to examine the relationships among the factors included in this and the other three models. Figure 6.9 and 6.10 depict the output of the path diagram showing the hypothesized direct effects and standardized estimates for the quality and delivery priority models respectively. Both figures depict the parameter estimates and R^2 values (explained variance) generated from the structural models. Similar path diagrams were generated for the cost and flexibility priority models as well.

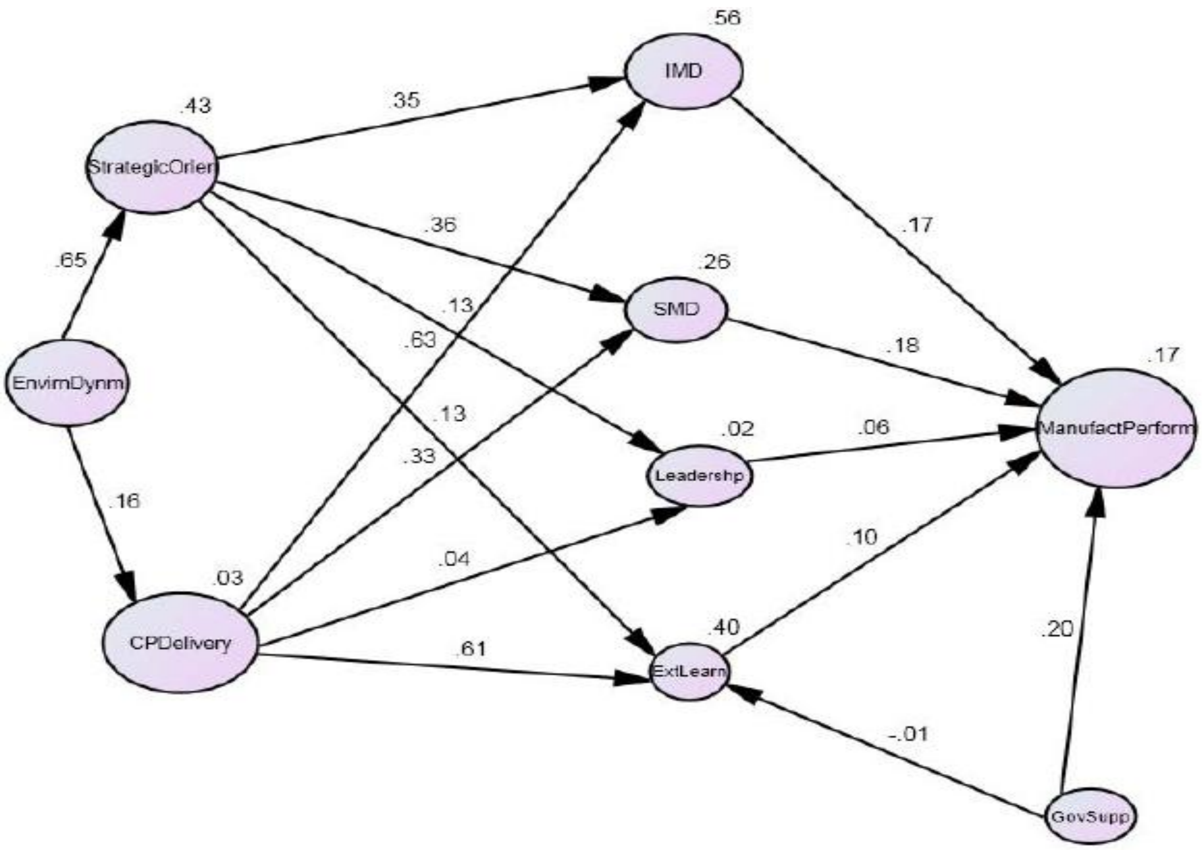
As can be observed from Figure 6.9 and 6.10, the R^2 values for the dependent factors in the Quality Priority Model range from 0.03 to 0.52, while these values range from 0.02 to 0.56 in the Delivery Priority Model. The R^2 for manufacturing performance, which is the ultimate dependent variable in the study, is 0.17 in both models. This result suggests that only 17 percent of the variance in this factor is explained by the independent factors. The leadership construct also has a lower percentage of explained variance in both models (i.e. 0.03 and 0.02 respectively in the quality and delivery priority models), which indicates that a smaller percentage of the variance in this factor is explained by the independent factors. The remaining constructs, however, have shown a relatively higher percentage of explained variance in both models.



Source: *Own Study (2013)*

Figure 6.9: AMOS graphic output for the structural model with quality priority

Both figures only depict estimates for the hypothesized direct effects and R^2 values, and do not indicate which paths are significant. Due to this reason, the parameter estimates, standard errors, t-values, and p-values generated from the quality and delivery priority models are further presented in Table 6.15. Significant paths are shaded in the table. All the figures and tables provide results about the hypothesized direct effects in the study. The indirect effects of the variables are also analyzed and the result is depicted in Table 6.19.



Source: *Own Study (2013)*

Figure 6.10: AMOS graphic output for the structural model with delivery priority

Table 6.15: Results of hypothesized direct effects – quality and delivery priority models

Hypothesized Paths			Quality Priority Model					Delivery Priority Model				
			St. Est.	Est.	S.E.	C.R.	P	St. Est.	Est.	S.E.	C.R.	P
StrategicOrien	<-	EnvirnDyn	0.655	0.559	0.07	7.89	***	0.653	0.56	0.07	7.92	***
CompPrior. ♣	<-	EnvirnDyn	0.23	0.203	0.08	2.68	0.007	0.162	0.145	0.08	1.85	0.064
IMD	<-	StrategOrie	0.296	0.262	0.06	4.11	***	0.345	0.306	0.07	4.71	***
SMD	<-	StrategOrie	0.333	0.398	0.11	3.77	***	0.356	0.428	0.11	4.07	***
Leadershp	<-	StrategOrie	0.101	0.08	0.06	1.28	0.202	0.127	0.101	0.06	1.62	0.106
ExtLearn	<-	StrategOrie	0.087	0.127	0.11	1.17	0.241	0.129	0.187	0.11	1.75	0.08
IMD	<-	CompPrior.	0.614	0.528	0.08	6.45	***	0.629	0.532	0.08	6.45	***
SMD	<-	CompPrior.	0.301	0.349	0.10	3.42	***	0.335	0.384	0.10	3.74	***
Leadershp	<-	CompPrior.	0.127	0.098	0.06	1.60	0.11	0.039	0.029	0.06	0.49	0.626
ExtLearn	<-	CompPrior.	0.59	0.838	0.13	6.35	***	0.609	0.844	0.13	6.38	***
ExtLearn	<-	GovSupp	-0.015	-0.02	0.08	-0.22	0.823	-0.006	-0.01	0.08	-0.10	0.924
ManufactPerform	<-	IMD	0.175	0.133	0.07	1.83	0.068	0.172	0.131	0.08	1.74	0.082
ManufactPerform	<-	SMD	0.181	0.102	0.05	1.94	0.053	0.178	0.1	0.05	1.87	0.062
ManufactPerform	<-	Leadershp	0.053	0.044	0.07	0.69	0.492	0.057	0.049	0.07	0.75	0.453
ManufactPerform	<-	ExtLearn	0.111	0.051	0.04	1.19	0.236	0.103	0.048	0.04	1.07	0.283
ManufactPerform	<-	GovSupp	0.198	0.107	0.04	2.47	0.014	0.199	0.108	0.04	2.49	0.013

Significant path coefficients estimates are shaded.

♣*CompPrior. represents quality priority in the Quality Model and delivery priority in the Delivery Model.*

Source: *Own Study (2013)*

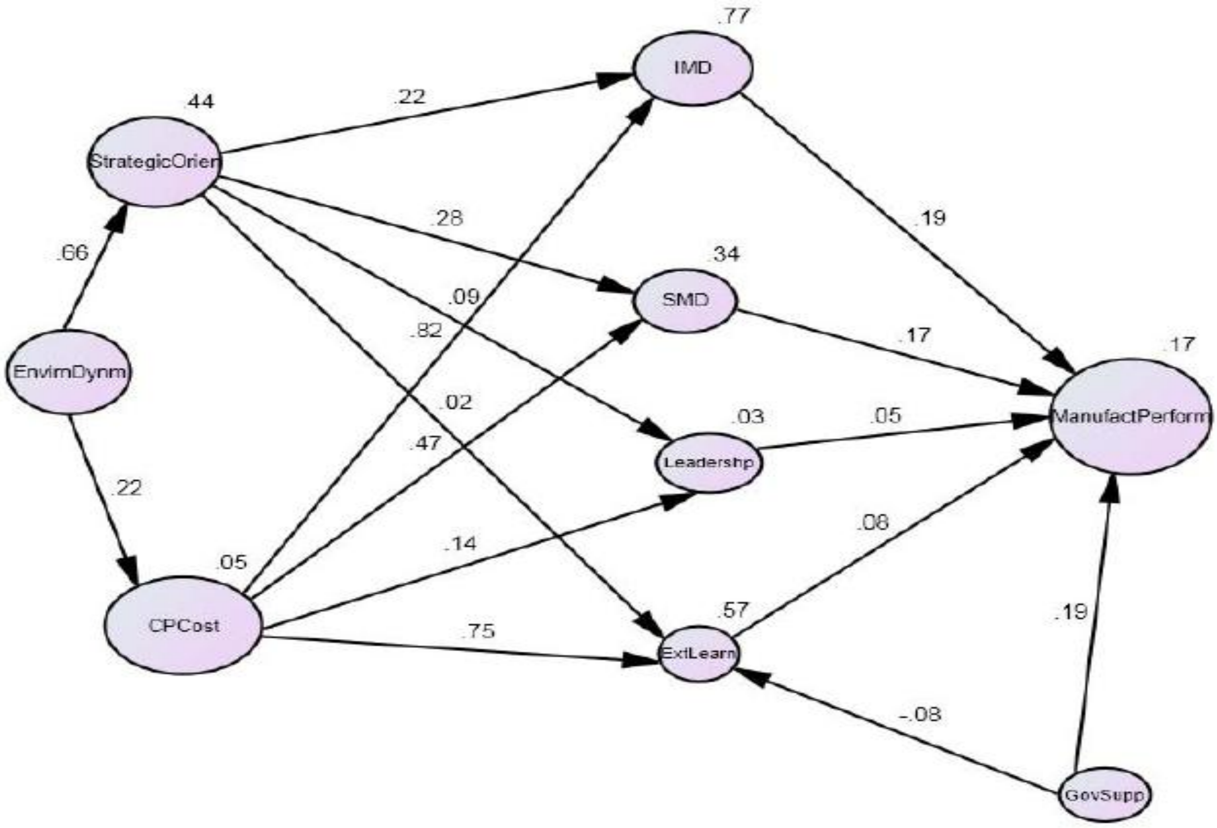
The results depicted in the above table pertain to the 16 hypothesized relationships tested in the Quality and Delivery Priority Models. The analysis of the paths in the Quality Priority Model reveals that the direct effects of environmental dynamism both on quality priority and strategic orientation (H_{1a} and H_{1e}) were significant at $p < 0.01$ and $p < 0.001$ levels respectively. In turn, the direct effects of quality priority on structural manufacturing decisions (H_{2a}), infrastructural manufacturing decisions (H_{2b}), as well as external learning capability (H_{2d}) were all significant at $p < 0.001$ level, though its effect on leadership (H_{2c}) was not significant.

The direct effects of strategic orientation on both structural manufacturing decisions (H_{6a}) and infrastructural manufacturing decisions (H_{6b}) were also significant at $p < 0.001$ level, while its effects on leadership (H_{6c}) and external learning capability (H_{6d}) were not significant. The direct effects of leadership practice of manufacturing managers (H_8) and external learning capability (H_9) on manufacturing performance also were not significant in the Quality Priority Model. However, the direct effects of structural manufacturing decisions (H_{7a}) and infrastructural manufacturing decisions (H_{7b}) on manufacturing performance were significant at $p < 0.1$ level in this model. The direct path from government support to manufacturing performance (H_{10a}) was also significant at $p < 0.05$ level, though the effect of government support on external learning capability (H_{10b}) was not significant at the 0.1 level.

Except the minor variations in the amounts of parameter estimates, t-values, and p-values, and the result about the direct effect of strategic orientation on external learning capability, the results about the other hypothesized relationships in the Delivery Priority Model are the same as those in the Quality Priority Model. In fact, in the latter model, delivery priority was entered in place of quality priority, and this is the only difference between the two models. As the analysis of the individual paths in the Delivery Priority Model reveal, in this regard, the direct effects of environmental dynamism both on delivery priority (H_{1b}) and strategic orientation (H_{1e}) were significant at $p < 0.1$ and $p < 0.001$ level respectively. In turn, the direct effects of delivery priority on structural manufacturing decisions (H_{3a}), infrastructural manufacturing decisions (H_{3b}), as well as external learning capability (H_{3d}) were all significant at $p < 0.001$ level. The effect of delivery priority on leadership (H_{3c}) was not significant, however.

The direct effects of strategic orientation on both structural manufacturing decisions (H_{6a}) and infrastructural manufacturing decisions (H_{6b}) were significant at $p < 0.001$ level, and its effect on external learning capability (H_{6d}) also was significant at $p < 0.1$ level. The effect of strategic orientation on leadership (H_{6c}), however, was not significant in the Delivery Priority Model. The direct effects of leadership (H_8) and external learning capability (H_9) on manufacturing performance again were not significant in this model. The direct effects of structural manufacturing decisions (H_{7a}) and infrastructural manufacturing decisions (H_{7b}) on manufacturing performance, however, were significant at $p < 0.1$ level. Again in this model, the direct path from government support to manufacturing performance (H_{10a}) was significant at $p < 0.05$ level, though the effect of government support on external learning capability (H_{10b}) was not significant at the 0.1 level. These results are almost similar to the findings in the Quality Model.

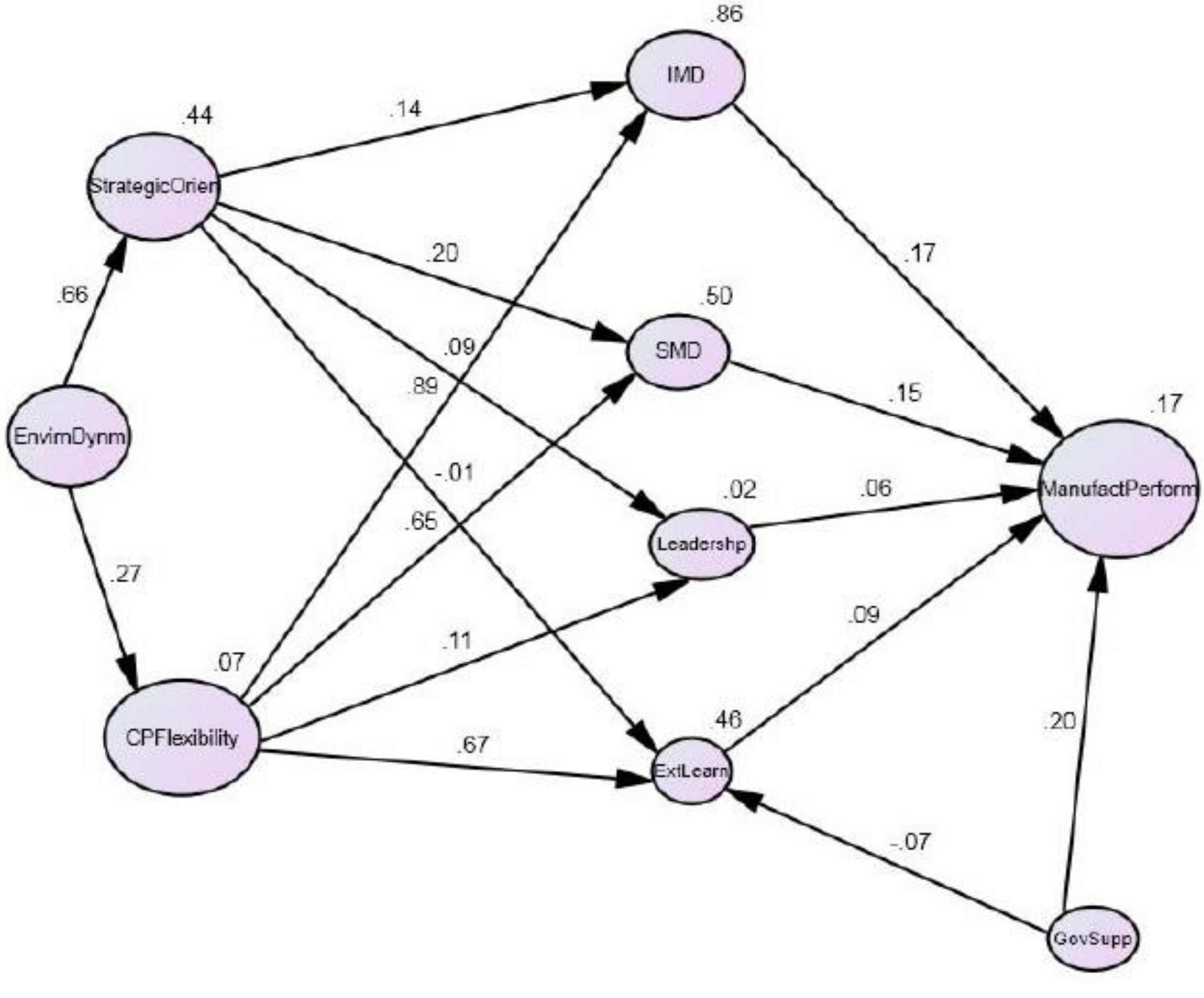
The other two models analyzed in the study are the Cost and Flexibility Priority Models. The standardized estimates and R^2 values generated from these models are depicted in Figure 6.11 and 6.12 respectively. As the figures reveal, the R^2 values for the dependent factors range from 0.03 to 0.77 in the Cost Priority Model (as depicted in Figure 6.11 below) and from 0.02 to 0.86 in the Flexibility Priority Model (which is depicted in Figure 6.12). In general, the estimated R^2 values are more or less similar in the four models tested in the study.



Source: *Own Study (2013)*

Figure 6.11: AMOS graphic output for the structural model with cost priority

For instance, the R^2 value for the manufacturing performance construct is 0.17 in all the four models and this suggest that 17 percent of the variance in the dependent factor (manufacturing performance) is explained by the independent factors in the structural models. The explained variance for the leadership construct is also found to be low in the cost and flexibility priority models, i.e. 0.03 and 0.02 respectively. It was 0.03 in the quality model and 0.02 in the delivery priority model. These results suggest that a smaller percentage of the variance in the factor - leadership - is explained by the independent factors in all the models. The remaining constructs, however, have shown a relatively higher percentage of explained variance in all the four models.



Source: *Own Study (2013)*

Figure 6.12: AMOS graphic output for the structural model with flexibility priority

Because the above figures do not indicate which hypothesized paths are significant, the parameter estimates, standard errors, t-values, and p-values obtained from the cost and flexibility priority models are presented further in Table 6.16. Significant paths are shaded in this table as well. The analysis of the individual paths in the Cost Priority Model indicate that the direct effects of environmental dynamism both on cost priority (H_{1c}) and strategic orientation (H_{1e}) were significant at $p < 0.05$ and $p < 0.001$ level respectively. In turn, the effects of cost priority on structural manufacturing decisions (H_{4a}), infrastructural manufacturing decisions (H_{4b}), and external learning capability (H_{4d}) were all significant at $p < 0.001$ level. The effect of cost priority on leadership (H_{4c}) was also significant at $p < 0.1$ level in the Cost Priority Model.

Table 6.16: Results of hypothesized direct effects – cost and flexibility priority models

Hypothesized Paths			Cost Priority Model					Flexibility Priority Model				
			St. Est.	Est.	S.E.	C.R.	P	St. Est.	Est.	S.E.	C.R.	P
StrategicOrien	<--	EnvirnDyn	0.664	0.563	0.07	7.96	***	0.663	0.571	0.07	8.03	***
CompPrior. [♣]	<--	EnvirnDyn	0.215	0.139	0.06	2.20	0.028	0.269	0.146	0.06	2.56	0.011
IMD	<--	StrategOrie	0.22	0.199	0.07	3.01	0.003	0.14	0.122	0.07	1.71	0.087
SMD	<--	StrategOrie	0.283	0.34	0.11	3.25	0.001	0.195	0.229	0.10	2.20	0.028
Leadershp	<--	StrategOrie	0.085	0.069	0.06	1.07	0.283	0.092	0.073	0.06	1.15	0.252
ExtLearn	<--	StrategOrie	0.023	0.035	0.12	0.30	0.762	-0.011	-0.02	0.13	-0.13	0.9
IMD	<--	CompPrior.	0.82	0.972	0.17	5.75	***	0.893	1.244	0.23	5.49	***
SMD	<--	CompPrior.	0.473	0.746	0.17	4.36	***	0.648	1.209	0.24	5.08	***
Leadershp	<--	CompPrior.	0.142	0.15	0.09	1.72	0.085	0.105	0.132	0.10	1.28	0.199
ExtLearn	<--	CompPrior.	0.748	1.484	0.25	5.87	***	0.673	1.577	0.29	5.42	***
ExtLearn	<--	GovSupp	-0.085	-0.1	0.08	-1.34	0.181	-0.066	-0.08	0.08	-0.99	0.322
ManufactPerfor	<--	IMD	0.187	0.142	0.09	1.52	0.13	0.174	0.134	0.11	1.28	0.201
ManufactPerfor	<--	SMD	0.166	0.094	0.06	1.59	0.111	0.154	0.089	0.07	1.23	0.22
ManufactPerfor	<--	Leadershp	0.052	0.044	0.07	0.68	0.498	0.055	0.047	0.07	0.73	0.467
ManufactPerfor	<--	ExtLearn	0.084	0.038	0.05	0.73	0.467	0.087	0.04	0.05	0.79	0.427
ManufactPerfor	<--	GovSupp	0.194	0.106	0.04	2.42	0.016	0.196	0.107	0.04	2.45	0.014

Significant path coefficients estimates are shaded.

[♣]*CompPrior. represents cost priority in the Cost Model and flexibility priority in the Flexibility Model.*

Source: *Own Study (2013)*

The direct effects of strategic orientation on both structural manufacturing decisions (H_{6a}) and infrastructural manufacturing decisions (H_{6b}) were also significant at $p < 0.01$ level, while its effects on leadership (H_{6c}) and external learning capability (H_{6d}) were not significant. The direct effects of leadership practice of manufacturing managers (H_8) and external learning capability (H_9) in turn on manufacturing performance also were not significant in the Cost Priority Model. The direct path from government support to manufacturing performance (H_{10a}) was also significant at $p < 0.05$ level, though the effect of government support on external learning capability (H_{10b}) was not significant at the 0.1 level.

These findings are consistent with what was obtained in the previous two models. The findings that contradict with the previous two models relate to the hypothesized effects of structural manufacturing decisions (H_{7a}) and infrastructural manufacturing decisions (H_{7b}) on manufacturing performance. In this regard, it was found that the direct effects of these two variables on manufacturing performance were not significant at $p < 0.1$ level in the Cost Priority Model. This suggests that both structural and infrastructural manufacturing decisions do not mediate the relationship between cost priority and manufacturing performance.

The results obtained about the hypothesized direct effects in the Flexibility Priority Model are more or less similar to the findings in the previous three models, especially with the results in the Cost Priority Model. In this regard, the analysis of individual path coefficients reveal that the direct effects of environmental dynamism both on flexibility priority (H_{1d}) and strategic orientation (H_{1e}) were significant at $p < 0.05$ and $p < 0.001$ level respectively. In turn, the direct effects of flexibility priority on structural manufacturing decisions (H_{5a}), infrastructural manufacturing decisions (H_{5b}), and external learning capability (H_{5d}) were all significant at $p < 0.001$ level, although its effect on leadership (H_{5c}) was not significant in this model.

The direct effects of strategic orientation on both structural manufacturing decisions (H_{6a}) and infrastructural manufacturing decisions (H_{6b}) were significant at $p < 0.05$ and $p < 0.1$ level respectively in the Flexibility Priority Model, while its effects on leadership (H_{6c}) and external learning capability (H_{6d}) were not significant. The direct effects of leadership practice of manufacturing managers (H_8) and external learning capability (H_9) in turn on manufacturing performance also were not significant in this model. Again in this model, the path from government support to manufacturing performance (H_{10a}) was significant at $p < 0.05$ level, though the effect of government support on external learning capability (H_{10b}) not significant at the 0.1 level.

These findings are consistent with the results in the previous three models. The findings that contradict with those in the Quality and Delivery Priority Models relate to the hypothesized effects of structural manufacturing decisions (H_{7a}) and infrastructural manufacturing decisions (H_{7b}) on manufacturing performance. In this regard, it was obtained that the effects of these two variables on manufacturing performance were not significant at the 0.1 level in the Flexibility Priority Model. This finding is actually consistent with the result in the Cost Priority Model.

In general, the results about the hypothesized direct effects are more or less consistent across the four models, and only in few occasions that the results vary among the models. In this regard, from the 16 hypothesized paths, the results for 12 hypotheses were similar across the four models. Two hypothesized paths that were weakly significant in the quality and delivery priority models were found to be not significant at the 0.1 level in the cost and flexibility priority models. One hypothesis that was found to be weakly significant in the delivery priority model, and another hypothesis that was found to be strongly significant in the cost priority model was not supported in the other models. Table 6.17 below depicts summary of standardized estimates and p-values obtained from the four structural models analyzed in the study. Shaded paths are significant either at the 0.001, 0.01, 0.05, or 0.1 levels.

Table 6.17: Summary of standardized estimates and p-values for the hypothesized paths

Hypothesized Paths			Quality Model		Delivery Model		Cost Model		Flexibility Model	
			St. Est.	p-value	St. Est.	p-value	St. Est.	p-value	St. Est.	p-value
StrategicOrien	<--	EnvirnDyn	0.655	***	0.653	***	0.664	***	0.663	***
CompPrior.	<--	EnvirnDyn	0.23	0.007	0.162	0.064	0.215	0.028	0.269	0.011
IMD	<--	StrategOrie	0.296	***	0.345	***	0.22	0.003	0.14	0.087
SMD	<--	StrategOrie	0.333	***	0.356	***	0.283	0.001	0.195	0.028
Leadershp	<--	StrategOrie	0.101	0.202	0.127	0.106	0.085	0.283	0.092	0.252
ExtLearn	<--	StrategOrie	0.087	0.241	0.129	0.08	0.023	0.762	-0.011	0.9
IMD	<--	CompPrior.	0.614	***	0.629	***	0.82	***	0.893	***
SMD	<--	CompPrior.	0.301	***	0.335	***	0.473	***	0.648	***
Leadershp	<--	CompPrior.	0.127	0.11	0.039	0.626	0.142	0.085	0.105	0.199
ExtLearn	<--	CompPrior.	0.59	***	0.609	***	0.748	***	0.673	***
ExtLearn	<--	GovSupp	-0.015	0.823	-0.006	0.924	-0.085	0.181	-0.066	0.322
ManufactPerform	<--	IMD	0.175	0.068	0.172	0.082	0.187	0.13	0.174	0.201
ManufactPerform	<--	SMD	0.181	0.053	0.178	0.062	0.166	0.111	0.154	0.22
ManufactPerform	<--	Leadershp	0.053	0.492	0.057	0.453	0.052	0.498	0.055	0.467
ManufactPerform	<--	ExtLearn	0.111	0.236	0.103	0.283	0.084	0.467	0.087	0.427
ManufactPerform	<--	GovSupp	0.198	0.014	0.199	0.013	0.194	0.016	0.196	0.014

Significant path coefficients estimates are shaded.

Source: *Own Study (2013)*

As it can be observed from the above table, the effect of strategic orientation on external learning capability was significant at $p < 0.1$ level in the Delivery Priority Model, while this path was not significant in the other models. The only competitive priority dimension that was found to influence leadership is cost, whose effect was significant at $p < 0.1$ level in the Cost Priority Model. Furthermore, the above results reveal that structural and infrastructural manufacturing decisions influence manufacturing performance when firms emphasize quality and delivery competitive priorities, and their effect on manufacturing performance were not significant when firms emphasize cost and flexibility priorities. Based on these results, Table 6.18 below summarizes the hypotheses and statistical significance of path coefficients in the four models.

Table 6.18: Summary of the hypotheses and statistical significance for the models

Hypotheses			Quality Model	Delivery Model	Cost Model	Flexibility Model
EnvirnDynm	→	Compet.Priority	Strongly Supported (H_{1a})	Strongly Supported (H_{1b})	Strongly Supported (H_{1c})	Strongly Supported (H_{1d})
EnvirnDynm	→	StrategicOrien	Strongly Supported (H_{1e})	Strongly Supported (H_{1e})	Strongly Supported (H_{1e})	Strongly Supported (H_{1e})
Compet.Priority	→	SMD	Strongly Supported (H_{2a})	Strongly Supported (H_{3a})	Strongly Supported (H_{4a})	Strongly Supported (H_{5a})
Compet.Priority	→	IMD	Strongly Supported (H_{2b})	Strongly Supported (H_{3b})	Strongly Supported (H_{4b})	Strongly Supported (H_{5b})
Compet.Priority	→	Leadershp	Not Supported (H_{2c})	Not Supported (H_{3c})	Weakly Supported (H_{4c})	Not Supported (H_{5c})
Compet.Priority	→	ExtLearn	Strongly Supported (H_{2d})	Strongly Supported (H_{3d})	Strongly Supported (H_{4d})	Strongly Supported (H_{5d})
StrategicOrien	→	SMD	Strongly Supported (H_{6a})	Strongly Supported (H_{6a})	Strongly Supported (H_{6a})	Strongly Supported (H_{6a})
StrategicOrien	→	IMD	Strongly Supported (H_{6b})	Strongly Supported (H_{6b})	Strongly Supported (H_{6b})	Weakly Supported (H_{6b})
StrategicOrien	→	Leadershp	Not Supported (H_{6c})	Not Supported (H_{6c})	Not Supported (H_{6c})	Not Supported (H_{6c})
StrategicOrien	→	ExtLearn	Not Supported (H_{6d})	Weakly Supported (H_{6d})	Not Supported (H_{6d})	Not Supported (H_{6d})
SMD	→	ManufactPerform	Weakly Supported (H_{7a})	Weakly Supported (H_{7a})	Not Supported (H_{7a})	Not Supported (H_{7a})
IMD	→	ManufactPerform	Weakly Supported (H_{7b})	Weakly Supported (H_{7b})	Not Supported (H_{7b})	Not Supported (H_{7b})
Leadershp	→	ManufactPerform	Not Supported (H_8)	Not Supported (H_8)	Not Supported (H_8)	Not Supported (H_8)
ExtLearn	→	ManufactPerform	Not Supported (H_9)	Not Supported (H_9)	Not Supported (H_9)	Not Supported (H_9)
GovernSupp	→	ManufactPerform	Strongly Supported (H_{10a})	Strongly Supported (H_{10a})	Strongly Supported (H_{10a})	Strongly Supported (H_{10a})
GovernSupp	→	ExtLearn	Not Supported (H_{10b})	Not Supported (H_{10b})	Not Supported (H_{10b})	Not Supported (H_{10b})

$p \leq 0.05$ (Strongly Supported); $0.05 > p \leq 0.1$ (Weakly Supported); $p > 0.1$ (Not Supported)

***Source:** Own Study (2013)*

6.3.3. Analyses of Indirect Effects of Variables in the Study

In addition to the hypothesized direct effects, analyses of the indirect effects of the variables were also made in the study. The analysis was conducted using the AMOS software and the results obtained from the quality, delivery, cost, and flexibility priority models are depicted in Table 6.19. As it can be observed from the table, the results (standardized estimates) about the indirect effects of variables in the four models are more or less similar, and hence only the findings in the Quality Priority Model are explained in this section.

Table 6.19: Standardized indirect effects - quality, delivery, cost, and flexibility models

Indirect Effects			Quality Priority Model	Delivery Priority Model	Cost Priority Model	Flexibility Priority Model
EnvirnDynm	→	Compet.Priority	0	0	0	0
EnvirnDynm	→	StrategicOrien	0	0	0	0
Compet.Priority	→	IMD	0	0	0	0
StrategicOrien	→	IMD	0	0	0	0
EnvirnDynm	→	IMD	0.335	0.327	0.324	0.333
Compet.Priority	→	SMD	0	0	0	0
StrategicOrien	→	SMD	0	0	0	0
GovSupport	→	ManufactPerform	-0.002	-0.001	-0.007	-0.006
GovSupport	→	ExtLearn	0	0	0	0
EnvirnDynm	→	SMD	0.287	0.287	0.291	0.304
Compet.Priority	→	Leadershp	0	0	0	0
StrategicOrien	→	Leadershp	0	0	0	0
EnvirnDynm	→	Leadershp	0.095	0.089	0.087	0.089
Compet.Priority	→	ExtLearn	0	0	0	0
StrategicOrien	→	ExtLearn	0	0	0	0
EnvirnDynm	→	ExtLearn	0.19	0.182	0.163	0.163
IMD	→	ManufactPerform	0	0	0	0
SMD	→	ManufactPerform	0	0	0	0
Leadershp	→	ManufactPerform	0	0	0	0
ExtLearn	→	ManufactPerform	0	0	0	0
Compet.Priority	→	ManufactPerform	0.234	0.232	0.303	0.32
StrategicOrien	→	ManufactPerform	0.126	0.143	0.092	0.057
EnvirnDynm	→	ManufactPerform	0.137	0.131	0.127	0.124

Source: *Own Study (2013)*

According to the results in the Quality Priority Model, the level of environmental dynamism, apart from its hypothesized direct effects, also indirectly influences infrastructural manufacturing decisions, structural manufacturing decisions, leadership, and external learning capability through increased emphasis on quality priority and higher strategic orientation. This variable indirectly influences infrastructural manufacturing decisions [with standardized path coefficient, 0.335 = (0.23 x 0.614) + (0.655 x 0.296)], structural manufacturing decisions [with standardized path coefficient, 0.287 = (0.23 x 0.301) + (0.655 x 0.333)], leadership [with standardized path coefficient, 0.095 = (0.23 x 0.126) + (0.655 x 0.101)], as well as external learning capability [with standardized path coefficient, 0.19 = (0.23 x 0.591) + (0.655 x 0.083)].

Increased emphasis on quality priority and higher strategic orientation, in turn, indirectly influence manufacturing performance through implementing manufacturing decisions in the structural and infrastructural areas, improved leadership practices, and developing external learning capability of the manufacturing plant. The standardized indirect path coefficients for these variables are 0.234 [0.234 = (0.614 x 0.175) + (0.301 x 0.181) + (0.126 x 0.053) + (0.591 x 0.11)] and 0.126 [0.126 = (0.296 x 0.175) + (0.333 x 0.181) + (0.101 x 0.053) + (0.083 x 0.11)] respectively. Environmental dynamism also indirectly influences manufacturing performance, having a standardized indirect path coefficient of 0.137. Similar results were also obtained in the other three models vis-à-vis indirect effects of the aforementioned variables. Apart from the results about the hypothesized direct effects, therefore, the findings about indirect effects of variables are very much interesting and provide further insights about the role of the different antecedents of manufacturing performance.

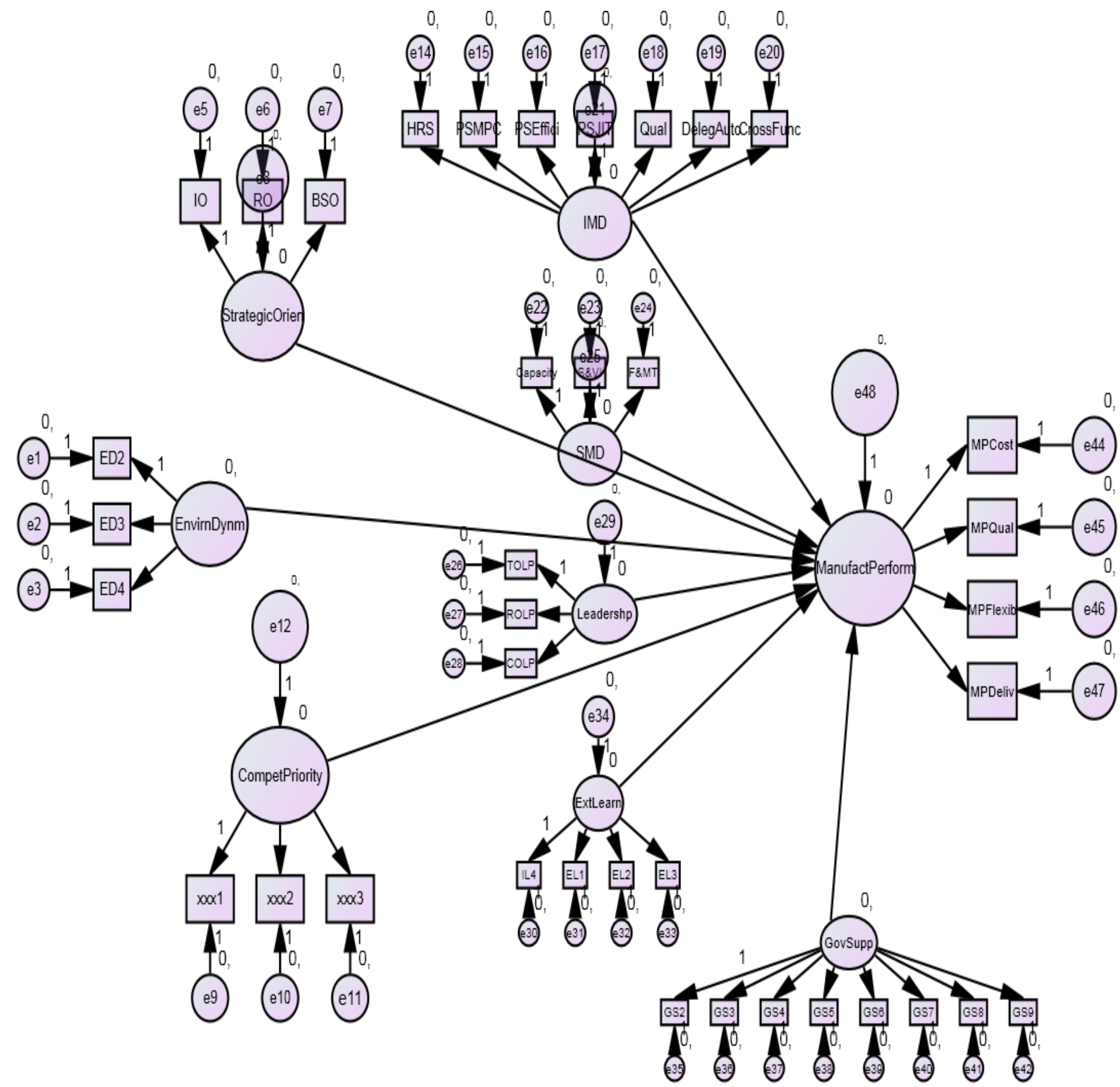
6.4. Comparison with Alternative Models

To provide additional evidence of the suitability of the theorized model already tested in this paper, attempt was made to make further comparison with an alternative model in the study. In this regard, the possibility of obtaining an alternative (Direct) model that better fits to the data than the proposed model was considered. Accordingly, direct paths from all the constructs to manufacturing performance were added, and then the overall fit of the model evaluated before analyzing the parameter estimates and p-values in these alternative models. This was done separately for all the four models (i.e. Quality, Delivery, Cost, and Flexibility Priority Models). Figure 6.13 depicts the nature of the alternative (direct) structural equation model being considered and Table 6.20 below provides the results (model fit statistics) of each of these models.

Table 6.20: Model fit statistics for the alternative direct models

Model Fit Statistics	CMIN (or x^2)	d.f.	P	$x^2/d.f.$	IFI	TLI (NNFI)	CFI	RMSEA
Quality Model	1300.942	657	.000	1.980	.861	.840	.858	0.071
Delivery Model	1299.673	657	.000	1.978	.859	.838	.857	0.071
Cost Model	1278.129	621	.000	2.058	.854	.832	.851	0.073
Flexibility Model	1207.840	621	.000	1.945	.868	.847	.865	0.069

Source: *Own Study (2013)*



Source: *Own Study (2013)*

Figure 6.13: Schematic view of the alternative (direct) structural equation model

As the results, especially the IFI, TLI, and CFI values, depicted in Table 6.20 reveal, the overall fit of the four alternative models were poor. The estimates and/or results generated from these models, therefore, will not be valid as such, and hence the alternative models were ignored from further analysis. Put another way, this is a confirmation for the validity of the findings in the proposed theoretical models, which were actually more suitable (fitted well) to the data and provided satisfactory results than estimates that could have been made using the alternative (Direct) models.

6.5. Analyses of Qualitative Information

The qualitative information analyzed in this part is so brief and was obtained from documents published by the government as well as the additional comments given by respondents in the questionnaires. The qualitative analysis was made based on information obtained from these sources alone, and no further and detailed qualitative data gathered and analyzed in the study.

6.5.1. The Manufacturing Sector under the GTP

From the official documents reviewed in the study, the country's Growth and Transformation Plan (GTP) is mentionable, which is a five year national development plan designed for and/or implemented in the period 2010/11 – 2014/15 (MoFED, 2010). From the economic sectors prioritized in the GTP, the sector that has obtained the highest attention for hastening growth and bringing about economic development is industry, specifically manufacturing. It is indicated in the document that the government is too much committed to ensure faster and sustainable development of the industrial sector through creating favorable conditions for industry to play key role in the economy. In this regard, particular emphasis was given to two sub-sectors, i.e. micro and small enterprises and medium and large scale industries, to support their expansion and development in the country.

From the medium and large scale industries, the plan again gives special attention to selected industries such as 'textile and garment industry, leather and leather products industry, sugar and sugar related industries, cement industry, metal and engineering industry, chemical industry, pharmaceuticals industry, and the agro-processing industry'. Maximizing the production capacities, increasing the number of establishments, as well as increasing the earnings of these industries especially in the export market is given due emphasis in the plan for which the government provides different incentives and supports.

The GTP also emphasizes the establishment of suitable industrial zones as well as privatization and development of the capacity of existing public enterprises in the country. The establishment of the industrial zones is aimed at creating conducive environment for investors, and hence attract new ones, through providing necessary services and building essential infrastructure facilities in the selected areas. The GTP is being implemented while this study is underway and, by now, it is too early to say that the plan has achieved the desired objectives (brought necessary changes) or failed to do so. However, as many respondents commented on the questionnaires, there are still problems and challenges the manufacturing firms have been facing in the context, which is briefly discussed next.

6.5.2. Existing Problems in the Manufacturing Sector: A Bird's Eye View

The problems mentioned in this section are only identified based on the additional comments of respondents in the questionnaires; otherwise no detailed qualitative data was gathered to develop a complete list of problems being faced by the manufacturing firms in the context. For the sake of this study, analysis of the comments given by respondents still suffices. Accordingly, one of the key problems mentioned by respondents is the shortage or frequent interruption of electric power. This has been a serious problem to their manufacturing operations, which curtails smooth flow of the production process and forces the manufacturing plant to operate below the optimum production capacity (or planned level of production). As the respondents further comment, this made the firms to invest in or spend additional funds for alternative energy sources such as using diesel generators. This in turn resulted in increased costs of production.

Some firms also raise concerns about the soaring prices of imported inputs, which, in part, is associated with the unfavorable change in foreign exchange rate in the last three years or more. These situations together have affected, among other things, the local firms' ability to produce at lower costs and compete effectively in the market, especially with foreign manufacturing companies.

6.5.3. Firms' View of Competition and the Market

As some respondents from industries like alcohol, wine, beverage and cement furher comment, their plant is not able to satisfy the existing demand in the domestic market because the supply (domestic production capacity) is limited. These firms consider themselves as "market leaders". Some of these respondents actually indicate that their plant's limited production capacity is becoming a bottleneck and making them loose viable opportunities in the market. Majority of the manufacturers in the context, however, view competition only from the domestic market perspective as many respondents indicate that their firm is a leader and/or a better competitor "in the country", the first to adopt production technology "in the country", and so on. They are not comparing themselves with firms in the developed or even other developing economies. This implies that the local firms are actually concerned with the domestic market and having a narrow view of competition, which is a serious problem or threat for survival in the today's globalized and fiercely competitive market.

6.5.4. Views and Expectations about the Role of Government

As per the additional comments in the questionnaires, what many respondents agree is that the government has been providing different kinds of supports and/or incentives to their manufacturing plant such as availing factory land for free or at lower fee, facilitating or creating export market links, issuing and implementing quality standards, facilitating implementation of best practices such as kaizen, quality management practices, and so on. Many of these respondents, however, comment that the government needs to heavily work on the problem of power supply to their manufacturing plant. Although not relevant to this study, many respondents also commented that excessive taxation is becoming a serious problem to their business operation.

In a nut shell, apart from the rigorous quantitative analyses made in this thesis, the preceding qualitative analyses and the themes emerged in due course generally throw relevant insights and underscore the need for further, more extensive qualitative study in the future regarding these issues or the identified themes.

6.6. Summary

This chapter has presented the results obtained in the quantitative and qualitative analyses of data in the study. The data about general profile of firms participated in the study was presented and analyzed first using descriptive statistics and then analysis and results of correlations among the validated constructs was presented. The correlation analysis reveals that except one variable, which is improvement capability, the remaining twelve constructs have reasonable level of correlations with other variables in the model. The higher correlations observed between the dimensions of competitive priorities were actually expected and hence they were all retained in the analysis. However, improvement capability was removed from the SEM analysis.

Four covariance structure models were implemented, each representing or including a particular dimension of competitive priorities, and then the overall fit of the models evaluated. All the models have shown better fit for the data and as a result, the research hypotheses were tested using the four structural models. The analyses of hypothesized direct effects, in this regard, reveal that ten, eleven, nine, and eight hypothesized effects were supported either at the 0.001, 0.01, 0.05, or 0.1 level in the Quality, Delivery, Cost, and Flexibility Priority Models respectively. (See Table 6.18 for the summary of the hypotheses being accepted and rejected in the study).

Apart from the analyses of hypothesized direct effects, the indirect effects of variables were also analyzed in each of these models. Attempt was also made to see if an alternative (Direct) model, as opposed to the proposed theoretical model, could be used for the analysis. However, the analysis revealed that the theoretical model had better fitted for the data than the alternative model and hence the latter was ignored from further consideration. The results and findings are further discussed in detail in the next chapter and accordingly relevant conclusions and recommendations are given in the study.

CHAPTER 7

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

This is the last chapter of the thesis and provides detailed discussions about the results and findings already presented in the previous chapter. The results and findings are synthesized and discussed in view of the evidence in the existing literature, and accordingly relevant conclusions are drawn and recommendations given.

7.1. Discussion of Results and Findings

The results and findings obtained in the study are discussed in this section in light of the existing body of knowledge as well as empirical evidence regarding drivers of manufacturing performance. As mentioned at the beginning of this thesis, the objective of this study was to find out how external/environmental factors and internal aspects of manufacturing operations together influence firm's manufacturing performance especially in the context of a developing economy. Accordingly, a conceptual framework relevant for the study was formulated, refined, and eventually tested using the SEM approach. The overall fit of the proposed theoretical model was assessed based on the empirical data and following this the hypothesized relationships were tested. The proposed theoretical model was found to be superior when compared with an alternative (direct) model, and due to this reason the hypothesized relationships were tested using the former (proposed) model only.

The proposed theoretical model again was tested further by implementing four separate (sub) models, namely, Quality, Delivery, Cost, and Flexibility Priority Models. The difference between these models rests in the competitive priorities dimension that enters into the analysis; otherwise the remaining variables are the same across the four models. The direct and indirect effects of variables such as environmental dynamism, competitive priorities (i.e. quality, delivery, cost, or flexibility priority), strategic orientation, manufacturing decisions, leadership, external learning capability, and government support on firm's manufacturing performance were tested in each of these models, and the findings are discussed in the following few pages.

7.1.1. Environmental Dynamism - An Important External Driver

Environmental dynamism was considered as a major external driver of the choice of competitive priorities and level of strategic orientation of manufacturing firms in the context. The analyses in all the four structural models reveal that environmental dynamism strongly influences the competitive priorities and strategic orientation of firms in the context. Firms that consider their environment more dynamic and competitive place increased emphasis towards each of the dimensions of the competitive priorities, which are key elements of manufacturing strategy. Such firms also have higher innovation-, resource-, and business strategy - orientation, which defines their strategic orientation. The extant literature (Ward and Duray, 2000; Butt, 2009) in fact reveals that the situation in the environment influences firm's competitive strategy and/or competitive priorities, and hence the above finding is somehow consistent with the existing evidence or insight in the literature. An additional insight the study provides relates to the significant influence the environment has on firms' strategic orientation.

Apart from the direct effects, it was also found in the study that the level of environmental dynamism indirectly influences subsequent decisions, practices, capabilities, and ultimately plant performance. This is an interesting finding about the role or influence of the external environment on internal organizational decisions, practices, and eventually operational performance. Firms that adjust themselves or take necessary measures in light of what is going on in the external business environment are likely to remain competitive in the market. This re-affirms the established view that firms need to design their operations strategy in light of the environment they are operating in and the level of competition thereof (Ward and Duray, 2000; Butt, 2009).

7.1.2. Impact of Competitive Priorities on Subsequent Decisions and Practices

In all the structural models analyzed in the study, it was found that the competitive priorities strongly influence firms' decisions in the structural and infrastructural areas. In fact, different researchers (Martı´n-Pen˜a and Dı´az-Garrido, 2008; Ward *et al.*, 2007; Peng, *et al.*, 2011; Nair and Boulton, 2008) earlier argued that firms' emphasis on different competitive priorities is expected to guide decisions regarding manufacturing and management practices, capacity, technology, production process, and so on. These key strategic choices (manufacturing decisions) are essential elements in firms' endeavor to realize the competitive priorities. The findings regarding the role of the competitive priorities guiding manufacturing decisions in the structural and infrastructural areas are, therefore, consistent with the available insights in the literature.

Apart from the above findings, it was also obtained in the study that cost, quality, delivery, and flexibility competitive priorities strongly influence firms' efforts in the development of external learning capability. This means, in other words, that increased emphasis on each of the above competitive priorities dimensions initiate manufacturing plants to develop external learning capability, for instance, through implementing useful suggestions or feedbacks regarding quality, delivery, design, etc. aspects; establishing long-term relationships with suppliers; maintaining close communication with suppliers about quality considerations and design changes, and so on (Schroeder, *et al.*, 2002; Huang, *et al.*, 2008). A few researchers earlier obtained that internal and external learning capabilities of the manufacturing plant enhances the development of unique product and process equipments and technologies (Schroeder, *et al.*, 2002) as well as lead to effective process implementation (Huang, *et al.*, 2008). The finding in this study draws additional attention towards the key role of competitive priorities in guiding the development of plant capabilities such as external learning capability, which becomes a basis for the development or implementation of subsequent processes, production technologies, or equipments.

A more surprising finding in this study is that the competitive priorities play meager role in guiding leadership practices (or managerial behaviors) of manufacturing managers. The study indicates that increased emphasis on quality, delivery, or flexibility competitive priorities dimensions does not significantly influence the leadership role or practice of middle-level, manufacturing managers. It is the cost priority alone that was found to influence the leadership practice of such managers in the context. Still, this is a result that is weakly supported in the study, and not strongly as such. This finding a little bit contradicts with the insights in the existing theoretical and empirical literatures in the area that widely emphasize the competitive priorities guide or influence managerial behaviors and/or human resource management practices in the context of manufacturing firms (Skinner, 1969; Jayaram, *et al.*, 1999; Santos, 2000; Ahmed and Schroeder, 2003).

The above findings rather underscore the idea that the manufacturers in the context, by and large, try to realize their competitive priorities through implementing various manufacturing decisions or developing plant learning capabilities than emphasizing on human or behavioral aspects of operations, for instance, through exercising leadership practices suitable to the particular circumstance or strategic goals being pursued.

7.1.3. Impact of Strategic Orientation on Subsequent Decisions and Practices

The other important internal driver considered in the study is strategic orientation, which was posited to influence manufacturing decisions (in the structural and infrastructural areas), manufacturing managers' leadership practices, as well as external learning capabilities of the manufacturing plant. Strategic orientation, according to this study, is deemed to be reflected in increased innovation-, resource-, and business strategy-orientation of manufacturing firms. As it was already discussed, this variable is strongly influenced by the situation in the external environment, more specifically the level of environmental dynamism being faced. Firms operating in or experiencing a more dynamic environment pay greater attention to increased innovativeness; developing or building unique manufacturing resources, practices, core competencies or skills; translating business strategy into manufacturing terms or investments; as well as implementing decisions consistent with their business strategy (Thun, 2008; Theoharakis and Hooley, 2008 cited in Butt, 2009; Herrmann, *et al.*, 2007 cited in Butt, 2009).

The results in the Quality, Delivery, Cost, and Flexibility Priority Models indicate, in this regard, that strategic orientation strongly influences structural and infrastructural manufacturing decisions. Increased strategic orientation leads to implementation of relevant structural and infrastructural manufacturing decisions or practices that become a basis for competitive advantage. As opposed to these findings, the analyses revealed that strategic orientation does not significantly influence manufacturing managers' leadership practices. And except in the Delivery Priority Model, it was also found that the impact of this variable on external learning capability of the manufacturing plant was not significant. The finding that strategic orientation play meager role in guiding the development of external learning capability, while strongly influencing firms' investments in structural and infrastructural resources, is, therefore, another surprising result obtained in the study.

7.1.4. Impact of Manufacturing Decisions on Manufacturing Performance

Manufacturing decisions are the courses of actions or decisions in the structural and infrastructural areas (Wheelwright, 1984; Boyer, 1998). It was found in this study that firm's decisions in these areas were significantly influenced by the competitive priorities and strategic orientation. As Colotla, *et al.* (2003) indicate, investments in these areas in turn determine firms' ability to achieve competitive advantage. Accordingly, it was obtained in this study (specifically in the Quality and Delivery Priority Models) that structural and infrastructural manufacturing decisions significantly influence manufacturing performance when firms seek to achieve quality and delivery priorities. The results in the Cost and Flexibility Priority Models, however, did not support the idea that such investments significantly influence manufacturing performance.

The above findings reveal that although increased emphasis on cost and flexibility priorities significantly influence structural and infrastructural manufacturing decisions, their subsequent influence on manufacturing performance (through the manufacturing decision areas) is not as strong as that of quality and delivery priorities. In spite of differences in the results between Quality and Delivery Priority Models, on one hand, and Cost and Flexibility Priority Models, on the other, the findings in the first two models regarding the influence of structural and infrastructural manufacturing decisions on plant performance are consistent with the insights and evidence in the extant literature (Acur, *et al.*, 2003; Christiansen, *et al.*, 2003; Devaraj, *et al.*, 2004; Narasimhan, *et al.*, 2005; da Silveira, 2005).

As cumulative capabilities theorists (Ferdows and De Meyer, 1990; Noble, 1995; Flynn and Flynn, 2004) argue, firms often seek to realize multiple plant capabilities (such as cost, quality, delivery, and flexibility priorities) simultaneously. These capabilities are developed in a certain sequence whereby quality forms the bases, followed by delivery, then flexibility, and finally cost (Amoako-Gyampah and Meredith, 2007). And according to Hill (1994), quality and delivery capabilities are "order-qualifiers" while the other two capabilities, i.e. flexibility and cost, are "order-winners". As the results in this study therefore reveal, firms placing increased emphasis on quality and delivery priorities (i.e. those seeking to achieve the basic order-qualifying competitive criteria) (Amoako-Gyampah and Meredith, 2007) subsequently make necessary investments in structural and infrastructural manufacturing resources, which in turn lead to the achievement of competitive manufacturing performance.

This finding is very interesting as it is consistent with an earlier argument that goes saying increased competition forces firms to focus on goals that have become order “qualifiers” as opposed to “order winners” (Wacker, 1996 as cited in Amoako-Gyampah and Meredith, 2007: 935).

7.1.5. Impact of Leadership on Manufacturing Performance

The issue and importance of inleadership practices in operations management, especially the role of leadership in the operations function, is early recognized in the work of Skinner (1969), who suggested the need to adopt or exercise different leadership styles depending on the specific operations strategy being pursued (Kathuria, *et al.*, 2010). In view of this, operations management researchers studied the link between human resource management (HRM) practices and issues like competitive priorities and/or performance (Jayaram, *et al.*, 1999; Santos, 2000; Ahmed and Schroeder, 2003; de Menezes, *et al.*, 2010). Kathuria and Partovi (1999) and Kathuria, *et al.* (2010) also assessed the impact of workforce management practices (meaning leadership practices) on managerial performance. These studies generally indicate the existence of significant relationships between HRM or leadership practices and performance. This study, however, suggests or reveals something different about the link between leadership practices and manufacturing performance.

Although effective leadership of manufacturing managers is believed to improve manufacturing performance on many fronts such as reducing cycle time, controlling product costs, improving timeliness of deliveries, productivity, efficiency, accuracy and quality of work (Kathuria, *et al.*, 2010), it was obtained in this study that manufacturing mangers’ leadership practice does not significantly influence firms’ manufacturing performance in the context. In addition, it was observed that this variable had the lowest percentage of explained variance in all the four models, and this reveals that leadership is not an important issue in the pursuit of competitive manufacturing performance among firms in the context. In all the structural models analyzed in the study, leadership is the only variable that was weakly influenced directly or indirectly by the different antecedents (i.e. competitive priorities, strategic orientation, and environmental dynamism) and as well had the lowest (insignificant) influence on the ultimate dependent variable, which is manufacturing performance. This finding thus raises concern regarding the leadership role (practices) of manufacturing managers in the context and/or why leadership played such an insignificant role in the manufacturing plant.

7.1.6. Impact of External Learning Capability on Manufacturing Performance

External learning capability is one of the capabilities manufacturing firms develop, which is often argued to enhance plant performance (Schroeder, *et al.*, 2002). Because this capability is built within the manufacturing plant, it is difficult to copy or imitate by others and hence can be the source of competitive advantage (Schroeder, *et al.*, 2002). It is to be recalled from the earlier discussion that external learning capability of the manufacturing plant is significantly influenced by the competitive priorities. The result in the Delivery Priority Model also reveals that this capability is influenced by firms' strategic orientation. In spite of this, the study indicates that external learning capability of the manufacturing plant in turn does not significantly influence manufacturing performance. This is a very important finding that divulges firms' limited efforts in building strong learning capability in general and external learning capability in particular that can contribute to or enhance their ability to achieve manufacturing-based competitive advantage.

7.1.7. The Role of Government Support

In addition to manufacturing decisions, leadership, and external learning capability, the other important variable analyzed in the study and that was found to strongly influence manufacturing performance is government support. According to Cai, *et al.* (2010), government support is reflected in implementation of policies and special projects that benefit companies; legal protection; providing needed information, financial support, etc; as well as helping companies obtain resources. Malik and Kotabe (2009), on the other hand, conceptualize this concept in terms of input and marketing supporting policies. As their study indicates, 'organizational learning combined with input supporting government policies enhanced performance', while 'the combination of manufacturing flexibility and marketing supporting government policies had an insignificant influence on performance' (Malik and Kotabe, 2009: 421).

The government in Ethiopia provides different kinds of supports and incentives to manufacturing firms in the context (EEA, 2011), and as the results in this study reveal, this support has significant direct effect on plant performance. The study, however, indicates that the support provided by the government does not significantly influence or augment firms' endeavor to develop external learning capability. Surprisingly, even the path coefficients from government support to external learning capability were negative in all the four models though the estimates were not statistically significant. Government support, therefore, has significant direct effect on manufacturing performance while it has no significant effect on external learning capability of the manufacturing plant. This is a very important finding that gives additional insights about the role of institutional forces. In spite of the conceptual, methodological, and model differences with previous works (Mesquita, *et al.*, 2007; Malik and Kotabe, 2009; Cai, *et al.*, 2010), the findings regarding the role of government support or the institutional environment in this study are very much appealing and require further attention.

7.2. Conclusions

Based on the above findings and discussions, different conclusions are drawn as presented in this section. The main objective of this study was to find out how external factors, mainly environmental dynamism and government support, and internal drivers (such as competitive priorities, strategic orientation, manufacturing decisions, leadership, and plant learning and improvement capabilities) together influence firm's manufacturing performance, and accordingly highlight significant relationships that lead to competitive manufacturing performance. In order to fulfill the above main research objective, five specific objectives were outlined at the onset of this study as well. The conclusions presented below address each of these objectives, which together fulfill the main research objective.

First and foremost, this study concludes that environmental dynamism is a major external driver of competitive priorities and strategic orientation of manufacturing firms. Apart from the direct effects, environmental dynamism also indirectly influences firms' investments or decisions regarding structural and infrastructural resources, manufacturing managers' leadership practices, plant external learning capability, as well as manufacturing performance. The competitive priorities and strategic orientation, on the other hand, are important internal drivers of manufacturing investments, decisions, or practices. The competitive priorities, in particular, strongly guide firm's investments in structural and infrastructural manufacturing resources as well as contribute to the development of external learning capability of the manufacturing plant. Strategic orientation also guides firm's investments in structural and infrastructural manufacturing resources though it plays limited role in guiding firms' efforts towards the development of external learning capability.

Apart from their direct effects, both the competitive priorities and strategic orientation indirectly influence manufacturing performance as well. These aspects (i.e. competitive priorities and strategic orientation), however, play little role in guiding or influencing managerial behaviors (meaning leadership practices) of manufacturing managers in the context. It is only the cost priority that significantly influences leadership practices of manufacturing managers, and not the other competitive priorities dimensions such as quality, delivery, or flexibility. Based on these findings, it is concluded that competitive priorities and strategic orientation are not key drivers of leadership practices of manufacturing managers.

Furthermore, the study concludes that structural and infrastructural manufacturing decisions are key drivers or determinants of manufacturing performance especially when firms place increased emphasis on quality or delivery priorities; otherwise these variables do not have significant influence on manufacturing performance. Structural and infrastructural manufacturing decisions, therefore, lead to competitive manufacturing performance when firms place greater emphasis on quality or delivery capabilities than the other dimensions. Leadership and external learning capability rather do not significantly influence manufacturing performance regardless of which competitive priorities firms seek to realize. In view of these findings, the study underscores that investments in structural and infrastructural manufacturing resources are key determinants of competitive manufacturing performance.

An important institutional contingency that was also found to influence manufacturing performance in the study is government support. This variable was found to have strong direct influence on manufacturing performance though it does not guide firms' efforts to develop plant capabilities such as external learning capability. This is also an interesting finding given that the government has been trying to provide different kinds of support and/or incentives to manufacturing firms in the context as well as issuing policies inculcating the same. The analysis of the qualitative information further reveals that the manufactures still expect the government to do a lot of things in relation to mitigating the existing power problem (especially supply to industries) as well as problems related to obtaining basic (imported) inputs and materials from foreign markets.

The other important insight learned from the additional comments of respondents is that the local manufacturers, by and large, compare themselves with other local producers rather than with firms in the developed or developing economies. This implies that the local manufacturers are actually concerned with the domestic market and take a narrow view of competition than what is needed in the today's globalized and fiercely competitive market. They have increased domestic-orientation and this in turn seems to have limited their ability to develop relevant plant capabilities that would become a basis to obtain sustainable competitive advantage. It is, therefore, a serious threat for competitiveness and survival in the global market.

7.3. Contributions of the Study

This study has immense contributions to knowledge and practice that in many ways could be considered as original. The originality, in part, emanates from the comprehensiveness of the research problem, synthesis of diverse theoretical perspectives, and the rigorous methodology being adopted to test and validate the research hypotheses. In this regard, the study highlights direct and indirect impacts of the external environment (comprising the competitive and institutional environments) as well as internal/organizational aspects (such as competitive priorities, strategic orientation, structural and infrastructural manufacturing decisions, leadership, and external learning capability) on firms' manufacturing performance in view of evidence from medium and large scale firms in a developing economy. This is a major contribution to the existing manufacturing strategy, best practices, leadership, and institutional literatures; and also provides relevant insights to researchers, manufacturers, as well as governments especially in the context of developing economies.

The findings about the influence of environmental dynamism on firm's strategic orientation and the subsequent impact of this variable on structural and infrastructural manufacturing decisions also provide new insight in the area. The finding that government support directly influencing manufacturing performance while leadership practices of manufacturing managers having insignificant influence on plant performance could also be considered as original contributions of this study. The insight obtained about the local manufacturing firms' increased domestic-market orientation and emphasis on their local competitors (or counterparts) than taking competition globally and creating the necessary capabilities to survive and succeed in such an environment is also something peculiar to the context, which the current researcher reveals.

7.4. Recommendations

Based on the findings and conclusions of this research, different recommendations are forwarded to manufacturers, the government, and other researchers in the area. The primary recommendation is that medium and large scale manufacturing firms in the context should give due attention to what is going on in their external environment in general and the industry to which they belong in particular regarding frequency of technological changes, pace of innovativeness, intensity of competition, etc. Based on their analyses of the environment, the manufacturers should try to align their internal practices or place proper emphasis on the aspects of manufacturing operations, especially in designing and implementing suitable manufacturing strategy that can lead to the achievement of competitive manufacturing performance, which is reflected in cost, quality, delivery, and flexibility performance dimensions. In this regard, firms need to have greater strategic orientation (i.e. increased innovation, resource, and business strategy orientation) as well as place increased emphasis on the dimensions of the competitive priorities, and accordingly invest in different structural and infrastructural manufacturing resources. This can lead to improved manufacturing performance and competitive advantage in the market.

The other recommendation is that the manufacturing firms should try to exhaustively utilize any kinds of support the government or its institutions provide to their manufacturing plant as this enhances manufacturing (plant) performance in so many ways. Cognizant of this fact, the government also needs to expand and/or better institutionalize the various supports it provides or can provide to manufacturing firms in the context through investing in capacity development programs, technology transfers, market linkages, etc as well as working towards creating increased awareness among firms, may be through providing more formalized trainings, about the global market situation (competing globally), innovative manufacturing practices, strategic resources and capabilities, key success factors, competitive advantage, and so on. The manufacturing firms also need to invest in or work towards creating learning capabilities in general and external learning capability in particular so that such capabilities can contribute to improved cost, quality, delivery, and flexibility performance. It is also critical for the local manufacturing firms, among other things, to re-design their operations strategies taking a broader view of the market and competition than their established narrow view of the same, which is primarily limited to or pointed towards the domestic market and other local competitors.

Although leadership is glue that ties all and leads to organizational success, it was observed that this variable has insignificant role in the manufacturing plant. Hence, an important issue that requires further attention is the reason why leadership practices of manufacturing managers failed to have significant link with competitive priorities, strategic orientation, as well as manufacturing performance. Is that due to the smaller sample size of subordinates who are used to elicit data about leadership practices per each manufacturing manager or else the manufacturing managers have been exercising their role without regard to firms' strategic orientation and competitive priorities. It is also important to identify other factors (contingencies) that are likely to influence leadership practices of manufacturing managers such as age, education, work experience in the plant, prior relationships, marital status, ethnicity/culture, etc.

7.5. Limitations and Directions for Future Research

This study may have different limitations associated with its design and coverage. In this regard, the study did not include small-scale manufacturing enterprises as well as samples from all industrial categories and regions in Ethiopia. As a result, the findings and/or outcomes reported in this thesis might not fully represent or reflect the situation in the manufacturing sector in Ethiopia as a whole. The study also did not explain or address performance differences across manufacturing firms operating in other developing economies as samples were only selected from Ethiopia. The findings and conclusions in the study, therefore, would not be taken as generalizations for manufacturing firms in developing economies as a whole. With this view, it is recommended that researchers include samples from all regions in the country as well as other developing economies in future studies. Apart from the above limitations, there is also difficulty in forming causality between variables as the study adopted a cross-sectional design. Researchers in the future, therefore, may conduct longitudinal studies in the area and explore causality between variables rather than only relationships as in the current study.

In this study, the researcher was also limited to analyzing the responses of individuals as proxy for plant level strategies, practices, and performance. In particular, manufacturing performance was assessed using perceptual measures (i.e. proxies) alone owing to the difficulty associated with obtaining objective measures of manufacturing performance from firms participated in the study as well as the difficulty associated with analyzing such objective measures of performance and making comparisons across firms in different industries. Although the use of proxies and especially perceptual measures of manufacturing performance is common in the literature (Spanos and Lioukas, 2001; Pertusa-Ortega, *et al.*, 2010; Ketokivi and Schroeder, 2004a; Hallgren and Olhager, 2009; Arendt and Brettel, 2010; Hallgren, *et al.*, 2011), potential biases would have been completely avoided had objective measures of performance been used in the study. Hence, researchers in the future may use objective measures of manufacturing performance in addition to perceptual measures in their study.

Manufacturing performance also was considered as a single, latent construct in the study though it was measured in terms of multiple dimensions. And due to this reason, it was not possible to determine which specific dimension (or element) of manufacturing performance is being affected by the antecedents considered in the study. Hence, other researchers can operationalize and measure this concept as multiple latent constructs in their studies. This might help to show which particular dimension of manufacturing performance is affected by the different antecedents and therefore provides further evidence in the area. In order to reduce the complexity of the structural model, separate models were also implemented for each dimension of competitive priorities in the study. In fact, it would have been possible to implement a single, all inclusive structural equation model had the sample size been large enough to warrant higher sample-variable (n:q) ratio, which is an important requirement when the SEM approach is used for data analysis. So researchers may take larger samples in future studies and test the current research model and validate its findings.

Furthermore, in order to avoid model complexity as well as reduce difficulty in the data analysis, the potential moderating effects, if any, of government support on the relationships between external learning capability and manufacturing performance as well as between structural and infrastructural manufacturing decisions and manufacturing performance also were not analyzed in the current study. The findings would have been more appealing had interactions been tested, however. Moderating effects are actually difficult to test, though not impossible, when the study implements the SEM approach for data analysis. The SEM approach, due to the difficulties associated, has not been widely used in testing moderating effects. Using this approach to assess moderating effects, therefore, would be a good contribution to the literature. Researchers may also identify other plant capabilities such as improvement or innovation capabilities and then determine whether the interaction between these capabilities and government support enhance plant performance. Others can extend further the current theoretical model, and hence examine the impact of manufacturing performance subsequently on market or business performance as well.

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APPENDICES

APPENDIX 1: COVER LETTER

UNIVERSITY OF SOUTH AFRICA (UNISA)
SCOOL OF BUSINESS LEADERSHIP
DOCTOR OF BUSINESS LEADERSHIP (DBL) PROGRAM

TITLE OF THE STUDY: Drivers of Manufacturing Performance in Medium and Large Scale Manufacturing Firms in Ethiopia

Dear Sir/Madam

I am a lecturer at Hawassa University and currently pursuing my doctoral study in the University of South Africa (UNISA), School of Business Leadership (SBL). I am conducting this research in fulfillment of the requirements for the Degree of Doctor of Business Leadership (DBL). The purpose of the study is to determine the effects of manufacturing strategy, leadership practices, and government support on firms' manufacturing performance. The findings might help to understand how the interplay or interrelationships among these variables influence plant performance especially in developing economies like Ethiopia. The successful completion of the study and the realization of its objectives, in this regard, considerably depend on your genuine participation and cooperation in providing the necessary data through this questionnaire. The response you give in the questionnaire would be so valuable and hence, I extremely appreciate your effort and time taken in filling the same and returning it as soon as possible. Your willingness to participate in fact not only helps to complete this study but also benefits the manufacturing sector in the country as well as in other developing countries.

Let you also feel free in providing the required data as all the information you give will remain confidential and only statistical summary and analysis to be reported in the study. In particular, I would like to assure you that your firm's name, your name, your position, and other personal information will remain anonymous (undisclosed) in any way in the study. In the future, if you need knowledge and professional advice regarding aspects of manufacturing strategy, practices, and performance, I would be very glad to do my best to work with you and your organization. You can use my telephone and e-mail address mentioned below for further contact. Thank you in advance for your cooperation and help!

Getnet Begashaw Ketema, DBL Candidate, UNISA
Address: Cell phone: +251-911-865979; e-mail: getbegashaw@yahoo.co.uk

APPENDIX 2: RESEARCH ETHICS COMPLIANCE CERTIFICATE

Graduate School of Business Leadership, University of South Africa, PO Box 392, Unisa, 0003, South Africa
Cnr Janadel and Alexandra Avenues, Midrand, 1685, Tel: +27 11 652 0000, Fax: +27 11 652 0299
E-mail: sbl@unisa.ac.za Website: www.unisa.ac.za/sbl

SCHOOL OF BUSINESS LEADERSHIP
RESEARCH ETHICS REVIEW COMMITTEE (GSBL CRERC)

03 June 2014

Ref #:2014_SBL/DBL_012_ RI [CN: Addis Ababa]

Supervisor: Dr Z Shibre (zzshib@yahoo.com)
Student researcher: Mr GB Ketema (45682747@mylife.unisa.ac.za)

This is to certify that the application for ethics clearance submitted by

Mr Getnet Begashaw Ketema (Student Number: # 45682747)

For the study

Drivers of Manufacturing Performance in Medium and Large Scale firms in Ethiopia

(Evidence from Addis Ababa and its Periphery)

*has received **ethics approval**.*

The ethical clearance was re-issued due to the amendment of the Research Title. The ethical clearance is granted to the research project as submitted to the School of Business Leadership Ethics Review Committee and is granted for the duration of the project, final approval was granted on 3 June 2014. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated to the School of Business Leadership Research Ethics Review Committee. An amended application could be requested if applicable.

It is your responsibility to ensure that the research project adheres to the values and principles expressed in the UNISA Research Ethics Policy, which can be found at the following website:
http://www.unisa.ac.za/cmsys/staff/contents/departments/res_policies/docs/Policy_Research%20Ethics_rev%20app%20Council_22.06.2012.pdf

Yours faithfully

Prof. Roy Ramphal
Chairperson
GSBL CRERC

45 years Building leaders who go beyond

SBL
GRADUATE SCHOOL OF BUSINESS LEADERSHIP
UNISA

APPENDIX 3: MPS INSTRUMENT PERMISSION LETTER

--- On **Wed, 14/3/12, Yukl, Gary A <*gyukl@albany.edu*>** wrote:

From: Yukl, Gary A gyukl@albany.edu
Subject: RE: MPS Instrument
To: "Getnet Begashaw" getbegashaw@yahoo.co.uk
Date: Wednesday, 14 March, 2012

Attached is a relatively short version of the MPS with 15 behaviors that should be relevant for middle managers of manufacturing units. Show only scale definitions and sample items in any research report, not the entire MPS. As for my book, the 7th edition (2010) can be purchased used from on-line sources like Amazon for a less expensive price, but the new 8th edition is more expensive in the USA but the international version may be cheaper in Africa.

[**Professor Gary Yukl can be contacted with the following Address: Phone: 518-442-4932; Fax: 518-442-4765; e-mail: g.yukl@albany.edu)]**

APPENDIX 4: REQUEST FOR ASSESSING CONTENT VALIDITY OF INSTRUMENTS

January 10, 2013

To: Professor Tesfaye Semela (PhD)
Cell Phone: +251-916-824225
e-mail: tskukem@yahoo.de
Hawassa University, Ethiopia

Dear Professor!

My name is Getnet Begashaw. I am a lecturer at Hawassa University and currently pursuing a doctoral study in the University of South Africa (UNISA), School of Business Leadership (SBL). I am conducting a research in fulfillment of the requirements for the degree of Doctor of Business Leadership (DBL). The study is entitled **"Drivers of Manufacturing Performance in Medium and Large Scale Firms in Ethiopia: Evidence from Addis Ababa and its Periphery."** The purpose is to determine how the interplay between the aspects of manufacturing strategy, leadership practices, and government support affect the manufacturing performance of medium and large scale firms in the context of a developing economy - Ethiopia. The specific objectives of the study include the following:

1. To identify the factors influencing competitive priorities and strategic orientation in manufacturing firms.
2. To show the impact of competitive priorities and strategic orientation on manufacturing decisions, learning and improvement capabilities, as well as manufacturing manager's leadership practices.
3. To assess the impact of manufacturing decisions, learning and improvement capabilities, as well as manufacturing manager's leadership practices on firm's manufacturing performance.
4. To identify variables mediating the relationships between competitive priorities and manufacturing performance.

5. To provide insights with respect to the impact of government support on firm's manufacturing performance in a developing economy.

In order to get the necessary data and eventually meet the stated objectives, I have planned to gather both qualitative and quantitative data. A multi-dimensional questionnaire will be used to gather data for the quantitative analysis. The qualitative analysis will be based on secondary data (official documents and reports). I have developed the items to be included in the questionnaires based on extensive review of relevant theories, conceptual papers, and prior studies in the area. The validity of the items included in the draft instrument is, by and large, tested in empirical studies conducted in developed and emerging economies. Taking the realities of the local context into account, it is still believed to be important to check the design and content validity of the items if there is anything to modify, contextualize, or add before distributing the survey instrument to participant firms for eliciting data.

This is, therefore, to inform you that you have been selected as an appropriate research expert to provide comments and/or suggestions regarding the design and validity of the survey instruments. And hence, I kindly request you to provide some suggestions or comments on the instrument and the specific items. I would like to thank you in advance for your cooperation! Attached herewith, please find the instrument.

Sincerely,

Getnet Begashaw Ketema, DBL Candidate, UNISA
Address: Cell phone: +251-911-865979
E-mail: getbegashaw@yahoo.co.uk

APPENDIX 5: CONFIRMITION OF CONTENT VALIDITY OF INSTRUMENTS

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+046 220 96 77
220 96 78

HAWASSA UNIVERSITY
School of Education &Training
Fax +046 220 54 21
5, Awassa ETHIOPIA

Date: January 17, 2013

To: Mr. Getnet Begashaw Ketema (DBL Candidate, UNISA)
Cell phone: +251-911-865979
E-mail: getbegashaw@yahoo.co.uk

Subject: Content validity of your research instrument

Dear Getnet!

It is to be recalled that in your letter dated January 10, 2013 you requested my professional assistance in assessing the logical, and content validity and design of your data gathering instruments. I appreciate your concern about checking the logical and content validity of the data gathering tools; and, I believe that doing so would considerably increase the quality of data you are going to generate. In view of the research objectives, I have tried to scrutinize the measures included in the draft instrument and checked whether they are relevant for the study as well as sufficient to meet the objectives. The instrument is more comprehensive and contains relevant measures and indicators. I found the items and the scales to be very clear and easy to respond to. All the items are pertinent and consistent with the literature. The leadership instrument in particular contains relevant items for assessing the behaviors of middle managers and hence it fits the purpose of your research. Regarding the items measuring "manufacturing decisions" and "manufacturing performance", you may replace some of the technical jargons for more clarity to your respondents. Overall, I found out that the measures you developed for data gathering are sound and capable of tapping the key variables that you identified in the research questions

Attached herewith, please find some of the comments written on the draft instrument!

Best Regards,

Tesfaye Semela, PhD

Professor of Educational Psychology, School of Education
Hawassa University, Ethiopia;
Address: Cell Phone: +251-916-824225
e-mail: tesfayes@hu.edu.et;, tskukem@yahoo.de

APPENDIX 6: SURVEY QUESTIONNAIRE TYPE 1

Research Title: “Drivers of Manufacturing Performance in Medium and Large Scale Manufacturing Firms in Ethiopia (Evidence from Addis Ababa and Its Periphery)”

This questionnaire should be completed by the General Manager (or Manager) of the firm. The questionnaire is divided into four sections: Section I requires general information about the firm; Section II is designed to measure your firm’s strategic orientation and level of environmental dynamism; Section III is designed to measure the level of government support provided to your firm; and Section IV is designed to measure the firm’s manufacturing performance relative to the competition in the industry. The questionnaire should take about 8 to 10 minutes to complete, and I request you to be frank in responding to the questions. Responding to all the questions is greatly appreciated, but you can leave blank any questions that you do not wish to answer. I assure you that your responses will be treated with strict confidentiality and will not be disclosed in any way to any outside parties. If you do not want to answer any question then please proceed to the next question. I would be very grateful if you try to answer all the questions.

Should you require any further information or want to contact the researcher about any aspect of this study, please contact Getnet Begashaw Ketema, cell phone: +251-911-865979 or e-mail: getbegashaw@yahoo.co.uk. Should you have concerns about the way in which the research has been conducted, you may contact Dr. Zewdie Shibre, +251-911-239959 or email: zzshib@yahoo.com.

Thank you very much for your participation and completing this questionnaire. Your input is very much appreciated.

Sincerely,

Getnet Begashaw Ketema,
DBL Candidate, UNISA
Address: Cell phone: +251-911-865979; e-mail: getbegashaw@yahoo.co.uk

SECTION I: GENERAL FIRM PROFILE

Instruction: This section contains questions meant to obtain general information about you and your company. The researcher believes that you are the right person to provide the required information regarding the firm's profile as you are the general manager (or the highest official) in the company. So, please read each question below and provide your answers accordingly.

1. What is your current job title in the company? (please write here)

____

2. How long have you been working in this company (including in the current position)? Please tick (√) in the appropriate box

- **a.** < 3 years ☐
- **b.** 3 - 6 years ☐
- **c.** 7 - 10 years ☐
- **d.** 11 - 15 years ☐
- **e.** 16 - 20 years ☐
- **f.** > 20 years ☐

3. To which industry does your company belong? Please tick (√) in the appropriate box

- **a.** Food products and Beverages ☐
- **b.** Textiles ☐
- **c.** Wearing Apparel ☐
- **d.** Tanning and Manufacture of Leather products ☐
- **e.** Chemical and Chemical products ☐
- **f.** Manufacture of Non-Metallic Mineral Products ☐
- **g.** Iron and Steel ☐
- **h.** Fabricated Metal Products (except machinery and equipment) ☐
- **i.** Machinery and Equipment ☐
- **j.** Assembly of Vehicles and Trailers/Semi-Trailers ☐
- **k.** Other (please specify) ______________________________

4. Indicate the ownership condition of your firm. Please tick (√) in the appropriate box

- **a.** Government owned (public enterprise) ☐
- **b.** Privately owned (single owner, partnership, an association, share company, joint venture) ☐

5. How many employees do you have in your plant/factory? (Please specify number of employees) ____________________.

6. For how many years has your firm been in operation? (Please specify plant age in years)________________________.

7. What is the level of your firm's fixed assets (in Birr)? Please tick (√) in the appropriate box

a.	< 10 million	
b.	10 - 50 million	
c.	51 - 100 million	
d.	101 - 200 million	
e.	201 - 300 million	
f.	300 - 500 million	
g.	> 500 million	

8. Indicate your firm's average annual sales in the last three years (in Birr)? Please tick (√) in the appropriate box

a.	< 10 million	
b.	10 - 50 million	
c.	51 - 100 million	
d.	101 - 150 million	
e.	151 - 200 million	
f.	200 - 300 million	
g.	> 300 million	

9. How do you describe the characteristics of your firm's production process? (please circle the appropriate number in the box)

a.	Products produced in small batches, similar equipment performing the same functions grouped together	**1**
b.	Products are produced in moderately large batches, similar equipment performing the same functions grouped together	**2**
c.	Products are produced in batches, work centers are laid out in the sequence in which the products are manufactured	**3**
d.	Products are produced in large batches or in a continuous flow, work centers are laid out in the sequence in which the products are manufactured	**4**

SECTION II: INFLUENCING FACTORS

Respondent: *General Manager*

Dear respondent! This section contains questions about your firm's orientation as well as level of environmental uncertainty being faced. Please analyze each item and answer accordingly.

A. YOUR FIRM'S ORIENTATION

To what extent do you agree with each of the following statements about your company? Five-point scale used: from 1 = strongly disagree to 5 = strongly agree (please circle the number that indicates your feeling)

a) Customer Orientation	Strongly Disagree			Strongly Agree	
1. Our commitment to serving the customer needs is closely monitored	1	2	3	4	5
2. Our objectives and strategies are driven by the creation of customer satisfaction	1	2	3	4	5
3. Our competitive strategies are based on understanding customer needs	1	2	3	4	5

b) Competitor Orientation	Strongly Disagree			Strongly Agree	
1. Our salespeople regularly share information within our business concerning competitors' strategies	1	2	3	4	5
2. Top management regularly discusses competitors' strengths and strategies	1	2	3	4	5
3. We respond rapidly to competitive actions that threaten us	1	2	3	4	5

c) Innovation Orientation	Strongly Disagree			Strongly Agree	
1. We introduce radical product innovations into the market more frequently than our competitors	1	2	3	4	5
2. Our percentage of radical product innovations in the product range in the last 3 years is significantly higher compared to the competition	1	2	3	4	5
3. We often use innovative technologies in the new product development	1	2	3	4	5
4. We are very proactive in the development and deployment of new technologies	1	2	3	4	5
5. We always rank among the first to use a new technology for new product development	1	2	3	4	5
6. Our products always reflect state-of-the-art technology	1	2	3	4	5

d) Resource Orientation	**Strongly Disagree**			**Strongly Agree**	
1. We gain a competitive advantage from our unique practices	1	2	3	4	5
2. We believe that organizations should build and maintain core competencies and skills	1	2	3	4	5
3. Our practices are unique and cannot be easily copied by others	1	2	3	4	5

e) Business Strategy Orientation	**Strongly Disagree**			**Strongly Agree**	
1. Our business strategy is translated into manufacturing terms	1	2	3	4	5
2. Potential manufacturing investments are screened for consistency with our business strategy	1	2	3	4	5
3. At our plant, manufacturing is kept in step with our business strategy	1	2	3	4	5
4. Manufacturing management is not aware of our business strategy	1	2	3	4	5
5. Corporate decisions are often made without consideration of the manufacturing strategy	1	2	3	4	5
6. Our components/materials make-versus-buy decisions are made to sustain or strengthen our manufacturing competence	1	2	3	4	5

B. ENVIRONMENTAL DYNAMISM

Please indicate the change in the following factors over the last 3 years (by rating them from 1 = Slow to 5 = Rapid)

	Slow			**Rapid**	
1. The rate at which products and services become outdated	1	2	3	4	5
2. The rate of innovation of new products or service	1	2	3	4	5
3. The rate of innovation of new operating processes	1	2	3	4	5
4. The rate of change in taste and preferences of customers in your industry	1	2	3	4	5

SECTION III: GOVERNMENT SUPPORT

Instruction: Dear respondent! This section contains items meant to measure the level of government support provided to your manufacturing plant. You need to analyze each item separately and do not allow your general view about (or attitude towards) the government to bias your answers. A five-point scale (ranging from 1 = strongly disagree to 5 = strongly agree) is used to measure your response, and hence you need to indicate the extent to which you agree or disagree with each of the following statements about government and its bureaus in recent (3 to 5) years. (Please circle the appropriate number)

	Strongly Disagree			Strongly Agree	
1. Implemented policies and special projects which benefit the manufacturing plant	1	2	3	4	5
2. Organized and supplied technical trainings to your manufacturing plant	1	2	3	4	5
3. Provided needed information (including results of technical and market studies) to your plant	1	2	3	4	5
4. Provided financial support to your company	1	2	3	4	5
5. Helped your company obtain resources (raw materials, production components, etc)	1	2	3	4	5
6. Helped your company obtain sufficient foreign currency reserves for transactions	1	2	3	4	5
7. Helped your company invest in innovative manufacturing practices (kaizen, statistical process control, etc)	1	2	3	4	5
8. Helped your company identify, select, and/or implement manufacturing technology	1	2	3	4	5
9. Helped your company acquire/absorb manufacturing knowledge and skill from abroad	1	2	3	4	5

SECTION IV: FIRM'S MANUFACTURING PERFORMANCE

Instruction: Dear respondent! This section contains questions meant to measure your plant's manufacturing performance as compared to the competition (or other firms in the industry). Please think about each item separately and indicate your opinion about how your plant compares to its competition in your industry regarding each aspect in the last three years (5 = superior or better than average; 4 = better than average; 3 = average or equal to the competition; 2= below average; 1 = poor or low end of the industry) (please circle the number)

	Poor or Low end of the Industry	Below Average	Average or Equal to the Competition	Better than Average	Superior or Better than Average
1. Cost					
Unit cost of manufacturing	1	2	3	4	5
Inventory turnover	1	2	3	4	5
Cycle time (from receipt of raw materials to shipment)	1	2	3	4	5

2. Quality					
Quality of product conformance (i.e. producing as per pre-established standards)	1	2	3	4	5
3. Flexibility					
Flexibility to change product mix (and design)	1	2	3	4	5
Flexibility to change volume	1	2	3	4	5
4. Delivery					
Delivery performance (on-time delivery)	1	2	3	4	5
Fast delivery (delivery speed)	1	2	3	4	5

OTHER COMMENTS: please state in the space below (the comments will remain anonymous)

Thank You Again!

APPENDIX 7: SURVEY QUESTIONNAIRE TYPE 2

Research Title: "Drivers of Manufacturing Performance in Medium and Large Scale Manufacturing Firms in Ethiopia (Evidence from Addis Ababa and Its Periphery)"

This questionnaire should be completed by the Manufacturing/Operations Manager in the firm. The questionnaire is divided into three sections: Section I measures the firm's competitive priorities; Section II measures the manufacturing decisions; and Section III measures learning and improvement capabilities of the manufacturing plant. The questionnaire should take about 8 to 10 minutes to complete, and I request you to be frank in responding to the questions. Responding to all the questions is greatly appreciated, but you can leave blank any questions that you do not wish to answer. I assure you that your responses will be treated with strict confidentiality and will not be disclosed in any way to any outside parties. If you do not want to answer any question then please proceed to the next question. I would be very grateful if you try to answer all the questions.

Should you require any further information or want to contact the researcher about any aspect of this study, please contact Getnet Begashaw Ketema, cell phone: +251-911-865979 or e-mail: getbegashaw@yahoo.co.uk. Should you have concerns about the way in which the research has been conducted, you may contact Dr. Zewdie Shibre, +251-911-239959 or email: zzshib@yahoo.com.

Thank you very much for your participation and completing this questionnaire. Your input is very much appreciated.

Sincerely,

Getnet Begashaw Ketema,
DBL Candidate, UNISA
Address: Cell phone: +251-911-865979; e-mail: getbegashaw@yahoo.co.uk

SECTION I: COMPETITIVE PRIORITIES OF THE FIRM

Instruction: Please indicate how important are the following for your company's competitive strategy, i.e., the way your company competes (1 = not at all important, 2 = not very important, 3 = moderately important, 4 = quite important, 5 = very important). (Please circle the number)

	Not at All Important	Not Very Important	Moderately Important	Quite Important	Very Important
(1) Cost priority:					
Low manufacturing unit costs	1	2	3	4	5
Inventory turnover	1	2	3	4	5
(2) Quality priority:					
High conformance to product specifications (or pre-established standards)	1	2	3	4	5
Ensuring accuracy in manufacturing	1	2	3	4	5
Ensuring consistency in manufacturing	1	2	3	4	5
(3) Delivery priority:					
Fast delivery	1	2	3	4	5
On-time delivery	1	2	3	4	5
Short manufacturing cycle time, from raw materials to delivery	1	2	3	4	5
(4) Flexibility priority:					
Ability to rapidly change over products on short notice (mix flexibility)	1	2	3	4	5
Ability to vary volume of product produced on short notice (volume flexibility)	1	2	3	4	5

SECTION II: MANUFACTURING DECISIONS OF THE FIRM

Instruction: Manufacturing strategy decisions encompass two major decision areas: structural decisions and infrastructural decisions, each having various sub-decision categories/areas as mentioned below. So, please first read the instructions under each of the decision areas (or sub-areas) and then indicate the appropriate rate, in view of the practice in your firm, for each item on a seven-point scale.

i. Manufacturing Strategy Structural Decision Areas

a. Capacity

Indicate the degree of emphasis the firm placed on the following activities over the past three years (please encircle the number)

	No Emphasis		Moderate Emphasis			Extreme Emphasis	
Capacity expansion	1	2	3	4	5	6	7
Plant relocation	1	2	3	4	5	6	7
Reconditioning of physical plants	1	2	3	4	5	6	7

b. Sourcing and vertical integration

Indicate the degree of emphasis your manufacturing plant placed on the following activities or areas in the past three years

	No Emphasis		Moderate Emphasis			Extreme Emphasis	
Electronic data interchange (EDI)	1	2	3	4	5	6	7
Purchasing management	1	2	3	4	5	6	7
Reducing the number of suppliers	1	2	3	4	5	6	7
Reducing the number of parts and components	1	2	3	4	5	6	7

c. Facilities/manufacturing technology

Indicate the degree of emphasis your manufacturing plant placed on the following activities in the past three years

	No Emphasis		Moderate Emphasis			Extreme Emphasis	
Computer-aided design (CAD)	1	2	3	4	5	6	7
Robotics	1	2	3	4	5	6	7
Developing new processes for new products	1	2	3	4	5	6	7
Group technology (GT)	1	2	3	4	5	6	7
Flexible manufacturing systems (FMS)	1	2	3	4	5	6	7

d. New product development (features)

Indicate the importance of the following reasons for undertaking new product development

	No Importance		Very Important			Absolutely Critical	
Improve product performance	1	2	3	4	5	6	7
Improve features offered to customers	1	2	3	4	5	6	7
Increase the number of features offered to customers	1	2	3	4	5	6	7
Increase product attractiveness	1	2	3	4	5	6	7

e. New product development (quality)

	No Importance		Very Important			Absolutely Critical	
Eliminate design errors	1	2	3	4	5	6	7
Improve product reliability	1	2	3	4	5	6	7
Improve product conformance to specifications	1	2	3	4	5	6	7
Improve product durability	1	2	3	4	5	6	7
Improve product serviceability	1	2	3	4	5	6	7
Improve product manufacturability	1	2	3	4	5	6	7

ii. Manufacturing Strategy Infrastructural Decision Areas

a. Human resource systems: empowerment

Indicate the degree of emphasis your manufacturing plant placed on the following activities in the past three years

	No Emphasis		Moderate Emphasis			Extreme Emphasis	
Giving workers a broader range of tasks	1	2	3	4	5	6	7
Giving workers more planning responsibility	1	2	3	4	5	6	7
Giving workers more inspection/quality responsibility	1	2	3	4	5	6	7

b. Human resource systems: workforce development programs

	No Emphasis		Moderate Emphasis			Extreme Emphasis	
Changing labor/management relationships	1	2	3	4	5	6	7
Improving direct labor motivation	1	2	3	4	5	6	7
Improving worker safety	1	2	3	4	5	6	7

c. Planning systems (manufacturing planning and control: MPC)

Indicate the degree of emphasis your manufacturing plant placed on the following activities or areas in the past three years

	No Emphasis		Moderate Emphasis			Extreme Emphasis	
Production/inventory control systems	1	2	3	4	5	6	7
Purchasing management	1	2	3	4	5	6	7
Integrating manufacturing information systems	1	2	3	4	5	6	7
Integrating information systems across departments	1	2	3	4	5	6	7

d. Planning systems (efficiency)

	No Emphasis		Moderate Emphasis			Extreme Emphasis	
Increasing first-pass yield	1	2	3	4	5	6	7
Increasing equipment utilization	1	2	3	4	5	6	7
Improving performance in meeting the production schedule	1	2	3	4	5	6	7

e. Planning systems (JIT emphasis)

	No Emphasis		Moderate Emphasis			Extreme Emphasis	
Lead-time reduction	1	2	3	4	5	6	7
Setup time reduction	1	2	3	4	5	6	7

Inventory reduction	1	2	3	4	5	6	7
Reducing the number of suppliers	1	2	3	4	5	6	7
Improving vendor quality	1	2	3	4	5	6	7
Reducing the number of parts and components	1	2	3	4	5	6	7

f. Quality

	No Emphasis		Moderate Emphasis			Extreme Emphasis	
Product attractiveness as perceived by the customer	1	2	3	4	5	6	7
Overall product quality as perceived by the customer	1	2	3	4	5	6	7

g. Delegation of authority

Answer the following statements pertaining to production workers at your plant

	Strongly Disagree		Neutral			Strongly Agree	
The organization keeps a written record of employee's job performance	1	2	3	4	5	6	7
The employee's written record is considered seriously when making employee related decisions	1	2	3	4	5	6	7
Employees are to adhere to strict operating procedures at all times	1	2	3	4	5	6	7
Approval signatures are needed for work to proceed from one stage to the next	1	2	3	4	5	6	7

h. Cross functional activities

In assuring the compatibility among decisions in one area (e.g. marketing) with those in other areas (e.g. production), to what extent are the following used?

	Rarely				Frequently		
Interdepartmental committees which allow departments to engage in joint decision making	1	2	3	4	5	6	7
Temporary task forces to facilitate interdepartmental collaboration on a specific project	1	2	3	4	5	6	7
Liaison personnel to coordinate the efforts of several departments on a specific project	1	2	3	4	5	6	7
Master plans used as coordinating devices	1	2	3	4	5	6	7
Bargaining among department heads	1	2	3	4	5	6	7

To what extent are the following decisions based on participative, cross-functional discussions?

	Rarely				Frequently		
Product or service decisions concerning production, marketing, and R&D strategies	1	2	3	4	5	6	7
Capital budget decisions: the selection and financing of long-term investments	1	2	3	4	5	6	7

SECTION III: LEARNING AND IMPROVEMENT CAPABILITIES

i. Learning Capability

Instruction: Please indicate the extent to which you agree or disagree with each of the following statements about this plant (1 = strongly disagree, 4 = neutral and 7 = strongly agree):

a. Internal Learning	**Strongly Disagree**			**Neutral**		**Strongly Agree**	
1. Employees are cross-trained at this plant so that they can fill in for others if necessary.	1	2	3	4	5	6	7
2. Employees receive training to perform multiple tasks.	1	2	3	4	5	6	7
3. Management takes all product and process improvement suggestions seriously.	1	2	3	4	5	6	7
4. Many useful suggestions are implemented at this plant.	1	2	3	4	5	6	7

b. External Learning	**Strongly Disagree**			**Neutral**		**Strongly Agree**	
1. We strive to establish long-term relationships with suppliers.	1	2	3	4	5	6	7
2. We maintain close communication with suppliers about quality considerations and design changes.	1	2	3	4	5	6	7
3. Our customers give us feedback on quality and delivery performance.	1	2	3	4	5	6	7
4. Our customers are actively involved in the product design process.	1	2	3	4	5	6	7

ii. Improvement Capability

Instruction: Please indicate the extent to which you agree or disagree with each of these statements about this plant (1 = strongly disagree, 4 = neutral and 7 = strongly agree):

a. Continuous Improvement	Strongly Disagree			Neutral		Strongly Agree	
1. We strive to continually improve all aspects of products and processes, rather than taking a static approach	1	2	3	4	5	6	7
2. We search for continued learning and improvement, after the installation of new equipment	1	2	3	4	5	6	7
3. Continuous improvement makes our performance a moving target, which is difficult for competitors to attack	1	2	3	4	5	6	7
4. We believe that improvement of a process is never complete; there is always room for more incremental improvement	1	2	3	4	5	6	7
5. Our organization is not a static entity, but engages in dynamically changing itself to better serve its customers.	1	2	3	4	5	6	7

b. Process Management	Strongly Disagree			Neutral		Strongly Agree	
1. A large percent of the processes on the shop floor are currently under statistical quality control	1	2	3	4	5	6	7
2. We make use of statistical techniques to reduce variance in processes	1	2	3	4	5	6	7
3. We use charts to determine whether our manufacturing processes are in control	1	2	3	4	5	6	7
4. We monitor our processes using statistical process control	1	2	3	4	5	6	7

c. Leadership Involvement in Quality	Strongly Disagree			Neutral		Strongly Agree	
1. All major department heads within the plant accept their responsibility for quality	1	2	3	4	5	6	7
2. Plant management provides personal leadership for quality products and quality improvement	1	2	3	4	5	6	7
3. Our plant management creates and communicates a vision focused on quality improvement	1	2	3	4	5	6	7
4. Our plant management is personally involved in quality improvement projects	1	2	3	4	5	6	7

OTHER COMMENTS: please state in the space below (the comments will remain anonymous)

Thank You Again!

APPENDIX 8: SURVEY QUESTIONNAIRE TYPE 3

Research Title: “Drivers of Manufacturing Performance in Medium and Large Scale Manufacturing Firms in Ethiopia (Evidence from Addis Ababa and Its Periphery)”

This questionnaire should be completed by three employees who are subordinates of the manufacturing/operations manager in the firm. It contains forty five (45) leadership items measuring managerial behaviors and should take about 8 to 10 minutes to complete. I request you to be frank in responding to the questions. Responding to all the questions is greatly appreciated, but you can leave blank any questions that you do not wish to answer. I assure you that your responses will be treated with strict confidentiality and will not be disclosed in any way to any outside parties. If you do not want to answer any question then please proceed to the next question. I would be very grateful if you try to answer all the questions.

Should you require any further information or want to contact the researcher about any aspect of this study, please contact Getnet Begashaw Ketema, cell phone: +251-911-865979 or e-mail: getbegashaw@yahoo.co.uk. Should you have concerns about the way in which the research has been conducted, you may contact Dr. Zewdie Shibre, +251-911-239959 or email: zzshib@yahoo.com.

Thank you very much for your participation and completing this questionnaire. Your input is very much appreciated.

Sincerely,

Getnet Begashaw Ketema,
DBL Candidate, UNISA
Address: Cell phone: +251-911-865979; e-mail: getbegashaw@yahoo.co.uk

MEASURES OF LEADERSHIP PRACTICES

Instruction: Please indicate how much your boss uses each managerial practice or behavior. The term "unit" refers to the team, department, division, or company for which your boss is the formal leader, and the term "members" refers to the people in the unit who report directly to your boss. Think about each type of behavior separately, and do not allow your general evaluation of the manager to bias your answers about specific behaviors. For each item, select one of the following response choices (1 = Not at all; 2 = To a Limited extent; 3 = To a Moderate extent; 4 = To a Considerable extent; 5 = To a Very great extent) (please circle the number)

Clarifying	**Not at all**	**To a Limited Extent**	**To a Moderate Extent**	**To a considerable Extent**	**To a Very great Extent**
1. Clearly explains ….	1	2	3	4	5
2. Sets specific ..	1	2	3	4	5
3. Explains the rules, policies, …..	1	2	3	4	5

Supporting	**Not at all**	**To a Limited Extent**	**To a Moderate Extent**	**To a considerable Extent**	**To a Very great Extent**
4. Shows concern …	1	2	3	4	5
5. Provides …	1	2	3	4	5
6. Expresses ……….	1	2	3	4	5

Envisioning Change	**Not at all**	**To a Limited Extent**	**To a Moderate Extent**	**To a considerable Extent**	**To a Very great Extent**
7. Describes a proposed …..	1	2	3	4	5
8. Describes a clear, …..	1	2	3	4	5
9. Describes a new ….	1	2	3	4	5

Short-term Planning	**Not at all**	**To a Limited Extent**	**To a Moderate Extent**	**To a considerable Extent**	**To a Very great Extent**
10. Develops …..	1	2	3	4	5
11. Plans and organizes …………..	1	2	3	4	5
12. Identifies ….	1	2	3	4	5

Encouraging Participation	**Not at all**	**To a Limited Extent**	**To a Moderate Extent**	**To a considerable Extent**	**To a Very great Extent**
13. Consults with …………	1	2	3	4	5
14. Asks ……………	1	2	3	4	5
15. Modifies a proposal ………..	1	2	3	4	5

Encouraging Innovation	**Not at all**	**To a Limited Extent**	**To a Moderate Extent**	**To a considerable Extent**	**To a Very great Extent**
16. Encourages …….	1	2	3	4	5
17. Encourages members to …….	1	2	3	4	5
18. Talks about ……………	1	2	3	4	5

Monitoring Activities and Performance	**Not at all**	**To a Limited Extent**	**To a Moderate Extent**	**To a considerable Extent**	**To a Very great Extent**
19. Checks on the ……………	1	2	3	4	5
20. Evaluates how …………	1	2	3	4	5
21. Evaluates the ………………..	1	2	3	4	5

Recognizing	**Not at all**	**To a Limited Extent**	**To a Moderate Extent**	**To a considerable Extent**	**To a Very great Extent**
22. Praises effective ……………	1	2	3	4	5
23. Provides …………..	1	2	3	4	5
24. Praises …………….	1	2	3	4	5

Explaining Need for Change	**Not at all**	**To a Limited Extent**	**To a Moderate Extent**	**To a considerable Extent**	**To a Very great Extent**
25. Explains why ………………	1	2	3	4	5
26. Explains why a policy …………..	1	2	3	4	5
27. Explains …………………	1	2	3	4	5

Resolving Work related Problems	**Not at all**	**To a Limited Extent**	**To a Moderate Extent**	**To a considerable Extent**	**To a Very great Extent**
28. Resolves ……………..	1	2	3	4	5
29. Takes ……………….	1	2	3	4	5
30. Handles ………………	1	2	3	4	5

Delegating and Empowering	**Not at all**	**To a Limited Extent**	**To a Moderate Extent**	**To a considerable Extent**	**To a Very great Extent**
31. Encourages ………….	1	2	3	4	5
32. Trusts members ………….	1	2	3	4	5
33. Empowers ………..	1	2	3	4	5

Encouraging/Facilitating Collective Learning	**Not at all**	**To a Limited Extent**	**To a Moderate Extent**	**To a considerable Extent**	**To a Very great Extent**
34. Encourages …………….	1	2	3	4	5
35. Looks for …………	1	2	3	4	5
36. Conducts a review ……………	1	2	3	4	5

Developing Member Skills	**Not at all**	**To a Limited Extent**	**To a Moderate Extent**	**To a considerable Extent**	**To a Very great Extent**
37. Provides advice …………..	1	2	3	4	5
38. Provides …………	1	2	3	4	5
39. Encourages …………..	1	2	3	4	5

Encouraging Cooperation	**Not at all**	**To a Limited Extent**	**To a Moderate Extent**	**To a considerable Extent**	**To a Very great Extent**
40. Encourages cooperation …………	1	2	3	4	5
41. Encourages members …………	1	2	3	4	5
42. Talks about …………..	1	2	3	4	5

Leading by Example	**Not at all**	**To a Limited Extent**	**To a Moderate Extent**	**To a considerable Extent**	**To a Very great Extent**
43. Leads ……………	1	2	3	4	5
44. Behaves ………	1	2	3	4	5
45. Sets …………….	1	2	3	4	5

OTHER COMMENTS: please state in the space below (the comments will remain anonymous)

Thank You Again!

APPENDIX 9: RESULTS OF SKEWNESS, KURTOSIS, AND OTHER DESCRIPTIVE STATISTICS

	N	Minim.	Maxim.	Mean		Std. Dev.	Skewness	Kurtosis
	Stati.	Statis.	Statist.	Statist.	Std. Error	Statistic	Statistic	Statistic
CusOrie1	197	1	5	4.01	.067	.937	-.660	-.285
CusOrie2	196	1	5	4.13	.066	.919	-.828	-.014
CusOrie3	195	1	5	4.08	.068	.943	-.798	-.113
ComOrie1	195	1	5	3.78	.068	.951	-.489	-.306
ComOrie2	196	1	5	3.87	.068	.957	-.547	-.435
ComOrie3	195	1	5	3.97	.068	.944	-.692	-.202
InnoOrie1	195	1	5	3.48	.069	.960	-.305	-.365
InnoOrie2	196	1	5	3.46	.068	.946	-.193	-.303
InnoOrie3	196	1	5	3.54	.076	1.059	-.278	-.770
InnoOrie4	191	1	5	3.69	.076	1.054	-.486	-.442
InnoOrie5	195	1	5	3.52	.082	1.141	-.297	-.791
InnoOrie6	193	1	5	3.56	.075	1.044	-.382	-.441
ResOrie1	191	1	5	3.80	.074	1.022	-.728	.031
ResOrie2	190	1	5	4.12	.068	.943	-.894	.069
ResOrie3	196	1	5	3.32	.080	1.119	-.296	-.620
BSOrie1	192	1	5	3.79	.069	.955	-.689	.237
BSOrie2	193	1	5	3.75	.074	1.027	-.581	-.197
BSOrie3	194	1	5	3.75	.069	.961	-.442	-.401
BSOrie4	192	1	5	3.03	.094	1.304	-.163	-1.085
BSOrie5	193	1	5	3.11	.095	1.314	-.185	-1.129
BSOrie6	197	0	5	3.75	.085	1.189	-1.169	1.617
ED1	193	1	5	2.83	.084	1.161	.046	-.874
ED2	194	1	5	3.20	.074	1.031	-.240	-.382
ED3	194	1	5	3.31	.079	1.095	-.185	-.576
ED4	193	1	5	3.51	.078	1.086	-.378	-.432
GS1	195	1	5	3.42	.078	1.092	-.370	-.441
GS2	193	1	5	3.05	.087	1.213	-.072	-.884
GS3	192	1	5	3.03	.084	1.160	-.214	-.758
GS4	195	1	5	2.72	.092	1.286	.164	-1.072
GS5	195	1	5	2.94	.084	1.172	-.064	-.731
GS6	193	1	5	3.03	.086	1.197	-.253	-.891
GS7	193	1	5	3.05	.093	1.286	-.187	-.987
GS8	193	1	5	2.95	.089	1.234	.039	-.900
GS9	194	1	5	2.94	.092	1.276	.016	-.971
MPC1	197	2	5	3.51	.056	.786	.229	-.412
MPC2	197	2	5	3.43	.062	.864	.190	-.595
MPC3	197	1	5	3.46	.064	.895	-.100	-.169
MPQ	196	1	5	3.78	.058	.817	-.249	-.141
MPF1	197	2	5	3.81	.061	.853	-.365	-.426
MPF2	197	1	5	3.63	.066	.926	-.327	-.364
MPD1	197	1	5	3.82	.068	.955	-.418	-.285
MPD2	197	1	5	3.79	.070	.982	-.409	-.547
CostP1	196	1	5	3.77	.075	1.055	-.681	.067
CostP2	193	1	5	3.73	.074	1.027	-.477	-.300
QualP1	195	1	5	3.88	.074	1.028	-.613	-.390
QualP2	196	1	5	3.89	.072	1.010	-.568	-.629
QualP3	197	1	5	3.94	.074	1.041	-.600	-.629
DelivP1	197	1	5	3.92	.076	1.066	-.705	-.433
DelivP2	197	1	5	4.02	.074	1.045	-.882	.139
DelivP3	197	1	5	3.82	.074	1.034	-.607	-.195
FlexP1	197	1	5	3.69	.066	.932	-.339	-.536
FlexP2	197	1	5	3.76	.069	.964	-.356	-.517

Capacity1	195	1	7	4.71	.112	1.564	-.657	.160
Capacity2	192	1	7	4.21	.124	1.718	-.309	-.614
Capacity3	194	1	7	4.75	.103	1.440	-.337	-.179
Sourcing & VericalInteg1	192	1	7	4.61	.109	1.506	-.612	.151
Sourcing & VericalInteg2	193	1	7	4.71	.100	1.391	-.324	-.303
Sourcing & VericalInteg3	193	1	7	4.04	.119	1.658	-.080	-.704
Sourcing & VericalInteg4	194	1	7	4.27	.119	1.660	-.132	-.561
Manufact Technology1	194	1	7	4.06	.129	1.790	-.168	-1.029
Manufact Technology2	191	1	7	3.54	.133	1.832	.105	-1.011
Manufact Technology3	194	1	7	4.42	.114	1.586	-.348	-.578
Manufact Technology4	191	1	7	4.20	.126	1.748	-.333	-.788
Manufact Technology5	194	1	7	4.64	.115	1.604	-.584	-.351
NPDF1	197	1	7	4.93	.097	1.367	-.485	.327
NPDF2	196	1	7	4.92	.101	1.414	-.259	-.318
NPDF3	196	1	7	4.78	.100	1.400	-.227	-.072
NPDF4	194	1	7	5.03	.107	1.485	-.312	-.566
NPDQ1	194	1	7	4.89	.110	1.535	-.268	-.543
NPDQ2	192	1	7	5.05	.105	1.453	-.371	-.289
NPDQ3	194	1	7	4.96	.110	1.537	-.380	-.470
NPDQ4	195	1	7	4.92	.113	1.576	-.550	-.221
NPDQ5	195	1	7	4.89	.102	1.426	-.250	-.292
NPDQ6	195	1	7	5.13	.106	1.475	-.536	-.158
HRsystems Empowerm1	194	1	7	4.29	.100	1.396	-.065	-.369
HRsystems Empowerm2	192	1	7	4.33	.098	1.359	-.080	-.374
HRsystems Empowerm3	195	2	7	4.69	.095	1.327	-.087	-.666
HRsystemsWorkforce1	197	1	7	4.44	.097	1.356	-.272	-.270
HRsystemsWorkforce2	194	1	7	4.74	.103	1.434	.004	-.803
HRsystemsWorkforce3	194	1	7	4.96	.101	1.410	-.408	-.456
Planningsystems MPC1	196	1	7	4.86	.093	1.303	-.401	.073
Planningsystems MPC2	195	1	7	4.89	.098	1.367	-.427	-.423
Planningsystems MPC2	194	1	7	4.60	.101	1.408	-.270	-.177
Planningsystems MPC2	196	1	7	4.43	.103	1.443	-.296	-.463
Planningsystems Efficiency1	189	1	7	4.62	.096	1.326	-.251	-.263
Planningsystems Efficiency2	196	1	7	4.77	.097	1.357	-.237	-.542
Planningsystems Efficiency3	196	1	7	4.96	.097	1.360	-.503	-.248
Planningsystems JIT1	190	1	7	4.58	.101	1.392	-.604	.216
Planningsystems JIT2	187	1	7	4.56	.101	1.376	-.537	-.085
Planningsystems JIT3	189	1	7	4.70	.100	1.372	-.378	-.380
Planningsystems JIT4	185	1	7	4.31	.121	1.644	-.297	-.580
Planningsystems JIT5	190	1	7	4.78	.106	1.455	-.368	-.307
Planningsystems JIT6	187	1	7	4.35	.113	1.539	-.261	-.479
Quality1	189	2	7	5.01	.097	1.331	-.147	-.699
Quality1	191	1	7	5.17	.102	1.405	-.599	-.022
Delegation of Authority1	190	1	7	4.82	.115	1.587	-.457	-.338
Delegation of Authority2	191	1	7	4.77	.110	1.517	-.316	-.568
Delegation of Authority3	189	1	7	4.84	.102	1.399	-.057	-.906
Delegation of Authority4	191	1	7	4.90	.104	1.440	-.071	-.842
Cross Functional Activities1	190	1	7	4.84	.097	1.344	-.687	.131
Cross Functional Activities2	191	1	7	4.63	.105	1.452	-.279	-.310
Cross Functional Activities3	190	1	7	4.33	.107	1.477	-.229	-.533
Cross Functional Activities4	185	1	7	4.64	.110	1.490	-.505	-.192
Cross Functional Activities5	188	1	7	4.71	.113	1.553	-.350	-.498
Cross Functional Activities6	190	1	7	4.79	.101	1.397	-.557	.136
Cross Functional Activities7	187	1	7	4.66	.111	1.513	-.373	-.223
IL1	190	1	7	4.48	.109	1.500	-.145	-1.041
IL2	189	1	7	4.29	.118	1.625	-.261	-.875
IL3	191	1	7	4.70	.106	1.470	-.115	-.831
IL4	190	1	7	4.68	.106	1.457	-.142	-.804

EL1	186	1	7	4.87	.109	1.484	-.328	-.734
EL2	189	1	7	4.91	.108	1.490	-.507	-.511
EL3	190	1	7	4.86	.109	1.503	-.425	-.459
EL4	187	1	7	4.37	.123	1.688	-.306	-.908
CI1	187	1	7	4.67	.105	1.432	-.244	-.518
CI2	190	1	7	4.69	.106	1.467	-.180	-.746
CI3	191	1	7	4.76	.105	1.456	-.452	-.255
CI4	191	1	7	4.85	.108	1.497	-.403	-.430
CI5	190	1	7	4.93	.103	1.420	-.261	-.816
PM1	191	1	7	4.59	.106	1.462	-.183	-.600
PM2	191	1	7	4.55	.106	1.460	-.268	-.674
PM3	185	1	7	4.48	.111	1.508	-.194	-.654
PM4	188	1	7	4.46	.112	1.539	-.098	-.751
LIQ1	187	1	7	4.89	.112	1.534	-.351	-.658
LIQ2	189	1	7	4.89	.104	1.436	-.172	-.819
LIQ3	191	1	7	4.85	.105	1.451	-.149	-.809
LIQ4	187	1	7	5.07	.105	1.437	-.409	-.544
Clarifying1	197	2	5	3.50	.045	.626	-.178	.676
Clarifying2	197	1	5	3.57	.049	.682	-.538	.549
Clarifying3	197	2	5	3.59	.047	.666	-.344	.120
Supporting1	197	1	5	3.43	.053	.747	-.340	-.100
Supporting2	197	2	5	3.45	.054	.760	-.086	-.329
Supporting3	197	1	5	3.38	.052	.735	-.274	-.072
Envisioning1	197	1	5	3.39	.051	.721	-.152	.278
Envisioning1	197	1	5	3.41	.054	.762	-.214	.018
Envisioning1	197	2	5	3.41	.054	.754	-.212	-.484
Short Term Planning1	197	1	5	3.49	.051	.720	-.473	.185
Short Term Planning2	197	2	5	3.54	.054	.761	-.314	-.213
Short Term Planning3	197	1	5	3.49	.050	.699	-.352	.119
Encourage Participation1	197	1	5	3.48	.054	.753	-.178	-.051
Encourage Participation2	197	1	5	3.43	.053	.738	.018	-.297
Encourage Participation3	197	1	5	3.40	.052	.726	-.190	-.009
Encourage Innovation1	197	1	5	3.43	.053	.739	-.111	-.055
Encourage Innovation2	197	1	5	3.45	.053	.743	-.042	-.165
Encourage Innovation3	197	1	5	3.47	.053	.739	-.147	-.329
Monitoring Activities1	197	1	5	3.51	.056	.779	-.507	.394
Monitoring Activities2	197	2	5	3.52	.049	.682	-.428	-.019
Monitoring Activities3	197	1	5	3.48	.053	.739	-.292	-.025
Recognizing1	197	1	5	3.45	.053	.748	-.466	.168
Recognizing2	197	1	5	3.51	.053	.749	-.570	.477
Recognizing3	197	1	5	3.35	.055	.778	-.334	-.015
Explaining Need for Change1	197	1	5	3.42	.056	.791	-.600	.605
Explaining Need for Change2	197	1	5	3.37	.054	.763	-.255	-.231
Explaining Need for Change3	197	1	5	3.41	.053	.749	-.358	.117
Resolving Workrelated Prob1	197	1	5	3.51	.055	.768	-.554	.442
Resolving Workrelated Prob2	197	1	5	3.53	.053	.749	-.640	.838
Resolving Workrelated Prob3	197	1	5	3.51	.054	.755	-.537	.259
Delegating and Empowering1	197	1	5	3.50	.052	.732	-.430	.277
Delegating and Empowering2	197	1	5	3.38	.054	.756	-.321	-.159
Delegating and Empowering3	197	2	5	3.42	.051	.722	-.075	-.372
Encourage Collective Learning1	197	1	5	3.38	.049	.681	-.231	-.114
Encourage Collective Learning2	197	1	5	3.45	.051	.713	-.449	.137
Encourage Collective Learning3	197	2	5	3.44	.051	.720	-.351	-.239
Developing Member Skills1	197	1	5	3.45	.056	.785	-.571	.394
Developing Member Skills2	197	1	5	3.47	.056	.787	-.633	.173
Developing Member Skills3	197	1	5	3.46	.057	.805	-.514	.040
Encouraging Cooperation1	197	1	5	3.46	.053	.741	-.401	.214
Encouraging Cooperation2	197	1	5	3.48	.053	.744	-.278	.084

Encouraging Cooperation3	197	1	5	3.44	.057	.798	-.313	-.175
Leading By Example1	197	1	5	3.40	.059	.832	-.497	.003
Leading By Example1	197	1	5	3.43	.061	.854	-.652	.232
Leading By Example1	197	1	5	3.50	.059	.826	-.821	.765
Valid N (listwise)	99							

APPENDIX 10: RESULTS OF INTERNAL CONSISTENCY OF INDIVIDUAL SCALES

Cronbach's Alpha values are computed for each scale in the study in order to check the internal consistency of the items included in the respective scales and the results are presented below:

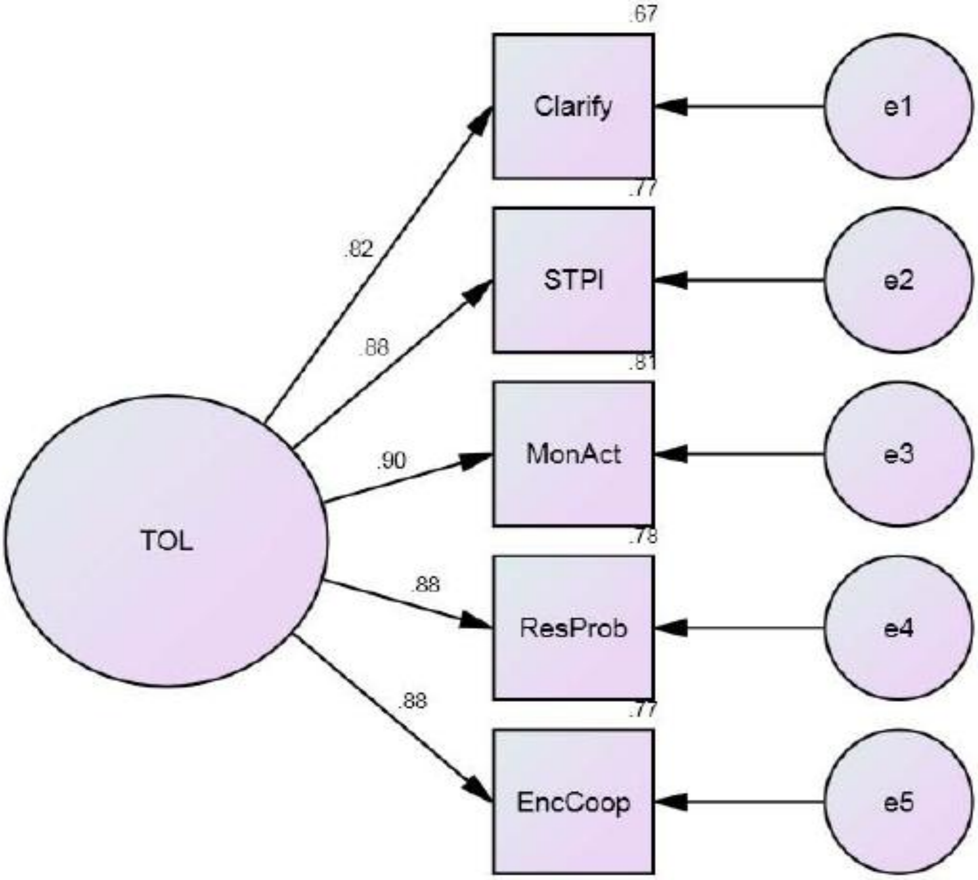
Variables/Scales	No. of Items	Cronbach's Alpha	Remark
Customer Orientation	3	0.865	
Competitor Orientation	3	0.797	
Innovation Orientation	6	0.886	
Resource Orientation	3	0.604	
Business Strategy Orientation	6	0.741	
Environmental Dynamism	4	0.792	0.835 when 1 item deleted
Cost Priority	2	0.748	
Quality Priority	3	0.834	
Delivery Priority	3	0.784	
Flexibility Priority	2	0.752	
Capacity	3	0.759	
Sourcing and vertical integration	4	0.786	
Facilities/manufacturing technology	5	0.891	
New product development	10	0.940	
Human resource systems	6	0.861	
Planning systems (MPC)	4	0.827	
Planning systems (Efficiency)	3	0.820	
Planning systems (JIT emphasis)	6	0.866	
Quality	2	0.812	
Delegation of authority	4	0.861	
Cross functional activities	7	0.885	
Internal Learning	4	0.845	
External Learning	4	0.802	
Continuous Improvement	5	0.847	
Process Management	4	0.871	
Leadership Involvement in Quality	4	0.902	

Clarifying	3	0.841	
Short-term Planning	3	0.834	
Monitoring Activities and Performance	3	0.858	
Resolving Work related Problems	3	0.893	
Supporting	3	0.883	
Encouraging Participation	3	0.868	
Recognizing	3	0.852	
Delegating and Empowering	3	0.884	
Developing Member Skills	3	0.913	
Encouraging Cooperation	3	0.907	
Leading by Example	3	0.893	
Explaining Need for Change	3	0.883	
Envisioning Change	3	0.866	
Encouraging Innovative Thinking	3	0.868	
Encouraging/Facilitating Collective Learning	3	0.872	
Government Support	9	0.931	
Cost Performance	3	0.757	
Quality Performance	1	-	
Flexibility Performance	2	0.633	
Delivery Performance	2	0.866	

Source: Own Study (2013)

APPENDIX 11: CFA RESULTS FOR THE MANAGERIAL BEHAVIORS

MODEL 1: CFA and Results for Task-Oriented Behavior



Computation of degrees of freedom (Demo)

Number of distinct sample moments: 20
Number of distinct parameters to be estimated: 15
Degrees of freedom (20 - 15): 5

Result (Demo)

Minimum was achieved
Chi-square = 6.877
Degrees of freedom = 5
Probability level = .230

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Demo	15	6.877	5	.230	1.375
Saturated model	20	.000	0		
Independence model	10	864.755	10	.000	86.476

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Demo	.992	.984	.998	.996	.998
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Demo	.500	.496	.499
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Demo	1.877	.000	13.011
Saturated model	.000	.000	.000
Independence model	854.755	761.950	954.949

FMIN

Model	FMIN	F0	LO 90	HI 90
Demo	.035	.010	.000	.066
Saturated model	.000	.000	.000	.000
Independence model	4.412	4.361	3.888	4.872

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Demo	.044	.000	.115	.476
Independence model	.660	.623	.698	.000

AIC

Model	AIC	BCC	BIC	CAIC
Demo	36.877	37.825		
Saturated model	40.000	41.263		
Independence model	884.755	885.387		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Demo	.188	.179	.245	.193
Saturated model	.204	.204	.204	.211
Independence model	4.514	4.041	5.025	4.517

HOELTER

Model	HOELTER .05	HOELTER .01

Model	HOELTER .05	HOELTER .01
Demo	316	430
Independence model	5	6

Estimates (Group number 1 - Demo): Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Demo)

			Estimate	S.E.	C.R.	P	Label
LPEncourageCooperation	<---	TOL	.626	.040	15.468	***	
LPResolvingWorkProblem	<---	TOL	.626	.040	15.587	***	
LPMonitoringActivities	<---	TOL	.610	.038	16.118	***	
LPShorttermPlanning	<---	TOL	.580	.038	15.462	***	
LPClarifying	<---	TOL	.490	.036	13.724	***	

Standardized Regression Weights: (Group number 1 - Demo)

			Estimate
LPEncourageCooperation	<---	TOL	.879
LPResolvingWorkProblem	<---	TOL	.883
LPMonitoringActivities	<---	TOL	.901
LPShorttermPlanning	<---	TOL	.879
LPClarifying	<---	TOL	.816

Intercepts: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
LPEncourageCooperation	3.425	.051	67.342	***	
LPResolvingWorkProblem	3.479	.051	68.734	***	
LPMonitoringActivities	3.468	.048	71.712	***	
LPShorttermPlanning	3.462	.047	73.479	***	
LPClarifying	3.516	.043	81.851	***	

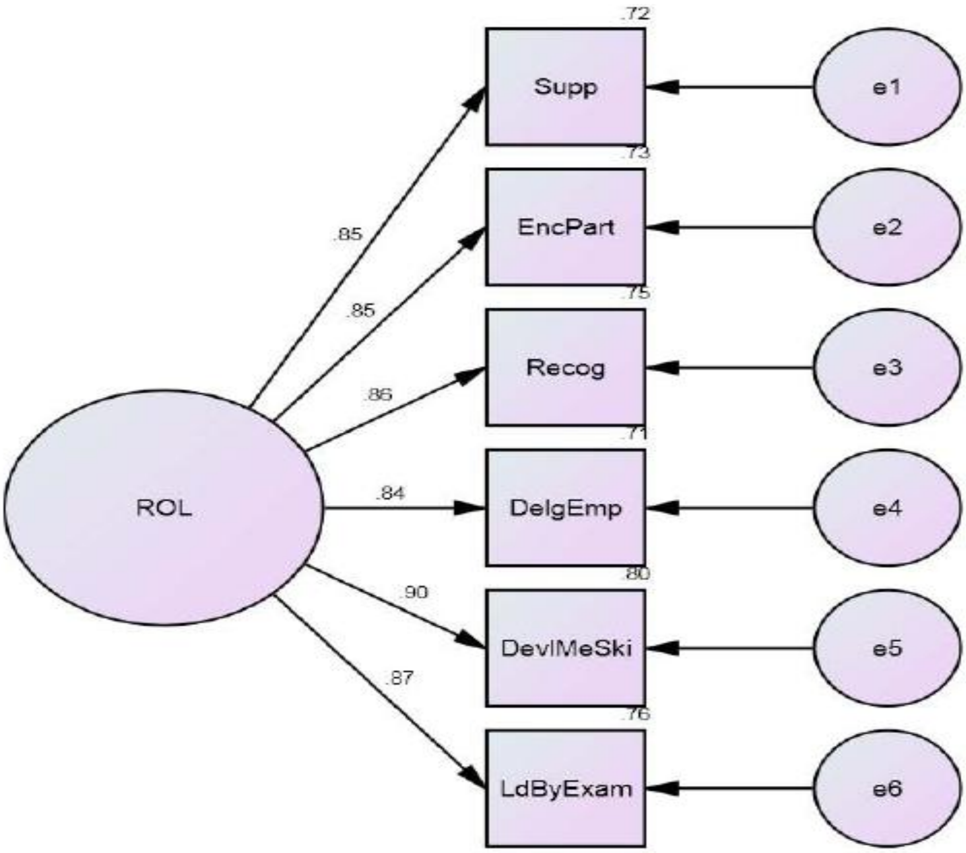
Variances: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
TOL	1.000				
e5	.115	.015	7.814	***	
e4	.110	.014	7.724	***	
e3	.086	.012	7.246	***	
e2	.099	.013	7.818	***	
e1	.121	.014	8.699	***	

Squared Multiple Correlations: (Group number 1 - Demo)

	Estimate
LPClarifying	.665
LPShorttermPlanning	.773
LPMonitoringActivities	.812
LPResolvingWorkProblem	.780
LPEncourageCooperation	.773

MODEL 2: CFA and Results for Relationship-Oriented Behavior



Computation of degrees of freedom (Demo)

Number of distinct sample moments: 27
Number of distinct parameters to be estimated: 18
Degrees of freedom (27 - 18): 9

Result (Demo)

Minimum was achieved
Chi-square = 17.039
Degrees of freedom = 9
Probability level = .048

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Demo	18	17.039	9	.048	1.893
Saturated model	27	.000	0		
Independence model	12	1045.458	15	.000	69.697

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Demo	.984	.973	.992	.987	.992
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Demo	.600	.590	.595
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Demo	8.039	.064	23.762
Saturated model	.000	.000	.000
Independence model	1030.458	928.127	1140.176

FMIN

Model	FMIN	F0	LO 90	HI 90
Demo	.087	.041	.000	.121
Saturated model	.000	.000	.000	.000
Independence model	5.334	5.257	4.735	5.817

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Demo	.068	.006	.116	.242
Independence model	.592	.562	.623	.000

AIC

Model	AIC	BCC	BIC	CAIC
Demo	53.039	54.372		
Saturated model	54.000	56.000		
Independence model	1069.458	1070.347		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Demo	.271	.230	.351	.277
Saturated model	.276	.276	.276	.286
Independence model	5.456	4.934	6.016	5.461

HOELTER

Model	HOELTER .05	HOELTER .01
Demo	195	250

Model	HOELTER .05	HOELTER .01
Independence model	5	6

Estimates (Group number 1 - Demo): Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Demo)

			Estimate	S.E.	C.R.	P	Label
LPDevelopMemberSkills	<---	ROL	.665	.042	15.955	***	
LPDelegatingandEmpowering	<---	ROL	.570	.040	14.378	***	
LPRecognizing	<---	ROL	.607	.040	15.045	***	
LPEncourageParticip	<---	ROL	.583	.040	14.697	***	
LPSupporting	<---	ROL	.576	.040	14.575	***	
LPLeadingByExample	<---	ROL	.679	.045	15.193	***	

Standardized Regression Weights: (Group number 1 - Demo)

			Estimate
LPDevelopMemberSkills	<---	ROL	.895
LPDelegatingandEmpowering	<---	ROL	.840
LPRecognizing	<---	ROL	.864
LPEncourageParticip	<---	ROL	.851
LPSupporting	<---	ROL	.847
LPLeadingByExample	<---	ROL	.869

Intercepts: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
LPDevelopMemberSkills	3.418	.053	64.393	***	
LPDelegatingandEmpowering	3.394	.048	70.051	***	
LPRecognizing	3.408	.050	67.859	***	
LPEncourageParticip	3.393	.049	69.332	***	
LPSupporting	3.372	.049	69.399	***	
LPLeadingByExample	3.393	.056	60.808	***	

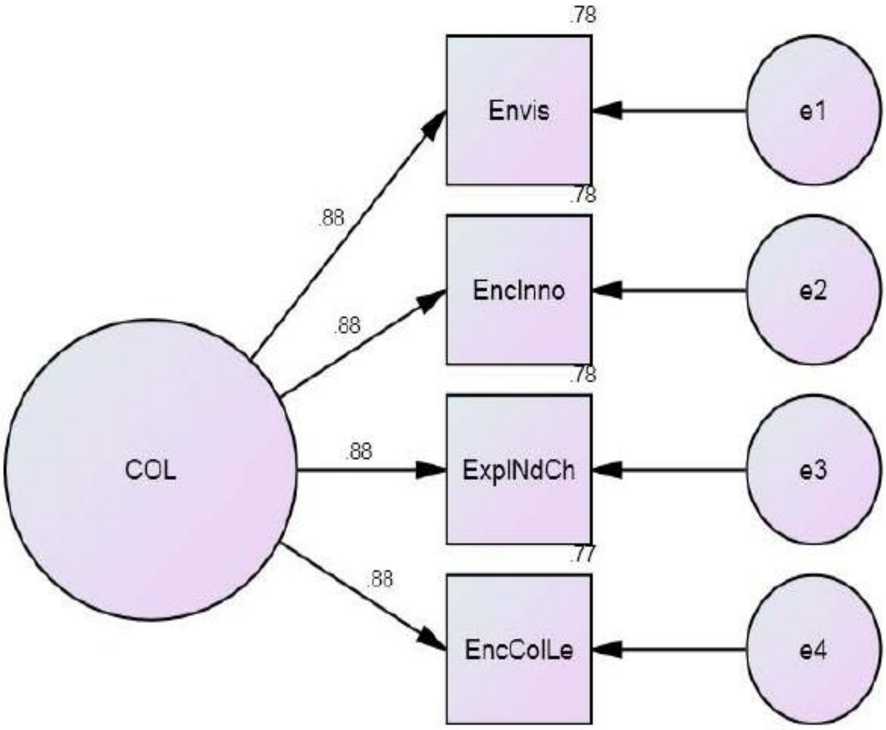
Variances: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
ROL	1.000				
e5	.110	.014	7.587	***	
e4	.136	.016	8.535	***	
e3	.125	.015	8.216	***	
e2	.129	.015	8.394	***	
e1	.131	.015	8.450	***	
e6	.149	.018	8.131	***	

Squared Multiple Correlations: (Group number 1 - Demo)

	Estimate
LPLeadingByExample	.755
LPSupporting	.717
LPEncourageParticip	.725
LPRecognizing	.746
LPDelegatingandEmpowering	.705
LPDevelopMemberSkills	.801

MODEL 3: CFA and Results for Change-Oriented Behavior



Computation of degrees of freedom (Demo)

Number of distinct sample moments: 14
Number of distinct parameters to be estimated: 12
Degrees of freedom (14 - 12): 2

Result (Demo)
Minimum was achieved
Chi-square = 3.503
Degrees of freedom = 2
Probability level = .174

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Demo	12	3.503	2	.174	1.752
Saturated model	14	.000	0		

Model	NPAR	CMIN	DF	P	CMIN/DF
Independence model	8	644.910	6	.000	107.485

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Demo	.995	.984	.998	.993	.998
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-**Adjusted Measures**

Model	PRATIO	PNFI	PCFI
Demo	.333	.332	.333
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Demo	1.503	.000	10.970
Saturated model	.000	.000	.000
Independence model	638.910	559.221	725.997

FMIN

Model	FMIN	F0	LO 90	HI 90
Demo	.018	.008	.000	.056
Saturated model	.000	.000	.000	.000
Independence model	3.290	3.260	2.853	3.704

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Demo	.062	.000	.167	.317
Independence model	.737	.690	.786	.000

AIC

Model	AIC	BCC	BIC	CAIC
Demo	27.503	28.131		
Saturated model	28.000	28.733		
Independence model	660.910	661.329		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Demo	.140	.133	.189	.144
Saturated model	.143	.143	.143	.147
Independence model	3.372	2.965	3.816	3.374

HOELTER

Model	HOELTER .05	HOELTER .01
Demo	336	516
Independence model	4	6

Estimates (Group number 1 - Demo): Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Demo)

			Estimate	S.E.	C.R.	P	Label
LPEncourageCollectLearning	<---	COL	.571	.037	15.319	***	
LPExplainingNeedforChang	<---	COL	.620	.040	15.463	***	
LPEncourageInnovation	<---	COL	.602	.039	15.415	***	
LPEnvisioning	<---	COL	.609	.039	15.433	***	

Standardized Regression Weights: (Group number 1 - Demo)

			Estimate
LPEncourageCollectLearning	<---	COL	.877
LPExplainingNeedforChang	<---	COL	.882
LPEncourageInnovation	<---	COL	.881
LPEnvisioning	<---	COL	.881

Intercepts: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
LPEncourageCollectLearning	3.384	.047	72.709	***	
LPExplainingNeedforChang	3.360	.050	66.895	***	
LPEncourageInnovation	3.414	.049	69.869	***	
LPEnvisioning	3.362	.049	68.160	***	

Variances: (Group number 1 - Demo)

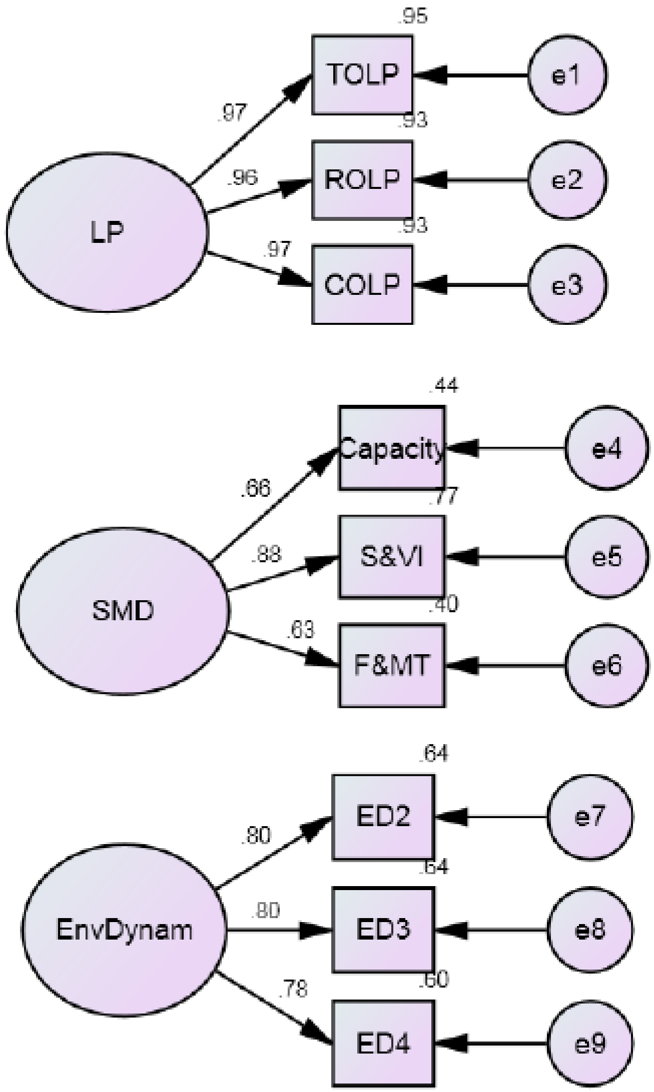
	Estimate	S.E.	C.R.	P	Label
COL	1.000				
e5	.098	.013	7.393	***	
e4	.110	.015	7.259	***	
e3	.105	.014	7.304	***	
e2	.107	.015	7.288	***	

Squared Multiple Correlations: (Group number 1 - Demo)

	Estimate
LPEnvisioning	.776
LPEncourageInnovation	.775
LPExplainingNeedforChang	.778
LPEncourageCollectLearning	.769

APPENDIX 12: CFA RESULTS FOR EACH CONSTRUCT (THE MEASUREMENT MODEL)

MODEL 1: CFA and Results for Environmental Dynamism, Structural Manufacturing Decisions, and Leadership



Notes for Model (Demo)

Computation of degrees of freedom (Demo)

Number of distinct sample moments: 54
Number of distinct parameters to be estimated: 27
Degrees of freedom (54 - 27): 27

Result (Demo)

Minimum was achieved
Chi-square = 38.886
Degrees of freedom = 27
Probability level = .065

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Demo	27	38.886	27	.065	1.440
Saturated model	54	.000	0		
Independence model	9	1287.868	45	.000	28.619

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Demo	.970	.950	.991	.984	.990
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Demo	.600	.582	.594
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Demo	11.886	.000	32.571
Saturated model	.000	.000	.000
Independence model	1242.868	1129.500	1363.625

FMIN

Model	FMIN	F0	LO 90	HI 90
Demo	.198	.061	.000	.166
Saturated model	.000	.000	.000	.000
Independence model	6.571	6.341	5.763	6.957

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Demo	.047	.000	.078	.520
Independence model	.375	.358	.393	.000

AIC

Model	AIC	BCC	BIC	CAIC
Demo	92.886	95.789		
Saturated model	108.000	113.806		
Independence model	1305.868	1306.836		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Demo	.474	.413	.579	.489
Saturated model	.551	.551	.551	.581
Independence model	6.663	6.084	7.279	6.668

HOELTER

Model	HOELTER .05	HOELTER .01
Demo	203	237
Independence model	10	11

Estimates (Group number 1 - Demo): Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Demo)

			Estimate	S.E.	C.R.	P	Label
TaskOL	<---	LP	.588	.031	18.691	***	par_1
RelationshioOL	<---	LP	.607	.033	18.330	***	par_2
ChangeOL	<---	LP	.602	.033	18.491	***	par_3
X23	<---	EnvDynam	.824	.068	12.096	***	par_4
X24	<---	EnvDynam	.874	.072	12.074	***	par_5
X25	<---	EnvDynam	.841	.072	11.639	***	par_6
CapacityDecision	<---	SMD	.854	.096	8.882	***	par_7
SourcingandVerticInteg	<---	SMD	1.077	.095	11.381	***	par_8
FacilityandManufTechno	<---	SMD	.900	.106	8.460	***	par_9

Standardized Regression Weights: (Group number 1 - Demo)

			Estimate
TaskOL	<---	LP	.972
RelationshioOL	<---	LP	.962
ChangeOL	<---	LP	.967
X23	<---	EnvDynam	.802
X24	<---	EnvDynam	.800
X25	<---	EnvDynam	.777
CapacityDecision	<---	SMD	.663
SourcingandVerticInteg	<---	SMD	.875
FacilityandManufTechno	<---	SMD	.630

Intercepts: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
TaskOL	3.470	.043	80.373	***	par_10
RelationshioOL	3.396	.045	75.374	***	par_11
ChangeOL	3.380	.044	76.062	***	par_12
X23	3.203	.074	43.343	***	par_13
X24	3.311	.078	42.188	***	par_14
X25	3.504	.078	44.964	***	par_15
CapacityDecision	4.552	.092	49.389	***	par_16
SourcingandVerticInteg	4.393	.088	49.883	***	par_17
FacilityandManufTechno	4.157	.102	40.642	***	par_18

Variances: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
LP	1.000				
EnvDynam	1.000				
SMD	1.000				
e1	.020	.004	5.585	***	par_19
e2	.029	.004	6.813	***	par_20
e3	.025	.004	6.315	***	par_21
e7	.377	.063	5.971	***	par_22
e8	.428	.071	6.004	***	par_23
e9	.464	.071	6.575	***	par_24
e4	.928	.128	7.228	***	par_25
e5	.354	.144	2.466	.014	par_26
e6	1.233	.158	7.786	***	par_27

Squared Multiple Correlations: (Group number 1 - Demo)

	Estimate
FacilityandManufTechno	.397
SourcingandVerticInteg	.766
CapacityDecision	.440
X25	.604
X24	.641
X23	.643
ChangeOL	.935
RelationshioOL	.926
TaskOL	.946

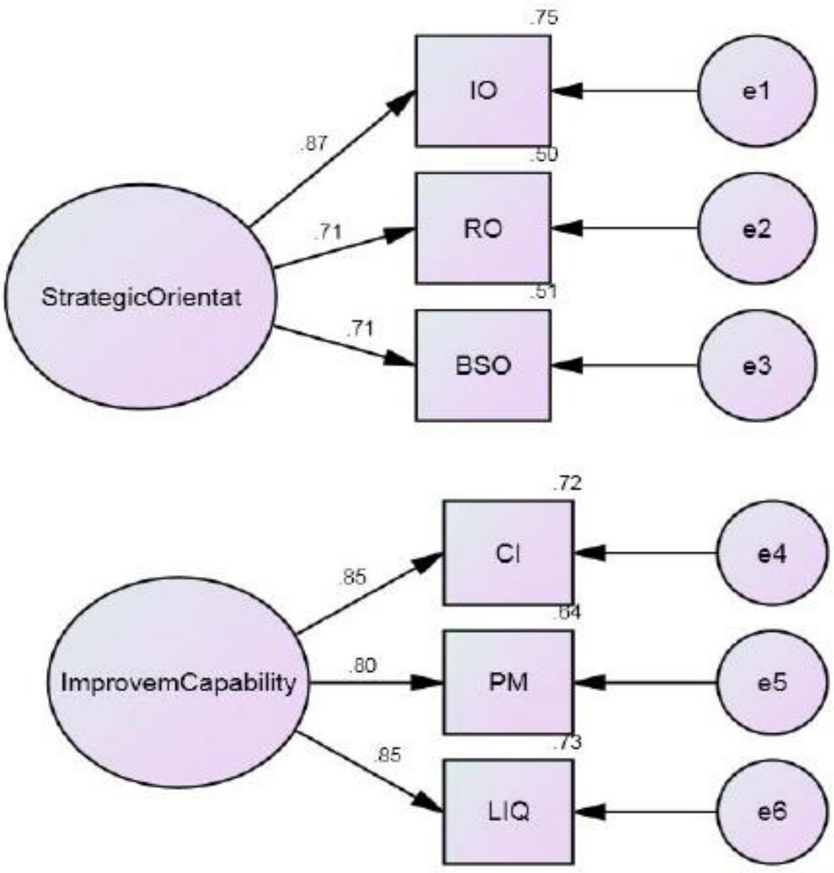
MODEL 2: CFA and Results for Strategic Orientation and Improvement Capability

Computation of degrees of freedom (Demo)

Number of distinct sample moments:	27
Number of distinct parameters to be estimated:	18
Degrees of freedom (27 - 18):	9

Result (Demo)

Minimum was achieved
Chi-square = 14.288
Degrees of freedom = 9
Probability level = .112



Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Demo	18	14.288	9	.112	1.588
Saturated model	27	.000	0		
Independence model	6	497.244	21	.000	23.678

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Demo	.971	.933	.989	.974	.989
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Demo	.429	.416	.424
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90

Model	NCP	LO 90	HI 90
Demo	5.288	.000	19.717
Saturated model	.000	.000	.000
Independence model	476.244	407.334	552.576

FMIN

Model	FMIN	F0	LO 90	HI 90
Demo	.073	.027	.000	.101
Saturated model	.000	.000	.000	.000
Independence model	2.537	2.430	2.078	2.819

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Demo	.055	.000	.106	.388
Independence model	.340	.315	.366	.000

AIC

Model	AIC	BCC	BIC	CAIC
Demo	50.288	51.621		
Saturated model	54.000	56.000		
Independence model	509.244	509.689		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Demo	.257	.230	.330	.263
Saturated model	.276	.276	.276	.286
Independence model	2.598	2.247	2.988	2.600

HOELTER

Model	HOELTER .05	HOELTER .01
Demo	233	298
Independence model	13	16

Estimates (Group number 1 - Demo): Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Demo)

			Estimate	S.E.	C.R.	P	Label
LeadershipInvolv	<---	ImprovCapability	1.095	.080	13.705	***	
ProcessManag	<---	ImprovCapability	1.011	.080	12.584	***	
ContinousImprov	<---	ImprovCapability	.974	.071	13.633	***	
BusinessStratOrientation	<---	StrategicOrienta	.588	.058	10.184	***	
ResourceOrientation	<---	StrategicOrienta	.625	.062	10.090	***	
InnovationOrientation	<---	StrategicOrienta	.740	.059	12.536	***	

Standardized Regression Weights: (Group number 1 - Demo)

			Estimate
LeadershipInvolv	<---	ImprovCapability	.854
ProcessManag	<---	ImprovCapability	.801
ContinousImprov	<---	ImprovCapability	.851
BusinessStratOrientation	<---	StrategicOrienta	.711
ResourceOrientation	<---	StrategicOrienta	.705
InnovationOrientation	<---	StrategicOrienta	.866

Intercepts: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
LeadershipInvolv	4.927	.093	52.979	***	
ProcessManag	4.518	.092	49.317	***	
ContinousImprov	4.783	.083	57.570	***	
BusinessStratOrientation	3.467	.059	58.711	***	
ResourceOrientation	3.653	.063	57.727	***	
InnovationOrientation	3.492	.061	57.218	***	

Variances: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
ImprovCapability	1.000				
StrategicOrienta	1.000				
e6	.445	.080	5.587	***	
e5	.572	.081	7.073	***	
e4	.362	.064	5.694	***	
e3	.338	.047	7.247	***	
e2	.395	.054	7.364	***	
e1	.183	.054	3.415	***	

Squared Multiple Correlations: (Group number 1 - Demo)

	Estimate
InnovationOrientation	.750
ResourceOrientation	.497
BusinessStratOrientation	.506
ContinousImprov	.724
ProcessManag	.641
LeadershipInvolv	.729

MODEL 3: CFA and Results for Cost, Quality, Delivery, and Flexibility Competitive Priorities

Computation of degrees of freedom (Demo)

Number of distinct sample moments:	65
Number of distinct parameters to be estimated:	36
Degrees of freedom (65 - 36):	29

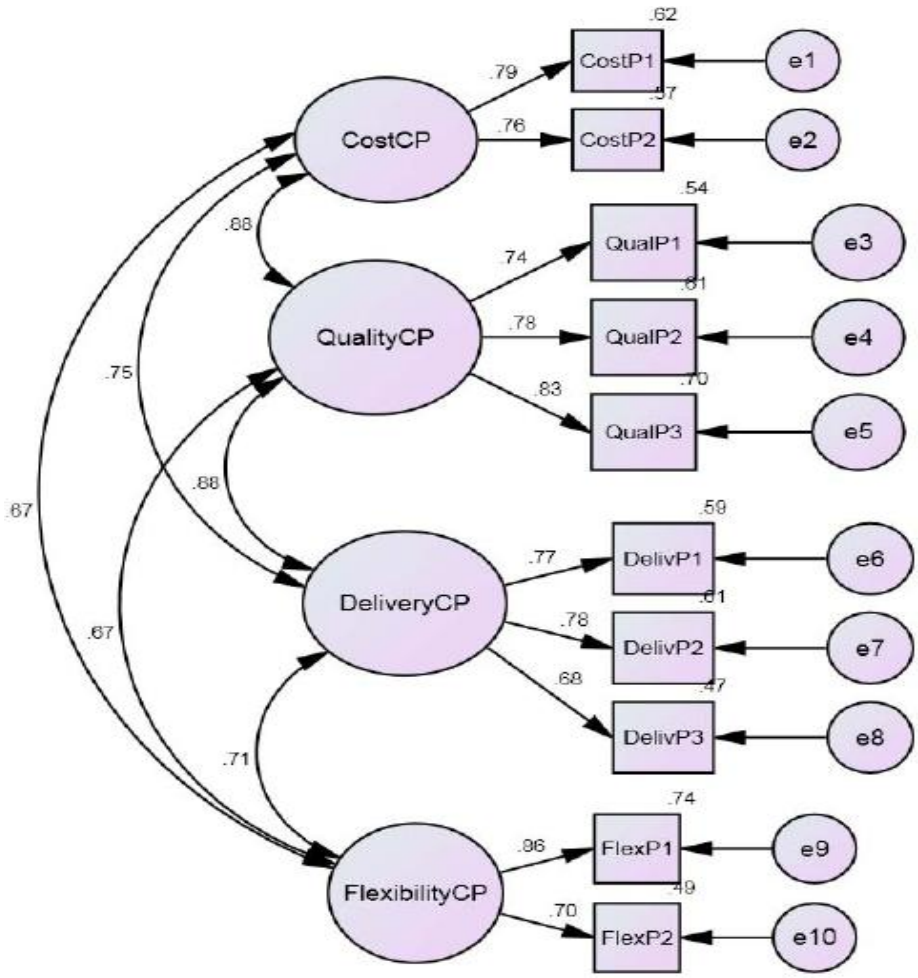
Result (Demo)

Minimum was achieved

Chi-square = 57.192

Degrees of freedom = 29

Probability level = .001



Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Demo	36	57.192	29	.001	1.972
Saturated model	65	.000	0		
Independence model	10	989.547	55	.000	17.992

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Demo	.942	.890	.971	.943	.970
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Demo	.527	.497	.511
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Demo	28.192	10.485	53.680
Saturated model	.000	.000	.000
Independence model	934.547	836.178	1040.329

FMIN

Model	FMIN	F0	LO 90	HI 90
Demo	.292	.144	.053	.274
Saturated model	.000	.000	.000	.000
Independence model	5.049	4.768	4.266	5.308

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Demo	.070	.043	.097	.103
Independence model	.294	.279	.311	.000

AIC

Model	AIC	BCC	BIC	CAIC
Demo	129.192	133.473		
Saturated model	130.000	137.730		
Independence model	1009.547	1010.736		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Demo	.659	.569	.789	.681
Saturated model	.663	.663	.663	.703
Independence model	5.151	4.649	5.690	5.157

HOELTER

Model	HOELTER .05	HOELTER .01
Demo	146	170
Independence model	15	17

Estimates (Group number 1 - Demo): Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
X44 <--- CostCP	.775	.069	11.311	***	
X43 <--- CostCP	.826	.070	11.839	***	
X52 <--- FlexibilityCP	.673	.068	9.869	***	

			Estimate	S.E.	C.R.	P	Label
X51	<---	FlexibilityCP	.801	.066	12.207	***	
X50	<---	DeliveryCP	.704	.069	10.189	***	
X49	<---	DeliveryCP	.817	.067	12.256	***	
X48	<---	DeliveryCP	.815	.069	11.878	***	
X47	<---	QualityCP	.866	.063	13.755	***	
X46	<---	QualityCP	.787	.063	12.510	***	
X45	<---	QualityCP	.753	.066	11.459	***	

Standardized Regression Weights: (Group number 1 - Demo)

			Estimate
X44	<---	CostCP	.758
X43	<---	CostCP	.785
X52	<---	FlexibilityCP	.699
X51	<---	FlexibilityCP	.862
X50	<---	DeliveryCP	.683
X49	<---	DeliveryCP	.784
X48	<---	DeliveryCP	.766
X47	<---	QualityCP	.834
X46	<---	QualityCP	.782
X45	<---	QualityCP	.736

Intercepts: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
X44	3.721	.073	50.691	***	
X43	3.764	.075	50.051	***	
X52	3.756	.069	54.667	***	
X51	3.690	.066	55.598	***	
X50	3.817	.074	51.833	***	
X49	4.020	.074	54.013	***	
X48	3.919	.076	51.600	***	
X47	3.944	.074	53.181	***	
X46	3.891	.072	54.102	***	
X45	3.878	.073	52.892	***	

Covariances: (Group number 1 - Demo)

			Estimate	S.E.	C.R.	P	Label
QualityCP	<-->	CostCP	.885	.042	20.876	***	
CostCP	<-->	DeliveryCP	.747	.057	13.037	***	
CostCP	<-->	FlexibilityCP	.668	.067	10.039	***	
QualityCP	<-->	DeliveryCP	.876	.037	23.372	***	
QualityCP	<-->	FlexibilityCP	.673	.060	11.247	***	
FlexibilityCP	<-->	DeliveryCP	.705	.060	11.826	***	

Correlations: (Group number 1 - Demo)

			Estimate
QualityCP	<-->	CostCP	.885
CostCP	<-->	DeliveryCP	.747

			Estimate
CostCP	<-->	FlexibilityCP	.668
QualityCP	<-->	DeliveryCP	.876
QualityCP	<-->	FlexibilityCP	.673
FlexibilityCP	<-->	DeliveryCP	.705

Variances: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
CostCP	1.000				
QualityCP	1.000				
DeliveryCP	1.000				
FlexibilityCP	1.000				
e2	.444	.064	6.973	***	
e1	.424	.067	6.369	***	
e10	.473	.065	7.259	***	
e9	.222	.067	3.339	***	
e8	.567	.067	8.453	***	
e7	.418	.058	7.170	***	
e6	.467	.062	7.488	***	
e5	.328	.047	6.930	***	
e4	.393	.050	7.896	***	
e3	.480	.057	8.393	***	

Squared Multiple Correlations: (Group number 1 - Demo)

	Estimate
X45	.542
X46	.612
X47	.696
X48	.587
X49	.615
X50	.466
X51	.742
X52	.489
X43	.617
X44	.575

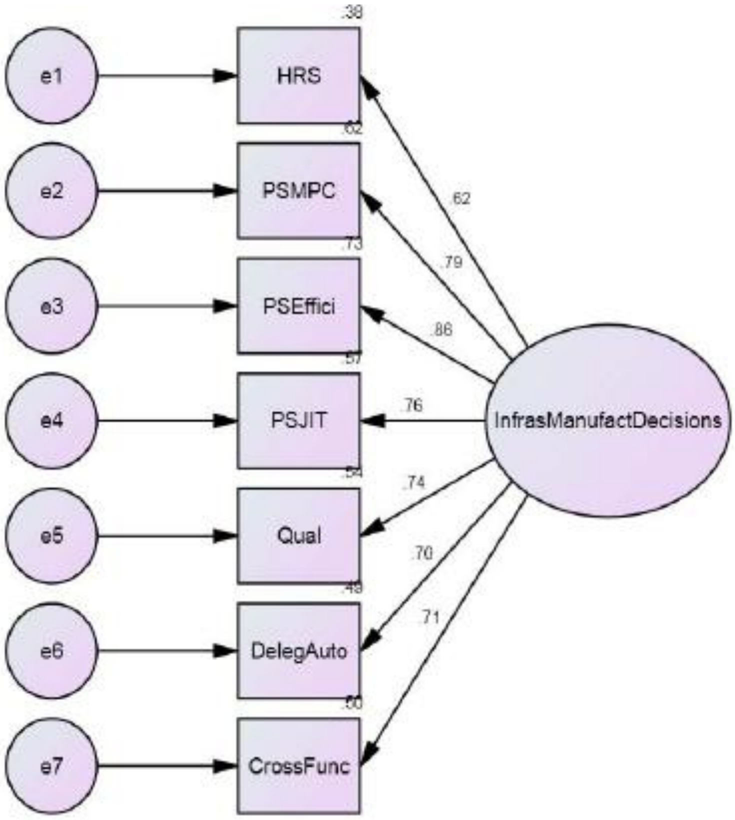
MODEL 4: CFA and Results for Infrastructural Manufacturing Decisions

Computation of degrees of freedom (Demo)

Number of distinct sample moments: 35
Number of distinct parameters to be estimated: 21
Degrees of freedom (35 - 21): 14

Result (Demo)

Minimum was achieved
Chi-square = 30.804
Degrees of freedom = 14
Probability level = .006



Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Demo	21	30.804	14	.006	2.200
Saturated model	35	.000	0		
Independence model	7	687.727	28	.000	24.562

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Demo	.955	.910	.975	.949	.975
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Demo	.500	.478	.487
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Demo	16.804	4.469	36.856
Saturated model	.000	.000	.000
Independence model	659.727	578.008	748.863

FMIN

Model	FMIN	F0	LO 90	HI 90
Demo	.157	.086	.023	.188
Saturated model	.000	.000	.000	.000
Independence model	3.509	3.366	2.949	3.821

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Demo	.078	.040	.116	.100
Independence model	.347	.325	.369	.000

AIC

Model	AIC	BCC	BIC	CAIC
Demo	72.804	74.591		
Saturated model	70.000	72.979		
Independence model	701.727	702.323		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Demo	.371	.309	.474	.381
Saturated model	.357	.357	.357	.372
Independence model	3.580	3.163	4.035	3.583

HOELTER

Model	HOELTER .05	HOELTER .01
Demo	151	186
Independence model	12	14

Estimates (Group number 1 - Demo)

Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Demo)

			Estimate	S.E.	C.R.	P	Label
PlanningJIT	<---	InfrasManufactDecisions	.859	.072	11.934	***	
PlanningEfficiency	<---	InfrasManufactDecisions	.984	.068	14.460	***	
PlanningMPC	<---	InfrasManufactDecisions	.876	.069	12.775	***	
HRS	<---	InfrasManufactDecisions	.641	.069	9.222	***	

			Estimate	S.E.	C.R.	P	Label
QualityInfrastDescision	<---	InfrasManufactDecisions	.920	.080	11.458	***	
DelegationofAuthority	<---	InfrasManufactDecisions	.867	.081	10.703	***	
CrossFunctiTraining	<---	InfrasManufactDecisions	.774	.071	10.845	***	

Standardized Regression Weights: (Group number 1 - Demo)

			Estimate
PlanningJIT	<---	InfrasManufactDecisions	.756
PlanningEfficiency	<---	InfrasManufactDecisions	.855
PlanningMPC	<---	InfrasManufactDecisions	.788
HRS	<---	InfrasManufactDecisions	.619
QualityInfrastDescision	<---	InfrasManufactDecisions	.736
DelegationofAuthority	<---	InfrasManufactDecisions	.700
CrossFunctiTraining	<---	InfrasManufactDecisions	.707

Intercepts: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
PlanningJIT	4.552	.082	55.770	***	
PlanningEfficiency	4.780	.082	58.168	***	
PlanningMPC	4.693	.079	59.083	***	
HRS	4.575	.074	61.875	***	
QualityInfrastDescision	5.097	.090	56.617	***	
DelegationofAuthority	4.834	.089	54.172	***	
CrossFunctiTraining	4.662	.079	59.131	***	

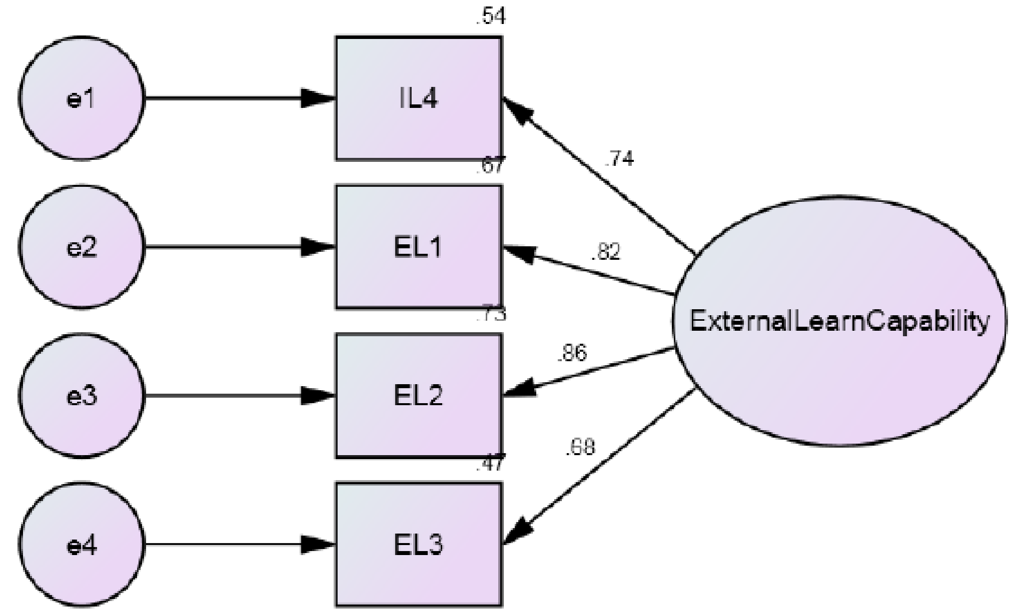
Variances: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
InfrasManufactDecisions	1.000				
e4	.551	.066	8.365	***	
e3	.355	.051	6.928	***	
e2	.468	.058	8.105	***	
e1	.661	.072	9.229	***	
e5	.716	.084	8.510	***	
e6	.781	.089	8.742	***	
e7	.598	.069	8.702	***	

Squared Multiple Correlations: (Group number 1 - Demo)

	Estimate
CrossFunctiTraining	.500
DelegationofAuthority	.491
QualityInfrastDescision	.542
HRS	.383
PlanningMPC	.621
PlanningEfficiency	.731
PlanningJIT	.572

MODEL 5: CFA and Results for External Learning Capability



Notes for Model (Demo)

Computation of degrees of freedom (Demo)

Number of distinct sample moments: 14
Number of distinct parameters to be estimated: 12
Degrees of freedom (14 - 12): 2

Result (Demo)

Minimum was achieved
Chi-square = 2.222
Degrees of freedom = 2
Probability level = .329

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Demo	12	2.222	2	.329	1.111
Saturated model	14	.000	0		
Independence model	4	336.694	10	.000	33.669

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Demo	.993	.967	.999	.997	.999
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Demo	.200	.199	.200
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Demo	.222	.000	8.336
Saturated model	.000	.000	.000
Independence model	326.694	270.442	390.365

FMIN

Model	FMIN	F0	LO 90	HI 90
Demo	.011	.001	.000	.043
Saturated model	.000	.000	.000	.000
Independence model	1.718	1.667	1.380	1.992

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Demo	.024	.000	.146	.490
Independence model	.408	.371	.446	.000

AIC

Model	AIC	BCC	BIC	CAIC
Demo	26.222	26.850		
Saturated model	28.000	28.733		
Independence model	344.694	344.904		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Demo	.134	.133	.175	.137
Saturated model	.143	.143	.143	.147
Independence model	1.759	1.472	2.083	1.760

HOELTER

Model	HOELTER .05	HOELTER .01
Demo	529	813
Independence model	11	14

Estimates (Group number 1 - Demo): Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Demo)

			Estimate	S.E.	C.R.	P	Label
X113	<---	ExternalLearnCapability	1.024	.102	10.076	***	
X112	<---	ExternalLearnCapability	1.272	.093	13.706	***	
X111	<---	ExternalLearnCapability	1.211	.095	12.806	***	
X110	<---	ExternalLearnCapability	1.071	.096	11.175	***	

Standardized Regression Weights: (Group number 1 - Demo)

			Estimate
X113	<---	ExternalLearnCapability	.683
X112	<---	ExternalLearnCapability	.857
X111	<---	ExternalLearnCapability	.819
X110	<---	ExternalLearnCapability	.738

Intercepts: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
X113	4.862	.109	44.642	***	
X112	4.919	.108	45.585	***	
X111	4.858	.108	45.051	***	
X110	4.679	.105	44.370	***	

Variances: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
ExternalLearnCapability	1.000				
e4	1.199	.143	8.414	***	
e3	.586	.107	5.462	***	
e2	.718	.111	6.452	***	
e1	.960	.121	7.904	***	

Squared Multiple Correlations: (Group number 1 - Demo)

	Estimate
X110	.545
X111	.671
X112	.734
X113	.466

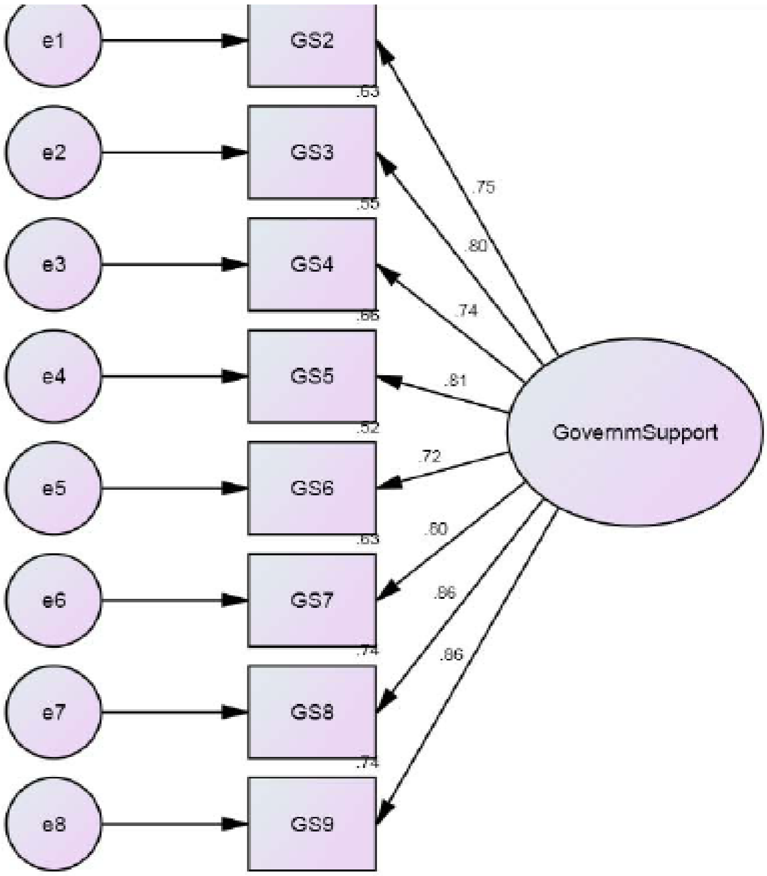
MODEL 6: CFA and Results for Government Support

Computation of degrees of freedom (Demo)

Number of distinct sample moments: 44
Number of distinct parameters to be estimated: 24
Degrees of freedom (44 - 24): 20

Result (Demo)

Minimum was achieved
Chi-square = 35.627
Degrees of freedom = 20
Probability level = .017



Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Demo	24	35.627	20	.017	1.781
Saturated model	44	.000	0		
Independence model	8	1063.603	36	.000	29.545

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Demo	.967	.940	.985	.973	.985
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Demo	.556	.537	.547
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90

Model	NCP	LO 90	HI 90
Demo	15.627	2.756	36.324
Saturated model	.000	.000	.000
Independence model	1027.603	924.885	1137.716

FMIN

Model	FMIN	F0	LO 90	HI 90
Demo	.182	.080	.014	.185
Saturated model	.000	.000	.000	.000
Independence model	5.427	5.243	4.719	5.805

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Demo	.063	.027	.096	.239
Independence model	.382	.362	.402	.000

AIC

Model	AIC	BCC	BIC	CAIC
Demo	83.627	85.938		
Saturated model	88.000	92.235		
Independence model	1079.603	1080.373		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Demo	.427	.361	.532	.438
Saturated model	.449	.449	.449	.471
Independence model	5.508	4.984	6.070	5.512

HOELTER

Model	HOELTER .05	HOELTER .01
Demo	173	207
Independence model	10	11

Estimates (Group number 1 - Demo): Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Demo)

			Estimate	S.E.	C.R.	P	Label
X30	<---	GovernmSupport	.949	.070	13.521	***	
X29	<---	GovernmSupport	.953	.080	11.858	***	
X28	<---	GovernmSupport	.925	.071	13.065	***	
X27	<---	GovernmSupport	.912	.076	12.050	***	
X31	<---	GovernmSupport	.861	.076	11.395	***	
X32	<---	GovernmSupport	1.023	.078	13.070	***	
X33	<---	GovernmSupport	1.064	.072	14.778	***	
X34	<---	GovernmSupport	1.101	.074	14.777	***	

Standardized Regression Weights: (Group number 1 - Demo)

			Estimate
X30	<---	GovernmSupport	.812
X29	<---	GovernmSupport	.742
X28	<---	GovernmSupport	.796
X27	<---	GovernmSupport	.752
X31	<---	GovernmSupport	.723
X32	<---	GovernmSupport	.795
X33	<---	GovernmSupport	.860
X34	<---	GovernmSupport	.860

Intercepts: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
X30	2.949	.084	35.167	***	
X29	2.728	.092	29.635	***	
X28	3.039	.084	36.352	***	
X27	3.060	.087	35.114	***	
X31	3.021	.086	35.274	***	
X32	3.061	.092	33.133	***	
X33	2.970	.089	33.455	***	
X34	2.960	.092	32.218	***	

Variances: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
GovernmSupport	1.000				
e4	.467	.055	8.519	***	
e3	.741	.082	9.008	***	
e2	.495	.058	8.605	***	
e1	.638	.072	8.909	***	
e5	.677	.075	9.044	***	
e6	.607	.070	8.622	***	
e7	.397	.050	7.857	***	
e8	.428	.054	7.888	***	

Squared Multiple Correlations: (Group number 1 - Demo)

	Estimate
X34	.739
X33	.740
X32	.633
X31	.523
X27	.566
X28	.634
X29	.551
X30	.659

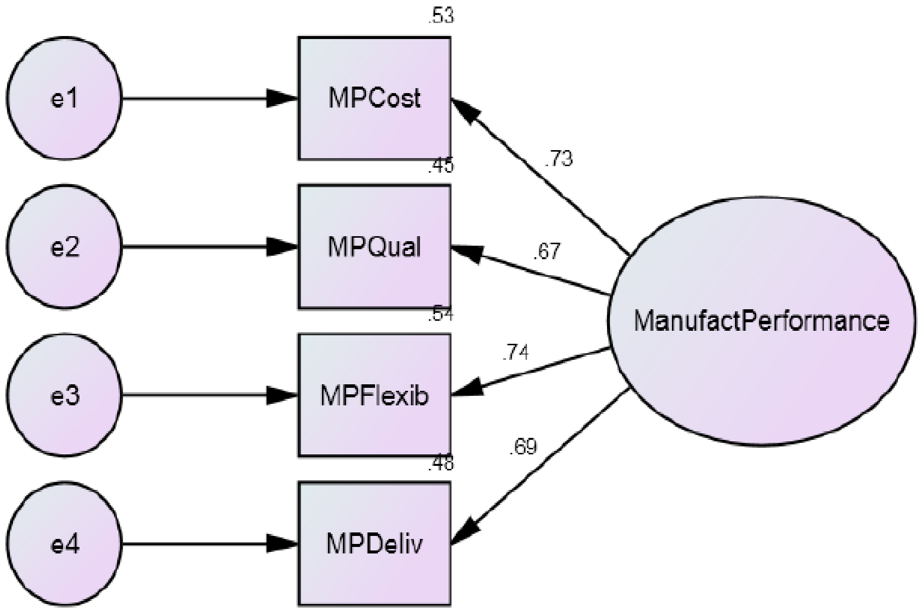
MODEL 7: CFA and Results for Manufacturing Performance

Computation of degrees of freedom (Demo)

Number of distinct sample moments: 14
Number of distinct parameters to be estimated: 12
Degrees of freedom (14 - 12): 2

Result (Demo)

Minimum was achieved
Chi-square = 1.017
Degrees of freedom = 2
Probability level = .601



Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Demo	12	1.017	2	.601	.509
Saturated model	14	.000	0		
Independence model	8	230.432	6	.000	38.405

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Demo	.996	.987	1.004	1.013	1.000
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Demo	.333	.332	.333
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Demo	.000	.000	5.286
Saturated model	.000	.000	.000
Independence model	224.432	178.474	277.809

FMIN

Model	FMIN	F0	LO 90	HI 90
Demo	.005	.000	.000	.027
Saturated model	.000	.000	.000	.000
Independence model	1.176	1.145	.911	1.417

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Demo	.000	.000	.116	.727
Independence model	.437	.390	.486	.000

AIC

Model	AIC	BCC	BIC	CAIC
Demo	25.017	25.646		
Saturated model	28.000	28.733		
Independence model	246.432	246.851		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Demo	.128	.133	.160	.131
Saturated model	.143	.143	.143	.147
Independence model	1.257	1.023	1.530	1.259

HOELTER

Model	HOELTER .05	HOELTER .01
Demo	1155	1775
Independence model	11	15

Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Demo)

			Estimate	S.E.	C.R.	P	Label
MPDelivery	<---	ManufactPerformance	.630	.064	9.907	***	
MPFlexibility	<---	ManufactPerformance	.559	.053	10.635	***	
MPQuality	<---	ManufactPerformance	.575	.060	9.511	***	
MPCost	<---	ManufactPerformance	.506	.048	10.499	***	

Standardized Regression Weights: (Group number 1 - Demo)

			Estimate
MPDelivery	<---	ManufactPerformance	.694
MPFlexibility	<---	ManufactPerformance	.736
MPQuality	<---	ManufactPerformance	.671
MPCost	<---	ManufactPerformance	.728

Intercepts: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
MPDelivery	3.805	.065	58.696	***	
MPFlexibility	3.718	.054	68.547	***	
MPQuality	3.756	.061	61.445	***	
MPCost	3.467	.050	69.802	***	

Variances: (Group number 1 - Demo)

	Estimate	S.E.	C.R.	P	Label
ManufactPerformance	1.000				
e4	.427	.057	7.528	***	
e3	.264	.038	6.868	***	
e2	.402	.051	7.816	***	
e1	.227	.032	7.005	***	

Squared Multiple Correlations: (Group number 1 - Demo)

	Estimate
MPCost	.530
MPQuality	.451
MPFlexibility	.542
MPDelivery	.482

APPENDIX 13: INTERSCALE CORRELATIONS

The results about correlation between each construct as well as AVISC are presented below:

Delivery

			Estimate	Correl.
1	DelivP	<-->	CostP	0.75
2	QualiP	<-->	DelivP	0.88
3	FlexP	<-->	DelivP	0.71
4	EnvDyn	<-->	DelivP	0.2
5	SMDec	<-->	DelivP	0.24
6	IMD	<-->	DelivP	0.54
7	MP	<-->	DelivP	0.18
8	ImpCap	<-->	DelivP	0.6
9	GovSupport	<-->	DelivP	-0.06
10	SO	<-->	DelivP	0.05
11	LP	<-->	DelivP	0.01
12	ExtLearn	<-->	DelivP	0.52
	Average			**0.39**

Quality

1	QualiP	<-->	DelivP	0.88
2	QualiP	<-->	CostP	0.88
3	QualiP	<-->	IMD	0.57
4	QualiP	<-->	LP	0.12
5	QualiP	<-->	SMDec	0.25
6	QualiP	<-->	ExtLearn	0.53
7	QualiP	<-->	ImpCap	0.58
8	QualiP	<-->	SO	0.13
9	QualiP	<-->	GovSupport	-0.02
10	EnvDyn	<-->	QualiP	0.26
11	MP	<-->	QualiP	0.32
12	FlexP	<-->	QualiP	0.68
	Average			**0.43**

Cost

1	DelivP	<-->	CostP	0.75
2	QualiP	<-->	CostP	0.88
3	FlexP	<-->	CostP	0.68
4	EnvDyn	<-->	CostP	0.23
5	SMDec	<-->	CostP	0.21
6	IMD	<-->	CostP	0.56
7	MP	<-->	CostP	0.39
8	ImpCap	<-->	CostP	0.64
9	GovSupport	<-->	CostP	0.16
10	SO	<-->	CostP	0.19
11	LP	<-->	CostP	0.16
12	ExtLearn	<-->	CostP	0.58
	Average			**0.45**

Flebility

1	FlexP	<-->	CostP	0.68
2	FlexP	<-->	DelivP	0.71

3	FlexP	<-->	QualiP	0.68
4	FlexP	<-->	EnvDyn	0.21
5	FlexP	<-->	MP	0.34
6	FlexP	<-->	SO	0.22
7	FlexP	<-->	ExtLearn	0.38
8	FlexP	<-->	ImpCap	0.5
9	FlexP	<-->	IMD	0.48
10	FlexP	<-->	LP	0.08
11	FlexP	<-->	GovSupport	0.14
12	FlexP	<-->	SMDec	0.49
	Average			**0.41**

EnvDyn

1	EnvDyn	<-->	DelivP	0.20
2	EnvDyn	<-->	CostP	0.23
3	EnvDyn	<-->	QualiP	0.26
4	EnvDyn	<-->	SO	0.65
5	EnvDyn	<-->	GovSupport	0.21
6	EnvDyn	<-->	ExtLearn	0.12
7	EnvDyn	<-->	SMDec	0.22
8	EnvDyn	<-->	IMD	0.33
9	EnvDyn	<-->	LP	0.05
10	EnvDyn	<-->	ImpCap	0.22
11	FlexP	<-->	EnvDyn	0.21
12	MP	<-->	EnvDyn	0.42
	Average			**0.26**

SMDec

1	SMDec	<-->	IMD	0.71
2	SMDec	<-->	LP	0.09
3	SMDec	<-->	CostP	0.21
4	SMDec	<-->	ImpCap	0.46
5	SMDec	<-->	ExtLearn	0.24
6	SMDec	<-->	DelivP	0.24
7	FlexP	<-->	IMD	0.48
8	QualiP	<-->	SMDec	0.25
9	EnvDyn	<-->	SMDec	0.22
10	MP	<-->	SMDec	0.32
11	GovSupport	<-->	SMDec	0.26
12	SO	<-->	SMDec	0.34
	Average			**0.32**

IMD

1	IMD	<-->	LP	0.11
2	IMD	<-->	CostP	0.56
3	IMD	<-->	ImpCap	0.83
4	IMD	<-->	ExtLearn	0.67
5	IMD	<-->	DelivP	0.54
6	QualiP	<-->	IMD	0.57
7	FlexP	<-->	IMD	0.48
8	EnvDyn	<-->	IMD	0.33

9	SMDec	<-->	IMD	0.71
10	MP	<-->	IMD	0.34
11	GovSupport	<-->	IMD	0.14
12	SO	<-->	IMD	0.34
	Average			**0.47**

MP

1	MP	<-->	SMDec	0.32
2	MP	<-->	IMD	0.34
3	MP	<-->	LP	0.13
4	MP	<-->	ExtLearn	0.26
5	MP	<-->	ImpCap	0.3
6	MP	<-->	GovSupport	0.27
7	MP	<-->	QualiP	0.32
8	MP	<-->	DelivP	0.18
9	MP	<-->	CostP	0.39
10	MP	<-->	EnvDyn	0.42
11	MP	<-->	SO	0.58
12	FlexP	<-->	MP	0.34
	Average			**0.32**

ImpCap

1	ImpCap	<-->	ExtLearn	0.87
2	ImpCap	<-->	CostP	0.64
3	ImpCap	<-->	LP	0.02
4	ImpCap	<-->	DelivP	0.60
5	QualiP	<-->	ImpCap	0.58
6	FlexP	<-->	ImpCap	0.50
7	EnvDyn	<-->	ImpCap	0.22
8	SMDec	<-->	ImpCap	0.46
9	IMD	<-->	ImpCap	0.83
10	MP	<-->	ImpCap	0.30
11	GovSupport	<-->	ImpCap	-0.01
12	SO	<-->	ImpCap	0.22
	Average			**0.44**

GovSupport

1	GovSupport	<-->	ImpCap	-0.01
2	GovSupport	<-->	ExtLearn	0.02
3	GovSupport	<-->	LP	0.18
4	GovSupport	<-->	IMD	0.14
5	GovSupport	<-->	SMDec	0.26
6	GovSupport	<-->	DelivP	-0.06
7	GovSupport	<-->	CostP	0.16
8	QualiP	<-->	GovSupport	-0.02
9	FlexP	<-->	GovSupport	0.14
10	EnvDyn	<-->	GovSupport	0.21
11	MP	<-->	GovSupport	0.27
12	SO	<-->	GovSupport	0.29
	Average			**0.13**

SO

1	SO	<-->	GovSupport	0.29
2	SO	<-->	ImpCap	0.22
3	SO	<-->	LP	0.13
4	SO	<-->	IMD	0.34
5	SO	<-->	SMDec	0.34
6	SO	<-->	ExtLearn	0.13
7	SO	<-->	DelivP	0.05
8	SO	<-->	CostP	0.19
9	QualiP	<-->	SO	0.13
10	FlexP	<-->	SO	0.22
11	MP	<-->	SO	0.58
12	EnvDyn	<-->	SO	0.65
	Average			**0.27**

LP

1	LP	<-->	CostP	0.16
2	LP	<-->	ExtLearn	0.14
3	LP	<-->	DelivP	0.01
4	QualiP	<-->	LP	0.12
5	FlexP	<-->	LP	0.08
6	EnvDyn	<-->	LP	0.05
7	SMDec	<-->	LP	0.09
8	IMD	<-->	LP	0.11
9	MP	<-->	LP	0.13
10	ImpCap	<-->	LP	0.02
11	GovSupport	<-->	LP	0.18
12	SO	<-->	LP	0.13
	Average			**0.10**

ExtLearn

1	ExtLearn	<-->	CostP	0.58
2	ExtLearn	<-->	DelivP	0.52
3	QualiP	<-->	ExtLearn	0.53
4	FlexP	<-->	ExtLearn	0.38
5	EnvDyn	<-->	ExtLearn	0.12
6	SMDec	<-->	ExtLearn	0.24
7	IMD	<-->	ExtLearn	0.67
8	MP	<-->	ExtLearn	0.26
9	ImpCap	<-->	ExtLearn	0.87
10	GovSupport	<-->	ExtLearn	0.02
11	SO	<-->	ExtLearn	0.13
12	LP	<-->	ExtLearn	0.14
	Average			**0.37**

Source: *Own Study (2013)*

APPENDIX 14: MEAN, STD. DEVIATION, AND CORRELATIONS

No.	Items	Mean	Std.	1	2	3	4	5	6	7	8	9	10	11	12	13
1	ED2	3.2	1.03	1												
2	ED3	3.3	1.10	.642**	1											
3	ED4	3.5	1.09	.624**	.622**	1										
4	GS2	3.0	1.21	.179*	.170*	.200**	1									
5	GS3	3.0	1.16	.094	.045	.074	.649**	1								
6	GS4	2.7	1.29	.048	.011	.067	.610**	.618**	1							
7	GS5	2.9	1.17	.063	.045	.112	.606**	.613**	.650**	1						
8	GS6	3.0	1.20	.193**	.087	.238**	.544**	.596**	.546**	.573**	1					
9	GS7	3.1	1.29	.123	.119	.111	.596**	.574**	.559**	.664**	.600**	1				
10	GS8	3.0	1.23	.174*	.168*	.168*	.611**	.673**	.582**	.689**	.632**	.721**	1			
11	GS9	2.9	1.28	.165*	.142*	.219**	.624**	.693**	.612**	.691**	.587**	.671**	.773**	1		
12	CostP	3.8	1.06	.191**	.157*	.213**	.111	.030	-.033	.030	.188**	.168*	.103	.071	1	
13	CostP	3.7	1.03	.100	.075	.118	.114	.043	-.053	-.032	.182*	.183*	.176*	.138	.598**	1
14	Quality	3.9	1.03	.164*	.161*	.228**	.086	.031	-.011	-.063	.121	.078	.088	.067	.563**	.529**
15	Quality	3.9	1.01	.153*	.187**	.138	.000	-.024	-.046	-.124	.068	.009	.031	.000	.528**	.528**
16	Quality	3.9	1.04	.131	.192**	.203**	-.069	-.138	-.170*	-.190**	.060	.010	-.010	-.093	.561**	.562**
17	Deliver	3.9	1.07	.070	.068	.107	-.070	-.151*	-.216**	-.224**	-.031	-.062	-.096	-.118	.462**	.417**
18	Deliver	4.0	1.04	.135	.166*	.160*	.011	-.110	-.103	-.144*	.080	-.044	-.024	-.050	.515**	.433**
19	Deliver	3.8	1.03	.117	.104	.235**	.069	-.009	.032	-.060	.134	.093	.071	.071	.347**	.419**
20	Flexibil	3.7	0.93	.076	.094	.146*	.119	.022	.029	-.006	.044	.096	.097	.121	.468**	.423**
21	Flexibil	3.8	0.96	.132	.212**	.214**	.076	.057	.039	.006	.132	.085	.100	.137	.371**	.349**
22	Innov	3.5	0.86	.545**	.429**	.363**	.272**	.175*	.184**	.168*	.180*	.192**	.223**	.179*	.109	.071
23	ResoO	3.7	0.89	.435**	.323**	.248**	.239**	.115	.093	.106	.143*	.193**	.097	.074	.204**	.123
24	BuStr	3.5	0.83	.428**	.362**	.337**	.303**	.217**	.273**	.187**	.200**	.186**	.216**	.222**	.090	.092
25	Capaci	4.6	1.29	.080	.147*	.175*	.166*	.110	.039	.118	.112	.212**	.208**	.245**	.048	.227**
26	S&VI	4.4	1.23	.124	.164*	.164*	.134	.051	.026	.074	.056	.139	.133	.237**	.118	.240**
27	F&MT	4.2	1.43	.113	.126	.104	.166*	.132	.145*	.156*	.177*	.175*	.236**	.284**	-.011	.113
28	HRS	4.6	1.04	.043	.121	.111	.216**	.138	.093	.057	.226**	.189**	.177*	.167*	.374**	.447**
29	PSMP	4.7	1.11	.210**	.220**	.211**	.127	.059	.013	-.004	.107	.114	.128	.224**	.230**	.313**
30	PSEffi	4.8	1.15	.160*	.247**	.193**	.109	-.004	.043	.039	.127	.127	.112	.107	.309**	.497**
31	PSJIT	4.6	1.14	.240**	.258**	.242**	.113	.058	.045	.052	.132	.161*	.163*	.169*	.281**	.336**
32	Qual	5.1	1.25	.173*	.196**	.224**	.082	-.060	-.048	-.055	.132	.075	.050	.063	.332**	.458**
33	Deleg	4.8	1.24	.187*	.312**	.261**	.030	-.076	-.114	-.127	.057	.007	.021	-.003	.208**	.389**
34	Cross	4.7	1.10	.146*	.203**	.191**	.046	.059	-.043	-.069	.051	.129	.139	.133	.138	.294**
35	TOLea	3.5	0.61	.003	.025	.092	.161*	.177*	.046	.086	.152*	.129	.141	.142*	.132	.121
36	ROLea	3.4	0.63	.011	.023	.080	.203**	.190**	.115	.120	.169*	.124	.151*	.172*	.091	.076
37	COLea	3.4	0.62	.047	.025	.096	.176*	.164*	.092	.113	.158*	.156*	.158*	.196**	.134	.155*
38	CI	4.8	1.15	.143*	.169*	.150*	.069	-.036	-.060	-.085	.052	.035	.066	.000	.424**	.453**
39	PM	4.5	1.27	.168*	.186*	.105	.049	-.030	-.063	-.093	.051	.084	.035	.048	.286**	.373**
40	LIQ	4.9	1.29	.177*	.182*	.166*	.067	-.047	-.093	-.080	.011	.020	.027	.003	.432**	.489**
41	IL4	4.7	1.46	.048	.068	.062	.022	.073	.042	-.015	.064	.105	.111	.088	.326**	.411**
42	EL1	4.9	1.48	.051	.067	.060	.045	.061	.059	-.004	.063	.095	.116	.058	.330**	.383**
43	EL2	4.9	1.49	.091	.119	.113	.025	.025	-.044	-.071	.067	-.011	.058	-.007	.307**	.405**
44	EL3	4.9	1.50	.143	.082	-.023	-.010	-.120	-.088	-.106	.021	-.047	-.044	-.126	.319**	.328**
45	MPCo	3.5	0.70	.272**	.291**	.267**	.223**	.205**	.171*	.170*	.124	.116	.213**	.207**	.225**	.160*
46	MPQu	3.8	0.86	.286**	.243**	.188**	.141	.027	.056	.114	.132	.059	.087	.049	.219**	.200**
47	MPFle	3.7	0.76	.236**	.248**	.194**	.224**	.202**	.132	.110	.114	.143*	.168*	.150*	.283**	.261**
48	MPDeli	3.8	0.91	.162*	.232**	.247**	.166*	.086	.089	.188**	.159*	.120	.179*	.093	.173*	.164*

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix 14 … continued

14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1																
.643**	1															
.586**	.642**	1														
.422**	.487**	.607**	1													
.423**	.561**	.625**	.634**	1												
.434**	.438**	.536**	.510**	.500**	1											
.481**	.476**	.429**	.442**	.436**	.518**	1										
.364**	.346**	.418**	.348**	.334**	.452**	.603**	1									
.076	.033	-.010	-.056	-.048	-.015	.052	.133	1								
.230**	.162*	.121	.116	.057	.151*	.137	.107	.610**	1							
.075	.080	.096	.111	.071	.066	.164*	.256**	.616**	.501**	1						
.160*	.154*	.157*	.176*	.144*	.212**	.198**	.331**	.148*	.204**	.234**	1					
.148*	.172*	.211**	.162*	.151*	.207**	.291**	.372**	.181*	.154*	.212**	.581**	1				
.023	.115	.096	.002	.076	.045	.216**	.296**	.254**	.097	.353**	.417**	.552**	1			
.369**	.363**	.421**	.348**	.400**	.260**	.324**	.268**	.041	.086	.108	.278**	.323**	.327**	1		
.262**	.314**	.258**	.204**	.272**	.189**	.231**	.229**	.287**	.264**	.262**	.354**	.478**	.507**	.464**	1	
.377**	.460**	.432**	.284**	.401**	.291**	.322**	.284**	.206**	.202**	.227**	.349**	.420**	.400**	.537**	.687**	1
.293**	.321**	.324**	.268**	.359**	.309**	.392**	.339**	.303**	.225**	.309**	.389**	.545**	.561**	.459**	.607**	.628**
.335**	.362**	.464**	.314**	.464**	.373**	.224**	.234**	.166*	.201**	.178*	.271**	.269**	.330**	.486**	.585**	.630**
.293**	.324**	.360**	.370**	.412**	.353**	.302**	.261**	.105	.149*	.162*	.352**	.229**	.154*	.416**	.502**	.630**
.179*	.238**	.251**	.263**	.196**	.264**	.301**	.321**	.123	.168*	.262**	.495**	.458**	.510**	.456**	.587**	.575**
.212**	.073	.091	.038	.004	.034	.078	.048	.104	.136	-.068	.105	.051	-.039	.159*	.048	.098
.147*	.037	.035	-.014	-.022	-.030	.062	.035	.148*	.158*	-.031	.111	.059	.036	.142*	.073	.097
.217**	.058	.068	.022	-.022	.033	.088	.052	.154*	.155*	-.025	.143*	.104	.031	.172*	.084	.114
.377**	.443**	.419**	.409**	.463**	.393**	.391**	.277**	.124	.162*	.119	.230**	.270**	.258**	.466**	.492**	.587**
.231**	.282**	.288**	.267**	.325**	.232**	.234**	.229**	.172*	.232**	.160*	.281**	.417**	.395**	.446**	.517**	.545**
.378**	.461**	.410**	.361**	.493**	.344**	.406**	.345**	.134	.175*	.185*	.218**	.323**	.297**	.449**	.485**	.623**
.340**	.321**	.237**	.246**	.310**	.250**	.252**	.158*	.113	.085	.083	.227**	.175*	.244**	.451**	.451**	.456**
.350**	.372**	.347**	.252**	.331**	.232**	.280**	.183*	.066	.053	.064	.080	.049	.124	.423**	.327**	.420**
.361**	.356**	.384**	.386**	.386**	.276**	.311**	.219**	.087	.089	.070	.190**	.157*	.268**	.466**	.419**	.464**
.214**	.299**	.306**	.318**	.444**	.271**	.193**	.109	.077	.094	.046	-.032	-.015	.093	.318**	.250**	.326**
.188**	.138	.170*	.081	.083	.093	.198**	.140	.391**	.306**	.334**	.142*	.162*	.208**	.177*	.110	.252**
.261**	.212**	.202**	.134	.136	.065	.192**	.107	.317**	.326**	.234**	.174*	.183*	.085	.170*	.231**	.308**
.199**	.134	.183*	.088	.129	.113	.272**	.205**	.343**	.317**	.258**	.128	.209**	.132	.158*	.115	.154*
.136	.133	.212**	.078	.090	.003	.145*	.195**	.323**	.238**	.264**	.138	.191**	.182*	.172*	.103	.253**

Appendix 14 … continued

31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
1																	
.586**	1																
.472**	.546**	1															
.597**	.428**	.551**	1														
.045	.067	.094	.007	1													
.047	.060	.041	.005	.936**	1												
.083	.098	.098	.061	.940**	.930**	1											
.535**	.581**	.536**	.488**	.007	-.031	.010	1										
.529**	.481**	.580**	.517**	.000	-.022	.046	.681**	1									
.525**	.554**	.584**	.519**	.039	.008	.038	.727**	.684**	1								
.361**	.420**	.490**	.390**	.150*	.117	.167*	.621**	.584**	.528**	1							
.324**	.410**	.414**	.262**	.130	.120	.113	.635**	.478**	.501**	.621**	1						
.390**	.551**	.539**	.392**	.151*	.108	.143	.695**	.529**	.551**	.639**	.695**	1					
.281**	.373**	.395**	.165*	-.037	-.077	-.056	.620**	.438**	.437**	.465**	.575**	.601**	1				
.248**	.112	.106	.188**	.071	.111	.097	.114	.080	.124	.102	.043	.136	.032	1			
.230**	.160*	.270**	.192**	.144*	.160*	.154*	.221**	.145*	.279**	.226**	.194**	.224**	.128	.504**	1		
.215**	.119	.113	.088	.011	.021	.021	.208**	.191**	.239**	.164*	.199**	.159*	.109	.520**	.500**	1	
.215**	.149*	.101	.163*	.104	.132	.127	.173*	.142	.198**	.095	.155*	.151*	.058	.511**	.442**	.524**	1

Source: *Own Study (2013)*

APPENDIX 15: DISTRIBUTION OF MANUFACTURING INDUSTRIES IN ADDIS ABABA

No	Categories of Manufacturing Industries	No. of Firms	%	Remark
1	Manufacture of Food Products and Beverages	219	25.03	
2	Manufacture of Tobacco	1	0.11	
3	Manufacture of Textiles	17.0	1.94	
4	Manufacture of Wearing Apparel, Except Fur Apparel	41.0	4.69	
5	Tanning and Dressing of Leather, Manufacture, of Luggage and Handbags, Manufacture of Footwear	69.0	7.89	
6	Manufacture of Wood and Products of Wood and Cork, Except Furniture	13	1.49	
7	Manufacture of Paper and Paper Products, Printing	94	10.74	
8	Manufacture of Chemicals and Chemical Products	55.0	6.29	
9	Manufacture of Rubber and Plastic Products	89	10.17	
10	Manufacture of Other Non-Metallic Mineral Products	95.0	10.86	
11	Manufacture of Basic Iron and Steel	7.0	0.80	
12	Manufacture of Fabricated Metal Products Except Machinery and Equipment	83.0	9.49	
13	Manufacture of Machinery and Equipment N.E.C	10.0	1.14	
14	Assembly of Motor Vehicles, Trailers and Semi-Trailers	4.0	0.46	
15	Manufacture of Furniture	78	8.91	
	Total	**875**	**100%**	

Source: *Ethiopia. CSA (2011)*