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Developing and Testing
Integrated Flexible Manufacturing Management Model

by

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Approval of the Institute of Social Sciences

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17.06.2017

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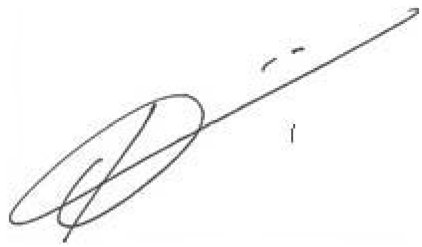
CLAIM FOR ORIGINALITY

This study comprised of three original features. The first one is the wide range of literature review that is made for all aspects of manufacturing flexibility. The second one is the developed model, which is made as Integrated Flexible Manufacturing Management Model (IFMMM). IFMMM is completely original and not mentioned in the literature. The third one is the case study based on IFMMM, which is also not available in the previous literature. These three features are explained as below:

1. **Literature Review:** The literature review presented in this study includes a comprehensive literature on manufacturing flexibility concept and indicates the lack of previous research on aspects of managing flexible manufacturing at all levels. There are a few researches on management of flexible manufacturing; however there were no study which covers all managerial aspects of flexible manufacturing within one concept.
2. **IFMMM (Integrated Manufacturing Model):** Integrated flexible manufacturing model is developed within this study. The model is developed upon body of research on flexible manufacturing and integrated management model. The model is unique in the research field and there is no similar research on flexible manufacturing literature.
3. **Case Study:** Case study is applied as in this research. Even though case study is a widely used research methodology in operations management, there is no case study research in the existing literature upon management of flexible manufacturing which includes all management levels based on integrated management model.

17.06.2017 **Orhan GÖÇER**



ÖZET

Bu araştırmanın amacı, entegre yönetim konsepti içerisinde, imalat şirketlerinin yönetim yetenekleri için bir çerçeve olarak Entegre Esnek İmalat Yönetimi Modeli (EEIYM)'ni geliştirmektir.

EEIYM iki konsept üzerine kurulmuştur. Bu iki konsept, Entegre Yönetim Modeli (Bleicher, 1999) ve imalat esnekliği konseptleridir. Entegre yönetim modeli, EEIYM'nin oluşturulmasında hem baz model olarak kullanılmış, hem de entegre yönetim modeli içerisinde bulunan yönetim yetenekleri, EEIYM'ye uyarlanmıştır. İmalat esnekliği boyutları, esneklik sağlayıcılar ve bunların arasındaki ilişkiler, entegre yönetim bağlamında incelenmiş ve seçilen esneklik boyutları ve esneklik sağlayıcıları, EEIYM'nin stratejik ve operatif seviyelerine yerleştirilmişlerdir.

Çalışmanın keşifsel doğası nedeniyle araştıma yöntemi olarak vaka çalışması kullanılmıştır. Türkiye'de, farklı sektörlerde faaliyet gösteren yedi imalat şirketi vaka çalışmalarında kullanılmak üzere seçilmiştir.

EEIYM'ye uygun olarak, hem vaka çalışmalarındaki yüz yüze mülakatlara bir akış sağlaması için hem de vaka içi anketlerde kullanılmak üzere bir soru formu hazırlanmıştır. Tüm şirketlerde üst düzey yöneticilerden bir temsilci ile yüz yüze mülakatlar yapılmış ve yedi şirketin ikisinde de firmanın beyaz yaka çalışanlarına yönelik anket çalışması yapılmıştır.

Çalışmanın sonuçları, tüm şirketlerde algılanan EEIYM bazlı yönetim yetenek seviyelerinde farklılıklar olduğunu göstermiştir. Her bir şirket için EEIYM bazlı yönetim yeteneklerini geliştirmek için özel odak alanları belirlenmiştir. Bunlara ek olarak her şirket için pazar değişkenliği algısı ve algılanan şirket performansı skorları da çalışma içerisinde sunulmuştur.

Sonuçlar, EEIYM'nin imalat şirkeleri için mevcut yönetim yetenek seviyelerini tesbit etmek için bir çerçeve ve olası geliştirmeler için de bir rehber olarak son derece kullanışlı bir model olduğunu göstermektedir.

Anahtar kelimeler: Esnek imalat, imalat esnekliği, entegre yönetim.

ABSTRACT

The purpose of this research is to develop Integrated Flexible Manufacturing Management Model (IFMMM) which provides a framework for management capabilities for manufacturing companies in an integrated management concept.

IFMMM is developed upon two concepts; Integrated Management Model (Bleicher, 1999) and manufacturing flexibility concept. Integrated management model is used as a basis for IFMMM and as well as the profiling elements of integrated management model are included in IFMMM. Manufacturing flexibility dimensions, flexibility enablers and as well as the interrelation between these dimensions and enablers are studied with an integrated management context. The selected flexibility dimensions and flexibility enablers are used as elements of strategic and operative levels of IFMMM.

Due to the exploratory nature of the research, case study is used as research method. Seven companies from Turkey, operating in different industries have been selected for case research. Based on IFMMM, a questionnaire has been developed to serve as a pattern for face-to-face interviews and as well as web based within company surveys. Interviews with members of top management have been done in each company and within two companies a white collar employee survey has been conducted.

The results of the study revealed that companies have different perceived IFMMM based management capabilities at all management levels for each studied company, which is compatible with the existing literature. For each company special focus areas identified to improve IFMMM based management capabilities. Perceived market dynamism and firm performance scores for each company are also presented in the research.

The results indicate that IFMMM provides a useful framework for determining current flexible manufacturing management capabilities of manufacturing companies and can be used as guidance for possible improvements.

Keywords: Flexible manufacturing, manufacturing flexibility, integrated management

DEDICATION

This dissertation is dedicated to my sons; Batuhan, Tolga and Attila, for being my latest teachers, I am always proud of being their father; my beloved wife Yeşim for her endless patience, guidance and support during this long journey; my parents Durmuş and Gülsüm for inspiring me to start my PhD study and lastly to the memory of passed away grandparents (Göçeroğlu) Bayram and Gülendam (Güllü) for being my first teachers.

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LIST OF ABBREVIATIONS

Abbreviation	**Explanation**
AMT	Advanced Management Technologies
FM	Flexible Manufacturing
FMS	Flexible Manufacturing Model
FP	Firm Performance
IFMMM	Integrated Flexible Manufacturing Model
IMM	Integrated Management Model
MF	Manufacturing Flexibility
MD	Market Dynamism
NB	Normative Behaviors
NG	Normative Goals
NS	Normative Structures
OB	Operative Behaviors
OG	Operative Goals
OS	Operative Structures
SB	Strategic Behaviors
SS	Strategic Structures
SG	Strategic Goals

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1 INTRODUCTION

This chapter provides the outlines of the research including background, purpose, scope and importance of the study and also management and research questions are included in this chapter. The structure of the thesis is presented at the end of the chapter.

1.1 Brief Background

Global competition, rapidly changing technology and shorter product life cycles make the current manufacturing environment extremely competitive (Koste and Malhotra, 1999). Researchers and managers agree that, traditional manufacturing approaches will not be enough to compete in such a competitive environment. Organizations must continuously develop new methods and perspectives to effectively manage their supply chains to meet changing market needs in a timely and cost effective fashion (Koste, 1999). Managers realize that intensification of competition and globalization means flexibility is essential for competition (Urtasun-Alonso, et al., 2014).

The competitive potential of manufacturing flexibility at the organizational level is widely recognized by managers (Cox, 1989). Flexibility is claimed to be the “next competitive battle” (De Meyer et al., 1989) even more important than cost and quality. The 1970s was the decade of productivity. In the 1980s, it was total quality management (TQM). The 1990s and 2000s belong to flexibility (Aggarwal, 1997). After the mass production era of Ford and lean management era of Toyota, these days are witnessing the era of flexibility (Genevois and Gurbuz, 2009). In a fast paced environment, characterized by short product life cycles and increasing product variety, manufacturing flexibility is emerging as a key competitive weapon. If an organization is flexible and possesses a set of strategic options, it can more effectively respond to dynamic environments (Sanchez, 1995). Manufacturing flexibility reflects the ability of firms to respond to changes in their customers’ needs, as well as to unanticipated changes stemming from competitive pressures (Ling-yee and Ogunmokun, 2008)

However, benefits of manufacturing flexibility, achieved by the organizations not only through the implementation of the technology but mostly through the managerial and organizational factors (Dempsey, 1983, cited in Slack (1988)). In that sense firms, who aimed to utilize manufacturing flexibility in their manufacturing systems, could not be managed as firms with mass production systems (Nemetz and Fry, 1988).

Therefore managers need to know how to manage manufacturing flexibility in order to utilize the investments done on their manufacturing systems, effectively. Despite, researches in the field of manufacturing flexibility did not concern about the management of manufacturing flexibility in all organizational levels yet.

Even manufacturing flexibility is defined in conjunction with environmental uncertainty by many researchers (Swamidass and Newell, 1987) the empirical researches on the field have mainly focused on investigating the response of the firm to the environmental uncertainty only on the operational level. However a comprehensive empirical research on the impacts of market dynamism, including environmental uncertainty, on management of firms with flexible manufacturing has not been conducted yet.

Therefore, there is a need for a comprehensive study in the field of manufacturing flexibility, which will both investigate how to manage manufacturing flexibility, in an integrated manner, in order to utilize manufacturing flexibility as a competitive tool.

1.2 Description of the Study

This research will attempt to come up with a comprehensive management model which covers all management levels to provide solutions to the problems regarding managing manufacturing flexibility.

1.2.1 Purpose of the study

The purpose of the study is to find out how the flexible manufacturing companies are being managed based on the perceptions of the managers and employees.

A conceptual model for the management of manufacturing flexibility is developed based on Integrated Management Model (Bleicher, 1999). The model which is proposed by this study is named as Integrated Flexible Manufacturing Management Model (IFMMM). The proposed IFMMM model is claimed to be a useful guide for managers of manufacturing companies at all levels to plan and act accordingly in order to utilize manufacturing flexibility properly to enhance firm performance.

The relationship between market dynamism, firm performance and management capabilities of manufacturing companies based Integrated Flexible Manufacturing Management Model is also analyzed within the study.

1.2.2 Scope of the Study

Scope of this research is to develop IFMMM (Integrated Flexible Manufacturing Management Model) based on the body of research on manufacturing flexibility and integrated management model, by merging the two concepts.

Additionally, the study investigates the impact of the market dynamism on the managerial capabilities and the relationship between the managerial capabilities and the business performance of the manufacturing organizations.

Adapted manufacturing flexibility dimensions are selected as the mostly cited manufacturing flexibility dimensions in a hierarchical manner. The other manufacturing flexibility dimensions excluded from this study.

1.2.3 Importance of the Study

The study is an important study for:

a. Researchers in the field of Management

The study is important for the researchers because it proposes a model which aims to be helpful in analyzing the management capabilities of firms with flexible manufacturing in an integrative manner and also the impact of market dynamics on the management capabilities of those firms.

Additionally, the study has a significant contribution to manufacturing flexibility literature. In their comprehensive study on manufacturing flexibility research of Mishra et al. (2014) list four broad group research questions for the proposed future agenda after reviewing existing body of research in the field of manufacturing flexibility as follows:

1. Relationship between manufacturing flexibility and other variables that affects manufacturing flexibility.
2. Impact of manufacturing flexibility on different aspects of firm performance.
3. Measurement thoughts in the area of manufacturing flexibility
4. Manufacturing flexibility studies in developing countries.

The study includes all listed four proposed research fields, since:

1. The study also explores the relationship between manufacturing flexibility and management capabilities of a firm and also market dynamism.

2. The study includes research questions regarding the impact of the manufacturing flexibility, as management capabilities on firm performance.
3. The study proposes a measurement tool which includes manufacturing flexibility dimensions.
4. The case studies are in Turkey, which is a developing country.

b. Managers

The study is important for managers of manufacturing companies since the developed IFMMM proposes the ideal profiles of management functions within the concept of integrated management model, in order to utilize manufacturing flexibility as a competitive tool. Moreover the developed questionnaire is useful for the managers to measure their existing managerial capabilities with respect to IFMMM and find out the possible improvement areas at all levels.

c. Public Policy

The study is important for policy makers since the study is aimed to highlight the components of effective management of flexible manufacturing which policy makers might advise to the firms, which will invest on Flexible Manufacturing Systems.

1.2.4 Management Questions

In order to stress out the importance of the study from the management perspective, some questions are aimed to be answered at the end of the study. Interviews with company executives resulted with the following management questions:

1. What are the management capabilities at different managerial levels that a firm would have, in order to use manufacturing flexibility as a competitive tool?
2. How could the companies enhance firm performance improving their management capabilities at all levels to utilize manufacturing flexibility as a competitive tool?

1.2.5 Research Questions

The proposed research will provide a set of evaluation tools for answering the following questions:

1. How could the management capability profiles of manufacturing companies be mapped based on the proposed Integrated Flexible Manufacturing Management Model?

2. How the manufacturing flexibility in manufacturing companies could be improved based on the proposed Integrated Flexible Manufacturing Management Model?
3. What is the impact of management capabilities of a flexible manufacturing company on firm performance?
4. What is the impact of environmental factors on management capabilities of flexible manufacturing company?

1.3 Structure of the Thesis

This thesis consists of six chapters. After the introduction in the first chapter, second chapter provides a comprehensive literature review on Manufacturing Flexibility; Market Dynamism; Firm Performance and Integrated Management Model. Third chapter introduces the development of our proposed "Integrated Flexible Manufacturing Management Model". In the fourth chapter Research Design and Methodology used in this study is explained. Fifth Chapter includes seven case analyses including the results and discussions. Lastly the thesis ends with conclusion and future work at chapter six.

2 LITERATURE REVIEW

This chapter presents a literature review on flexible manufacturing, manufacturing flexibility, market dynamism, firm performance and Integrated Management Model.

2.1 Flexible Manufacturing Systems

Flexible Manufacturing Systems (FMS) have been firstly applied in 1960s (Bessant and Haywood, 1986). The emphasis on the concept of Flexible Manufacturing Systems in engineering and management literature has become popular in 1980s.

There are different ways to define the term FMS, by describing its equipment components, and/or operating strategies and behavior. One of the most comprehensive definitions, for the term FMS has been made by U.K. Department of Industry (Bessant and Haywood, 1986), as: "*A system which combines microelectronics and mechanical engineering to bring economies of scale to batch work. An online computer controls the machine tools and other work stations and the transfer of components and tooling.*"

As a combination of different views, FMS is an integrated manufacturing system which includes computer-controlled automated material handling devices and machine tools that can simultaneously process high volumes of various products (Browne et al., 1984). In that sense, while FMS's enable mass production companies to utilize process efficiency, also enables unit/batch production companies to enhance product development capabilities (Nemetz and Fry, 1988).

Flexible Manufacturing Systems differ from conventional automated production systems because they can be easily re-programmed and can accommodate larger variations in the size and shape of work pieces and in the number and sequence of the operations to be performed (Carlsson, 1984).

In order to define a manufacturing system as an FMS, there are two key conceptual requirements, which are *Flexibility* and *Automation* (Browne et al. 1984). Their name implies that the feature which characterizes them among all the other features is their flexibility (Barad and Sipper, 1988). Flexible Manufacturing Systems have standard basic components as:

1. *Machine Tools*: Machine tools could be General Purpose Machine Tools or Specialized Machine Tools and their tool changing capabilities affect the flexibility of the system.

2. *Materials Handling System:* There might be different types of material handling systems as conveyors, one-way carousels, network of wire guided carts or robot carts.

3. *Storage area for in-process inventory:* There might be central buffer storage or Decentralized buffer for each machine tool.

4. *Computer Control:* The Computer System Controls the operations and flow of parts within the system. (Browne et al. 1984)

The standard components of FMS listed above and their characteristics are used to classify Flexible Manufacturing Systems and to define the basic differences between different FMS types.

2.1.1 Classification Flexible Manufacturing Systems

Flexible Manufacturing Systems have been classified according to the characteristics of basic physical components of FMS as follows (Browne et al, 1984; Yilmaz and Davis, 1987):

1. *Type I FMS - Flexible Machining Cell***:** Flexible Machining Cell, which is the most simple and also most flexible type of FMS is consists of a general purpose CNC Machine tool interfaced with an automated material handling device. Generally the work pieces processed are in smaller lot sizes (Martin et al., 1990). A robot or a pallet changer is sometimes used to load and unload the machine tool.

2. *Type II FMS-Flexible Machining System:* This type of FMS consists of several Type I FMS- Flexible Machining Cells with different types of general purpose Machining Tools. There is a real time online control on parts manufacturing and alternative routes for parts are usually available.

3. *Type III FMS – Flexible Transfer Line:* In a Flexible Transfer Line, each operation is assigned to one machine. Therefore the routing for a part is *fixed*. The layout is mostly process driven and the material handling device is a conveyor or a carousel. Type III FMS is capable of retooling and also is capable of rerouting of parts to an available machine tool by the help of Computer Control.

4. *Type IV FMS- Flexible Transfer Multi-line*: The fourth type of FMS consists of several interconnected Type III FMS. The main advantage of Type IV FMS is to provide alternative routings for each part produced in the system.

Each type of FMS is different in terms of the flexibility that they utilize. Therefore the companies need to be aware of characteristics of flexibility, hence which is the most important aspect of FMS (Browne et al., 1984), that they need to implement.

As the rate of diffusion of Flexible Manufacturing Systems increased exponentially in 1980s, researchers focused on the term *manufacturing flexibility*, which is the main objective of the firms while adoption of Flexible Manufacturing Systems. FMSs played a key role in the development of the first taxonomies of *manufacturing flexibility* construct (Perez et al., 2016).

2.2 Manufacturing Flexibility

Manufacturing flexibility is being studied by researchers since 1980s, with research becoming more pervasive since the 1990s (Larso, 2004). Most of the studies on manufacturing flexibility provide implicitly or explicitly stated definitions of the concept of manufacturing flexibility (D'Souza and Williams, 2000). Manufacturing flexibility is defined as the capacity of a manufacturing system to adapt successfully to changing environmental conditions and process requirements (Swamidass, 1988). A similar definition has also been made as "the ability of manufacturing system to cope with changing circumstances or instability caused by environment" (Gupta and Goyal, 1989).

Manufacturing flexibility is defined in connection with market conditions as "*the quickness and ease with which plants can respond to changes in market conditions*" (Cox, 1989). Similiarly, Vokurka and O'Leary-Kelly (2000) define manufacturing flexibility as an ability of a manufacturing system to respond to changes in customer needs and in the competitive environment.

The definitions of Manufacturing Flexibility have certain commonalities, as they all define manufacturing flexibility as an ability of manufacturing system to react to the environmental changes. Secondly, most of the definitions refer to the time required for the adjustments to be done on manufacturing system and the cost of those adjustments. In consideration of these commonalities, a more generalized definition of manufacturing flexibility has been made as "*the ability to change or react with little penalty in* ***time, cost or performance"*** (Upton, 1994). Lately, the term manufacturing flexibility is defined as the ability to meet increasingly varied customer expectations without incurring excessive costs, time, organizational disruption, or loss of performance (Ling-yee and Ogunmokun, 2008). In spite of the commonalities in definitions of the manufacturing flexibility concept, after more than two decades of research in manufacturing flexibility, a consensus on the definition of manufacturing flexibility is still lacking (Rogers et al., 2011).

Definitions of Manufacturing Flexibility from related literature are listed in Table 2.1 in a chronological order.

Table 2.1 Selected Definitions of Manufacturing Flexibility

Author (s)	Definition	Properties Suggested
Mascarenhas (1981)	"The ability of a firm to cope with environmental instability"	Environmental Instability
Zelenovich (1982)	"The ability of a manufacturing system to adapt to changes in environmental conditions and in the process requirements"	Adaptation to changing environmental conditions
Buzacott and Mandelbaum (1985)	"The ability of a manufacturing system to cope with changing circumstances"	Cope with changes (no specific change defined)
Cox (1989)	"The quickness and ease with which plants can respond to changes in market conditions"	Quickness and Ease of responding to Changing Environmental Conditions
Gupta and Somers (1992)	"The ability of an organization to change operations management activities both economically and effectively given a certain capacity"	To change economically and effectively given a certain capacity
Watts et al. (1993)	"The ability to implement changes in the operating environment in a timely manner at a reasonable cost in response to changes in market conditions."	Timely manner and reasonable cost
Gerwin (1993)	"Capability of a manufacturing system to adjust its resources effectively in response to internal and external changes."	Response to Internal Changes
Upton (1994)	"The ability to change or react with little penalty in time, cost or performance"	To React, penalty in time, cost or performance
Pagell and Krause (2004)	"Firm's capability to meet changes in market demands through integrated and coordinated operational policies"	Integrated and coordinated operational policies
Ling-yee and Ogunmokun (2008)	"The ability to meet increasingly varied customer expectations without incurring excessive costs, time, organizational disruption, or loss of performance"	To meet customer expectations, without organizational disruption.
Boyle and Scherrer-Rathje (2009)	"The capability of a manufacturing system or facility to effectively address uncertainty from a wide variety of sources, yet continue to produce efficiently different products or product volumes of acceptable quality, cost, and time frame."	Addresses uncertainty while producing efficiently with constraints: cost, quality and time.
Jin et al. (2013)	"Compared to industry norms, the ability of a manufacturing firm to efficiently and effectively respond to changing customer requirements by altering its product development and production."	Addresses responding changing customer demand constarints: efficiency and effectivity.

The above definitions emphasize some important points. First, flexibility is used to accommodate uncertainty, usually in the form of changes emanating from both the internal and external environment, e.g. changes in product design or customer requirements. Second, flexibility refers to the capability of a manufacturing system to manage its resources in order to adapt successfully to these changes. Therefore, manufacturing flexibility could be defined as: the ability of manufacturing organisations to manage their resources in order to cope with environmental uncertainties, and to be able to produce variability in product outputs.

2.2.1 Dimensions of Manufacturing Flexibility

There is a general agreement among researchers that manufacturing flexibility is a multidimensional concept (D'Souza and Williams, 2000). A vast variety of different types and dimensions of manufacturing flexibility had been identified and discussed within the published literature (Gottfried and Winkler, 2013). It is stated there are 50 different terms used to name various dimensions of flexibility mentioned in existing literature (Sethi and Sethi, 1990). Shewchuk and Moodie (1998) have collected 29 types of flexibility in manufacturing literature. Overlapped definitions for different dimensions are also found (Gotfried and Winkler, 2013). A summary of various flexibility dimensions used by researchers are listed in Table 2.2.

Table 2.2 Selected Studies on Dimensions of Manufacturing Flexibility

Dimension	**Author**
Machine Flexibility	Browne et al (1984), Sethi and Sethi (1990), Gupta and Somers (1992), Hyun and Ahn (1992), Upton (1994), Koste (1999), Koste and Malhotra (1999), Braglia and Petrioni (2000), Vokurka and O'Leary-Kelly (2000), Zhang et al. (2003),
Material Handling Flexibility	Sethi and Sethi (1990), Gupta and Somers (1992), Koste (1999)Kathuira and Partovi (1999), Koste and Malhotra (1999), D'Souza and Williams (2000), Vokurka and O'Leary-Kelly (2000), Zhang et al (2003)
Operation Flexibility	Browne et al (1984), Sethi and Sethi (1990), Upton (1994), Chryssolouris (1996), Koste and Malhotra (1999), Vokurka and O'Leary-Kelly (2000)
Process Flexibility	Sethi and Sethi (1990), Gupta and Somers (1992), Hyun and Ahn (1992), Jordan and Graves (1995), Sanchez (1995), Braglia and Petrioni (2000), D'Souza and Williams (2000), Vokurka and O'Leary-Kelly (2000), Petrioni and Belivacqua (2002)
Routing Flexibility	Yilmaz and Davis (1987), Sethi and Sethi (1990), Gupta and Somers (1992), Hyun and Ahn (1992), Gerwin (1993), Upton (1994), Braglia and Petrioni (2000), Vokurka and O'Leary-Kelly (2000), Petrioni and Belivacqua (2002), Zhang et al (2003), D'Souza (2006), Joseph and Srindharan (2011)
Product / New Product Flexibility	Browne et al (1984), Sethi and Sethi (1990), Hyun and Ahn (1992), Olhager (1993), Upton (1994), Sanchez (1995), Chryssolouris (1996), Koste and Malhotra (1999), Braglia and Petrioni (2000), Vokurka and O'Leary-Kelly (2000), Petrioni and Belivacqua (2002), D'Souza (2006), Boyle and Scherrer-Rathje (2009)
Volume Flexibility	Sethi and Sethi (1990), Hyun and Ahn (1992), Olhager (1993), Gerwin (1993), Ettlie and Penner-Hahn (1994), Upton(1994), Suarez et al (1996), Kathuira and Partovi (1999), D'Souza and Williams (2000), Braglia and Petrioni (2000), Zhang et al (2003), Narasimhan et al (2004), Oke (2005), Cousens et al (2009), Hallgren and Olhager (2009)
Expansion Flexibility	Browne et al (1984), Sethi and Sethi (1990), Hyun and Ahn (1992), Upton (1994), Koste and Malhotra (1999), Braglia and Petrioni (2000), Vokurka and O'Leary-Kelly (2000), Petrioni and Belivacqua (2002), D'Souza (2006)
Program / Programming Flexibility	Sethi and Sethi (1990), Gupta and Somers (1992), Hyun and Ahn (1992), Upton (1994), Vokurka and O'Leary-Kelly (2000)
Production Flexibility	Sethi and Sethi (1990), Vokurka and O'Leary-Kelly (2000)
Market Flexibility	Sethi and Sethi (1990), Gupta and Somers (1992), Vokurka and O'Leary-Kelly (2000)
Mix Flexibility	Slack (1988), Suarez et al (1996), Kathuira and Partovi (1999), D'Souza and Williams (2000), Das (2001), Zhang et al (2003), Koste et al (2004), Oke (2005), Cousens et al (2009), Hallgren and Olhager (2009)
Modification Flexibility	Kathuira and Partovi (1999), Koste and Malhotra (1999), Das (2001), Narasimhan et al (2004), Koste et al (2004)
Labor Flexibility	Koste and Malhotra (1999), Zhang et al (2003), Koste et al (2004)

The taxonomy of flexibility dimensions established by Browne et al. (1984) has formed the foundation of most subsequent research into identifying and measuring manufacturing flexibility (Mendes and Machado, 2015). The dimensions of flexibility which has been classified and defined by Browne et al (1984) are listed in Table 2.3.

Table 2.3 Flexibility Dimensions by Browne et al. (1984)

No	Flexibility Dimension	Definition	Attained By
1	Machine Flexibility	"The ease of making the changes required to produce a given set of part types"	a) Technological progress b) Proper operation assignment c) Technological capability
2	Process Flexibility	"The ability to produce a given set of part types, each possibly using different materials, in several ways"	a) Machine flexibility b) multi-purpose, adaptable, CNC machining centers
3	Product Flexibility	"The ability to changeover to produce a new (set of) product(s) very economically and quickly"	a) Efficient and automated production planning and control system b) Machine flexibility
4	Routing Flexibility	"The ability to handle breakdowns to continue producing the given set of part types."	a) Automated rerouting of parts by pooling machines into machine groups b) Duplicating operation assignments
5	Volume Flexibility	"The ability to operate an FMS profitably at different production volumes."	a) Multipurpose machines b) A layout that is not dedicated to particular process c) A sophisticated and automated materials handling system d) Routing flexibility
6	Expansion Flexibility	"The capability of building a system, and expanding it as needed, easily and modularly."	a) A non-dedicated, non-process-driven layout b) A flexible material handling system c) Modular, flexible machining cells d) Routing flexibility
7	Operation Flexibility	"The ability to interchange the ordering of several operations for each part type"	a) Multipurpose machines b) A layout that is not dedicated to particular process c) A sophisticated and automated materials handling system
8	Production Flexibility	"The Universe of part types that the FMS can produce"	a) Increasing the level of existing technology b) Increasing the versatility of the machine tools

In their study, Koste and Malhotra (1999) have listed 9 most important and commonly cited manufacturing flexibility dimensions. Detailed information about these flexibility dimensions is provided in this study.

2.2.1.1 Machine Flexibility

Machine Flexibility is defined as "*the ease of making the changes required to produce a given set of part types*" (Browne et al, 1984). A more comprehensive definition has been made as "*the number and heterogeneity of operations a machine can execute without incurring high transition penalties"* (Koste and Malhotra, 1999). This may be achieved by using general-purpose equipment that uses multiple tools and programs or special-purpose equipment, such as an FMS, that is designed to perform multiple operations (Adler 1988, Upton 1994, Zhang et al. 2003). Machine flexibility is identified as one of the "*two most fundamental types of flexibility"* by Chandra and Tombak (1992). Machine flexibility is also named as '*Equipment Flexibility"* (Rogers et al, 2011).

Definitions of Machine Flexibility from manufacturing flexibility literature are listed in a chronological order in Table 2.4.

Table 2.4 Definitions of Machine Flexibility

Author (s)	**Definition of Machine Flexibility**
Browne et al. (1984)	"The ease of making the changes required to produce a given set of part types."
Bessant and Haywood (1986)	"The ability to change to make different parts within a product family."
Yilmaz and Davis (1987)	"The ability, without human interference or long set-up times, to replace worn-out or broken tools; change tools in a tool magazine; assemble or mount the required fixtures."
Gupta and Goyal (1989)	"The possible uses of a machine and the ease of converting from one of these uses to another."
Sethi and Sethi (1990)	"Various types of operations that a machine can perform without requiring a prohibitive effort in switching from one operation to another."
Gupta and Somers (1992)	"The variety of operations that the machine can perform without incurring high costs or expending prohibitive amounts of time in switching from one operation to another."
Gerwin (1993)	"The types of operations performed without difficulty in switching from one to the other."
Upton (1994)	"Ability to change the machine with which a particular process is carried out."
Parker and Wirth (1999)	"The ability to perform a variety of operations on a single machine."
Koste and Malhotra (1999)	"The number and heterogeneity of operations a machine can execute without incurring high transition penalties or large changes in performance outcomes."
Vokurka and O'Leary-Kelly (2000)	"The range of operations that a piece of equipment can perform without incurring a major setup."
Zhang et al. (2003)	"The ability of a piece of equipment to perform different operations economically and effectively."
Boyle (2006)	"The various types of operations that the machine can perform without requiring a prohibitive effort in switching from one operation to another."

If we trace the definitions listed in chronological order in Table 2.4 for Machine Flexibility, while prior definitions of Machine Flexibility were centered " different/ variety of " "parts/part types" processed by a single machine, in later definitions "different/variety- also heterogeneity" of "operations" were emphasized. The term prohibitive effort" commonly used in the definitions above are mainly expressed in terms of time and cost as, machine change-over time, machine setup cost, lost production time or scrap due to changeover (Petrioni and Bevilacqua, 2002). As Machine is considered as the basic element of a manufacturing system (Narasimhan and Das, 1999), the machine level provides a basic framework for flexibility. In other words, machine level flexibility is necessary for other flexibility types.

Technological enablers of machine flexibility are numerical control, easily accessible programs, sophisticated part loading and tool changing devices, integration with CAD/CAM, etc. (Sethi and Sethi, 1990). Although process and technology choice plays an important role in determining the level of machine flexibility, managerial policies can also have a significant impact (Koste, 1999). Operators need to be trained to acquire programming, maintaining and diagnostic skills (Sethi and Sethi, 1990). Employee participation in statistical process control could decrase the *cost* of changeover, therefore increase level of machine flexibility (Koste, 1999).

2.2.1.2 Volume Flexibility

Volume flexibility is defined as the ability of the manufacturing system to operate in varying production volume easily (De Toni and Tonchia, 1998) and profitably (Sethi and Sethi, 1990). This ability is related to the ability to increase and decrease production to satisfy upward and downward changes in demand. Volume flexibility demonstrates the competitive potential of the manufacturing companies as increasing the production volume when the demand rises and to decrease the inventory level in case of low demand (Gerwin, 1993).

The concept of volume flexibility has been widely discussed in the field of microeconomics (Carlsson, 1989) and traditionally by cost curves. If we think of the Average Total Cost Curve of a firm, flatter the cost curve, manufacturing system is more flexible, since the marginal costs rise more slowly. Figure 2.1 illustrates average total cost curves of two firms. Manufacturing system of firm A has a higher level of volume flexibility then firm B.

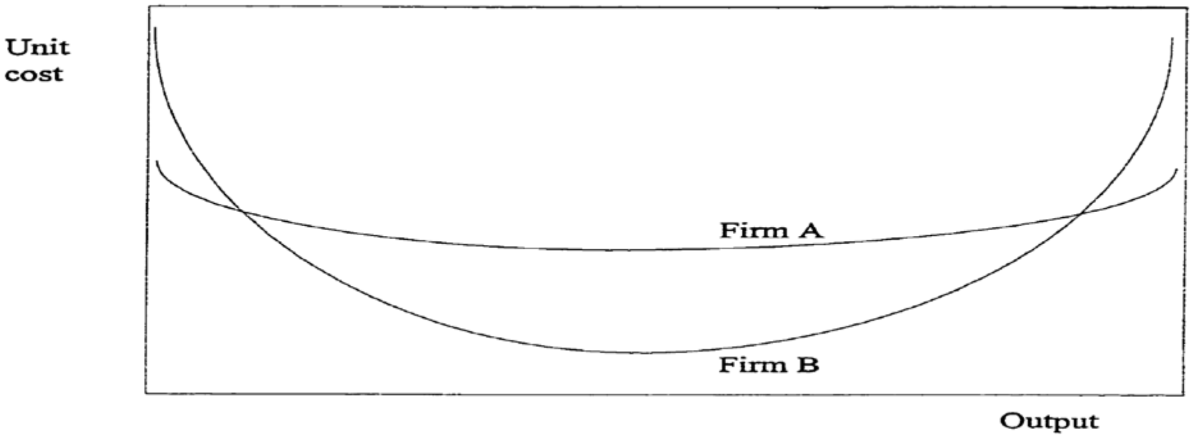

Figure 2.1 Average Total Cost Curve (Carlsson, 1989)

The marginal cost of production in firm A is relatively lower than of firm B (which could be understood by the slope of the curve), which means that varying the production volume affects the total cost relatively lower in firm A. In other words, more flatter the average total cost curve; volume flexibility of the manufacturing system is higher.

Table 2.5 includes definitions of volume flexibility from manufacturing flexibility literature in chronological order.

Table 2.5 Definitions of Volume Flexibility

Author(s)	Definition
Browne et al. (1984)	“The ability to operate an FMS at different production volumes.”
Bessant and Haywood (1986)	“The ability to accommodate (economically) changes in volumes produced.”
Yilmaz and Davis (1987)	“The ability to operate in FMS profitably at different production volumes.”
Taymaz (1989)	“Handling shifts in volume for a given part”
Cox (1989)	“The capacity to quickly expand the quantities of a given product mix produced.”
Gupta and Somers (1992)	“The ability of a manufacturing system to be operated profitably at different overall output levels, thus allowing the factory to adjust production within a wide range”
De Toni and Tonchia (1998)	“The ability to vary the volume of products without remarkable consequences on production costs”
Narasimhan and Das (1999)	“The ability to handle volume fluctuations”
Parker and Wirth (1999)	“Volume flexibility is considered to be the ability to operate efficiently, effectively and profitably over a range of volumes.”
Koste and Malhotra (1999)	“The extent of change and the degree of fluctuation in aggregate output level which the system can accommodate without incurring high transition penalties or large changes in performance outcomes”
D'Souza and Williams (2000)	“The ability to change the level of output of a manufacturing process”
Das(2001)	“Ease of increasing volume capacity without adding new equipment”
Zhang et al (2003)	“The ability of the organization to operate at various batch sizes and/or at different production output levels economically and effectively”
Rogers et al (2011)	“The ability of the system to increase or decrease volume while remaining profitable”

The definitions of volume flexibility listed in Table 2.5 points out the ability of a manufacturing system to alter production output level in an efficient way that the organization remains profitable. In this sense, in order to consider a manufacturing system to be flexible in terms of production volume, the manufacturing system is assumed to be constrained with its existing configuration (Koste, 1999). By definition, additional elements (i.e. new machinery investments or additional labor for the sake of capacity expansion) to manufacturing system will change the production volume, but not in a timely and cost effective manner. Volume flexibility is also named as Demand Flexibility by Son and Park (1987).

Use of multi skilled labor contributes to volume flexibility of a manufacturing system. In case of low demand for certain products, workers could be used in performing other tasks, if they possess other skills. Moreover establishing an effective subcontracting network is very important in achieving higher levels of volume flexibility (Sethi and Sethi, 1990). Deploying overtime or temporary labor, creating and maintaining slack resources and using inventory buffers also provide volume flexibility to the firms which enables them to cope with demand fluctuations (Jack and Raturi, 2003).

Volume flexibility is considered as one of the first order flexibilities since it has a direct impact on the competitive position of a firm in the market (Suarez et al, 1996). A firm with high level of volume flexibility can maintain a high level of delivery reliability by preventing out of stock conditions with relatively lower level of stock, when sudden increases in demand for certain products occurs. While in periods of low demand, a volume flexible firm does not suffer with excess stock and surplus capacity (Jack and Raturi, 2002).

2.2.1.3 Routing Flexibility

Routing flexibility has been frequently studied in shop floor control and FMS scheduling literature (Koste and Malhotra, 1999) and can be regarded as the main contributor to the flexibility of an FMS (Joseph and Sridharan, 2011). Routing Flexibility is defined as the ability to change machine visitation sequences, i.e. in case of breakdowns and to continue production of the given parts (Yilmaz and Davis, 1987). In a manufacturing system with higher routing flexibility, parts could be produced by alternate routes through system (Sethi and Sethi, 1990). Routing flexibility has been recognized as a fundamental characteristic for a manufacturing systems overall flexibility by enhancing manufacturing system for the easier scheduling of parts by better balancing the machine loads and allowing the system to produce given parts without any interruption (Chang, 2007), thus accommodating any event affecting machine availability (Parker and Wirth, 1999). Machine availability changes, in case of machine breakdown, in case of rush orders when the machine is already engaged in production, or in case of maintenance.

Several definitions of Routing Flexibility from manufacturing flexibility literature are listed in Table 2.6, in chronological order.

Table 2.6 Definitions of Routing Flexibility

Author(s)	Definition
Browne et al (1984)	"The ability to handle breakdowns and to continue producing a given set of part types."
Bessant and Haywood (1986)	"The ability to process parts via different routes within the plant in response to breakdown or other factors"
Yılmaz and Davis (1987)	"The ability to vary machine visitation sequences (for example, in case of breakdowns) and to continue producing the given set of part types."
Sethi and Sethi (1990)	"The ability to produce a part by alternate routes through the system".
De Toni and Tonchia (1998)	"The ability of a flexible system to work in a suboptimal manner
Parker and Wirth (1999)	"The ability to vary the path a part may take through the manufacturing system."
Koste and Malhotra (1999)	"The number of products which have alternate routes and the extent of variation among the routes used without incurring high transition penalties or large changes in performance outcomes"
Chang (2007)	"The ability of a manufacturing system to provide multiple alternate routes to produce a set of parts/ products economically and efficiently"
Rogers et al (2011)	"The ability to move parts, tooling, and materials along multiple routes in the production facility"
Jain et al (2013)	"The ability of the manufacturing system to continue producing given parts mix in the presence of internal disturbances, such as breakdown or failure."

While the ability of a production system to use alternative routes for production of a product has been given as a definition of Routing Flexibility in early definitions, in later studies the definition has been evolved to "the ability of a production system to use alternative routes for production of a part/product economically/profitable, efficiently". Alternate routes may include use of different machines, different operations or different sequences of operations.

A manufacturing system having multipurpose machines, varying no of identical machines, a system control software and multiskilled labor would have higher level of routing flexibility (Sethi and Sethi, 1990).

Even routing flexibility is encountered as a one of the "second order flexibilities", for which it has been stated not to have a direct impact on competitive position of a firm in the market (Suarez et al, 1996), since routing flexibility enables the firms to deliver customer needs on time in case of uncertainties, which could be due to internal (such as machine breakdowns, absence of tool and fixtures, unexpected plan changes, i.e) or external (sudden demand increases, supplier related issues, i.e.) disruptions. Therefore, routing flexibility provides an answer to the strategic needs of meeting customer requirements (Chang, 2007).

2.2.1.4 Operation Flexibility

Operation flexibility is defined as the ability to interchange the ordering of several operations in each part type (Browne et al, 1984). Changing the sequence of the operations is without high transition penalties and does not cause significant changes in performance outcomes.

Operation Flexibility, which appears both in shop floor scheduling and also manufacturing flexibility literature, is also named as *"Sequencing Flexibility"* (Koste and Malhotra, 1999) and is associated with the manufacturing of a part (Benjafaar and Ramakrishnan, 1996). In other words, operation flexibility is a property of a part, not the production system. A production system will be considered to have operation flexibility; if the parts being produced in the system have high level of operation flexibility (Sethi and Sethi, 1990).Several definitions for operation flexibility are listed in Table 2.7, in chronological order.

Table 2.7 Definitions of Operation Flexibility

Author(s)	Definition
Browne et al (1984)	"The ability to interchange the ordering of several operations for each type."
Sethi and Sethi (1990)	"The ability of a part to be produced in different ways"
Benjafaar and Ramakrishnan (1996)	"The possibility of performing an operation in more than one machine."
Koste (1999)	"The number of parts that have alternate sequencing plans and the heterogeneity (variety) of processing sequences used without incurring high transition penalties or large changes in performance outcomes."
Jain et al (2013)	"The ability to interchange the sequence of manufacturing operations for a given part. "

Operation flexibility definition made by Benjafaar and Ramakrishnan (1996) might cause confusion in defining Routing Flexibility and Operation Flexibility. In their study Benjafaar and Ramakrishnan (1996) defined also another flexibility dimension related with manufacturing of a part named Sequencing Flexibility and defined as the possibility of interchanging the sequence in which required manufacturing operations are performed. Sequencing Flexibility, as defined by Benjafaar and Ramakrishnan (1996) has more similiar definition with Operation Flexibility defined by other researchers listed in Table 2.7. Despite the possible confusion with Routing Flexibility, Operation Flexibility of parts contributes to the Routing Flexibility of the manufacturing system (Sethi and Sethi, 1990).

Operation flexibility helps to raise the level of capacity utilization by changing the sequence of operations when the originally designated operation is not available (Parker and With, 1999). However, since operations flexibility is related with the part being produced, it is much related with the design of the parts. Parts, assembled from standardized components or parts that are modular are likely to exhibit operation flexibility (Sethi and Sethi, 1990). In machining systems, operation flexibility comes with self contained features that are accessable from several surfaces. However in assembly systems, parts that are assembled from standardised or modular components are more likely to possess operation flexibility (Jain et al., 2013).

2.2.1.5 Expansion Flexibility

Expansion Flexibility is the ability to add *easily* capability and capacity (De Toni and Tonchia, 1998). Here capacity stands for output rate per unit time, where capability stands for characteristics as quality, the technological state or other flexibility types (Sethi and Sethi, 1990). In contrast with volume flexibility, expansion flexibility deals with maximum output of the system. This type of flexibility can be measured as how large the flexible manufacturing system could become (Petrioni and Bevilacqua, 2002).

In contrast with the other flexibility dimensions, expansion flexibility is not confined with the restriction of the current configuration of the manufacturing systems (Koste, 1999). Additional machines, tools, labor or new technology could be included in the system. Selected definitions of Expansion Flexibility in existing literature are listed in Table 2.8.

Table 2.8 Definitions of Expansion Flexibility

Author(s)	Definition
Browne et al (1984)	"The capability of building a system, and expanding it as needed, easily and modularly"
Sethi and Sethi (1990)	"The ease with which its capacity and capability can be increased when needed."
Gupta and Somers (1992)	"The extent of overall effort needed to increase the capacity and capability of a manufacturing system when needed"
Chryssolouris (1996)	"The ability to expand the system easily and in a modular fashion."
Koste and Malhotra (1999)	"The number and heterogeneity (variety)of expansions which can be accommodated without incurring high transition penalties or large changes in performance outcomes"
Rogers et al (2011)	"A mid-range or long-range increase in capacity"
Jain et al (2013)	"Refers to build a system and expand it incrementally"

Expansion flexibility could be attained by building small production units (Buzacott and Mandelbaum, 1985), having modular flexible manufacturing cells, having multi-purpose machinery that does not require special foundations and a material handling system that can be more easily routed, having a high level of automation that can facilitate mounting additional shifts, providing infrastructure to support growth, and planning for change (Sethi and Sethi, 1990).

Expansion flexibility is not flexibility dimension valid for short-term considerations and represents an option to effect mid-range or long term change (Rogers et al., 2011).

It allows firms to expand production progressively instead of purchasing all equipment in advance which may place a prohibitive burden on the firm (Parker and Wirth, 1999). If the firm experiences a sharp demand increase, if able to expand production capacity quickly, it would help the firm to gain additional revenue. Expansion flexibility allows the firm to take advantages of market opportunities or minimize customer dissatisfaction (Koste, 1999). This flexibility type is important to firms with growth strategies, such as ventures into new markets, and can be considered as strategic flexibility (Bengtsson, 2001).

2.2.1.6 Product Flexibility

Product flexibility refers to the ability to introduce a new product to production system very economically and quickly (Koste and Malhotra, 1999; Browne et al., 1984). More broadly, it is associated with both the introduction of new products and the modification of existing products (Cox, 1989; Ettlie and Penner-Hahn, 1994; Hyun and Ahn, 1992). Product flexibility helps the companies to be responsive to the market changes by enabling introducing new products, or modifying the existing products faster and in an economical manner (Gupta and Somers, 1992). Table 2.9 provides definitions for Product Flexibility from various authors.

Table 2.9 Definitions of Product Flexibility

Author(s)	Definition
Brown, et al (1984)	"Ability to changeover to produce a new set of products very economically and quickly"
Slack (1988)	"The ability to introduce novel products"
Azzone and Bertele (1989)	"The ability to introduce new products into production with low costs"
Cox (1989)	"The ability to quickly change the types of products produced in the plant by adding new ones"
Dixon, et al (1990)	"Ability to introduce new products rapidly, and to so at relatively low cost"
Chen, et al. (1992)	"Capability to changeover to introduce new product"
Gupta and Somers (1992)	"Ease with which new parts can be added or substituted for existing parts, i.e., the ease with which the current product mix can be changed at relatively low cost in a short period"

Product flexibility is characterized with the number and variety of the new products introduced by the organization. The number of the new products provides insight into an organization's strategic emphasis on product development and provides an opportunity to compare with other competitors in terms of product flexibility. The variety of the new products refers to the innovativeness of the organization (Koste, 1999). An organization that develops and introduces products that are very different from each other could be considered more flexible than those which introduce products more similar to each other.

As competition continues to increase, organizations that differentiate themselves with product flexibility can gain a competitive advantage. Early or on-time introduction of a new product can significantly impact the profitability of that product (Vesey, 1991). Therefore, a high level of product flexibility may allow an organization to continually stay ahead of competitors.

2.2.1.7 Mix Flexibility

Mix Flexibility is defined as the number of products which the manufacturing system can produce within a given time period (Slack, 1988). If a broad range of different product lines (or variation within a line) is desired to be produced with a given short time period, in this case mix flexibility could be a useful flexibility dimension. Mix flexibility represents being able to produce a range of products or variants with fast setups (Gerwin, 1993). Mix Flexibility has been named as *Process Flexibility* by several researchers (Browne et al, 1984; Sethi and Sethi, 1990).

Several definitions for Mix Flexibility are listed in Table 2.10, as below, in chronological order.

Table 2.10 Definitions of Mix Flexibility

Author(s)	Definition
Slack (1988)	"The range of products which the company can produce within a given time period"
Sethi and Sethi (1990)	"The set of part types that the system can produce without major setups"
Gerwin (1993)	"Being able to handle a range of products or variants with fast setups."
Olhager (1993)	"The ability to change relative production quantities among the products in a product mix."
De Toni and Tonchia (1998)	"The ability of a manufacturing process to produce a number of different products at the same point in time"
Narasimhan and Das (1999)	"The ability of a manufacturing system to switch between different products in the product mix"
D'Souza and Williams (2000)	"The ability of the system to produce many different products during the same planning period"

Mix flexibility has been identified as one of the important dimensions of manufacturing flexibility (Koste et al., 2004, Oke, 2013). As a first first-order flexibility dimension (Suarez et al. 1996), mix flexibility has a direct impact on firms’ competitive position.

While defining mix flexibility, it is important to underline that it is assumed to be evaluated within the current production system configuration (Zhang et al., 2003). This constraint is necessary in order to evaluate the level of mix flexibility. Any additional investment on the current system capabilities done in order to enhance the product range or variety could not be encountered as mix flexibility, but alternatively could be evaluated as expansion flexibility. However, mix flexibility has an impact on innovation performance. High level of mix flexibility enables product innovation within the current system configuration, which can also contribute to new product development (Oke, 2013).

Mix flexibility is significant since it serves as an alternative for focused manufacturing (Gerwin, 1993) by reducing the cost of change, changeover times and wait times, actions that would benefit manufacturing cost reduction (Das, 2001). In a plant with mix flexibility, by the help of Just-in-Time (JIT), Production and Computer Integrated Manufacturing (CIM), benefits of producing high variety of products with relatively shorter lead times without high costs could be obtained. In that sense, such a factory may exhibit Economies of Scope (Gerwin, 1993).

Therefore, mix flexibility will be much more important for a company who aims to provide a wide range of products to the different segments of the market, while it will be less important for a company focused on a specific market segment (Ngamsirijit, 2008).

Mix flexibility enables a company to respond environmental uncertainties without excess inventory or excess capacity (Kekre and Srinavsan, 1990).

2.2.1.8 Labor Flexibility

Labor flexibility is a relatively newer dimension defined in flexibility literature (Rogers et al., 2011) and is defined as the number of different tasks an operator can perform easily **(**Koste and Malhotra, 1999). The different tasks that the operator executes could include working on more than one machine, doing complete job instead of a single part of the job, carrying out of inspection, maintenance and setup changeover jobs by production workers and so on (Singh and Chauhan, 2013). A list of definitions of Labor Flexibility is available in Table 2.11.

Table 2.11 Definitions of Labor Flexibility

Author(s)	**Definition**
Chen, et al (1992)	" The ability of the employees to perform a wide range of different manufacturing tasks"
Koste and Malhotra (1999)	"The number and variety of tasks that the employees can perform without high transition costs and performance losses."
Vokurka and O'Leary-Kelly (2000)	"Range of tasks that an operator can perform within the manufacturing system"
Zhang et al. (2003)	"The broad range of tasks that an operator can perform in the organization economically and effectively"
Rogers et al. (2011)	"The ability of the workers to perform number and variety of different tasks within a manufacturing system"
Perez, et al (2016)	"The range of manufacturing tasks an employee can perform"

Employees play a key role in utilizing aggregate manufacturing flexibility. Even though an investment on sophisticated technologies has been done, if the workforce is not functionally flexible, a desired level of flexibility may not be achieved (Urtasun-Alonso, et al., 2014).

A flexible workforce is especially valuable in responding design changes and new product development. In addition to that, such companies with more flexible labor can respond to demand fluctuations easily (Jain et al., 2013). Higher labor flexibility provides capability to allocate alternative labor in case of workforce absence (Singh, 2008).

In order to achieve multi-skilled capacity, appropriate workforce training is needed (Chang, 2012). Moreover, use of temporary labor (Cousens et al., 2009) and working over-time when needed (Boyle and Scherrer- Rathje, 2009) also contributes to labor flexibility.

Labor flexibility is a key to achieve other flexibility dimensions. Labor flexibility enables manufacturing systems to achieve Mix, Volume Flexibility (Olhager, 1993; Jack and Raturi, 2002; Chen et al. 1992), New Product (Oke, 2013) and Market Flexibility (Kim et al., 2013).

2.2.1.9 Material Handling Flexibility

This dimension of flexibility is defined as "the number of existing handling options between processing centers and the heterogeneity of the material which can be transported via these material handling systems without incurring high transition costs" (Koste and Malhotra, 1999). If the material handling system is able to move different part types effectively through the manufacturing facility, including loading and unloading of the parts, inter-machine transportation and storage of the parts, the system could be evaluated as flexible (Gupta and Somers, 1992). A list of definitions for Material Handling Flexibility is available in Table 2.12.

Table 2.12 Definitions of Material Handling Flexibility

Author(s)	Definition
Chatterjee, et al. (1984)	"Capabilities of the material handling system, linkages between processing centers"
Sethi and Sethi (1992)	"Ability to move different part types efficiently for proper positioning and processing through the manufacturing facility it serves"
Chen, et al. (1992)	"Capability to transport different workpieces from the loading area, through machining centers, to the unloading or storage areas"
Gupta and Somers (1992)	Ability of material handling systems to move different part types effectively through the manufacturing facility, including loading and unloading of parts, inter-machine transportation and storage of the parts under various conditions of the manufacturing facility."
Koste and Malhotra (1999)	"The number of existing paths between processing centers and heterogeneity (variety) of material which can be transported along these paths without incurring high transition penalties or large changes in performance outcomes."
Zhang, et al. (2003)	"The ability to transport different workpieces between various processing centers over multiple paths economically and effectively"

Material Handling Flexibility is associated with the number of existing paths between processing centers and the number of different parts to be transported along these paths (Koste, 1999). In a production system, number of paths represents whether a fixed or flexible handling system is used. Fixed systems, like conveyors, restrict the material flow to designated paths (Coyle, et al. 2002). This kind of material handling systems requires high capital investment and changing those systems need time and is not cost effective.

A flexible material handling system improves machine availability, utilization and also reduces throughput times (Sethi and Sethi, 1990). Material handling flexibility is dependent on rerouting factor (ability of a material handling system to change travel paths automatically or with small set-up delay and cost), variety of loads (such as work pieces, tools, jigs and fixtures), transfer speed (associated with the weight and geometry of the parts and frequency of transportation) and number of connected elements (machines, buffers, etc.) (Tsourveloudis and Phillis, 1998).

2.2.2 Conceptualization of Flexibility Dimensions

A comprehensive framework to analyze, understand and define any kind of flexibility dimension has been developed by Upton (1994). He made a generic definition of flexibility as "*the ability to change or react with little penalty in* ***time, effort, cost, or performance***. "

He proposed that, any flexibility type has three attributes as:

1. ***Dimension:*** Dimension of Flexibility is the factor to be changed. It might be the production volume, or input material or routing. Each dimension of change implies a different flexibility as defined in existing literature.
2. ***Time:*** It is defined by how frequently the change or adaptation will be occurred. It might be minute by minute, monthly or yearly. Flexibilities are classified as *Strategic,* if the time is scaled by years, *Tactical,* if the time is scaled by months, *Operation,* if the time is scaled by seconds, hours, or days.
3. ***Element:*** There are three basic elements of flexibility:
   a. Range, is the number of different positions that can be achieved for a given flexibility dimension.
   b. Mobility, is the ability to move from one position to another. It could be defined by time or cost of the change.
   c. Uniformity, is the similarity of performance outcomes, such as cost, yield or quality, within the *given Range.*

The framework developed by Upton (1994) is illustrated in Figure 2.2.

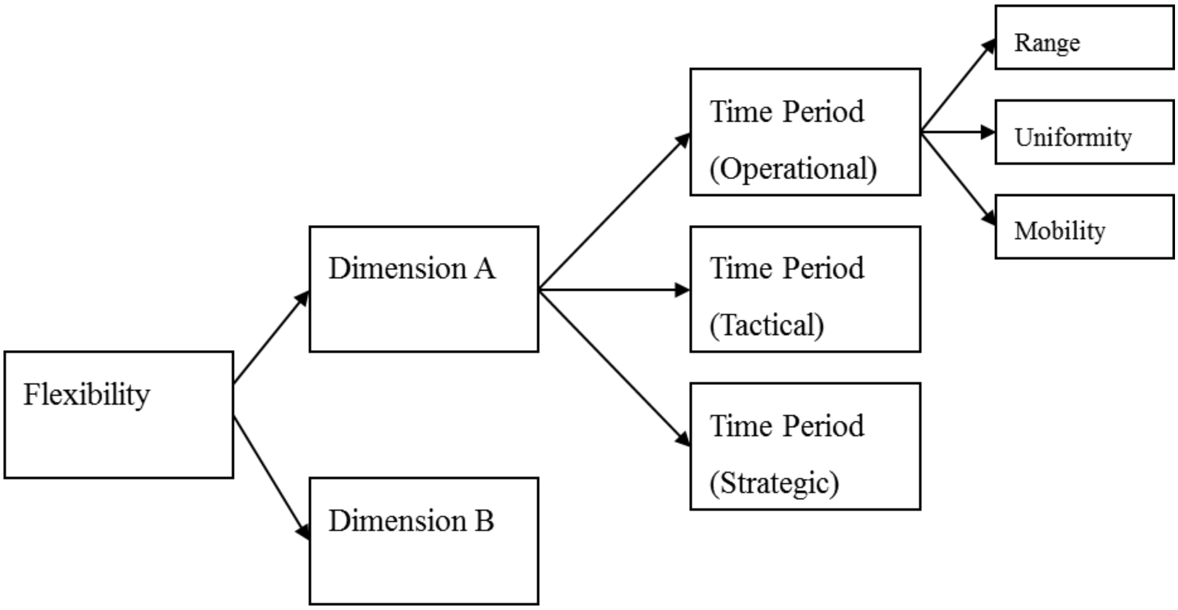

Figure 2.2 Flexibility Framework (Upton, 1994)

When the flexibility dimension and time period has been defined, it could be characterized by defining the elements as in the framework illustrated in Fig. 2.2. The framework is a basis for defining and analyzing any flexibility dimension. Moreover the framework developed by Upton has been a theoretical base for studies as Koste and Malhotra (1999) and D'Souza and Williams (2000) who developed scales to measure manufacturing flexibility dimensions.

Koste and Malhotra (1999) has developed a model for understanding flexibility dimensions by redefining Range Element splitting into two new elements as Range-Number, which is the number of the options and Range-Heterogeneity, which is defined as the heterogeneity of the options.

2.2.3 Hierarchy of Flexibility Dimensions

Researchers who studied flexibility dimensions, emphasized that the flexibility dimensions are interrelated. Slack (1988) developed a framework to assess manufacturing flexibility and his framework illustrates a hierarchic of flexibility dimensions. Slack (1988) has classified flexibility dimensions as **resource flexibility dimensions** (*Process Flexibility, Labor Flexibility, Supply System Flexibility, Control System Flexibility)*, which are the inherent flexibility of the manufacturing resources, and **system flexibility dimensions** (*Product Flexibility, Mix Flexibility, Volume Flexibility, Delivery Flexibility)*, which are the general manufacturing system objectives that define the flexibility of the whole system. Slack (1988) states that the degree of flexibility of resource flexibility dimensions determines the degree of flexibility of the four types of system flexibility.

In another study, Sethi and Sethi (1990) have developed a framework to illustrate the interrelatedness of manufacturing flexibility dimensions. In their study, based on the eight flexibility dimensions provided by Browne et al. (1984), they have defined eleven flexibility dimensions (*machine flexibility, material handling flexibility, operation flexibility, process flexibility, product flexibility, routing flexibility, volume flexibility, expansion flexibility, program flexibility, production flexibility, market flexibility*) an have classified those dimensions as:

1. Component (Basic) Flexibilities: *Machine Flexibility, Material Handling Flexibility, Operation Flexibility.*
2. System Flexibilities: *Process Flexibility, Product Flexibility, Routing Flexibility, Volume Flexibility, Expansion Flexibility.*
3. Aggregate Flexibilities: *Program Flexibility, Production Flexibility, Market Flexibility.*

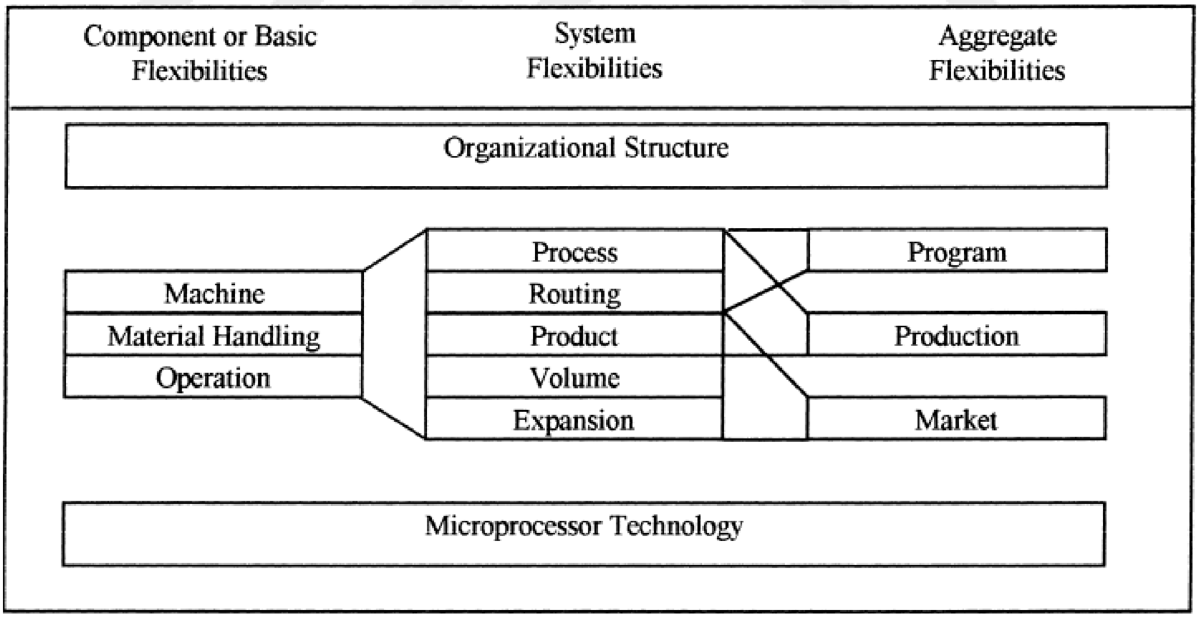

Figure 2.3 Linkages between flexibility dimensions (Sethi and Sethi, 1990)

Similar to the Slack's flexibility hierarchy, Sethi and Sethi (1990), in their framework, illustrated in Figure 2.3, have proposed that Basic Flexibilities contribute to System

Flexibilities and System Flexibilities create Aggregate Flexibilities, which create competitive advantage for the company.

Apart from different definitions of flexibility dimensions, as in the framework developed by Sethi and Sethi (1990), flexibility dimensions have been classified as, “First Order Flexibilities (mix, volume, product and delivery-time flexibilities) which are important for the customers and directly affect the competitive position of a company and all other flexibility dimensions are “Lower Order Flexibilities” (Suarez et al., 1996). Moreover, it has been stated that there is a hierarchical relationship between those as Lower-Order Flexibilities are needed to have First-Order Flexibilities. A similar classification has also been made as *Internal Flexibilities* and *External Flexibilities* (Upton, 1994). Internal Flexibilities are defined *as “What we can do”* and External Flexibilities are defined as *“What customers see”* (Upton, 1994).

Narasimhan and Das (1999) have developed a hierarchical classification of the flexibility dimensions as illustrated in Table 2.13. Their hierarchical framework consists of three levels, from bottom to top sequenced as, operational flexibilities, tactical flexibilities and strategic flexibilities. Operational flexibilities are the machine/shop floor level flexibilities and provide a basis for upper level flexibilities. Machine, routing, material handling, program and equipment flexibilities are encountered as operational flexibilities. Tactical level flexibilities are plant level flexibilities derived from infrastructural and organizational enablers and as well as tactical level flexibilities. Mix, volume, expansion and modification flexibilities are classified as tactical flexibilities. At the top of their flexibility hierarchy, Narasimhan and Das (1999) placed *strategic flexibilities*, which are company level flexibilities and have a direct impact on the competitive position of the company. New product and market flexibilities are encountered as strategic flexibility.

Table 2.13 Hierarchical Classification of Manufacturing Flexibilities (Narasimhan and Das, 1999)

Level	Manufacturing Flexibility Dimensions	Description	Supporting Literature
Operational flexibilities (Machine/Shop Level)	Equipment Flexibility	“The ability of a machine to switch among different types of operations without prohibitive effort”	Browne et al., 1984; Carter, 1986 Gerwin,1993
	Material Flexibility	“The ability of equipment to handle variations in key dimensional and metallurgical properties of inputs”	
	Routing flexibility (can derive from equipment flexibility or from duplicated facilities)	“The ability to vary machine visitation sequences for processing a part”	Browne et al., 1984; Gerwin 1993
	Material handling flexibility (can support routing flexibility)	“The ability of the material handling system to move material effectively through the plant”	Sethi and Sethi, 1990; Gupta and Somers, 1992
	Program flexibility	“The ability of equipment to run unattended for long periods of time”	Sethi and Sethi, 1990; Gupta and Somers, 1992
Tactical flexibilities (Plant level)	Mix flexibility	“The ability of a manufacturing system to switch between different products in the product mix”	Browne, et al., 1984; Gerwin, 1993; Gupta and Somers, 1996
	Volume flexibility	“The ability of the manufacturing system to vary aggregate production volume economically”	Slack, 1988; Browne et al., 1984; Sethi and Sethi, 1990
	Expansion flexibility (supports volume flexibility)	“The ability to expand capacity without prohibitive effort”	Browne et al., 1984; Gupta and Somers, 1992
	Modification flexibility	“The ability of the manufacturing process to customize products through minor design modifications”	Gerwin,1993
Strategic Flexibilities (Firm Level)	New product flexibility	“The ability of the manufacturing system to introduce and manufacture new parts and products”	Browne, et al., 1984; Gerwin, 1993; Gupta and Somers, 1996
	Market flexibility	“The ability of the manufacturing system to adapt to or influence market changes”	Sethi and Sethi, 1990; Gerwin, 1993

2.2.4 Managing Manufacturing Flexibility

It is noted that the benefits predicted for an FMS are achieved by the organizations not through the technology but through the managerial and organizational changes (Dempsey, 1983, cited by Slack, 1988). Implementation of Flexible Manufacturing Systems has different impacts on organizational attributes, which are inevitable to benefit from FMS. The major influence of FMS on Organization Design will be the need to develop an organizational structure which will support the implementation of three basic objectives, product differentiation, efficiency and product development (Nemetz and Fry, 1988). In this manner, FMS Organizations have *organic structures* to facilitate functional integration, which is pointed out by researchers as inevitable for utilizing flexibility (Bessant and Haywood, 1986) and continuous improvement (Sonntag, 1990). Moreover, closer integration with suppliers (Chang et al., 2007) and closer relationship with Customers (Bessant and Haywood, 1986) reinforce effectiveness of manufacturing flexibility for the firm.

Organizations which implemented FMS have more flat organizational structure with few hierarchical levels where span of control is narrow and decision making is Decentralized (Sonntag, 1990, Nemetz and Fry, 1988). Team work is inevitable when needed in these organizations (Sonntag, 1990). Moreover, in those FMS implemented organizations, skill of labor is both deep and breadth (Adler, 1988).

The reward system is based on innovation rather than production as in mass production organizations (Nemetz and Fry, 1988). In their empirical study, Suarez et al (1996) illustrated that that involvement of workers in problem solving activities and flexible wage scheme for plant workers are positively correlated with new-product, mix and volume flexibility. Additionally Maffei and Meredith (1995) state that the role of the operator has to change in Flexible Manufacturing Systems and the Operator needs to have more expansive managerial-type role for the operator. In contrast, Upton (1995) has illustrated that workforce experience has a negative impact on some flexibility dimensions as product flexibility.

Size of the organization also affects the flexibility of manufacturing function. Larger organizations have less flexibility in manufacturing function (Vokurka and O'Leary-Kelly, 2000).

Both cooperation with suppliers and customers and also between management and workers enhance the flexibility of manufacturing resources and systems. Within the firm cooperativeness takes the form of management providing training and job security and encouraging employee participation in decision making (Sonntag, 1990).

2.2.5 Strategic Management and Manufacturing Flexibility

In addition to the organizational aspects of manufacturing flexibility, researchers also studied the strategic management aspects of the concept. Business strategy has direct effects on the adoption of manufacturing flexibility dimensions (Vokurka and O'Leary-Kelly, 2000).

Manufacturing flexibility remains a key strategic objective of many organizations (Beach et al., 2000). The elements of manufacturing strategy are stated as "*cost, quality, flexibility and technology*" (Adam and Swamidass, 1989). Moreover, in another study, the major objectives of manufacturing strategy are listed as "*quality, dependability, cost and flexibility*" (Olhager, 1993).

Additionally, the elements of manufacturing strategy are defined as "availability, productivity and dependability" (Slack, 1988). Manufacturing Flexibility enables better availability, better productivity and dependability which increase company competitiveness.

By definition, manufacturing flexibility has been evaluated as a strategic tool to handle environmental uncertainty (Gupta and Goyal, 1989). In other words, manufacturing flexibility improves *agility* which makes it inevitable to cope with external uncertainty (Kim, et al., 2013). Most of the researchers defined the relationship between manufacturing flexibility and environmental uncertainty as "reactive". The impact of manufacturing flexibility on environmental uncertainty could be both reactive and proactive (Gerwin, 1993). Companies could follow one of four generic strategies which could be listed as "*Adaptation, Redefinition, Banking and Reduction*" in order to cope with environmental uncertainty. Manufacturing flexibility is needed to adapt environmental changes as a reactive response for the companies who follow *adaptation strategy*,. Besides, a company who has a *redefinition strategy*, which is a proactive strategy, flexibility is needed to create more uncertainties in the environment by changing services, products, and lead times. Companies might also ***bank*** *flexibility* that is to hold manufacturing flexibility in reserve for future needs. In this case, flexibility is an investment for future options. Lastly, companies might try to ***reduce*** environmental uncertainty by long term contracts, preventive maintenance or buffer inventory. In this case, flexibility is also decreased.

A manufacturing firm's flexibility can be considered as a *dynamic capability*. As an internal capability, flexibility enables the company to act independently to reduce uncertainties in the market. As an external capability, flexibility provides a different set of managerial aspects for participation in a supply chain. This duality has the potential to contribute as a significant competitive advantage (Genchev and Willis, 2014).

Gerwin (1993) has developed a framework to illustrate the relationship between Manufacturing Flexibility, Strategy and Environmental Uncertainty and Performance Outcomes as illustrated in Figure 2.4.

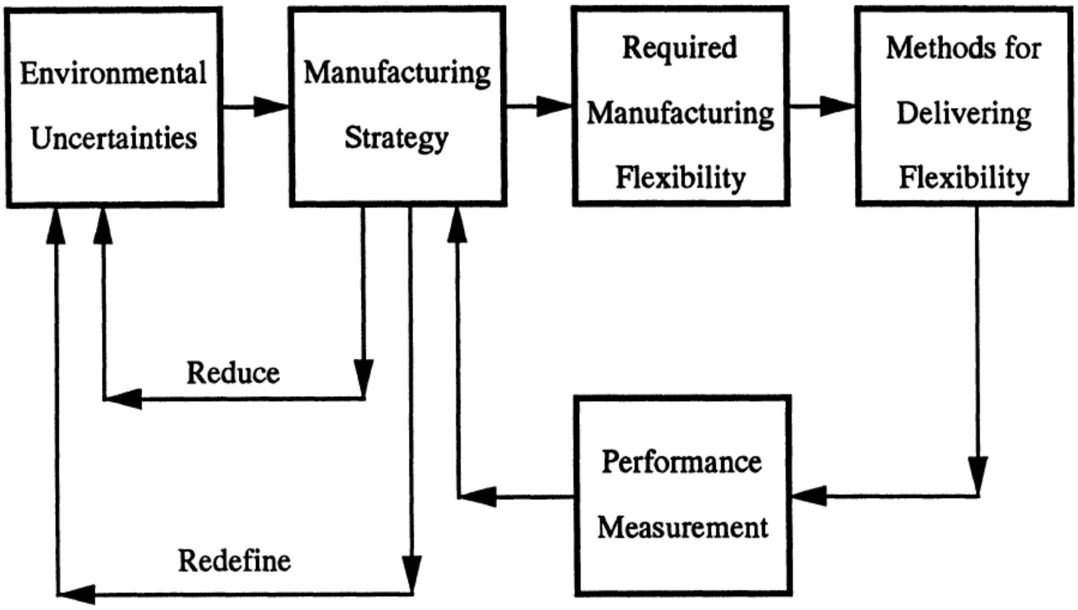

Figure 2.4 Manufacturing Flexibility and Manufacturing Strategy (Gerwin, 1993).

In his model, Gerwin (1993) used Slack (1988)'s definition of elements of Manufacturing Strategy as (Productivity, Dependability, Availability). Manufacturing Strategy could be either reactive to reduce impacts of Uncertainty, or proactive to redefine Environmental Uncertainty. In both strategies, different Manufacturing Flexibility dimensions in different levels are required. Methods are implemented to deliver required manufacturing flexibility dimensions in required levels to attain objectives of manufacturing system (productivity, dependability, availability).

The relationship between Manufacturing Strategy and Manufacturing Flexibility was explored by Ettlie and Penner-Hahn (1994). In their empirical research, they have listed the objectives of Manufacturing Strategy as (quality, cost, flexibility and delivery). A firm who has more focused manufacturing strategy illustrates less flexibility in manufacturing.

In an empirical study which has been conducted to analyze the relationship between Business Strategy and Manufacturing Flexibility, firms, according to the business strategy that they follow, have been classified into three categories: *Preemptive/first Mover*, *Low Cost/Follower* and *Differentiation/Follower (Chang et al., 2003).* In order to analyze Manufacturing Flexibility, six external flexibility dimensions as (*Product, Mix, Volume, Delivery, Modification, and Service*) have been evaluated. The research has illustrated that the firms who have *Preemptive/ First Mover* strategy requires product, volume and mix flexibilities for high performance. On the other side, the existence of modification, delivery and service flexibilities have a positive impact on business performance in the firms who have *Differentiation /Follower* strategy. Lastly manufacturing flexibility does not help firms with *Low Cost /Follower* strategy in regard to their business performance.

2.2.6 Manufacturing Flexibility Research in Turkey

Although there are quite body of research regarding manufacturing flexibility and flexible manufacturing systems in Turkey, most of the studies conducted in the field have focused on more operational and engineering problems as planning, job scheduling, machine loading (i.e.). Our study, as a comprehensive study on management of flexible manufacturing will be a pioneering one in Turkey as well.

In her master thesis, Kose (2003) has studied the usage of Advanced Manufacturing Technologies in manufacturing firms and the impacts of Advanced Manufacturing Technologies on the production and sales performance. In this manner she has developed an instrument and conducted a survey among manufacturing firms located in Aegean Region (Izmir, Manisa, and Denizli). The manufacturing flexibility dimensions' definitions and measures have been developed based on the dimensions defined by Browne et al. (1984). They have founded that firms who give importance to Expansion Flexibility and Production Flexibility have the objective to provide variety of products upon the needs and requests of the customers. Moreover the study has illustrated that the usage of flexible manufacturing systems decreases product costs. Additionally the companies who use flexible manufacturing systems have ability to deliver products more appropriate to the customer preferences.

Another study has been conducted by Zerenler (2003). In his PhD Dissertation, he has investigated the impact of manufacturing flexibility on firm performance during crisis periods. In his study, he has defined the term manufacturing flexibility and the dimensions of manufacturing flexibility and particularly the term dynamic flexibility, as the ability to deal with uncertainty in the form of unpredictable events (Carlsson, 1992), which is important for the firms during the crisis periods. Specifically he has dealt with production process flexibility. He has conducted a survey among Top 500 manufacturing companies listed in Capital Magazine for year 2002. In his research, it has been illustrated that the firms with higher degree of flexibility in their manufacturing processes perform better than the firms with lower degree of flexibility in their manufacturing processes during crisis periods.

2.3 Market Dynamism

Previous research on manufacturing flexibility has supported the idea that market dynamics are related to building suitable infrastructures (Anand and Ward, 2004).

The competitive environment can be classified according to three general factors: objects, attributes, and perceived uncertainty (Bourgeois, 1980). The first factor, the environment as objects, refers to the different aspects of a firm's environment, such as customer demand patterns, supplier dependability or the length of product life cycles. The second factor, attributes, consists of three general dimensions: *complexity, munificence, and dynamism* (Dess and Beard, 1984).

Complexity refers to the heterogeneity or ''the number and diversity of external factors facing an organization'' (Bourgeois, 1980), where as munificence gauges the supportiveness of an environment in terms of the availability of resources or the ability of the environment to foster the growth of firms within it. Dynamism refers to *the degree of instability, or the turbulent nature*, of the marketplace in which a firm competes. Dynamism is also defined as to *the rate of change, absence of pattern and unpredictability of the environment* (Dess and Beard, 1984). Similarly, dynamism has been explained as a combination of instability and uncertainty (Tagerden et al., 2003). In broad terms, dynamism refers to the *volatility, uncertainty, instability, unpredictability* and *rate of change* present in a firm's environment (Eroglu and Hofer, 2014).

Characteristics of the market dynamism result in high product variety and high demand uncertainty (Sharma et al., 2004 cited in Yildirmaz, 2009). In a dynamic environment change occurs at a faster pace and greater magnitude (Rosenzweig, 2009). Market dynamism exerts an external impact on firms due to various changes induced by different sources, such as technology innovation, customer expectation and product demand (Chan et al., 2015)

The research has been conducted to investigate the relationship between market dynamism, manufacturing flexibility and the type of automation components in 24 manufacturing firms from automobile industry and 15 manufacturing firms from machine tools industry in India. They have listed the characteristics of market dynamism as follows:

- High rate of New Product Development
- Shifts in demand of different model
- Shifts in total demand
- Shifts in customers' loyalty

- Fast changing technology (Sharma et al., 2004 cited in Yildirmaz, 2009).

Constantly changing technology enables product and process innovation which induces shorter life cycles and thus, providing more choices to the customers and different competition ways to the companies (Chang et al., 2003). Moreover the developments of information and telecommunications technology also induce environmental uncertainty (Prastacos et al., 2002). By the help of new technologies, information flow takes place immediately, which results in shorter product life cycles, faster new product development and adapting to each customer more quickly (Hitt et al, 1998).

Different events cause dynamism (Milliken, 1990). It is a consequence of a set of primary uncertainties, which refer to exogenous variables, such as changing customer preferences or the appearance of new technologies. The level of dynamism is determined by the existence of competitive uncertainties (Dudaroglu, 2008). Moreover the actions carried out by existing firms in competitive environments can also cause to dynamism (Yildirmaz, 2009). A firm can encourage customers to see the benefits of shorter lead times or more frequent new product introductions and then provide those by the help of manufacturing flexibility. Once more, by creating more uncertainties for its rivals the firm has established a powerful competitive advantage (Gerwin, 1993).

Market dynamism is related to the rate of change of the customer preferences, market segments, demand patterns (Javorski and Kohli, 1993) and innovation in the market (Li and Liu, 2014). It could be described as the rate of changes in competitive conditions related with customers' demand (Simon et al., 2002) and a result of factors such as rapid shift in technology, price, and variance in product availability and support services (Cannon et al., 2000).

Market dynamism has defined as a heterogeneous flow of opportunities and has four dimensions of dynamism which affect performance as:

Velocity – the rate of opportunities flow into a given environment

Complexity- the degree to which environmental opportunities have many features that must be successfully dealt with by the firm.

Ambiguity – the degree to which the environment is difficult to interpret

Unpredictability- the degree to which it is difficult to forecast the environment and future opportunities (Davis et al, 2007).

In their study, Yilmaz et al. (2005) have measured market dynamism with the rate of changes in *Customer Preferences, Competitors' Strategies, Product Characteristics and Technology.*

A dynamic environment challenges manufacturing firms to adjust their plant's processes more rapidly (Azedegan et al., 2013). Many of the researchers, in the field of manufacturing flexibility, point to the use of flexibility to accommodate environmental uncertainty (Beach et. al, 2000). Manufacturing flexibility is claimed to be required to maintain competitiveness in a changing business environment, and cites current issues such as a rapidly decreasing product life cycle, the influx of competitors, an increasing demand for product changes and the introduction of new products, materials and processes (Frazelle, 1986). Additionally, Correa (1994) has suggested that environmental uncertainty and variability in outputs are the two main reasons that manufacturing flexibility is sought.

Manufacturing flexibility enables organizations to perform better than Mass Production Organizations in turbulent and complex environment characterized with dynamic change (Nemetz and Fry, 1988).

The effects of perceived environmental uncertainty on manufacturing flexibility has been investigated in an empirical study (Swamidass and Newell, 1987). In the study, moderate support has been found for the hypothesized relationship that perceived environmental uncertainty would have a positive impact on manufacturing flexibility. Similiarly, in another recent study, it has been illustrated that hypercompetitiveness of environment increases organizations' metaflexibility level (which is defined as learning capability or ability to solve paradoxes) and also increases manufacturing flexibility (Llorens et al. , 2005).

Managers of the firms operating in such complex and dynamic environments needs a paradigm shift to guide their organizations (Yildirmaz, 2009). New principles have emerged for managing firms in these environments where time frames for strategic decisions are narrower. In other words, dynamic environments force the firms to develop strategic flexibility to obtain sustainable competitive advantage (Cingoz and Akdogan, 2013). Market dynamism does not only affect organizational decisions and activities, but also the nature of work in organizations (Dudaroglu, 2008).

2.4 Firm Performance

Research on the relationship between manufacturing flexibility and performance is insufficient (Ling-yee and Ogunmokun, 2008). Researchers consider organizational performance as an important parameter when investigating organizational structure, strategy, and planning (Dess and Robinson, 1984). Performance, "*refers to efficiencies in terms of utilization of resources as well as the accomplishment of organizational goals*" (Steers, 1982; cited in Dyer, 2006). There are three major approaches for measuring firm performance in the literature (Hitt et al., 1998) which are:

1. Goal Approach (Etzioni, 1964)
2. System Resource Approach (Yuchtman and Seashore, 1967)
3. Constituency Approach (Thompson, 1967)

The goal approach measures the performance by explicit goals such as profit, growth, net sales, etc. The system resource approach measures the firm performance in terms of the key factors upon which the firm depends for survival (Yildirmaz, 2008) and lastly constituency approach measures the performance as the degree of fulfillment of constituent needs (Dess and Robinson, 1984).

Firm performance is a multidimensional construct which can be measured by many different tools (Dudaroglu, 2008). Ruekert et al. (1985) conceptualized performance in three dimensions as *effectiveness, efficiency* and *adaptiveness*. *Effectiveness* considers the degree to which the goals are reached. *Efficiency* focuses on the relationship between outputs and the inputs required to reach those outputs. *Adaptiveness* reflects the ability of the organization to adapt to environmental changes. Efficiency is associated with profitability; effectiveness is associated with achieving nonfinancial goals, and adaptiveness is associated with adaptation to changes (Homburg et al., 1999).

Dimensions of firm performance are classified as financial, operational and organizational (Hart, 1992). Financial performance includes return on investment, return on sales, return on equity, earnings per share and sales growth. Operational performance includes new product development and marketing effectiveness. Organizational performance reflects broad organizational outcomes and capabilities such as employee satisfaction and organizational focus on quality or adaptability.

Firm performance could also be classified as ***financial-market related performance*** which includes, Sales Growth, Market Share, Return on Assets, Return on Sales and Overall

Profitability and ***qualitative performance*** which includes, Quality Improvements, New Product Development Capability, Employee Satisfaction and Employee Commitment (Yilmaz et al., 2005).

A manufacturing firm’s performance can be measured by financial indicators such as return on investment, return on sales, return on equity, earnings per share, and sales growth; and by operational indicators such as market share, new product development, product quality, and market effectiveness (Gupta and Somers, 1996). Operational success could lead to financial performance. New product development is one of the prominent performance indicators (Gupta and Somers, 1996) of manufacturing firms and the speed of a new product development gives firms competitive advantage in the marketplace.

Over the last two decades, several studies have provided evidence for the relationship between flexibility and performance in manufacturing (Hallgren and Olhager, 2009). Gerwin (1993) suggested that the level of performance of a firm is contingent on its ability to match the appropriate type of flexibility with the corresponding type of environmental uncertainty confronting the firm.

Slack (2005) remarked that flexibility can bring about both direct and visible and indirect and less visible performance outcomes. It has been found empirically that manufacturing flexibility has a significant impact on direct performance outcomes such as reduced manufacturing costs, sales growth and financial profitability (Ling-yee and Ogunmokun, 2008). Significant positive relationship between manufacturing flexibility and financial performance has been found in several studies (Swamidass and Newell, 1987; Vickery et al., 1997). Further empirical evidence has emerged that manufacturing flexibility has a significant impact on indirect performance outcomes such as new product flexibility. In another study, it has been found that high-mix flexibility plants have a shorter cycle time (Suarez et al., 1996).

In an empirical study conducted to investigate the relationship between manufacturing flexibility, business strategy and business performance, the measure of business performance is considered to include both financial (net profit) and non-financial (growth and successful new product introduction) performance for the firms who have *Preemptive/ First Mover* or *Differentiation /Follow* strategy (Chang et al., 2003).

In a research which has been conducted to investigate the competence–flexibility and flexibility–performance relationships, firm performance has been defined with two attributes, *economic achievement* , which has attributes as profitability, market share, capacity utilization and unit cost reduction, and *innovation achievement* which has attributes as developing new products and modifying/upgrading the existing products (Ling-yee and Ogunmokun, 2008).

Lynch and Cross (1991) have developed a framework to illustrate the relationship between manufacturing flexibility and performance measures, In their model, customer satisfaction refers to external performance measure and productivity as internal performance measure. There are also lower-level performances: product quality and delivery reliability constitute the customer satisfaction; delivery reliability and short process lead times improve the flexibility; short process lead times and process quality and cost influence the productivity. However there is a lack of rigorous analytical models, capable of generating clear relationships between the degree of flexibility in a system and the system's level of performance (Benjaafar and Ramakrishnan, 1996).

2.5 Integrated Management Model

Integrated Management Model is introduced by Knut Bleicher from University of St. Gallen on 1991 in his book named *"Das Konzept Integriertes Managament (The Concept of Integrated Management"*. Bleicher (1999) built the Integrated Management Model upon the theoretical framework of the system approach developed by Hans Ulrich and named St. Gallen Management Concept from in late 60's. (Jungmeister and Gomez, 2008).

2.5.1 St. Gallen Management Concept

St. Gallen Management Concept defines firms as *complex and dynamic systems*. Since, as a system, a firm consists of elements, the diversity of these elements and the interaction between these elements creates *complexity* (Rüegg-Stürm, 2005). As a *dynamic system*, constant development and "re-construction" occurs as a charachteristic of the firm in a recursive manner (Bleicher, 1999). In a dynamic and complex system, Ulrich (1984) states that management has three functions: *"Forming, Steering and Development"*. Figure 2.5 illustrates the functions of management conceptualization of St Gallen Management Concept.

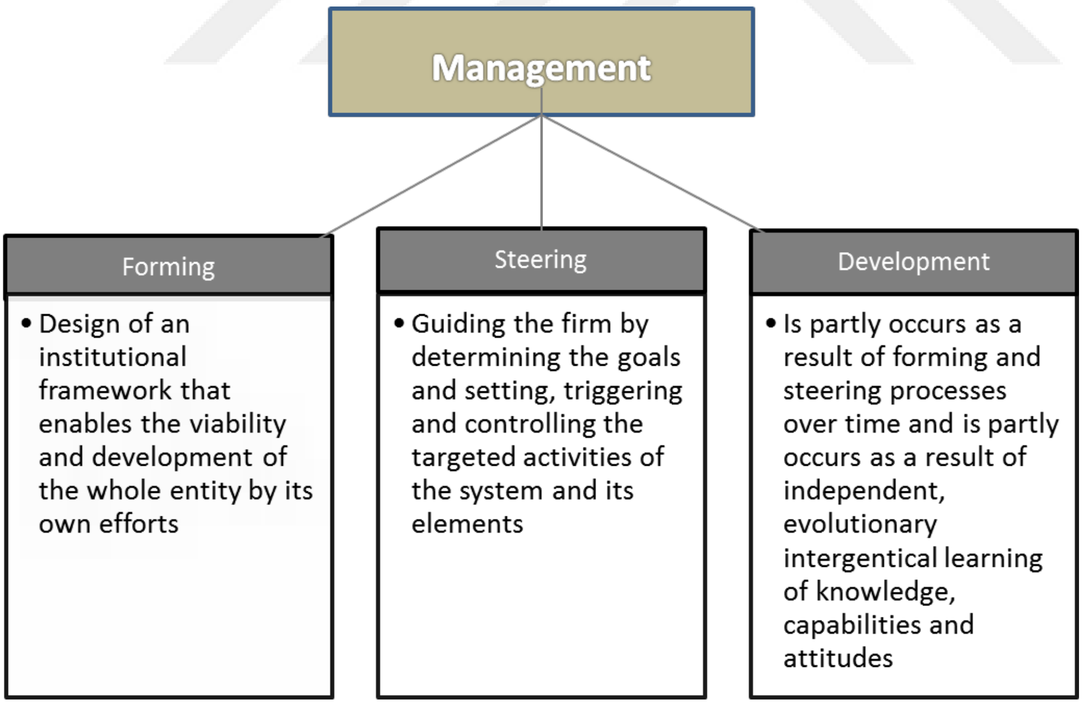

Figure 2.5 Functions of Management (Bleicher, 1999)

Upon the three functions of management illustrated in Figure 4 and system approach to organizations, Ulrich (1984) defines management as *"forming, steering and further developing productive socio-technical systems"* (Reügg-Stürm, 2005). In a newer view on the functions of management, *forming* and *development* are counted as more essential functions. Steering function is hided with the *self-forming* and *self-development* aspects of the organizations as socio-technical systems. Moreover, they are becoming more and more rational for the organizations to adapt dynamic environmental conditions and as well as to satisfy growing needs of the employees for a significant motivation (Bleicher, 1999).

As a systemic view of management, St. Gallen Management Concept aims to provide a multi-dimensional classification of decision problems. It provides a problem-oriented framework and methodology for an integral conceptualization of problem solving approaches, considering contextual and situational factors of corporate development (Risopoulos, 2006) in a holistic view (Pado, 2016). At the same time, the model serves as a framework for a variety of management techniques, tools and concepts (Jungmeister and Gomez, 2008). According to Ulrich (1984), system approach has become scientific for new man agement science that strives for an *integrative*, *holistic* effort for *designing, controlling, and development* of organizations as socio-technical systems (Demirel, 2008).

2.5.2 Evolution of Integrated Managment Model

In the search of a new, integrated management tought; Ulrich (1984) recommends three management levels: normative, strategic, and operative. These three management levels represent logically distinguishable problem areas to be dealt by management. Such a distingished definition of management levels does not mean a seperation of responsibility between different management categories, instead, for an *integrated* management view, all levels need to be considered together (Bleicher, 1994). The management levels in Integrated Management Model are defined according to the impact of time dimension.

Normative Level is about the corporate survival and development capabilities of the firm and deals with general aims, principles and norms. It defines the aims of the organization serves the meaning of the identity for the members of the *"social system"*, and gives the organization a distinct direction (Baldegger, 2012). Due to the "*constitutive role*", Normative Level is the basis for all activities of the management (Bleicher, 1994).

Strategic Level is about the construction, maintanence and utilisation of success potentials (Alsan and Oner, 2003) and also allocation of the resources (Baldegger, 2012). As normative level plays a role as foundation for all management activities, strategic management *directs* these activities (Bleicher, 1994).

Operative Level is about implementing normative and strategic objectives into processes (Bleciher, 1994). Efficiency is the key for activities at Operative Management Level.

These Three Management Levels are integrated in vertical level through *goals, structures and Behavior* (Bleicher, 1994). Integrated Management Model is based on the defined integration. Bleicher (1999) proposes a method which enables the construction of an organizational profile for assessment by means of two dimensional structures of the problem areas of management: the impact of time (vertical view) and constituting elements (horizontal view).

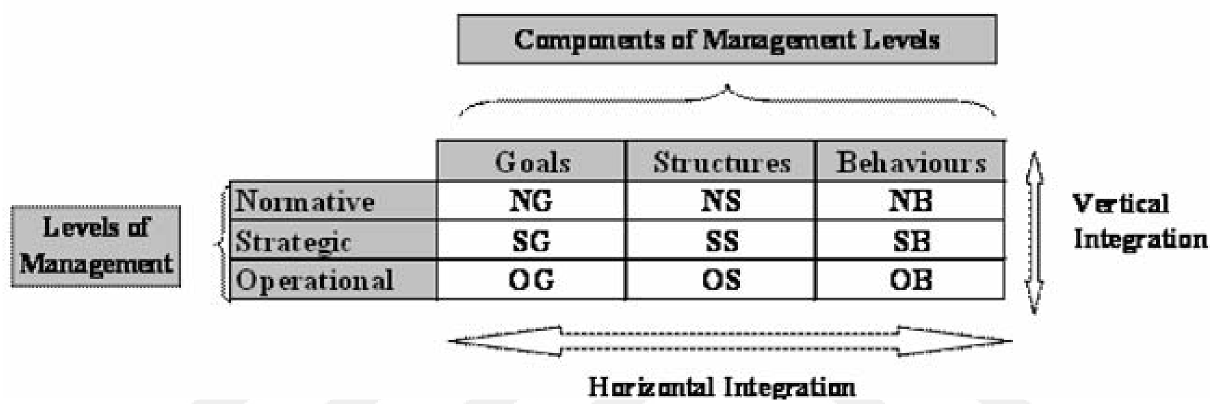

Figure 2.6 Integrated Management Matrix (Bleicher, 1999, cited in Alsan and Oner, 2003)

As illustrated in Figure 2.6, the vertical integration which has been defined according to the time dimension which requires the execution of different activities.

On the horizontal view, each management levels consist of three components: *structures, goals* and *behavior.* This issue is based on the assumption that the management activities influence the organizational activities in such a way that the structures are influenced, goals are determined and a basic and agreed behavioral pattern is created. The structure covers the order of elements in a system and their relationship and on the other hand the instruments for the generation of such arrangements (Alsan and Oner, 2003).

The normative level fulfills the foundational function (ought to be), the strategic level executed the orientation function where the operational level carries the function of realization.

Integrated Management Model (IMM) emphasizes that the normative, strategic and operative duties are not stratified by one organizational layer but distributed over all of the organization.

IMM enables management of all aspects simultaneously regardless of any priority (Gorzelany-Dziadkowiec and Fudalinski, 2013).

Saritas and Oner (2004) stated that Integrated Management Model (IMM) indicates following basic notions of systems approach:

1. “The framework is integrative and brings different components and levels of management together to provide a more complete picture.”
2. “Management is a multilevel process in IMM with normative, strategic and operational levels”.
3. “IMM conceives management as a multidimensional process. It brings three components of management together as goals, structures and Behaviors.”
4. “Management is a recursive process. In principle, the whole scheme applies to any level of recursion of an organization.”
5. “All components and levels that constitute the framework are dynamically interrelated.”

2.5.3 Fields of Integrated Management Model

Each field of Integrated Management Model requires a detailed explanation for a better understating of the model. Table 2.14 presents explanation of each field of Integrated Management Model and lists generic IMM constructs for each field. The fields of IMM can be defined on upon vertical integration.

At the normative level, goals are related with determination of long term objective and are represented by corporate policy, mission and vision statement. Such mission statements are implemented at the strategic level by programs. Programs are translated into actions in the form of tasks in operative level.

On the structure dimension, the constitution of the organization on normative level is supported by the organization structure and management systems at strategic level. At the operative level, structures and management systems are expressed with processes which are controlled by administrative systems (Besli, 2008).

Normative behavior is formed by corporate culture which is influenced by the past and shapes the future attitude of the members. Behavior at strategic level is concerned with the development of problem solving skills in the light of norms and values derived from corporate culture, which are translated into performance related behavior within working processes at operative level which are subject to leadership processes (Bleicher, 1994).

Table 2.14 Definitions of IMM Fields (Besli, 2008)

	Goal Forming, steering and development activities	**Structure** System elements, relationships, instruments	**Behaviour** Social and cultural aspects and integration of organization with its environment
Normative *Development and Viability, survival and growth*	**Organizational Policy** Mission statement Overall direction and orientation for the strategic and operative management The fundamental strategy of the business Long-term and overall goals and a basic orientation for the strategic management	**Constitution of the Organization** Values and principles that provide an overall direction Supreme values and norms Order and Regulations Rights and relations of the owners Rules of conflict management Legal design tools Humanistic social systems	**Corporate Culture** Culture acts as a catalyst between past-oriented values and forward-based behaviour Cognitive abilities of the organization Attitudes of the members towards tasks, duties, products, other members Perceptions and preferences against developments and events
Strategic *Construction, maintenance and utilisation of succes or value potentials*	**Plans and Programs** Translation of the mission statement into actions Creation, use and development of success potentials Deals with ***Effectiveness***	**Organizational Programs and Management Structures** Steering problem, management and cooperation behaviour towards the desired direction	**Problem Behaviour** Development of the problem solving skills of the members in the light of values and norms supplied by corporate culture Openness in the interaction within senior levels
Operational *Implementation; Techniques; Value Delivery*	**Operational Tasks** All normative and strategic goals are translated into operational actions through implementation Includes problem solving process of operational namagement Deals with **Efficiency** (Profitability, Quality, Productivity)	**Processes** Adaptation of structures and management systems and estabishment of an overall optimum among basic units Resource allocation, investigation and validation of information flowing between systems	**Performance and Cooperative behaviour** Development of attitudes Creaton of appropriate behaviours, motivation, coherency and synergy Increase the performance of the work processes shaped by the employee management Learning and communication processes

A proposed profiling method is available which is used to construct organization profile for assessment (Alsan and Oner, 2003). Parameters with two extremes are developed reflecting the relevant management aspect for each field. In the following sections, definition of each IMM field is provided along with the list of corresponding profiling elements with extreme values, respectively.

2.5.3.1 Normative Goals

Normative Goals are related with the long term objective of the organization and concerned with the mission and vision statements of the organization. In this field, long-term objectives are determined. For strategic and operative management level, the mission and vision statement should describe detailed direction (Demirel, 2008). The corresponding profiling elements with extremes are listed as follows:

1. "Internal direction of these missions (individual economic/social economic)";
2. "Time perspective of the goal (short-term/long-term)";
3. "Chance perspective (keep it/progressive)";
4. "Risk perspective (disturbing/vulnerable)";
5. "Objective performance goals (weak/strong)";
6. "Financial value goals (weak/strong)";
7." Ecological goals (weak/strong)";
8. "Social goals (weak/strong)"

2.5.3.2 Normative Structures

In this field, order and regulations are determined within the organization. Rights and relations of stakeholders are important for organization. The normative structures are the values and principles that provide the overall direction for the organization (Demirel, 2008). The corresponding profiling elements with extremes are listed as follows:

1. "Representation of interests in board (shareholder/ stakeholder)";
2. "Art of conflict resolution (confrontation/consensus)";
3. "Economical, legal and social structure (no differentiated/ differentiated)";
4. "Distance of the management to real life (close-operative/ far-strategic)";
5. "Competence distribution of management (single-level/ multiple-level)";
6. "Division of executives (directorial, CEO/ staff, team)";
7. "Sense of responsibility of the top team (protective/multiplier)"
8. "Rationale of the top team (monitoring/consulting)".

2.5.3.3 Normative Behavior

Organizational culture forms the normative behavior, which includes the cognitive abilities of an organization and the attitudes of its members towards duties, tasks, products, fellow members, management and organization, which shape the perceptions and preferences against events and developments (Oner and Saritas, 2004). The corresponding profiling elements with extremes are listed as follows:

1. “Cultural openness (inside oriented/ outside oriented)”;
2. “Attitude towards change (hostile/friendly)”;
3. “Cultural orientation (Top/ Basis)”;
4. “Sub cultural differentiation (uniform value system/ functionally different, but joint value system confined to division)”;
5. “Cultural expression (instrumental/development oriented)”;
6. “Value added orientation of management (cost oriented/ benefit oriented)”;
7. “Role of employees (members/Actors)”;
8. “Employee engagement (collective, us/individual, hero)”.

2.5.3.4 Strategic Goals

This field of IMM is mainly concerned with the creation, use and development of success potentials. Organization policy delivers long-term and overall goals and a basic orientation for the strategic management in the strategic goals (Alsan and Öner 2003). The corresponding profiling elements with extremes are listed as follows:

1. “Supply of performance (broad/narrow)”;
2. “Individuality of problem solving (standardized/ individual)”;
3. “Competitive posture (defensive/offensive)”;
4. “Leader-follower behavior (leader/follower)”;
5. ”Value-added activities (cost oriented rationalization/ customer focused optimization)”;
6. “Dependency of value-added activities (independent/ networking)”;
7. “Deployment of resources (fixed/flexible)”;
8. “Performance of resources (specialized/generalist)”

2.5.3.5 Strategic Structures

Strategic goals need to be supported with corresponding organizational structures and programs within strategic structures. These structures are supported with management systems which steer the problem, management and cooperation Behavior towards the desired direction. The corresponding elements with extereme values are listed as follows:

1. “Focus (issue-oriented/person-oriented)”;
2. “Reference points (formal rules/symbols)”;
3. “Extent of rules (single rules, efficiency oriented/ framework rules, effectively oriented)”;
4. ”Time orientation (unlimited period/predicTable period)”;
5. “Synergy orientation (central/ decentral)”;
6. “Hierarchy (high/low)”

2.5.3.6 Strategic Behavior

Bleicher (1999) explains this field of the IMM matrix as development of the problem solving skills of the members of the organization in respect to values and norms supplied by the organizational culture. The profiling elements of this IMM field with extreme values are listed as follows:

1. “Level of participative behavior for management decisions (low/high)”;
2. “Focus of behavior development (individual/team)”;
3. “Desired management behavior (risk-averse/ entrepreneurial)”;
4. “Desired competency potential (specialist/generalist)”;
5. “Authority development (institutional, hierarchy based/ communication, specialist based)”;
6. “Focus of desired responsibility (dependence, member only executes/ delegation, autonomous)”;
7. “Place of behavior development (on the job/off the job)”;
8. “Type of desired learning behavior (vertical, horizontal)”

2.5.3.7 Operative Goals

In this field of IMM, the goals and success criteria established on higher levels are adjusted to the functioning of the system. The degree of this adjustment can be measured in terms of the benefits. Bleicher (1999) provides a sample set of techniques for

the methodological focus according to the objects of operative management. Management techniques for operative goals are:

1. “Goal setting techniques”;
2. “Problem identification and diagnosis”;

3. “Generation of alternatives”;
4. “Assessment, evaluation and decision making techniques”
5. “Order definition and instructions”.

2.5.3.8 Operative Structures

Bleicher (1999) provides a sample set of techniques for the methodological focus according to the objects of operative management. The techniques that could be used in the case of operational structures are:

1. “Survey techniques”;
2. “Representation techniques”;
3. “Implementation methodologies”
4. “Organizational development”

2.5.3.9 Operative Behavior

This field concerns with the development of attitudes in operational level in order to increase the performance of work processes. Creation of appropriate behaviors, motivation, coherency and synergy among employees upon the organization are all based on the operational behaviors. (Oner and Saritas, 2004) Operative behavior includes;

1.” Behavior diagnosis”;
2. “Creativity techniques”;
3. “Motivation techniques”;
4. “Group Dynamics”.

3 PROPOSED INTEGRATED FLEXIBLE MANUFACTURING MANAGEMENT MODEL

This chapter provides outlines of development of IFMMM (Integrated Flexible Manufacturing Model) and the other constructs of the research model along with the development of the research questionnaire.

3.1 General Characteristics of a Model

Before introducing Integrated Flexible Manufacturing Management Model, it is necessary to discuss the basic features of a model. A model is *a mapping of* a system – or a specific part of a system, which is reconstructed on a special purpose to study the system as a whole or partially (Rüegg-Stürm, 2005). An assessment of the models has been proposed by Deutsch (1963, cited in Alsan and Oner, 2003) by identifying three basic criteria for the evaluation and selection. According to him, the quality of a model is evaluated upon the following:

1. *Economy*
2. *Significance*
3. *Explanatory or predictive powers.*

If a model highlights the true aspects of the represented phenomenon through a picture of the reality which is simpler than the reality, the model is considered as *economical* (Alsan and Oner, 2003). A model has more *significance*, if it highlights the important things and leaving out less important things. In other words, the significance of a model depends on what it omits rather than what it includes (Rüegg-Stürm, 2005). Lastly, a better model has greater "*explanatory or predictive powers*" (Alsan and Oner, 2003). A predictive model needs to have:

1. "*Rigor* defined as the capacity of the model to produce unique answers regardless of the user of the model"
2. "*Combinatorial Richness* refers to the range of hypotheses that could be generated out of the model"
3. "*Organizing Power* is about the capacity of the model to explain new phenomena other than those already included in".

3.2 Development of Integrated Flexible Manucaturing Management Model

IMM has been used as a conceptual framework for development of various models in prior management research. Table 3.1 illustrates a list of developed management models based on systemic approach of Integrated Management Model from different fields of management research.

Table 3.1 Selected Management Models based on IMM

Author(s)	**Name and Description of the Model**
Alsan and Oner (2003)	IFM (Integrated Foresight Management Model)
Oner and Saritas (2005)	IDMM (Integrated Development Management Model)
Gursozer-Buyukiskender (2006)	ICLMM (Integrated Customer Loyalty Management Model)
Zivojinovic (2007)	IQM (Integrated Quality Management)
Herrmann et al. (2007)	Total Life Cycle Management Model
Besli (2008)	IITMM (Integrated Information Technology Management Model)
Demirel (2008)	ISRM (Integrated Stakeholder Relationships Management Model)
Eversheim (2009)	AIM (Aachen Innovation Management Model)
Gorzelany-Dziakowiec and Fudalinski (2013)	Integrated Management in Small Enterprises

Integrated Flexible Manufacturing Management Model (IFMMM) is developed upon conceptual framework of IMM and Concept of Manufacturing Flexibility, in order to define the management capabilities of a Flexible Manufacturing Organization in an integrated manner.

Benefits of Flexible Manufacturing Systems can be utilized not only with the technological aspects but through changes in managerial and organizational attributes (Dempsey 1983, cited in Slack (1988)). IFMMM is developed to provide a framework of management at all management levels (Normative, Strategic, and Operative) and Components (Goals, Structures, Behaviors) in an integrated manner and with a holistic view.

As explained in Section 2.5.3, Bleicher (1999) has proposed a profiling method by defining elements for each IMM field with the extreme values for the defined elements individually. The list of the elements with extreme values is illustrated in Table 3.2.

Table 3.2 Elements of IMM with Extreme Values (Bleicher 1999; Alsan and Oner, 2003)

	Goals (system)	Structures (organization)	Behaviors (people)
Normative	1. "Internal direction of the mission (individual economic/social economic)"	1. "Representation of interests in board (shareholder/stakeholder)"	1." Cultural Openness (inside oriented/outside oriented)"
	2. "Time perspective of the goal (short-term/long-term)"	2. "Art of conflict resolution (confrontation/consensus)"	2. "Attitudes towards change (hostile/friendly)"
	3. "Chance perspective (keep it/progressive)"	3. "Economical, legal and social structure (non-differentiated/differentiated)"	3. "Cultural Orientation (Top/Basis)"
	4." Risk perspective (disturbing/vulnerable)"	4. "Distance of the management to real life (close-operative/far-strategic)"	4." Subcultural differentiation (uniform value system/ functionally differentiated)"
	5."Objective performance goals (weak expression/strong expression)"	5. "Competence distribution of management (single level/multiple level)"	5." Cultural expression (instrumental/development oriented)"
	6."Financial value goals (weak expression/strong expression)"	6. "Division of executives (directorial, CEO/Staff, Team)"	6. "Value added orientation of management (cost oriented/benefit oriented)"
	7."Ecological goals (weak expression/strong expression)"	7. "Sense of responsibility of the top team (protective/multiplier)"	7." Role of employees (members/actors)"
	8."Social goals (weak expression/strong expression)"	8. "Rationale of the top team (monitoring/consulting)"	8."Employee engagement (collective, us/individual, hero)"
Strategic	1. "Supply of performance (broad/narrow)"	1." Focus (issue-oriented/person-oriented)"	1. "Level of participative behavior for management decisions (low/high)"
	2. "Individuality of problem solving (standardized/individual)"	2. "Reference points (formal rules/symbols)"	2. "Focus of behavior development (individual/team)"
	3. "Competitive posture (defensive /offensive)"	3." Extent of rules (single rules, efficiency oriented/framework rules, effectivity oriented)"	3. "Desired management behavior (risk-averse/entrepreneurial)"
	4. "Leader-follower behavior (leader/follower)"	4. "Time orientation (unlimited period/predictable period)"	4. "Desired competency potential (specialist/generalist)"
	5. "Value added activities (cost oriented rationalization/customer focused optimization)"	5." Synergy orientation (central/decentral)"	5. "Authority development (institutional, hierarchy based/communication, specialist based)"
	6. "Dependency of value added activities (individual/ networking)"	6." Hierarchy (high/low)"	6. "Focus of desired responsibility (dependence, member only executes/ delegation, autonomous)"
	7. "Deployment of resources (fixed /flexible)"	7. "Organizational development (inward, towards efficiency/ outwards, towards effectiveness)"	7. "Place of behavior development (on the job/off the job)"
	8. "Performance of resources (specialized/generalist) "	8. "Starting point of organizational development (top-down/ bottom-up)"	8. "Type of desired learning behavior (vertical/horizontal)"
Operative	1. "Goal setting techniques" 2. "Problem identification and diagnosis" 3. "Generation of alternatives" 4. "Assessment, evaluation and decision making techniques" 5. "Order definition and instructions"	1. "Survey techniques" 2. "Representation techniques" 3. "Implementation methodologies" 4. "Organizational development"	1. "Behavior diagnosis" 2. "Creativity techniques" 3. "Motivation techniques" 4. "Group dynamics"

While developing IFMMM, elements of each IMM field have been processed individually within the context of manufacturing flexibility. For each element, a proper proposed extreme value has been searched in related manufacturing flexibility upon the profiling definitions of Bleicher (1999).

As illustrated in Table 3.2, Bleicher (1999) did not propose any profiling for Operative Level Components, instead, management techniques are suggested for each operative management component. Therefore, Operative Level of IFMMM has been developed by adapting relevant manufacturing flexibility constructs.

In the remaining part of this section, construction of each IFMMM component along with the profiling elements is explained in detail.

3.2.1 Normative Goals

Normative goals are about long term objectives of the organization and concerned with mission and vision statement which determines the general direction of the organization. The profiling elements of Normative Goals along with the extreme values are listed within Table 3.2. For each profiling element, Bleicher (1999) defines basic characteristics. We have surveyed the manufacturing literature to match those basic characteristics stated in IMM to define the "ought to be" extreme for flexible manufacturing organizations' profile. Normative Goals profiling elements and corresponding proposed "ought to be" extreme value listed in Table 3.3.

3.2.1.1 Internal direction of the mission

Bleicher (1999) determined values for Internal Direction of the Mission as *Individual Economic* in one extreme and *Social Economic* in the other extreme. Social Economic extreme is characterized with cooperation with the stakeholders during determination of the goals (Bleicher, 1999). Individual Economic extreme is characterized by determination of the goals mainly upon market conditions and return on investment period.

The importance of the cooperation with the suppliers, customers and even with the other o-companies within the industry (Sonntag, 1990) has a positive impact on utilization of manufacturing flexibility (Suarez et al., 1996). Close relationship with suppliers has a positive impact on business performance in flexible manufacturing organizations (Chang et al., 2007). Moreover, the alignment of supplier involvement is a generic factor for Mix and Volume Flexibility and also product development (Oke, 2005). Therefore, we can state that the "ought to be" extreme for internal direction of the mission element as *social economic* in normative goal component of IFMMM.

3.2.1.2 Time perspective of the goal

According to IMM, time perspective of the goal has two extreme values as *short-term* and *long-term*. Short-term extreme value is characterized with determination of success potentials by evaluating the existing capabilities along with a quarterly planning. On the other hand long-term extreme value is characterized with developing needed capabilities to achieve corporate goals along with long term planning (Bleicher, 1999).

In order to capitalize manufacturing flexibility, organizations need to focus on long-range planning and development of success potentials along with support systems and structures

(Gerwin, 1993). We can state that the "ought to be" profile value for time perspective of the goal element of normative goals component of IFMMM as *long-term*.

3.2.1.3 Chance perspective

Chance perspective profiling element is proposed to have values as *keep it* and *progressive* at two extremes. *Progressive* extreme value is characterized with searching for challenges in imbalance conditions. Current circumstances also named as *"status quo"* is never considered as satisfactory. Changes in business environment are considered as a *"windows of opportunity"* for success potentials. On the other hand, *Keep it* extreme is characterized with avoiding from uncertainties, protection of "status quo" and consideration of changes in the environment as threats.

The manufacturing organizations with higher manufacturing flexibility capabilities wish to stimulate changes in the environment and use their flexibility for new success potentials (Mascarenhas, 1981; Gerwin, 1993). Therefore, we can state that the "ought to be" value for profiling manufacturing organizations via IFMMM for this element of normative goals as *"progressive"*.

3.2.1.4 Risk perspective

Bleicher (1999) proposes two extreme values for Risk Perspective profiling element of Normative Goals within IMM values as *disturbing* at one extreme and *vulnerable* at the other extreme. *Disturbing* profile is characterized with avoiding the risk and search for safety. Those companies are focusing on the causes (internal and external) disturbing situations, disturbance types and objects to eliminate the risk. On the other hand *vulnerable* profile is characterized with willingness of confrontation with the risk. Companies with *vulnerable* profile consider that avoidance from the risk might be dangerous since such a condition can weaken the innovativeness and adaptability capabilities.

Manufacturing flexibility might play a central role for the companies to stimulate the environment by destruction of the present for new success potentials (Ettlie and Penner-Hahn, 1994). Chang et al. (2007) states that risk taking aspect have a positive impact on manufacturing flexibility dimensions and for this kind of progressive companies, manufacturing flexibility has a positive impact on organizational performance (Gupta and Somers, 1996). We propose that the "ought to be" extreme value for risk taking element is *vulnerable*.

3.2.1.5 Objective performance goals

Expression of objective performance goals could be *strong* at one extreme and *weak* at the other extreme. Companies who seek to determine its own efficiency and quality standards are profiled with *strong expression of objective* performance goals. Those kinds of companies actively try to influence the market conditions and as well as competitors and target to achieve the best performance in the market. On the other hand *weak expression of* objective performance goals is associated with definition of the performance goals according competition and adaptation to the existing market conditions, reactively.

The manufacturing companies with *first mover* strategy tend to adapt new technology or enter a new market earliest to achieve high performance outcomes (Gupta and Somers, 1996). Investing in manufacturing flexibility, including product, mix and volume flexibilities improve business outcomes. On the other hand manufacturing flexibility does not have any impact on the business performance outcomes of companies with *cost/follower* strategy (Chang et al., 2003). Therefore, the targeted profile extreme for flexible manufacturing companies is proposed to be *strong expression* for Objective Performance Goals element.

3.2.1.6 Financial value goals

Acceding to IMM (Bleicher, 1999), companies might have two extreme profiles according to the expression of financial value goals element; *weak* and *strong*. *Strong expression* of financial goals is associated with the highest desire for reaching financial goals. Realization of financial performance goals is evaluated as the prerequisite for developing new potentials. The companies with *weak expression* of financial value goals profile set the financial goals according to the minimum requirements for survival and the demand for realization of the financial goals is relatively weak.

It has been found empirically that manufacturing flexibility has a significant impact on direct financial performance outcomes such as cost reduction and financial profitability (Ling-yee and Ogunmokun, 2008). Significant positive relationship between manufacturing flexibility and financial performance has been found in several studies (Swamidass and Newell, 1987; Vickery et al.,1997). In that sense, we can conclude that the expression of financial goals performance “ought to be” strong accoding to profiling of IFMMM.

3.2.1.7 Ecological goals

Expression of ecological goals might be either *weak* or *strong* at two extreme. The companies, in which ecological goals are expressed *strongly*; realization of ecological goals, which are derived from corporate social responsibility, is assumed to be an important element of corporate success. In those companies, ecological goals are stated clearly in corporate policies and achievement is evaluated. On the other hand, *weak* expression of ecological goals is associated with the consideration of ecological goals as a source of additional costs. In those companies, ecological goals are set according to legal requirements.

Environmentally friendly manufacturing is a prerequisite for manufacturing companies operating around the globe. Moreover, manufacturing companies need to incorporate ecological factors and parameters into corporate strategies and policies to maintain a competitive edge (Sarkis, 1995). Therefore, we can state that, based on manufacturing flexibility literature, the expression of ecological goals "ought to be" strong in IFMMM model.

3.2.1.8 Social goals

According to IMM, social goals might be expressed *weak* at one extreme and *strong* at the other extreme. *Strong expression* of social goals means that the inclusion of the social concerns is the driving force behind entrepreneurial action (Bleicher, 1999). In those companies, human resources are considered as the key for corporate policy and personal development of the employees is desired. At the other extreme, satisfaction of the social needs is only desired as a tool for performance enhancement. In this kind of companies, where social goals are expressed *weakly,* the consideration of social goals is used as a means of "*personnel marketing*".

There is a consensus on the importance of the human resource practices for a successful flexible manufacturing organization (Adler, 1888; Nemetz and Fry, 1988; Sethi and Sethi, 1990; Maffei and Meredith, 1995; Cordero, 1997). Manufacturing companies using HRM practices as; a proper reward system and career development, existence of self managing multifunctional teams; empowering the workers and providing extensive training and improving the union relations can lever flexible manifesting to a larger extent than the other manufacturing companies (Cordero, 1997). In that sense, we can say that social goals required to be expressed *strongly* in our IFMMM profiling.

Table 3.3 IFMMM - Elements of Normative Goals

Normative Goals - IFMMM			
No	**Element**	**Proposed Profiling Extreme**	**Author(s)**
1	Internal Direction of the Mission	Social Economic	(Sonntag, 1990) ; (Suarez et al., 1996); (Chang et al., 2007); (Oke, 2005)
2	Time Perspective of the Goal	Long-term	(Gerwin, 1993)
3	Chance Perspective	Progressive	(Mascarenhas, 1981); (Gerwin, 1993).
4	Risk Perspective	Vulnerable	(Ettlie and Penner-Hahn, 1994);Chang et al. (2007); (Gupta and Somers, 1996)
5	Objective Performance Goals	Strong Expression	(Gupta and Somers, 1996); (Chang et al., 2003)
6	Financial Value Goals	Strong Expression	(Ling-yee and Ogunmokun, 2008), (Swamidass and Newell, 1987); (Vickery et al.,1997)
7	Ecological Goals	Strong Expression	(Sarkis, 1995)
8	Social Goals	Strong Expression	(Adler, 1888); (Nemetz and Fry, 1988); (Sethi and Sethi, 1990); (Maffei and Meredith, 1995);(Cordero, 1997).

3.2.2 Normative Structures

The constitution of the organization determines the order and requlations. Rights and relations of stakeholders are important for organization. The normative structures are the values and principles that provide the overall direction for the organization (Demirel, 2008) . The profiling elements along with the extreme values are listed in Table 3.2. D'Souza (2002) states that organization structures, corporate policies and procedures are important determinants of manufacturing flexibility options. In that sense, we have adopted all elements of Normative Goals into IFMMM model. For each profiling element listed in Normative Structures within IMM, we have surveyed the manufacturing literature and determined the proposed profiling value, where available. Normative Structures profiling elements and corresponding proposed "ought to be" extreme value listed in Table 3.4.

3.2.2.1 Representation of interests in board

In the companies with *Stakeholder* extreme profile, employees are represented in boards or other high level management organs. Consumer rights protection representatives are also included in management as a member of board or with an advisory role. On the other hand, companies with the other extreme, *shareholder* profile have boards only consist of shareholders.

There is no study related with the board composition in manufacturing flexibility literature. On the other hand, the importance of the cooperation with stakeholders has been widely emphasized (Sonntag, 1990; Oke, 2005; Kayis and Kara, 2005; Chang et al., 2007). Therefore, we propose that the "ought to be" extreme value for representation of interests in board element would be *stakeholder* in IFMMM model.

3.2.2.2 Art of conflict resolution

Bleicher (1999) proposed two extreme values for art of conflict resolution as *consensus* and *confrontation*. In the companies at one extreme, high *consensus* is searched for the resolution of the conflicts. In those companies, striving unanimous decisions is aimed. Different conflict resolution mechanisms as existence of "*ombudsmen*" are established.

On the other hand, political interests of the different parties are enforced in a conflict situation. There is a conflict of interest between various parties, which form different contingent coalitions in case of conflict. Thus, in the companies at the *confrontation extreme,* most of the times, decisions are taken in an authoritarian manner.

In order to achieve a better operations performance in flexible manufacturing companies, there is a requirement for a prior consensus to be formulated by top management, while setting the priorities (Gupta and Goyal, 1989). We can say that in the profiling extreme for art of conflict resolution element of IFMMM would be *consensus*.

3.2.2.3 Economical, legal and social structure

Integrated Management Model proposes that structure of a company might be either *differentiated* or *non-differentiated*. In a *differentiated* structure, legal structure is divided into economic units. Each unit exists as an autonomous structure with its own top management. In a *non-differentiated* structure, only the top body of the whole organization has a legal status and differentiation is only exists within divisional structure.

A *differentiated* structure within a manufacturing company, which could be attained with additional management levels (i.e.), yields with more flexible manufacturing technology (Gal-Or, 2002). We can set the ideal value for "economic, legal and social structure" as *differentiated*.

3.2.2.4 Distance of the management to real life

The classification of the management style of the top management has been made as *close-operative* and *far-strategic* according to their distance to the real life. In one hand, top managers could be *close* to the operations by focusing daily operational details. This type of managers tries to deal with issues at all levels of the company.

At the other extreme, top managers are only focusing on formulation of the fundamental mission, determination of the policies and construction of the management structures. Integrity of the organization is maintained with financial control. Gerwin (1993) points that, instead of dealing with operational details, top managers should focus on steering function and must detect the areas need for change for utilizing manufacturing flexibility. We can propose that distance of the management to real life "ought to be" *far-strategic* according to IFMMM.

3.2.2.5 Competence distribution of management

According to IMM, competence distribution of management might be *single level* or *multiple levels* at two extremes. In a *single level* competence distribution, execution and audit functions are performed by the same team. In this kind of organizations, establishment of the necessary mechanisms to avoid from conflict of interest is crucial. On the other hand, *multi-*

level competence distribution means existence of a separate audit team. There is no one takes place in both executive board and supervisory board. Instead there are linking mechanisms for the coordination.

There is no clear emphasizing on the competence distribution of management element within manufacturing flexibility literature. However we adapt this element to IFMMM, as it is.

3.2.2.6 Division of executives

If the departmentalization is not completed yet, the executives are acting in a *directorial* role, where they are responsible for activities at all levels. In the other extreme, the departments are already established and executives have responsibilities for certain departments and division of executives said to be *staff/team.*

Companies which implemented FMS have more flat organizational structure with few hierarchical levels where span of control is narrow and decision making is Decentralized (Sonntag, 1990, Nemetz and Fry, 1988). Team work is inevitable when needed in these organizations (Sonntag, 1990). Moreover, in those FMS implemented organizations, skill of labor is both deep and breadth (Adler, 1988). Moreover, vertical separation of the departments enhances the performance of flexible manufacturing technology (Gal-or, 2002). Therefore, we can conclude that the profiling value for 'division of executives' element might be *Staff/Team".*

3.2.2.7 Sense of responsibility of the top team

At one extreme, top team feels responsibility for development and for creating value for all related parties. In this kind of companies, top managers always search for new opportunities. This extreme profile is named as *multiplier* profile. On the other extreme, *protective,* top managers feel themselves responsible for protection of the existing value and viability. They search for safety in conventional way.

As a competitive tool, manufacturing flexibility incorporates the value creation in the companies. Especially market related flexibility types as product flexibility might be a tool for searching new opportunities. Therefore, we can say that the top managements of the flexible manufacturing companies to have a *multiplier* profile.

3.2.2.1 Rationale of the top management team

If the top management team is focused on reviewing the performance results, monitoring the business process and securing the order with controlling, the profile is named as *monitoring.*

On the other hand, the top managers focusing on strategic planning, structuring and acting a consulting role are profiled as *consulting*.

In order to stimulate a high performing flexible manufacturing system, managers should shift from directing day to day operations to developing support systems and structures, emphasizing long-term planning and training employees (Gerwin, 1993). In that sense, we can propose that the ideal top management profile might be *consulting* within IFMMM.

Table 3.4 IFMMM - Elements of Normative Structures

Normative Structures – IFMMM			
No	**Element**	**Proposed Profiling Extreme**	**Author(s)**
1	Representation of interests in board	Stakeholder	(Sonntag, 1990; Oke, 2005; Kayis and Kara, 2005; Chang et al., 2007)
2	Art of conflict resolution	Consensus	(Gupta and Goyal, 1989)
3	Economical, legal and social structure	Differentiated	(Gal-Or, 2002)
4	Distance of the management to real life	Far-Strategic	Gerwin (1993)
5	Competence distribution of management	Multiple Level	
6	Division of executives	Staff/Team	(Adler, 1988; Sonntag, 1990, Nemetz and Fry, 1988; Gal-Or, 2002)
7	Sense of responsibility of the top team	Multiplier	
8	Rationale of the top team	Consulting	(Gerwin, 1993)

3.2.3 Normative Behavior

Organizational culture forms the normative behavior, which includes the cognitive abilities of an organization and the attitudes of its members towards duties, tasks, products, fellow members, management and organization, which shape the perceptions and preferences against events and developments (Oner and Saritas, 2004). The corresponding profiling elements with extremes are listed within Table 3.2.

Organizational culture has a significant role in implementation and execution of manufacturing flexibility enabled with Advanced Manufacturing Technologies (Zammuto and O'Connor, 1992; Beach et al., 2000). We have define each profiling element of Normative Behavior component with a manufacturing flexibility perspective and set the profiling values for each. Normative Goals profiling elements of IFMMM and corresponding proposed "ought to be" extremes are listed in Table 3.5.

3.2.3.1 Cultural Openness

The companies, which are capable of perceiving environmental changes at all levels and take those changes into account in strategy formulation activities are profiled as *outside oriented*. Within this kind of companies, the problems are defined upon customer expectations (Bleicher, 1999). The other extreme for this element is *inside oriented*. The inside oriented profile companies are dealing mostly with internal subjects and customer expectations are mostly perceived as disruptive. The changes in the environment are lately perceived and could not be used to influence structure.

The organizations operating in dynamic environments should have ability to generate new potentials by developing learning capabilities (Llorens, 2005). By definition, manufacturing flexibility has been evaluated as a strategic tool to handle environmental uncertainty (Gupta and Goyal, 1989). In that sense, any perceived change in the external environment is referred to stimuli for flexibility (Beach et al., 2000). We can propose that the profiling extreme value for Cultural Openness might be *outside oriented* within IFMMM.

3.2.3.2 Attitudes towards change

The attitude towards change could be *hostile* at one extreme and *friendly* at the other extreme (Bleicher, 1999). *Hostile* profile is associated with search for equilibrium and avoidance from change. The companies which try to avoid from change are seeking security based on the formalization and try to protect the actual. The companies in which the change is perceived *friendly*, change is stimulated and viewed as a potential for spontaneous challenges. The managers of these companies instead of formalities mainly focus on the content with an entrepreneurial approach.

Manufacturing flexibility is anticipated as a competitive tool in dynamic environments to respond changes from competitive pressure (Vokurka and O'Leary-Kelly, 2000). In that sense, manufacturing flexibility enables the companies to cope with changes and moreover, create success potentials from changing environments (Gerwin, 1993). Carlsson (1992) states that one of the main differences between dynamically flexible and inflexible companies is the acceptance or refusal of continuous change. We can propose that the profiling extreme value for attitudes towards change is *friendly* within IFMMM.

3.2.3.3 Cultural orientation

Cultural orientation of management might be *top* at one extreme and *basis* at the other extreme (Bleicher, 1999). In a *basis* oriented profile, each individual subculture strives for a close relationship to the culture of its customers and the corporate culture serves as a basis and supplies values to the subcultures for the sake of achievement. Open communication and cooperation within subcultures have dominance. On the other extreme, *top* oriented profile a culture is "given" by the model derived past life examples and the difference between subcultures faded away from the sense of belonging and the identity expressed by the entrepreneur.

In the companies emphasizing control oriented values, in other words, *top* oriented orientation; the implementation failures within the process of flexible manufacturing installations more likely to occur and the change process is much longer than companies emphasizing flexibility (Zammuto and O'Connor, 1992). We can set the extreme profiling value to cultural orientation element of IFMMM as *basis* orientation.

3.2.3.4 Subcultural differentiation

According to Bleicher (1999), companies might have subcultural differentiation profile between two extremes, a *uniform culture* and *functionally differentiated subcultures*. A *uniform culture* profile subcultural differences are mainly disregarded and a unified way of thinking has been settled. A generally accepted set of values enable a unified direction of behavior at all levels. On the other hand, existence of *functionally differentiated subcultures* comes up with conflicts and competition between different subcultures based on differentiation of the views and conflict of interest. A variation of the values at the departmental level creates a differentiation of the behavior. Therefore there is a need for an effort of coordination between subgroups.

Flexibility oriented value systems emphasize *differentiation* and decentralization (Zammuto and O'Connor, 1992). Flexible manufacturing companies need to receive and process information from many sources, which leads to a high level of *differentiation* between functional groups with an organic organizational structure (Nemetz and Fry, 1988). We can state that the "ought to be" extreme for subcultural differentiation element of IFMMM as *"functionally differentiated subcultures"*.

3.2.3.5 Cultural expression

Cultural expression may occur in a *development oriented* or *instrumental* manner, at two extreme. Development oriented expression comes up with the use of flexible structures. Culture is evoled from the developing structure. There is a rewarding behavior and the mistakes are tolerated. *Instrumental* expression is associated with a tendency towards perfectionism with the existence of a technocratic order. There is a coercive approach and a fear of mistakes. The orientation is towards tools and processes, instead of goals.

It is widely stated in manufacturing literature that *orientation towards tools and processes* is not enough for a successful flexible manufacturing adaptation and utilization for manufacturing flexibility (Nemetz and Fry, 1988; Sonntag, 1990; Zammuto and O'Connor, 1992; Llorens et al; 2005). In their empirical study, Kathuira and Partovi (1999) concluded that *rewarding* plays an important role in manufacturing settings characterized by high emphasis on flexibility. Based upon the manufacturing flexibility research, we can propose that the cultural expression in manufacturing flexibility context "ought to be" development oriented.

3.2.3.6 Value added orientation of management

Management might focus on *cost* at one extreme and focus on *benefit* at the other extreme. In the *cost oriented* extreme, main focus of the management is the realization of the investment. There is a strict control and auditing and focus on '*economies of scale'*. On the other hand, *benefit* orientation is characterized with the idea of creating customer value and developing customer preferences. In that sense, there might be an "organizational slack" to be used for value creation.

Upton (1994) defines manufacturing flexibility as "*the ability to change or react with little penalty in* ***time, cost or performance".*** There is a tradeoff between flexibility and cost. A company focusing on *cost* would presumably want to focus on *economies of scale*, in which they utilize long production runs and avoid production changeovers (Vokurka and O'leary-Kelly, 2000); therefore there is no significant requirement for flexibility. Moreover, a *control* oriented culture may cause an implementation failure in acquisition of advanced management technologies (Zammuto and O'Connor, 1992) which enable manufacturing flexibility. However, enhancement of manufacturing flexibility has an impact on increasing customer value (Zhang et al. 2003). The value added orientation of the managers of flexible manufacturing companies proposed to be *"benefit oriented"*.

3.2.3.7 Role of employees

The employees might play a role as only *members* at one extreme and *actors* in an organization and *actors* in an organization at the other extreme. As *members,* the employees have a relationship with the company with a sense of belonging and each *member* contributes to the preservation of the whole within his/her domain. *Members* are promoted according to the proven loyalty with a normal performance level. On the other hand, as *actors*, employees are perceived as the main owners of the activities. *Actors* may receive rewards and promotions upon their proven performance (Bleicher, 1999).

The organizations which have a greater emphasis on flexibility oriented values which characterized with affiliation and attachment are more likely to gain AMT's flexibility and productivity benefits (Zammuto and O'Connor, 1992). On the other hand, for a successful implementation of manufacturing flexibility, it is important to encourage employees to determine the best way to accomplish the task (Kathuira and Partovi, 1999). Appraisal and recognition of the effective performance also helps manager to utilize flexibility in uncertainty conditions. We can propose that IFMMM "ought to be " extreme for role of employees is *actors*.

3.2.3.8 Employee engagement

Employee engagement could either be in a *collective* manner in which developing group competence is encouraged and collective responsibility is taken. Achievement is appraised indirectly and thoroughly. The motivating values are internalized through group processes. Employee engagement could also be in an *individual* manner, where the employees are self-motivated and competence and responsibility belongs to the individuals. Therefore success and failure are highly personized.

Adopting a team approach yields greater technological flexibility in companies facing up with high environmental uncertainties (Gal-Or, 2002). Zammuto and O'Connor (1992) analyzed Advance Manufacturing Technology implementations within *"the competing values model" of Quinn (1988) (cited in Zammuto and O'Connor, 1992)*. A group value system which proposes a *Clan* form of organization enables more flexibility at all levels. In addition to that, in flexible manufacturing companies, reward systems should be based on group incentives instead of individual production incentives (Nemetz and Fry, 1988). Then we can state that the ideal value for employee engagement element would be *"Collective, Us"* in IFMMM.

Table 3.5 IFMMM - Elements of Normative Behaviors

Normative Behaviors – IFMMM			
No	**Element**	**Proposed Profiling Extreme**	**Author(s)**
1	Cultural Openness	Outside oriented	(Gupta and Goyal, 1989; Beach et al., 2000; Llorens, 2005)
2	Attitude towards change	Friendly	(Carlsson, 1992; Gerwin, 1993; Vokurka and O'Leary-Kelly, 2000)
3	Cultural Orientation	Basis	(Zammuto and O'Connor, 1992)
4	Subcultural differentiation	Differentiated	(Nemetz and Fry, 1988; Zammuto and O'Conner, 1992)
5	Cultural Expression	Development Oriented	(Nemetz and Fry, 1988; Sonntag, 1990; Zammuto and O'Conner, 1992; Llorens et al; 2005)
6	Value added orientation of management	Benefit oriented	(Zammuto and O'Connor, 1992; Upton, 1994; Vokurka and O'leary-Kelly, 2000; Zhang et al., 2003)
7	Role of Employees	Actors	(Zammuto and O'Connor, 1992; Kathuira and Partovi, 1999)
8	Employee Engagement	Collective, Us	(Gal-or, 2002; Zammuto and O'Connor, 1992; (Nemetz and Fry, 1988).

3.2.4 Strategic Goals

This field of IMM is mainly concerned with the creation, use and development of success potentials. Organization policy delivers long-term and overall goals and a basic orientation for the strategic management in the strategic goals (Alsan and Öner 2003). Strategic goals deals with effectiveness (Bleicher, 1999). The corresponding profiling elements with extremes are listed in Table 3.2.

While developing Strategic Goals component of IFMMM, we have surveyed each particular IMM Strategic Goal element within manufacturing flexibility literature and determine the relevant extreme value within manufacturing flexibility context. Moreover, we have adapted product flexibility dimension within Strategic Goals component of IFMMM. Strategic Goals profiling elements of IFMMM along with the desired extreme are listed in Table 3.6.

3.2.4.1 Supply of performance

According to IMM, companies might supply a *broad* performance, in which companies try to cover the needs of all possible customer groups with a wide product range. This kind of companies focuses on *"Economies of Scope"* and serves various market segments. At the other extreme, *narrow* supply of performance is associated with individual product offering within a wider range. Instead of multiple product offerings, customer attraction is subject to outstanding properties of single products offered. This kind of companies focus on *"Economies of Scale"* and concentrate on different markets individually.

Manufacturing flexibility, especially mix flexibility and product flexibility enable companies provide a wide range of products to the different segments of the market, while it will be less important for a company focused on a specific market segment (Ngamsirijit, 2008). Manufacturing flexibility competences enable companies to decrease a setup time, which allows small batch production to be economical as mass production. This enables the organization to change its focus from economies of scale to economies of scope (Gupta and Goyal, 1989).   For a flexible manufacturing company supply of performance profile "ought to be" broad".

3.2.4.2 Individuality of problem solving

According to IMM, companies might have a *standardized* approach to problem solving, or an *individual* approach to problem solving, in two extremes (Bleicher, 1999). Standardized problem solving approach, market performance design is precisely defined and has to meet a large number of customers' expectations. Standardization is the key for price competition. *Individual* approach is associated with dealing with individual customer requirements, even for one time requests separately. Individual approach creates a potential frees the company from the pressure of price competition.

From a strategic perspective, the dichotomy of flexible manufacturing capabilities and competencies may help firms to achieve mass customization. Increasingly sophisticated customers require firms to supply a rich variety of products with good quality and low cost (Zhang et al., 2003). In that sense, the problem solving approach of flexible manufacturing companies within IFMMM is proposed to be *“individual”*.

3.2.4.3 Competitive Posture

According to competitive posture, companies may act offensive, or defensive in two extremes. In an offensive strategy, the company's competitive behavior is active as competition structures and market definition are constantly challenged. The competitive behavior is dynamic, if there is a potential for differentiation, existing competitive advantages might be sacrificed (Bleicher, 1999). In a defensive strategy, the company’s competitive behavior is reactive, a follower strategy is implemented. The tendency is to protect existing competitive behavior which has enabled a success in past competition.

Managers of the companies seeking attractive market opportunities are advised to develop new product flexibility. Once a new market niche has been established, competitive aggressiveness strategy should be used to enhance product mix flexibility; so that the market is protected (Chang et al., 2007). The aggressiveness dimension of business strategy is significantly related to all of the dimensions of manufacturing flexibility (Gupta and Goyal, 1989). In that sense, the ideal profiling value for competitive posture is *offensive*.

3.2.4.4 Leader-Follower Behavior

According to their market entry behavior, companies might act either as a *leader* or as a *follower.* Innovation is the key element for a leader behavior. Innovation enables companies to perform autonomous competitive behavior. A *follower* strategy is merely depends on the idea of minimizing risk of failure by adapting already processed successful strategies of the leader.

Product Flexibility refers to the ability to introduce a new product to production system very economically and quickly (Koste and Malhotra, 1999, Browne et al, 1984), which is associated with innovation and a leader behavior. Additionally, mix flexibility has an impact on innovation performance. High level of mix flexibility enables product innovation within the current system configuration, which can also contribute to new product development (Oke, 2013). Therefore, mix flexibility has an impact on innovation performance. Moreover, Chang et al. (2003) found that manufacturing flexibility does not have any impact on business performance of companies with cost/follower strategy. We can conclude that, within IFMMM, the desirable profiling extreme for this element is a leader behavior.

3.2.4.5 Value added activities

According to IMM, the value added perspective could be either *cost oriented rationalization* or *customer focused optimization*. In a customer oriented rationalization, the aim of all value added activities is to increase satisfaction level of the customer needs. In a *cost oriented rationalization* all value added activities are evaluated with a cost reduction perspective.

Manufacturing flexibility enables companies to respond to changing customer demands quickly. Especially, first order flexibilities (mix, volume, product and delivery-time flexibilities) which are important for the customers and directly affect the competitive position of a company (Suarez et al., 1996). Moreover, manufacturing flexibility does not have an impact on the business performance for a company with low cost strategy (Chang et al. 2003). Based on the manufacturing flexibility literature, IFMMM suggests that orientation of value added activities need to be "customer focused optimization".

3.2.4.6 Dependency of value added activities

IMM proposes that value added activities depend either on *networking* or *individual* activities throughout the value chain. Strategic focus in *networking dependency* is on some selected activities of the value chain, which promise either cost or differentiation advantages over competitors. Outsourcing single activities helps in decreasing the complexity. Strategic focus in *individual dependency* profile is on all individual activities separately. Due to the need for security and control, there is a tendency towards keeping activities within the company, regardless of high labor costs (Bleicher, 1999).

Outsourcing competences have a positive impact on flexibility capabilities (Ling-yee and Ogunmokun, 2008) and agreements with subcontractors are considered as flexibility enablers (Boyle, 2006). Therefore we can set the ideal value for dependency of value added activities as *networking* within IFMMM.

3.2.4.7 Deployment of resources

Deployment of resources could be in a *fixed* or in *flexible* manner. By definition, manufacturing flexibility proposes a *flexible* deployment of the resources. Gerwin (1993) states that *banking* flexibility is a strategy to create excess capacity to cope with environmental uncertainty. The “ought to be” value for deployment of resources profiling element is *flexible*.

3.2.4.8 Performance of resources

The performance of the resources has a spectrum from *specialized* to *generalist*. In a *generalist* view, the *flexible* and *universal* performance potentials enables the companies to adapt changing performance expectations. In this view, “economies of scale” does not have a priority.

In stable environments, the strategic focus of the companies is on economies of scale and flexibility is low (Mascarenhas, 1981). In such a strategic focus, even though a commitment to specialized assets creates exit barriers, it is achieved with the expense of maintaining flexibility and of retaining options and alternatives (Aaker and Mascarenhas, 1984). We can state that, in a flexible manufacturing organization, the performance of resources would be generalist.

3.2.4.9 Level of Product Flexibility

In addition to the profiling elements of IMM, we have adopted product flexibility dimension as a profiling element of Strategic Goals. Product flexibility is classified as a *first order flexibility*, which is important for the customer and has a direct impact on the competitive position of the company (Sethi and Sethi, 1990; Suarez et al. 1996). Narasimhan and Das (1999) classified product flexibility as a *strategic* flexibility, which is a long-term strategic capability of a company that can help to redefine business environments and change the basis of the competition. In that sense, we have classified product flexibility as a strategic goal element. The profiling extremes are specified as *“low”* and *“high”*.

Table 3.6 IFMMM - Elements of Strategic Goals

Strategic Goals – IFMMM			
No	**Element**	**Proposed Profiling Extreme**	**Author(s)**
1	Supply of Performance	Broad	(Gupta and Goyal, 1989; Ngamsirijit, 2008)
2	Individuality of Problem Solving	Individual	(Zhang et al., 2003)
3	Competitive Posture	Offensive	(Gupta and Goyal, 1989; Chang et al., 2007)
4	Leader- Follower Behavior	Leader	(Koste and Malhotra, 1999, Browne et al, 1984; Change et al.,2003; Oke, 2013)
5	Value added activities	Customer focused optimization	(Sethi and Sethi, 1990; Change et al., 2007)
6	Dependency of Value Added Activities	Networking	(Boyle, 2006; Ling-yee and Ogunmokun, 2008)
7	Deployment of Resources	Flexible	(Gerwin, 1993)
8	Performance of Resources	Generalist	(Aaker and Mascarenhas, 1984; Mascarenhas, 1981)
9	Level of Product Flexibility	High	(Sethi and Sethi, 1990; Suarez et al. 1996; Narasimhan and Das (1999)

3.2.5 Strategic Structures

Strategic goals need to be supported with corresponding organizational structures and programs within strategic structures. These structures are supported with management systems which steer the problem, management and cooperation Behavior towards the desired direction. The corresponding elements with extreme values are listed within Table 3.2.

We have adapted elements of strategic structures field of IMM to our IFMMM model and also we have added *Expansion Flexibility* dimension of manufacturing flexibility as a profiling element of strategic structures of IFMMM. Each element is defined in detail within this section and the list of the profiling elements of IFMMM along with the ideal profile is listed in Table 3.7.

3.2.5.1 Focus

Focus element is about defining and setting the positions. The orientation could be either towards already defined people or towards the tasks. Person orientation is associated with definition of the positions with the consideration of the skills of the defined persons and appropriate tasks. Managers and experts are ready to select the task upon their qualifications and ready to change them according to personal development. On the other hand, in an issue oriented profile, according to organization structure, positions are identified and described. Jobs are assessed upon the requirements and employees are promoted to already defined positions according to structure.

In a flexible manufacturing company, job structures are homogeneous at a high skill level with a low division of work (Kohler and Schultz-Wild, 1985). In an ideal situation, all or most of the tasks of the system can be performed by each operator with a job rotation. In that sense, we propose that the focus of the strategic structure would be person-oriented within IFMMM.

3.2.5.2 Reference points

The reference point of the relationships could be either *formal rules* or *symbols*. In a high level of formalization, all current and potential tasks and procedures are regulated and documented (organization charts, manuals, etc). There is a significant standardization of structures and processes. In a low level formalization, structure is considered as a means of development of the meaning. Contingency leads to different problem-oriented structural forms.

Flexible manufacturing systems have changed the Taylorian approach to manufacturing with a high level of task specialization (Bessant and Haywood, 1986). A matrix type structure exists in flexible manufacturing companies (Hutchison and Das, 2007). In such an organization, contingent task forces and teams (new product introduction teams, production control team, quality teams, i.e.) and task specific positions as program managers are defined. In those Flexible manufacturing organizations, the behavior is adaptive to the task, rather than standardized and management skills are integrative, rather than detailed and specific (Nemetz and Fry, 1988), therefore we can state that the reference point of the relationships in a flexible manufacturing company would be *symbols* within IFMMM.

3.2.5.3 Extent of rules

The extent of the rules could be either efficiency oriented with defined single rules or effectiveness oriented framework rules. Management emphasis on efficiency did not correlate positively with flexibility (Kathuira and Partovi, 1999), therefore the extent of the rules element might be defined with framework rules and effectiveness oriented within IFMMM.

3.2.5.4 Time orientation

The time orientation of the structure could be towards a predictable time period in which the structure and the procedures are subject to a rapid change and need to be considered and adapted to the changing conditions. The responsibilities are assigned to employees for time limited tasks. After the time limited task is completed, the employees are assigned to new tasks. The rules are also subject to the time period for the execution of a special task.

The other extreme refers to the time orientation of the structure towards an unlimited time period in which structures and procedures remain almost unchanged within a predictable time period. The rules and regulations are not subject to a time limitation but perceived as eternal. Responsibilities are allocated permanently to functional units.

Instead of a traditional mechanistic organization structure, a matrix type structure along with a task based assignments is more proper for flexible manufacturing companies (Bessant and Haywood, 1986; Nemetz and Fry, 1988; Hutchison and Das, 2007). Team work is encouraged when flexibility is emphasized and the task assignments are also suggested to be done by the team members (Kathuira and Partovi, 1999). Moreover, temporary labor arrangements have a positive impact on labor (Cousens et al., 2009) and volume (Jack and Raturi, 2003) flexibilities. Therefore the ideal time orientation within IFMMM is limited to a *predictable period.*

3.2.5.5 Synergy Orientation

According to IMM, the content of the configuration with respect to synergy orientation could be *centralized* or *Decentralized* at two extremes. Decentralized orientation is associated with the thought that the structure is developed upon the market conditions and technology demand and any type of structure is not perceived as the best suitable'. Power is widely distributed within the organization and decision making is decentralized. For the sake of employee motivation and customer satisfaction, even existence of overlapping processes is welcomed.

On the other extreme, centralized orientation is characterized with a structure where power is held by higher level managers and decision making is highly centralized. A centralized structure is perceived as a mean for creating synergy through functional divisions.

Typically a flexible manufacturing organization would have an *organic structure,* where decision making is Decentralized (Kathuira and Partovi; 1999) and power is distributed within the organization (Bessant and Haywood, 1987; Nemetz and Fry, 1988; Hutchison and Das, 2007). Therefore, we can state that IFMMM proposes that the ideal value for synergy orientation element would be *decentralized*.

3.2.5.6 Hierarchy

Companies might have a *vertical* organization structure or *flat* organization structure in two extremes. Flexible manufacturing companies are characterized with a *flat* organization structure (Nemetz and Fry, 1988). Flatter organization structure enhances flexibility in manufacturing companies (Sonntag, 1990). The ideal organization structure within IFMMM is a *flat* one with low level of hierarchy.

3.2.5.7 Organizational Development

The organizational development could be oriented either to *outwards* in which effectiveness is the key objective, or to *inwards* in which efficiency is the key objective. In one extreme, organization development is supported by the interaction of the subunits with their respective environmental segments. The departments and business units have the opportunity to work with 3rd parties in a given autonomy. At the other extreme, organizational development is support with a centralist approach in which the subunits have a little autonomy. Integration is perceived essential for the determination of clearly defined areas of responsibility.

Even though there is no direct discussion about organizational development orientation within manufacturing flexibility literature, it is noted that cooperation with the suppliers, customers and even with the other companies within the industry has a positive impact on the flexibility

(Sonntag, 1990; Suarez et al., 1996). In their empirical research, Kayis and Kara (2005) found that the collaboration with the customers and suppliers has a positive impact on manufacturing flexibility. The emphasis on the importance of the development of the relations with the 3rd parties' addresses that the organizational development element of IFMMM is ideally oriented to outwards.

3.2.5.8 Starting point of organizational development

The organizational development could be structured from *bottom to top* or from *top to bottom* depending on the participation of the employees in organizational development process. If a wide range of employees are participating in the organizational development, the profile is a *bottom-up* development profile.

According to IMM (Bleicher, 1999), search for flexibility is associated for a bottom-up organizational development structure. In this kind of companies, overlapping tasks are tolerated for the sake of flexibility. In that sense, starting point of organizational development element of IFMMM is idealized as *bottom up.*

3.2.5.9 Level of Expansion Flexibility

We have included expansion flexibility dimension as a profiling element of IFMMM within strategic structures. As a plant level flexibility (Narasimhan and Das, 1999), expansion flexibility is related with mid-range or long term changes (Rogers et al., 2011). Moreover, Bengtsson (2001) classifies expansion flexibility as a strategic flexibility. Therefore, we can consider expansion flexibility within strategic level of IFMMM. The profiling extremes are specified as *"low"* and *"high"*.

Table 3.7 IFMMM - Elements of Strategic Structures

Strategic Structures – IFMMM			
No	**Element**	**Proposed Profiling Extreme**	**Author(s)**
1	Focus	Person Oriented	(Kohler and Schultz-Wild, 1985)
2	Reference Points	Individual	(Bessant and Haywood, 1986; Nemetz and Fry, 1988; Hutchison and Das, 2007)
3	Extent of rules	Framework rules	(Kathuira and Partovi, 1999)
4	Time orientation	Leader	((Bessant and Haywood, 1986; Nemetz and Fry, 1988; Kathuira and Partovi, 1999; Jack and Raturi, 2003; Hutchison and Das, 2007; Cousens et al., 2009)
5	Synergy orientation	Decentralized	(Bessant and Haywood, 1987; Nemetz and Fry, 1988; Kathuira and Partovi, 1999; Hutchison and Das, 2007)
6	Hierarchy	Flat	(Nemetz and Fry, 1988; Sonntag, 1990)
7	Organizational development	Outwards	(Sonntag, 1990; Suarez et al. 1996; Kayis and Kara, 2005)
8	Starting point of organizational development	Bottom up	(Bleicher, 1999)
9	Level of Expansion Flexibility	High	(Narasimhan and Das, 1999; Bengtsson, 2001; Rogers et al., 2011)

3.2.6 Strategic Behaviors

Bleicher (1999) explains this field of the IMM matrix as development of the problem solving skills with respect to values and norms supplied by the organizational culture. The corresponding profiling elements of strategic Behaviors are listed in Table 3.2. We have adapted the strategic Behavior elements to IFMMM. Each profiling element is explained in detail within this section. A list of IFMMM strategic Behavior elements is available in Table 3.8 along with the corresponding ideal extreme.

3.2.6.1 Level of participative behavior for management decisions

Companies, in which a wide group of employees at all levels, are joining in activities as budgeting, goal setting and performance review are profiled with a *high* level of participative behavior for decision making. In those companies, there is a comprehensive information flow on multilayer communication channels and the decisions are taken upon majority principle.

On the other extreme, companies with a *low* level of participative behavior for decision making, goals are set in a heterogeneous manner for employees and performance is controlled by the supervisors. The information flow is vertical and restricted to the most important information to be given to the employee. The decisions are taken by the supervısors.

High level of involvement in problem solving activates is associated with high level manufacturing flexibility (Suarez et al., 1996; Braglia and Petrioni, 2000). Therefore we can say that level of participative behavior for management decisions element of IFMMM is ideally *high*.

3.2.6.2 Focus of behavior development

The behavior development focus could be *individual* or *team*. *Individual* behavior development focus is associated with emphasizing individual goals, rewarding the achievement of individual goals and encouraging individual performance instead of team work.

On the other hand *team* focused behavior development is characterized with emphasizing team goals and rewarding the achievement of team goals. Team work is encouraged not just for accomplishment of the given tasks but also is perceived as a mean for self-development for employees.

Team work is perceived as inevitable for reaching flexibility in manufacturing organizations (Kohler and Schultz-Wild, 1985; Sonntag, 1990; Kathuira and Partovi, 1999; McCreery et al., 2004). According to Cousens et al. (2009), the existence of autonomous work teams is a capability for developing manufacturing flexibility dimensions. The ideal focus of behavior development is said to be *team* within IFMMM.

3.2.6.3 Desired management behavior

According to IMM, the profile of the management with respect to change might be either *entrepreneurial* or *risk averse*. *Entrepreneurial* management searches for change and uses the change. The traditional concepts are not enough for entrepreneurial managers and they search for a possibility of creative destruction of these concepts. The other management behavior is *risk averse* and looks for stability. The main objective of the management is to protect the order by using various management tools.

Manufacturing flexibility is the key for the companies to stimulate the environment by destruction of the present for new potentials (Ettlie and Penner-Hahn, 1994). A proactive company assumes an opportunity seeking perspective, can introduce new products prior to the competitors and anticipate future demand to create change and shape the environment through high product flexibility. Moreover, risk taking aspect is associated with high manufacturing flexibility (Chang et al., 2007). The desired management behavior is idealized as entrepreneurial within IFMMM.

3.2.6.4 Desired competency potential

The competency potential could be profiled as *specialist* or *generalist*. Specialist profile is associated with specialization of the employees on defined tasks and having deep knowledge about the specified subjects. Specialization is desired for security by dealing the same type of problems. Generalist competency approach is about dealing with various tasks and having a general knowledge about a higher number of different subjects with a wide perspective. This kind of employee profile enables a willingness to deal with unknown subjects and newly experienced problems.

Even though some of the manufacturing flexibility researchers emphasize that a specialized deep knowledge about the tasks is important in realizing manufacturing flexibility (Narasimhan et al., 2004), majority of the studies illustrate that existence of multi skilled employees is a major flexibility enabler for manufacturing companies (Sethi and Sethi, 1990; Zhang et al., 2003; Oke, 2005; Cousens et al., 2009). Therefore, we can also state that the desired competency potential might be *generalist* within IFMMM.

3.2.6.5 Authority development

Based on the development of the authority, companies might have profiles: *institutionalized/hierarchy based* at one extreme and *communication/specialist based* at the other extreme. Institutionalized/hierarchy based authority is simply the formal authority. The source of the authority is the position in the organizational hierarchy, in other words authority is not tied to a person but to the position.

Communication/specialist based authority is simply the competent authority. The source of the authority is the capabilities and competences of the individuals. Therefore regardless of the position in the organizational hierarchy, authority could be tied up to the person. In this case, the coercive power of the organization does not have an impact on the employees.

In traditional companies, the source of authority is the position in the organizational hierarchy. However, in flexible manufacturing companies, the source of authority is knowledge, instead of the position (Nemetz and Fry, 1988). The ideal profile for authority development within IFMMM is *communication/specialist based*.

3.2.6.6 Focus of desired responsibility

The desired responsibility focus might be either *dependence, member only executes* or *delegation, autonomous* in two extremes. In dependence focus profile, delegation of the responsibilities and duties is very limited. Delegation of tasks is possible “as far as it is necessary”. At the other extreme, delegation, autonomous focus is characterized with willingness of delegation. The tasks and responsibilities are delegated “as far as it is possible”.

Autonomous activities as self-directed teams (Chang et al., 2007) and autonomy of the operators (Maffei and Meredith, 1995) have an impact on manufacturing flexibility. In that sense, focus of desired responsibility element of IFMMM is ideally profiled with *delegation/autonomous*.

3.2.6.7 Place of behavior development

According to IMM, the place of behavior development could be either *on the job* or *off the job*. On the job behavior development is associated with on the job training. By the help of on the job training cooperation and communication skills are also developed. On the other hand *off the job* behavior development is associated with specialization on the given tasks. Technical qualifications are perceived more important than interpersonal skills.

Work force training is extremely important in achieving desired level of manufacturing flexibility (Gupta and Somers, 1996; Kathuira and Partovi, 1999; Chang, 2012; Urtasun-Alonso, et al., 2014). Moreover, Cordero (1997) states that formal and *on the job training* is an important practice for a successful flexible manufacturing system. The ideal extreme value for place of behavior development element of IFMMM is *on the job*.

3.2.6.8 Type of desired learning behavior

The desired learning behavior could be either *vertical* or *horizontal* in two extremes. Vertical learning behavior is about specialization in a given task. Learning is perceived as a tool for securing professional success and is implemented within existing frameworks. Horizontal learning is about experimenting and discovering something new. Instead of perceiving learning as mean for professional success purposes, learning itself is perceived as the main purpose and it is dynamic and stimulated by curiosity.

The training requirements in flexible manufacturing companies are more extensive and source of learning is different than traditional manufacturing companies (Majchrzak, 1988). In a flexible manufacturing company, learning needs are continuous to adapt responses and advances in the FMS technology (Cordero, 1997). Within IFMMM, the desired learning behavior is ideally *horizontal*.

Table 3.8 IFMMM - Elements of Strategic Behaviors

Strategic Behaviors – IFMMM			
No	**Element**	**Proposed Profiling Extreme**	**Author(s)**
1	Level of participative behavior for management decisions	High	(Suarez et al., 1996; Braglia and Petrioni, 2000)
2	Focus of behavior development	Team	(Kohler and Schultz-Wild, 1985; Sonntag, 1990; Kathuira and Partovi, 1999; McCreery et al., 2004; Cousens et al., 2009)
3	Desired management behavior	Entrepreneurial	(Ettlie and Penner-Hahn, 1994; Chang et al., 2007)
4	Desired competency potential	Generalist	(Sethi and Sethi, 1990; Zhang et al., 2003; Oke, 2005; Cousens et al., 2009)
5	Authority development	Communication/specialist based	(Nemetz and Fry, 1988)
6	Focus of desired responsibility	Delegation/Autonomous	(Maffei and Meredith, 1995; Chang et al., 2007)
7	Place of behavior development	On the job	(Gupta and Somers, 1996; Kathuira and Partovi, 1999; Chang, 2012; Urtasun-Alonso, et al., 2014; Cordero, 1997)
8	Type of desired learning behavior	Horizontal	(Majchrzak, 1988; Cordero, 1997)

3.2.7 Operative Goals

Operative goals of IFMMM consist of the elemens of manufacturing performance as goals to be achieved and first order flexibility dimensions, namely mix and volume flexibility. Manufacturing strategy has four dimensions: cost, quality, delivery and flexibility (De Meyer et al., 1989; Dean and Snell, 1996). Reducing the **manufacturing costs**, enhancing **delivery performance** and delivering high **quality** products are accounted as performance goals of the manufacturing system. Therefore, these elements of manufacturing performance are included in the form of emphasis on goals to be achieved.

We have also added new product introduction performance goal to the operative goals. **New product introduction performance** is encountered as an element of manufacturing performance (Das, 2001).

Mix flexibility and volume flexibility are classified as first order flexibilities (Suarez et al. 1996). Mix and volume flexibilities are derived from flexibility enablers and as well as second order flexibility dimensions. Narasimhan and Das (1999) classified mix and volume flexibility dimensions as plant level, tactical flexibilities. These flexibility dimensions have direct impact on the competitive position of the company. Therefore, we have included **level of mix flexibility** and **level of volume flexibility** dimensions as elements of operational goals of IFMMM. The elements of IFMMM operative goals are listed in Table 3. 9. The profiling extremes for each operative goal element are **low** and **high**.

Table 3.9 IFMMM - Elements of Operative Goals

Operative Goals – IFMMM			
No	**Element**	**Proposed Profiling Extreme**	**Author(s)**
1	Manufacturing cost reduction goal	High	(De Meyer et al., 1989; Dean and Snell, 1996; Das, 2001)
2	Quality performance goal	High	(De Meyer et al., 1989; Dean and Snell, 1996; Das, 2001)
3	New product introduction performance goal	High	(De Meyer et al., 1989; Dean and Snell, 1996; Das, 2001)
4	Delivery performance goal	High	(De Meyer et al., 1989; Dean and Snell, 1996; Das, 2001)
5	Level of volume flexibility goal	High	(Sethi and Sethi, 1990; Suarez et al. 1996; Narasimhan and Das, 1999)
6	Level of mix flexibility goal	High	(Sethi and Sethi, 1990; Suarez et al. 1996; Narasimhan and Das, 1999)

3.2.8 Operative Structures

Operative structures field of IFMMM consists of physical flexibility enablers in terms of infrastructural and technological elements and second order flexibility dimensions. The flexibility enablers has been constructed and classified by adapting Advanced Manufacturing Technologies (AMT) dimensions developed by Swamidass and Kotha (1998) (cited in Das, 2001). Additionally, second order flexibility dimensions, which are related with the shop floor level operations, are also included in operative structures. Elements of operative structures are explained within this section and the elements with extreme values are listed in Table 3.11.

3.2.8.1 Production systems application

Production systems which are related with advanced manufacturing technologies (Das, 2001) are listed as:

a. Use of FMS (Flexible Manufacturing Systems)
b. Use of CNC (Computer Numerical Control)
c. Use of CAM (Computer Aided Manufacturing)

By definition, flexible manufacturing systems are associated with manufacturing flexibility. Also use of CNC and CAM has a positive impact on the level of manufacturing flexibility (Braglia and Petrioni, 2000; Narasimhan et al., 2004). The extreme values of production systems application are ***wide*** and ***narrow***.

3.2.8.2 Infrastructural support systems

Infrastructural support systems consist of existence and usage of production related technologies such as computer systems, material handling devices and methodologies as JIT production or TPM applications. The list of infrastructural support systems derived from manufacturing flexibility research is in Table 3.10.

Table 3.10 IFMMM – Operational Structures - Infrastructural Support Systems

No	Construct	Author
1	Use of Bar-Coding	(Das, 2001)
2	Use of Real-Time Process Control Systems	(Das, 2001)
3	Use of in-plant EDI systems	(Das, 2001; Oke, 2005)
4	Use of automated material handling systems	(Das, 2001)
5	Use of JIT Production Systems	(Gerwin, 1993; Narasimhan et al., 2004; Oke, 2005)
6	Use of Cellular Manufacturing	(Narasimhan et al., 2004)
7	Use of Preventive Maintenance	(Zhang et al., 2003)
8	Degree of General Computer Integration	(Upton, 1997)

Existence and usage of the listed systems enable manufacturing companies to utilize manufacturing flexibility. The extreme values of infrastructural support systems are ***wide*** and ***narrow***.

3.2.8.3 Design Applications

Computer Aided Design (CAD) and Computer Aided Engineering (CAE) are classified as design applications (Das, 2001). The usage of design applications has an impact on several manufacturing flexibility dimensions (Narasimhan et al., 2004). Therefore, we have included design applications as an element of operative structures. The profiling extremes of design applications are ***wide*** and ***narrow***.

3.2.8.4 Level of Machine Flexibility

As a basic flexibility type (Brown et al., 1984; Narasimhan and Das, 1999), machine flexibility is an enabler of the other flexibility dimensions. Therefore, we have included level of machine flexibility as an element of operative structures field of IFMMM. The profiling extremes of level of machine flexibility are ***high*** and ***low.***

3.2.8.5 Level of Routing Flexibility

Routing flexibility is classified as an operational level (Narasimhan and Das, 1999) and second order (Suarez et al., 1996) flexibility dimension and enabler of the other flexibility types. Therefore, we have included routing flexibility as element of operative structures of IFMMM with the profiling extremes of ***high*** and ***low***.

3.2.8.6 Level of Operation Flexibility

As component level (Brown et al., 1984) flexibility, operation flexibility is the enabler of the other manufacturing flexibility dimensions. Therefore, we have included operation flexibility as an element of operative structures of IFMMM with the extreme profiling values of ***high*** and **low**.

Table 3.11 IFMMM - Elements of Operative Structures

Operative Structures – IFMMM			
No	**Element**	**Proposed Profiling Extreme**	**Author(s)**
1	Production systems application	Wide	(Braglia and Petrioni, 2000; Narasimhan et al., 2004)
2	Infrastructural support systems	Wide	(Gerwin, 1993; Upton, 1997; Das, 2001; Zhang et al., 2003; Narasimhan et al., 2004; Oke, 2005)
3	Design applications	Wide	(Das, 2001; Narasimhan et al., 2004)
4	Level of machine flexibility	High	(Brown et al.,1984; Narasimhan and Das, 1999)
5	Level of routing flexibility	High	(Narasimhan and Das, 1999)
6	Level of operation flexibility	High	(Brown et al., 1984)

3.2.9 Operative Behaviors

Operative Behaviors of IFMMM consists of shop floor level behaviors derived from management attitude and as well as strategic behaviors in relation with the performance of the flexible manufacturing. Additionally labor flexibility is also included in operative behaviors. The list of operative behavior elements along with the relevant profile value are listed in Table 3.12.

Table 3.12 IFMMM - Elements of Operative Behaviors

Operative Behaviors – IFMMM			
No	**Element**	**Proposed Profiling Extreme**	**Author(s)**
1	Existance of team work	Wide	(Braglia nad Petrioni, 2000; Das, 2001)
2	Decision making processes in operations	Decentralized	(Das, 2001)
3	Existance of multiskilled labor	Wide	(Upton, 1997; Petrioni and Belivacqua, 2002; Boyle 2006)
4	Level of labor flexibility	High	(Zhang et. al, 2003)

Table 3.13 Elements of IFMMM with Extreme Values

	Goals (system)	Structures (organization)	Behaviors (people)
Normative	1. Internal direction of the mission (individual economic/social economic) 2. Time perspective of the goal (short-term/long-term) 3. Chance perspective (keep it/progressive) 4. Risk perspective (disturbing/vulnerable) 5.Objective performance goals (weak expression/strong expression) 6. Financial value goals (weak expression/strong expression) 7. Ecological goals (weak expression/strong expression) 8. Social goals (weak expression/strong expression)	1. Representation of interests in board (shareholder/stakeholder) 2. Art of conflict resolution (confrontation/consensus) 3. Economical, legal and social structure (non-differentiated/differentiated) 4. Distance of the management to real life (close-operative/far-strategic) 5. Competence distribution of management (single level/multiple level) 6. Division of executives (directorial, CEO/Staff, Team) 7. Sense of responsibility of the top team (protective/multiplier) 8. Rationale of the top team (monitoring/consulting)	1. Cultural Openness (inside oriented/outside oriented) 2. Attitudes towards change (hostile/friendly) 3. Cultural Orientation (Top/Basis) 4. Subcultural differentiation (uniform value system/ functionally differentiated) 5. Cultural expression (instrumental/development oriented) 6. Value added orientation of management (cost oriented/benefit oriented) 7. Role of employees (members/actors) 8.Employee engagement (collective, us/individual, hero)
Strategic	1. Supply of performance (broad/narrow) 2. Individuality of problem solving (standardized/individual) 3. Competitive posture (defensive /offensive) 4. Leader-follower behavior (leader/follower) 5. Value added activities (cost oriented rationalization/customer focused optimization) 6. Dependency of value added activities (individual/ networking) 7. Deployment of resources (fixed /flexible) 8. Performance of resources (specialized/generalist) 9. Level of product flexibility (low/high)	1. Focus (issue-oriented/person-oriented) 2. Reference points (formal rules/symbols) 3. Extent of rules (single rules, efficiency oriented/framework rules, effectivity oriented) 4. Time orientation (unlimited period/predicTable period) 5. Synergy orientation (central/decentral) 6. Hierarchy (high/low) 7. Organizational development (inward, towards efficiency/ outwards, towards effectiveness) 8. Starting point of organizational development (top-down/ bottom-up) 9. Level of expansion flexibility (low/high)	1. Level of participative behavior for management decisions (low/high) 2. Focus of behavior development (individual/team) 3. Desired management behavior (risk-averse/entrepreneurial) 4. Desired competency potential (specialist/generalist) 5. Authority development (institutional, hierarchy based/communication, specialist based) 6. Focus of desired responsibility (dependence, member only executes/ delegation, autonomous) 7. Place of behavior development (on the job/off the job) 8. Type of desired learning behavior (vertical/horizontal)
Operative	1. Manufacturing cost reduction (low/high) 2. Quality performance (low/high) 3.New product introduction performance (low/high) 4. Delivery performance (low/high) 5. Level of volume flexibility (low/high) 6. Level of mix flexibility (low/high)	1. Production systems application (narrow/wide) 2. Infrastructural support systems (narrow/wide) 3. Design systems (Narrow/Wide) 4. Level of machine flexibility (low/high) 5. Level of routing flexibility (low/hig) 6. Level of operation flexibility (low/high)	1. Existance of teamwork (narrow/wide) 2. Decision making processes in operations (centratised/Decentralized) 3. Existance of multiskilled labor (narrow/wide) 4. Level of labor flexibility (low/high)

3.3 Research Model – IFMMM, Market Dynamism and Firm Performance

Besides developing IFMMM to measure management capabilities of flexible manufacturing companies, the research also aims to explore:

1. The impact of market dynamics on the management capabilities of flexible manufacturing companies
2. The impact of management capabilities on firm performance.

The research which includes IFMMM fields, market dynamism and firm performance is illustrated in Figure 3.1.

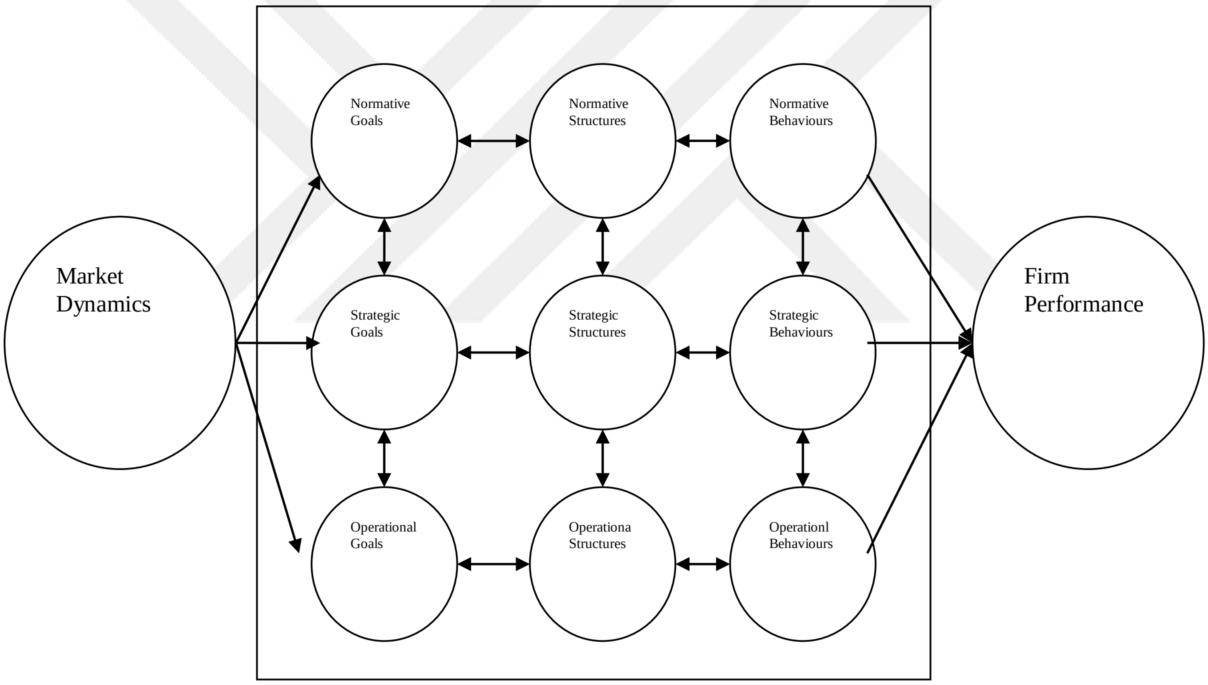

Figure 3.1 Research Model – IFMMM, Market Dynamism, Firm Performance

The construction of IFMMM elements are explained in detail in section 3.2. The other constructs of the research model will be explained in this section.

3.3.1 Market Dynamism

In their research, Yilmaz et al. (2005) measured market dynamism with the rate of changes in *Customer Preferences, Competitors' Strategies, Product Characteristics and Technology*. In our research, we named the subconstructs of market dynamism as:

1. **Dynamism in competition intensity**; which includes the rapid changes in competitors' strategies in sales and marketing and pricing.
2. **Dynamism in customer preference**, which is related with the customers' preferences about the product related properties including price and performance.
3. **Dynamism in technology** is related with the rapid changes in the technology related with the product, process and other market related aspects.

3.3.2 Firm Performance

We have adapted the subconstructs of firm performance from the study of Ulusoy et al.(2008) as illustrated in Table 3.14.

Table 3.14 Subconstructs of Firm Performance

Firm Performance		
No	**Subconstruct**	**Definition**
1.	Financial Performance	Related with profitability
2.	Market Performance	Related with sales growth, market share and customer satisfaction
3.	Innovation Performance	Related with new product development and process development
4.	Manufacturing Performance	Related with quality, cost, delivery and flexibility performance

3.4 Developing Questionnaire

For each construct of the research model, illustrated in Figure 3.1., research questionnaire has been prepared based on relevant literature. Initial questionnaire has been reviewed together with *2 top managers with PhD degree*, in order to determine and eliminate ambiguities and difficulties of understanding. At this phase some of the questions are revised, some of the questions are replaced with reverse questions and some of the questions are removed. Turkish questionnaire has reviewed together with a *Turkish language expert* to eliminate translation related wording issues.

Each item in the questionnaire was based on a six point Likert Scale. The six point Likert scale was used to avoid a mid-point, which prevents respondents from declaring a neutral opinion.

Prior to the pilot study, in order to maintain the internal validity of the questionnaire, each item has been reviewed to ensure that the relevant questions measure the subconstructs. Wording and sequence of the questions are revised and questionnaire has become ready for pilot study.

3.4.1 Developing IFMMM Questionnaire

The questionnaire for IFMMM has been developed upon initial IMM items and relevant manufacturing flexibility research for the subconstructs adapted from manufacturing flexibility literature. The composition of the initial IFMMM Questionnaire is illustrated in Table 3.15.

Table 3.15a. Summary of Initial IFMMM Questionnaire- Normative Level

Subconstruct	**Name**	**No of Items**	**Adapted from**
NORMATIVE GOALS			
NG1	Internal direction of the mission	3	Bleicher (1999)
NG2	Time perspective of the goal	3	Bleicher (1999)
NG3	Chance perspective	2	Bleicher (1999)
NG4	Risk perspective	2	Bleicher (1999)
NG5	Objective performance	3	Bleicher (1999)
NG6	Financial value goals	3	Bleicher (1999)
NG7	Ecological goals	3	Bleicher (1999)
NG8	Social goals	2	Bleicher (1999)
NORMATIVE STRUCTURES			
NS1	Representation of interests in board	1	Bleicher (1999)
NS2	Art of conflict resolution	3	Bleicher (1999)
NS3	Economical, legal and social structure	1	Bleicher (1999)
NS4	Distance of the management to real life	2	Bleicher (1999)
NS5	Competence distribution of management	2	Bleicher (1999)
NS6	Division of executives	2	Bleicher (1999)
NS7	Sense of responsibility of the top team	3	Bleicher (1999)
NS8	Rationale of the top team	3	Bleicher (1999)
NORMATIVE BEHAVIORS			
NB1	Cultural Openness	3	Bleicher (1999)
NB2	Attitudes towards change	4	Bleicher (1999)
NB3	Cultural Orientation	3	Bleicher (1999)
NB4	Subcultural differentiation	3	Bleicher (1999)
NB5	Cultural Expression	4	Bleicher (1999)
NB6	Value added orientation of management	4	Bleicher (1999)
NB7	Role of employees	3	Bleicher (1999)
NB8	Employee Engagement	4	Bleicher (1999)

Table 3.15b. Summary of Initial IFMMM Questionnaire- Strategic Level

Subconstruct	Name	No of Items	Adapted from
STRATEGIC GOALS			
SG1	Supply of performance	3	Bleicher (1999)
SG2	Individuality of problem solving	2	Bleicher (1999)
SG3	Competitive posture	2	Bleicher (1999)
SG4	Leader-follower behavior	2	Bleicher (1999)
SG5	Value added activities	2	Bleicher (1999)
SG6	Dependency of value added activities	2	Bleicher (1999)
SG7	Deployment of resources	2	Bleicher (1999)
SG8	Performance of resources	2	Bleicher (1999)
SG9	**Level of Product Flexibility**	**2**	**Petrioni and Belivacqua (2002)**
STRATEGIC STRUCTURES			
SS1	Focus	3	Bleicher (1999)
SS2	Reference points	3	Bleicher (1999)
SS3	Extent of rules	3	Bleicher (1999)
SS4	Time orientation	4	Bleicher (1999)
SS5	Synergy orientation	4	Bleicher (1999)
SS6	Hierarchy	1	Bleicher (1999)
SS7	Organizational development	3	Bleicher (1999)
SS8	Starting point of organizational development	3	Bleicher (1999)
SS9	**Level of Expansion Flexibility**	**2**	**Braglia and Petrioni (2000)**
STRATEGIC BEHAVIORS			
SB1	Level of participative behavior for management decisions	3	Bleicher (1999)
SB2	Focus of behavior development	3	Bleicher (1999)
SB3	Desired management behavior	3	Bleicher (1999)
SB4	Desired competency potential	3	Bleicher (1999)
SB5	Authority development	3	Bleicher (1999)
SB6	Focus of desired responsibility	3	Bleicher (1999)
SB7	Place of behavior development	2	Bleicher (1999)
SB8	Type of desired learning behavior	3	Bleicher (1999)

Table 3.15c. Summary of Initial IFMMM Questionnaire- Operative Level

Subconstruct	Name	No of Items	Adapted from
OPERATIVE GOALS			
OG1	Manufacturing Cost Reduction Goal	1	Das (2001)
OG2	Quality Performance Goal	1	Das (2001)
OG3	Delivery Performance Goal	1	Das (2001)
OG4	New Product Introduction Goal	3	Das (2001)
OG5	**Level of Volume Flexibility**	**2**	**Braglia and Petrioni (2000)**
OG6	**Level of Mix Flexibility**	**2**	**Das (2001)**
OPERATIVE STRUCTURES			
OS1	Production Systems Applications	3	Das (2001)
OS2	Infrastructural Production Support Systems Applications	8	Das (2001), Narasimhan et al.(2004), Zhang et al. (2003), Upton (1997)
OS3	Design Applications	2	Das (2001)
OS4	**Level of Machine Flexibility**	**5**	**Zhang et al. (2003)**
OS5	**Level of Routing Flexibility**	**2**	**Petrioni and Belivacqua (2002)**
OS6	**Level of Operation Flexibility**	**2**	**D'Souza and Williams (2000)**
OPERATIVE BEHAVIORS			
OB1	Team Work	1	Das (2001)
OB2	Decision Making Processes in Operations	2	Das (2001)
OB3	Multiple Skilled Labor	1	Boyle (2006)
OB4	**Level of Labor Flexibility**	**3**	**Zhang et al. (2003)**

The initial IFMMM questionnaire consists of 172 items. The questionnaire has been used for pilot study and revised after the pilot study.

3.4.2 Developing Market Dynamism Questionnaire

Market Dynamism has three subconstructs, namely, dynamism in competition intensity, dynamism in customer preferences and dynamism in technology. The composition of the market dynamism questionnaire is illustrated in Table 3.16

Table 3.16 Summary of Initial Market Dynamism Questionnaire

Subconstruct	Name	No of Items	Adapted from
MARKET DYNAMISM			
MD1	Dynamism in Competition Intensity	3	Homburg et al. (1999)
MD2	Dynamism in Customer Preferences	2	Homburg et al. (1999)
MD3	Dynamism in Technology	1	Ensley et al. (2006)

3.4.3 Developing Firm Performance Questionnaire

Firm performance questionnaire has been adapted from Ulusoy et al. (2008). The summary of the questionnaire along with subconstructs is available in Table 3.17.

Table 3.17 Summary of Initial Firm Performance Questionnaire

Subconstruct	Name		No of Items	Adapted from
FIRM PERFORMANCE				
FP1	Financial Performance		3	Ulusoy et al. (2008)
FP2	Market Performance		3	Ulusoy et al. (2008)
FP3	Innovation Performance		7	Ulusoy et al. (2008)
FP4	Manufacturing Performance			Ulusoy et al. (2008)
	FP41	Manufacturing Quality Performance	6	Ulusoy et al. (2008)
	FP42	Manufacturing Cost Performance	6	Ulusoy et al. (2008)
	FP43	Manufacturing Flexibility Performance	7	Ulusoy et al. (2008)
	FP44	Manufcaturing Delivery Performance	6	Ulusoy et al. (2008)

4 RESEARCH DESIGN AND METHODOLOGY

This chapter outlines the research methodology, provides details of the pilot study and concludes with the refinement of the questionnaire.

4.1 Research Strategy

This research is about developing IFMMM (Integrated Flexible Manufacturing Management Model) to investigate the management capabilities of flexible manufacturing companies. Additionally research also aims to explore the relationship between market dynamism, management capabilities and firm performance.

We have developed the research questions listed below in our study:

1. How could the management capability profiles of manufacturing companies be mapped based on the proposed Integrated Flexible Manufacturing Management Model?

2. How the manufacturing flexibility in manufacturing companies could be improved based on the proposed Integrated Flexible Manufacturing Management Model?

According to Yin (2009), case study is a recommended research method for a study if the conditions listed below exist:

1. If the research question is a “how” or a “why” question, then case study is a suitable research method. As the research questions in this study are “how” questions, case study is a preferred research method.
2. In case of the researcher’s control over the behavioral events is restricted, then case study is more appropriate method then other research methods to be applied. Since the researcher of the current study does not have any control over the behavioral events, case study is applicable.
3. In addition to the conditions above, case study is the most appropriate research method, if the study investigates a contemporary phenomenon in depth and within its real life context.

In this study, all of these three conditions exist. Therefore case study is used as a research method.

This research is exploratory in nature since there is a lack of preliminary research about the topic and aims to develop a conceptual model.

As indicated in the research questions, the study is about the manufacturing companies. It is clear that the aim of the research is to explore the phenomenon at organizational level, thus the “unit of analysis” of the research is “organization”. The cases are then selected from “manufacturing companies”.

4.2 Validity and Reliability

There are numerous criteria to judge the quality of a research design. However the quality of a research in social sciences is associated with validity and reliability (Yin, 2009). Because case study is a form of such research, the same criteria are also relevant for case studies. The mentioned criteria explained as below:

4.2.1 Internal validity

Internal validity is about the causal relationship between variables and results (Gibbert et al., 2008) and refers to data analysis phase (Yin, 2009). Three measures have been proposed to enhance internal validity. First, case study researchers should formulate a clear research framework, which demonstrates the causal relationship between research variables. Second, through pattern matching, researchers should compare empirically observed patterns with either predicted ones or patterns established in previous studies and in different contexts (Eisenhardt, 1989). Third, theory triangulation enables a researcher to verify findings by adopting multiple perspectives (Yin, 2009).

In our research, we have provided a clear research framework, available in Figure 3.1., which illustrates the causal relationship between variables. In a case study, we do not intend to perform statistical analysis on investigating causal relationship (Meredith, 1998), but to observe the causal relationship. In our research, the framework and the instrument has been developed and searching for the causality between research variables based on application of an empirical study with the unit of analysis is still manufacturing companies, has been proposed as a future work.

4.2.3 Construct validity

Construct validity is related with the quality of the operationalization of the concepts being studied (Yin, 2009). As such, construct validity refers to the extent to which a study investigates what it claims to investigate (Gibbert et al., 2008). Case study method is commonly criticized as, the researchers fail to develop well established operational measures and that “subjective” judgements are used instead (Yin, 2009). In order to enhance construct validity, it is suggested to use *multiple source of evidence* (Yin, 2009) by collecting data from different sources and have a look to the same phenomenon from different angles. Second tactic is to establish *clear chain of evidence* which will allow the reader to reconstruct how the researcher went from the initial questions to the final conclusions (Gibbert el al., 2008).

In this research, structured *interviews* with top managers of the companies are selected as primary source of information. However additional data sources have also been used to triangulate the information. One of the basic information sources is the *survey* applied to the white collar employees in two cases, which enabled us to have a clear idea about the general perception of the employees about the construct. The same questionnaire which has been used during the top management interviews is also used for the web-based survey conducted to white collar employees of the same companies.

In addition to that, the general market and product information has also been investigated for each particular case and used as a secondary data source.

During the design phase, we have made a comprehensive literature survey in order to develop the model and the related questionnaire. Moreover, we have applied to the expert opinion by interviewing numerous numbers of academics and top professionals as well. After the development of the model and the related questionnaire, a *pilot study* has been performed. During pilot study the preliminary questionnaire has been applied to top management and white collar employee of the pilot case. According to the feedback gathered from the pilot case study, the questionnaire has been refined in terms of content and number of questionnaire. By the help of the intensive work during model and questionnaire development phase, the model and questionnaire has been grounded on a strong theoretical basis and the researcher followed clear *chain of evidence* during data collection.

4.2.4 External validity

External validity is related with the *"generalizability"* of the research findings. The external validity problem has been the major barrier in doing case studies. The critics are mainly state that a single or multiple case studies are not sufficient for generalizing the results. However these critics are more compatible for a survey research, where the results of a sample are generalized to the universe. The situation in case study research is completely different. The cases could not be considered as samples and the case study research rely on *analytic generalizability* instead of *statistical generalizability (*which is valid for survey research) (Yin, 2009).

Analytic generalization refers to the generalization from empirical observation to the theory, rather than population (Gibbert et al., 2008). Eisenhardt (1989) argued that case studies can be a starting point for theory development and suggests a cross case analysis involving *four to ten* case studies may provide a good basis for analytical generalization.

In this study, a multiple case study research has been applied. Seven companies operating in different industries and having different profiles have been selected and included in case study. The number and selection of the cases enhanced the external validity of this research.

4.2.5 Reliability

Reliability refers to the absence of the random error, enabling the later investigator followed the same procedures and conducted the same case study and getting the same results (Gibbert et al., 2008). The keywords here are *transparency* and *replication*. Transparency could be achieved by measures such as careful documentation and clarification of the research procedures. Replication may be accomplished by putting together a case study database which includes the case study notes, the case study documents, and the narratives collected during the study, organized in such a way as to facilitate retrieval for later investigators (Yin 2009). In this study, the research procedures, case study documents and case study notes are documented clearly within case reports. A refined questionnaire has been used as data collection tool for all cases both for top management interviews and as well as web-based surveys for white collar employees of two cases out of seven.

4.3 Case Selection

In order to maintain external validity and guard against observer bias (Voss et al., 2002), we have used multiple cases in our research. The traditional way of selecting the cases for case study starts with identifying the population. In our research, the population is defined as the *manufacturing companies* operating *within Turkey*.

In theory building, sampling cases from the population is quite different than statistical sampling (Eisenhardt, 1989).The theoretical sampling may require cases to replicate previous cases, to fill theoretical categories or provide polar examples, moreover ease of access is one of the important criteria in case selection (Yin, 2009). In our study, the cases are selected from different industries in order to observe the profiling based on the research model in different industries and as well as the impact of market dynamism. Number of cases is within the range four to ten recommended by Eisenhardt (1989) for better analytical generalization. We have selected seven cases which are different from each other in terms different categories as, *size, geographical location, no of years in business, no of sites, ownership structure, etc.* The heterogeneous properties of the cases enable us to observe different management profiles according to each classification. Moreover, some of the similarities within the selected cases might give us the chance for replication. The selected cases along with profiles are illustrated in Table 4.1.

Table 4.1. Case profile matrix

		No of Employees			
		50-99	100-249	250-499	500 and more
Industry	2673- Plastic Packaging		1983 51.000.000 COMPANY 2 120 425.000		
	2820- Plastic Compounding	2004 30.000.000 COMPANY 1 63 476.190			
	3080- Plastic Containers	1975 12.000.000 COMPANY 5 65 184.615		2011 30.000.000 COMPANY 4 350 85.714	
	3050- Plastic Hose and Construction Materials				1965 110.000.000 COMPANY 3 680 161.765
	2211- Fabric Production			2004 54.000.000 COMPANY 6 420 128.571	
	3460- Metal Forging and Stamping			1962 50.000.000 COMPANY 7 320 156.250	

Each company is located in the relevant cell based on Industry, which is listed together with *SIC Code* in rows and range of number of employees in coloumns. Within each cell, we have a composition of information as, in upper left corner, year of establishment; no of employees in lower left corner; sales revenue (USD) , on upper right corner and sales revenue (USD) per employee in lower right corner.

4.4 Data Collection

In order to maintain construct validity, multiple data sources has been used in our research. The structured interviews with the top managers of the companies are the main data source for each case (Yin, 2009). Aligned with the research model, management capabilities at all levels and functions are included. Therefore, capturing the perception of the top managers regarding the research constructs was the targeted in data collection phase.

In a structured interview, a fixed format is followed and each answer is noted while the interview proceeds (Meredith et al., 1989). A questionnaire has been developed to capture the perception of the interviewee about the current managerial capabilities of their companies aligned with the research objectives and the same questionnaire has been used within all interviews. The development of the questionnaire is explained in detail within section 3.4. In order to control the situation and responses throughout the interviews (Meredith, et al., 1989), face to face interviews has been done for each case. The duration of the interviews was around two to three hours.

In addition to the top management interviews, within two cases, the same questionnaire has been used for a web based white collar survey. The general market and product information has also been investigated for each particular case and used as a secondary data source.

4.5 Data Analysis

The collected data from the structured interviews and other relevant sources are translated into the scores for each research construct by using descriptive statistics. The average perceived scores of for each subconstruct, including managerial capabilities based on profiling elements of IFMMM and also other research variables, market dynamism and firm performance for each case particularly *within-case analysis* and also a comparison between cases within *cross-case analysis.* The scores of IFMMM elements, representing management capabilities, are converted to a *"capability scale"* which enables more efficient comparison of the results. The ranges of the scores and corresponding capability scale are available in Table 4.2.

Table 4.2. Capability Scale

Perceived score of IFMMM element	Capability
1.00-2.24	Low
2.25-3.49	Mid-Low
3.50-4.74	Mid-High
4.75-6.00	High

For each IFMMM field and constructs of the research model, we calculate the overall score as the mean value of the scores of the corresponding subconstructs. We assume that there is no weight difference between the subconstructs for each construct in the model.

4.6 Pilot Study

A pilot study has been conducted as the final preparation for the data collection (Yin, 2009), in order to refine the data collection methods, including the questionnaire. The selection of the pilot case was due to the *ease of access* criteria. Both face to face interviews and web based survey have been conducted within the pilot case. The company profile of the pilot case is illustrated in Table 4.2.

4.6.1 Company profile

The company is a manufacturing company operating in automotive parts industry. The company, which is operating in the same industry for more than 50 year, has a single manufacturing site, located in Marmara Region. Main products are brake drums and brake discs. Main production methodologies are *metal casting* and *machining*.

Annual turnover of the company is over 50 Million USD, as of 2014. More than 300 employees are working for the company. The profile of the company is summarized in Table 4.3.

Table 4.3 Company profile- Pilot Case

Industry	Years in Business	Subsidiary of a Group	No of Employees	No of Products	Annual Turnover (Million USD)	Single Site/ Multisite	Region
3460- Metal Forging and Stamping	**50-59**	**No**	**250-499**	**100-499**	**50-99**	**Single Site**	**Marmara**

4.6.2 Results of Pilot Study

After interview with the top manager, we had the permission for a white-collar survey. A web-based survey, based on the research questionnaire, has been conducted. A total of 20 responses with 18 valid responses have been collected. The collected data has been analyzed by using SPSS 11.5 and the results are summarized within this section.

4.6.2.1 IFMMM Profile of the Pilot Study

The IFMMM scores and profiles for each IFMMM field have been determined after data analysis, by using descriptive statistics.

4.6.2.1.1 Normative Goals Profile

The IFMMM Normative Goals scores of the pilot case, based on the perception of the white collar staff is summarized in Table 4.4.

Table 4.4 Normative Goals Scores of Pilot Case

NORMATIVE GOALS (NG)								**SCORE**
NG1	**Internal Direction of the Mission**							
Individual Economic	1	2	3	4	5	6	**Social Economic**	**3,76**
NG2	**Time Perspective of the Goal**							
Short Term	1	2	3	4	5	6	Long Term	**3,45**
NG3	**Chance Perspective**							
Keep It	1	2	3	4	5	6	**Progressive**	**4,42**
NG4	**Risk Perspective**							
Disturbing	1	2	3	4	5	6	Vulnerable	**3,39**
NG5	**Objective Performance Goals**							
Weak	1	2	3	4	5	6	**Strong**	**4,56**
NG6	**Financial Value Goals**							
Weak	1	2	3	4	5	6	**Strong**	**3,68**
NG7	**Ecological Goals**							
Weak	1	2	3	4	5	6	**Strong**	**4,16**
NG8	**Social Goals**							
Weak	1	2	3	4	5	6	**Strong**	**3,67**
Overall Normative Goals Score								**3,89**

The scores illustrate that two elements, namely, "*Time perspective of the Goal*" and "*Risk Perspective*" indicate a mid-low capability profile. The white collar staff of the pilot company perceives that the management prepares *short-term*, *quarterly plans* to determine opportunities based on existing potentials, rather than long term planning.

Additionally the risk perspective score shows us that the perception on the risk perspective of the management is *disturbing”*, which means that the management avoids risks and searches for safety, instead of confrontation of the risk.

The remaining elements have scores indicating a *mid-high* profile. The normative goal profile of the pilot case is illustrated with the radar diagram in Figure 4.1.

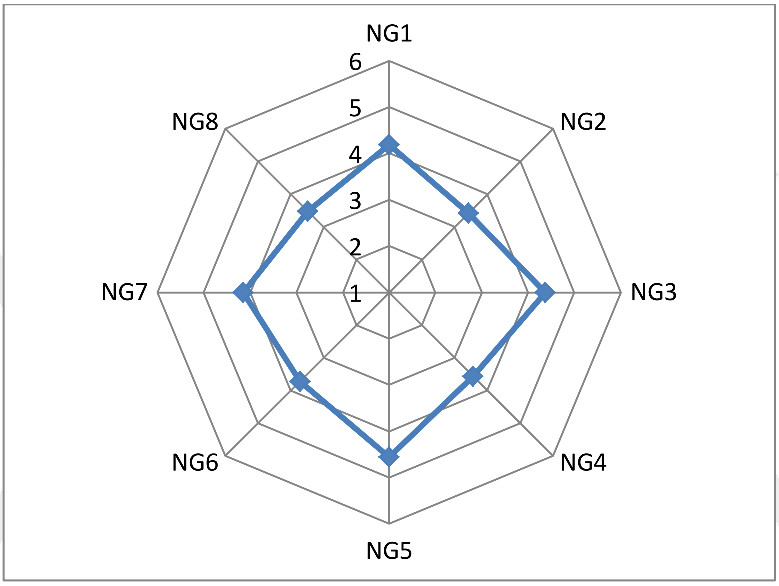

Figure 4.1 IFMMM – Normative Goals profile of the Pilot Case

4.6.2.1.2 Normative Structures Profile

The IFMMM normative structures scores of the pilot case, upon the perception of the white collar staff is listed in Table 4.5.

Table 4.5 Normative Structures scores of pilot case

NORMATIVE STRUCTURES (NS)								**SCORE**
NS1	**Representation of interests in board**							
Shareholder	1	2	3	4	5	6	**Stake Holder**	**3,95**
NS2	**Art of Conflict Resolution**							
Confrontation	1	2	3	4	5	6	**Consensus**	**3,72**
NS3	**Economical, Legal and Social Structure**							
Non-differentiated	1	2	3	4	5	6	Differentiated	**1,00**
NS4	**Distance of Management to Real Life**							
Close-Operative	1	2	3	4	5	6	Far-Strategic	**2,63**
NS5	**Competence Distribution of Management**							
Single Level	1	2	3	4	5	6	**Multilevel**	**3,86**
NS6	**Division of Executives**							
Directorial/CEO	1	2	3	4	5	6	**Staff,Team**	**5,17**
NS7	**Sense of Responsibility of Top Management Team**							
Protective	1	2	3	4	5	6	**Multiplier**	**4,50**
NS8	**Rationale of Top Management Team**							
Monitoring	1	2	3	4	5	6	**Consulting**	**4,20**
Overall Normative Structures Score								**2,98**

The score of “Economic, legal and social structure” element corresponds to a low capability profile with score of 1,00 and “Distance of management to real life” is below 3,50 and correspond to a mid-low. “Economic, legal and social structure” has a value of 1,00, indicating the structure is non-differentiated. It is because the company is not a member of group of companies and consists of only one legal structure. We have omitted this element in profiling which is illustrated in Figure 4.2. Distance of management to real life” is perceived as close-operative (score is 2,63), which indicates that the top management members are interfering with daily business activities regularly.

The other six elements have scores close to the IFMMM ideal extreme values. The scores of two elements, “competence distribution of management” and “art of conflict resolution” have a mid-low capability profile. The overall normative structures score is 2,98, and the corresponding capability scale is Mid-Low, which is far from IFMMM ideal extreme value.

Even though the board is composed of shareholders, the perception of the employees is that the stakeholders are also included in board composition. This result has driven us to reconsider the items in the questionnaire and revise accordingly after the pilot study. The normative structures profile of the pilot case is illustrated in Figure 4.2.

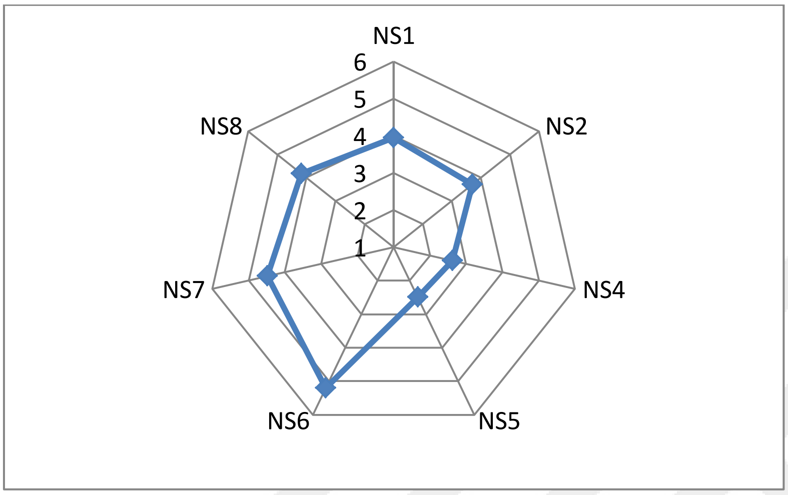

Figure 4.2 IFMMM – Normative Structures profile of the Pilot Case

4.6.2.1.3 Normative Behaviors Profile

The IFMMM normative behaviors scores of the pilot case are listed in Table 4.6.

Table 4.6 Normative Behaviors scores of pilot case

NORMATIVE BEHAVIORS (NB)								**SCORE**
NB1	**Cultural Openness**							
Inside oriented	1	2	3	4	5	6	**Outside oriented**	**3,85**
NB2	**Attitude Towards Change**							
Hostile	1	2	3	4	5	6	Friendly	**3,00**
NB3	**Orientation of Management**							
Top	1	2	3	4	5	6	**Basis**	**3,54**
NB4	**Subcultural Differentiation**							
Uniform Value System	1	2	3	4	5	6	**Functionally differentiated**	**3,87**
NB5	**Cultural Expression**							
Instrumental	1	2	3	4	5	6	**Development oriented**	**3,80**
NB6	**Value Added Orientation of Management**							
Cost oriented	1	2	3	4	5	6	Benefit oriented	**2,74**
NB7	**Role of Employees**							
Members	1	2	3	4	5	6	Actors	**3,45**
NB8	**Employee engagement**							
Individual, Hero	1	2	3	4	5	6	Collective, Us	**3,00**
Overall Normative Behaviors score								**3,40**

The scores of four NB elements out of eight have mid-low capability profile. *"Attitude towards change"* element score is 3, which indicates that the management perceives change as a risk and focuses on protecting the status quo and is scaled as *mid-low* capability profile. The perception of the employees regarding the *"value added orientation"* of the management is cost oriented instead of benefit oriented. *"Employee engagement"* is perceived as *"individual",* which stands for individual task assignments and highly personalized success and failure, which is opposite to the ideal IFMMM extreme. *"Role of employees*" element score is 3,45, a *mid-low capability profile,* which indicates a *"members" profile associated with* the perception that the employees have a relationship with the company with a sense of belonging and each *member* contributes to the preservation of the whole within his/her domain. However, IFMMM ideal extreme profile *actors* stand for a perception that employees are the main owners of the activities. The overall NB score is 3,40, which is a *mid-low* capability profile and indicates that the NB score of the pilot case is far from IFMMM ideal score. The IFMMM normative behavior profile of the pilot case is illustrated in Figure 4.3.

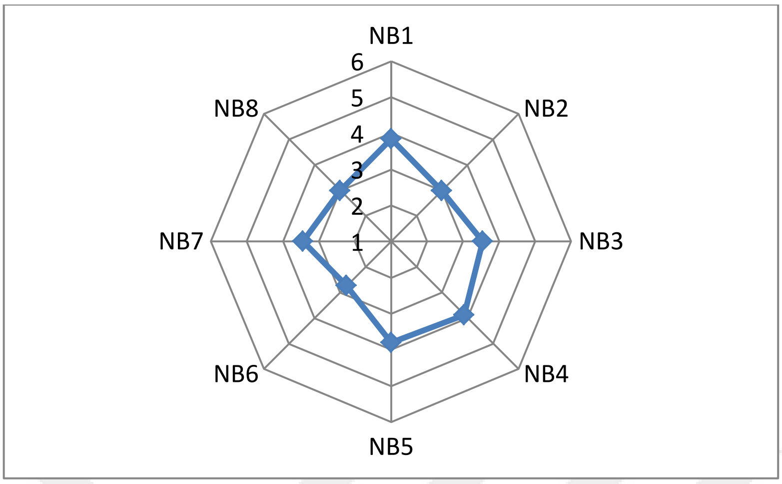

Figure 4.3 IFMMM – Normative Behaviors profile of the Pilot Case

The interviews with the participants after the survey shown us that some of the items in NB questionnaire were not clear enough or some wording problems pointed out. Therefore, the items of NB questionnaire have been revised after the pilot study.

4.6.2.1.4 Strategic Goals Profile

The IFMMM strategic goals scores of the pilot case based on perception of white collar employees are listed in Table 4.7.

Table 4.7 Strategic goals scores of pilot case

STRATEGIC GOALS (SG)								**SCORE**
SG1	**Supply of Performance**							
Narrow	1	2	3	4	5	6	**Broad**	**3,82**
SG2	**Individuality of Problem Solving**							
Standardized	1	2	3	4	5	6	Individual	**3,19**
SG3	**Competitive Posture**							
Defensive	1	2	3	4	5	6	**Offensive**	**4,05**
SG4	**Leader-Follower Behavior**							
Follower	1	2	3	4	5	6	**Leader**	**4,00**
SG5	**Value Added Activities**							
Cost Oriented Rationalization	1	2	3	4	5	6	Customer Focused Optimization	**3,24**
SG6	**Dependency of Value Added Activities**							
Individual	1	2	3	4	5	6	Networking	**3,38**
SG7	**Deployment of Resources**							
Fixed	1	2	3	4	5	6	**Flexible**	**3,94**
SG8	**Performance of Resources**							
Specialized	1	2	3	4	5	6	**Generalist**	**3,70**
SG9	**Level of Product Flexibility**							
Low	1	2	3	4	5	6	High	**3,47**
Overall Strategic Goals score								**3,20**

Four out of nine SG elements have scores below have mid-low capability profile. SG2, *"Individuality of problem solving",* element score is 3,19 (corresponds a mid-low profile), which indicates the company has a standardized solutions to meet large number of customers expectations. Standardization is the main focus for attaining success. In contrast, IFMMM proposes an individual problem solving approach. The focus of the management in *"value added activities"* is cost oriented rationalization, which illustrates that the management mainly focuses on cost reduction goal, instead of customer focused optimization. *"Dependency of value added activities"* score shows that the company aims to accomplish all value added tasks within the company and is not willing to use any kind of outsourcing, in other terms, networking.

The level of *product flexibility* is 3,47 (mid-low profile) which shows us that, white collar staff of the company perceive that product flexibility level is lower than the competitors. The employees perceive that the number and variety of new products that the company introduces to the market is low, when compared with the competitors. The perception of the employees regarding the SG profile of the pilot company is illustrated with the radar diagram in Figure 4.4.

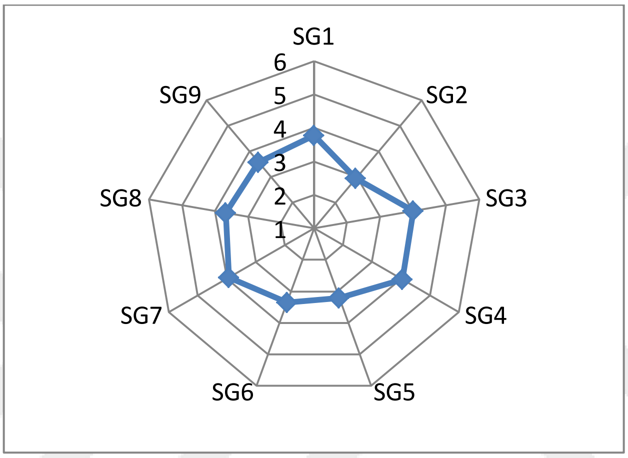

Figure 4.4 IFMMM – Strategic Goals profile of the Pilot Case

The interview with the participants after the survey has shown that some of the participants have difficulties in understanding some of the items in SG questionnaire. We have revised the SG questionnaire after the case study.

4.6.2.1.5 Strategic Structures Profile

The IFMMM Strategic goals scores of the pilot case, based on employee perception are listed in Table 4.8.

Table 4.8 Strategic structures scores of pilot case

STRATEGIC STRUCTURES (SS)								**SCORE**
SS1	**Focus**							
Issue-Oriented	1	2	3	4	5	6	Person-Oriented	**3,04**
SS2	**Reference Points**							
Formal Rules	1	2	3	4	5	6	Symbols	**2,88**
SS3	**Extent of Rules**							
Efficiency Oriented	1	2	3	4	5	6	**Effectiveness Oriented**	**4,09**
SS4	**Time Orientation**							
Unlimited Period	1	2	3	4	5	6	Predictable Period	**3,24**
SS5	**Synergy Orientation**							
Central	1	2	3	4	5	6	Decentral	**3,49**
SS6	**Hierarchy**							
High	1	2	3	4	5	6	**Low**	**4,14**
SS7	**Organizational Development**							
Inwards, Towards Efficiency	1	2	3	4	5	6	Outwards, Towards Effectiveness	**3,19**
SS8	**Starting Point of Organizational Development**							
Top-Down	1	2	3	4	5	6	Bottom-Up	**3,06**
SS9	**Level of Expansion Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,14**
Overall Strategic Structures Score								**3,47**

The results illustrates that six elements of strategic structures out of nine have a score lower than 3,50. *"Focus"* element score is 3,04, which indicates that the organizational positions within the company determined on task basis and the employees perceive that level of division of labor is high. However ideal IFMMM extreme is a *"person-oriented"* focus in setting the positions within the organization. *"Reference points"* score, which is 2,88, indicates that employees' perception of the degree of formalization is high. Instead of symbols and framework rules, the organization tends to stick to the formal rules and procedures.

Time orientation of the structure is towards and unlimited time period (score: 3,24), which indicates that the structures and procedures remain almost unchanged within a predictable time period. The synergy orientation score is very slightly lower than 3,50, with a tendency towards a centralized organization structure. Moreover, the scores of *organizational development* and *starting point of organizational development* elements illustrates an efficiency oriented organizational development and high centralization.

Despite the six elements which have scores under 3,50, indicating a *mid-low* capability profile, signals a more mechanistic organization structure, employees also perceive that level of *hierarchy* low (score: 4,14, mid-high profile), and *extent of rules* (score:4,09, mid-high profile) are effectiveness oriented, which are the characteristics of more organic organization structure. Moreover, *level of expansion flexibility* score is 4,14, so that white collar employees perceive that the company can expand its capacity easier and faster than the competitors.

The overall strategic structures score is *3,47* and indicates a *mid-low* capability profile. The SS profile of the pilot company is illustrated with the radar diagram in Figure 4.5.

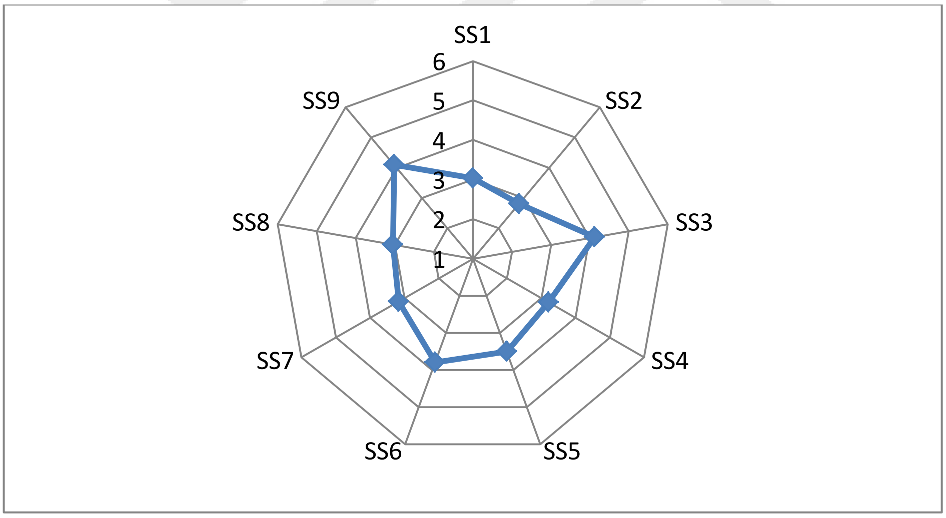

Figure 4.5 IFMMM – Strategic Goals profile of the Pilot Case

4.6.2.1.6 Strategic Behaviors Profile

The strategic behaviors profiling elements scores of the pilot case, based on the perception of white collar employees, is listed in Table 4.9.

Table 4.9 Strategic behaviors scores of pilot case

STRATEGIC BEHAVIORS (SB)								**SCORE**
SB1	**Level of Participative Behavior for Management Decisions**							
Low	1	2	3	4	5	6	High	**2,98**
SB2	**Focus of Behavior Development**							
Individual	1	2	3	4	5	6	**Team**	**3,65**
SB3	**Desired Management Behavior**							
Risk- Averse	1	2	3	4	5	6	Entrepreneurial	**3,06**
SB4	**Desired Competency Potential**							
Specialist	1	2	3	4	5	6	**Generalist**	**4,09**
SB5	**Authority Development**							
Institutional- Hierarchy Based	1	2	3	4	5	6	**Communication- Specialist Based**	**3,68**
SB6	**Focus of Desired Responsibility**							
Dependence- Member Only Executes	1	2	3	4	5	6	Delegation-Autonomous	**3,07**
SB7	**Place of Behavior Development**							
Off the Job	1	2	3	4	5	6	**On the Job**	**4,45**
SB8	**Type of Desired Learning Behavior**							
Vertical	1	2	3	4	5	6	**Horizontal**	**3,76**
Overall Strategic Behaviors Score								**3,59**

The perception of the employees about the *participative behavior* for decision making is profiled as *mid-low* (score:2,98), which is associated with more vertical information flow and centralized decision making. *Desired management behavior* tends to avoid from risk (score:3,06), where IFMMM ideal profile is *entrepreneurial management behavior.* The score of the *focus of desired responsibility (3,07)* element indicates a *mid-low* profile, which shows that delegation of the responsibilities and duties is still limited. The remaining five profiling elements have *mid-high* capability profiles and the overall SB score is 3,59 which indicates a mid-high profile. The SB profile of the pilot company is illustrated with the radar diagram in Figure 4.6.

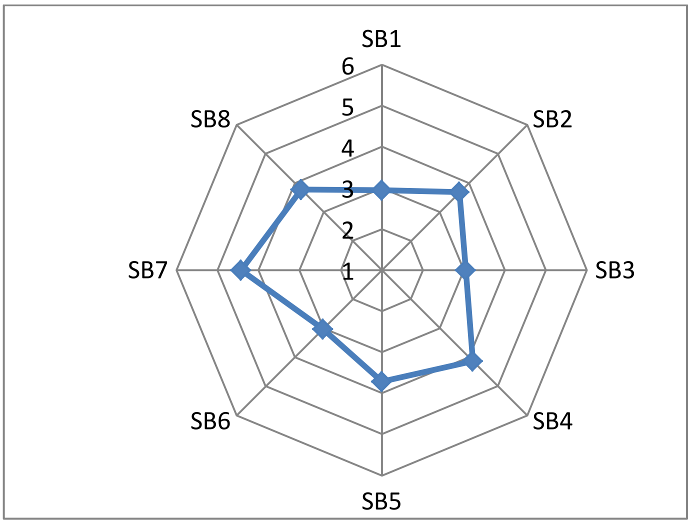

Figure 4.6 IFMMM – Strategic Behaviors profile of the Pilot Case

Based on the participants' comments on the strategic behaviors items, we have revised the wording of some questions and also removed some questions prior to the case studies.

4.6.2.1.7 *Operative goals profile*

The scores of IFMMM operative goals profiling elements of the pilot case, based on white collar employees' perception are listed in Table 4.10.

Table 4.10 Operative goals scores of pilot case

OPERATIVE GOALS (OG)									**SCORE**
OG1	**Manufacturing Cost Reduction Goal**								
Low	1	2	3	4	5	6	**High**		**4,56**
OG2	**Quality Performance Goal**								
Low	1	2	3	4	5	6	**High**		**4,50**
OG3	**Delivery Performance Goal**								
Low	1	2	3	4	5	6	**High**		**4,34**
OG4	**New Product Introduction Performance Goal**								
Low	1	2	3	4	5	6	**High**		**4,01**
OG5	**Level of Volume Flexibility**								
Low	1	2	3	4	5	6	**High**		**4,30**
OG6	**Level of Mix Flexibility**								
Low	1	2	3	4	5	6	**High**		**4,34**
Overall operative goals									**4,34**

The scores of operative goals shows us that the white collar employees perceive that the emphasis on *manufacturing cost reduction, quality performance, delivery performance and new product introduction performance goals* are extremely high.

Employees perceive that level *of volume flexibility* is *mid-high* (4,30), which shows that the company can change the production volume more easily and effectively than the competitors. Perceived level *of mix flexibility* is also *mid-high* (4,34), which illustrates that the capability of changing product mix effectively is better than the competitors. The OG profile of the pilot company is illustrated with the radar diagram in Figure 4.7.

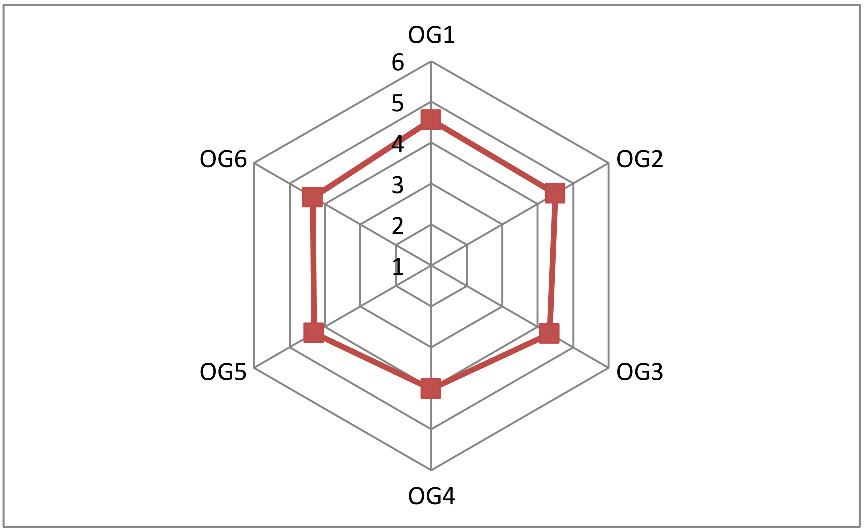

Figure 4.7 IFMMM – Operative goals profile of the Pilot Case

4.6.2.1.8 Operative structures profile

The scores of IFMMM operative structures profiling elements of the pilot case, based on white collar employees' perception are listed in Table 4.11.

Table 4.11 Operative structures scores of pilot case

OPERATIVE STRUCTURES (OS)								**SCORE**
OS1	**Production Systems Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**4,59**
OS2	**Infrastructural Production Support Systems Applications**							
Narrow	1	2	3	4	5	6	Wide	**3,08**
OS3	**Design Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**4,00**
OS4	**Level of Machine Flexibility**							
Low	1	2	3	4	5	6	**High**	**3,82**
OS5	**Level of Routing Flexibility**							
Low	1	2	3	4	5	6	**High**	**3,76**
OS6	**Level of Operation Flexibility**							
Low	1	2	3	4	5	6	**High**	**3,79**
Overall operative structures score								**3,84**

Operative structures scores of the pilot case shows us that the *production systems applications* (4,59) and *design applications* (4,00) are widely used in the pilot company. The usage infrastructural production support systems applications are not visible at desired level. The list of infrastructural production support systems applications is available in Table 3.10.

Level of machine flexibility is relatively high (3,82). The company has capability to change operations performed by single machines easily and effectively.

Perception of the employees about the routing flexibility level (3,76) which indicates that the manufacturing system is able to provide multiple alternate routes to produce the products.

Operation flexibility level (3,79) shows us that the manufacturing system is able to interchange the sequence of the operations for a given product. The OS profile of the pilot company is illustrated with the radar diagram in Figure 4.8.

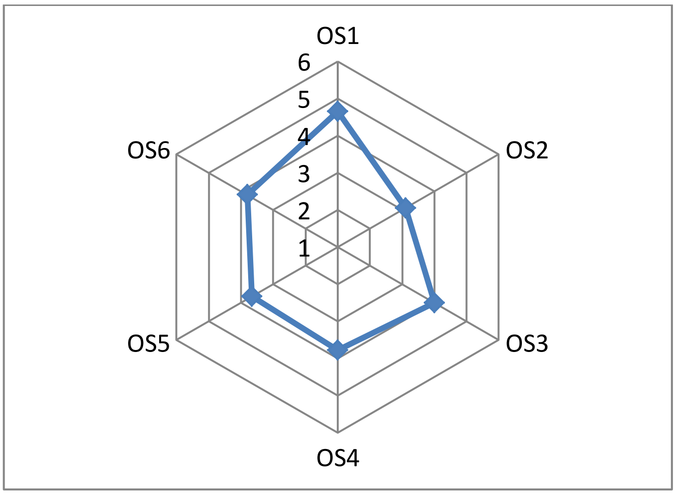

Figure 4.8 IFMMM – Operative structures profile of the Pilot Case

4.6.2.1.9 *Operative behaviors profile*

The scores of IFMMM operative structures profiling elements of the pilot case, based on white collar employees' perception are listed in Table 4.12.

Table 4.12 Operative behaviors scores of pilot case

OPERATIVE BEHAVIORS (OB)								**SCORE**
OB1	**Team Work**							
Narrow	1	2	3	4	5	6	**Wide**	**3,89**
OB2	**Decision Making Processes in Operations**							
Centralized	1	2	3	4	5	6	Decentralized	**3,24**
OB3	**Multi-Skilled Labor**							
Narrow	1	2	3	4	5	6	Wide	**3,37**
OB4	**Level of Labor Flexibility**							
Low	1	2	3	4	5	6	High	**3,44**
Overall operative behaviors score								**3,48**

The operative behaviors profile of the pilot case illustrates that the *team work* is a part of operations management activities. In parallel with the relevant elements of normative behaviors and strategic behaviors, *decision making* at operation level is also centralized.

The capability of the manufacturing workers to perform multiple tasks is relatively low. The OB profile of the pilot company is illustrated with the radar diagram in Figure 4.9.

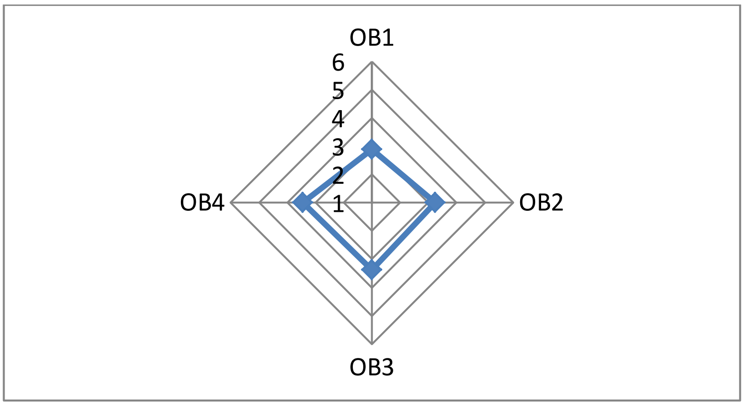

Figure 4.9 IFMMM – Operative behaviors profile of the Pilot Case

4.6.2.2 Manufacturing Flexibility- Pilot Study

We have adapted eight manufacturing flexibility dimensions as profiling elements of IFMMM within different IFMMM field. The list of the manufacturing flexibility dimensions along with the corresponding scores is available in Table 4.13.

Table 4.13 Manufacturing flexibility perception of pilot case

MANUFACTURING FLEXIBILITY (MF)		SCORE
SG9	Level of Product Flexibility	3,47
SS9	Level of Expansion Flexibility	4,14
OG5	Level of Volume Flexibility	4,30
OG6	Level of Mix Flexibility	4,34
OS4	Level of Machine Flexibility	3,82
OS5	Level of Routing Flexibility	3,76
OS6	Level of Operations Flexibility	3,89
OB4	Level of Labor Flexibility	3,44
Overall Manufacturing Flexibility Score		3,89

Manufacturing flexibility scores indicates that the pilot company has flexibility levels better than the competitors except *product flexibility* and *labor flexibility*. The overall flexibility score illustrates that the perceived manufacturing flexibility level is above the competition.

4.6.2.3 Market Dynamism Perception- Pilot Study

The market dynamism scores are illustrated in Table 4.14.

Table 4.14 Market Dynamism perception of pilot case

MARKET DYNAMISM (MD)		SCORE
MD1	Dynamism in Competition Intensity	3,80
MD2	Dynamism in Customer Preferences	3,67
MD3	Dynamism in Technology	4,00
Overall Market dynamism		3,82

The perception of the pilot case employees about technology based dynamism is relatively higher. Perceived dynamism in competition intensity and customer preferences is higher than average. We can conclude that perceived overall market dynamism is also high.

4.6.2.4 Firm Performance Perception- Pilot Study

The questionnaire includes items for firm performance (defined in section 3.4.3.) along with the subconstructs. For each subconstruct the perceived performance scores are summarized separately.

4.6.2.4.1 Financial performance

Financial performance subconstruct is composed of *profitability on sales revenue, profitability on assets, general profitability*. The scores of financial performance components are listed in Table 4.15.

Table 4.15 Financial performance perception of pilot case

FINANCIAL PERFORMANCE (FP1)		**SCORE**
FP11	**Profitability on sales revenue**	**4,42**
FP12	**Profitability on assets**	**4,05**
FP13	**General profitability**	**4,42**
Overal financial performance		**4,30**

The financial performance scores show us that white collar employees of the pilot case perceive that their company's financial performance in all aspects is better than the competitors'. Overall financial performance score (4,30) is an indicator of a perception of a financial performance better than the competition.

4.6.2.4.2 Market performance

Market performance is measured with the performance of the company on *customer satisfaction score, total sales* and *market share.* Perceived market performance score along with the components are listed in Table 4.16.

Table 4.16 Market performance perception of pilot case

MARKET PERFORMANCE (FP2)		**SCORE**
FP21	**Customer satisfaction**	**4,63**
FP12	**Total sales**	**5,00**
FP13	**Market share**	**4,89**
Overal market performance		**4,84**

The perception of the employees about the market performance of the pilot case implies that the employees perceive that their company is performing better than the competitors in terms of customer satisfaction, total sales and as well as market share.

4.6.2.4.3 Innovation performance

General innovation performance includes product innovation, process innovation and innovation in management systems. The overall innovation performance score, based on white collar employees perception is **3,89**, which indicates that the overall innovation performance is better than the competition.

However, the responses show us that the product innovation score (**3,51**) , including the ratio of new products in the current product mix and number of patents is on average level. This result is compatible with the level of product flexibility (SG9) score **(3,49)**. We can conclude that, white collar employees perceive that the new product innovation performance of the company is around industry average.

4.6.2.4.4 Manufacturing performance

The subconstructs of manufacturing performance along with the scores from pilot case are listed in Table 4.17.

Table 4.17 Manufacturing performance perception of pilot case

MANUFACTURING PERFORMANCE (FP4)		**SCORE**
FP41	**Manufacturing quality performance**	**4,11**
FP42	**Manufacturing cost performance**	**3,78**
FP43	**Manufacturing flexibility performance**	**3,88**
FP44	**Delivery performance**	**4,29**
Overall Manufacturing performance		**4,02**

Overall manufacturing performance score (4,02) indicates that the white collar employees perceive that their manufacturing performance is better than the competitors'. All of the four subconstructs have scores above average, which means that that the white collar employees' perception about quality performance, cost performance, flexibility performance and delivery performance are better than competition.

The comparison of the scores of manufacturing performance subconstructs with the corresponding operative goals subconstructs is listed in Table 4.18.

Table 4.18 Comparison of manufacturing performance scores and operative goals scores

MANUFACTURING PERFORMANCE (FP4)		SCORE	OPERATIVE GOALS		SCORE
FP41	**Manufacturing quality performance**	**4,11**	**OG2**	**Quality performance goal**	**4,50**
FP42	**Manufacturing cost performance**	**3,78**	**OG1**	**Manufacturing cost reduction performance goal**	**4,56**
FP44	**Delivery performance**	**4,29**	**OG3**	**Delivery performance goals**	**4,34**

The comparison of the scores of manufacturing performance with the relevant operative goals scores illustrates that, the strong emphasis on quality performance goal and delivery performance goal perceived to be ended with better performance in quality and delivery. The level of emphasis on manufacturing cost reduction performance goal is high (4,56), however the perceived achievement about the manufacturing cost reduction (3,78) could be improved.

The overall manufacturing flexibility level, derived from IFMMM elements is **3,89** (Table 4.13). The manufacturing flexibility performance score (FP43) measured with firm performance items (Table 4.17) is **3,88.** Both measures result with almost same value, which is also a good indication in terms of *construct validity*.

4.6.3 Lessons from Pilot Study

We have conducted pilot study as a part of research design prior to data collection (Yin, 2009). Pilot study helped us in various aspects of the methodology including testing the questionnaire, presentation of the results and preparations for conducting interviews. We have included the company which we had conducted the pilot study also in our study as a case, named as **Company 7.**

After the web based survey responses are collected, interviews with the respondents illustrated us that some items of the questionnaire are difficult to understand, some items could be removed and wording of some items could be changed.

The reformation of the questionnaire has been completed. The items included in market dynamism questionnaire and firm performance questionnaire remained unchanged. The revisions have been made in items included in IFMMM questionnaire. The revised IFMMM questionnaire is presented in Table 4.19.

Table 4.19a Summary of final IFMMM questionnaire- Normative Level

Subconstruct	Name	No of Items	Adapted from
NORMATIVE GOALS			
NG1	Internal direction of the mission	3	Bleicher (1999)
NG2	Time perspective of the goal	2	Bleicher (1999)
NG3	Chance perspective	2	Bleicher (1999)
NG4	Risk perspective	2	Bleicher (1999)
NG5	Objective performance	3	Bleicher (1999)
NG6	Financial value goals	2	Bleicher (1999)
NG7	Ecological goals	3	Bleicher (1999)
NG8	Social goals	3	Bleicher (1999)
NORMATIVE STRUCTURES			
NS1	Representation of interests in board	2	Bleicher (1999)
NS2	Art of conflict resolution	3	Bleicher (1999)
NS3	Economical, legal and social structure	1	Bleicher (1999)
NS4	Distance of the management to real life	2	Bleicher (1999)
NS5	Competence distribution of management	2	Bleicher (1999)
NS6	Division of executives	2	Bleicher (1999)
NS7	Sense of responsibility of the top team	3	Bleicher (1999)
NS8	Rationale of the top team	3	Bleicher (1999)
NORMATIVE BEHAVIORS			
NB1	Cultural Openness	3	Bleicher (1999)
NB2	Attitudes towards change	3	Bleicher (1999)
NB3	Cultural Orientation	2	Bleicher (1999)
NB4	Subcultural differentiation	3	Bleicher (1999)
NB5	Cultural Expression	4	Bleicher (1999)
NB6	Value added orientation of management	4	Bleicher (1999)
NB7	Role of employees	3	Bleicher (1999)
NB8	Employee Engagement	4	Bleicher (1999)

Table 4.19b Summary of final IFMMM questionnaire- Strategic Level

Subconstruct	Name	No of Items	Adapted from
STRATEGIC GOALS			
SG1	Supply of performance	3	Bleicher (1999)
SG2	Individuality of problem solving	2	Bleicher (1999)
SG3	Competitive posture	2	Bleicher (1999)
SG4	Leader-follower behavior	2	Bleicher (1999)
SG5	Value added activities	2	Bleicher (1999)
SG6	Dependency of value added activities	2	Bleicher (1999)
SG7	Deployment of resources	2	Bleicher (1999)
SG8	Performance of resources	2	Bleicher (1999)
SG9	**Level of Product Flexibility**	**2**	**Petrioni and Belivacqua (2002)**
STRATEGIC STRUCTURES			
SS1	Focus	3	Bleicher (1999)
SS2	Reference points	3	Bleicher (1999)
SS3	Extent of rules	3	Bleicher (1999)
SS4	Time orientation	4	Bleicher (1999)
SS5	Synergy orientation	3	Bleicher (1999)
SS6	Hierarchy	2	Bleicher (1999)
SS7	Organizational development	3	Bleicher (1999)
SS8	Starting point of organizational development	3	Bleicher (1999)
SS9	**Level of Expansion Flexibility**	**2**	**Braglia and Petrioni (2000)**
STRATEGIC BEHAVIORS			
SB1	Level of participative behavior for management decisions	3	Bleicher (1999)
SB2	Focus of behavior development	3	Bleicher (1999)
SB3	Desired management behavior	3	Bleicher (1999)
SB4	Desired competency potential	3	Bleicher (1999)
SB5	Authority development	2	Bleicher (1999)
SB6	Focus of desired responsibility	3	Bleicher (1999)
SB7	Place of behavior development	2	Bleicher (1999)
SB8	Type of desired learning behavior	3	Bleicher (1999)

Table 4.19c Summary of final IFMMM questionnaire- Operative Level

Subconstruct	**Name**	**No of Items**	**Adapted from**
OPERATIVE GOALS			
OG1	Manufacturing Cost Reduction Goal	1	Das (2001)
OG2	Quality Performance Goal	1	Das (2001)
OG3	Delivery Performance Goal	1	Das (2001)
OG4	New Product Introduction Goal	3	Das (2001)
OG5	**Level of Volume Flexibility**	**2**	**Braglia and Petrioni (2000)**
OG6	**Level of Mix Flexibility**	**2**	**Das (2001)**
OPERATIVE STRUCTURES			
OS1	Production Systems Applications	3	Das (2001)
OS2	Infrastructural Production Support Systems Applications	8	Das (2001), Narasimhan et al.(2004), Zhang et al. (2003), Upton (1997)
OS3	Design Applications	2	Das (2001)
OS4	**Level of Machine Flexibility**	**4**	**Zhang et al. (2003)**
OS5	**Level of Routing Flexibility**	**2**	**Petrioni and Belivacqua (2002)**
OS6	**Level of Operation Flexibility**	**2**	**D'Souza and Williams (2000)**
OPERATIVE BEHAVIORS			
OB1	Team Work	1	Das (2001)
OB2	Decision Making Processes in Operations	2	Das (2001)
OB3	Multiple Skilled Labor	1	Boyle (2006)
OB4	**Level of Labor Flexibility**	**3**	**Zhang et al. (2003)**

The final IFMMM questionnaire consists of 169 items. The number of the questions and as well as the wording of the questions are revised and prepared for case study data collection. The summary of the number of items in the questionnaire is available in Table 4.20.

Table 4.20 Summary of Questionnaire

Label	Construct	No of Items
NG	Normative Goals	20
NS	Normative Structures	18
NB	Normative Behaviors	26
SG	Strategic Goals	19
SS	Strategic Structures	26
SB	Strategic Behaviors	22
OG	Operative Goals	10
OS	Operative Structures	21
OB	Operative Behaviors	7
IFMMM	**Total IFMMM Questions**	**169**
MD	Market Dynamism	6
FP	Firm Performance	38
Total No of Items		**213**

5 FIELD STUDY

In this chapter we have detailed the results and findings of seven cases which have been included in our field study. After conducting the pilot study, we have revised the questionnaire to be used for data collection during top manager interviews and within case surveys. An introduction letter is also prepared to explain the purpose of the study to the participants. A copy of the introduction letter is available in appendix 4.

5.1 Summary of Case Profiles

The cases are selected from companies from various industries with different properties in terms of size, geographical location and production technology. A summary of case profiles is available in Table 5.1.

Table 5.1 Case profile matrix (Table 4.1. revisited)

		No of Employees			
		50-99	100-249	250-499	500 and more
Industry	2673- Plastic Packaging		1983 51.000.000 COMPANY 2 120 425.000		
Industry	2820- Plastic Compounding	2004 30.000.000 COMPANY 1 63 476.190			
Industry	3080- Plastic Containers	1975 12.000.000 COMPANY 5 65 184.615		2011 30.000.000 COMPANY 4 350 85.714	
Industry	3050- Plastic Hose and Construction Materials				1965 110.000.000 COMPANY 3 680 161.765
Industry	2211- Fabric Production			2004 54.000.000 COMPANY 6 420 128.571	
Industry	3460- Metal Forging and Stamping			1962 50.000.000 COMPANY 7 320 156.250	

The participating companies differ in terms of no of employees, whereas we have included companies with no of employees below 100 (Company 1 and Company 5) and above 500 (Company 3). We have cases with annual turnover below 20.000.000 USD (Company 1 and Company 5) and above 100.000.000 USD (Company 3). Moreover seven companies are selected from six different industries. On the other hand we have two companies operating in the same industry (Company 4 and Company 5), which will give us more chance for comparison of the findings within cross case analysis. The companies also differ in terms of *years in* business, where we have companies less than five years (as of 2015) in the business (Company 4) and companies more than fifty years in business (Company 3 and Company 7).

All of the information regarding the companies, presented in Table 5.1, is based on the answers of the top managers to the respective profiling questions during interviews. The company names are not used within this study in order to ensure confidentiality purposes. All of the companies are located in Turkey.

We have conducted *structured interviews* with the top managers of the companies as a primary source of data. The profile of interviewees in each company is illustrated in Table 5.2.

Table 5.2 Summary of Interviewee Profile

Information	**Company 1**	**Company 2**	**Company 3**	**Company 4**	**Company 5**	**Company 6**	**Company 7**
Position in the Company	Vice President	General Manager	General Manager	General Manager	Deputy General Manager	General Manager	General Manager
Level of Education	BS	MS	MS	BA	BA	BA	PhD
Years in the company	10-19	10-19	10-19	0-9	10-19	10-19	20-29
Years in business	20-29	10-19	10-19	10-19	10-19	20-29	30-39

All of the interviewees are from the top management team of the selected companies and have BS/BA or higher education level with more than 10 years of experience, which make them to reliably participate in the interviews as representative of their companies to rate perceived level of management capabilities within IFMMM framework.

In addition to the top management interviews, we have conducted white collar survey, where the same questionnaire is used as data collection instrument, within two cases (Company 2 and Company 7). The results of white collar employee surveys are presented as part of within case analyses.

First of all findings from each case is presented particularly as *within case analysis* and then a *cross case analysis* is presented which includes the comparison of the findings from different cases.

5.2 Within-Case Analysis

In this section, each company participated in the study is analyzed separately. A brief introduction of the company information is provided and then the average perceived scores of current management capabilities based on IFMMM is calculated and converted to a capability scale as explained in section 4.5. The perceived market dynamism and firm performance scores of each case are also summarized within case analysis.

5.2.1 Company 1 Case Analysis

Company 1 is operating in Plastic Industry, specifically dealing with Technical Thermoplastics. The company has a single site located in Marmara region and has been established in 2004. Main products are Engineering Plastics as compounds of Polyamide, Polybutylene and Polycarbonate. Main production methods are blending and extrusion.

Annual turnover of the company is around 30 Million USD, as of 2014. 63 employees are working for the company. This information obtained during interview with the top management upon the answers of the top interviewee to the relevant questions.

Brief company information is summarized as below in Table 5.3.

Table 5.3 Company profile- Company 1

Industry	Years in Business	Subsidiary of a Group	No of Employees	No of Products	Annual Turnover (Million USD)	Single Site/ Multisite	Region
2820- Plastic Compounding	10-19	No	50-99	100-499	10-49	Single Site	Marmara Region

A face to face interview has been completed with the Vice President of the company. The profile of the interviewee is available in Table 5.2. The structured interview has been based on the questionnaire. Before starting the questionnaire, detailed information regarding the study and the model has been provided to the interviewee. The instrument items have been answered by the Vice President and the perceived IFMMM profile of the company has been prepared based on the answers.

5.2.1.1 IFMMM Profile of Company 1

5.2.1.1.1 Normative Goals

Scores of elements of normative goals have been calculated based on the top management perception and listed in Table 5.4.

Table 5.4 Normative Goals Profile- Company 1

NORMATIVE GOALS (NG)								**SCORE**
NG1	**Internal Direction of the Masson**							
Individual Economic	1	2	3	4	5	6	**Social Economic**	**5,00**
NG2	**Time Perspective of the Goal**							
Short Term	1	2	3	4	5	6	**Long Term**	**6,00**
NG3	**Chance Perspective**							
Keep It	1	2	3	4	5	6	**Progressive**	**5,00**
NG4	**Risk Perspective**							
Disturbing	1	2	3	4	5	6	**Vulnerable**	**4,50**
NG5	**Objective Performance**							
Weak	1	2	3	4	5	6	**Strong**	**5,66**
NG6	**Financial Value Goals**							
Weak	1	2	3	4	5	6	**Strong**	**4,50**
NG7	**Ecological Goals**							
Weak	1	2	3	4	5	6	**Strong**	**4,66**
NG8	**Social Goals**							
Weak	1	2	3	4	5	6	**Strong**	**5,00**
Overall normative goals score								**5,04**

All of the profiling elements of normative goals have scores corresponding to mid-high or high profile with respect of IFMMM. *Internal direction of the mission* score represents a social economic profile perception which indicates that management cooperates with stakeholders while determining the goals. *Time perspective of the goal* with a long term profile perception shows us that long term planning exists in the company.

Chance perspective profile is perceived as progressive which illustrates that management is searching for new challenges in imbalance conditions. *Risk perspective* element score represents a mid-high profile closed to vulnerable profile perception, so that the management is willing to confront risk for better adaptability and innovativeness. The expression of *financial value goals, ecological goals* and *social goals* is all strong.

Overall normative goals score is 5,04; representing a *high* profile according to IFMMM. The normative goal profile of Company 1 is illustrated with the radar diagram in Figure 5.1.

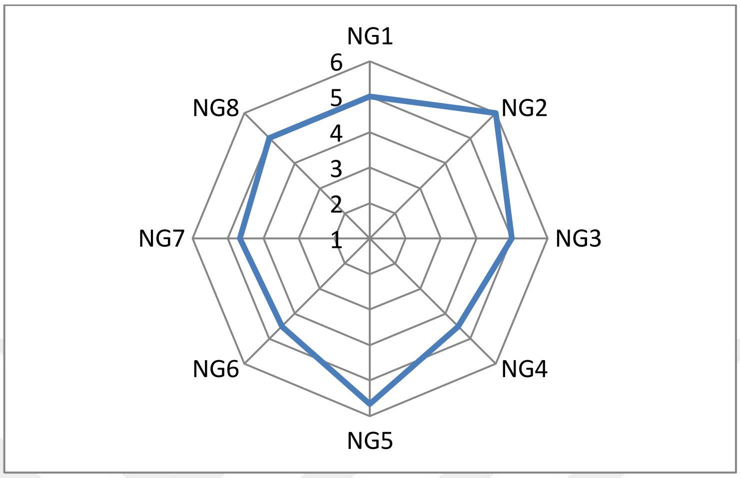

Figure 5.1 Normative goals profile of Company 1

5.2.1.1.2 Normative Structures

The perception of the top management regarding normative structures, based on IFMMM is used to calculate the scores of profiling elements which are listed in Table 5.5.

Table 5.5 Normative Structures Profile- Company 1

NORMATIVE STRUCTURES (NS)								**SCORE**
NS1	**Representation of interests in board**							
Shareholder	1	2	3	4	5	6	Stake Holder	**2,00**
NS2	**Art of Conflict Resolution**							
Confrontation	1	2	3	4	5	6	**Consensus**	**5,00**
NS3	**Economical, Legal and Social Structure**							
Non-differentiated	1	2	3	4	5	6	**Differentiated**	**6,00**
NS4	**Distance of Management to Real Life**							
Close-Operative	1	2	3	4	5	6	**Far-Strategic**	**4,00**
NS5	**Competence Distribution of Management**							
Single Level	1	2	3	4	5	6	**Multilevel**	**6,00**
NS6	**Division of Executives**							
Directorial/CEO	1	2	3	4	5	6	**Staff,Team**	**6,00**
NS7	**Sense of Responsibility of Top Management Team**							
Protective	1	2	3	4	5	6	**Multiplier**	**5,33**
NS8	**Rationale of Top Management Team**							
Monitoring	1	2	3	4	5	6	**Consulting**	**5,66**
Overall normative structures score								**5,00**

Since the board is composed of only shareholders, the profile of *representation of interests in board* is *shareholder*. *Distance of management to real life* has a score of 4,00 (mid-high capability profile) indicates that the profile is closer to *far strategic* profile. All of the remaining elements have a *high capability* profile with respect to the assigned IFMMM ideal. Overall normative structures score (5,00) indicates a *high management capability profile* based on perception of the top management. The normative structures profile of Company 1 is illustrated with the radar diagram in Figure 5.2.

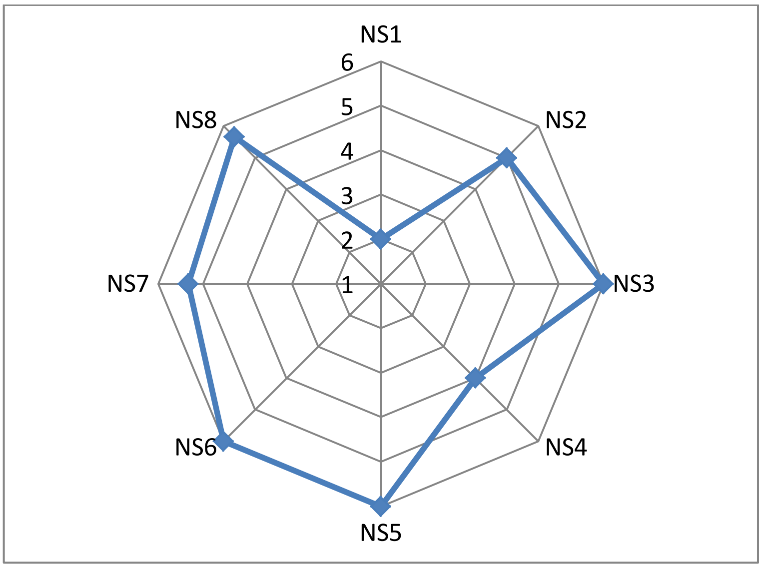

Figure 5.2 Normative Structures Profile for Company 1

5.2.1.1.3 Normative Behaviors

The perception of the top management regarding normative behaviors, based on IFMMM is used to calculate the scores for profiling elements which are listed in Table 5.6

Table 5.6 Normative Behaviors Profile – Company 1

NORMATIVE BEHAVIORS (NB)								**SCORE**
NB1	**Cultural Openness**							
Inside Oriented	1	2	3	4	5	6	**Outside Oriented**	**4,67**
NB2	**Attitude Towards Change**							
Hostile	1	2	3	4	5	6	**Friendly**	**4,34**
NB3	**Cultural Orientation**							
Top	1	2	3	4	5	6	Basis	**2,50**
NB4	**Subcultural Differentiation**							
Uniform Value System	1	2	3	4	5	6	**Functionally differentiated**	**4,00**
NB5	**Cultural expression**							
Instrumental	1	2	3	4	5	6	**Development oriented**	**3,50**
NB6	**Value Added Orientation of Management**							
Cost Oriented	1	2	3	4	5	6	Value oriented	**2,75**
NB7	**Role of employees**							
Members	1	2	3	4	5	6	**Actors**	**6,00**
NB8	**Employee engagement**							
Individual, Hero	1	2	3	4	5	6	**Collective, Us**	**4,25**
Overall normative behaviors score								**4,00**

Only two profiling element out of eight included in normative behaviors field of IFMMM perceived as *mid-low capability* profile, which are NB3, *cultural orientation* and NB6, *value added orientation of management.* NB3 score refers to a *basis cultural orientation* of the management where subcultural differences are eliminated. NB6 profile indicates that focus of management is on minimizing costs with creating *economies of scale*, where IFMMM ideally propose a benefit-oriented profile focusing on value creation for customers. One item has a *high IFMMM capability profile*, which is NB7, *role of employees.* Top management perceived that the employees have a relationship with the company with a sense of belonging and each *member* contributes to the preservation of the whole within his/her domain. Remaining six profiling elements perceived with a *mid-high capability* with respect to IFMMM ideal profile. Overall normative behaviors score also indicates a *mid-high management capability* with respect to IFMMM. The normative behaviors profile of Company 1 is illustrated with the radar diagram in Figure 5.3.

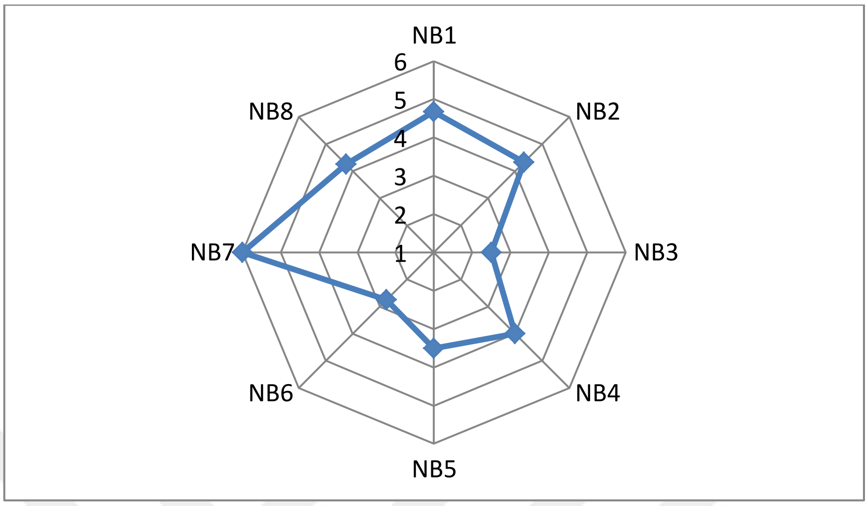

Figure 5.3 Normative Behaviors Profile for Company 1

5.2.1.1.4 Strategic Goals

The perception of the top management regarding strategic goals, based on IFMMM is used to calculate the scores for profiling elements which are listed in Table 5.7

Table 5.7 Strategic Goals Profile- Company 1

STRATEGIC GOALS (SG)								**SCORE**
SG1	**Supply of Performance**							
Narrow	1	2	3	4	5	6	**Broad**	**5,00**
SG2	**Individuality of Problem Solving**							
Standardized	1	2	3	4	5	6	**Individual**	**5,00**
SG3	**Competitive Posture**							
Defensive	1	2	3	4	5	6	**Offensive**	**4,00**
SG4	**Leader-Follower Behavior**							
Follower	1	2	3	4	5	6	**Leader**	**6,00**
SG5	**Value Added Activities**							
Cost Oriented Rationalization	1	2	3	4	5	6	Customer Focused Optimization	**2,00**
SG6	**Dependency of Value Added Activities**							
Individual	1	2	3	4	5	6	Networking	**2,00**
SG7	**Deployment of Resources**							
Fixed	1	2	3	4	5	6	**Flexible**	**3,50**
SG8	**Performance of Resources**							
Specialized	1	2	3	4	5	6	**Generalist**	**4,00**
SG9	**Level of Product Flexibility**							
Low	1	2	3	4	5	6	**High**	**5,50**
Overall Strategic Goals score								**4,11**

Scores of *value added activities* and *dependency of value added activities* elements represents a *low* management capability profile within IFMMM, which indicates a *cost reduction* perspective in evaluation of all value added activities. This profile is compatible with NB6 (Value added orientation of management) profile, which is cost oriented.

Three elements, SG1 (*supply of performance)*, SG2 (*individuality of problem solving)* and SG4 (*leader-follower behavior)* have scores indicating a *high* management capability profile with respect to IFMMM. SG1 (supply of performance) profile illustrates that the management perceives that they try to serve a wide range of products for all possible customer. During the interview, we have learned that the company is already producing customer specific, tailor made products, which is compatible with SG1 and SG2 profiles.

Score of SG4 (leader follower behavior), shows us that the management has a very strong perception about their leadership in the market in terms of innovation. SG9 *(Level of product flexibility)* score refers to a *high* level of product flexibility and is compatible with SG4 profile. SG9 profile indicates that management perceives that they introduce new products to the market more easily and effectively than the competition.

Overall strategic goals score is 4,11 and overall IFMMM strategic goals profile indicates a *mid-high* management capability profile. The strategic goals profile of Company 1 is illustrated with the radar diagram in Figure 5.4.

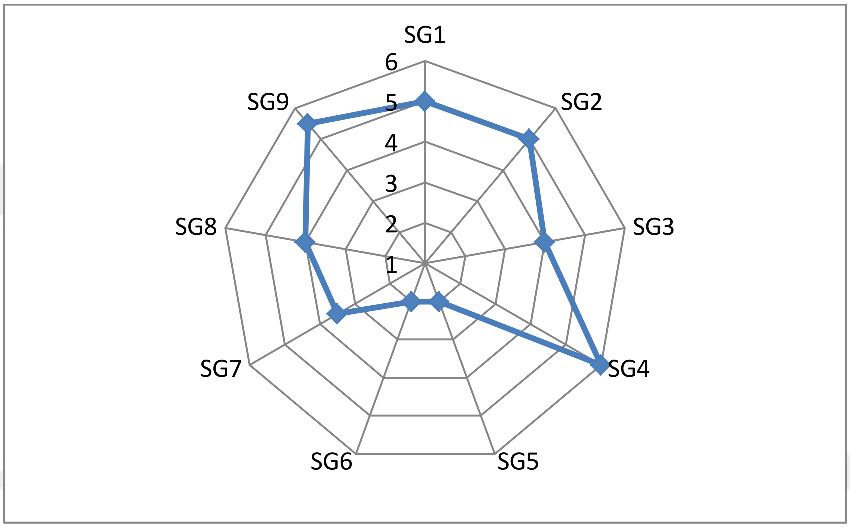

Figure 5.4 Strategic Goals Profile for Company 1

5.2.1.1.5 Strategic Structures

The perception of the top management regarding strategic structures, based on IFMMM is used to calculate the scores for profiling elements which are listed in Table 5.8.

Table 5.8 Strategic Structures Profile- Company 1

STRATEGIC STRUCTURES (SS)								**SCORE**
SS1	**Focus**							
Issue-Oriented	1	2	3	4	5	6	Person-Oriented	**2,00**
SS2	**Reference Points**							
Formal Rules	1	2	3	4	5	6	Symbols	**1,33**
SS3	**Extent of Rules**							
Efficiency Oriented	1	2	3	4	5	6	**Effectiveness Oriented**	**4,00**
SS4	**Time Orientation**							
Unlimited Period	1	2	3	4	5	6	Predictable Period	**3,25**
SS5	**Synergy Orientation**							
Central	1	2	3	4	5	6	**Decentral**	**4,00**
SS6	**Hierarchy**							
High	1	2	3	4	5	6	Low	**2,50**
SS7	**Organizational Development**							
Inwards, Towards Efficiency	1	2	3	4	5	6	Outwards, Towards Effectiveness	**3,33**
SS8	**Starting Point of Organizational Development**							
Top-Down	1	2	3	4	5	6	Bottom-Up	**3,00**
SS9	**Level of Expansion Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,00**
Overall strategic structures score								**3,05**

The scores of *focus* and *reference points* elements represents a *low management profile* with respect to IFMMM and indicates a **high degree of formalization**. The perception of hierarchy is *high*, starting point of organizational development is perceived as *Top-down*.

The *mid-low organizational development* profile indicates an efficiency orientation is compatible with SG5 *(value added activities)* profile.

Level of expansion flexibility is *mid-high*, management perceive that they can increase the production capacity easily and effectively, compared to the competitors.

Overall IFMMM strategic structures score of Company 1 is 3,05, indicating a *mid-low management capability profile*. The strategic structures profile of Company 1 is illustrated with the radar diagram in Figure 5.5.

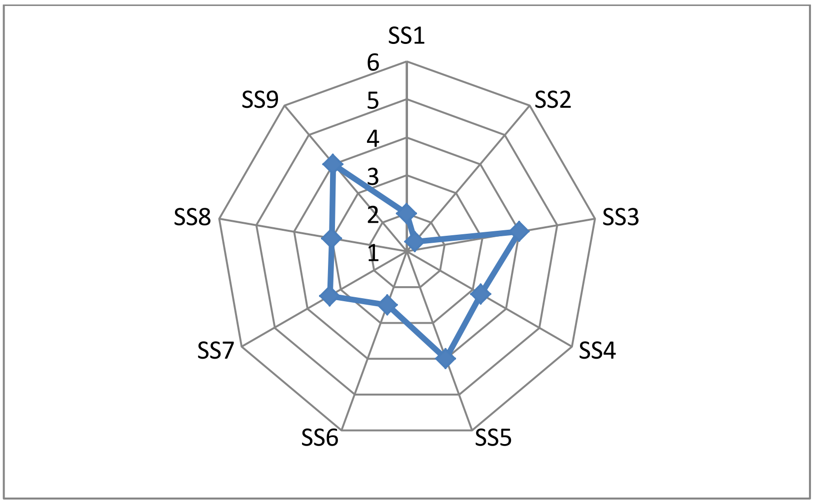

Figure 5.5 Strategic Structures Profile for Company 1

5.2.1.1.6 Strategic Behaviors

The perception of the top management regarding Strategic Behaviors, based on IFMMM is used to calculate scores for profiling elements which are listed in Table 5.9.

Table 5.9 Strategic Behaviors Profile – Company 1

STRATEGIC BEHAVIORS								SCORE
SB1	**Level of Participative Behavior for Management Decisions**							
Low	1	2	3	4	5	6	**High**	**4,00**
SB2	**Focus of Behavior Development**							
Individual	1	2	3	4	5	6	**Team**	**4,00**
SB3	**Desired Management Behavior**							
Risk- Averse	1	2	3	4	5	6	Entrepreneurial	**3,00**
SB4	**Desired Competency Potential**							
Specialist	1	2	3	4	5	6	**Generalist**	**5,33**
SB5	**Authority Development**							
Institutional- Hierarchy Based	1	2	3	4	5	6	**Communication- Specialist Based**	**5,00**
SB6	**Focus of Desired Responsibility**							
Dependence- Member Only Executes	1	2	3	4	5	6	**Delegation-Autonomous**	**5,00**
SB7	**Place of Behavior Development**							
Off the Job	1	2	3	4	5	6	**On the Job**	**4,50**
SB8	**Type of Desired Learning Behavior**							
Vertical	1	2	3	4	5	6	**Horizontal**	**5,33**
Overall strategic behavior score								**4,52**

Strategic goals elements scores' illustrates either mid-high, or high perceived management capability profile for all elements except SG3 *(Desired Management Behavior)*. *Desired management behavior* score indicates a mid-low capability and a *risk-averse* profile which is associated with looking for stability and avoiding from change. However NB2 *(Attitude towards change)* profile was indicating that the management perceive change as friendly and SG3 profile is not compatible with NB2 profile.

The remaining profiling items have illustrated that *level of participative behavior for management decisions* is high, which shows us that there is a comprehensive information flow on various channels. *Authority development* is based on *specialist*, competency based authority, instead of formal, hierarchy based authority. This profile is compatible with SS6 *(Hierarchy)* profile. *Focus of behavior development* profile indicates existence and importance of team-work. *Horizontal type of desired learning behavior* profile shows us that the management perceived that employees are experimenting and learning new tasks as a regular process. Overall strategic behavior score is 4,52 and refers to a *mid-high* management capability profile. The strategic behavior profile of Company 1 is illustrated with the radar diagram in Figure 5.6.

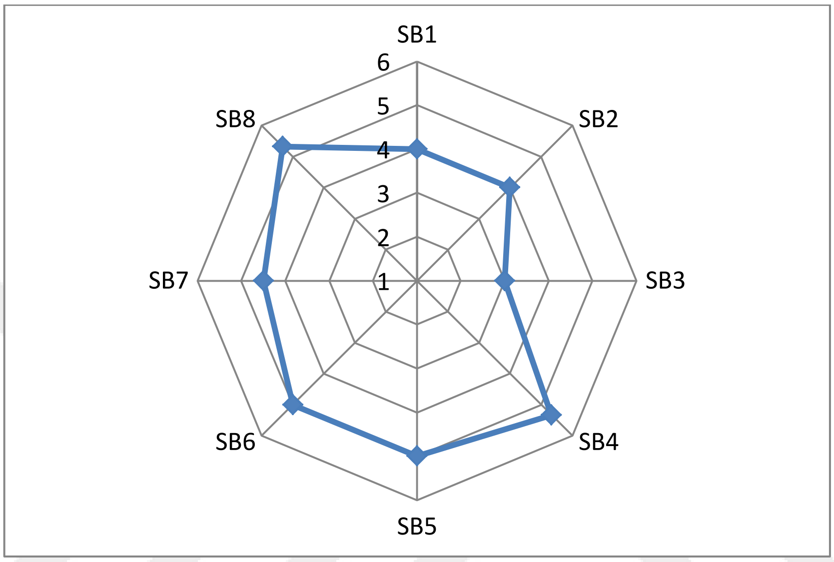

Figure 5.6 Strategic Behaviors Profile for Company 1

5.2.1.1.7 Operative Goals

The perception of the top management regarding Operational Goals elements, based on IFMMM, is illustrated as profiling scores as lists in Table 5.10.

Table 5.10 Operative Goals Scores- Company 1

OPERATIVE GOALS (OG)									**SCORE**
OG1	**Manufacturing Cost Reduction Goal**								
Low	1	2	3	4	5	6	**High**		**6,00**
OG2	**Quality Performance Goal**								
Low	1	2	3	4	5	6	**High**		**6,00**
OG3	**Delivery Performance Goal**								
Low	1	2	3	4	5	6	**High**		**6,00**
OG4	**New Product Introduction Performance Goal**								
Low	1	2	3	4	5	6	**High**		**6,00**
OG5	**Level of Volume Flexibility**								
Low	1	2	3	4	5	6	**High**		**4,00**
OG6	**Level of Mix Flexibility**								
Low	1	2	3	4	5	6	**High**		**5,00**
Overall operative goals									**5,50**

The scores of operative goals profiling elements shows us that the management perceive that the emphasis on manufacturing cost reduction goal, quality performance goal, delivery performance goal and new product introduction performance goal is very high. Top management perceives that realizing the goals of manufacturing system is very significant for the company.

The management perception about level of volume flexibility refers to a mid-high flexibility level which means that the management perceives that they can change the production output volume easily and effectively with respect to competition. Additionally level of mix flexibility is also high. Perception on capability of changing existing product mix is highly developed, compared with the competitors’.

Overall operative goals score is 5,50 and refers to a high management capability profile with respect to IFMMM. The operative goals profile of Company 1 is illustrated with the radar diagram in Figure 5.7.

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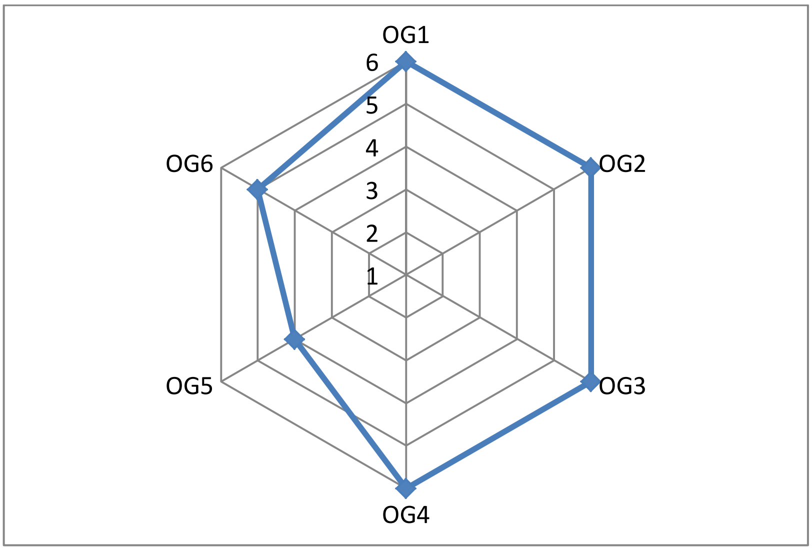

Figure 5.7 Operational Goals Profile for Company 1

5.2.1.1.8 Operative Structures

The perception of the top management regarding operative structures, based on IFMMM is used to calculate scores for profiling elements which are listed in Table 5.11.

Table 5.11 Operative Structures Scores- Company 1

OPERATIVE STRUCTURES (OG)								**SCORE**
OS1	**Production Systems Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**3,66**
OS2	**Infrastructural Production Support Systems Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**4,57**
OS3	**Design Applications**							
Narrow	1	2	3	4	5	6	Wide	**2,00**
OS4	**Level of Machine Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,58**
OS5	**Level of Routing Flexibility**							
Low	1	2	3	4	5	6	**High**	**5,00**
OS6	**Level of Operation Flexibility**							
Low	1	2	3	4	5	6	**High**	**5,00**
Overall operative structures score								**4,13**

Scores of production systems applications indicates that the production systems applications are used in the company with a *mid-high* profile. On the other hand, infrastructural production support systems are widely available within the company. Design applications usage is weak, which is due to the structure of the products produced by the company. The company mainly produces polymer granules, where design applications, in traditional terms, are not applicable for product design purposes.

The management perceives that *Level of machine flexibility*, *level of routing flexibility* and *level of operation flexibility* are all higher than the competition.

Overall operative structures score is 4,13; which refers to a *mid-high* management capability profile with respect to IFMMM. The operative structures profile of Company 1 is illustrated with the radar diagram in Figure 5.8.

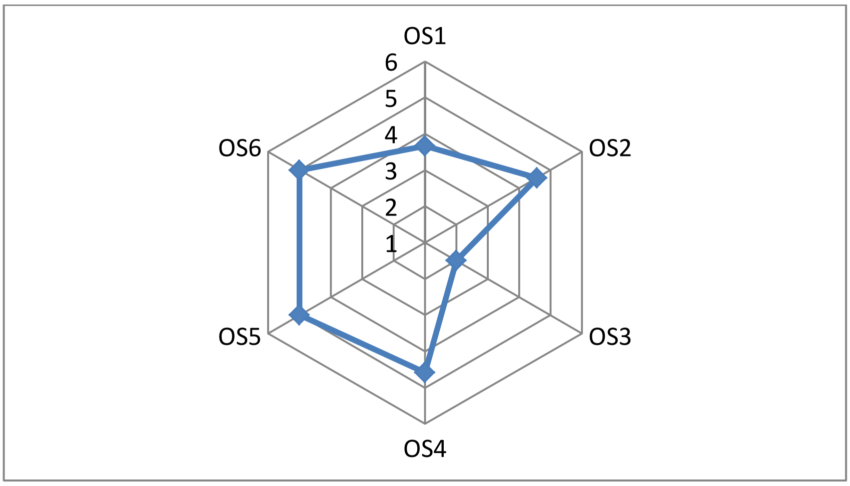

Figure 5.8 Operational Structures Profile for Company 1

5.2.1.1.9 Operative Behaviors

The perception of the top management regarding Operative Behaviors, based on IFMMM is used to calculate scores for profiling elements which are listed in Table 5.12.

Table 5.12 Operative Behaviors Scores- Company 1

OPERATIVE BEHAVIORS (OB)								**SCORE**
OB1	**Team Work**							
Narrow	1	2	3	4	5	6	**Wide**	**4,00**
OB2	**Decision Making Processes in Operations**							
Centralized	1	2	3	4	5	6	**Decentralized**	**4,00**
OB3	**Multi-Skilled Labor**							
Narrow	1	2	3	4	5	6	**Wide**	**4,00**
OB4	**Level of Labor Flexibility**							
Low	1	2	3	4	5	6	High	**3,00**
Overall operative behaviors score								**3,48**

Operative behaviors elements' scores indicate that teams are built and operate for operational level tasks and OB1 profile is compatible with SB2 (see Table 5.9) and NB8 (see Table 5.6) profiles. *Decision making process in operations* score illustrates a *Decentralized* decision making profile and is compatible with SB1 (see Table 5.9) profile.

Level of labor flexibility is perceived as *mid-low* profile, which indicates to the perception that the capability of the employees to perform more than one task is lower than the competitors' Overall operative behaviors score is **3,48** and refers to a *mid-low management capability profile* with respect to IFMMM. The operative behaviors profile of Company 1 is illustrated with the radar diagram in Figure 5.9.

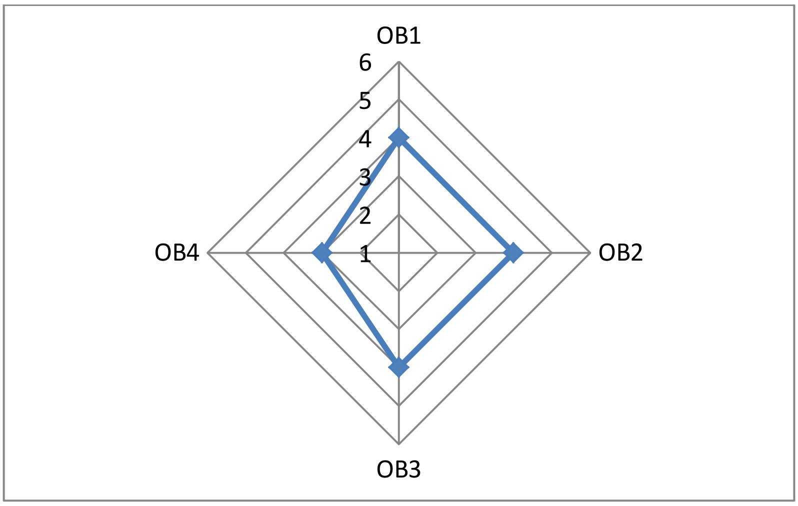

Figure 5.9 Operational Behaviors Profile for Company 1

5.2.1.2 Manufacturing Flexibility Profile-Company 1

The list of the manufacturing flexibility dimensions along with the corresponding scores of Company 1 is available in Table 5.13.

Table 5.13 Manufacturing flexibility perception of Company1

MANUFACTURING FLEXIBILITY (MF)		SCORE
SG9	Level of Product Flexibility	5,50
SS9	Level of Expansion Flexibility	4,00
OG5	Level of Volume Flexibility	4,00
OG6	Level of Mix Flexibility	5,00
OS4	Level of Machine Flexibility	4,58
OS5	Level of Routing Flexibility	5,00
OS6	Level of Operations Flexibility	5,00
OB4	Level of Labor Flexibility	3,00
Overall Manufacturing Flexibility Score		4,51

Manufacturing flexibility scores indicates that the management perceives that Company 1 has flexibility levels better than the competitors except *labor flexibility*. The overall flexibility score illustrates that the perceived manufacturing flexibility level is above the competition. Manufacturing flexibility profile of company 1 is illustrated with the radar diagram in Figure 5.10.

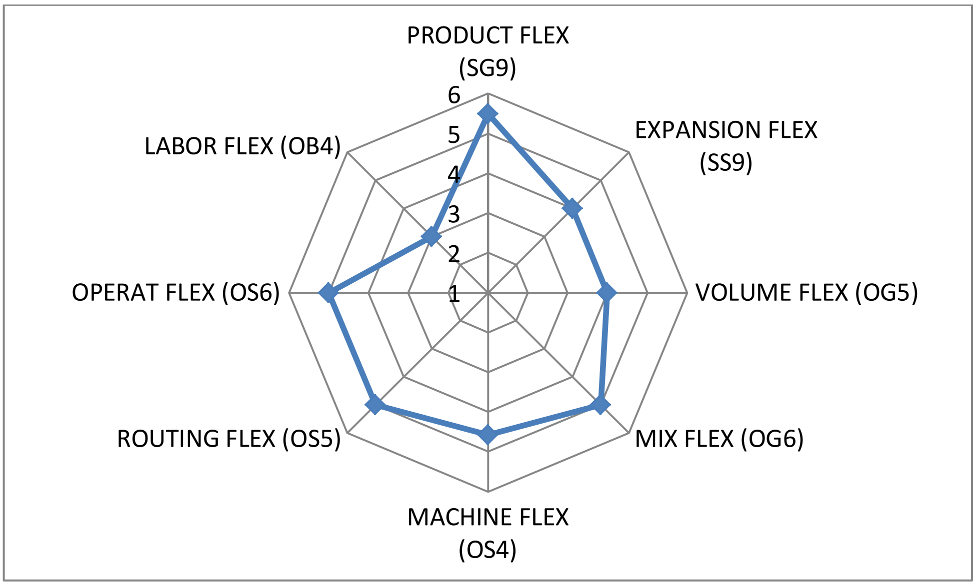

Figure 5.10 Manufacturing Flexibility Profile for Company 1

5.2.1.3 Market Dynamism – Company 1

The perceived market dynamism scores upon management interview are illustrated in Table 5.14.

Table 5.14 Market dynamism perception of Company 1

MARKET DYNAMISM (MD)		SCORE
MD1	Dynamism in Competition Intensity	2,00
MD2	Dynamism in Customer Preferences	4,00
MD3	Dynamism in Technology	3,00
Overall Market dynamism		3,00

The perception of the management about dynamism in competition intensity and dynamism in technology is *low*. However dynamism in customer preferences is perceived as high. The interviewee stated that the competition regarding engineering polymers market is consolidated and numbers of producers are offering limited number of products to the market, therefore competition intensity is perceived as low. On the other hand, customers' preferences are perceived as dynamic.

5.2.1.4 Firm Performance – Company 1

Perceived firm performance scores of Company 1 are summarized in Table 5.15.

Table 5.15 Firm performance perceived- Company 1

FIRM PERFORMANCE (FP)		SCORE
FP1	Financial Performance	6,00
FP2	Market Performance	4,67
FP3	Innovation Performance	5,71
FP4	Manufacturing Performance	4,38
Overall Firm Performance		5,19

The scores of firm performance show us that, management perceives that company 1 performs better than the competitors for each performance element. They perceive that the financial performance of the company is at the highest level. Market performance and manufacturing performance scores indicates a *mid-high* performance level. Innovation performance also indicates a *high* performance level and is compatible with OG6 (Table 5.10) , new product introduction performance goal score. Overall firm performance score is 5,19 and refers to a perception of *high* aggregate performance.

5.2.1.4.1 Manufacturing performance

Manufacturing performance perception is detailed in this section. The subconstructs of manufacturing performance with the scores from top management interview are listed in Table 5.16.

Table 5.16 Manufacturing performance perception of Company 1

MANUFACTURING PERFORMANCE (FP4)		**SCORE**
FP41	**Manufacturing quality performance**	**5,00**
FP42	**Manufacturing cost performance**	**3,83**
FP43	**Manufacturing flexibility performance**	**4,42**
FP44	**Delivery performance**	**4,25**
Overall Manufacturing performance		**4,38**

Overall manufacturing performance score (4,38) indicates that the management perceive that their manufacturing performance is better than the competitors'. Manufacturing quality performance refers to a high level performance. Management thinks that their quality level is above the industry average and frequency of claims received from the customers is very low. Cost, delivery and flexibility performance perception also refer to a perception of better performance than the competition.

The comparison of the scores of manufacturing performance subconstructs with the corresponding operative goals subconstructs is listed in Table 5.17.

Table 5.17 Comparison of manufacturing performance scores and operative goals scores

MANUFACTURING PERFORMANCE (FP4)		**SCORE**	**OPERATIVE GOALS**		**SCORE**
FP41	**Manufacturing quality performance**	**5,00**	**OG2**	**Quality performance goal**	**6,00**
FP42	**Manufacturing cost performance**	**3,83**	**OG1**	**Manufacturing cost reduction performance goal**	**6,00**
FP44	**Delivery performance**	**4,25**	**OG3**	**Delivery performance goals**	**6,00**

The comparison of the scores of manufacturing performance with the relevant operative goals scores illustrates that, the strong emphasis on quality performance goal, cost reduction performance and delivery performance goal are higher than the perceived performance scores. The interviewee also stated that especially cost performance needed to be improved.

5.2.2 Company 2 Case Analysis

Company 2 is a manufacturing company operating in Plastic Industry, specifically Plastic Food Packaging Industry. The company has been established in 1983 and, has a single manufacturing site Marmara Region. Main products are disposable plastic food containers, cups, plates and cutlery. Main production methodologies are extrusion, thermoforming and injection molding.

Annual turnover of the company is over 50 Million USD, as of 2014. Around 120 employees are working for the company. The information regarding the number of employees and annual turnover is obtained during interview with the top management. We did not search for any other data to verify the declared Figures.

Brief company information is summarized as below in Table 5.18.

Table 5.18 Company profile – Company 2

Industry	**Years in Business**	**Subsidiary of a Group**	**No of Employees**	**No of Products**	**Annual Turnover (Million USD)**	**Single Site/ Multisite**	**Region**
2673-Plastic Packaging	**30-39**	**Yes**	**100-249**	**1000 and more**	**50-99**	**Single Site**	**Marmara**

We have collected data from two main sources, an interview with the top management and white collar survey.

A face to face interview has been completed with the General Manager of the company. The profile of the interviewee is available in Table 5.2. The structured interview has been based on the questionnaire. Before starting the questionnaire, detailed information regarding the study and the model has been provided to the interviewee. The instrument items have been answered by the General Manager and the perceived IFMMM profile of the company has been prepared based on the answers.

A web based survey has been conducted within the company. Only white collar employees have been participated into the survey. We have received 29 responses, which is the total population, and 22 responses out of 29 were included in data analysis.

The results have been documented separately for top management perception and white collar employee perception and a comparison of both has been presented within this section.

5.2.2.1 IFMMM Profile of Company 2- Top management perception

5.2.2.1.1 Normative Goals

Scores of elements of normative goals have been calculated based on the top management perception and listed in Table 5.19.

Table 5.19 Normative Goals Profile- Company 2 – Top Management Perception

NORMATIVE GOALS (NG)								**SCORE**
NG1	**Internal Direction of the Mission**							
Individual Economic	1	2	3	4	5	6	**Social Economic**	**5,33**
NG2	**Time Perspective of the Goal**							
Short Term	1	2	3	4	5	6	**Long Term**	**5,50**
NG3	**Chance Perspective**							
Keep It	1	2	3	4	5	6	**Progressive**	**5,50**
NG4	**Risk Perspective**							
Disturbing	1	2	3	4	5	6	**Vulnerable**	**5,00**
NG5	**Objective Performance goals**							
Weak	1	2	3	4	5	6	**Strong**	**5,66**
NG6	**Financial Value Goals**							
Weak	1	2	3	4	5	6	**Strong**	**5,50**
NG7	**Ecological Goals**							
Weak	1	2	3	4	5	6	**Strong**	**5,00**
NG8	**Social Goals**							
Weak	1	2	3	4	5	6	**Strong**	**5,00**
Overall normative goals score								**5,31**

The scores of all normative goals elements refer to a *high* IFMMM capability profile. The scores shows us that the management perceives that long term plans are prepared to and they cooperate with the stakeholders in goal setting. They try to stimulate change within the environment and perceive risk as vulnerable. The expression of objective performance, financial, ecological and social goals are all *strong*.

Overall normative goals score is 5,31, representing a *high* profile according to IFMMM. The normative goal profile of Company 2, based on top management perception is illustrated with the radar diagram in Figure 5.11.

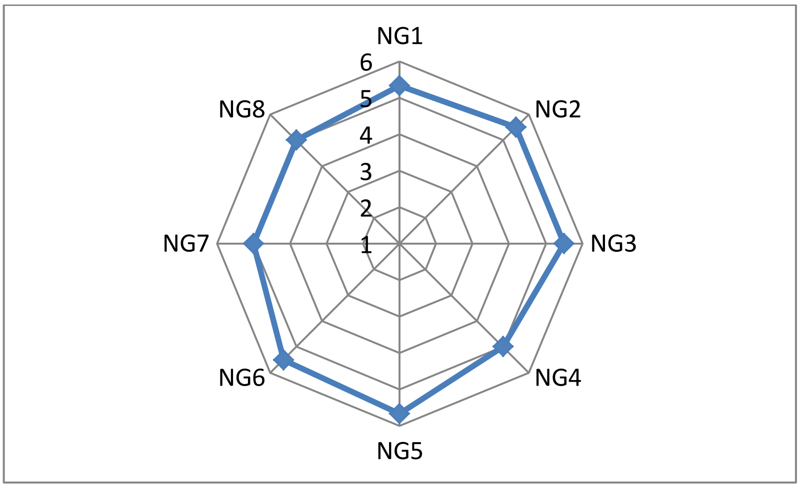

Figure 5.11 Normative Goals Profile for Company 2- Top management perception

5.2.2.1.2 Normative Structures

The normative structures elements scores based on perception of the top management are listed in Table 5.20.

Table 5.20 Normative Structures Profile- Company 2- Top management perception

NORMATIVE STRUCTURES (NS)								**SCORE**
NS1	**Representation of interests in board**							
Shareholder	1	2	3	4	5	6	**Stake Holder**	**5,50**
NS2	**Art of Conflict Resolution**							
Confrontation	1	2	3	4	5	6	**Consensus**	**5,00**
NS3	**Economical, Legal and Social Structure**							
Non-differentiated	1	2	3	4	5	6	**Differentiated**	**6,00**
NS4	**Distance of Management to Real Life**							
Close-Operative	1	2	3	4	5	6	**Far-Strategic**	**5,00**
NS5	**Competence Distribution of Management**							
Single Level	1	2	3	4	5	6	**Multilevel**	**4,00**
NS6	**Division of Executives**							
Directorial/CEO	1	2	3	4	5	6	**Staff,Team**	**3,50**
NS7	**Sense of Responsibility of Top Management Team**							
Protective	1	2	3	4	5	6	**Multiplier**	**5,00**
NS8	**Rationale of Top Management Team**							
Monitoring	1	2	3	4	5	6	**Consulting**	**4,66**
Overall normative structures score								**4,83**

Normative structures elements scores of Company 2 based on top management interview illustrates that stakeholders are also represented in the board. Since the company is a subsidiary of a group of companies, *economic, legal and social structure* element has *differentiated* profile. Top management is far from daily operations and has responsibilities for certain divisions.

Top management of company 2 perceives that they feel responsibility to create value for all related stakeholders with a *multiplier* profile of sense of responsibility. Moreover they are focused on strategic planning and structuring, instead of monitoring and act as consultant.

Overall normative structures score is 4,83 and refers to a *high* management capability profile with respect to IFMMM.

The normative structures profile of Company 2, based on top management perception, is illustrated with the radar diagram in Figure 5.12.

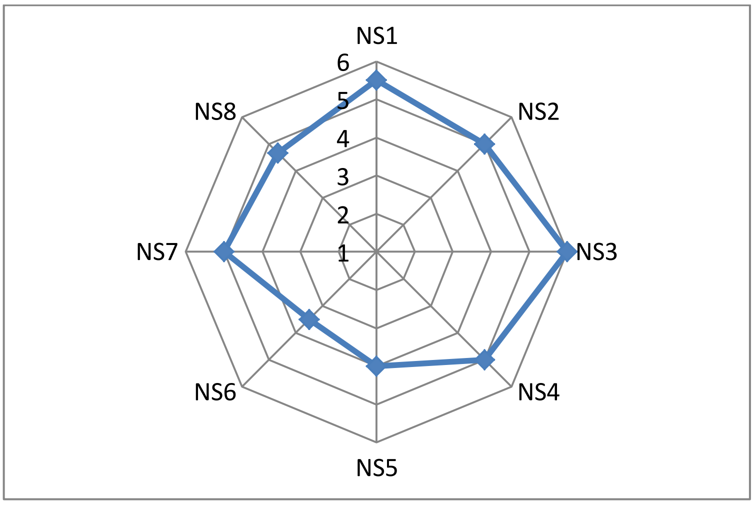

Figure 5.12 Normative structures profile for Company 2- Top management perception

5.2.2.1.3 Normative Behaviors

The normative behaviors elements' scores based perceptions of the top management are listed in Table 5.21.

Table 5.21 Normative Behaviors Profile – Company 2 - Top management perception

NORMATIVE BEHAVIORS (NB)								**SCORE**
NB1	**Cultural Openness**							
Inside Oriented	1	2	3	4	5	6	**Outside Oriented**	**5,00**
NB2	**Attitude Towards Change**							
Hostile	1	2	3	4	5	6	**Friendly**	**5,00**
NB3	**Orientation of Management**							
Top	1	2	3	4	5	6	**Basis**	**4,50**
NB4	**Subcultural Differentiation**							
Uniform Value System	1	2	3	4	5	6	**Functionally differentiated**	**4,00**
NB5	**Cultural expression**							
Instrumental	1	2	3	4	5	6	**Development oriented**	**4,00**
NB6	**Value Added Orientation of Management**							
Cost Oriented	1	2	3	4	5	6	Value oriented	**3,00**
NB7	**Role of employees**							
Members	1	2	3	4	5	6	**Actors**	**5,00**
NB8	**Employee engagement**							
Individual, Hero	1	2	3	4	5	6	**Collective, Us**	**4,25**
Overall normative behaviors score								**4,34**

Only one profiling element out of eight included in normative behaviors field of IFMMM perceived as *mid-low capability* profile, which is NB6, *value added orientation of management*. This profile indicates that focus of management is on minimizing costs with creating *economies of scale*.

Cultural Openness profile indicates that company 2 can perceive environmental changes at all levels and take them into account for strategy formulation. They perceive change as friendly and is compatible with NG4 (see Table 5.19) profile.

Overall normative behaviors score also indicates a *mid-high management capability* with respect to IFMMM. The normative behaviors profile of Company 2, based on top management perception, is illustrated with the radar diagram in Figure 5.13.

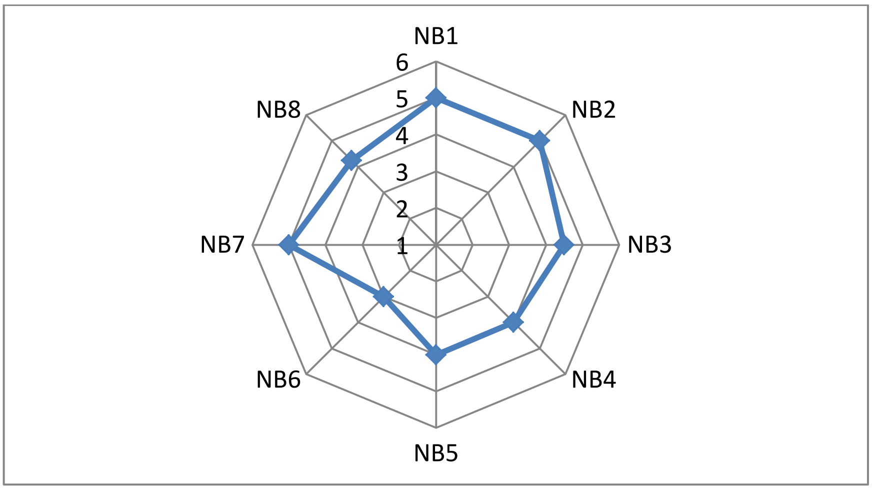

Figure 5.13 Normative behaviors profile for Company 2- Top management perception

5.2.2.1.4 Strategic Goals

The IFMMM strategic goals elements' scores, based perception of the top management, are listed in Table 5.22.

Table 5.22 Strategic Goals Profile- Company 2- Top management perception

STRATEGIC GOALS (SG)								**SCORE**
SG1	**Supply of Performance**							
Narrow	1	2	3	4	5	6	**Broad**	**5,00**
SG2	**Individuality of Problem Solving**							
Standardized	1	2	3	4	5	6	**Individual**	**6,00**
SG3	**Competitive Posture**							
Defensive	1	2	3	4	5	6	**Offensive**	**6,00**
SG4	**Leader-Follower Behavior**							
Follower	1	2	3	4	5	6	**Leader**	**6,00**
SG5	**Value Added Activities**							
Cost Oriented Rationalization	1	2	3	4	5	6	**Customer Focused Optimization**	**5,00**
SG6	**Dependency of Value Added Activities**							
Individual	1	2	3	4	5	6	Networking	**4,50**
SG7	**Deployment of Resources**							
Fixed	1	2	3	4	5	6	**Flexible**	**4,00**
SG8	**Performance of Resources**							
Specialized	1	2	3	4	5	6	**Generalist**	**4,00**
SG9	**Level of Product Flexibility**							
Low	1	2	3	4	5	6	**High**	**5,00**
Overall Strategic goals score								**5,06**

Scores of IFMMM strategic goals elements, based on top management perception of Company 2, refers to a *mid-high* or *high* management capability profile. SG2, SG3 and SG4 scores indicate a profile same as IFMMM ideal extreme.

SG9 *(Level of product flexibility)* score is also *high* and this score is compatible with SG4, *leader-follower behavior* profile. High level of product flexibility indicates that management perceives that they can introduce new products to the market more easily and effectively than the competition.

Overall strategic goals score is **5,06** and overall IFMMM strategic goals profile indicates a *high* management capability profile. The strategic goals profile of Company 2, based on top management perception, is illustrated with the radar diagram in Figure 5.14.

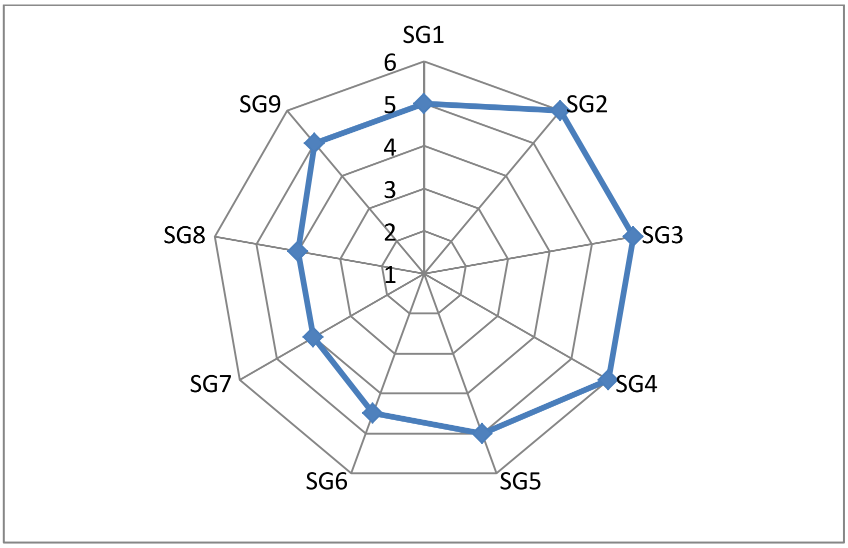

Figure 5.14 Strategic goals profile for Company 2- Top management perception

5.2.2.1.5 Strategic Structures

The IFMMM strategic structures elements' scores, based perception of the top management, are listed in Table 5.23.

Table 5.23 Strategic Structures Profile- Company 2- Top management perception

STRATEGIC STRUCTURES (SS)								**SCORE**
SS1	**Focus**							
Issue-Oriented	1	2	3	4	5	6	Person-Oriented	**1,00**
SS2	**Reference Points**							
Formal Rules	1	2	3	4	5	6	**Symbols**	**6,00**
SS3	**Extent of Rules**							
Efficiency Oriented	1	2	3	4	5	6	**Effectiveness Oriented**	**5,33**
SS4	**Time Orientation**							
Unlimited Period	1	2	3	4	5	6	**Predictable Period**	**3,50**
SS5	**Synergy Orientation**							
Central	1	2	3	4	5	6	**Decentral**	**5,00**
SS6	**Hierarchy**							
High	1	2	3	4	5	6	**Low**	**6,00**
SS7	**Organizational Development**							
Inwards, Towards Efficiency	1	2	3	4	5	6	Outwards, Towards Effectiveness	**2,33**
SS8	**Starting Point of Organizational Development**							
Top-Down	1	2	3	4	5	6	**Bottom-Up**	**4,66**
SS9	**Level of Expansion Flexibility**							
Low	1	2	3	4	5	6	**High**	**6,00**
Overall Strategic Structures Score								**4,42**

The scores of two profiling elements namely SS1 *focus* and SS7 *organizational development* point for a profile far from IFMMM extremes. *Focus* profile indicates that the positions within the organization structures are determined upon already defined tasks. *Organizational development* scores refer to an efficiency orientation.

Level of expansion flexibility is *high*, management perceive that they can increase the production capacity easily and effectively, compared to the competitors.

Overall IFMMM strategic structures score of Company 2 is 4,42, indicating a *mid-high management capability profile*. The strategic structures profile of Company 2, based on top management perception, is illustrated with the radar diagram in Figure 5.15.

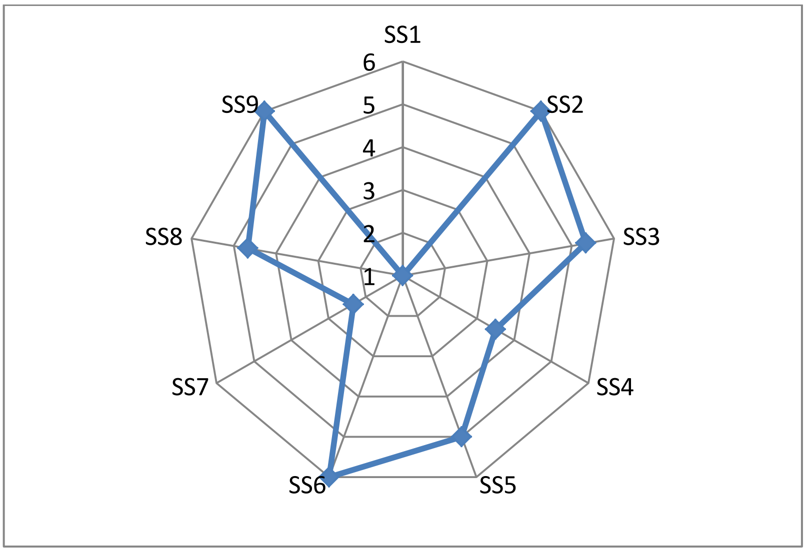

Figure 5.15 Strategic structures profile for Company 2- Top management perception

5.2.2.1.6 *Strategic Behaviors*

The IFMMM strategic behaviors elements' scores, based perception of the top management, are listed in Table 5.24.

Table 5.24 Strategic Behaviors Profile- Company 2- Top management perception

STRATEGIC BEHAVIORS								**SCORE**
SB1	**Level of Participative Behavior for Management Decisions**							
Low	1	2	3	4	5	6	**High**	**4,00**
SB2	**Focus of Behavior Development**							
Individual	1	2	3	4	5	6	**Team**	**4,66**
SB3	**Desired Management Behavior**							
Risk- Averse	1	2	3	4	5	6	**Entrepreneurial**	**5,00**
SB4	**Desired Competency Potential**							
Specialist	1	2	3	4	5	6	**Generalist**	**5,00**
SB5	**Authority Development**							
Institutional- Hierarchy Based	1	2	3	4	5	6	**Communication- Specialist Based**	**4,00**
SB6	**Focus of Desired Responsibility**							
Dependence- Member Only Executes	1	2	3	4	5	6	**Delegation-Autonomous**	**5,00**
SB7	**Place of Behavior Development**							
Off the Job	1	2	3	4	5	6	**On the Job**	**5,00**
SB8	**Type of Desired Learning Behavior**							
Vertical	1	2	3	4	5	6	**Horizontal**	**5,00**
Overall strategic behavior score								**4,71**

Strategic goals elements scores illustrate either mid-high, or high perceived management capability profile for all elements. *Level of participative behavior for management decisions* is high, which indicates that top management perceives that there is a comprehensive information flow on various channels. *Authority development* is based on *specialist,* competency based authority, instead of formal, hierarchy based authority. This profile is compatible with SS6 *(Hierarchy)* profile. *Focus of behavior development* profile indicates existence and importance of team-work. *Horizontal type of desired learning behavior* profile shows us that the management perceived that employees are experimenting and learning new tasks as a regular process. Overall strategic behavior score is 4,71 and refers to a *high* management capability profile. The strategic structures profile of Company 2, based on top management perception, is illustrated with the radar diagram in Figure 5.16.

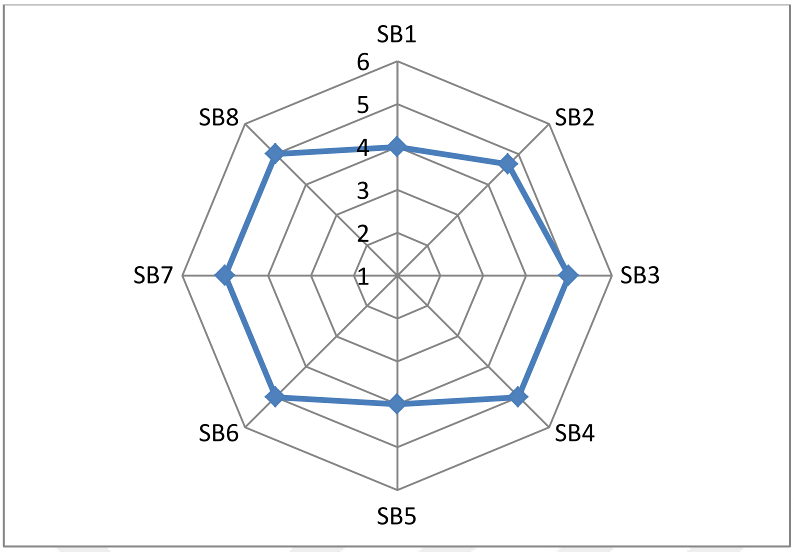

Figure 5.16 Strategic behaviors profile for Company 2- Top management perception

5.2.2.1.7 Operative Goals

The perception of the top management of Company 2 regarding operative goals elements, based on IFMMM, and is illustrated as profiling scores as listed in Table 5.25.

Table 5.25 Operative Goals Scores- Company 2- Top management perception

OPERATIVE GOALS (OG)								**SCORE**
OG1	**Manufacturing Cost Reduction Goal**							
Low	1	2	3	4	5	6	**High**	**6,00**
OG2	**Quality Performance Goal**							
Low	1	2	3	4	5	6	**High**	**6,00**
OG3	**Delivery Performance Goal**							
Low	1	2	3	4	5	6	**High**	**6,00**
OG4	**New Product Introduction Performance Goal**							
Low	1	2	3	4	5	6	**High**	**5,33**
OG5	**Level of Volume Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,00**
OG6	**Level of Mix Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,00**
Overall operative goals								**5,22**

The scores of operative goals profiling elements shows us that the management perceive that the emphasis on manufacturing cost reduction goal, quality performance goal, delivery performance goal and new product introduction performance goal is very high. Top management perceives that realizing the goals of manufacturing system is very significant for the company.

The management perception about level of volume flexibility refers to a mid-high flexibility level which means that the management perceives that they can change the production output volume easily and effectively with respect to competition. Additionally level of mix flexibility is also mid-high. Perception on capability of changing existing product mix is higher than the competitors'.

Overall operative goals score is 5,22 and refers to a high management capability profile with respect to IFMMM. The operative goals profile of Company 2, based on top management perception, is illustrated with the radar diagram in Figure 5.17.

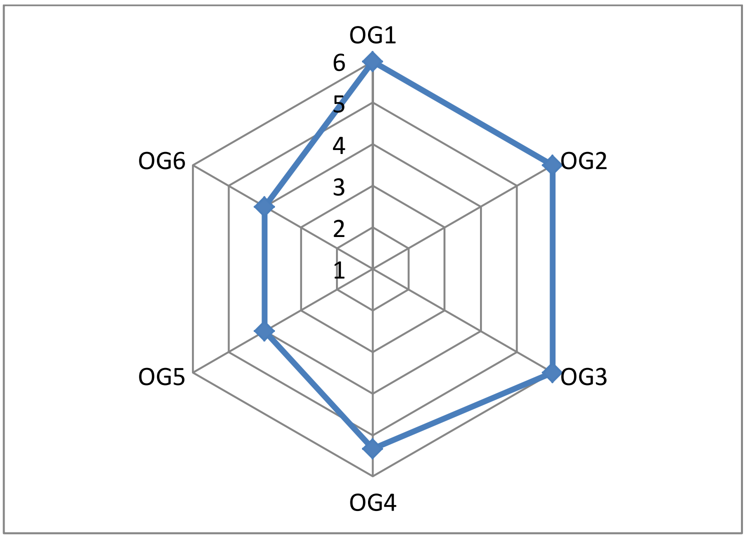

Figure 5.17 Operative goals profile for Company 2- Top management perception

5.2.2.1.8 Operative Structures

The perception of the top management regarding operative structures, based on IFMMM is used to calculate scores for profiling elements which are listed in Table 5.26.

Table 5.26 Operative Structures Scores- Company 2- Top management perception

OPERATIVE STRUCTURES (OG)								**SCORE**
OS1	**Production Systems Applications**							
Narrow	1	2	3	4	5	6	Wide	**2,33**
OS2	**Infrastructural Production Support Systems Applications**							
Narrow	1	2	3	4	5	6	Wide	**3,00**
OS3	**Design Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**6,00**
OS4	**Level of Machine Flexibility**							
Low	1	2	3	4	5	6	**High**	**5,00**
OS5	**Level of Routing Flexibility**							
Low	1	2	3	4	5	6	**High**	**5,00**
OS6	**Level of Operation Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,00**
Overall operative structures score								**4,22**

Scores of production systems applications indicates that the production systems applications are used in the company with a *low* profile. Also, infrastructural production support systems are not widely available within the company. Design applications usage is very high, which is due to the structure of the products produced by the company. The company has a separate product design department in which design applications are widely used.

The management perceives that *level of machine flexibility*, *level of routing flexibility* and *level of operation flexibility* are all higher than the competition.

Overall operative structures score is 4,22; which refers to a *mid-high* management capability profile with respect to IFMMM. The operative structures profile of Company 2, based on top management perception, is illustrated with the radar diagram in Figure 5.18.

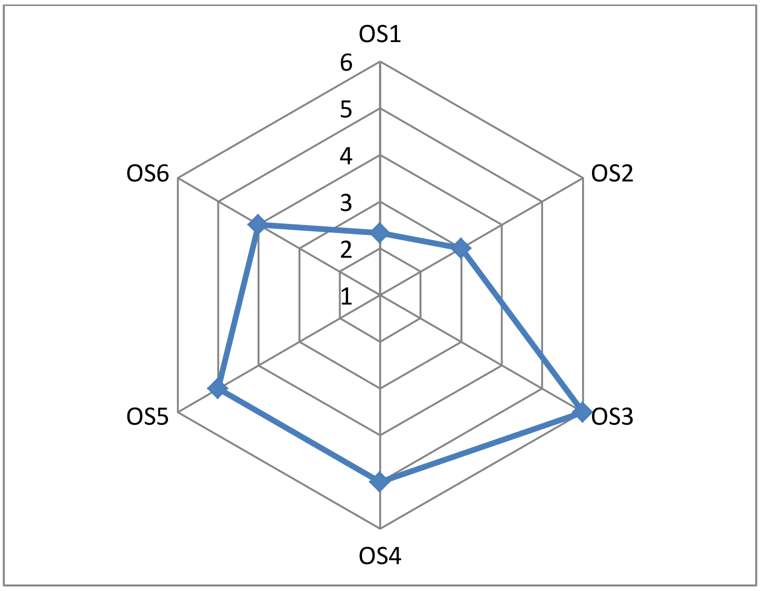

Figure 5.18 Operative structures profile for Company 2- Top management perception

5.2.2.1.9 Operative Behaviors

The IFMMM operative behaviors elements' scores, based on perception of the top management, are listed in Table 5.27.

Table 5.27 Operative Behaviors Scores- Company 2- Top management perception

OPERATIVE BEHAVIORS (OB)									**SCORE**
OB1	**Team Work**								
Narrow	1	2	3	4	5	6	**Wide**		**4,00**
OB2	**Decision Making Processes in Operations**								
Centralized	1	2	3	4	5	6	**Decentralized**		**4,00**
OB3	**Multi-Skilled Labor**								
Narrow	1	2	3	4	5	6	**Wide**		**4,00**
OB4	**Level of Labor Flexibility**								
Low	1	2	3	4	5	6	**High**		**4,00**
Overall operative behaviors score									**4,00**

Operative behaviors elements' scores indicate that team work is applicable in operational level tasks and OB1 profile is compatible with SB2 (see Table 5.24) and NB8 (see Table 5.21) profiles. *Decision making process in operations* score illustrates a *Decentralized* decision making profile and is compatible with SB1 (see Table 5.24) profile.

Level of labor flexibility is perceived as *mid-high* profile, which indicates to the perception that the capability of the employees to perform more than one task is higher than the competitors'. OB4 profile is also compatible with SB8 (see Table 5.24) profile. Overall operative behaviors score is **4,00** and refers to a *mid-high management capability profile* with respect to IFMMM. The operative behaviors profile of Company 2, based on top management perception, is illustrated with the radar diagram in Figure 5.19.

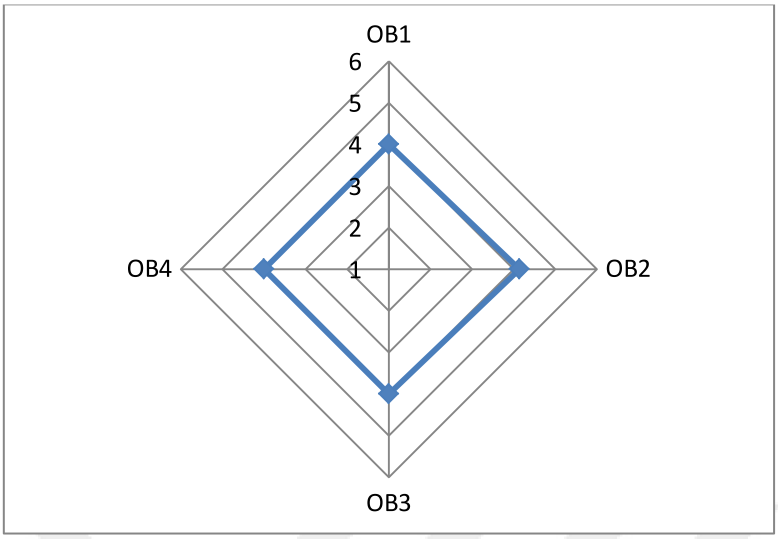

Figure 5.19 Operative behaviors profile for Company 2- Top management perception

5.2.2.2 Manufacturing Flexibility Profile-Company 2- Top management perception

The list of the manufacturing flexibility dimensions along with the corresponding scores of Company 2, based on top management perception is available in Table 5.28.

Table 5.28 Manufacturing flexibility perception of Company 2- top management perception

Manufacturing flexibility scores indicates that the management perceives that Company 2 has flexibility levels better than the competitors. The overall flexibility score illustrates that the perceived manufacturing flexibility level is above the competition. Manufacturing flexibility profile of company 2, based on top management level is illustrated with the radar diagram in Figure 5.20.

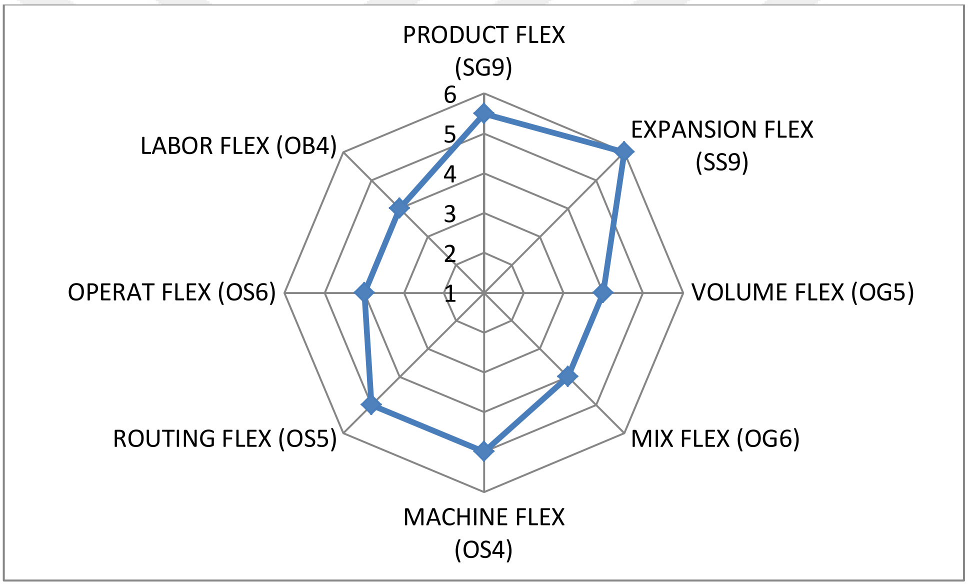

Figure 5.20 Manufacturing flexibility profile for Company 2- Top management perception

5.2.2.3 Market dynamism – Company 2- Top management perception

The perceived market dynamism scores upon management interview are illustrated in Table 5.29.

Table 5.29 Market dynamism – Company 2 – Top management perception

MARKET DYNAMISM (MD)		SCORE
MD1	**Dynamism in Competition Intensity**	**6,00**
MD2	**Dynamism in Customer Preferences**	**4,00**
MD3	**Dynamism in Technology**	**4,00**
Overall Market dynamism		**4,66**

The perception of the management about dynamism in competition intensity is very high. The interviewee informed us that the number of entries to the market and exits from the market is very high due to absence of entry barriers. Moreover, new products are developed and introduced to the market on a continuous base. The product prices are also dynamically changing. Dynamism in customer preferences and technology are perceived mid-high. New trends in the market including demand for environment friendly products and sustainability issues create dynamism in customer preferences. Overall market dynamism score is 4,66 and refers to a perceived mid-high market dynamism.

5.2.2.4 Firm Performance – Company 2- Top management perception

The perceived firm performance scores of Company 2 based on top management interview are listed in Table 5.30

Table 5.30 Firm performance Company 2 – top management perception

FIRM PERFORMANCE (FP)		SCORE
FP1	**Financial Performance**	**4,00**
FP2	**Market Performance**	**5,33**
FP3	**Innovation Performance**	**5,43**
FP4	**Manufacturing Performance**	**4,73**
Overall Firm Performance		**4,81**

The scores of firm performance show us that, management perceives that company 2 performs better than the competitors for each performance element. They perceive that the market performance and innovation performance scores of the company indicate a perceived *high* performance level, whereas financial performance and manufacturing performance scores indicates a *mid-high* performance level. Innovation performance score is compatible with OG6 (Table 5.25) “*new product introduction performance*” goal score. Overall firm performance score is 4,81 and refers to a perception of high aggregate performance.

5.2.2.4.1 Manufacturing performance

Manufacturing performance perception is detailed in this section. The subconstructs of manufacturing performance with the scores from top management interview are listed in Table 5.31

Table 5.31 Manufacturing performance Company 2- Top management perception

MANUFACTURING PERFORMANCE (FP4)		**SCORE**
FP41	**Manufacturing quality performance**	**5,00**
FP42	**Manufacturing cost performance**	**4,50**
FP43	**Manufacturing flexibility performance**	**4,43**
FP44	**Delivery performance**	**5,00**
Overall Manufacturing performance		**4,73**

Overall manufacturing performance score (4,73) indicates that the management perceive that their manufacturing performance is better than the competitors’. Manufacturing quality performance and delivery performance refer to a high level performance. Management also thinks that their manufacturing cost and flexibility performance are also better than the competition.

The comparison of the scores of manufacturing performance subconstructs with the corresponding operative goals subconstructs is listed in Table 5.32

Table 5.32 Comparison of manufacturing performance scores and operative goals scores- Company 2- Top management perception

MANUFACTURING PERFORMANCE (FP4)		**SCORE**	**OPERATIVE GOALS**		**SCORE**
FP41	**Manufacturing quality performance**	**5,00**	**OG2**	**Quality performance goal**	**6,00**
FP42	**Manufacturing cost performance**	**4,50**	**OG1**	**Manufacturing cost reduction performance goal**	**6,00**
FP44	**Delivery performance**	**5,00**	**OG3**	**Delivery performance goals**	**6,00**

The comparison of the scores of manufacturing performance with the relevant operative goals scores illustrates that, the strong emphasis on quality performance goal, cost reduction performance and delivery performance goal are higher than the perceived performance scores.

Manufacturing flexibility performance score is **4,43** and is compatible with overall manufacturing flexibility score calculated with IFMMM elements, which is 4,69 (see Table 5.28).

5.2.2.5 IFMMM Profile of Company 2- White Collar Employee Perception

5.2.2.5.1 Normative Goals

Scores of elements of normative goals have been calculated based on the white collar perception and listed in Table 5.33.

Table 5.33 Normative Goals Profile- Company 2 – White collar perception

NORMATIVE GOALS (NG)								SCORE
NG1	**Internal Direction of the Masson**							
Individual Economic	1	2	3	4	5	6	Social Economic	**2,64**
NG2	**Time Perspective of the Goal**							
Short Term	1	2	3	4	5	6	Long Term	**2,31**
NG3	**Chance Perspective**							
Keep It	1	2	3	4	5	6	Progressive	**2,23**
NG4	**Risk Perspective**							
Disturbing	1	2	3	4	5	6	Vulnerable	**2,77**
NG5	**Objective Performance goals**							
Weak	1	2	3	4	5	6	Strong	**2,38**
NG6	**Financial Value Goals**							
Weak	1	2	3	4	5	6	Strong	**2,02**
NG7	**Ecological Goals**							
Weak	1	2	3	4	5	6	Strong	**2,89**
NG8	**Social Goals**							
Weak	1	2	3	4	5	6	Strong	**3,36**
Overall normative goals score								**2,58**

The perception of white collar employees of Company 2 about all normative goals elements refer to either *mid-low* or *low* management capability with respect to IFMMM. White collar employees think that management focuses on short term planning to create value from existing potentials. Risk is perceived as disturbing and there is a tendency to avoid from risk. Moreover the expression of objective performance, financial value, ecological and social goals is weak.

Overall normative goals score is **2,58** which refers to a *mid-low* management capability with respect to IFMMM. The IFMMM normative goals profile of company 2, based on white collar perception is illustrated in Figure 5.21.

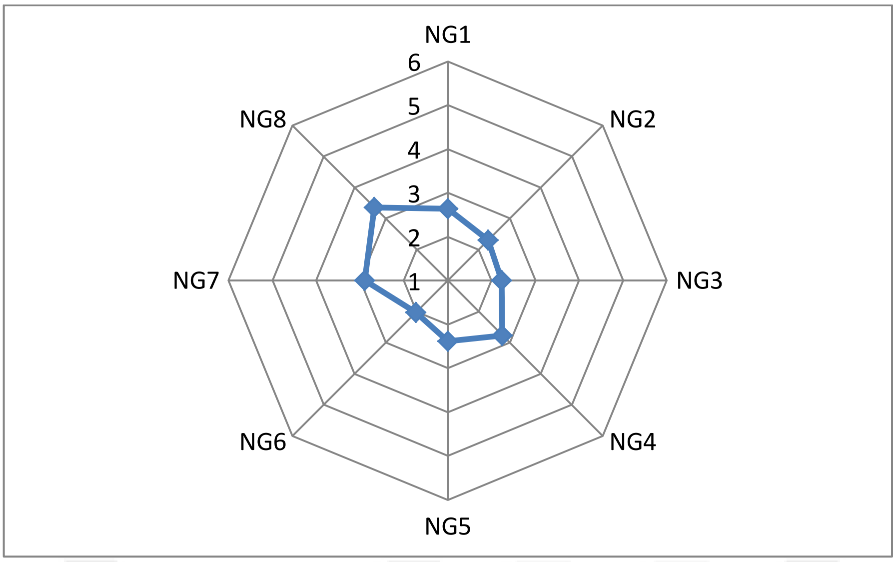

Figure 5.21 Normative goals profile for Company 2- White collar perception

5.2.2.5.2 Normative Structures:

Scores of elements of normative structures have been calculated based on the white collar perception and listed in Table 5.34.

Table 5.34 Normative Structures Profile- Company 2- White collar perception

NORMATIVE STRUCTURES (NS)								**SCORE**
NS1	**Representation of interests in board**							
Shareholder	1	2	3	4	5	6	Stake Holder	**3,47**
NS2	**Art of Conflict Resolution**							
Confrontation	1	2	3	4	5	6	Consensus	**3,20**
NS3	**Economical, Legal and Social Structure**							
Non-differentiated	1	2	3	4	5	6	**Differentiated**	**4,66**
NS4	**Distance of Management to Real Life**							
Close-Operative	1	2	3	4	5	6	Far-Strategic	**3,00**
NS5	**Competence Distribution of Management**							
Single Level	1	2	3	4	5	6	Multilevel	**3,05**
NS6	**Division of Executives**							
Directorial/CEO	1	2	3	4	5	6	Staff,Team	**2,07**
NS7	**Sense of Responsibility of Top Management Team**							
Protective	1	2	3	4	5	6	Multiplier	**2,29**
NS8	**Rationale of Top Management Team**							
Monitoring	1	2	3	4	5	6	Consulting	**2,31**
Overall normative structures score								**3,01**

Normative structures scores, based on white collar perception illustrates that, except NS3, all other elements are associated with either *low* or *mid-low* management profile. Since the company is a member of a group of companies, NS has a *differentiated* profile. Employees perceive that only shareholders are represented in the board. Top management involve in daily operations and also closely monitoring the activities.

Overall normative structures score refers to a *mid-low* IFMMM management capability profile. IFMMM normative structures profile of Company 2, based on white collar employee perception, is illustrated in Figure 5.22

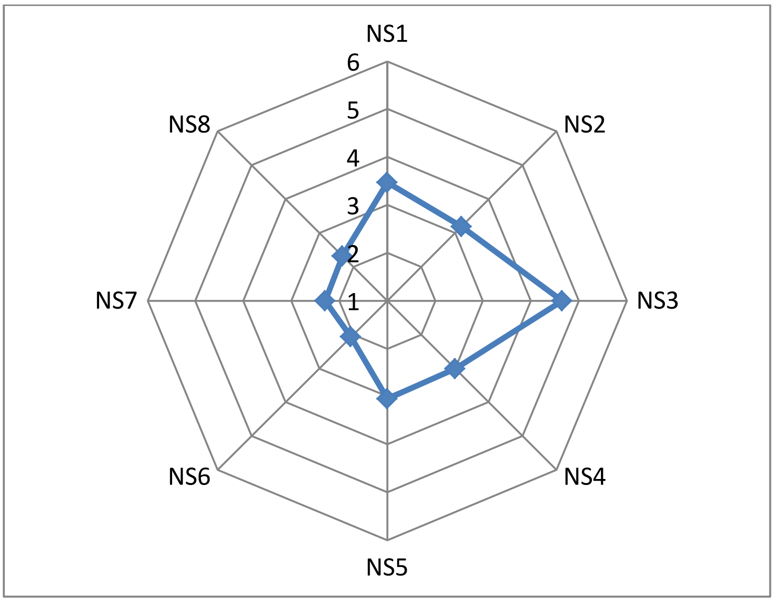

Figure 5.22 Normative structures profile for Company 2- White collar perception

5.2.2.5.3 Normative Behaviors:

Scores of elements of normative behaviors have been calculated based on the white collar perception and listed in Table 5.35.

Table 5.35 Normative Behaviors Profile – Company 2- White collar perception

NORMATIVE BEHAVIORS (NB)								**SCORE**
NB1	**Cultural Openness**							
Inside Oriented	1	2	3	4	5	6	Outside Oriented	**2,67**
NB2	**Attitude Towards Change**							
Hostile	1	2	3	4	5	6	Friendly	**2,87**
NB3	**Orientation of Management**							
Top	1	2	3	4	5	6	Basis	**3,03**
NB4	**Subcultural Differentiation**							
Uniform Value System	1	2	3	4	5	6	Functionally differentiated	**3,00**
NB5	**Cultural expression**							
Instrumental	1	2	3	4	5	6	Development oriented	**3,06**
NB6	**Value Added Orientation of Management**							
Cost Oriented	1	2	3	4	5	6	**Value oriented**	**4,94**
NB7	**Role of employees**							
Members	1	2	3	4	5	6	**Actors**	**3,54**
NB8	**Employee engagement**							
Individual, Hero	1	2	3	4	5	6	**Collective, Us**	**3,97**
Overall normative behaviors score								**3,38**

White collar employees of company 2 perceive that *attitude towards change* is hostile. The company has an *inside oriented profile* for *cultural Openness* and *orientation of management* is *top* where identity is expressed by the entrepreneur.

Value added orientation of the management is perceived as value oriented. NB6 has a *high,* NB7 and NB8 elements have a *mid-high* management capability profile.

Overall normative behaviors score refers to a *mid-low* IFMMM management capability profile. IFMMM normative behaviors profile of Company 2, based on white collar employee perception, is illustrated in Figure 5.23.

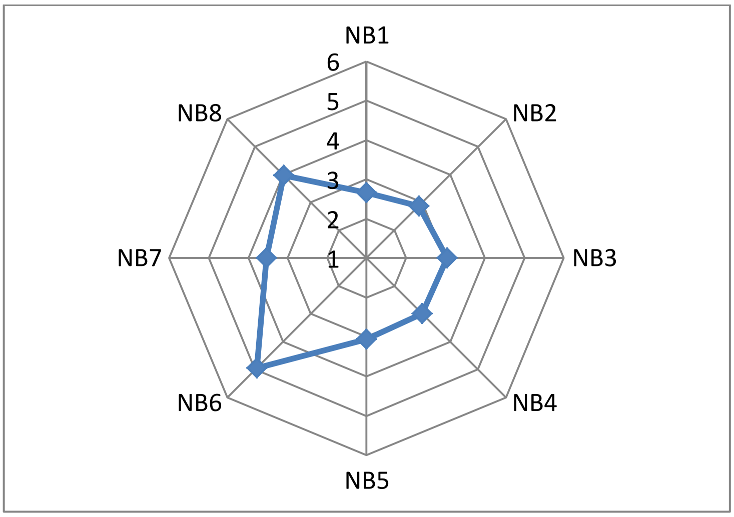

Figure 5.23 Normative behaviors profile for Company 2- White collar perception

5.2.2.5.4 Strategic Goals

Scores of elements of strategic goals have been calculated based on the white collar perception and listed in Table 5.36.

Table 5.36 Strategic Goals Profile- Company 2- White collar perception

STRATEGIC GOALS (SG)								SCORE
SG1	**Supply of Performance**							
Narrow	1	2	3	4	5	6	Broad	**2,67**
SG2	**Individuality of Problem Solving**							
Standardized	1	2	3	4	5	6	Individual	**2,05**
SG3	**Competitive Posture**							
Defensive	1	2	3	4	5	6	Offensive	**2,21**
SG4	**Leader-Follower Behavior**							
Follower	1	2	3	4	5	6	Leader	**2,43**
SG5	**Value Added Activities**							
Cost Oriented Rationalization	1	2	3	4	5	6	Customer Focused Optimization	**2,83**
SG6	**Dependency of Value Added Activities**							
Individual	1	2	3	4	5	6	Networking	**3,08**
SG7	**Deployment of Resources**							
Fixed	1	2	3	4	5	6	Flexible	**2,91**
SG8	**Performance of Resources**							
Specialized	1	2	3	4	5	6	Generalist	**2,84**
SG9	**Level of Product Flexibility**							
Low	1	2	3	4	5	6	High	**2,93**
Overall Strategic goals score								**2,67**

Perception of white collar employees about *supply of performance* element refers to a *narrow* profile indicating narrow product range offering for all customer groups. Competitive posture is *defensive* and company has a *follower* behavior in terms of competitive strategy. Level of product flexibility is *mid-low* with respect to competition.

Overall strategic goals score refers to a *mid-low* IFMMM management capability profile. IFMMM strategic goals profile of Company 2, based on white collar employee perception, is illustrated in Figure 5.24.

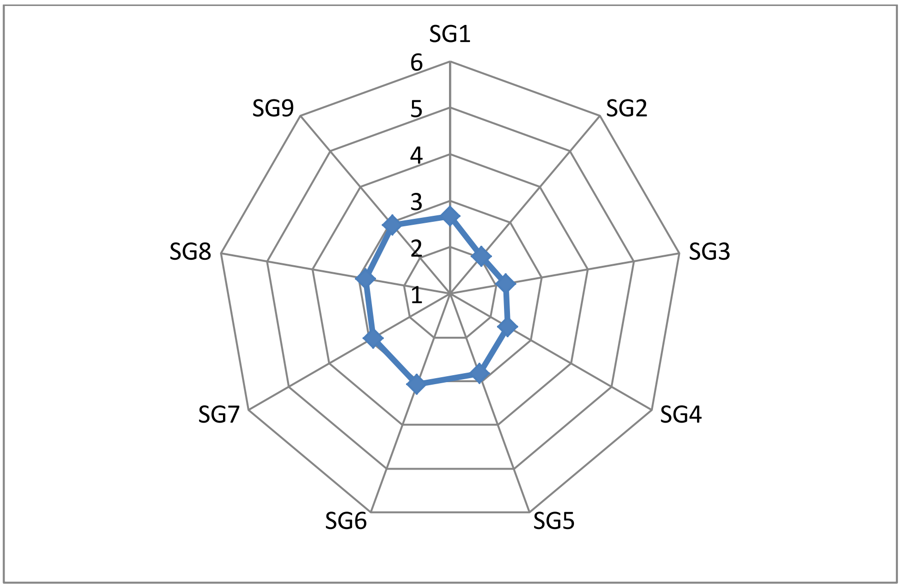

Figure 5.24 Strategic goals profile for Company 2- White collar perception

5.2.2.5.5 Strategic Structures

The IFMMM strategic structures elements' scores, based perception of the top management, are listed in Table 5.37.

Table 5.37 Strategic Structures Profile- Company 2- White collar perception

STRATEGIC STRUCTURES (SS)								**SCORE**
SS1	**Focus**							
Issue-Oriented	1	2	3	4	5	6	Person-Oriented	**3,48**
SS2	**Reference Points**							
Formal Rules	1	2	3	4	5	6	Symbols	**2,87**
SS3	**Extent of Rules**							
Efficiency Oriented	1	2	3	4	5	6	Effectiveness Oriented	**2,95**
SS4	**Time Orientation**							
Unlimited Period	1	2	3	4	5	6	**Predictable Period**	**4,37**
SS5	**Synergy Orientation**							
Central	1	2	3	4	5	6	**Decentral**	**3,59**
SS6	**Hierarchy**							
High	1	2	3	4	5	6	Low	**3,22**
SS7	**Organizational Development**							
Inwards, Towards Efficiency	1	2	3	4	5	6	**Outwards, Towards Effectiveness**	**3,70**
SS8	**Starting Point of Organizational Development**							
Top-Down	1	2	3	4	5	6	Bottom-Up	**3,24**
SS9	**Level of Expansion Flexibility**							
Low	1	2	3	4	5	6	High	**2,81**
Overall Strategic Structures Score								**3,36**

White collar employees of Company 2 perceive that the degree of formalization is high and the hierarchy within the company is also high. On the other hand SS5 element's score refers to a Decentralized decision making. They perceive that the *starting point of organizational development* is top-down. Level of expansion flexibility is *low* with respect to competition. Overall strategic structures score refers to a *mid-low* IFMMM management capability profile. IFMMM strategic structures profile of Company 2, based on white collar employee perception, is illustrated in Figure 5.25.

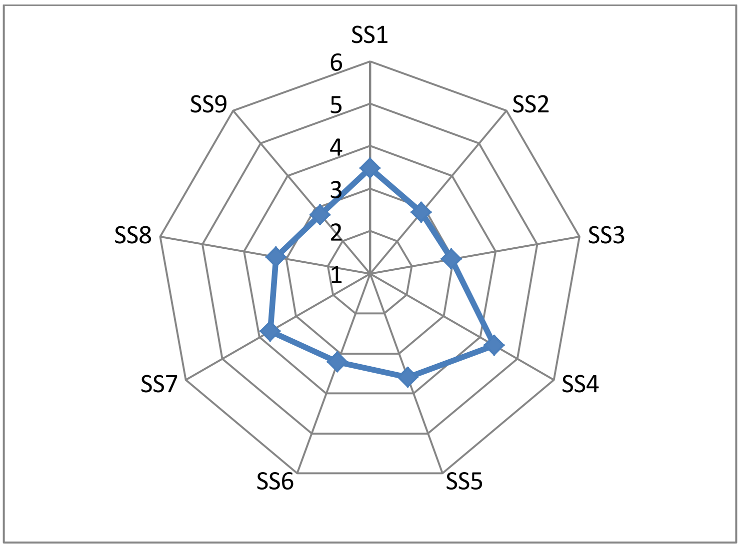

Figure 5.25 Strategic structures profile for Company 2- White collar perception

5.2.2.5.6 Strategic Behaviors

The IFMMM strategic behaviors elements' scores, based perception of the top management, are listed in Table 5.38.

Table 5.38 Strategic Behaviors Profile- Company 2- White collar perception

STRATEGIC BEHAVIORS								**SCORE**
SB1	**Level of Participative Behavior for Management Decisions**							
Low	1	2	3	4	5	6	**High**	**3,85**
SB2	**Focus of Behavior Development**							
Individual	1	2	3	4	5	6	Team	**3,06**
SB3	**Desired Management Behavior**							
Risk- Averse	1	2	3	4	5	6	**Entrepreneurial**	**3,51**
SB4	**Desired Competency Potential**							
Specialist	1	2	3	4	5	6	Generalist	**2,97**
SB5	**Authority Development**							
Institutional- Hierarchy Based	1	2	3	4	5	6	**Communication- Specialist Based**	**3,57**
SB6	**Focus of Desired Responsibility**							
Dependence- Member Only Executes	1	2	3	4	5	6	Delegation-Autonomous	**3,00**
SB7	**Place of Behavior Development**							
Off the Job	1	2	3	4	5	6	On the Job	**3,14**
SB8	**Type of Desired Learning Behavior**							
Vertical	1	2	3	4	5	6	Horizontal	**2,94**
Overall strategic behavior score								**3,26**

Level of participation in decision making is perceived as *high* by white collar employees of Company 2 and is compatible with SS5 profile (see Table 5.37). However *desired management behavior* profile is *entrepreneurial* and is not compatible with NG4 (see Table 5.33) and NB2 (see Table 5.35) profiles. They perceive that *type of desired learning behavior* is *vertical* associated with specialization.

Overall strategic behaviors score refers to a *mid-low* IFMMM management capability profile. IFMMM strategic behaviors profile of Company 2, based on white collar employee perception, is illustrated in Figure 5.26.

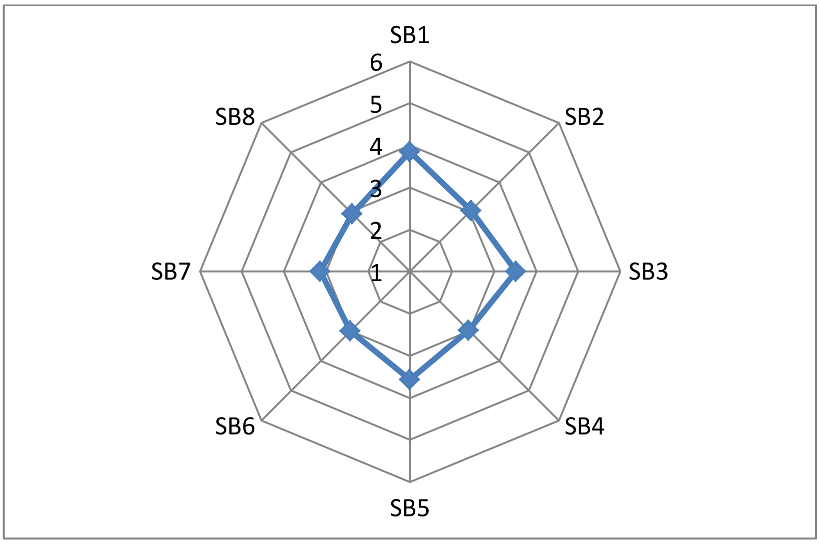

Figure 5.26 Strategic behaviors profile for Company 2- White collar perception

5.2.2.5.7 Operative Goals

The perception of the white collar employees of Company 2 regarding operative goals elements, based on IFMMM, is illustrated as profiling scores as listed in Table 5.39.

Table 5.39 Operative Goals Scores- Company 2- White collar perception

OPERATIVE GOALS (OG)								**SCORE**
OG1	**Manufacturing Cost Reduction Goal**							
Low	1	2	3	4	5	6	High	**2,18**
OG2	**Quality Performance Goal**							
Low	1	2	3	4	5	6	High	**2,55**
OG3	**Delivery Performance Goal**							
Low	1	2	3	4	5	6	High	**2,50**
OG4	**New Product Introduction Performance Goal**							
Low	1	2	3	4	5	6	High	**2,12**
OG5	**Level of Volume Flexibility**							
Low	1	2	3	4	5	6	High	**2,29**
OG6	**Level of Mix Flexibility**							
Low	1	2	3	4	5	6	High	**2,12**
Overall operative goals								**2,29**

The scores of *manufacturing cost reduction goal* and *new product introduction performance goal* indicates a *low* IFMMM management capability profile, whereas scores of *quality performance goal* and *delivery performance goal* refers to a *mid-low* IFMMM management capability profile.

Level of volume flexibility and level of mix flexibility scores both indicates *low* level of flexibility compared with the competitors'.

Overall operative goals score refers to a *mid-low* IFMMM management capability profile. IFMMM operative goals profile of Company 2, based on white collar employee perception, is illustrated in Figure 5.27.

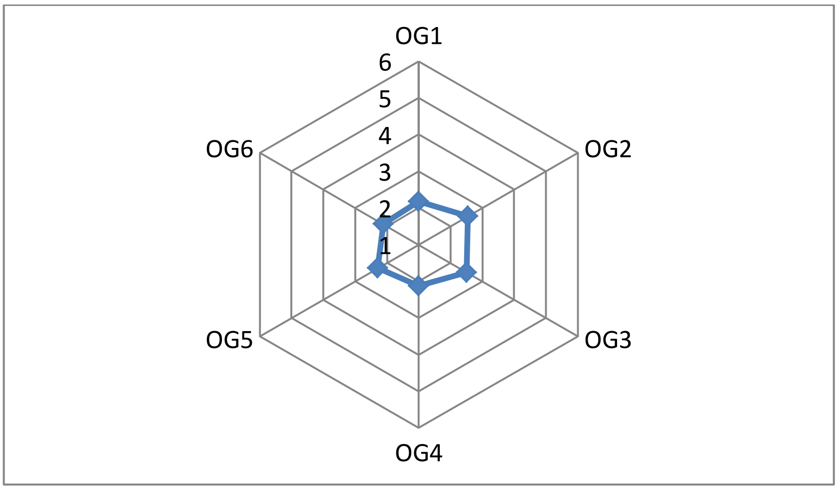

Figure 5.27 Operative goals profile for Company 2- White collar perception

5.2.2.5.8 Operative Structures

The perception of the white collar employees of Company 2 regarding operative goals elements, based on IFMMM, is illustrated as profiling scores as listed in Table 5.40.

Table 5.40 Operative Structures Scores- Company 2- White collar perception

OPERATIVE STRUCTURES (OG)								**SCORE**
OS1	**Production Systems Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**4,12**
OS2	**Infrastructural Production Support Systems Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**4,18**
OS3	**Design Applications**							
Narrow	1	2	3	4	5	6	Wide	**3,05**
OS4	**Level of Machine Flexibility**							
Low	1	2	3	4	5	6	High	**2,98**
OS5	**Level of Routing Flexibility**							
Low	1	2	3	4	5	6	High	**2,43**
OS6	**Level of Operation Flexibility**							
Low	1	2	3	4	5	6	High	**2,75**
Overall operative structures score								**3,25**

White collar employees of company 2 perceive that the production systems applications and infrastructural production support systems applications are widely applied within the company. However they perceive that the design applications have a limited usage.

Basic flexibility dimensions, *machine, routing and operation* flexibilities all are perceived to be *lower* than the competition.

Overall operative structures score refers to a *mid-low* IFMMM management capability profile. IFMMM operative structures profile of Company 2, based on white collar employee perception, is illustrated in Figure 5.28.

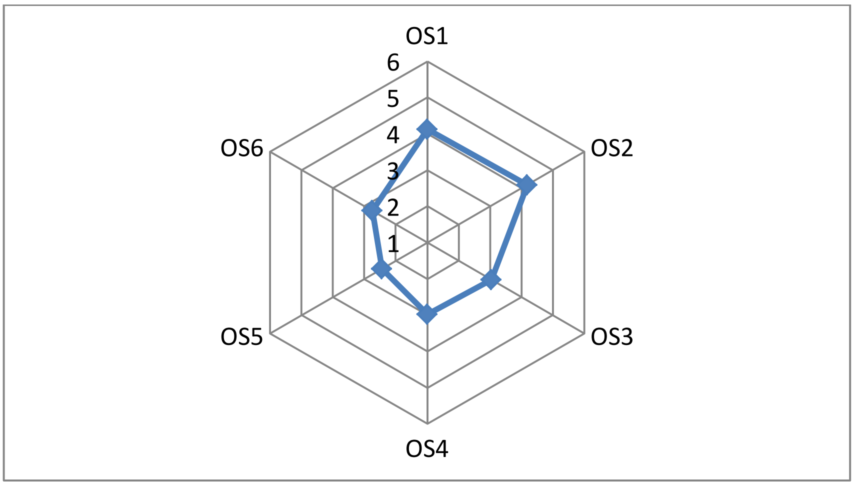

Figure 5.28 Operative structures profile for Company 2- White collar perception

5.2.2.5.9 *Operative Behaviors*

The IFMMM operative behaviors elements' scores, based on perception of the white collar employees, are listed in Table 5.41.

Table 5.41 Operative Behaviors Scores- Company 2- White collar perception

OPERATIVE BEHAVIORS (OB)								**SCORE**
OB1	**Team Work**							
Narrow	1	2	3	4	5	6	Wide	**2,91**
OB2	**Decision Making Processes in Operations**							
Centralized	1	2	3	4	5	6	Decentralized	**3,39**
OB3	**Multi-Skilled Labor**							
Narrow	1	2	3	4	5	6	Wide	**2,95**
OB4	**Level of Labor Flexibility**							
Low	1	2	3	4	5	6	High	**3,09**
Overall operative behaviors score								**3,09**

White collar employees perceived that existence of *team work* rare at operational level. Decision making is centralized. This profile is not compatible with SB1 profile (see Table 5.38). *Level of labor flexibility* is perceived to be lower than the competitors.

Overall operative behaviors score refers to a *mid-low* IFMMM management capability profile. IFMMM operative behaviors profile of Company 2, based on white collar employee perception, is illustrated in Figure 5.29.

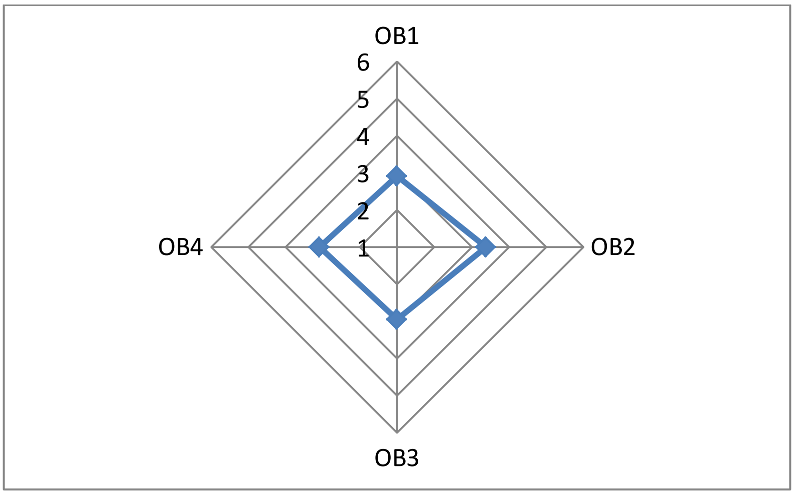

Figure 5.29 Operative behaviors profile for Company 2- White collar perception

5.2.2.6 Manufacturing Flexibility Profile-Company 2- White collar perception

The list of the manufacturing flexibility dimensions along with the corresponding scores of Company 2, based on white collar perception is available in Table 5.42.

Table 5.42 Manufacturing flexibility perception of Company 2- white collar perception

MANUFACTURING FLEXIBILITY (MF)		**SCORE**
SG9	**Level of Product Flexibility**	**2,93**
SS9	**Level of Expansion Flexibility**	**2,81**
OG5	**Level of Volume Flexibility**	**2,29**
OG6	**Level of Mix Flexibility**	**2,12**
OS4	**Level of Machine Flexibility**	**2,98**
OS5	**Level of Routing Flexibility**	**2,43**
OS6	**Level of Operations Flexibility**	**2,75**
OB4	**Level of Labor Flexibility**	**3,09**
Overall Manufacturing Flexibility Score		**2,68**

The manufacturing flexibility scores of company 2, based on white collar employees perception refers to a *mid-low* profile for all dimensions, except *mix flexibility level,* which is *low* level flexibility profile.

Overall manufacturing flexibility score refers to a *mid-low* IFMMM management capability profile. Manufacturing flexibility profile of Company 2, based on white collar employee perception, is illustrated in Figure 5.30 as a radar diagram.

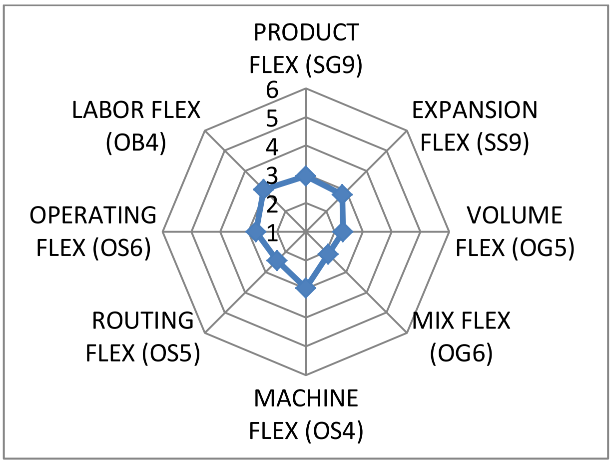

Figure 5.30 Manufacturing flexibility profile for Company 2- White collar perception

5.2.2.7 Market Dynamism

The perceived market dynamism scores upon management interview are illustrated in Table 5.43.

Table 5.43 Market dynamism – Company 2 – White collar perception

MARKET DYNAMISM (MD)		SCORE
MD1	**Dynamism in Competition Intensity**	**2,44**
MD2	**Dynamism in Customer Preferences**	**2,50**
MD3	**Dynamism in Technology**	**2,71**
Overall Market dynamism		**2,55**

White collar employees of company 2 perceive that the market dynamism is *low* for all components. They perceive that the market, in which their company operates, is relatively stable.

5.2.2.8 Firm Performance

The perceived firm performance scores of Company 2, based on white collar perception, are listed in Table 5.44

Table 5.44 Firm performance Company 2 – White collar perception

FIRM PERFORMANCE (FP)		SCORE
FP1	**Financial Performance**	**2,37**
FP2	**Market Performance**	**2,38**
FP3	**Innovation Performance**	**2,68**
FP4	**Manufacturing Performance**	**2,86**
Overall Firm Performance		**2,57**

The scores of firm performance show us that, white collar employees perceives that company 2 has a lower performance in terms of financial, market, innovation and manufacturing, when they compare with the competition.

5.2.2.9 Company 2 – Comparison of results

The results of the both top management interview and white collar employee survey are illustrated in detail in previous sections. In this section, comparison of both results is given.

5.2.2.9.1 Comparison of Normative level IFMMM profiles – Company 2

The comparative scores of normative level items, derived from top management interview and white collar survey as listed in Table 5.45.

Table 5.45 Comparison of normative level items – Company 2

		Top Management Results		White Collar Results	
NORMATIVE GOALS (NG)		**Score**	**Profile**	**Score**	**Profile**
NG1	**Internal Direction of the Masson**	**5,33**	**Social Economic**	**2,64**	**Individual economic**
NG2	**Time Perspective of the Goal**	**5,50**	**Long Term**	**2,31**	**Short Term**
NG3	**Chance Perspective**	**5,50**	**Progressive**	**2,23**	**Keep It**
NG4	**Risk Perspective**	**5,00**	**Vulnerable**	**2,77**	**Disturbing**
NG5	**Objective Performance goals**	**5,66**	**Strong**	**2,38**	**Weak**
NG6	**Financial Value Goals**	**5,50**	**Strong**	**2,02**	**Weak**
NG7	**Ecological Goals**	**5,00**	**Strong**	**2,89**	**Weak**
NG8	**Social Goals**	**5,00**	**Strong**	**3,36**	**Weak**
Overall normative goals score		**5,31**		**2,58**	
NORMATIVE STRUCTURES (NS)		**Score**	**Profile**	**Score**	**Profile**
NS1	**Representation of interests in board**	**5,50**	**Stakeholder**	**3,47**	**Shareholder**
NS2	**Art of Conflict Resolution**	**5,00**	**Consensus**	**3,20**	**Confrontation**
NS3	**Economical, Legal and Social Structure**	**6,00**	**Differentiated**	**4,66**	**Differentiated**
NS4	**Distance of Management to Real Life**	**5,00**	**Far-Strategic**	**3,00**	**Close-Operative**
NS5	**Competence Distribution of Management**	**4,00**	**Multilevel**	**3,05**	**Single Level**
NS6	**Division of Executives**	**3,50**	**Staff,Team**	**2,07**	**Directorial, CEO**
NS7	**Sense of Responsibility of Top Management Team**	**5,00**	**Multiplier**	**2,29**	**Protective**
NS8	**Rationale of Top Management Team**	**4,66**	**Consulting**	**2,31**	**Monitoring**
Overall normative structures score		**4,83**		**3,01**	
NORMATIVE BEHAVIORS (NB)		**Score**	**Profile**	**Score**	**Profile**
NB1	**Cultural Openness**	**5,00**	**Outside oriented**	**2,67**	**Inside oriented**
NB2	**Attitude Towards Change**	**5,00**	**Friendly**	**2,87**	**Hostile**
NB3	**Orientation of Management**	**4,50**	**Basis**	**3,03**	**Top**
NB4	**Subcultural Differentiation**	**4,00**	**Functionally differentiated**	**3,00**	**Uniform value system**
NB5	**Cultural expression**	**4,00**	**Development oriented**	**3,06**	**Instrumental**
NB6	**Value Added Orientation**	**3,00**	**Cost oriented**	**4,94**	**Value oriented**
NB7	**Role of employees**	**5,00**	**Actors**	**3,54**	**Actors**
NB8	**Employee engagement**	**4,25**	**Collective,Us**	**3,97**	**Collective,Us**
Overall normative behaviors score		**4,34**		**3,38**	

As it can be seen in the Table, IFMMM normative goals elements' scores and associated profiles, based on top management interview and white collar survey are all different than each other. The perception of top management and the perception of white collar employees about their companies' related IFMMM profiles are far different.

Top management perceives that the *time perspective of the goal* profile is *long term,* which indicates that there is a long term planning within the company to achieve the goals. However, white collar employees did not perceive such a long term planning. Top management perceives that the emphasis on *objective performance goals, financial value goals, ecological goals* and *social goals* are all strong. On the other hand, white collar employees do not perceive the same, but they perceive that the emphasis on *objective performance goals, financial value goals, ecological goals* and *social goals* are all weak.

While top management perceives a *high* overall normative goals profile with a score of **5,31**; white collar employees perceive a *mid-low* overall normative goals profile with a score of **2,58**. Such a difference between top management perception and white collar employees' perception on the same subject is a symptom for communication problems.

Top management and white collar employees perceive different profiles also for IFMMM normative structures elements. While top management states that *stakeholders* are represented in the board, white collar employees perceive that only *shareholders* exist in the board. Top management thinks that they do not interfere with daily operations; instead they are far from operative level and deals with strategic issues. However white collar employees perceive that the management is closely dealing with daily operations. Additionally NS8 profile upon top management perception refers to a *consulting* profile for *rationale of top management team,* on the other hand, white collar employees perceive that the *rationale of top management team* is *monitoring*.

While top management perceives a *high* overall normative structures profile with a score of **4,83**; white collar employees perceive a *mid-low* overall normative goals profile with a score of **3,01.**

The perception regarding normative behaviors profiles for company 2 also differs for top management and white collar. Top management perceives that their *attitude towards change* is *friendly*, but white collar employees perceive that their *attitude towards change* is *hostile*. Top management perceives that the company has an *outside oriented*, *open* culture where there are *differences* between divisional *subcultures* and *cultural expression* is *development oriented*. On the other hand, white collar employees perceive that the company has an *inside oriented* culture where a *uniform value system exists* and *cultural expression* is *instrumental.*

Top management perceive that the focus of management regarding *value added* activities is *cost oriented*, while white collar employees perceive different and they think that management focuses on increasing customer value.

Such a difference between top management perception and white collar employees' perception about normative level IFMMM elements might be a symptom for communication problems between top management and white collar staff.

The normative level IFMMM profiles for Company 2, based on top management perception and white collar perception are illustrated in Figure 5.31 for better visual comparison.

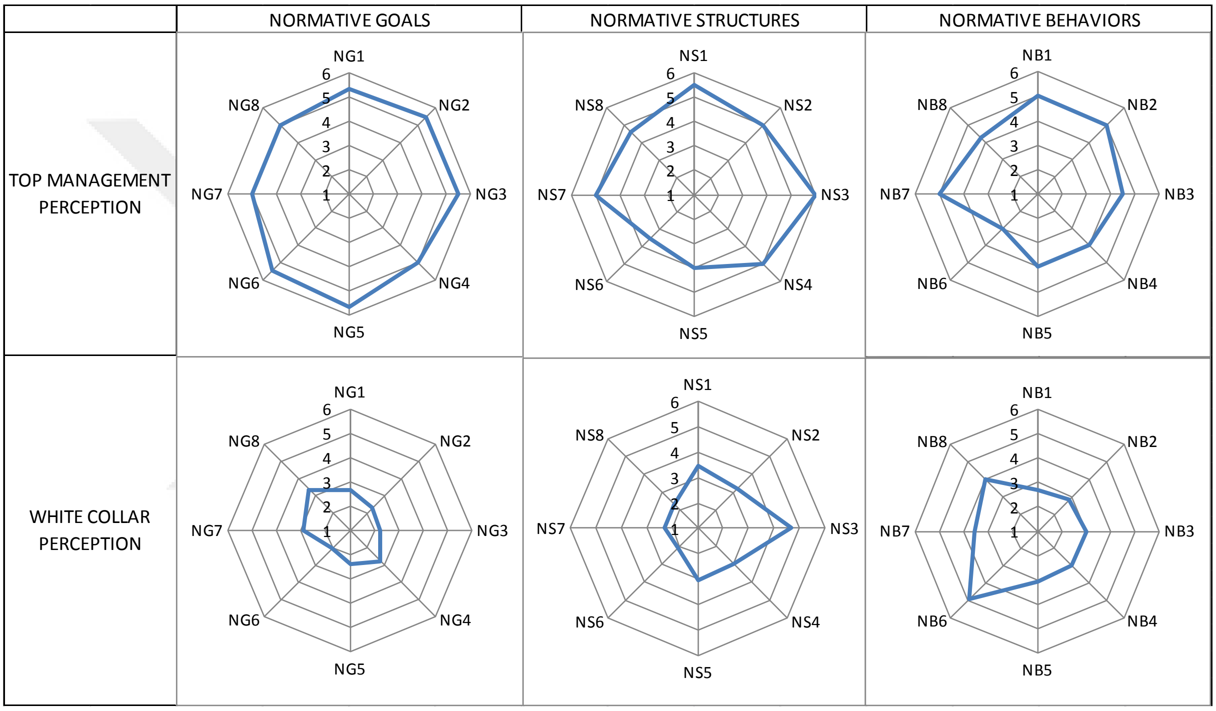

Figure 5.31 Comparison of normative level profiles- Company 2

5.2.2.9.2 Comparison of strategic level IFMMM profiles – Company 2

The comparative scores of strategic level items, derived from top management interview and white collar survey as listed in Table 5.46.

Table 5.46 Comparison of strategic level items – Company 2

		Top Management Results		White Collar Results	
STRATEGIC GOALS (SG)		**Score**	**Profile**	**Score**	**Profile**
SG1	**Supply of performance**	**5,00**	**Broad**	**2,67**	**Narrow**
SG2	**Individuality of problem solving**	**6,00**	**Individual**	**2,05**	**Standardized**
SG3	**Competitive posture**	**6,00**	**Offensive**	**2,21**	**Defensive**
SG4	**Leader-follower behavior**	**6,00**	**Leader**	**2,43**	**Follower**
SG5	**Value added activities**	**5,00**	**Customer focused optimisation**	**2,83**	**Cost oriented rationalization**
SG6	**Dependency of value added activities**	**4,50**	**Networking**	**3,08**	**Individual**
SG7	**Deployment of resources**	**4,00**	**Flexible**	**2,91**	**Fixed**
SG8	**Performance of resources**	**4,00**	**Generalist**	**2,84**	**Specialized**
SG9	**Level of product flexibility**	**5,00**	**High**	**2,93**	**Low**
Overall strategic goals score		**5,06**		**2,67**	
STRATEGIC STRUCTURES (SS)		**Score**	**Profile**	**Score**	**Profile**
SS1	**Focus**	**1,00**	**Issue oriented**	**3,47**	**Issue orieted**
SS2	**Reference points**	**6,00**	**Symbols**	**2,87**	**Formal rules**
SS3	**Extent of rules**	**5,33**	**Effectiveness oriented**	**2,95**	**Efficiency oriented**
SS4	**Time orientation**	**3,50**	**Predictable period**	**4,37**	**Predictable period**
SS5	**Synergy orientation**	**5,00**	**Decentral**	**3,59**	**Decentral**
SS6	**Hierarchy**	**6,00**	**Low**	**3,22**	**High**
SS7	**Organizational development**	**2,33**	**Inwards, efficiency**	**3,70**	**Outwards, effectiveness**
SS8	**Starting point of organizational development**	**4,66**	**Bottom-Up**	**3,24**	**Top-down**
SS9	**Level of Expansion flexibility**	**6,00**	**High**	**2,81**	**Low**
Overall strategic structures score		**4,42**		**3,36**	
STRATEGIC BEHAVIORS (SB)		**Score**	**Profile**	**Score**	**Profile**
SB1	**Level of Participative Behavior**	**4,00**	**High**	**3,85**	**High**
SB2	**Focus of behavior development**	**4,66**	**Team**	**3,06**	**Individual**
SB3	**Desired management behavior**	**5,00**	**Enterpreneurial**	**3,51**	**Enterpreneurial**
SB4	**Desired Competency Potential**	**5,00**	**Generalist**	**2,97**	**Specialist**
SB5	**Authority development**	**4,00**	**Comunication-specialist based**	**3,57**	**Comunication-specialist based**
SB6	**Focus of desired responsibility**	**5,00**	**Delegation-autonomous**	**3,00**	**Dependence-Member Only Executes**
SB7	**Place of Behavior Development**	**5,00**	**On the job**	**3,14**	**Off the Job**
SB8	**Type of Desired Learning Behavior**	**5,00**	**Horizontal**	**2,94**	**Vertical**
Overall strategic behaviors score		**4,71**		**3,26**	

Strategic goals elements scores and profiles based on top management perception and white collar perception are all different. Top management perceives that company 2 has a *broad supply of performance profile*. However white collar employees' perception is that the company has a *narrow* profile associated with economies of scale focus. Similiarly, top management thinks that their *competitive posture* is *offensive*, but white collar employees perceive the same as *defensive*. Top management evaluates their company as the *leader* in the market which is associated with innovativeness, where white collar employees evaluate the same as a *follower* behavior. Similiarly, according to top management, company 2 has a *high level of product flexibility* with respect to the competitors; according to white collar employees, company 2 has a *low level of product flexibility* with respect to the competitors.

While top management perceives a *high* overall strategic goals profile with a score of **5,06**; white collar employees perceive a *mid-low* overall strategic goals profile with a score of **2,67**.

When we compare the strategic structures elements, we can see that top management and white collar employees perceive the same IFMMM profile for SS1, SS4 and SS5 items. But perceived profile for the remaining 6 strategic structures elements. Top management perceives that the *level of hierarchy* within the company is *low*; but white collar employees perceive a *high level of hierarchy*. Even though the SS profile of company 2 based on white collar employees perception indicates a more mechanistic structure; SS5 profile shows us that white collar employees perceive that the power is distributed within the company and decision making is also Decentralized.

The perceived *level of expansion flexibility* is *very high* according to top management; *low* according to white collar employees. Top management thinks that they can expand easier and faster that the competitors; but white collar employees perceive the opposite. Such a difference can be explained with the *lack of communication* between top management and the employees.

While top management perceives a *mid-high* overall strategic structures profile with a score of **4,42**; white collar employees perceive a *mid-low* strategic structures profile with a score of **3,36**.

Top management and white collar employees of company 2 perceive same profile for 3 elements; SB1; SB3 and SB5. The remaining 5 elements have been perceived with different profiles.

We have stated that the significant difference between the perception of top management and perception of white collar employees for IFMMM profiles of company 2 refers to a communication problem. However, perceived SB1 profile indicates that *level of participative* *behavior* is *high*. White collar employees also perceive that they participate in budgeting, planning and execution of the activities. Therefore, the communication problem is expected to be eliminated with such a participated behavior.

While top management perceives a *mid-high* overall strategic behaviors profile with a score of **4,71**; white collar employees perceive a *mid-low* strategic behaviors profile with a score of **3,36**.

The strategic level IFMMM profiles for Company 2, based on top management perception and white collar perception are illustrated in Figure 5.32 for better visual comparison

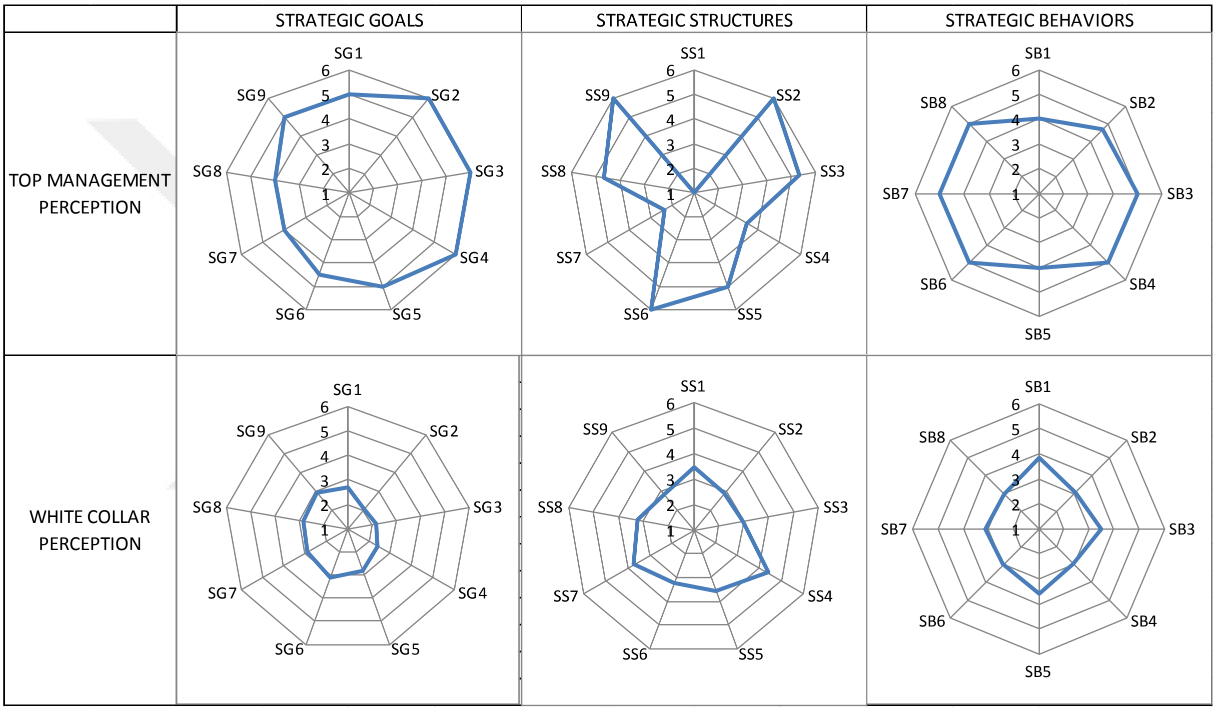

Figure 5.32 Comparison of strategic level profiles- Company 2

5.2.2.9.3 *Comparison of operative level IFMMM profiles – Company 2*

The comparative scores of operative level items, derived from top management interview and white collar survey as listed in Table 5.47.

Table 5.47 Comparison of operative level items – Company 2

		Top Management Results		White Collar Results	
OPERATIVE GOALS (OG)		**Score**	**Profile**	**Score**	**Profile**
OG1	**Manufacturing cost reduction goal**	**6,00**	**High**	**2,18**	**Low**
OG2	**Quality performance goal**	**6,00**	**High**	**2,55**	**Low**
OG3	**Delivery performance goal**	**6,00**	**High**	**2,50**	**Low**
OG4	**New product introduction performance goal**	**5,33**	**High**	**2,12**	**Low**
OG5	**Level of volume flexibility**	**4,00**	**High**	**2,29**	**Low**
OG6	**Level of mix flexibility**	**4,00**	**High**	**2,12**	**Low**
Overall operative goals score		**5,22**		**2,29**	
OPERATIVE STRUCTURES (OS)		**Score**	**Profile**	**Score**	**Profile**
OS1	**Production Systems Applications**	**2,33**	**Narrow**	**4,12**	**Wide**
OS2	**Infrastructural Production Support Systems Applications**	**3,00**	**Narrow**	**4,18**	**Wide**
OS3	**Design Applications**	**6,00**	**Wide**	**3,05**	**Narrow**
OS4	**Level of machine flexibility**	**5,00**	**High**	**2,98**	**Low**
OS5	**Level of routing flexibility**	**5,00**	**High**	**2,43**	**Low**
OS6	**Level of operation flexibility**	**4,00**	**High**	**2,75**	**Low**
Overall operative structures score		**4,22**		**3,25**	
OPERATIVE BEHAVIORS (OB)		**Score**	**Profile**	**Score**	**Profile**
OB1	**Team Work**	**4,00**	**Wide**	**2,91**	**Narrow**
OB2	**Decision Making Processes in Operations**	**4,00**	**Decentralized**	**3,39**	**Centralized**
OB3	**Multi skilled labor**	**4,00**	**Wide**	**2,95**	**Narrow**
OB4	**Level of labor flexibility**	**4,00**	**High**	**3,05**	**High**
Overall strategic behaviors score		**4,00**		**3,05**	

All operative goals elements’ profiles are perceived differently by top management and white collar employees of company 2. Top management perceives that the emphases on *manufacturing cost reduction goal, quality performance goal, delivery performance goal and new product introduction performance goal* are all *high;* but white collar employees do not perceive the same. Also the perception of both; regarding the *level of volume flexibility* and *level of mix flexibility* are also different.

While top management perceives a *high* overall operative goals profile with a score of **5,22**; white collar employees perceive a *mid-low* operative goals profile with a score of **2,29**.

Top management stated that the *production systems applications* and *infrastructural support systems* are not widely used within the company, but *design applications* are widely used within the company; the perception of white collar employees is vice versa. They perceive that *production systems applications* and *infrastructural support systems* widely applied within the company, but the usage of *design applications* is limited. Top management perceives that company 2 has a *high level of machine; routing and operation flexibility* when they compare with the competitors. However, white collar employees perceive that the level *of machine; routing and operation flexibility* is lower than the competitors'.

While top management perceives a *mid-high* overall operative structures profile with a score of **4,22**; white collar employees perceive a *mid-low* operative structures profile with a score of **3,25**.

When we compare the operative behaviors profiles, we observe that both, top management and white collar employees perceive that *level of labor flexibility* is *high.* Despite white collar employees perceive that SB1, *level of participative behavior*, profile as *high* and SS5, *synergy orientation* profile as *Decentralized,* their perception of OB2 profile is centralized.

While top management perceives a *mid-high* overall operative behaviors profile with a score of **4,00**; white collar employees perceive a *mid-low* operative behaviors profile with a score of **3,05**.

The operative level IFMMM profiles for Company 2, based on top management perception and white collar perception are illustrated in Figure 5.33 for better visual comparison

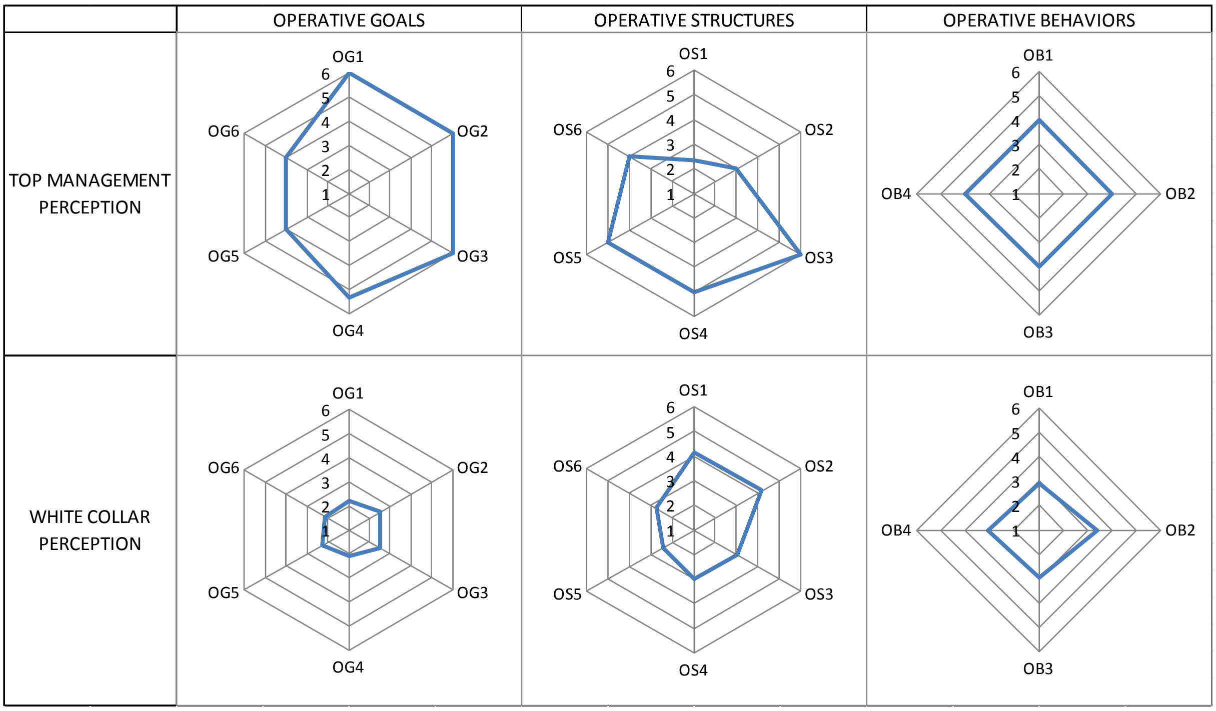

Figure 5.33 Comparison of operative level profiles- Company 2

5.2.2.9.4 Comparison of manufacturing flexibility scores – Company 2

The comparative scores of manufacturing flexibility items, derived from top management interview and white collar survey as listed in Table 5.48.

Table 5.48 Comparison of manufacturing flexibility– Company 2

MANUFACTURING FLEXIBILITY (MF)	Top management perception scores	White collar employees perception scores
Level of Product Flexibility	5,50	2,93
Level of Expansion Flexibility	6,00	2,81
Level of Volume Flexibility	4,00	2,29
Level of Mix Flexibility	4,00	2,12
Level of Machine Flexibility	5,00	2,98
Level of Routing Flexibility	5,00	2,43
Level of Operations Flexibility	4,00	2,75
Level of Labor Flexibility	4,00	3,09
Overall Manufacturing Flexibility Score	4,69	2,68

The perception of top management of company 2 regarding manufacturing flexibility dimensions indicates a high level flexibility, when compared with the competitors, for all dimensions included in IFMMM. However perception of white collar employees company 2 regarding manufacturing flexibility dimensions indicates a *low* level flexibility, when compared with the competitors, for all dimensions included in IFMMM.

Since the company 2 has a diversified product range (more than 1000 products), the company has a high mix flexibility. Moreover since the company has multiple identical machines for each operation, routing flexibility is also high. However, these flexibility dimensions are also perceived as *low level* flexibilities by white collar employees.

5.2.2.9.5 Comparison of market dynamism scores – Company 2

The comparative scores of market dynamism, derived from top management interview and white collar survey as listed in Table 5.49.

Table 5.49 Comparison of market dynamism– Company 2

MARKET DYNAMISM (MD)		**Top management perception scores**	**White collar employees perception scores**
MD1	**Dynamism in Competition Intensity**	**6,00**	**2,44**
MD2	**Dynamism in Customer Preferences**	**4,00**	**2,50**
MD3	**Dynamism in Technology**	**4,00**	**2,71**
Overall Market dynamism		**4,66**	**2,55**

Top management of company 2 perceives that the market that they operate in is a dynamic market. The interviewee informed us that the number of entries to the market and exits from the market is very high due to absence of entry barriers and low investment requirements. Dynamism in customer preferences and technology are perceived mid-high. New trends in the market including demand for environment friendly products and sustainability issues create dynamism in customer preferences.

However, white collar employees do not perceive the dynamism in the market. They perceive more stable market in terms of competition intensity, customer preferences and technology.

Since the company is operating in plastic industry, product prices are subject to a continuous change due to changes in global polymer prices. Therefore, regardless of other parameters, we can say that product prices are dynamically changing.

5.2.2.9.6 Comparison of firm performance scores – Company 2

The comparative scores of firm performance, derived from top management interview and white collar survey as listed in Table 5.50.

Table 5.50 Comparison of firm performance– Company 2

FIRM PERFORMANCE (FP)		**Top management perception scores**	**White collar employees perception scores**
FP1	**Financial Performance**	**4,00**	**2,37**
FP2	**Market Performance**	**5,33**	**2,38**
FP3	**Innovation Performance**	**5,43**	**2,68**
FP4	**Manufacturing Performance**	**4,73**	**2,86**
Overall Firm Performance		**4,81**	**2,57**

While top management perceive that company 2 is better that the competitors in terms of financial, market, innovation and manufacturing performance; white collar employees perceive that company 2 is worse that the competitors in terms of financial, market, innovation and manufacturing performance.

Top manager told us that the company won innovation related prizes from in last 3 years from institutions as Istanbul Chamber of Industry (ISO). However the results of the survey illustrated that it could not be communicated with the white collar employees.

The other performance results illustrate that there is a significant difference between the perception of performance between top management and white collar employees of the company 2.

5.2.3 Company 3 Case Analysis

Company 3 is a manufacturing company operating in producing Construction Materials and established in 1965. The company is a subsidiary of an international group and has two production sites in Turkey, one is located in Marmara region and the other one is located in Southeast Anatolian region.

Main products are Water and Waste Pipes for Sanitary, Infrastructure and Agricultural use. Main production methods are extrusion, molding and assembly.

Annual turnover of the company is around 110 Million USD, as of 2014. More than 500 employees are working for the company.

Brief company information is summarized as below in Table 5.51.

Table 5.51 Company profile- Company 3

Industry	Years in Business	Subsidiary of a Group	No of Employees	No of Products	Annual Turnover (Million USD)	Single Site/ Multisite	Region
3050- Plastic Hose and Construction Materials	**50-59**	**Yes**	**500-999**	**100-499**	**Over 100**	**Multi-Site**	**Marmara, Southeast Anatolian**

A face to face interview has been completed with the General Manager of the company. The profile of the interviewee is available in Table 5.2. The structured interview has been based on the questionnaire. Before starting the questionnaire, detailed information regarding the study and the model has been provided to the interviewee. The instrument items have been answered by the General Manager and the perceived IFMMM profile of the company has been prepared based on the answers.

5.2.3.1 IFMMM Profile Company 3

5.2.3.1.1 Normative Goals

Scores of elements of normative goals have been calculated based on the top management perception and listed in Table 5.52.

Table 5.52 Normative Goals Profile- Company 3 – Top Management Perception

NORMATIVE GOALS (NG)								**SCORE**
NG1	**Internal Direction of the Masson**							
Individual Economic	1	2	3	4	5	6	**Social Economic**	**5,66**
NG2	**Time Perspective of the Goal**							
Short Term	1	2	3	4	5	6	**Long Term**	**6,00**
NG3	**Chance Perspective**							
Keep It	1	2	3	4	5	6	**Progressive**	**5,00**
NG4	**Risk Perspective**							
Disturbing	1	2	3	4	5	6	Vulnerable	**3,00**
NG5	**Objective Performance goals**							
Weak	1	2	3	4	5	6	**Strong**	**4,66**
NG6	**Financial Value Goals**							
Weak	1	2	3	4	5	6	**Strong**	**5,00**
NG7	**Ecological Goals**							
Weak	1	2	3	4	5	6	**Strong**	**6,00**
NG8	**Social Goals**							
Weak	1	2	3	4	5	6	**Strong**	**5,00**
Overall normative goals score								**5,04**

The scores of all normative goals elements refer to either a *mid-high* or a *high* IFMMM capability profile except *Risk perspective* profile. The management of company 3 perceives risk as disturbing. *Internal direction of the mission, time perspective of the goal, chance perspective, financial goals, ecological goals and social goals* scores indicates a high IFMMM capability profile and remaining, *objective performance goals* element has a *mid-high* IFMMM capability profile. The scores shows us that the management perceives that long term plans are prepared to and they cooperate with the stakeholders in goal setting. They try to stimulate change within the environment. The expression of objective performance, financial, ecological and social goals are all *strong*. However they perceive the risk is disturbing and focuses on avoiding the risk.

Overall normative goals score is 5,04 representing a *high* profile according to IFMMM. The normative goal profile of Company 3 is illustrated with the radar diagram in Figure 5.34.

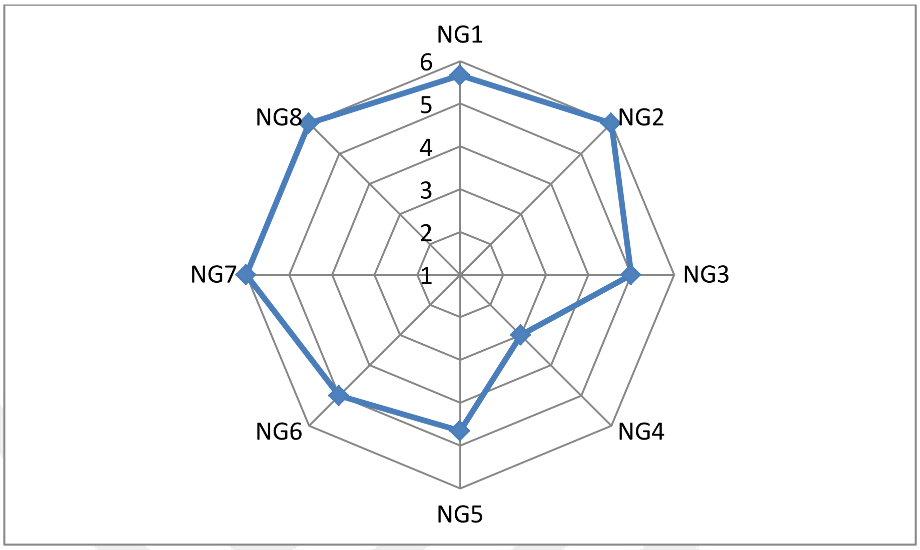

Figure 5.34 Normative Goals Profile for Company 3

5.2.3.1.2 Normative Structures

The perception of the top management regarding normative structures, based on IFMMM is used to calculate the scores of profiling elements which are listed in Table 5.53.

Table 5.53 Normative Structures Profile- Company 3

NORMATIVE STRUCTURES (NS)								SCORE
NS1	**Representation of interests in board**							
Shareholder	1	2	3	4	5	6	Stake Holder	**3,00**
NS2	**Art of Conflict Resolution**							
Confrontation	1	2	3	4	5	6	Consensus	**3,33**
NS3	**Economical, Legal and Social Structure**							
Non-differentiated	1	2	3	4	5	6	**Differentiated**	**6,00**
NS4	**Distance of Management to Real Life**							
Close-Operative	1	2	3	4	5	6	Far-Strategic	**3,00**
NS5	**Competence Distribution of Management**							
Single Level	1	2	3	4	5	6	**Multilevel**	**5,00**
NS6	**Division of Executives**							
Directorial/CEO	1	2	3	4	5	6	**Staff,Team**	**6,00**
NS7	**Sense of Responsibility of Top Management Team**							
Protective	1	2	3	4	5	6	**Multiplier**	**6,00**
NS8	**Rationale of Top Management Team**							
Monitoring	1	2	3	4	5	6	**Consulting**	**5,00**
Overall normative structures score								**4,67**

Since the board is composed of only shareholders, the profile of *representation of interests in board* is *shareholder*. *Distance of management to real life* has a score of 3,00 (mid-low capability profile) indicates that top managers are close to the operative daily activities. *Art of conflict resolution* profile is *confrontation.* Since company 3 is a subsidiary of a group, NS3 profile is *differentiated*. All of the remaining elements have a *high capability* profile with respect to the assigned IFMMM ideal.

Overall normative structures score (4,67) indicates a *high management capability profile* based on perception of the top management. The normative structures profile of Company 3 is illustrated with the radar diagram in Figure 5.35.

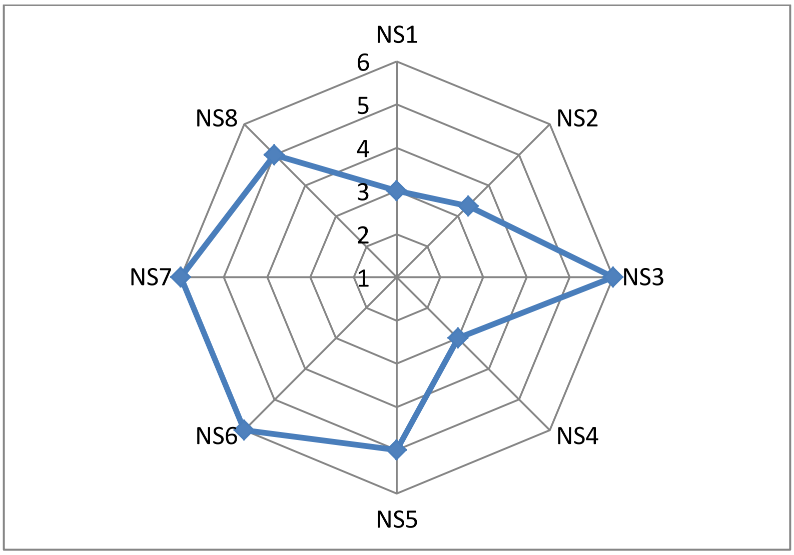

Figure 5.35 Normative Structures Profile for Company 3

5.2.3.1.3 Normative Behaviors

The perception of the top management regarding normative behaviors, based on IFMMM is used to calculate the scores for profiling elements which are listed in Table 5.54.

Table 5.54 Normative Behaviors Profile – Company 3

NORMATIVE BEHAVIORS (NB)								**SCORE**
NB1	**Cultural Openness**							
Inside Oriented	1	2	3	4	5	6	**Outside Oriented**	**6,00**
NB2	**Attitude Towards Change**							
Hostile	1	2	3	4	5	6	**Friendly**	**4,00**
NB3	**Cultural Orientation**							
Top	1	2	3	4	5	6	**Basis**	**4,14**
NB4	**Subcultural Differentiation**							
Uniform Value System	1	2	3	4	5	6	**Functionally differentiated**	**3,66**
NB5	**Cultural expression**							
Instrumental	1	2	3	4	5	6	**Development oriented**	**3,66**
NB6	**Value Added Orientation of Management**							
Cost Oriented	1	2	3	4	5	6	Value oriented	**2,00**
NB7	**Role of employees**							
Members	1	2	3	4	5	6	**Actors**	**6,00**
NB8	**Employee engagement**							
Individual, Hero	1	2	3	4	5	6	**Collective, Us**	**4,25**
Overall normative behaviors score								**4,26**

Only one profiling element out of eight included in normative behaviors field of IFMMM perceived as *low capability* profile, which is NB6, *value added orientation of management.* This profile indicates that focus of management is on minimizing costs with creating *economies of scale*.

Top management perceived that the employees have a relationship with the company with a sense of belonging and each *member* contributes to the preservation of the whole within his/her domain. *Attitude towards change* is *friendly* which is associated with entrepreneurship. *Cultural expression* profile refers to the existence of flexible structures within the company.

Overall normative behaviors score also indicates a *mid-high management capability* with respect to IFMMM. The normative behaviors profile of Company 3 is illustrated with the radar diagram in Figure 5.36.

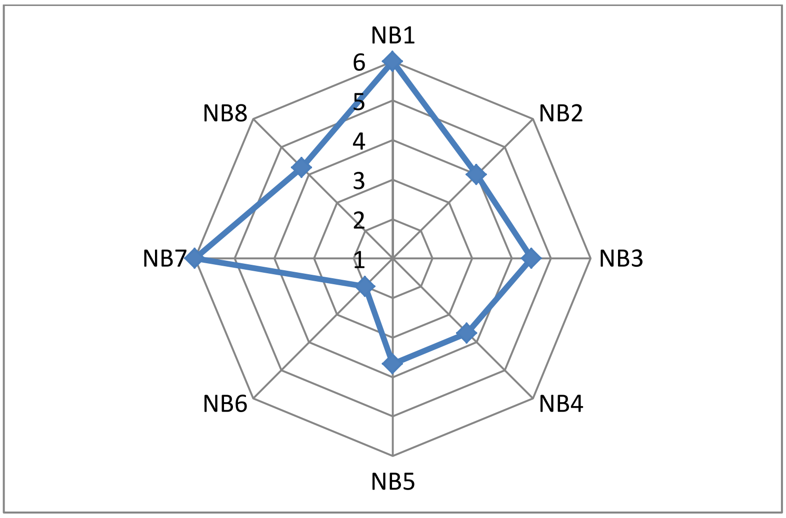

Figure 5.36 Normative Behaviors Profile for Company 3

5.2.3.1.4 Strategic Goals

The perception of the top management regarding strategic goals, based on IFMMM is used to calculate the scores for profiling elements which are listed in Table 5.55.

Table 5.55 Strategic Goals Profile- Company 3

STRATEGIC GOALS (SG)								**SCORE**
SG1	**Supply of Performance**							
Narrow	1	2	3	4	5	6	**Broad**	**4,00**
SG2	**Individuality of Problem Solving**							
Standardized	1	2	3	4	5	6	**Individual**	**5,50**
SG3	**Competitive Posture**							
Defensive	1	2	3	4	5	6	**Offensive**	**6,00**
SG4	**Leader-Follower Behavior**							
Follower	1	2	3	4	5	6	**Leader**	**6,00**
SG5	**Value Added Activities**							
Cost Oriented Rationalization	1	2	3	4	5	6	**Customer Focused Optimisation**	**3,50**
SG6	**Dependency of Value Added Activities**							
Individual	1	2	3	4	5	6	**Networking**	**4,00**
SG7	**Deployment of Resources**							
Fixed	1	2	3	4	5	6	Flexible	**3,00**
SG8	**Performance of Resources**							
Specialized	1	2	3	4	5	6	**Generalist**	**5,00**
SG9	**Level of Product Flexibility**							
Low	1	2	3	4	5	6	**High**	**5,50**
Overall Strategic Goals score								**4,72**

Strategic goals elements' scores of Company 3 indicates that the management perceive that they offer a *broad* range of products to cover needs of different customer groups and provide individual solutions for customer problems. Perceived *competitive posture* is very offensive. *Value added* perspective indicates that the aim of all value added activities is to increase satisfaction level of customer needs. Even though this profile is not compatible with NB6 (see Table 5.54) profile, the score of SG5 item is the lowest *mid-high* score.

Level of product flexibility score refers to a *high* flexibility level. This score is compatible with SG1 and SG4 profiles. Overall strategic goals score is 4,72 and overall IFMMM strategic goals profile indicates a *mid-high* management capability profile. The strategic goals profile of Company 3 is illustrated with the radar diagram in Figure 5.37.

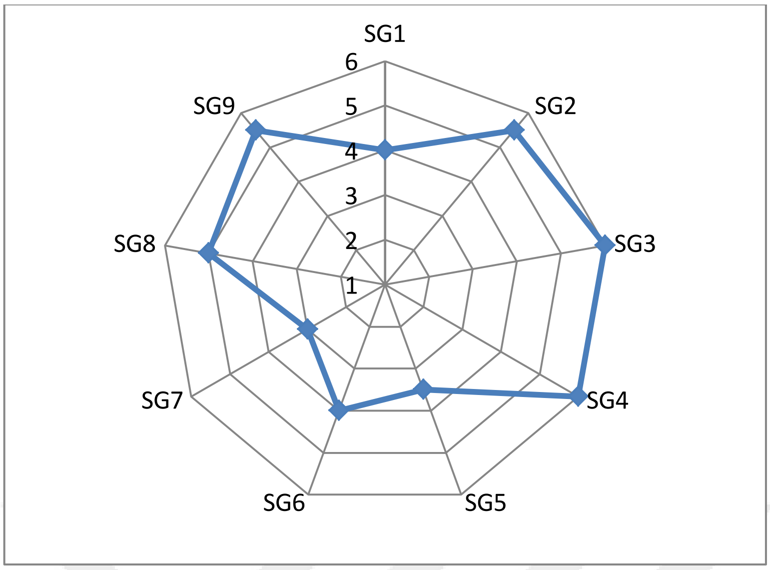

Figure 5.37 Strategic Goals Profile for Company 3

5.2.3.1.5 Strategic Structures

The IFMMM strategic structures elements' scores, based perception of the top management, are listed in Table 5.56.

Table 5.56 Strategic Structures Profile- Company 3

STRATEGIC STRUCTURES (SS)								**SCORE**
SS1	**Focus**							
Issue-Oriented	1	2	3	4	5	6	Person-Oriented	**2,66**
SS2	**Reference Points**							
Formal Rules	1	2	3	4	5	6	**Symbols**	**3,66**
SS3	**Extent of Rules**							
Efficiency Oriented	1	2	3	4	5	6	Effectiveness Oriented	**2,60**
SS4	**Time Orientation**							
Unlimited Period	1	2	3	4	5	6	Predictable Period	**3,25**
SS5	**Synergy Orientation**							
Central	1	2	3	4	5	6	**Decentral**	**3,66**
SS6	**Hierarchy**							
High	1	2	3	4	5	6	**Low**	**4,00**
SS7	**Organizational Development**							
Inwards, Towards Efficiency	1	2	3	4	5	6	Outwards, Towards Effectiveness	**2,66**
SS8	**Starting Point of Organizational Development**							
Top-Down	1	2	3	4	5	6	**Bottom-Up**	**3,66**
SS9	**Level of Expansion Flexibility**							
Low	1	2	3	4	5	6	**High**	**5,00**
Overall Strategic Structures Score								**3,46**

The scores of three profiling elements namely SS1 *focus*, SS3 *extent of rules* and SS7 *organizational development* point for a profile far from IFMMM extremes. *Focus* profile indicates that the positions within the organization structures are determined upon already defined tasks. *Rules* consist of efficiency oriented, directing single rules, instead of broad reference purpose rules. *Organizational development* scores refer to an *inwards* orientation where a high integration between the organizational units is searched. Management perceives that level of *hierarchy* within the organization is *low* and level of formalization is also low.

Level of expansion flexibility is *high*, management perceive that they can increase the production capacity easily and effectively, compared to the competitors.

Overall IFMMM strategic structures score of Company 3 is 3,46, indicating a *mid-low management capability profile*. The strategic structures profile of Company 3, based on top management perception, is illustrated with the radar diagram in Figure 5.38.

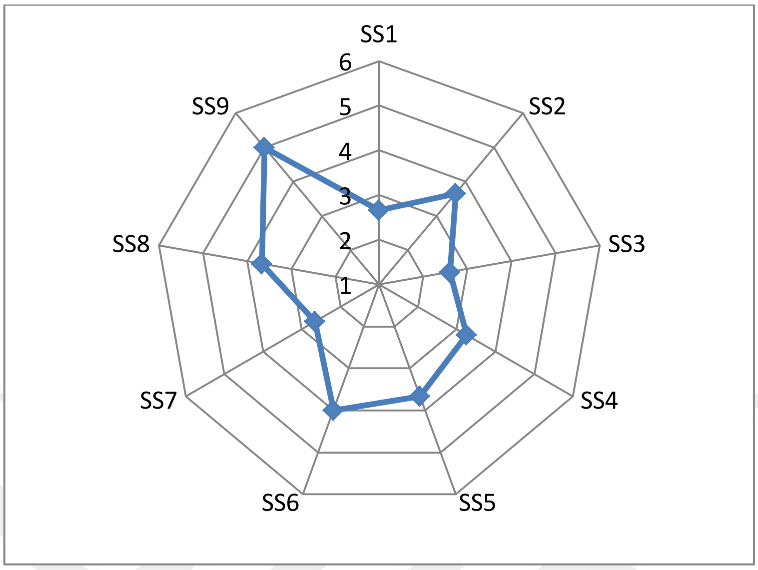

Figure 5.38 Strategic Structures Profile for Company 3

5.2.3.1.6 Strategic Behaviors

The perception of the top management regarding Strategic Behaviors, based on IFMMM is used to calculate scores for profiling elements which are listed in Table 5.57.

Table 5.57 Strategic Behaviors Profile – Company 3

STRATEGIC BEHAVIORS								**SCORE**
SB1	**Level of Participative Behavior for Management Decisions**							
Low	1	2	3	4	5	6	**High**	**3,66**
SB2	**Focus of Behavior Development**							
Individual	1	2	3	4	5	6	**Team**	**6,00**
SB3	**Desired Management Behavior**							
Risk- Averse	1	2	3	4	5	6	**Enterpreneurial**	**4,30**
SB4	**Desired Competency Potential**							
Specialist	1	2	3	4	5	6	**Generalist**	**5,00**
SB5	**Authority Development**							
Institutional- Hierarchy Based	1	2	3	4	5	6	**Communication- Specialist Based**	**6,00**
SB6	**Focus of Desired Responsibility**							
Dependence- Member Only Executes	1	2	3	4	5	6	**Delegation-Autonomous**	**4,66**
SB7	**Place of Behavior Development**							
Off the Job	1	2	3	4	5	6	**On the Job**	**5,00**
SB8	**Type of Desired Learning Behavior**							
Vertical	1	2	3	4	5	6	**Horizontal**	**4,33**
Overall strategic behavior score								**4,87**

Strategic goals elements scores' illustrates either mid-high, or high perceived management capability profile for all elements. *Desired management behavior* score indicates an *entrepreneurial* profile and is compatible with NB2 profile (see Table 5.54).

The management perceives that *level of participative behavior for management decisions* is high, which shows us that there is a comprehensive information flow on various channels. *Authority development* is based on *specialist*, competency based authority, instead of formal, hierarchy based authority. This profile is compatible with SS6 *(Hierarchy)* profile. *Focus of behavior development* profile indicates existence and importance of team-work. *Horizontal type of desired learning behavior* profile shows us that the management perceived that employees are experimenting and learning new tasks as a regular process. Overall strategic behavior score is 4,87 and refers to a *high* management capability profile. The strategic behavior profile of Company 3 is illustrated with the radar diagram in Figure 5.39.

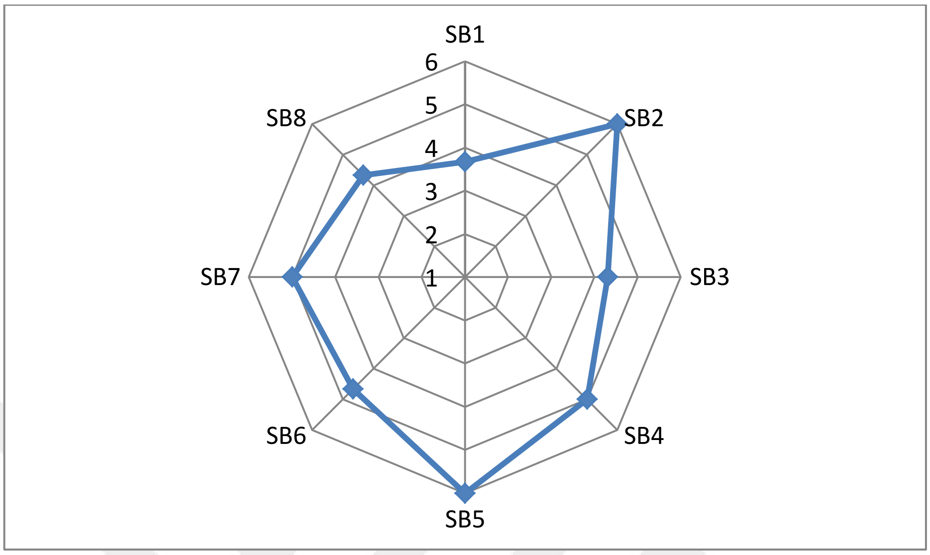

Figure 5.39 Strategic Behaviors Profile for Company 3

5.2.3.1.7 Operative Goals

The perception of the top management of Company 3 regarding operative goals elements, based on IFMMM, and is illustrated as profiling scores as listed in Table 5.58.

Table 5.58 Operative Goals Scores of Company 3

OPERATIVE GOALS (OG)								**SCORE**
OG1	**Manufacturing Cost Reduction Goal**							
Low	1	2	3	4	5	6	**High**	**6,00**
OG2	**Quality Performance Goal**							
Low	1	2	3	4	5	6	**High**	**6,00**
OG3	**Delivery Performance Goal**							
Low	1	2	3	4	5	6	**High**	**6,00**
OG4	**New Product Introduction Performance Goal**							
Low	1	2	3	4	5	6	**High**	**5,00**
OG5	**Level of Volume Flexibility**							
Low	1	2	3	4	5	6	High	**2,00**
OG6	**Level of Mix Flexibility**							
Low	1	2	3	4	5	6	**High**	**5,00**
Overall operative goals								**5,00**

The scores of operative goals profiling elements shows us that the management perceive that the emphasis on manufacturing cost reduction goal, quality performance goal, delivery performance goal and new product introduction performance goal is very high. Top management perceives that realizing the goals of manufacturing system is very significant for the company.

The management perception about level of volume flexibility refers to a low flexibility level. Additionally level of mix flexibility is high. Perception on capability of changing existing product mix is higher than the competitors'.

Overall operative goals score is 5,00 and refers to a high management capability profile with respect to IFMMM. The operative goals profile of Company 3, based on top management perception, is illustrated with the radar diagram in Figure 5.40.

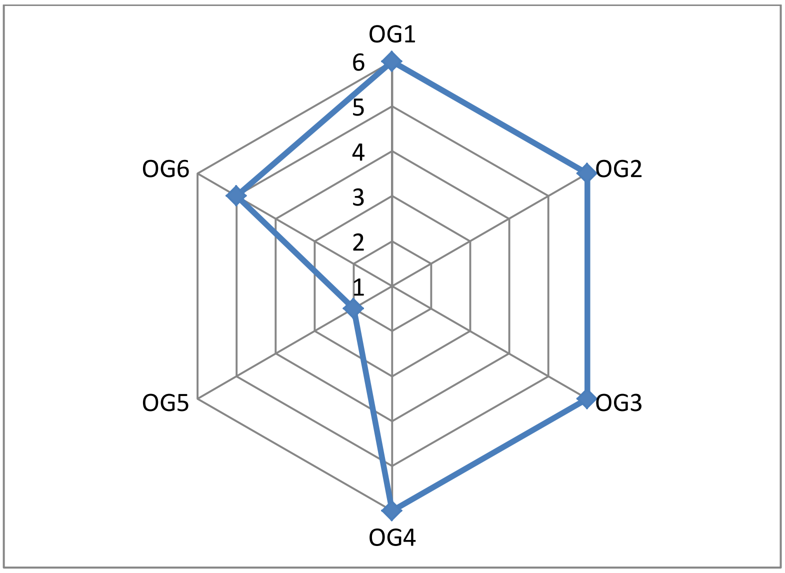

Figure 5.40 Operative Goals Profile for Company 3

5.2.3.1.8 *Operative Structures*

The perception of the top management regarding operative structures, based on IFMMM is used to calculate scores for profiling elements which are listed in Table 5.59.

Table 5.59 Operative Structures Scores- Company 3

OPERATIVE STRUCTURES (OG)								**SCORE**
OS1	**Production Systems Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**4,00**
OS2	**Infrastructural Production Support Systems Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**5,00**
OS3	**Design Applications**							
Narrow	1	2	3	4	5	6	Wide	**6,00**
OS4	**Level of Machine Flexibility**							
Low	1	2	3	4	5	6	**High**	**5,00**
OS5	**Level of Routing Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,50**
OS6	**Level of Operation Flexibility**							
Low	1	2	3	4	5	6	High	**2,00**
Overall operative structures score								**4,42**

Scores of production systems applications indicates that the production systems applications are used in the company with a *mid-high* profile. On the other hand, infrastructural production support systems are widely available within the company. Design applications usage is at very high level. The interviewee informed us that they have a separate team for product design using design applications both for visual and engineering purposes.

The management perceives that *Level of machine flexibility* and *level of routing flexibility* are all higher than the competition. However *level of operation flexibility* is *lower* than the competition. The interviewee explained that, especially the pipe and hose production is a continuous process type production and changing the sequence of the operations is not technically possible.

Overall operative structures score is 4,42; which refers to a *mid-high* management capability profile with respect to IFMMM. The operative structures profile of Company 3 is illustrated with the radar diagram in Figure 5.41.

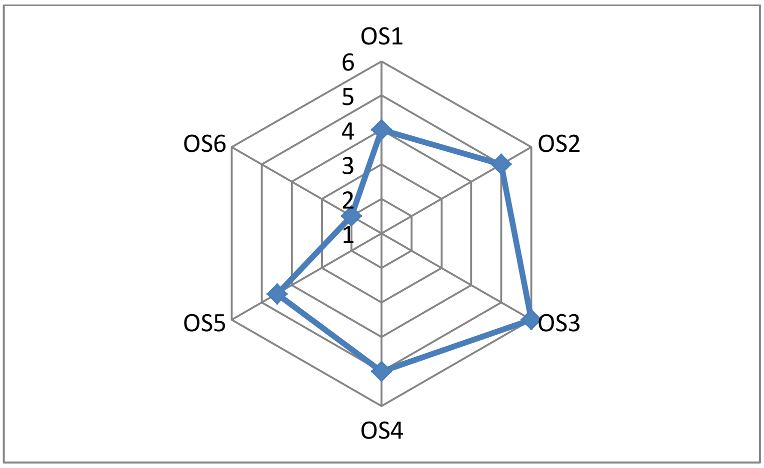

Figure 5.41 Operative Structures Profile for Company 3

5.2.3.1.9 Operative Behaviors

The IFMMM operative behaviors elements' scores, based on perception of the top management, are listed in Table 5.60.

Table 5.60 Operative Behaviors Scores – Company 3

OPERATIVE BEHAVIORS (OB)								**SCORE**
OB1	**Team Work**							
Narrow	1	2	3	4	5	6	**Wide**	**6,00**
OB2	**Decision Making Processes in Operations**							
Centralized	1	2	3	4	5	6	**Decentralized**	**3,00**
OB3	**Multi-Skilled Labor**							
Narrow	1	2	3	4	5	6	**Wide**	**5,00**
OB4	**Level of Labor Flexibility**							
Low	1	2	3	4	5	6	**High**	**5,66**
Overall operative behaviors score								**4,92**

Operative behaviors elements' scores indicate that team work is widely applied in operational level tasks and OB1 profile is compatible with SB2 (see Table 5.57) and NB8 (see Table 5.54) profiles. *Decision making process in operations* score illustrates a *centralized* decision making profile and is not compatible with SB1 (see Table 5.57) profile, but both scores are close to each other. This profile indicates a more centralized decision making at operative level than decision making at managerial level.

Level of labor flexibility is perceived as *high* profile, which indicates to the perception that the capability of the employees to perform more than one task is higher than the competitors'. OB4 profile is also compatible with SB8 (see Table 5.57) profile. Overall operative behaviors score is **4,92** and refers to a *high management capability profile* with respect to IFMMM. The operative behaviors profile of Company 3, based on top management perception, is illustrated with the radar diagram in Figure 5.42.

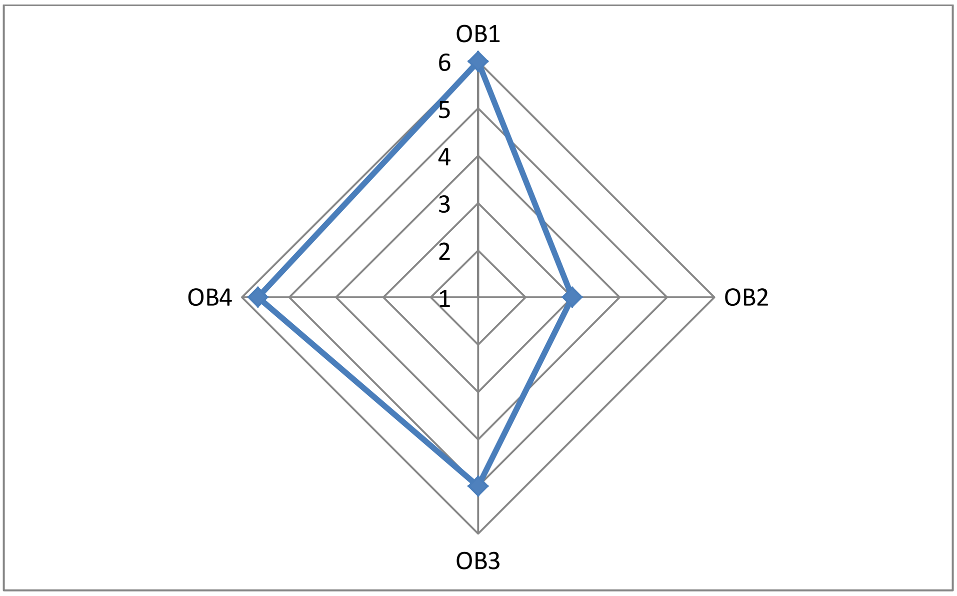

Figure 5.42 Operative Behaviors Profile for Company 3

5.2.3.2 Manufacturing Flexibility Profile-Company 3

The list of the manufacturing flexibility dimensions along with the corresponding scores of Company 3, based on top management perception is available in Table 5.61

Table 5.61 Manufacturing flexibility perception of Company 3

MANUFACTURING FLEXIBILITY (MF)		SCORE
SG9	Level of Product Flexibility	5,50
SS9	Level of Expansion Flexibility	5,00
OG5	Level of Volume Flexibility	2,00
OG6	Level of Mix Flexibility	5,00
OS4	Level of Machine Flexibility	5,00
OS5	Level of Routing Flexibility	4,50
OS6	Level of Operations Flexibility	2,00
OB4	Level of Labor Flexibility	5,66
Overall Manufacturing Flexibility Score		4,33

The overall flexibility score illustrates that the perceived manufacturing flexibility level is above the competition. Manufacturing flexibility profile of company 3, based on top management level is illustrated with the radar diagram in Figure 5.43.

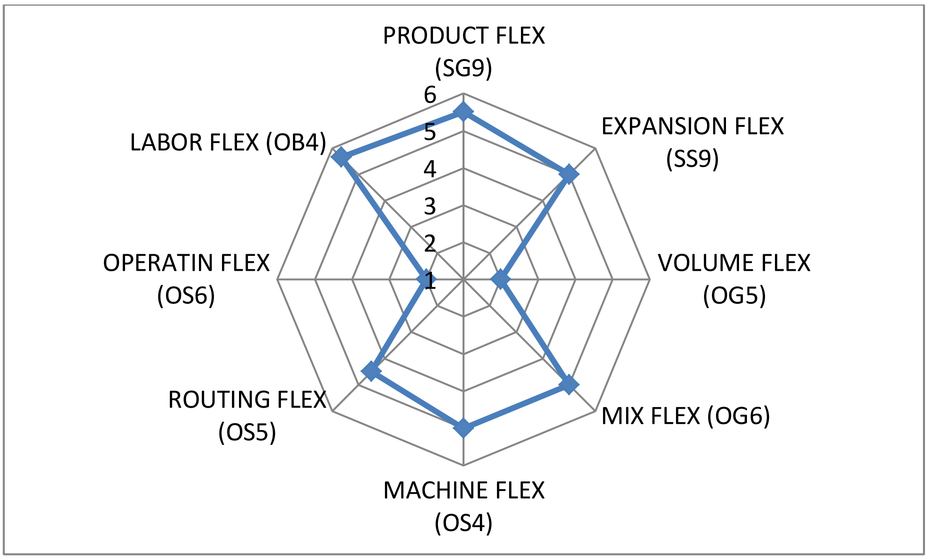

Figure 5.43 Manufacturing flexibility profile for Company 3

5.2.3.3 Market Dynamism

The perceived market dynamism scores upon management interview are illustrated in Table 5.62.

Table 5.62 Market dynamism – Company 3

MARKET DYNAMISM (MD)		SCORE
MD1	**Dynamism in Competition Intensity**	**4,00**
MD2	**Dynamism in Customer Preferences**	**4,33**
MD3	**Dynamism in Technology**	**6,00**
Overall Market dynamism		**4,78**

The perception of the management about dynamism in competition intensity is high. The management perceives the Dynamism in Technology is very high. Overall market dynamism score is 4,71 and refers to a perceived mid-high market dynamism.

5.2.3.4 Firm Performance

The perceived firm performance scores of Company 3, based on top management perception, are listed in Table 5.63.

Table 5.63 Firm performance- Company 3

FIRM PERFORMANCE (FP)		SCORE
FP1	**Financial Performance**	**5,00**
FP2	**Market Performance**	**6,00**
FP3	**Innovation Performance**	**6,00**
FP4	**Manufacturing Performance**	**4,31**
Overall Firm Performance		**5,33**

The scores of firm performance show us that, management perceives that company 3 has a better performance in terms of financial, market, innovation and manufacturing, when they compare with the competition. Management thinks that their company the leader in the industry in terms of market share and they evaluate themselves as the most innovative company in the market. Innovation performance score indicates a *high* performance level and is compatible with OG4 (Table 5.58), new product introduction performance goal score. Overall firm performance score is 5,33 and refers to a perception of *high* aggregate performance.

5.2.3.4.1 *Manufacturing performance*

Manufacturing performance perception is detailed in this section. The subconstructs of manufacturing performance with the scores from top management interview are listed in Table 5.64.

Table 5.64 Manufacturing performance perception of Company 3

MANUFACTURING PERFORMANCE (FP4)		SCORE
FP41	**Manufacturing quality performance**	**5,33**
FP42	**Manufacturing cost performance**	**4,14**
FP43	**Manufacturing flexibility performance**	**5,00**
FP44	**Delivery performance**	**2,75**
Overall Manufacturing performance		**4,31**

Overall manufacturing performance score (4,31) indicates that the management perceive that their manufacturing performance is better than the competitors'. Manufacturing quality performance refers to a high level performance. Management thinks that their quality level is above the competition. Cost and flexibility performance perception also refer to a perception of better performance than the competition. However delivery performance is perceived lower than the competitors. The management thinks that the delivery performance could be much better than the current performance. Especially in periods with high order volumes, they have difficulties in responding orders. They told us that the new factory will help them to improve delivery performance.

The comparison of the scores of manufacturing performance subconstructs with the corresponding operative goals subconstructs is listed in Table 5.65.

Table 5.65 Comparison of manufacturing performance scores and operative goals scores

MANUFACTURING PERFORMANCE (FP4)		SCORE	OPERATIVE GOALS		SCORE
FP41	**Manufacturing quality performance**	**5,33**	**OG2**	**Quality performance goal**	**6,00**
FP42	**Manufacturing cost performance**	**4,14**	**OG1**	**Manufacturing cost reduction performance goal**	**6,00**
FP44	**Delivery performance**	**2,75**	**OG3**	**Delivery performance goals**	**6,00**

The comparison of the scores of manufacturing performance with the relevant operative goals scores illustrates that, the strong emphasis on quality performance goal, cost reduction performance goal and delivery performance goal are higher than the perceived performance scores. The interviewee mentioned about their plans to improve delivery performance by increasing the capacity with the 2nd production unit.

5.2.4 Company 4 Case Analysis

Company 4 is a producer of plastic carriage containers and plastic logistics equipment. The company has been established in 2011 and has two production sites in Turkey, one is located in Marmara region and the other one is located in Mediterranean region.

Main products are Crates, Pallets and Containers, which are used for material handling and carriage purposes.

Main production methods are injection molding and assembly.

Annual turnover of the company is around 30 Million USD, as of 2014. More than 250 employees are working for the company.

Brief company information is summarized as below in Table 5.66.

Table 5.66 Company profile- Company 4

Industry	Years in Business	Subsidiary of a Group	No of Employees	No of Products	Annual Turnover (Million USD)	Single Site/ Multisite	Region
3080-Plastic Containers	0-9	No	250-499	500-999	10-49	Multi-Site	Marmara Region and Mediterranean Region

A face to face interview has been completed with the General Manager of the company. The profile of the interviewee is available in Table 5.2. The structured interview has been based on the questionnaire. Before starting the questionnaire, detailed information regarding the study and the model has been provided to the interviewee. The instrument items have been answered by the General Manager and the perceived IFMMM profile of the company has been prepared based on the answers.

5.2.4.1 IFMMM Profile Company 4

5.2.4.1.1 Normative Goals

Scores of elements of normative goals have been calculated based on the top management perception and listed in Table 5.67.

Table 5.67 Normative Goals Scores- Company 4

NORMATIVE GOALS (NG)								**SCORE**
NG1	**Internal Direction of the Mission**							
Individual Economic	1	2	3	4	5	6	**Social Economic**	**4,66**
NG2	**Time Perspective of the Goal**							
Short Term	1	2	3	4	5	6	**Long Term**	**6,00**
NG3	**Chance Perspective**							
Keep It	1	2	3	4	5	6	**Progressive**	**4,00**
NG4	**Risk Perspective**							
Disturbing	1	2	3	4	5	6	**Vulnerable**	**4,00**
NG5	**Objective Performance goals**							
Weak	1	2	3	4	5	6	**Strong**	**5,66**
NG6	**Financial Value Goals**							
Weak	1	2	3	4	5	6	**Strong**	**5,00**
NG7	**Ecological Goals**							
Weak	1	2	3	4	5	6	Strong	**3,33**
NG8	**Social Goals**							
Weak	1	2	3	4	5	6	**Strong**	**5,00**
Overall normative goals score								**4,71**

The scores of all normative goals elements refer to either a *mid-high* or a *high* IFMMM capability profile except *Ecological Goals* element. NG7, *ecological goals* score indicates a *mid-low* IFMMM capability profile. *Time perspective of the goal, Objective performance goals, financial value goals and social goals* scores refer to a high IFMMM capability profile and remaining *internal direction of the mission, chance perspective* and *risk perspective* elements have a *mid-high* IFMMM capability profile. The scores show us that the management perceives that long term plans are prepared. They try to stimulate change within the environment and perceive risk as vulnerable. The expression of objective performance, financial and social goals are all *strong,* expression of ecological goals is *weak*.

Overall normative goals score is 4,71, and refers to a *high* profile according to IFMMM. The normative goal profile of Company 4 is illustrated with the radar diagram in Figure 5.44.

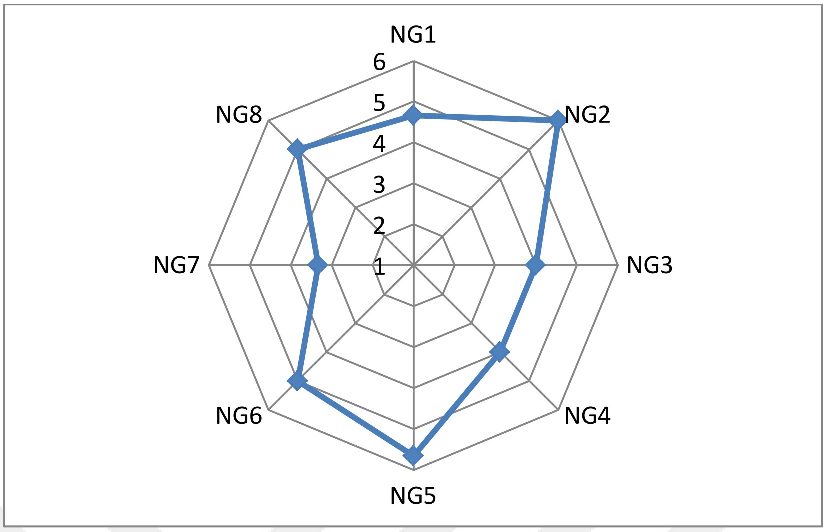

Figure 5.44 Normative Goals Profile for Company 4

5.2.4.1.2 Normative Structures

Scores of elements of normative structures have been calculated based on top management perception and listed in Table 5.68.

Table 5.68 Normative Structures Scores- Company 4

NORMATIVE STRUCTURES (NS)								SCORE
NS1	**Representation of interests in board**							
Shareholder	1	2	3	4	5	6	**Stake Holder**	**4,00**
NS2	**Art of Conflict Resolution**							
Confrontation	1	2	3	4	5	6	**Consensus**	**6,00**
NS3	**Economical, Legal and Social Structure**							
Non-differentiated	1	2	3	4	5	6	**Differentiated**	**6,00**
NS4	**Distance of Management to Real Life**							
Close-Operative	1	2	3	4	5	6	**Far-Strategic**	**4,00**
NS5	**Competence Distribution of Management**							
Single Level	1	2	3	4	5	6	**Multilevel**	**5,00**
NS6	**Division of Executives**							
Directorial/CEO	1	2	3	4	5	6	**Staff,Team**	**6,00**
NS7	**Sense of Responsibility of Top Management Team**							
Protective	1	2	3	4	5	6	**Multiplier**	**5,66**
NS8	**Rationale of Top Management Team**							
Monitoring	1	2	3	4	5	6	**Consulting**	**5,33**
Overall normative structures score								**5,25**

Normative structures scores, based on top management perception illustrates that, all IFMMM elements are associated with either *mid-high* or *high* management profile. Since the company is a member of a group of companies, NS has a *differentiated* profile. Top management team has a *consulting* role and they are not engaged with daily operations. Board composition consists of shareholders and non-shareholder members.

Overall normative structures score refers to a *high* IFMMM management capability profile. IFMMM normative structures profile of Company 4, based on top management perception, is illustrated in Figure 5.45.

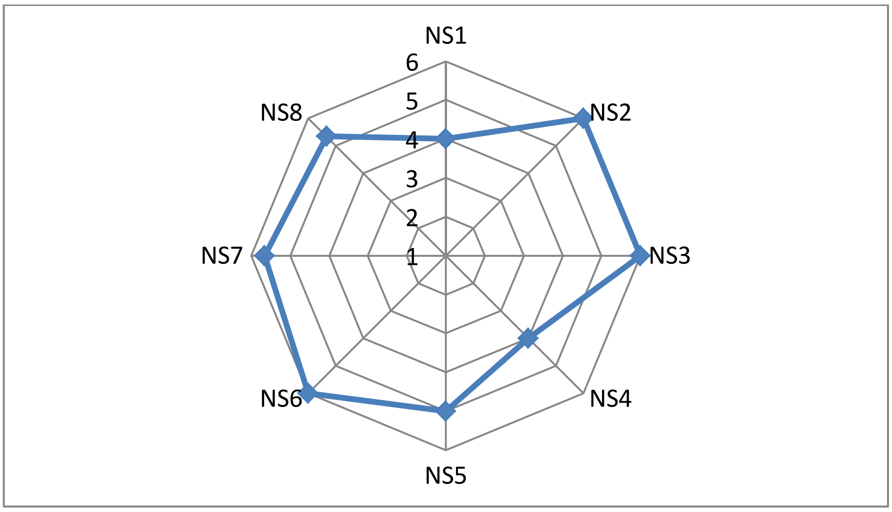

Figure 5.45 Normative Structures Profile for Company 4

5.2.4.1.3 *Normative Behaviors*

The perception of the top management regarding normative behaviors, based on IFMMM is used to calculate the scores for profiling elements which are listed in Table 5.69.

Table 5.69 Normative Behaviors Scores – Company 4

NORMATIVE BEHAVIORS (NB)								**SCORE**
NB1	**Cultural Openness**							
Inside Oriented	1	2	3	4	5	6	**Outside Oriented**	**3,66**
NB2	**Attitude Towards Change**							
Hostile	1	2	3	4	5	6	**Friendly**	**4,66**
NB3	**Cultural Orientation**							
Top	1	2	3	4	5	6	**Basis**	**5,00**
NB4	**Subcultural Differentiation**							
Uniform Value System	1	2	3	4	5	6	**Functionally differentiated**	**4,66**
NB5	**Cultural expression**							
Instrumental	1	2	3	4	5	6	**Development oriented**	**6,00**
NB6	**Value Added Orientation of Management**							
Cost Oriented	1	2	3	4	5	6	**Value oriented**	**4,00**
NB7	**Role of employees**							
Members	1	2	3	4	5	6	**Actors**	**6,00**
NB8	**Employee engagement**							
Individual, Hero	1	2	3	4	5	6	**Collective, Us**	**5,00**
Overall normative behaviors score								**4,87**

Normative behaviors scores, based on top management perception illustrates that, all IFMMM elements are associated with either *mid-high* or *high* management profile. Top management perceives that the employees have a relationship with the company with a sense of belonging and each *actor* contributes to the preservation of the whole within his/her domain. *Attitude towards change* is *friendly* which is associated with entrepreneurship. *Cultural expression* profile refers to the existence of flexible structures within the company. *Subcultural differentiation* is *functionally differentiated.* NB6 score shows us that management perceives that *value added orientation* is towards creating customer value and improving customer preferences.

Overall normative behaviors score also indicates a *high management capability* with respect to IFMMM. The normative behaviors profile of Company 4 is illustrated with the radar diagram in Figure 5.46.

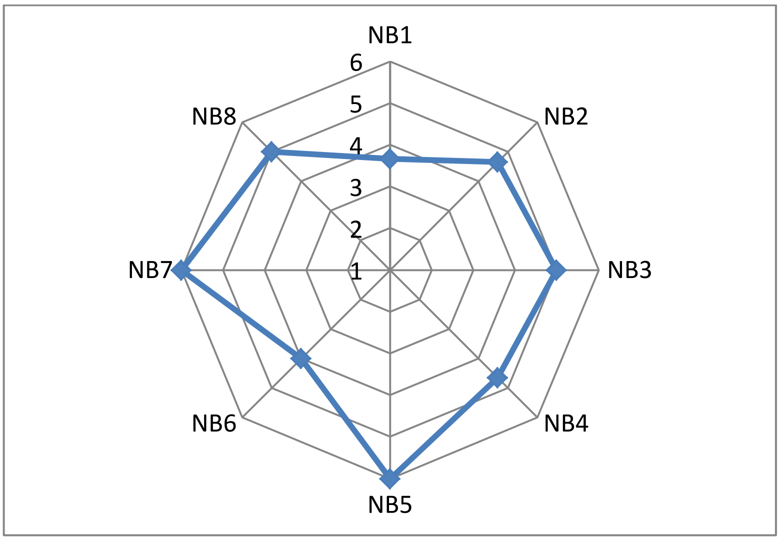

Figure 5.46 Normative Behaviors Profile for Company 4

5.2.4.1.4 Strategic Goals

The perception of the top management regarding strategic goals, based on IFMMM is used to calculate the scores for profiling elements which are listed in Table 5.70.

Table 5.70 Strategic Goals Scores- Company 4

STRATEGIC GOALS (SG)								**SCORE**
SG1	**Supply of Performance**							
Narrow	1	2	3	4	5	6	**Broad**	**5,33**
SG2	**Individuality of Problem Solving**							
Standardized	1	2	3	4	5	6	**Individual**	**6,00**
SG3	**Competitive Posture**							
Defensive	1	2	3	4	5	6	**Offensive**	**5,00**
SG4	**Leader-Follower Behavior**							
Follower	1	2	3	4	5	6	**Leader**	**4,50**
SG5	**Value Added Activities**							
Cost Oriented Rationalization	1	2	3	4	5	6	**Customer Focused Optimization**	**4,50**
SG6	**Dependency of Value Added Activities**							
Individual	1	2	3	4	5	6	**Networking**	**4,00**
SG7	**Deployment of Resources**							
Fixed	1	2	3	4	5	6	**Flexible**	**4,00**
SG8	**Performance of Resources**							
Specialized	1	2	3	4	5	6	**Generalist**	**4,00**
SG9	**Level of Product Flexibility**							
Low	1	2	3	4	5	6	**High**	**5,00**
Overall Strategic Goals score								**4,70**

Strategic goals scores, based on top management perception illustrates that, all IFMMM elements are associated with either *mid-high* or *high* management profile. Management perceives that they offer a *broad* range of products to cover needs of different customer groups and provide individual solutions for customer problems. Perceived *competitive posture* is very offensive. *Value added* perspective indicates that the aim of all value added activities is to increase satisfaction level of customer needs. This profile is compatible with NB6 (see Table 5.69) profile.

Level of product flexibility score refers to a *high* flexibility level. Management perceives that they are far better than the competitors in terms of product flexibility. This score is compatible with SG1 and SG4 profiles. Overall strategic goals score is 4,70 and refers to a *mid-high* management capability profile. The strategic goals profile of Company 4 is illustrated with the radar diagram in Figure 5.47.

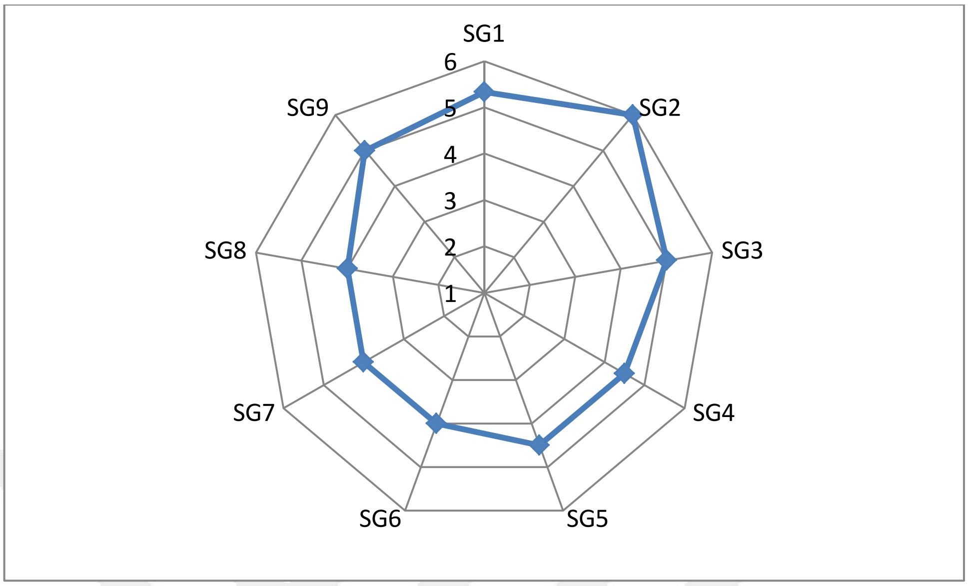

Figure 5.47 Strategic Goals Profile for Company 4

5.2.4.1.5 Strategic Structures

The IFMMM strategic structures elements' scores, based perception of the top management, are listed in Table 5.71.

Table 5.71 Strategic Structures Scores- Company 4

STRATEGIC STRUCTURES (SS)								**SCORE**
SS1	**Focus**							
Issue-Oriented	1	2	3	4	5	6	Person-Oriented	**2,66**
SS2	**Reference Points**							
Formal Rules	1	2	3	4	5	6	**Symbols**	**4,30**
SS3	**Extent of Rules**							
Efficiency Oriented	1	2	3	4	5	6	**Effectiveness Oriented**	**5,00**
SS4	**Time Orientation**							
Unlimited Period	1	2	3	4	5	6	Predictable Period	**3,25**
SS5	**Synergy Orientation**							
Central	1	2	3	4	5	6	Decentral	**3,33**
SS6	**Hierarchy**							
High	1	2	3	4	5	6	**Low**	**5,00**
SS7	**Organizational Development**							
Inwards, Towards Efficiency	1	2	3	4	5	6	Outwards, Towards Effectiveness	**1,66**
SS8	**Starting Point of Organizational Development**							
Top-Down	1	2	3	4	5	6	**Bottom-Up**	**3,66**
SS9	**Level of Expansion Flexibility**							
Low	1	2	3	4	5	6	**High**	**6,00**
Overall Strategic Structures Score								**3,87**

The scores of three profiling elements namely SS1 *focus*, SS4 *time orientation* and SS7 *organizational development* point for a *mid-low* and *low* IFMMM profile. *Focus* profile indicates that the positions within the organization structures are determined upon already defined tasks. *Time orientation* profile indicates that structures and procedures remain almost unchanged and are not subject to a time limitation but perceived as eternal. *Organizational development* scores refer to an *inwards* orientation where a high integration between the organizational units is searched. Management perceives that level of *hierarchy* within the organization and level of formalization is low. *Synergy Orientation* profile indicates that decision making is *decentralized.*

Level of expansion flexibility is *high*, management perceive that they can increase the production capacity easily and effectively.

Overall IFMMM strategic structures score of Company 4 is 3,87; which refers to a *mid-high management capability profile*. The strategic structures profile of Company 4, based on top management perception, is illustrated with the radar diagram in Figure 5.48.

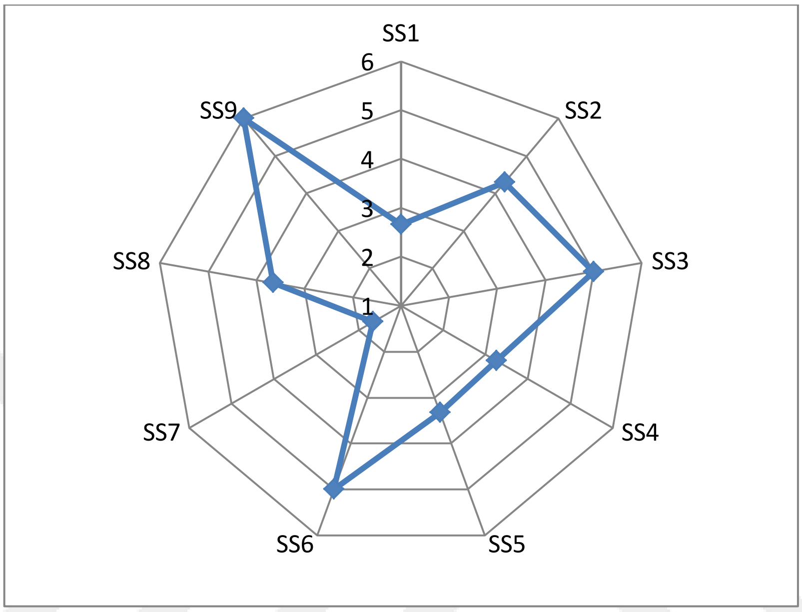

Figure 5.48 Strategic Structures Profile for Company 4

5.2.4.1.6 Strategic Behaviors

The perception of the top management regarding Strategic Behaviors, based on IFMMM is used to calculate scores for profiling elements which are listed in Table 5.72.

Table 5.72 Strategic Behaviors Scores – Company 4

STRATEGIC BEHAVIORS								**SCORE**
SB1	**Level of Participative Behavior for Management Decisions**							
Low	1	2	3	4	5	6	**High**	**4,66**
SB2	**Focus of Behavior Development**							
Individual	1	2	3	4	5	6	**Team**	**6,00**
SB3	**Desired Management Behavior**							
Risk- Averse	1	2	3	4	5	6	**Entrepreneurial**	**5,30**
SB4	**Desired Competency Potential**							
Specialist	1	2	3	4	5	6	**Generalist**	**5,00**
SB5	**Authority Development**							
Institutional- Hierarchy Based	1	2	3	4	5	6	**Communication- Specialist Based**	**5,00**
SB6	**Focus of Desired Responsibility**							
Dependence- Member Only Executes	1	2	3	4	5	6	**Delegation-Autonomous**	**4,33**
SB7	**Place of Behavior Development**							
Off the Job	1	2	3	4	5	6	**On the Job**	**5,00**
SB8	**Type of Desired Learning Behavior**							
Vertical	1	2	3	4	5	6	**Horizontal**	**4,66**
Overall strategic behavior score								**4,99**

Strategic goals elements scores' illustrates either mid-high, or high perceived management capability profile for all elements. *Desired management behavior* score indicates an *entrepreneurial* profile and is compatible with NB2 profile (see Table 5.69).

The management perceives that *level of participative behavior for management decisions* is high, which shows us that there is a comprehensive information flow on various channels. This profile is compatible with SS5 (*Synergy orientation*) profile (see Table 5.71). *Authority development* is based on *specialist,* competency based authority, instead of formal, hierarchy based authority. This profile is compatible with SS6 *(Hierarchy)* profile (see Table 5.71). *Focus of behavior development* profile indicates existence and importance of team-work. *Horizontal type of desired learning behavior* profile shows us that the management perceived that employees are experimenting and learning new tasks as a regular process. Overall strategic behavior score is 4,99 and refers to a *high* management capability profile. The strategic behavior profile of Company 4 is illustrated with the radar diagram in Figure 5.49.

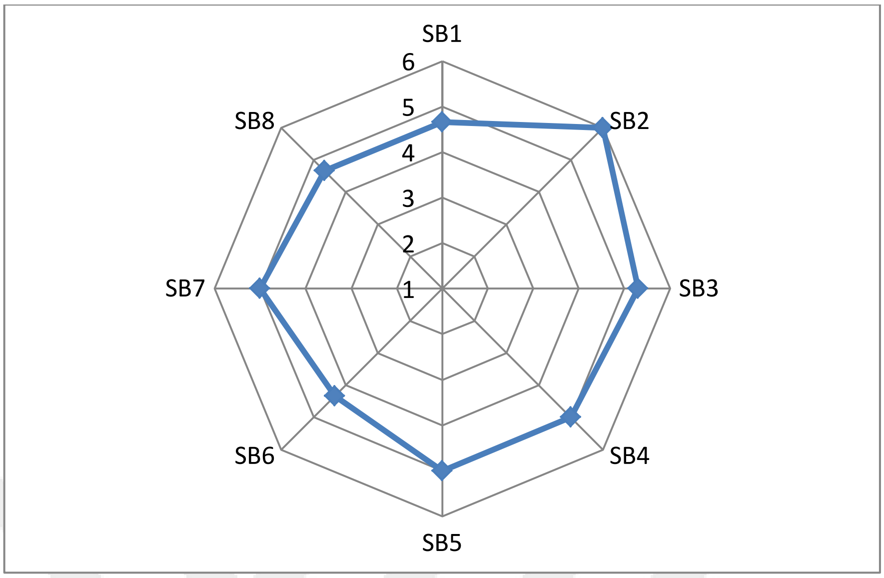

Figure 5.49 Strategic Behaviors Profile for Company 4

5.2.4.1.7 Operative Goals

The perception of the top management regarding Operational Goals elements, based on IFMMM, is illustrated as profiling scores as listed in Table 5.73.

Table 5.73 Operative Goals Scores- Company 4

OPERATIVE GOALS (OG)								**SCORE**
OG1	**Manufacturing Cost Reduction Goal**							
Low	1	2	3	4	5	6	**High**	**5,00**
OG2	**Quality Performance Goal**							
Low	1	2	3	4	5	6	**High**	**5,00**
OG3	**Delivery Performance Goal**							
Low	1	2	3	4	5	6	**High**	**5,00**
OG4	**New Product Introduction Performance Goal**							
Low	1	2	3	4	5	6	**High**	**6,00**
OG5	**Level of Volume Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,50**
OG6	**Level of Mix Flexibility**							
Low	1	2	3	4	5	6	High	**2,00**
Overall operative goals								**4,58**

The scores of operative goals profiling elements shows us that the management perceive that the emphasis on manufacturing cost reduction goal, quality performance goal, delivery performance goal and new product introduction performance goal is high.

The management perception about level of volume flexibility refers to a mid-high flexibility level which means that the management perceives that they can change the production output volume easily and effectively with respect to competition. On the other hand, level of mix flexibility is low**.** Management perceives that Company 4 cannot change the existing product mix to another in an economic and efficient manner.

Overall operative goals score is 4,58 and refers to a mid-high management capability profile with respect to IFMMM. The operative goals profile of Company 4 is illustrated with the radar diagram in Figure 5.50.

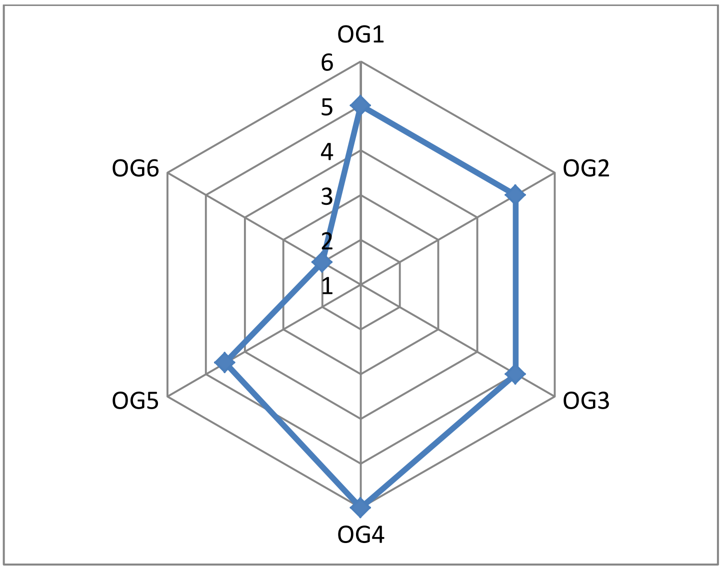

Figure 5.50 Operative Goals Profile for Company 4

5.2.4.1.8 Operative Structures

The perception of the top management regarding operative structures, based on IFMMM is used to calculate scores for profiling elements which are listed in Table 5.74.

Table 5.74 Operative Structures Scores- Company 4

OPERATIVE STRUCTURES (OG)								**SCORE**
OS1	**Production Systems Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**4,66**
OS2	**Infrastructural Production Support Systems Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**5,12**
OS3	**Design Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**6,00**
OS4	**Level of Machine Flexibility**							
Low	1	2	3	4	5	6	High	**2,75**
OS5	**Level of Routing Flexibility**							
Low	1	2	3	4	5	6	**High**	**5,00**
OS6	**Level of Operation Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,50**
Overall operative structures score								**4,67**

Scores of production systems applications indicates that the usage of production systems applications is *wide* within the company. Additionally, infrastructural production support systems are widely available within company 4. Design applications are widely used by Company 4 staff. The company has a product design team which consists of industrial designers and engineers.

The management perceives that *level of routing flexibility* and *level of operation flexibility* are higher than the competition. However, *level of machine flexibility* is *low*. The interviewee told us that the machines and tools used within the plant are not general purpose equipment. Therefore *level of machine flexibility* is lower than the competitors.

Overall operative structures score is 4,67, which refers to a *mid-high* management capability profile with respect to IFMMM. The operative structures profile of Company 4 is illustrated with the radar diagram in Figure 5.51.

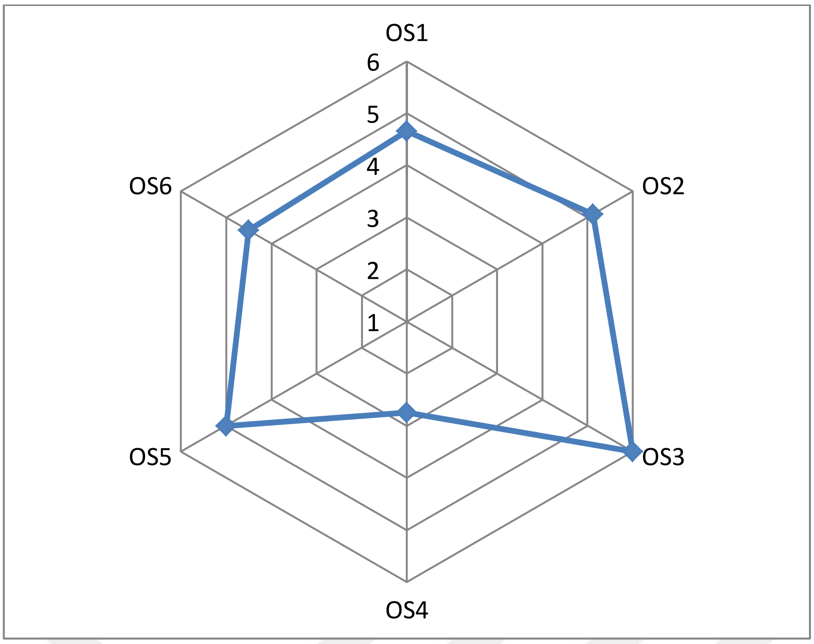

Figure 5.51 Operative Structures Profile for Company 4

5.2.4.1.9 *Operative Behaviors*

The IFMMM operative behaviors elements' scores, based on perception of the top management, are listed in Table 5.75.

Table 5.75 Operative Behaviors Scores – Company 4

OPERATIVE BEHAVIORS (OB)								**SCORE**
OB1	**Team Work**							
Narrow	1	2	3	4	5	6	**Wide**	**4,00**
OB2	**Decision Making Processes in Operations**							
Centralized	1	2	3	4	5	6	**Decentralized**	**4,00**
OB3	**Multi-Skilled Labor**							
Narrow	1	2	3	4	5	6	**Wide**	**5,00**
OB4	**Level of Labor Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,33**
Overall operative behaviors score								**4,33**

Operative behaviors elements' scores indicate that team work is widely applied in operational level tasks and OB1 profile is compatible with SB2 (see Table 5.72) and NB8 (see Table 5.69) profiles. *Decision making process in operations* score illustrates a *Decentralized* decision making profile and is compatible with SB1 (see Table 5.72) profile.

Level of labor flexibility is perceived as *mid-high* profile, which indicates to the perception that the capability of the employees to perform more than one task is higher than the competitors'. OB4 profile is also compatible with SB8 (see Table 5.72) profile. Overall operative behaviors score is **4,33** and refers to a *mid-high management capability profile* with respect to IFMMM. The operative behaviors profile of Company 4, based on top management perception, is illustrated with the radar diagram in Figure 5.52.

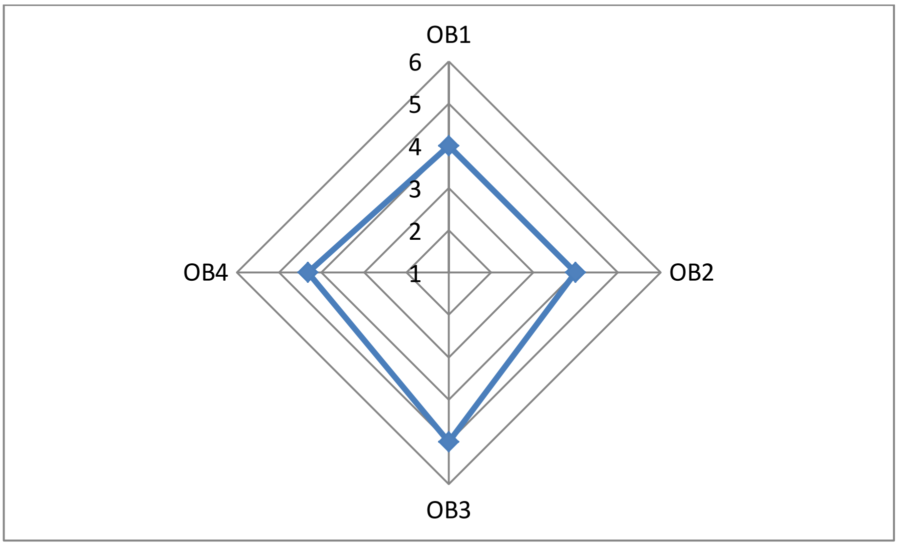

Figure 5.52 Operative Behaviors Profile for Company 4

5.2.4.2 Manufacturing Flexibility Profile-Company 4

The list of the manufacturing flexibility dimensions along with the corresponding scores of Company 4, based on top management perception is available in Table 5.76.

Table 5.76 Manufacturing flexibility perception of Company 4

MANUFACTURING FLEXIBILITY (MF)		**SCORE**
SG9	**Level of Product Flexibility**	**5,00**
SS9	**Level of Expansion Flexibility**	**6,00**
OG5	**Level of Volume Flexibility**	**4,50**
OG6	**Level of Mix Flexibility**	**2,00**
OS4	**Level of Machine Flexibility**	**2,75**
OS5	**Level of Routing Flexibility**	**5,00**
OS6	**Level of Operations Flexibility**	**4,50**
OB4	**Level of Labor Flexibility**	**4,33**
Overall Manufacturing Flexibility Score		**4,26**

The overall flexibility score illustrates that the perceived manufacturing flexibility level is above the competition. Management perception about *level of mix flexibility* and *level of machine flexibility* refers to a low level of flexibility. All other flexibility dimensions levels perceived as higher than competitors'. Manufacturing flexibility profile of company 4, based on top management level is illustrated with the radar diagram in Figure 5.53.

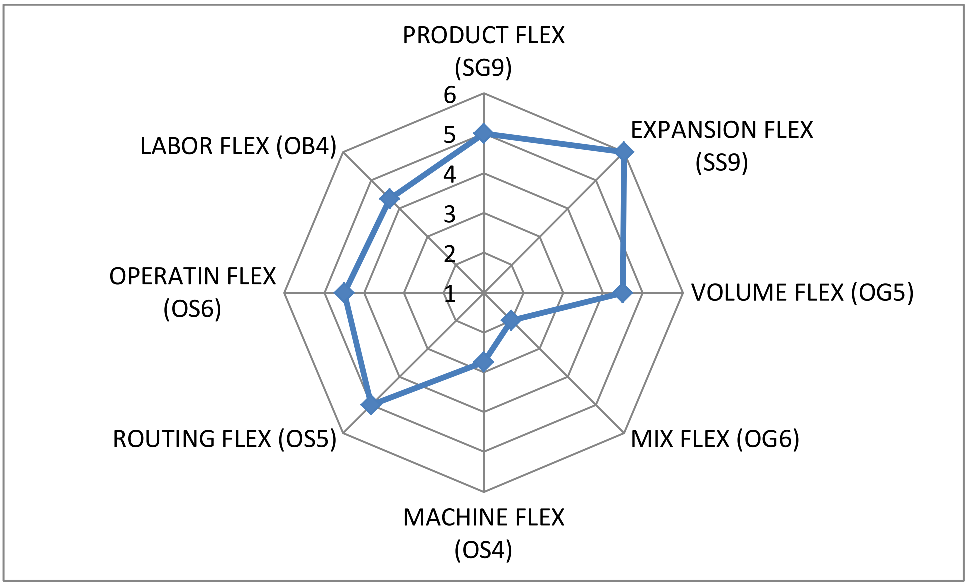

Figure 5.53 Manufacturing flexibility profile for Company 4

5.2.4.3 Market Dynamism

The perceived market dynamism scores upon management interview are illustrated in Table 5.77.

Table 5.77 Market dynamism – Company 4

MARKET DYNAMISM (MD)		SCORE
MD1	**Dynamism in Competition Intensity**	**4,66**
MD2	**Dynamism in Customer Preferences**	**4,00**
MD3	**Dynamism in Technology**	**4,00**
Overall Market dynamism		**4,22**

The perception of the management about dynamism in competition intensity is high. The management perceives the Dynamism in Technology is also high. During the interview, the interviewee informed us that especially in food logistics, plastic equipment usage is replacing wooden or metal products; therefore new players are entering to the market which increases competition intensity dynamism and customer preferences dynamism.
Overall market dynamism score is 4,22 and refers to a perceived mid-high market dynamism.

5.2.4.4 Firm Performance

The perceived firm performance scores of Company 4, based on top management perception, are listed in Table 5.78.

Table 5.78 Firm performance- Company 4

FIRM PERFORMANCE (FP)		SCORE
FP1	**Financial Performance**	**4,00**
FP2	**Market Performance**	**5,33**
FP3	**Innovation Performance**	**5,71**
FP4	**Manufacturing Performance**	**4,90**
Overall Firm Performance		**4,98**

The scores of firm performance show us that, management perceives that company 4 has a better performance in terms of financial, market, innovation and manufacturing then the competitors. Management perceives that company 4 is the leader in the industry in terms of market share and they evaluate themselves as the most innovative company in the market. Innovation performance score indicates a *high* performance level and is compatible with OG4 (Table 5.73), new product introduction performance goal score. Overall firm performance score is 4,98 and refers to a perception of *high* aggregate performance.

5.2.4.4.1 Manufacturing performance

Manufacturing performance perception is detailed in this section. The subconstructs of manufacturing performance with the scores from top management interview are listed in Table 5.79.

Table 5.79 Manufacturing performance perception of Company 4

MANUFACTURING PERFORMANCE (FP4)		**SCORE**
FP41	**Manufacturing quality performance**	**5,17**
FP42	**Manufacturing cost performance**	**4,00**
FP43	**Manufacturing flexibility performance**	**4,43**
FP44	**Delivery performance**	**6,00**
Overall Manufacturing performance		**4,90**

Overall manufacturing performance score (4,90) indicates that the management perceive that their manufacturing performance is better than the competitors'. Manufacturing quality performance refers to a high level performance. Cost, delivery and flexibility performance perception also refer to a perception of better performance than the competition.

The comparison of the scores of manufacturing performance subconstructs with the corresponding operative goals subconstructs is listed in Table 5.80.

Table 5.80 Comparison of manufacturing performance scores and operative goals scores-Company 4

MANUFACTURING PERFORMANCE (FP4)		**SCORE**	**OPERATIVE GOALS**		**SCORE**
FP41	**Manufacturing quality performance**	**5,17**	**OG2**	**Quality performance goal**	**5,00**
FP42	**Manufacturing cost performance**	**4,00**	**OG1**	**Manufacturing cost reduction performance goal**	**5,00**
FP44	**Delivery performance**	**6,00**	**OG3**	**Delivery performance goals**	**5,00**

5.2.5 Company 5 Case Analysis

Company 5 is operating in Plastic Industry, specifically producing plastic carriage cases and logistics equipment for agricultural products and established in 1975. The company has two production sites and both are located in Aegean Region. Main products are carriage cases for agricultural products. Main production methods are plastic injection molding and assembly.

Annual turnover of the company is around 12 Million USD, as of 2014. More than 50 employees are working for the company.

Brief company information is summarized as below in Table 5.81.

Table 5.81 Company profile- Company 5

Industry	Years in Business	Subsidiary of a Group	No of Employees	No of Products	Annual Turnover (Million USD)	Single Site/ Multisite	Region
3080-Plastic Containers	**30-39**	**No**	**50-99**	**100-499**	**10-49**	**Multi-Site**	**Aegean**

A face to face interview has been completed with the Deputy General Manager of the company. The profile of the interviewee is available in Table 5.2. The structured interview has been based on the questionnaire. Before starting the questionnaire, detailed information regarding the study and the model has been provided to the interviewee. The instrument items have been answered by the Deputy General Manager and the perceived IFMMM profile of the company has been prepared based on the answers.

5.2.5.1 IFMMM Profile Company 5

5.2.5.1.1 Normative Goals

Scores of elements of normative goals have been calculated based on the top management perception and listed in Table 5.82.

Table 5.82 Normative Goals Scores- Company 5

NORMATIVE GOALS (NG)								**SCORE**
NG1	**Internal Direction of the Mission**							
Individual Economic	1	2	3	4	5	6	**Social Economic**	**4,66**
NG2	**Time Perspective of the Goal**							
Short Term	1	2	3	4	5	6	**Long Term**	**6,00**
NG3	**Chance Perspective**							
Keep It	1	2	3	4	5	6	**Progressive**	**4,00**
NG4	**Risk Perspective**							
Disturbing	1	2	3	4	5	6	**Vulnerable**	**5,00**
NG5	**Objective Performance goals**							
Weak	1	2	3	4	5	6	**Strong**	**4,33**
NG6	**Financial Value Goals**							
Weak	1	2	3	4	5	6	**Strong**	**4,50**
NG7	**Ecological Goals**							
Weak	1	2	3	4	5	6	**Strong**	**5,00**
NG8	**Social Goals**							
Weak	1	2	3	4	5	6	**Strong**	**5,00**
Overall normative goals score								**4,81**

The scores of all normative goals elements, based on top management perception of company 5, refer to either a *mid-high* or a *high* IFMMM capability profile. *Internal direction of the mission, chance perspective, and time perspective of the goal, ecological goals, financial value goals and social goals* scores refer to a high IFMMM capability profile and remaining *objective performance goals* and *chance perspective* elements have a *mid-high* IFMMM capability profile. The scores show us that the management perceives that long term plans are prepared. They try to stimulate change within the environment and perceive risk as vulnerable. The expression of objective performance, financial, ecological and social goals are all *strong*.

Overall normative goals score is 4,81, and refers to a *high* profile according to IFMMM. The normative goal profile of Company 5 is illustrated with the radar diagram in Figure 5.54.

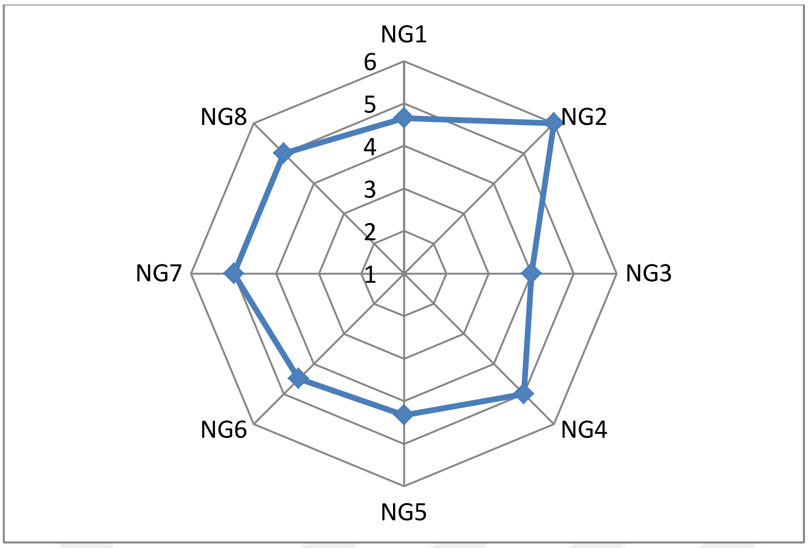

Figure 5.54 Normative Goals Profile for Company 5

5.2.5.1.2 Normative Structures

The perception of the top management regarding normative structures, based on IFMMM is used to calculate the scores of profiling elements which are listed in Table 5.83.

Table 5.83 Normative Structures Profile- Company 5

NORMATIVE STRUCTURES (NS)								**SCORE**
NS1	**Representation of interests in board**							
Shareholder	1	2	3	4	5	6	Stake Holder	**5,00**
NS2	**Art of Conflict Resolution**							
Confrontation	1	2	3	4	5	6	**Consensus**	**5,00**
NS3	**Economical, Legal and Social Structure**							
Non-differentiated	1	2	3	4	5	6	**Differentiated**	**6,00**
NS4	**Distance of Management to Real Life**							
Close-Operative	1	2	3	4	5	6	**Far-Strategic**	**5,00**
NS5	**Competence Distribution of Management**							
Single Level	1	2	3	4	5	6	Multilevel	**3,00**
NS6	**Division of Executives**							
Directorial/CEO	1	2	3	4	5	6	**Staff,Team**	**5,00**
NS7	**Sense of Responsibility of Top Management Team**							
Protective	1	2	3	4	5	6	**Multiplier**	**5,33**
NS8	**Rationale of Top Management Team**							
Monitoring	1	2	3	4	5	6	**Consulting**	**5,00**
Overall normative structures score								**4,92**

Normative structures scores, based on top management perception illustrates that, all IFMMM elements are associated with either *mid-high* or *high* management profile. Since the company is a member of a group of companies, NS has a *differentiated* profile. Top management team has a *consulting* role and they are not engaged with daily operations. Board composition consists of shareholders and non-shareholder members.

Overall normative structures score refers to a *high* IFMMM management capability profile. IFMMM normative structures profile of Company 5, based on top management perception, is illustrated in Figure 5.55

Figure 5.55 Normative Structures Profile for Company 5

5.2.5.1.3 Normative Behaviors

The perception of the top management regarding normative behaviors, based on IFMMM is used to calculate the scores for profiling elements which are listed in Table 5.84.

Table 5.84 Normative Behaviors Scores – Company 5

NORMATIVE BEHAVIORS (NB)								SCORE
NB1	**Cultural Openness**							
Inside Oriented	1	2	3	4	5	6	**Outside Oriented**	**5,00**
NB2	**Attitude Towards Change**							
Hostile	1	2	3	4	5	6	**Friendly**	**5,33**
NB3	**Cultural Orientation**							
Top	1	2	3	4	5	6	**Basis**	**5,00**
NB4	**Subcultural Differentiation**							
Uniform Value System	1	2	3	4	5	6	**Functionally differentiated**	**4,66**
NB5	**Cultural expression**							
Instrumental	1	2	3	4	5	6	Development oriented	**2,75**
NB6	**Value Added Orientation of Management**							
Cost Oriented	1	2	3	4	5	6	Value oriented	**2,00**
NB7	**Role of employees**							
Members	1	2	3	4	5	6	**Actors**	**5,00**
NB8	**Employee engagement**							
Individual, Hero	1	2	3	4	5	6	Collective, Us	**2,75**
Overall normative behaviors score								**3,84**

Cultural Openness, attitude towards change, cultural orientation, subcultural differentiation and *role of employees'* scores are associated with either *mid-high* or *high* management profile. Top management perceives that the employees have a relationship with the company with a sense of belonging and each *actor* contributes to the preservation of the whole within his/her domain. *Attitude towards change* is *friendly* which is associated with entrepreneurship. *Subcultural differentiation* is *functionally differentiated.*

On the other hand, c*ultural expression* profile refers to a tendency towards technocratic leadership behavior. NB6 score shows us that management perceives that *value added orientation* is *cost oriented* and towards realization of the investment. NB8 score indicates *an* individual *employee engagement* profile where success and failure are highly personalized.

Overall normative behaviors score also indicates a *mid-high management capability* with respect to IFMMM. The normative behaviors profile of Company 5 is illustrated with the radar diagram in Figure 5.56.

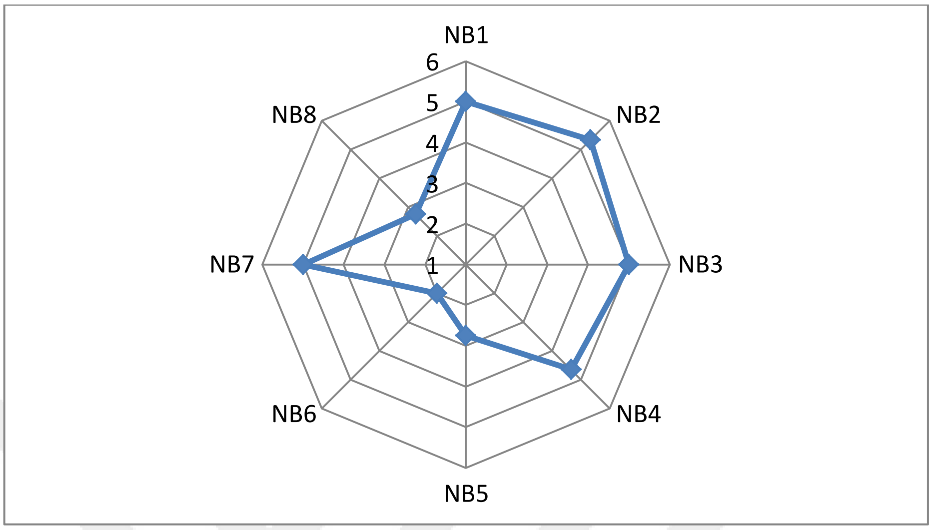

Figure 5.56 Normative Behaviors Profile for Company 5

5.2.5.1.4 Strategic Goals

The perception of the top management regarding strategic goals, based on IFMMM is used to calculate the scores for profiling elements which are listed in Table 5.85.

Table 5.85 Strategic Goals Scores- Company 5

STRATEGIC GOALS (SG)								**SCORE**
SG1	**Supply of Performance**							
Narrow	1	2	3	4	5	6	**Broad**	**4,66**
SG2	**Individuality of Problem Solving**							
Standardized	1	2	3	4	5	6	**Individual**	**4,00**
SG3	**Competitive Posture**							
Defensive	1	2	3	4	5	6	**Offensive**	**5,00**
SG4	**Leader-Follower Behavior**							
Follower	1	2	3	4	5	6	**Leader**	**5,00**
SG5	**Value Added Activities**							
Cost Oriented Rationalization	1	2	3	4	5	6	**Customer Focused Optimization**	**3,50**
SG6	**Dependency of Value Added Activities**							
Individual	1	2	3	4	5	6	**Networking**	**5,50**
SG7	**Deployment of Resources**							
Fixed	1	2	3	4	5	6	**Flexible**	**4,50**
SG8	**Performance of Resources**							
Specialized	1	2	3	4	5	6	**Generalist**	**5,50**
SG9	**Level of Product Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,50**
Overall Strategic Goals score								**4,68**

Strategic goals scores, based on top management perception illustrates that, all IFMMM elements are associated with either *mid-high* or *high* management profile. Management perceives that they offer a *broad* range of products to cover needs of different customer groups and provide individual solutions for customer problems. Perceived *competitive posture* is very offensive.

Level of product flexibility score refers to a *mid-high* flexibility level. Management perceives that they are far better than the competitors in terms of product flexibility. This score is compatible with SG1 and SG4 profiles. Overall strategic goals score is 4,68 and refers to a *mid-high* management capability profile. The strategic goals profile of Company 5 is illustrated with the radar diagram in Figure 5.57.

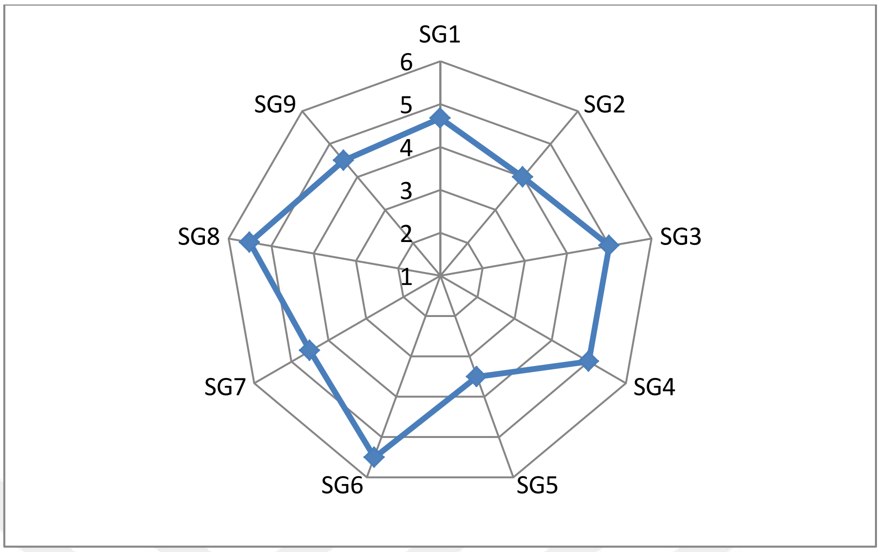

Figure 5.57 Strategic Goals Profile for Company 5

5.2.5.1.5 Strategic Structures

The IFMMM strategic structures elements' scores, based perception of the top management, are listed in Table 5.86.

Table 5.86 Strategic Structures Scores- Company 5

STRATEGIC STRUCTURES (SS)									**SCORE**
SS1	**Focus**								
Issue-Oriented	1	2	3	4	5	6	Person-Oriented		**2,66**
SS2	**Reference Points**								
Formal Rules	1	2	3	4	5	6	**Symbols**		**3,66**
SS3	**Extent of Rules**								
Efficiency Oriented	1	2	3	4	5	6	Effectiveness Oriented		**5,00**
SS4	**Time Orientation**								
Unlimited Period	1	2	3	4	5	6	**Predictable Period**		**3,50**
SS5	**Synergy Orientation**								
Central	1	2	3	4	5	6	**Decentral**		**3,66**
SS6	**Hierarchy**								
High	1	2	3	4	5	6	**Low**		**5,00**
SS7	**Organizational Development**								
Inwards, Towards Efficiency	1	2	3	4	5	6	Outwards, Towards Effectiveness		**2,00**
SS8	**Starting Point of Organizational Development**								
Top-Down	1	2	3	4	5	6	**Bottom-Up**		**4,00**
SS9	**Level of Expansion Flexibility**								
Low	1	2	3	4	5	6	**High**		**6,00**
Overall Strategic Structures Score									**3,94**

The scores of two profiling elements namely SS1 *focus* and SS7 *organizational development* point for a *mid-low* and *low* IFMMM profile, respectively. *Focus* profile indicates that the positions within the organization structures are determined upon already defined tasks. *Organizational development* scores refer to an *inwards* orientation where a high integration between the organizational units is searched. Management perceives that level of *hierarchy* within the organization and level of formalization is low. *Synergy Orientation* profile indicates that decision making is *decentralized.*

Level of expansion flexibility is *high*, management perceive that they can increase the production capacity easily and effectively.

Overall IFMMM strategic structures score of Company 5 is 3,94, which refers to a *mid-high management capability profile*. The strategic structures profile of Company 5, based on top management perception, is illustrated with the radar diagram in Figure 5.58.

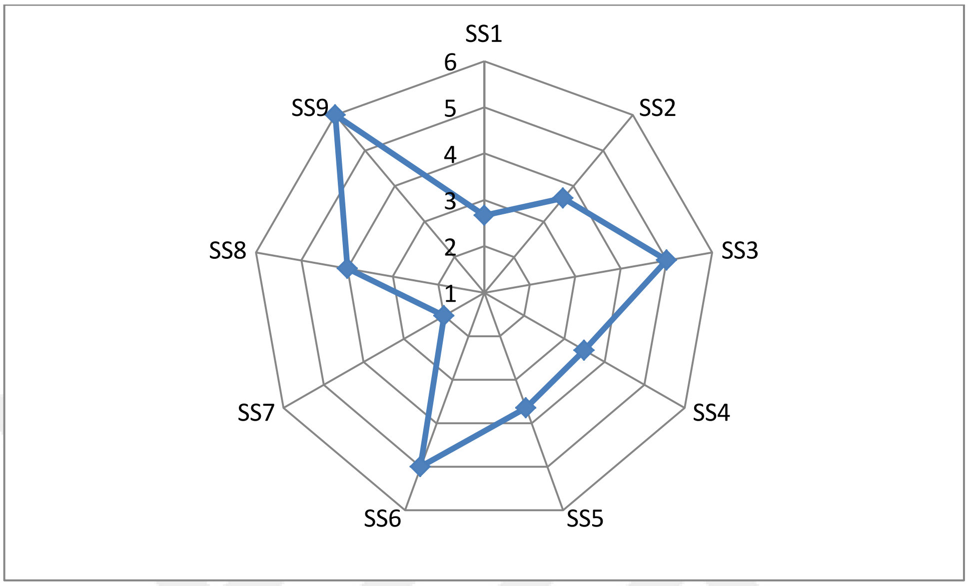

Figure 5.58 Strategic Structures Profile for Company 5

5.2.5.1.6 Strategic Behaviors

The perception of the top management regarding Strategic Behaviors, based on IFMMM is used to calculate scores for profiling elements which are listed in Table 5.87.

Table 5.87 Strategic Behaviors Scores – Company 5

STRATEGIC BEHAVIORS								**SCORE**
SB1	**Level of Participative Behavior for Management Decisions**							
Low	1	2	3	4	5	6	**High**	**4,33**
SB2	**Focus of Behavior Development**							
Individual	1	2	3	4	5	6	**Team**	**5,66**
SB3	**Desired Management Behavior**							
Risk- Averse	1	2	3	4	5	6	**Entrepreneurial**	**5,00**
SB4	**Desired Competency Potential**							
Specialist	1	2	3	4	5	6	**Generalist**	**5,33**
SB5	**Authority Development**							
Institutional- Hierarchy Based	1	2	3	4	5	6	**Communication- Specialist Based**	**5,00**
SB6	**Focus of Desired Responsibility**							
Dependence- Member Only Executes	1	2	3	4	5	6	**Delegation-Autonomous**	**4,33**
SB7	**Place of Behavior Development**							
Off the Job	1	2	3	4	5	6	**On the Job**	**5,00**
SB8	**Type of Desired Learning Behavior**							
Vertical	1	2	3	4	5	6	**Horizontal**	**4,00**
Overall strategic behavior score								**4,83**

Strategic goals elements scores' illustrates either mid-high, or high perceived management capability profile for all elements. *Desired management behavior* score indicates an *entrepreneurial* profile and is compatible with NB2 profile (see Table 5.84).

The management perceives that *level of participative behavior for management decisions* is high, which shows us that there is a comprehensive information flow on various channels. This profile is compatible with SS5 (*Synergy orientation*) profile (see Table 5.86). *Authority development* is based on *specialist,* competency based authority, instead of formal, hierarchy based authority. This profile is compatible with SS6 *(Hierarchy)* profile (see Table 5.86). *Focus of behavior development* profile indicates existence and importance of team-work. *Horizontal type of desired learning behavior* profile shows us that the management perceived that employees are experimenting and learning new tasks as a regular process. Overall strategic behavior score is 4,83 and refers to a *high* management capability profile. The strategic behavior profile of Company 5 is illustrated with the radar diagram in Figure 5.59.

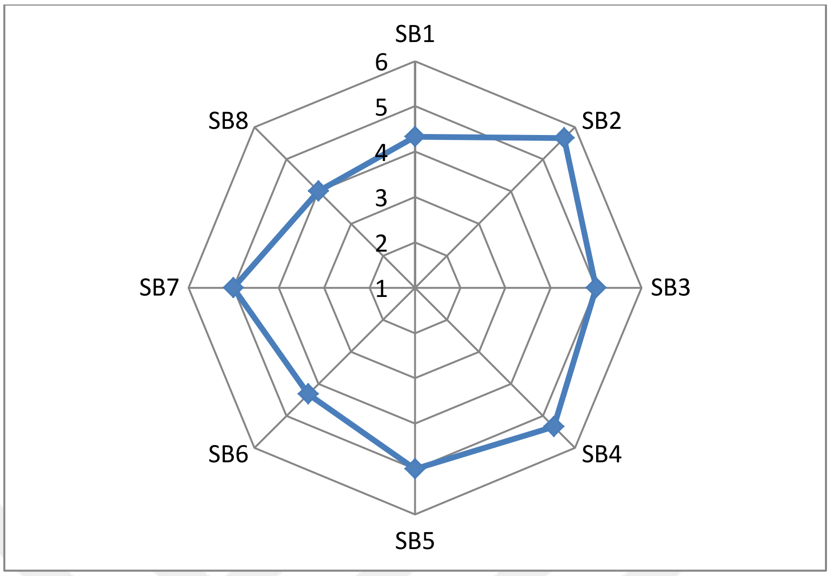

Figure 5.59 Strategic Behaviors Profile for Company 5

5.2.5.1.7 Operative Goals

The perception of the top management regarding Operative Goals elements, based on IFMMM, is illustrated as profiling scores as listed in Table 5.88.

Table 5.88 Operative Goals Scores- Company 5

OPERATIVE GOALS (OG)								**SCORE**
OG1	**Manufacturing Cost Reduction Goal**							
Low	1	2	3	4	5	6	**High**	**5,00**
OG2	**Quality Performance Goal**							
Low	1	2	3	4	5	6	**High**	**6,00**
OG3	**Delivery Performance Goal**							
Low	1	2	3	4	5	6	**High**	**5,00**
OG4	**New Product Introduction Performance Goal**							
Low	1	2	3	4	5	6	**High**	**5,66**
OG5	**Level of Volume Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,00**
OG6	**Level of Mix Flexibility**							
Low	1	2	3	4	5	6	High	**4,00**
Overall operative goals								**4,94**

The scores of operative goals profiling elements shows us that the management perceive that the emphasis on manufacturing cost reduction goal, quality performance goal, delivery performance goal and new product introduction performance goal is high.

The management perception about level of volume flexibility refers to a mid-high flexibility level which means that the management perceives that they can change the production output volume easily and effectively with respect to competition. Additionally level of mix flexibility is also high. Perception on capability of changing existing product mix is highly developed, compared with the competitors'.

Overall operative goals score is 4,94 and refers to a high management capability profile with respect to IFMMM. The operative goals profile of Company 5 is illustrated with the radar diagram in Figure 5.60.

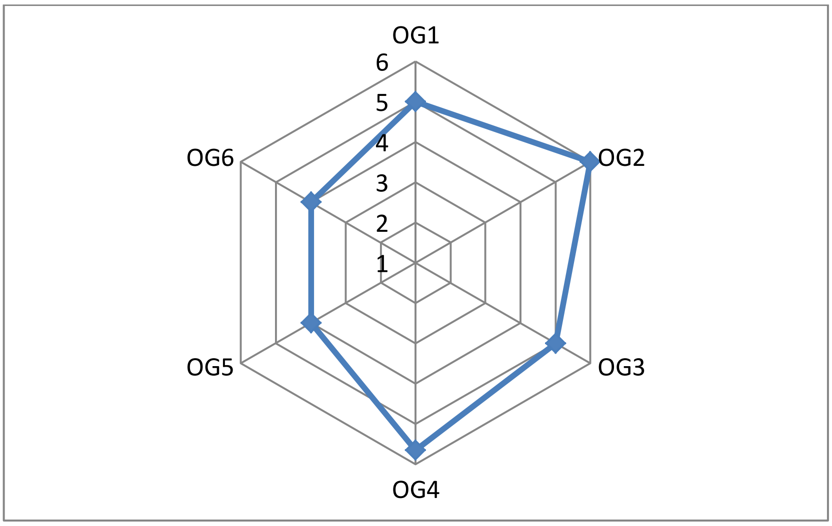

Figure 5.60 Operative Goals Profile for Company 5

5.2.5.1.8 *Operative Structures*

The perception of the top management regarding operative structures, based on IFMMM is used to calculate scores for profiling elements which are listed in Table 5.89.

Table 5.89 Operative Structures Scores- Company 5

OPERATIVE STRUCTURES (OG)								**SCORE**
OS1	**Production Systems Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**4,00**
OS2	**Infrastructural Production Support Systems Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**3,75**
OS3	**Design Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**4,00**
OS4	**Level of Machine Flexibility**							
Low	1	2	3	4	5	6	High	**2,75**
OS5	**Level of Routing Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,50**
OS6	**Level of Operation Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,00**
Overall operative structures score								**3,83**

Scores of production systems applications indicates that the usage of production systems applications is *wide* within the company. Additionally, infrastructural production support systems are available within company 5. Design applications are used by Company 5 staff.

The management perceives that *level of routing flexibility* and *level of operation flexibility* are higher than the competition. However, *level of machine flexibility* is *low*. The interviewee told us that the machines and tools used within the plant are not general purpose equipment. Therefore *level of machine flexibility* is lower than the competitors.

Overall operative structures score is 3,83, which refers to a *mid-high* management capability profile with respect to IFMMM. The operative structures profile of Company 5 is illustrated with the radar diagram in Figure 5.61.

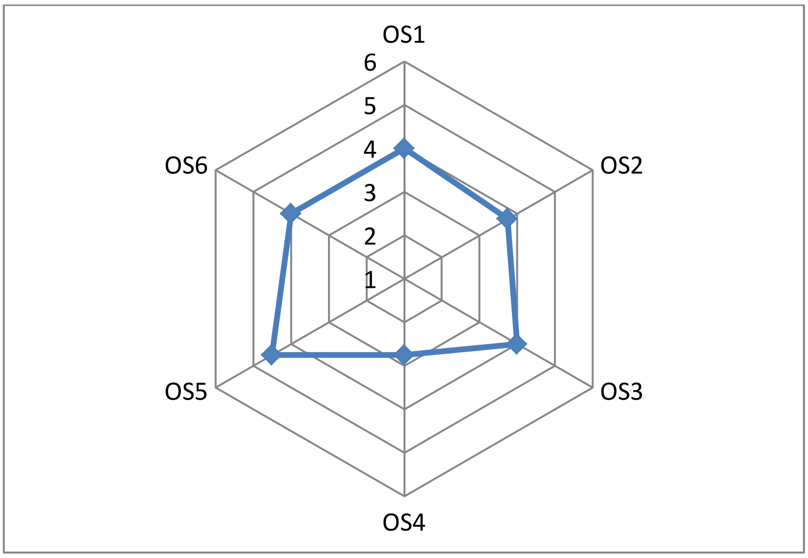

Figure 5.61 Operative Structures Profile for Company 5

5.2.5.1.9 Operative Behaviors

The IFMMM operative behaviors elements' scores, based on perception of the top management, are listed in Table 5.90.

Table 5.90 Operative Behaviors Scores – Company 5

OPERATIVE BEHAVIORS (OB)								**SCORE**
OB1	**Team Work**							
Narrow	1	2	3	4	5	6	**Wide**	**4,00**
OB2	**Decision Making Processes in Operations**							
Centralized	1	2	3	4	5	6	**Decentralized**	**4,00**
OB3	**Multi-Skilled Labor**							
Narrow	1	2	3	4	5	6	**Wide**	**5,00**
OB4	**Level of Labor Flexibility**							
Low	1	2	3	4	5	6	**High**	**5,66**
Overall operative behaviors score								**4,67**

Operative behaviors elements' scores indicate that team work is widely applied in operational level tasks and OB1 profile is compatible with SB2 (see Table 5.87) profile but not compatible with NB8 (see Table 5.84) profile. *Decision making process in operations* score illustrates a *Decentralized* decision making profile and is compatible with SB1 (see Table 5.87) profile.

Level of labor flexibility is perceived as *high*, which indicates to the perception that the capability of the employees to perform more than one task is higher than the competitors'. OB4 profile is also compatible with SB8 (see Table 5.87) profile.

Overall operative behaviors score is **4,67** and refers to a *mid-high management capability profile* with respect to IFMMM. The operative behaviors profile of Company 5, based on top management perception, is illustrated with the radar diagram in Figure 5.62.

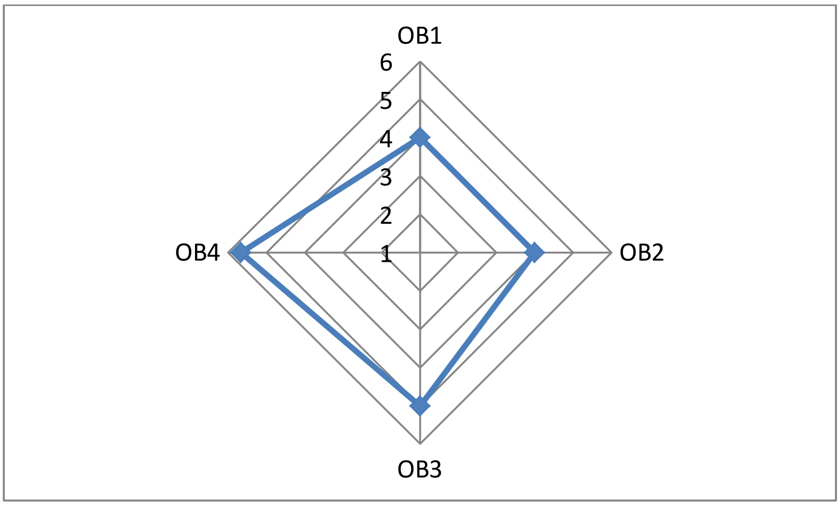

Figure 5.62 Operative Behaviors Profile for Company 5

5.2.5.2 Manufacturing Flexibility Profile-Company 5

The list of the manufacturing flexibility dimensions along with the corresponding scores of Company 5, based on top management perception is available in Table 5.91.

Table 5.91 Manufacturing flexibility perception of Company 5

MANUFACTURING FLEXIBILITY (MF)		**SCORE**
SG9	**Level of Product Flexibility**	**4,50**
SS9	**Level of Expansion Flexibility**	**6,00**
OG5	**Level of Volume Flexibility**	**4,00**
OG6	**Level of Mix Flexibility**	**4,00**
OS4	**Level of Machine Flexibility**	**2,75**
OS5	**Level of Routing Flexibility**	**4,50**
OS6	**Level of Operations Flexibility**	**4,00**
OB4	**Level of Labor Flexibility**	**5,66**
Overall Manufacturing Flexibility Score		**4,43**

The overall flexibility score illustrates that the perceived manufacturing flexibility level is above the competition. Management perception about *level of machine flexibility* refers to a low level of flexibility. All other flexibility dimensions levels perceived as higher than competitors'. Manufacturing flexibility profile of company 5, based on top management level is illustrated with the radar diagram in Figure 5.63.

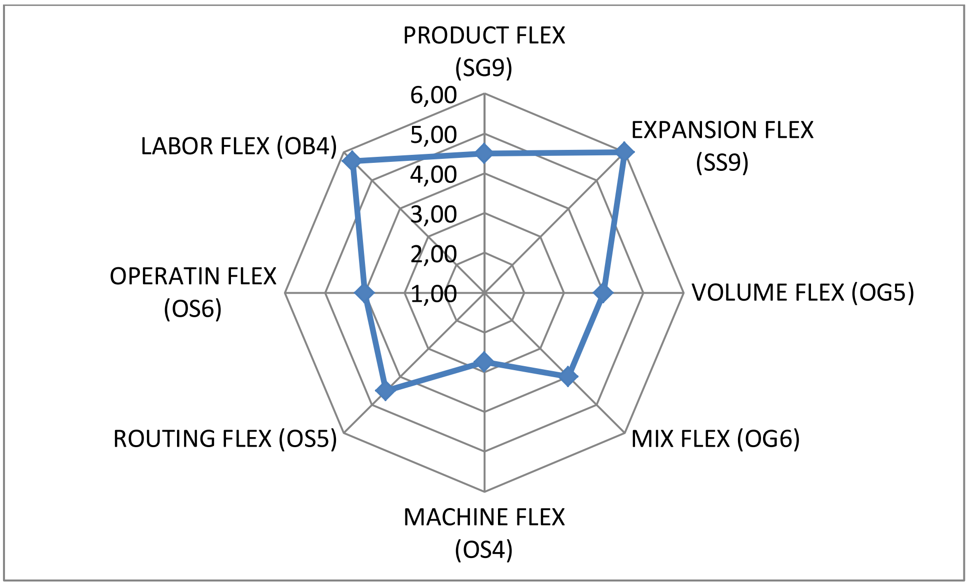

Figure 5.63 Manufacturing flexibility profile for Company 5

5.2.5.3 Market Dynamism

The perceived market dynamism scores upon top management interview for company 5 are illustrated in Table 5.92.

Table 5.92 Market dynamism – Company 5

MARKET DYNAMISM (MD)		**SCORE**
MD1	**Dynamism in Competition Intensity**	**5,00**
MD2	**Dynamism in Customer Preferences**	**4,50**
MD3	**Dynamism in Technology**	**5,00**
Overall Market dynamism		**4,84**

The perception of the management about dynamism in competition intensity is high. The management perceives the Dynamism in Technology is also high. Overall market dynamism score is 4,84 and refers to a perceived high market dynamism.

5.2.5.4 Firm Performance

The perceived firm performance scores of Company 5, based on top management perception, are listed in Table 5.93.

Table 5.93 Firm performance- Company 5

FIRM PERFORMANCE (FP)		**SCORE**
FP1	**Financial Performance**	**4,00**
FP2	**Market Performance**	**4,33**
FP3	**Innovation Performance**	**4,43**
FP4	**Manufacturing Performance**	**4,39**
Overall Firm Performance		**4,29**

The scores of firm performance show us that, management perceives that company 5 has a better performance in terms of financial, market, innovation and manufacturing then the competitors. Innovation performance score indicates a *high* performance level and is compatible with OG4 (Table 5.76), new product introduction performance goal score. Overall firm performance score is 4,29 and refers to a perception of *mid-high* aggregate performance.

5.2.5.4.1 Manufacturing performance

Manufacturing performance perception is detailed in this section. The subconstructs of manufacturing performance with the scores from top management interview are listed in Table 5.94.

Table 5.94 Manufacturing performance perception of Company 5

MANUFACTURING PERFORMANCE (FP4)		SCORE
FP41	Manufacturing quality performance	4,66
FP42	Manufacturing cost performance	4,33
FP43	Manufacturing flexibility performance	4,43
FP44	Delivery performance	4,14
Overall Manufacturing performance		4,39

Overall manufacturing performance score (4,14) indicates that the management perceive that their manufacturing performance is better than the competitors'. Manufacturing quality performance refers to a high level performance. Cost, delivery and flexibility performance perception also refer to a perception of better performance than the competition.

The comparison of the scores of manufacturing performance subconstructs with the corresponding operative goals subconstructs is listed in Table 5.95.

Table 5.95 Comparison of manufacturing performance scores and operative goals scores-Company 5

MANUFACTURING PERFORMANCE (FP4)		SCORE	OPERATIVE GOALS		SCORE
FP41	Manufacturing quality performance	4,66	OG2	Quality performance goal	5,00
FP42	Manufacturing cost performance	4,33	OG1	Manufacturing cost reduction performance goal	6,00
FP44	Delivery performance	4,14	OG3	Delivery performance goals	5,00

5.2.6 Company 6 Case Analysis

Company 6 is operating in Textile Industry, specifically yarning and established in 2004. The company has two production sites; both are located in Marmara Region. Main products are various blends of yarns. Main production method is spinning.

Annual turnover of the company is around 54 Million USD, as of 2014. 420 employees are working for the company.

Brief company information is summarized as below in Table 5.96.

Table 5.96 Company profile- Company 6

Industry	**Years in Business**	**Subsidiary of a Group**	**No of Employees**	**No of Products**	**Annual Turnover (Million USD)**	**Single Site/ Multisite**	**Region**
2211- Fabric Production	**10-19**	**No**	**250-499**	**1000 and More**	**50-99**	**Multi-Site**	**Marmara**

A face to face interview has been completed with the General Manager of the company. The profile of the interviewee is available in Table 5.2. The structured interview has been based on the questionnaire. Before starting the questionnaire, detailed information regarding the study and the model has been provided to the interviewee. The instrument items have been answered by the General Manager and the perceived IFMMM profile of the company has been prepared based on the answers.

5.2.6.1 IFMMM Profile Company 6

5.2.6.1.1 Normative Goals

Scores of elements of normative goals have been calculated based on the top management perception and listed in Table 5.97.

Table 5.97 Normative Goals Profile- Company 6

NORMATIVE GOALS (NG)								**SCORE**
NG1	**Internal Direction of the Mission**							
Individual Economic	1	2	3	4	5	6	**Social Economic**	**5,33**
NG2	**Time Perspective of the Goal**							
Short Term	1	2	3	4	5	6	**Long Term**	**4,00**
NG3	**Chance Perspective**							
Keep It	1	2	3	4	5	6	**Progressive**	**5,00**
NG4	**Risk Perspective**							
Disturbing	1	2	3	4	5	6	**Vulnerable**	**3,50**
NG5	**Objective Performance**							
Weak	1	2	3	4	5	6	**Strong**	**4,33**
NG6	**Financial Value Goals**							
Weak	1	2	3	4	5	6	**Strong**	**5,00**
NG7	**Ecological Goals**							
Weak	1	2	3	4	5	6	Strong	**3,00**
NG8	**Social Goals**							
Weak	1	2	3	4	5	6	**Strong**	**4,00**
Overall normative goals score								**4,27**

Internal direction of the mission score of company 6 represents a social economic profile perception which indicates that management cooperates with stakeholders while determining the goals. *Time perspective of the goal* with a long term profile perception shows us that long term planning exists in the company.

Chance perspective profile is perceived as progressive which illustrates that management is searching for new challenges in imbalance conditions. *Risk perspective* element score represents a mid-high profile closed to vulnerable profile perception, so that the management is willing to confront risk for better adaptability and innovativeness. The expression of *financial value goals and social goals* is all strong. However expression of *ecological goals* is weak.

Overall normative goals score is 4,27, representing a *mid-high* profile according to IFMMM. The normative goal profile of Company 6 is illustrated with the radar diagram in Figure 5.60.

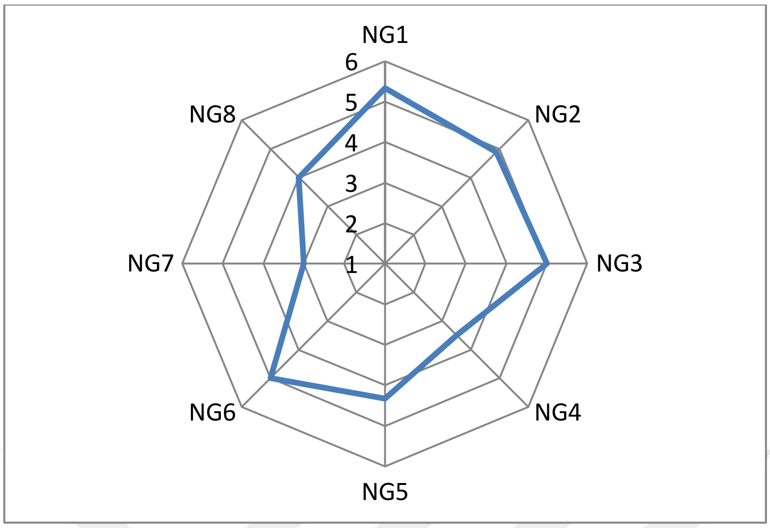

Figure 5.64 Normative Goals Profile for Company 6

5.2.6.1.2 Normative Structures

The perception of the top management regarding normative structures, based on IFMMM is used to calculate the scores of profiling elements which are listed in Table 5.98.

Table 5.98 Normative Structures Profile- Company 6

NORMATIVE STRUCTURES (NS)									**SCORE**
NS1	**Representation of interests in board**								
Shareholder	1	2	3	4	5	6	Stake Holder		**2,00**
NS2	**Art of Conflict Resolution**								
Confrontation	1	2	3	4	5	6	Consensus		**2,67**
NS3	**Economical, Legal and Social Structure**								
Non-differentiated	1	2	3	4	5	6	**Differentiated**		**5,00**
NS4	**Distance of Management to Real Life**								
Close-Operative	1	2	3	4	5	6	Far-Strategic		**2,00**
NS5	**Competence Distribution of Management**								
Single Level	1	2	3	4	5	6	**Multilevel**		**5,00**
NS6	**Division of Executives**								
Directorial/CEO	1	2	3	4	5	6	**Staff,Team**		**5,00**
NS7	**Sense of Responsibility of Top Management Team**								
Protective	1	2	3	4	5	6	**Multiplier**		**4,33**
NS8	**Rationale of Top Management Team**								
Monitoring	1	2	3	4	5	6	**Consulting**		**4,67**
Overall normative structures score									**3,83**

Since the board is composed of only shareholders, the profile of *representation of interests in board* is *shareholder*. *Distance of management to real life* has a score of 2,00 (low capability profile) indicates that top managers are close to the operative daily activities. However NS8, *rationale of top management* score represents a *consulting* profile. *Art of conflict resolution* profile is *confrontation*. All of the remaining elements have a *high* or *mid-high capability* profile with respect to the IFMMM ideal.

Overall normative structures score (3,83) indicates a *mid-high management capability profile* based on perception of the top management. The normative structures profile of Company 6 is illustrated with the radar diagram in Figure 5.65.

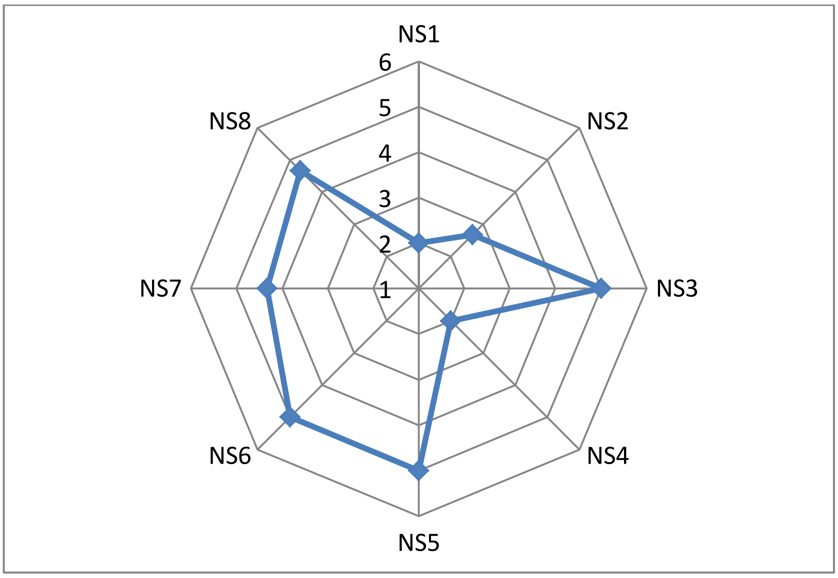

Figure 5.65 Normative Structures Profile for Company 6

5.2.6.1.3 Normative Behaviors

The perception of the top management regarding normative behaviors, based on IFMMM is used to calculate the scores for profiling elements which are listed in Table 5.99.

Table 5.99 Normative Behaviors Scores – Company 6

NORMATIVE BEHAVIORS (NB)								**SCORE**
NB1	**Cultural Openness**							
Inside Oriented	1	2	3	4	5	6	**Outside Oriented**	**4,67**
NB2	**Attitude Towards Change**							
Hostile	1	2	3	4	5	6	**Friendly**	**5,00**
NB3	**Cultural Orientation**							
Top	1	2	3	4	5	6	Basis	**3,00**
NB4	**Subcultural Differentiation**							
Uniform Value System	1	2	3	4	5	6	Functionally differentiated	**2,67**
NB5	**Cultural expression**							
Instrumental	1	2	3	4	5	6	**Development oriented**	**5,83**
NB6	**Value Added Orientation of Management**							
Cost Oriented	1	2	3	4	5	6	Value oriented	**1,75**
NB7	**Role of employees**							
Members	1	2	3	4	5	6	**Actors**	**4,00**
NB8	**Employee engagement**							
Individual, Hero	1	2	3	4	5	6	Collective, Us	**2,75**
Overall normative behaviors score								**3,71**

Cultural Openness profile indicates that company 6 is capable to perceive environmental changes at all levels and take them into account for strategy formulation. Management of company 6 perceives change as friendly. . NB3 score refers to a *basis cultural orientation* of the management where subcultural differences are eliminated. NB6 profile indicates that focus of management is on minimizing costs with creating *economies of scale,* where IFMMM ideally propose a benefit-oriented profile focusing on value creation for customers. Top management perceives that the employees have a relationship with the company with a sense of belonging and each *actor* contributes to the preservation of the whole within his/her domain. NB8 score indicates *an* individual *employee engagement* profile where success and failure are highly personalized.

Overall normative behaviors score also indicates a *mid-high management capability* with respect to IFMMM. The normative behaviors profile of Company 6 is illustrated with the radar diagram in Figure 5.62.

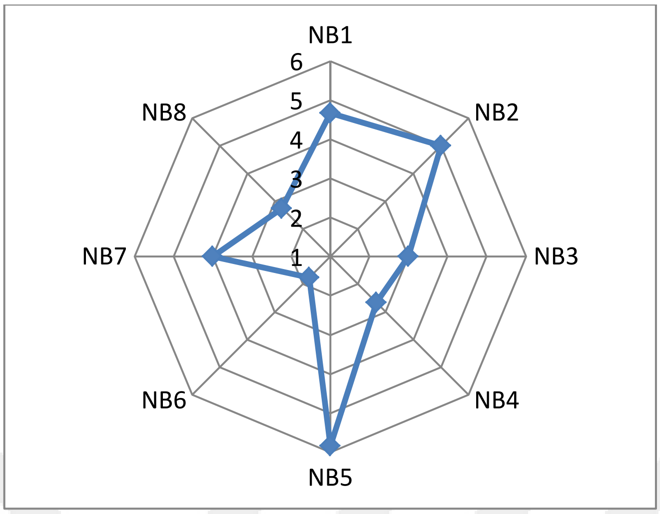

Figure 5.66 Normative Behaviors Profile for Company 6

5.2.6.1.4 Strategic Goals

The perception of the top management regarding strategic goals, based on IFMMM is used to calculate the scores for profiling elements which are listed in Table 5.100.

Table 5.100 Strategic Goals Profile- Company 6

STRATEGIC GOALS (SG)								**SCORE**
SG1	**Supply of Performance**							
Narrow	1	2	3	4	5	6	**Broad**	**5,33**
SG2	**Individuality of Problem Solving**							
Standardized	1	2	3	4	5	6	**Individual**	**4,50**
SG3	**Competitive Posture**							
Defensive	1	2	3	4	5	6	**Offensive**	**5,00**
SG4	**Leader-Follower Behavior**							
Follower	1	2	3	4	5	6	**Leader**	**4,50**
SG5	**Value Added Activities**							
Cost Oriented Rationalization	1	2	3	4	5	6	Customer Focused Optimisation	**2,50**
SG6	**Dependency of Value Added Activities**							
Individual	1	2	3	4	5	6	**Networking**	**3,50**
SG7	**Deployment of Resources**							
Fixed	1	2	3	4	5	6	**Flexible**	**5,00**
SG8	**Performance of Resources**							
Specialized	1	2	3	4	5	6	**Generalist**	**4,50**
SG9	**Level of Product Flexibility**							
Low	1	2	3	4	5	6	High	**2,50**
Overall Strategic Goals score								**4,15**

Scores of *value added activities* element represents a *low* management capability profile within IFMMM, which indicates a *cost reduction* perspective in evaluation of all value added activities. This profile is compatible with NB6 (Value added orientation of management) profile, which is cost oriented.

SG1 (supply of performance) profile illustrates that the management perceives that they try to serve a wide range of products for all possible customer. Score of SG4 (leader follower behavior), shows us that the management has a very strong perception about their leadership in the market in terms of innovation. SG9 *(Level of product flexibility)* score refers to a *low* level of product flexibility. The management thinks that the competitors in international arena are much faster in introducing new products to the market.

Overall strategic goals score is 4,15 and overall IFMMM strategic goals profile indicates a *mid-high* management capability profile. The strategic goals profile of Company 6 is illustrated with the radar diagram in Figure 5.67.

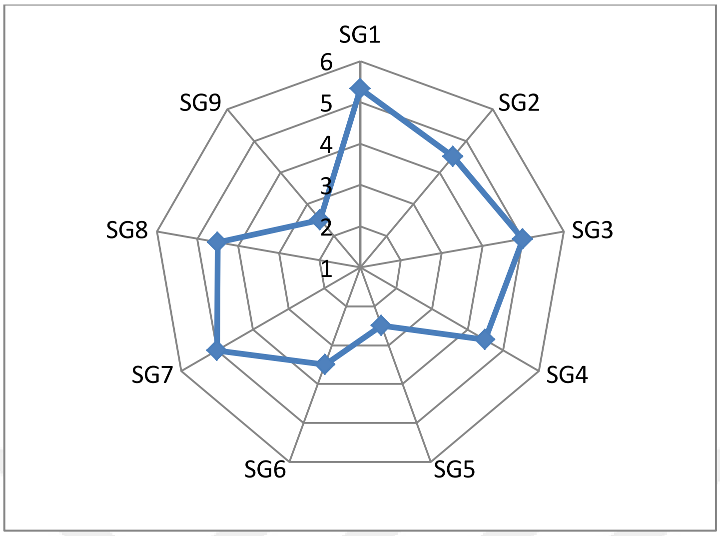

Figure 5.67 Strategic Goals Profile for Company 6

5.2.6.1.5 Strategic Structures

The IFMMM strategic structures elements' scores, based perception of the top management, are listed in Table 5.101.

Table 5.101 Strategic Structures Scores- Company 6

STRATEGIC STRUCTURES (SS)								**SCORE**
SS1	**Focus**							
Issue-Oriented	1	2	3	4	5	6	Person-Oriented	**2,67**
SS2	**Reference Points**							
Formal Rules	1	2	3	4	5	6	Symbols	**3,00**
SS3	**Extent of Rules**							
Efficiency Oriented	1	2	3	4	5	6	**Effectiveness Oriented**	**4,67**
SS4	**Time Orientation**							
Unlimited Period	1	2	3	4	5	6	Predictable Period	**2,50**
SS5	**Synergy Orientation**							
Central	1	2	3	4	5	6	Decentral	**3,33**
SS6	**Hierarchy**							
High	1	2	3	4	5	6	**Low**	**4,00**
SS7	**Organizational Development**							
Inwards, Towards Efficiency	1	2	3	4	5	6	Outwards, Towards Effectiveness	**2,00**
SS8	**Starting Point of Organizational Development**							
Top-Down	1	2	3	4	5	6	Bottom-Up	**3,00**
SS9	**Level of Expansion Flexibility**							
Low	1	2	3	4	5	6	**High**	**5,00**
Overall Strategic Structures Score								**3,35**

Focus profile indicates that the positions within the organization structures are determined upon already defined tasks. *Time orientation* profile indicates that structures and procedures remain almost unchanged and are not subject to a time limitation but perceived as eternal. *Organizational development* scores refer to an *inwards* orientation where a high integration between the organizational units is searched. Management perceives that level of *hierarchy* within the organization and level of formalization is low. *Synergy orientation* profile indicates that decision making is *centralized.* SS8 score indicates that organizational development is structured *top to bottom.*

Level of expansion flexibility is *high,* management perceive that they can increase the production capacity easily and effectively.

Overall IFMMM strategic structures score of Company 6 is 3,35; which refers to a *mid-low management capability profile*. The strategic structures profile of Company 6, based on top management perception, is illustrated with the radar diagram in Figure 5.68.

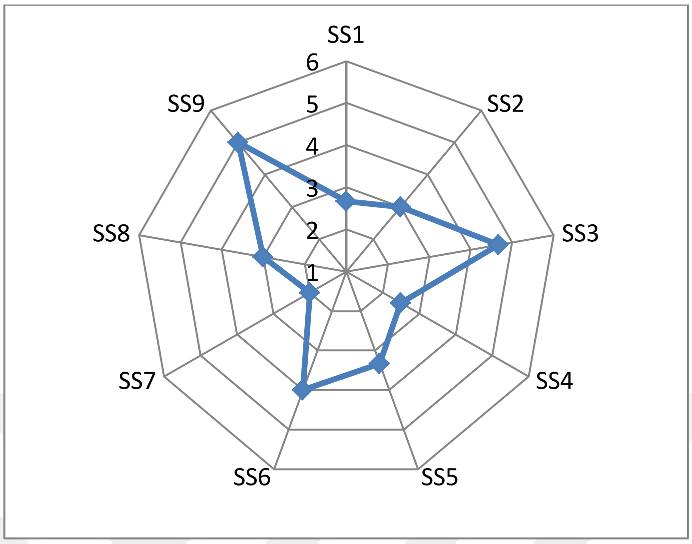

Figure 5.68 Strategic Structures Profile for Company 6

5.2.6.1.6 *Strategic Behaviors*

The perception of the top management regarding Strategic Behaviors, based on IFMMM is used to calculate scores for profiling elements which are listed in Table 5.102.

Table 5.102 Strategic Behaviors Scores – Company 6

STRATEGIC BEHAVIORS								**SCORE**
SB1	**Level of Participative Behavior for Management Decisions**							
Low	1	2	3	4	5	6	**High**	**3,67**
SB2	**Focus of Behavior Development**							
Individual	1	2	3	4	5	6	Team	**3,00**
SB3	**Desired Management Behavior**							
Risk- Averse	1	2	3	4	5	6	**Entrepreneurial**	**3,67**
SB4	**Desired Competency Potential**							
Specialist	1	2	3	4	5	6	**Generalist**	**4,33**
SB5	**Authority Development**							
Institutional- Hierarchy Based	1	2	3	4	5	6	Communication- Specialist Based	**3,00**
SB6	**Focus of Desired Responsibility**							
Dependence- Member Only Executes	1	2	3	4	5	6	**Delegation-Autonomous**	**4,33**
SB7	**Place of Behavior Development**							
Off the Job	1	2	3	4	5	6	**On the Job**	**5,00**
SB8	**Type of Desired Learning Behavior**							
Vertical	1	2	3	4	5	6	**Horizontal**	**4,33**
Overall strategic behavior score								**3,92**

Desired management behavior score indicates an *entrepreneurial* profile and is compatible with NB2 profile (see Table 5.99). SB2 *focus of behavior development* profile is *individual* and is compatible with NB8 (see Table 5.99) profile.

The management perceives that *level of participative behavior for management decisions* is mid high, which shows us that there is a comprehensive information flow on various channels. *Authority development* is based on formal positions and hierarchy based authority. This profile is not compatible with SS6 *(Hierarchy)* profile (see Table 5.101). *Focus of behavior development* profile indicates existence and importance of team-work. *Horizontal type of desired learning behavior* profile shows us that the management perceived that employees are experimenting and learning new tasks as a regular process. Overall strategic behavior score is 3,92 and refers to a *mid-high* management capability profile. The strategic behavior profile of Company 6 is illustrated with the radar diagram in Figure 5.69.

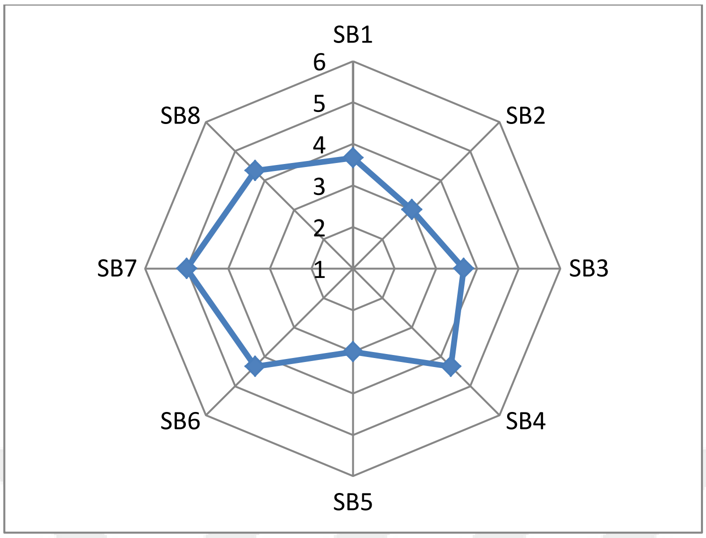

Figure 5.69 Strategic Behaviors Profile for Company 6

5.2.6.1.7 Operative Goals

The perception of the top management regarding Operative Goals elements, based on IFMMM, is illustrated as profiling scores as listed in Table 5.103.

Table 5.103 Operative Goals Scores- Company 6

OPERATIVE GOALS (OG)									**SCORE**
OG1	**Manufacturing Cost Reduction Goal**								
Low	1	2	3	4	5	6	**High**		**6,00**
OG2	**Quality Performance Goal**								
Low	1	2	3	4	5	6	**High**		**6,00**
OG3	**Delivery Performance Goal**								
Low	1	2	3	4	5	6	**High**		**6,00**
OG4	**New Product Introduction Performance Goal**								
Low	1	2	3	4	5	6	**High**		**5,00**
OG5	**Level of Volume Flexibility**								
Low	1	2	3	4	5	6	**High**		**4,67**
OG6	**Level of Mix Flexibility**								
Low	1	2	3	4	5	6	**High**		**3,50**
Overall operative goals									**5,19**

The scores of operative goals profiling elements shows us that the management perceive that the emphasis on manufacturing cost reduction goal, quality performance goal, delivery performance goal and new product introduction performance goal is high.

The management perception about level of volume flexibility refers to a mid-high flexibility level which means that the management perceives that they can change the production output volume easily and effectively with respect to competition. Additionally level of mix flexibility is also high.

Overall operative goals score is 5,19 and refers to a high management capability profile with respect to IFMMM. The operative goals profile of Company 6 is illustrated with the radar diagram in Figure 5.70.

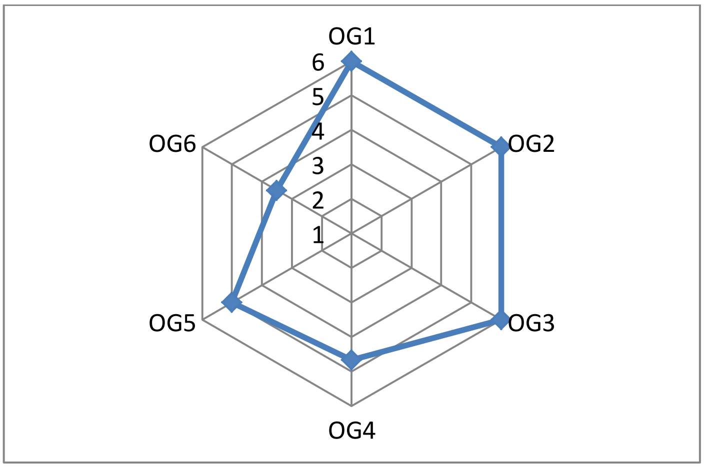

Figure 5.70 Operative Goals Profile for Company 6

5.2.6.1.8 Operative Structures

The perception of the top management regarding operative structures, based on IFMMM is used to calculate scores for profiling elements which are listed in Table 5.104.

Table 5.104 Operative Structures Scores- Company 6

OPERATIVE STRUCTURES (OG)								**SCORE**
OS1	**Production Systems Applications**							
Narrow	1	2	3	4	5	6	Wide	**3,00**
OS2	**Infrastructural Production Support Systems Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**3,88**
OS3	**Design Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**4,50**
OS4	**Level of Machine Flexibility**							
Low	1	2	3	4	5	6	High	**5,00**
OS5	**Level of Routing Flexibility**							
Low	1	2	3	4	5	6	**High**	**3,50**
OS6	**Level of Operation Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,50**
Overall operative structures score								**4,06**

Scores of production systems applications indicates that the usage of production systems applications is rare. Due to production methods, the company does not have widely applied advanced management technologies. Additionally, infrastructural production support systems are available within company 6. The design and product development team uses special applications for creating different blends of yarns. Therefore OS3 score indicates a *high* IFMMM profile.

The management perceives that *level of machine flexibility, level of routing flexibility* and *level of operation flexibility* are higher than the competition. Overall operative structures score is 4,06, which refers to a *mid-high* management capability profile with respect to IFMMM. The operative structures profile of Company 6 is illustrated with the radar diagram in Figure 5.71.

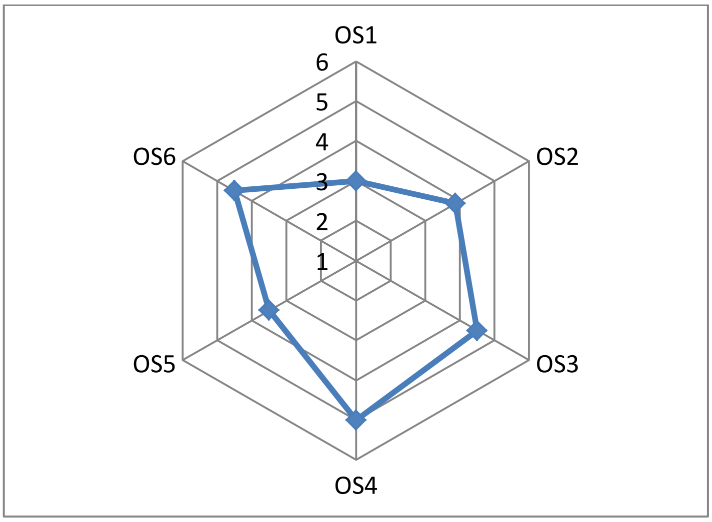

Figure 5.71 Operative Structures Profile for Company 6

5.2.6.1.9 Operative Behaviors

The IFMMM operative behaviors elements' scores, based on perception of the top management, are listed in Table 5.105.

Table 5.105 Operative Behaviors Scores – Company 6

OPERATIVE BEHAVIORS (OB)								**SCORE**
OB1	**Team Work**							
Narrow	1	2	3	4	5	6	**Wide**	**5,00**
OB2	**Decision Making Processes in Operations**							
Centralized	1	2	3	4	5	6	**Decentralized**	**5,00**
OB3	**Multi-Skilled Labor**							
Narrow	1	2	3	4	5	6	**Wide**	**4,00**
OB4	**Level of Labor Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,00**
Overall operative behaviors score								**4,50**

Operative behaviors elements' scores indicate that team work is widely applied in operational level tasks despite SB2 (see Table 5.102) profile and NB8 (see Table 5.99) profile. *Decision making process in operations* score illustrates a *Decentralized* decision making profile and is compatible with SB1 (see Table 5.102) profile.

Level of labor flexibility is perceived as *high*, which indicates to the perception that the capability of the employees to perform more than one task is higher than the competitors'. OB4 profile is also compatible with SB8 (see Table 5.102) profile.

Overall operative behaviors score is 4,50 and refers to a *mid-high management capability profile* with respect to IFMMM. The operative behaviors profile of Company 6, based on top management perception, is illustrated with the radar diagram in Figure 5.72.

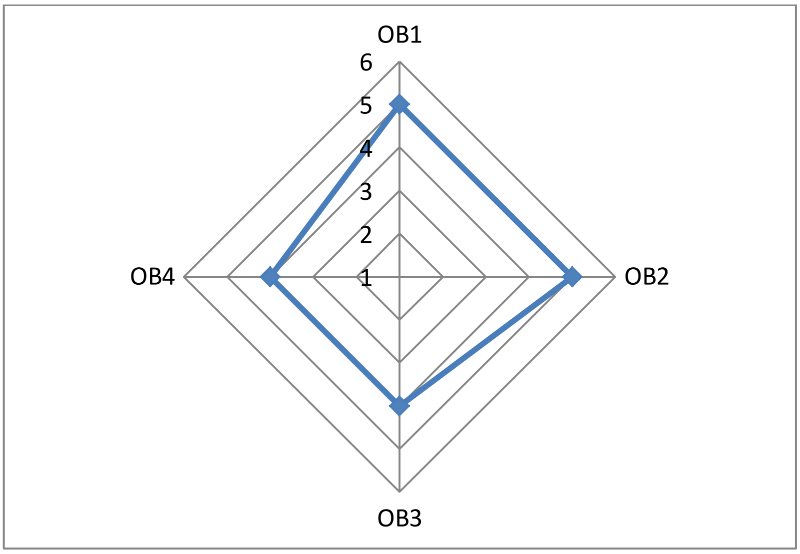

Figure 5.72 Operative Behaviors Profile for Company 6

5.2.6.2 Manufacturing Flexibility Profile-Company 6

The list of the manufacturing flexibility dimensions along with the corresponding scores of Company 6, based on top management perception is available in Table 5.106.

Table 5.106 Manufacturing flexibility perception of Company 6

MANUFACTURING FLEXIBILITY (MF)		SCORE
SG9	**Level of Product Flexibility**	**2,50**
SS9	**Level of Expansion Flexibility**	**5,00**
OG5	**Level of Volume Flexibility**	**5,00**
OG6	**Level of Mix Flexibility**	**3,50**
OS4	**Level of Machine Flexibility**	**5,00**
OS5	**Level of Routing Flexibility**	**3,50**
OS6	**Level of Operations Flexibility**	**4,50**
OB4	**Level of Labor Flexibility**	**4,00**
Overall Manufacturing Flexibility Score		**4,13**

The overall flexibility score illustrates that the perceived manufacturing flexibility level is above the competition. Management perception about *level of product flexibility* refers to a low level of flexibility. All other flexibility dimensions levels perceived as higher than competitors'. Manufacturing flexibility profile of company 6, based on top management level is illustrated with the radar diagram in Figure 5.73.

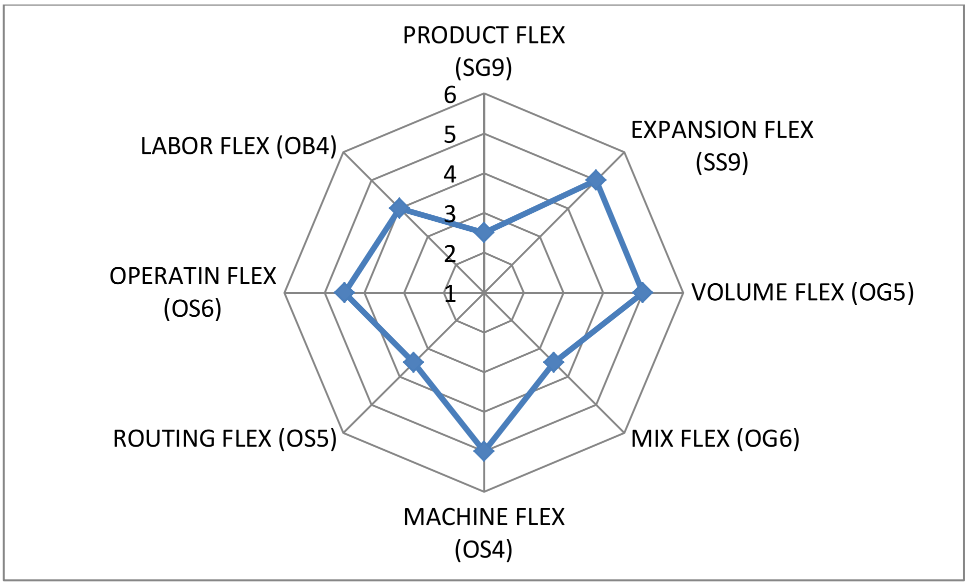

Figure 5.73 Manufacturing Flexibility Profile for Company 6

5.2.6.3 Market Dynamism

The perceived market dynamism scores upon top management interview for company 6 are illustrated in Table 5.107.

Table 5.107 Market dynamism – Company 6

MARKET DYNAMISM (MD)		**SCORE**
MD1	**Dynamism in Competition Intensity**	**6,00**
MD2	**Dynamism in Customer Preferences**	**4,50**
MD3	**Dynamism in Technology**	**3,00**
Overall Market dynamism		**4,50**

The perception of the management about dynamism in competition intensity and dynamism in customer preferences are high. On the other hand, the management perceives the Dynamism in Technology is low. Overall market dynamism score is 4,50 and refers to a perceived high market dynamism.

5.2.6.4 Firm Performance

The perceived firm performance scores of Company 6, based on top management perception, are listed in Table 5.108.

Table 5.108 Firm performance- Company 6

FIRM PERFORMANCE (FP)		**SCORE**
FP1	**Financial Performance**	**4,00**
FP2	**Market Performance**	**5,00**
FP3	**Innovation Performance**	**4,28**
FP4	**Manufacturing Performance**	**4,74**
Overall Firm Performance		**4,51**

The scores of firm performance show us that, management perceives that company 6 has a better performance in terms of financial, market, innovation and manufacturing then the competitors. Innovation performance score indicates a *high* performance level and is compatible with OG4 (Table 5.103), new product introduction performance goal score. Overall firm performance score is 4,51 and refers to a perception of *mid-high* aggregate performance.

5.2.6.4.1 Manufacturing performance

The subconstructs of manufacturing performance with the scores from top management interview are listed in Table 5.109.

Table 5.109 Manufacturing performance perception of Company 6

MANUFACTURING PERFORMANCE (FP4)		SCORE
FP41	**Manufacturing quality performance**	**5,33**
FP42	**Manufacturing cost performance**	**4,66**
FP43	**Manufacturing flexibility performance**	**4,71**
FP44	**Delivery performance**	**4,25**
Overall Manufacturing performance		**4,74**

Overall manufacturing performance score (4,74) indicates that the management perceive that their manufacturing performance is better than the competitors'. Manufacturing quality performance refers to a high level performance. Cost, delivery and flexibility performance perception also refer to a perception of better performance than the competition.

The comparison of the scores of manufacturing performance subconstructs with the corresponding operative goals subconstructs is listed in Table 5.110.

Table 5.110 Comparison of manufacturing performance scores and operative goals scores- Company 6

MANUFACTURING PERFORMANCE (FP4)		SCORE	OPERATIVE GOALS		SCORE
FP41	**Manufacturing quality performance**	**5,33**	**OG2**	**Quality performance goal**	**6,00**
FP42	**Manufacturing cost performance**	**4,66**	**OG1**	**Manufacturing cost reduction performance goal**	**6,00**
FP44	**Delivery performance**	**4,25**	**OG3**	**Delivery performance goals**	**6,00**

5.2.7 Company 7 Case Analysis

We have revisited the company, which we have used as a pilot study as Company 7 of our field study.

Company 7 is a manufacturing company operating in Automotive Parts Industry. The company, which is operating in the same industry for more than 50 year, has a single manufacturing site, located in Marmara Region. Main products are brake drums and brake discs. Main production methodologies are *metal casting* and *machining*.

Annual turnover of the company is over 50 Million USD, as of 2014. More than 300 employees are working for the company. The profile of the company is summarized in Table 5.111.

Table 5.111 Company profile- Company 7 (Table 4.3 revisited)

Industry	Years in Business	Subsidiary of a Group	No of Employees	No of Products	Annual Turnover (Million USD)	Single Site/ Multisite	Region
3460- Metal Forging and Stamping	**50-59**	**No**	**250-449**	**100-499**	**50-99**	**Single Site**	**Marmara**

As Company 2 data collection, we have collected data from two main sources, an interview with the top management and an employee survey.

A face to face interview has been completed with the General Manager of the company. The profile of the interviewee is available in Table 5.2. The structured interview has been based on the questionnaire. Before starting the questionnaire, detailed information regarding the study and the model has been provided to the interviewee. The instrument items have been answered by the General Manager and the perceived IFMMM profile of the company has been prepared based on the answers.

A web based survey has been conducted within the company. Only department managers have been participated into the survey. We have received 6 responses, which is the total population, and 5 responses out of 6 were included in data analysis.

The results have been documented separately for top management perception and employee perception and a comparison of both has been presented within this section.

5.2.7.1 IFMMM Profile of Company 7- Top management perception

5.2.7.1.1 Normative Goals

Scores of elements of normative goals have been calculated based on the top management perception and listed in Table 5.112.

Table 5.112 Normative Goals Profile- Company 7 – Top Management Perception

NORMATIVE GOALS (NG)								**SCORE**
NG1	**Internal Direction of the Mission**							
Individual Economic	1	2	3	4	5	6	**Social Economic**	**4,67**
NG2	**Time Perspective of the Goal**							
Short Term	1	2	3	4	5	6	**Long Term**	**4,50**
NG3	**Chance Perspective**							
Keep It	1	2	3	4	5	6	**Progressive**	**5,00**
NG4	**Risk Perspective**							
Disturbing	1	2	3	4	5	6	**Vulnerable**	**4,00**
NG5	**Objective Performance goals**							
Weak	1	2	3	4	5	6	**Strong**	**5,34**
NG6	**Financial Value Goals**							
Weak	1	2	3	4	5	6	**Strong**	**4,50**
NG7	**Ecological Goals**							
Weak	1	2	3	4	5	6	**Strong**	**4,00**
NG8	**Social Goals**							
Weak	1	2	3	4	5	6	**Strong**	**5,34**
Overall normative goals score								**4,67**

The scores shows us that the management perceives that long term plans are prepared to and they cooperate with the stakeholders in goal setting. They try to stimulate change within the environment and perceive risk as vulnerable. The expression of objective performance, financial, ecological and social goals are all *strong*.

Overall normative goals score is 4,67, representing a *mid-high* profile according to IFMMM. The normative goal profile of Company 7, based on top management perception is illustrated with the radar diagram in Figure 5.74.

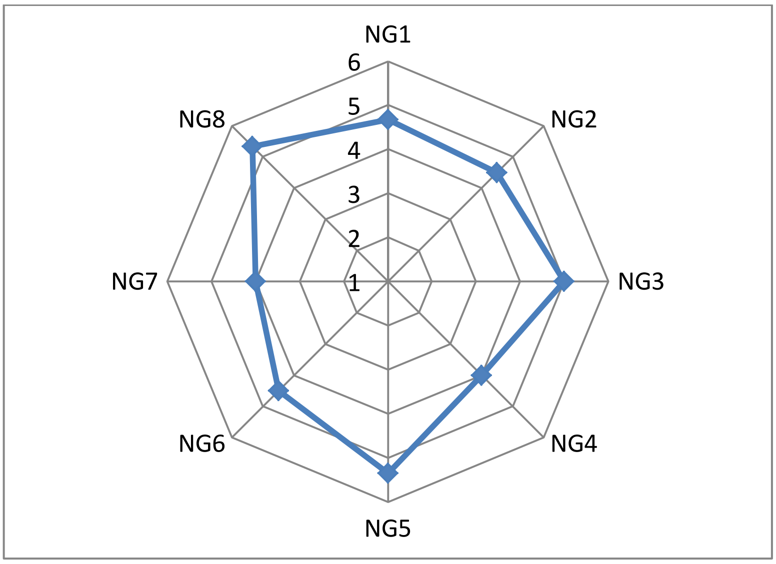

Figure 5.74 Normative Goals Profile for Company 7- Top Management Perception

5.2.7.1.2 Normative Structures

The normative structures elements scores based on perception of the top management are listed in Table 5.113.

Table 5.113 Normative Structures Profile- Company 7- Top management perception

NORMATIVE STRUCTURES (NS)								**SCORE**
NS1	**Representation of interests in board**							
Shareholder	1	2	3	4	5	6	**Stake Holder**	**5,00**
NS2	**Art of Conflict Resolution**							
Confrontation	1	2	3	4	5	6	**Consensus**	**4,34**
NS3	**Economical, Legal and Social Structure**							
Non-differentiated	1	2	3	4	5	6	**Differentiated**	**6,00**
NS4	**Distance of Management to Real Life**							
Close-Operative	1	2	3	4	5	6	**Far-Strategic**	**4,00**
NS5	**Competence Distribution of Management**							
Single Level	1	2	3	4	5	6	Multilevel	**1,50**
NS6	**Division of Executives**							
Directorial/CEO	1	2	3	4	5	6	**Staff,Team**	**5,50**
NS7	**Sense of Responsibility of Top Management Team**							
Protective	1	2	3	4	5	6	**Multiplier**	**4,00**
NS8	**Rationale of Top Management Team**							
Monitoring	1	2	3	4	5	6	**Consulting**	**5,00**
Overall normative structures score								**4,42**

Normative structures elements scores of Company 2 based on top management interview illustrates that stakeholders are also represented in the board. Top management is far from daily operations and has responsibilities for certain divisions. NS5 score refers to a *single level competence distribution* profile which indicates that execution and audit functions are performed by the same team.

Top management of company 7 perceives that they feel responsibility to create value for all related stakeholders with a *multiplier* profile of sense of responsibility. Moreover they are focused on strategic planning and structuring, instead of monitoring and act as consultant.

Overall normative structures score is 4,42 and refers to a *mid-high* management capability profile with respect to IFMMM.

The normative structures profile of Company 7, based on top management perception, is illustrated with the radar diagram in Figure 5.75

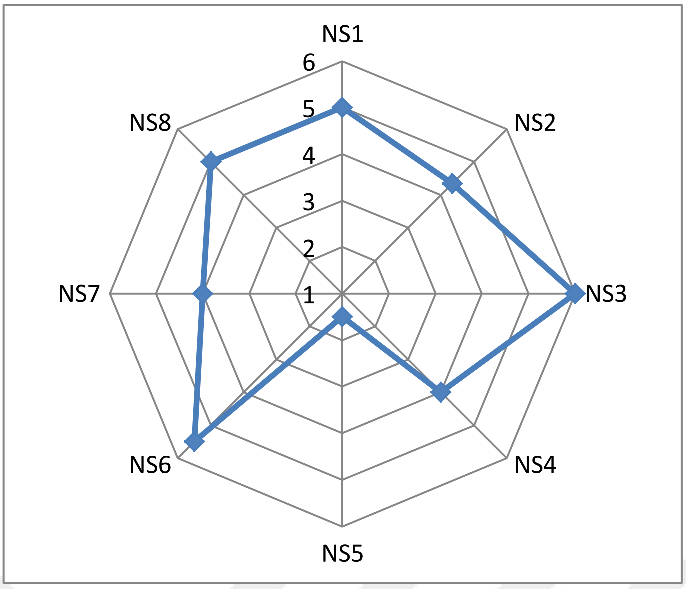

Figure 5.75 Normative structures profile for Company 7- Top management perception

5.2.7.1.3 Normative Behaviors

The normative behaviors elements' scores based perceptions of the top management are listed in Table 5.114.

Table 5.114 Normative Behaviors Profile – Company 7 – Top management perception

NORMATIVE BEHAVIORS (NB)								SCORE
NB1	**Cultural Openness**							
Inside Oriented	1	2	3	4	5	6	**Outside Oriented**	**4,67**
NB2	**Attitude Towards Change**							
Hostile	1	2	3	4	5	6	**Friendly**	**4,34**
NB3	**Orientation of Management**							
Top	1	2	3	4	5	6	**Basis**	**4,50**
NB4	**Subcultural Differentiation**							
Uniform Value System	1	2	3	4	5	6	**Functionally differentiated**	**4,67**
NB5	**Cultural expression**							
Instrumental	1	2	3	4	5	6	**Development oriented**	**4,25**
NB6	**Value Added Orientation of Management**							
Cost Oriented	1	2	3	4	5	6	Value oriented	**2,00**
NB7	**Role of employees**							
Members	1	2	3	4	5	6	**Actors**	**5,00**
NB8	**Employee engagement**							
Individual, Hero	1	2	3	4	5	6	Collective, Us	**2,50**
Overall normative behaviors score								**3,99**

NB6, *value added orientation of management* profile indicates that focus of management is on minimizing costs with creating *economies of scale*. .NB8 score indicates *an* individual *employee engagement* profile where success and failure are highly personalized.

NB1, *cultural Openness* profile indicates that company 7 can perceive environmental changes at all levels and take them into account for strategy formulation. They perceive change as friendly and is compatible with NG4 (see Table 5.112) profile. Top management perceive that the employees have a relationship with the company with a sense of belonging and each *actor* contributes to the preservation of the whole within his/her domain

Overall normative behaviors score also indicates a *mid-high management capability* with respect to IFMMM. The normative behaviors profile of Company 7, based on top management perception, is illustrated with the radar diagram in Figure 5.76.

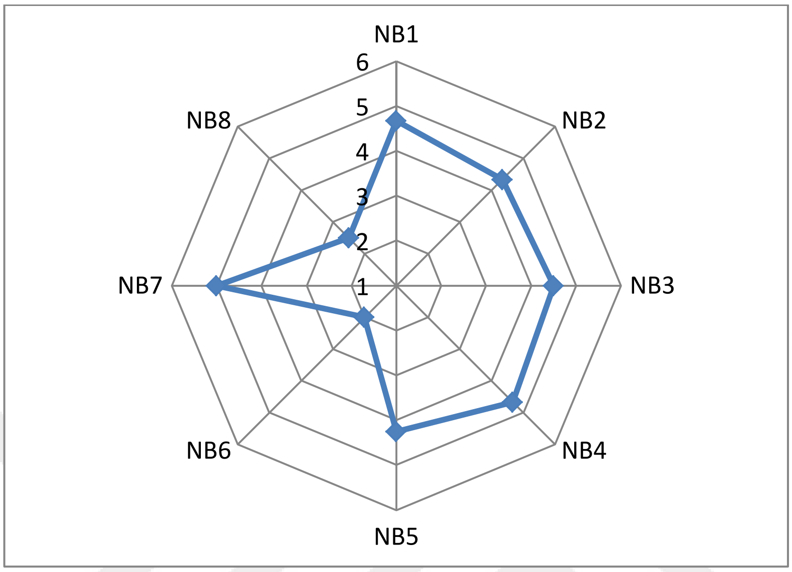

Figure 5.76 Normative behaviors profile for Company 7- top management perception

5.2.7.1.4 Strategic Goals

The IFMMM strategic goals elements' scores, based perception of the top management, are listed in Table 5.115.

Table 5.115 Strategic Goals Profile- Company 7- Top management perception

STRATEGIC GOALS (SG)								**SCORE**
SG1	**Supply of Performance**							
Narrow	1	2	3	4	5	6	**Broad**	**4,00**
SG2	**Individuality of Problem Solving**							
Standardized	1	2	3	4	5	6	**Individual**	**4,50**
SG3	**Competitive Posture**							
Defensive	1	2	3	4	5	6	**Offensive**	**5,00**
SG4	**Leader-Follower Behavior**							
Follower	1	2	3	4	5	6	**Leader**	**4,50**
SG5	**Value Added Activities**							
Cost Oriented Rationalization	1	2	3	4	5	6	**Customer Focused Optimisation**	**3,50**
SG6	**Dependency of Value Added Activities**							
Individual	1	2	3	4	5	6	Networking	**3,00**
SG7	**Deployment of Resources**							
Fixed	1	2	3	4	5	6	Flexible	**1,00**
SG8	**Performance of Resources**							
Specialized	1	2	3	4	5	6	**Generalist**	**4,00**
SG9	**Level of Product Flexibility**							
Low	1	2	3	4	5	6	**High**	**3,50**
Overall Strategic goals score								**3,67**

SG1 (supply of performance) profile illustrates that the management perceives that they try to serve a wide range of products for all possible customer groups. *Competitive posture* is *offensive.* Score of SG4 (leader follower behavior), shows us that the management has a very strong perception about their leadership in the market in terms of innovation. Scores of *value added activities* element represents a *mid-high* management capability profile within IFMMM, which indicates an *increasing customer value* perspective in evaluation of all value added activities. SG6 profile indicates that Company 7 management aims to keep all value added activities within the company, instead of *networking*. The resources are deployed upon *fixed, defined* rules and frameworks.

SG9 *(Level of product flexibility)* score refers to a *mid-high* level of product flexibility. Overall strategic goals score is 3,67 and overall IFMMM strategic goals profile indicates a *mid-high* management capability profile. The strategic goals profile of Company 7 is illustrated with the radar diagram in Figure 5.77.

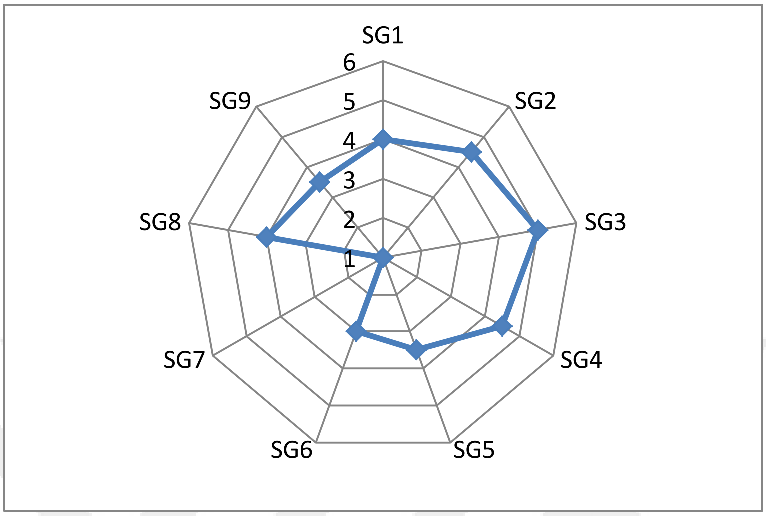

Figure 5.77 Strategic goals profile for Company 7- top management perception

5.2.7.1.5 Strategic Structures

The IFMMM strategic structures elements' scores, based perception of the top management, are listed in Table 5.116.

Table 5.116 Strategic Structures Profile- Company 7- Top management perception

STRATEGIC STRUCTURES (SS)								**SCORE**
SS1	**Focus**							
Issue-Oriented	1	2	3	4	5	6	Person-Oriented	**1,00**
SS2	**Reference Points**							
Formal Rules	1	2	3	4	5	6	**Symbols**	**3,67**
SS3	**Extent of Rules**							
Efficiency Oriented	1	2	3	4	5	6	**Effectiveness Oriented**	**5,00**
SS4	**Time Orientation**							
Unlimited Period	1	2	3	4	5	6	**PredicTable Period**	**5,00**
SS5	**Synergy Orientation**							
Central	1	2	3	4	5	6	Decentral	**3,00**
SS6	**Hierarchy**							
High	1	2	3	4	5	6	**Low**	**4,00**
SS7	**Organizational Development**							
Inwards, Towards Efficiency	1	2	3	4	5	6	Outwards, Towards Effectiveness	**2,33**
SS8	**Starting Point of Organizational Development**							
Top-Down	1	2	3	4	5	6	**Bottom-Up**	**4,00**
SS9	**Level of Expansion Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,50**
Overall Strategic Structures Score								**3,61**

The scores of three profiling elements namely SS1 *focus,* SS5 *synergy orientation* and SS7 *organizational development* point for a profile far from IFMMM extremes. *Focus* profile indicates that the positions within the organization structures are determined upon already defined tasks. *Synergy orientation* profile indicates that decision making is *centralized. Organizational development* scores refer to an efficiency orientation.

Level of expansion flexibility is *high,* management perceive that they can increase the production capacity easily and effectively, compared to the competitors.

Overall IFMMM strategic structures score of Company 7 is 3,61, indicating a *mid-high management capability profile*. The strategic structures profile of Company 7, based on top management perception, is illustrated with the radar diagram in Figure 5.78.

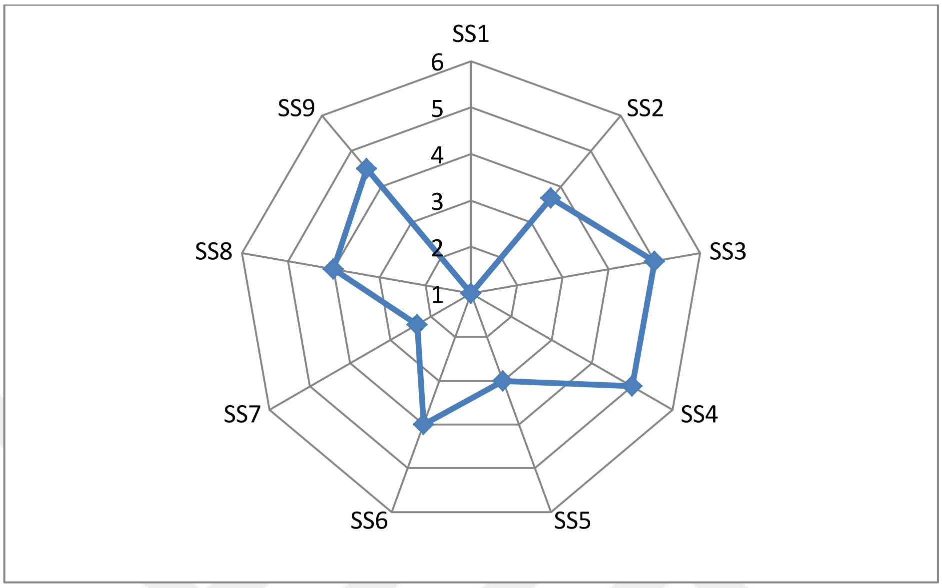

Figure 5.78 Strategic structures profile for Company 7- Top management perception

5.2.7.1.6 *Strategic Behaviors*

The IFMMM strategic behaviors elements' scores, based perception of the top management, are listed in Table 5.117.

Table 5.117 Strategic Behaviors Profile- Company 7- Top management perception

STRATEGIC BEHAVIORS								SCORE
SB1	**Level of Participative Behavior for Management Decisions**							
Low	1	2	3	4	5	6	**High**	**4,67**
SB2	**Focus of Behavior Development**							
Individual	1	2	3	4	5	6	**Team**	**5,34**
SB3	**Desired Management Behavior**							
Risk- Averse	1	2	3	4	5	6	**Enterpreneurial**	**4,34**
SB4	**Desired Competency Potential**							
Specialist	1	2	3	4	5	6	**Generalist**	**4,67**
SB5	**Authority Development**							
Institutional- Hierarchy Based	1	2	3	4	5	6	**Communication- Specialist Based**	**6,00**
SB6	**Focus of Desired Responsibility**							
Dependence- Member Only Executes	1	2	3	4	5	6	**Delegation-Autonomous**	**5,34**
SB7	**Place of Behavior Development**							
Off the Job	1	2	3	4	5	6	**On the Job**	**5,00**
SB8	**Type of Desired Learning Behavior**							
Vertical	1	2	3	4	5	6	**Horizontal**	**4,34**
Overall strategic behavior score								**4,96**

Strategic goals elements scores illustrate either mid-high, or high perceived management capability profile for all elements. *Level of participative behavior for management decisions* is high, which indicates that top management perceives that there is a comprehensive information flow on various channels. *Authority development* is based on *specialist,* competency based authority, instead of formal, hierarchy based authority. This profile is compatible with SS6 *(Hierarchy)* profile. *Focus of behavior development* profile indicates existence and importance of team-work. *Horizontal type of desired learning behavior* profile shows us that the management perceived that employees are experimenting and learning new tasks as a regular process.

Overall strategic behavior score is 4,96 and refers to a *high* management capability profile. The strategic structures profile of Company 7, based on top management perception, is illustrated with the radar diagram in Figure 5.79

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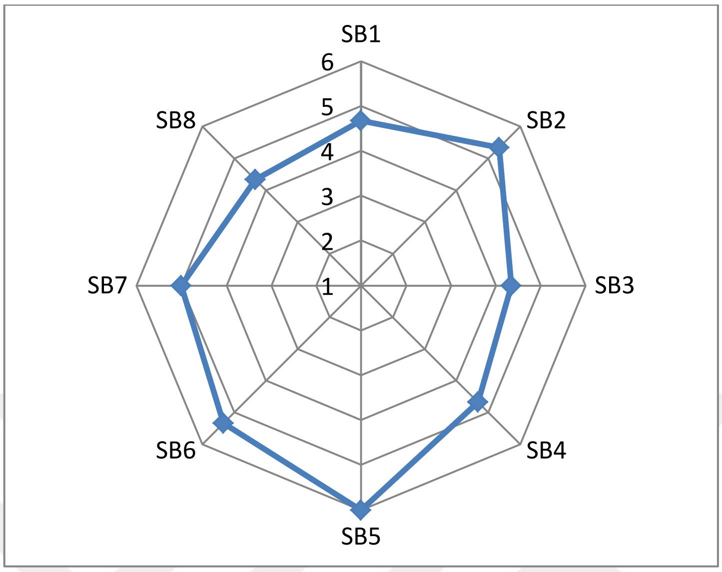


Figure 5.79 Strategic behaviors profile for Company 7- Top management perception

5.2.7.1.7 *Operative Goals*

The perception of the top management regarding Operational Goals elements, based on IFMMM, is illustrated as profiling scores as listed in Table 5.118.

Table 5.118 Operative Goals Scores- Company 7- Top management perception

OPERATIVE GOALS (OG)									**SCORE**
OG1	**Manufacturing Cost Reduction Goal**								
Low	1	2	3	4	5	6	**High**		**4,00**
OG2	**Quality Performance Goal**								
Low	1	2	3	4	5	6	**High**		**5,00**
OG3	**Delivery Performance Goal**								
Low	1	2	3	4	5	6	**High**		**4,00**
OG4	**New Product Introduction Performance Goal**								
Low	1	2	3	4	5	6	**High**		**4,67**
OG5	**Level of Volume Flexibility**								
Low	1	2	3	4	5	6	**High**		**4,50**
OG6	**Level of Mix Flexibility**								
Low	1	2	3	4	5	6	**High**		**4,00**
Overall operative goals									**4,36**

The scores of operative goals profiling elements shows us that the management perceive that the emphasis on manufacturing cost reduction goal, quality performance goal, delivery performance goal and new product introduction performance goal is high.

The management perception about level of volume flexibility refers to a mid-high flexibility level which means that the management perceives that they can change the production output volume easily and effectively with respect to competition. Additionally level of mix flexibility is also high. Perception on capability of changing existing product mix is highly developed, compared with the competitors'.

Overall operative goals score is 4,36 and refers to a mid-high management capability profile with respect to IFMMM. The operative goals profile of Company 7 is illustrated with the radar diagram in Figure 5.80.

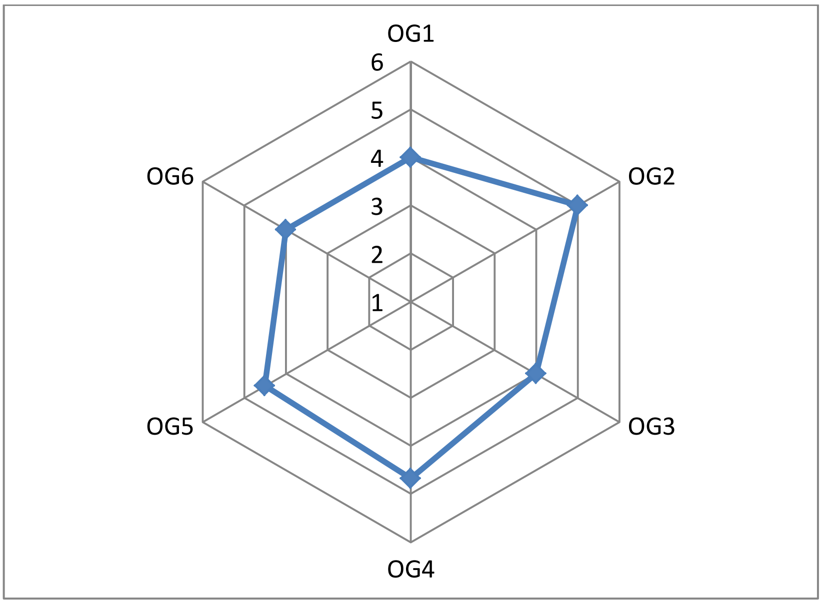


Figure 5.80 Operative goals profile for Company 7- Top management perception

5.2.7.1.8 *Operative Structures*

The perception of the top management regarding operative structures, based on IFMMM is used to calculate scores for profiling elements which are listed in Table 5.119.

Table 5.119 Operative Structures Scores- Company 7- Top management perception

OPERATIVE STRUCTURES (OG)								**SCORE**
OS1	**Production Systems Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**5,67**
OS2	**Infrastructural Production Support Systems Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**3,63**
OS3	**Design Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**6,00**
OS4	**Level of Machine Flexibility**							
Low	1	2	3	4	5	6	High	**4,25**
OS5	**Level of Routing Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,00**
OS6	**Level of Operation Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,50**
Overall operative structures score								**4,67**

Scores of production systems applications indicates that the usage of production systems applications is high. Due to production methods, the company has widely applied advanced management technologies like CNC tools, and CAM applications. Additionally, infrastructural production support systems are available within company 7. Computer Aided Design applications are widely used by company 7 staff.

The management perceives that *level of machine flexibility, level of routing flexibility* and *level of operation flexibility* are higher than the competition. Overall operative structures score is 4,67, which refers to a *mid-high* management capability profile with respect to IFMMM. The operative structures profile of Company 7 is illustrated with the radar diagram in Figure 5.81.

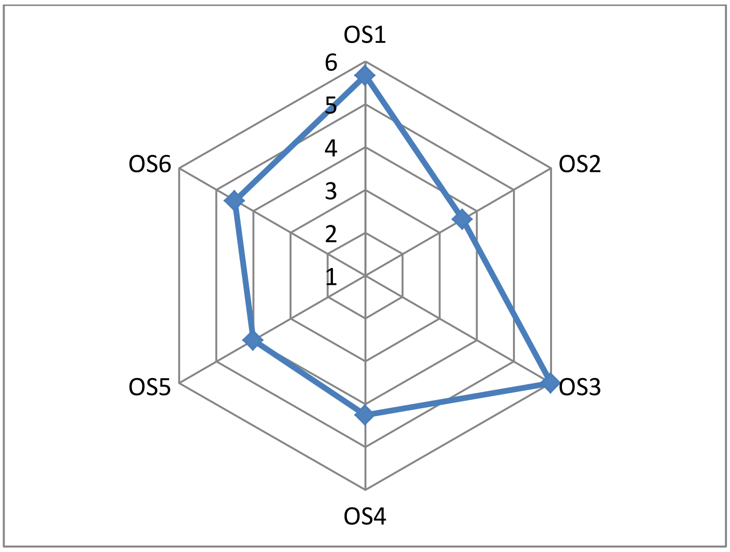


Figure 5.81 Operative structures profile for Company 7- Top management perception

5.2.7.1.9 *Operational Behaviors*

The perception of the top management regarding operative behaviors, based on IFMMM is used to calculate scores for profiling elements which are listed in Table 5.120.

Table 5.120 Operative Behaviors Scores- Company 7- Top management perception

OPERATIVE BEHAVIORS (OB)								**SCORE**
OB1	**Team Work**							
Narrow	1	2	3	4	5	6	**Wide**	**6,00**
OB2	**Decision Making Processes in Operations**							
Centralized	1	2	3	4	5	6	**Decentralized**	**4,00**
OB3	**Multi-Skilled Labor**							
Narrow	1	2	3	4	5	6	**Wide**	**4,00**
OB4	**Level of Labor Flexibility**							
Low	1	2	3	4	5	6	High	**3,34**
Overall operative behaviors score								**4,34**

Operative behaviors elements' scores indicate that teams are built and operate for operational level tasks and OB1 profile is compatible with SB2 (see Table 5.109) and NB8 (see Table 5.6) profiles. *Decision making process in operations* score illustrates a *Decentralized* decision making profile and is compatible with SB1 (see Table 5.109) profile.

Level of labor flexibility is perceived as *mid-low* profile, which indicates to the perception that the capability of the employees to perform more than one task is lower than the competitors'. Overall operative behaviors score is 4,34 and refers to a *mid-high management capability profile* with respect to IFMMM. The operative behaviors profile of Company 7 is illustrated with the radar diagram in Figure 5.82.

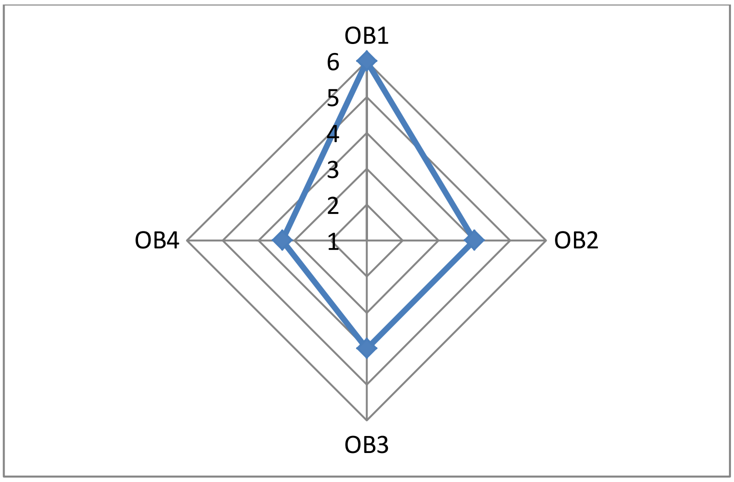


Figure 5.82 Operative behaviors profile for Company 7- Top management perception

5.2.7.2 Manufacturing Flexibility Profile-Company 7- Top management perception

The list of the manufacturing flexibility dimensions along with the corresponding scores of Company 7, based on top management perception is available in Table 5.121.

Table 5.121 Manufacturing flexibility perception of Company 7- Top management perception

MANUFACTURING FLEXIBILITY (MF)		**SCORE**
SG9	**Level of Product Flexibility**	**3,50**
SS9	**Level of Expansion Flexibility**	**4,50**
OG5	**Level of Volume Flexibility**	**4,50**
OG6	**Level of Mix Flexibility**	**4,00**
OS4	**Level of Machine Flexibility**	**4,25**
OS5	**Level of Routing Flexibility**	**4,00**
OS6	**Level of Operations Flexibility**	**4,50**
OB4	**Level of Labor Flexibility**	**3,34**
Overall Manufacturing Flexibility Score		**4,07**

Manufacturing flexibility scores indicates that the management perceives that Company 7 has flexibility levels, except *level of labor flexibility,* better than the competitors. The overall flexibility score illustrates that the perceived manufacturing flexibility level is above the competition. Manufacturing flexibility profile of company 7, based on top management level is illustrated with the radar diagram in Figure 5.83.

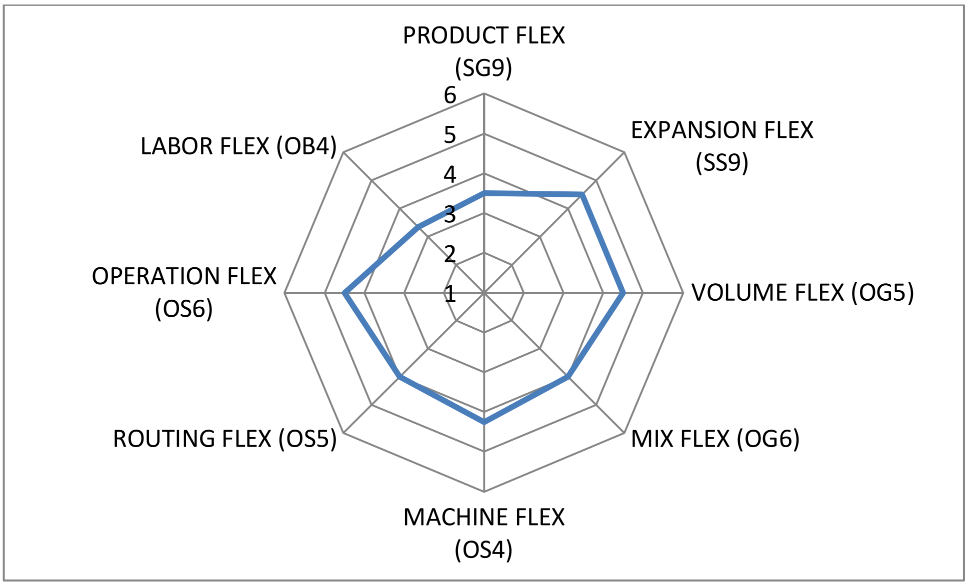


Figure 5.83 Manufacturing Flexibility Profile for Company 7- Top management perception

5.2.7.3 Market Dynamism

The perceived market dynamism scores upon management interview are illustrated in Table 5.122.

Table 5.122 Market dynamism – Company 7 – Top management perception

MARKET DYNAMISM (MD)		SCORE
MD1	**Dynamism in Competition Intensity**	**5,00**
MD2	**Dynamism in Customer Preferences**	**3,50**
MD3	**Dynamism in Technology**	**4,00**
Overall Market dynamism		**4,17**

The perception of the management about dynamism in competition intensity is high. Dynamism in customer preferences and technology are perceived mid-high. Overall market dynamism score is 4,17 and refers to a perceived mid-high market dynamism.

5.2.7.4 Firm Performance – Company 7- Top management perception

The perceived firm performance scores of Company 7 based on top management interview are listed in Table 5.123

Table 5.123 Firm performance Company 7 – top management perception

FIRM PERFORMANCE (FP)		SCORE
FP1	**Financial Performance**	**4,00**
FP2	**Market Performance**	**5,67**
FP3	**Innovation Performance**	**4,43**
FP4	**Manufacturing Performance**	**4,42**
Overall Firm Performance		**4,63**

The scores of firm performance show us that, management perceives that company 7 performs better than the competitors for each performance element. They perceive that the market performance score of the company indicates a perceived *high* performance level, whereas financial performance, innovation performance and manufacturing performance scores indicate a *mid-high* performance level. Overall firm performance score is 4,63 and refers to a perception of *mid-high* aggregate performance.

5.2.7.4.1 Manufacturing performance

The subconstructs of manufacturing performance with the scores from top management interview are listed in Table 5.124

Table 5.124 Manufacturing performance Company 7- Top management perception

MANUFACTURING PERFORMANCE (FP4)		SCORE
FP41	Manufacturing quality performance	4,84
FP42	Manufacturing cost performance	4,00
FP43	Manufacturing flexibility performance	4,57
FP44	Delivery performance	4,25
Overall Manufacturing performance		4,42

Overall manufacturing performance score (4,42) indicates that the management perceive that their manufacturing performance is better than the competitors'. Manufacturing quality performance refers to a high level performance. Management also thinks that their manufacturing cost, delivery and flexibility performance are also better than the competition.

The comparison of the scores of manufacturing performance subconstructs with the corresponding operative goals subconstructs is listed in Table 5.125

Table 5.125 Comparison of manufacturing performance scores and operative goals scores- Company 7- Top management perception

MANUFACTURING PERFORMANCE (FP4)		SCORE	OPERATIVE GOALS		SCORE
FP41	Manufacturing quality performance	4,84	OG2	Quality performance goal	4,00
FP42	Manufacturing cost performance	4,00	OG1	Manufacturing cost reduction performance goal	5,00
FP44	Delivery performance	4,25	OG3	Delivery performance goals	4,00

5.2.7.5 IFMMM Profile of Company 7- white collar perception

5.2.7.5.1 Normative Goals

Scores of elements of normative goals for Company 7 have been calculated based on the white collar perception and listed in Table 5.126.

Table 5.126 Normative Goals Profile- Company 7 – White collar perception

NORMATIVE GOALS (NG)								**SCORE**
NG1	**Internal Direction of the Mission**							
Individual Economic	1	2	3	4	5	6	**Social Economic**	**4,27**
NG2	**Time Perspective of the Goal**							
Short Term	1	2	3	4	5	6	**Long Term**	**5,10**
NG3	**Chance Perspective**							
Keep It	1	2	3	4	5	6	**Progressive**	**4,80**
NG4	**Risk Perspective**							
Disturbing	1	2	3	4	5	6	**Vulnerable**	**4,30**
NG5	**Objective Performance goals**							
Weak	1	2	3	4	5	6	**Strong**	**5,07**
NG6	**Financial Value Goals**							
Weak	1	2	3	4	5	6	**Strong**	**4,80**
NG7	**Ecological Goals**							
Weak	1	2	3	4	5	6	**Strong**	**4,80**
NG8	**Social Goals**							
Weak	1	2	3	4	5	6	**Strong**	**4,47**
Overall normative goals score								**4,70**

The scores of all normative goals elements, based on perception of white collar employees of company 7, refer to a *mid-high* or *high* IFMMM capability profile. The scores shows us that the management perceives that long term plans are prepared to and they cooperate with the stakeholders in goal setting. They try to stimulate change within the environment and perceive risk as vulnerable. The expression of objective performance, financial, ecological and social goals are all *strong*.

Overall normative goals score is 4,70; representing a *mid-high* profile according to IFMMM. The normative goal profile of Company 7, based on white collar perception is illustrated with the radar diagram in Figure 5.84.

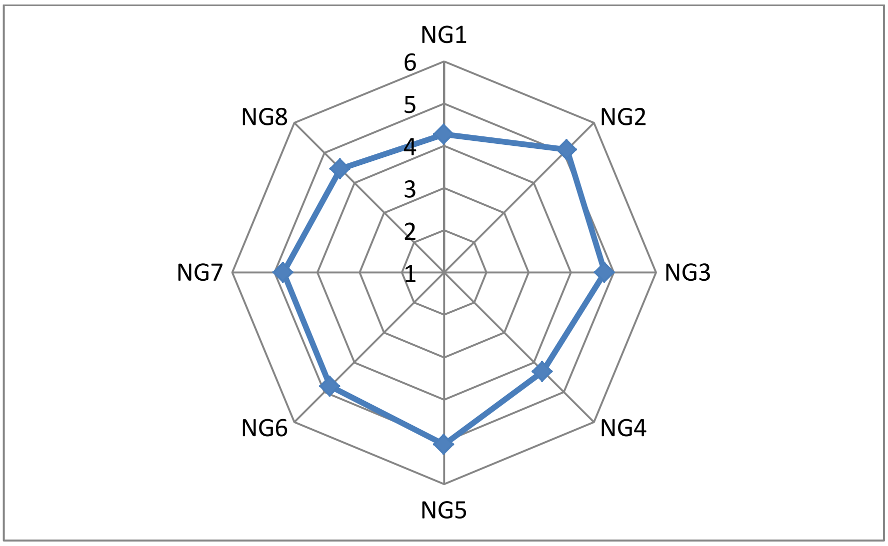


Figure 5.84 Normative goals profile for company 7 – white collar perception

5.2.7.5.2 Normative Structures

The normative structures elements scores based on perception of the white collar employees are listed in Table 5.127.

Table 5.127 Normative structures profile- Company 7- white collar perception

NORMATIVE STRUCTURES (NS)								**SCORE**
NS1	**Representation of interests in board**							
Shareholder	1	2	3	4	5	6	**Stake Holder**	**3,90**
NS2	**Art of Conflict Resolution**							
Confrontation	1	2	3	4	5	6	**Consensus**	**4,14**
NS3	**Economical, Legal and Social Structure**							
Non-differentiated	1	2	3	4	5	6	Differentiated	**1,00**
NS4	**Distance of Management to Real Life**							
Close-Operative	1	2	3	4	5	6	Far-Strategic	**3,20**
NS5	**Competence Distribution of Management**							
Single Level	1	2	3	4	5	6	**Multilevel**	**3,60**
NS6	**Division of Executives**							
Directorial/CEO	1	2	3	4	5	6	**Staff,Team**	**4,70**
NS7	**Sense of Responsibility of Top Management Team**							
Protective	1	2	3	4	5	6	**Multiplier**	**5,00**
NS8	**Rationale of Top Management Team**							
Monitoring	1	2	3	4	5	6	**Consulting**	**5,14**
Overall normative structures score								**3,84**

Normative structures elements scores of Company 7 illustrates that white collar employees perceive that stakeholders are also represented in the board. They perceive that the *economic, legal and social structure* is *non-differentiated.* Top management is close to the daily operations and has responsibilities for certain divisions. NS5 score refers to a *multi-level competence distribution* profile which indicates that execution and audit functions are performed by the different teams. They perceive Top management of company feels responsibility to create value for all related stakeholders with a *multiplier* profile of sense of responsibility. Moreover they perceive that the top management team focuses on strategic planning and structuring, instead of monitoring and act as consultant.

Overall normative structures score is 3,84 and refers to a *mid-high* management capability profile with respect to IFMMM.

The normative structures profile of Company 7, based on white collar perception, is illustrated with the radar diagram in Figure 5.85

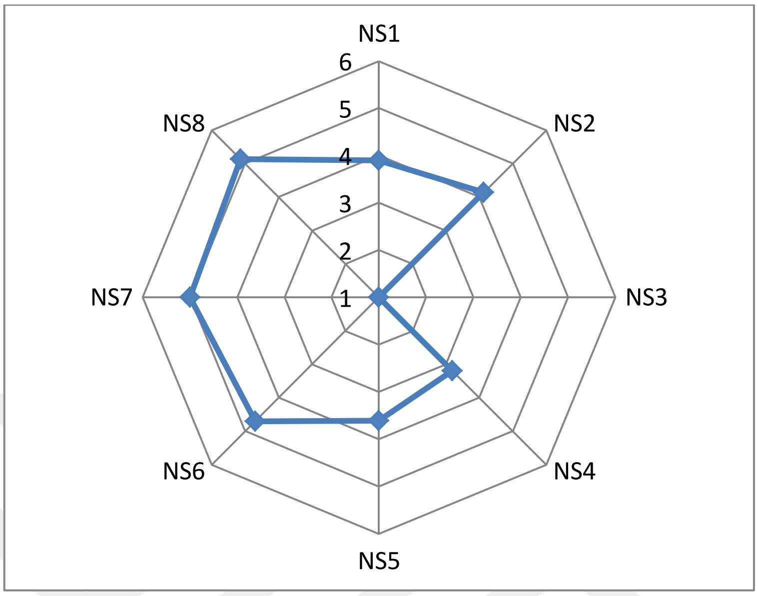


Figure 5.85 Normative structures profile for Company 7- white collar perception

5.2.7.5.3 Normative Behaviors

The normative behaviors elements' scores based perceptions of the white collar employees are listed in Table 5.128.

Table 5.128 Normative Behaviors Profile – Company 7 – white collar perception

NORMATIVE BEHAVIORS (NB)								**SCORE**
NB1	**Cultural Openness**							
Inside Oriented	1	2	3	4	5	6	**Outside Oriented**	**4,74**
NB2	**Attitude Towards Change**							
Hostile	1	2	3	4	5	6	**Friendly**	**4,20**
NB3	**Orientation of Management**							
Top	1	2	3	4	5	6	**Basis**	**3,90**
NB4	**Subcultural Differentiation**							
Uniform Value System	1	2	3	4	5	6	**Functionally differentiated**	**3,94**
NB5	**Cultural expression**							
Instrumental	1	2	3	4	5	6	**Development oriented**	**4,00**
NB6	**Value Added Orientation of Management**							
Cost Oriented	1	2	3	4	5	6	Value oriented	**2,55**
NB7	**Role of employees**							
Members	1	2	3	4	5	6	**Actors**	**4,20**
NB8	**Employee engagement**							
Individual, Hero	1	2	3	4	5	6	Collective, Us	**2,90**
Overall normative behaviors score								**3,80**

NB6, *value added orientation of management* profile indicates that white collar employees perceive that focus of management is on minimizing costs with creating *economies of scale.* NB8 score indicates *an* individual *employee engagement* profile where success and failure are highly personalized.

NB1, *cultural Openness* profile indicates that, according to white collar employees, company 7 can perceive environmental changes at all levels and take them into account for strategy formulation. They perceive change as friendly and is compatible with NG4 (see Table 5.126) profile. White collar employees perceive that the employees have a relationship with the company with a sense of belonging and each *actor* contributes to the preservation of the whole within his/her domain.

Overall normative behaviors score also indicates a *mid-high management capability* with respect to IFMMM. The normative behaviors profile of Company 7, based on white collar employees' perception, is illustrated with the radar diagram in Figure 5.86.

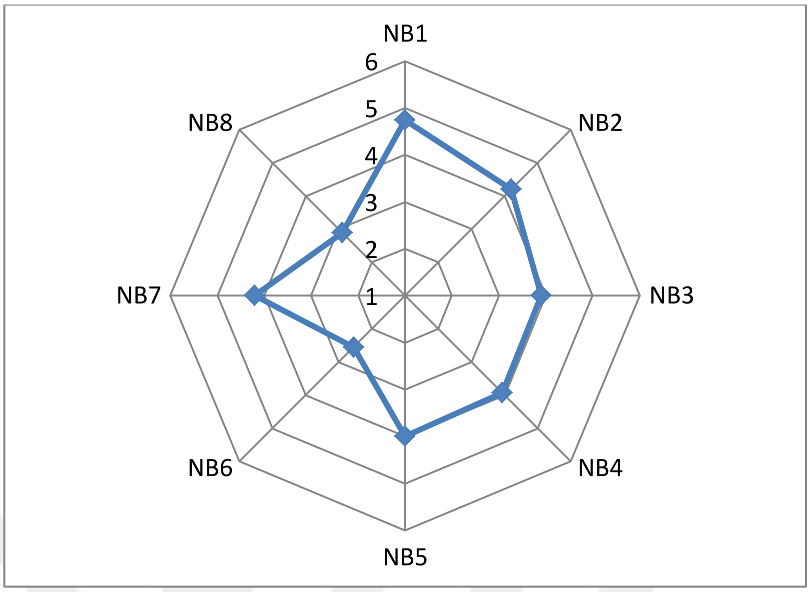


Figure 5.86 Normative behaviors profile for Company 7- white collar perception

5.2.7.5.4 Strategic Goals

The IFMMM strategic goals elements' scores, based perception of the top management, are listed in Table 5.129.

Table 5.129 Strategic Goals Profile- Company 7- Top management perception

STRATEGIC GOALS (SG)								SCORE
SG1	**Supply of Performance**							
Narrow	1	2	3	4	5	6	**Broad**	**3,67**
SG2	**Individuality of Problem Solving**							
Standardized	1	2	3	4	5	6	**Individual**	**4,20**
SG3	**Competitive Posture**							
Defensive	1	2	3	4	5	6	**Offensive**	**3,70**
SG4	**Leader-Follower Behavior**							
Follower	1	2	3	4	5	6	**Leader**	**4,40**
SG5	**Value Added Activities**							
Cost Oriented Rationalization	1	2	3	4	5	6	**Customer Focused Optimisation**	**4,20**
SG6	**Dependency of Value Added Activities**							
Individual	1	2	3	4	5	6	**Networking**	**4,50**
SG7	**Deployment of Resources**							
Fixed	1	2	3	4	5	6	**Flexible**	**4,30**
SG8	**Performance of Resources**							
Specialized	1	2	3	4	5	6	**Generalist**	**4,00**
SG9	**Level of Product Flexibility**							
Low	1	2	3	4	5	6	High	**3,10**
Overall Strategic goals score								**4,00**

SG1 (supply of performance) profile illustrates that the white collar employees perceive that they try to serve a wide range of products for all possible customer groups. *Competitive posture* is *offensive*. Score of SG4 (leader follower behavior), shows us that white collar employees have a strong perception about their leadership in the market in terms of innovation. Scores of *value added activities* element represents a *mid-high* management capability profile within IFMMM, which indicates an *increasing customer value* perspective in evaluation of all value added activities. SG6 profile indicates that Company 7 has a *networking* profile for *dependency of value added activities* element. White collar employees perceive that the resources are deployed upon *flexible* rules.

SG9 *(Level of product flexibility)* score refers to a *mid-low* level of product flexibility. Overall strategic goals score is 4,00 and overall IFMMM strategic goals profile indicates a *mid-high* management capability profile. The strategic goals profile of Company 7, based on white collar employees' perception is illustrated with the radar diagram in Figure 5.87.

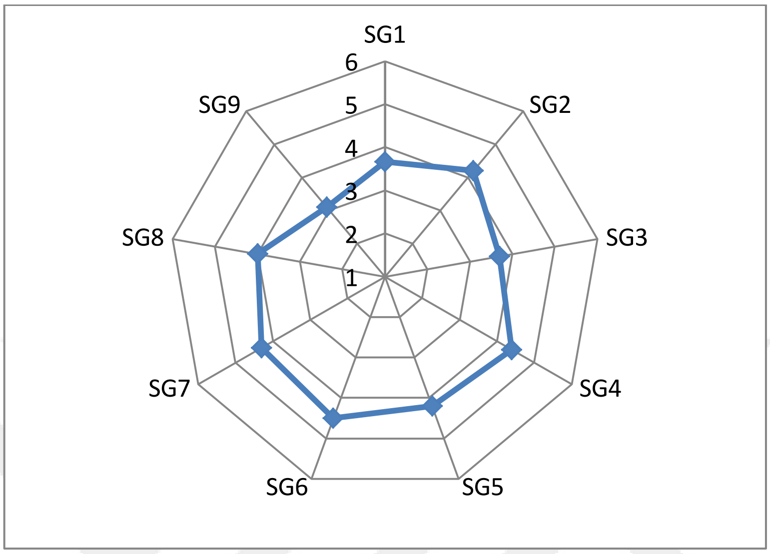


Figure 5.83 Strategic goals profile for company 7- white collar perception

5.2.7.5.5 *Strategic Structures*

The IFMMM strategic structures elements' scores, based perception of the top management, are listed in Table 5.130.

Table 5.130 Strategic structures profile- Company 7- white collar perception

STRATEGIC STRUCTURES (SS)								**SCORE**
SS1	**Focus**							
Issue-Oriented	1	2	3	4	5	6	Person-Oriented	**3,00**
SS2	**Reference Points**							
Formal Rules	1	2	3	4	5	6	**Symbols**	**3,60**
SS3	**Extent of Rules**							
Efficiency Oriented	1	2	3	4	5	6	**Effectiveness Oriented**	**4,20**
SS4	**Time Orientation**							
Unlimited Period	1	2	3	4	5	6	PredicTable Period	**3,20**
SS5	**Synergy Orientation**							
Central	1	2	3	4	5	6	**Decentral**	**3,53**
SS6	**Hierarchy**							
High	1	2	3	4	5	6	Low	**3,20**
SS7	**Organizational Development**							
Inwards, Towards Efficiency	1	2	3	4	5	6	Outwards, Towards Effectiveness	**3,10**
SS8	**Starting Point of Organizational Development**							
Top-Down	1	2	3	4	5	6	Bottom-Up	**3,40**
SS9	**Level of Expansion Flexibility**							
Low	1	2	3	4	5	6	**High**	**4,10**
Overall Strategic Structures Score								**3,49**

SS1, *focus* profile indicates that the positions within the organization structures are determined upon already defined tasks and SS4, *time orientation* profile indicates that white collar employees perceive that these positions are not subject to a limited time period. *Synergy orientation* profile indicates that decision making is *decentralized. Organizational development* scores refer to an efficiency orientation. White collar employees perceive a *high* level of *hierarchy.*

Level of expansion flexibility is *high,* management perceive that they can increase the production capacity easily and effectively, compared to the competitors.

Overall IFMMM strategic structures score of Company 7 is 3,49, indicating a *mid-low management capability profile*. The strategic structures profile of Company 7, based on white collar perception, is illustrated with the radar diagram in Figure 5.88.

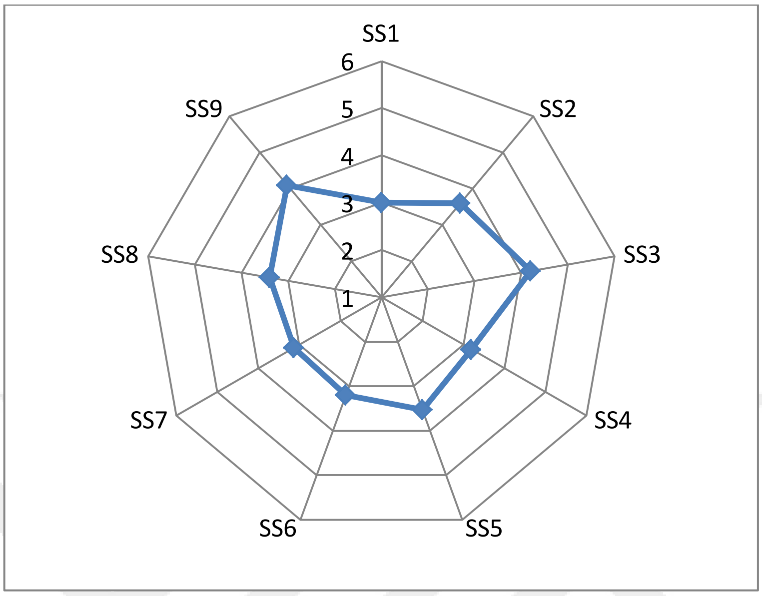


Figure 5.88 Strategic structures profile for Company 7- white collar perception

5.2.7.5.6 *Strategic Behaviors*

The IFMMM strategic behaviors elements' scores, based on perception of the white collar employees, are listed in Table 5.131.

Table 5.131 Strategic Behaviors Profile- Company 7- white collar employee perception

STRATEGIC BEHAVIORS								SCORE
SB1	**Level of Participative Behavior for Management Decisions**							
Low	1	2	3	4	5	6	**High**	**3,94**
SB2	**Focus of Behavior Development**							
Individual	1	2	3	4	5	6	**Team**	**4,14**
SB3	**Desired Management Behavior**							
Risk- Averse	1	2	3	4	5	6	Enterpreneurial	**3,47**
SB4	**Desired Competency Potential**							
Specialist	1	2	3	4	5	6	**Generalist**	**4,07**
SB5	**Authority Development**							
Institutional- Hierarchy Based	1	2	3	4	5	6	**Communication- Specialist Based**	**3,90**
SB6	**Focus of Desired Responsibility**							
Dependence- Member Only Executes	1	2	3	4	5	6	**Delegation-Autonomous**	**4,27**
SB7	**Place of Behavior Development**							
Off the Job	1	2	3	4	5	6	**On the Job**	**3,80**
SB8	**Type of Desired Learning Behavior**							
Vertical	1	2	3	4	5	6	**Horizontal**	**3,80**
Overall strategic behavior score								**3,92**

Level of participative behavior for management decisions is high, which indicates that top management perceives that there is a comprehensive information flow on various channels. *Authority development* is based on *specialist*, competency based authority, instead of formal, hierarchy based authority. *Focus of behavior development* profile indicates existence and importance of team-work. *Horizontal type of desired learning behavior* profile shows us that the management perceived that employees are experimenting and learning new tasks as a regular process. SB3 profile refers to a perceived *risk averse* management behavior.

Overall strategic behavior score is 3,92 and refers to a *mid-high* management capability profile. The strategic structures profile of Company 7, based on white collar perception, is illustrated with the radar diagram in Figure 5.89

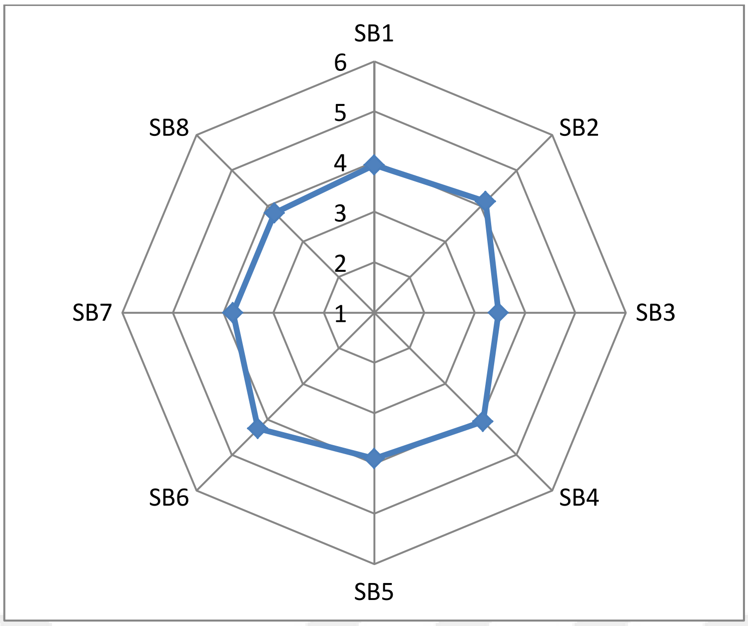


Figure 5.89 Strategic behaviors profile for Company 7- white collar perception

5.2.7.5.7 *Operative Goals*

The perception of the white collar employees of Company 7, regarding operative goals elements of IFMMM, is illustrated as profiling scores as listed in Table 5.132.

Table 5.132 Operative goals scores- Company 7- white collar perception

OPERATIVE GOALS (OG)									**SCORE**
OG1	**Manufacturing Cost Reduction Goal**								
Low	1	2	3	4	5	6	**High**		**4,80**
OG2	**Quality Performance Goal**								
Low	1	2	3	4	5	6	**High**		**5,00**
OG3	**Delivery Performance Goal**								
Low	1	2	3	4	5	6	**High**		**5,00**
OG4	**New Product Introduction Performance Goal**								
Low	1	2	3	4	5	6	**High**		**3,54**
OG5	**Level of Volume Flexibility**								
Low	1	2	3	4	5	6	**High**		**4,30**
OG6	**Level of Mix Flexibility**								
Low	1	2	3	4	5	6	**High**		**4,20**
Overall operative goals									**4,47**

The scores of operative goals profiling elements shows us that white collar employees of Company 7 perceive that the emphasis on manufacturing cost reduction goal, quality performance goal, delivery performance goal and new product introduction performance goal is high.

The perception about level of volume flexibility refers to a mid-high flexibility level which means that they perceive that they can change the production output volume easily and effectively with respect to competition. Additionally level of mix flexibility is also high. Perception on capability of changing existing product mix is highly developed, compared with the competitors'.

Overall operative goals score is 4,47 and refers to a mid-high management capability profile with respect to IFMMM. The operative goals profile of Company 7, based on white collar employees' perception is illustrated with the radar diagram in Figure 5.90.

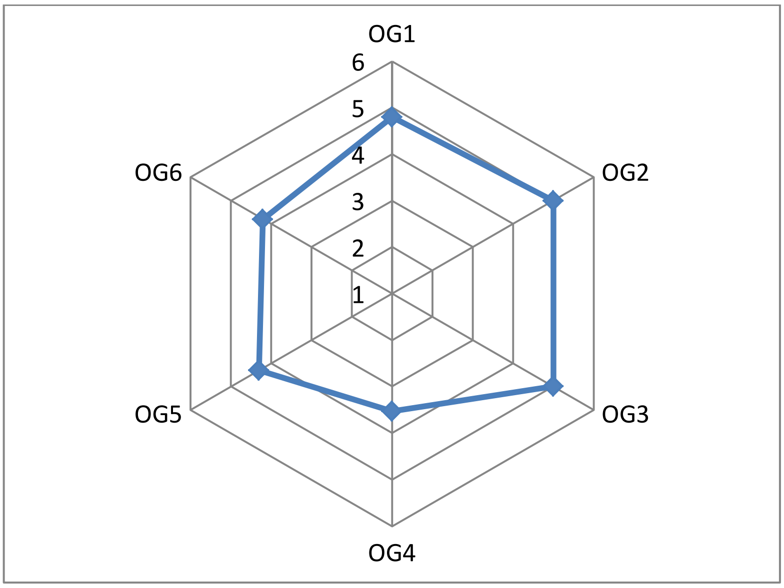


Figure 5.90 Operative goals profile for Company 7- white collar employees

5.2.7.5.8 Operative Structures

The perception of the white collar employees regarding operative structures of IFMMM is used to calculate scores for profiling elements which are listed in Table 5.133.

Table 5.133 Operative structures scores- Company 7- white collar perception

OPERATIVE STRUCTURES (OG)								**SCORE**
OS1	**Production Systems Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**4,27**
OS2	**Infrastructural Production Support Systems Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**2,33**
OS3	**Design Applications**							
Narrow	1	2	3	4	5	6	**Wide**	**3,10**
OS4	**Level of Machine Flexibility**							
Low	1	2	3	4	5	6	High	**3,75**
OS5	**Level of Routing Flexibility**							
Low	1	2	3	4	5	6	**High**	**3,90**
OS6	**Level of Operation Flexibility**							
Low	1	2	3	4	5	6	**High**	**3,80**
Overall operative structures score								**3,52**

Scores of production systems applications indicates that the usage of production systems applications is high. Due to production methods, the company has widely applied advanced management technologies like CNC tools, and CAM applications. However, white collar employees perceive that infrastructural production support systems are not widely applicable within Company 7. Computer Aided Design applications have a limited usage by company 7 staff.

The management perceives that *level of machine flexibility, level of routing flexibility* and *level of operation flexibility* are higher than the competition. Overall operative structures score is 3,52, which refers to a *mid-high* management capability profile with respect to IFMMM. The operative structures profile of Company 7, based on white collar employees' perception is illustrated with the radar diagram in Figure 5.91.

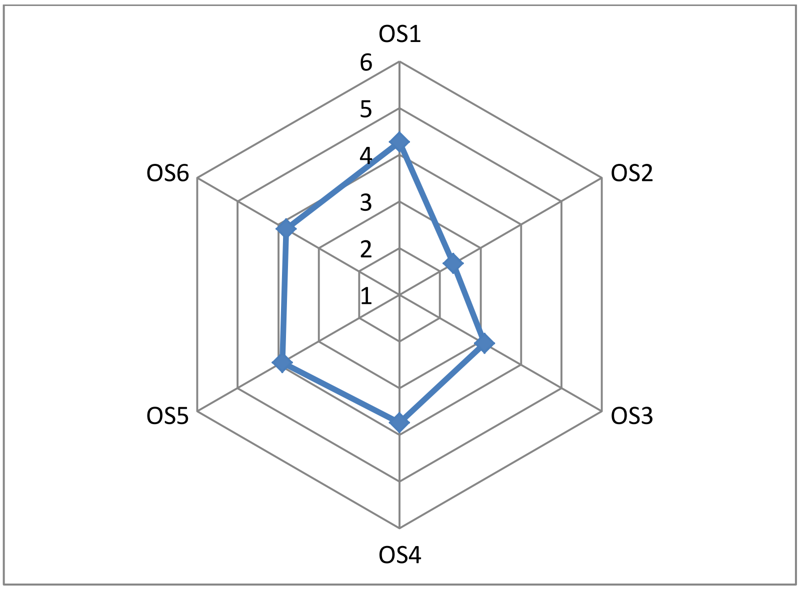


Figure 5.91 Operative structures profile for Company 7- white collar perception

5.2.7.5.9 Operative Behaviors

The perception of the white collar employees of Company 7 regarding operative behaviors, based on IFMMM is used to calculate scores for profiling elements which are listed in Table 5.134.

Table 5.134 Operative Behaviors Scores- Company 7- white collar perception

OPERATIVE BEHAVIORS (OB)								**SCORE**
OB1	**Team Work**							
Narrow	1	2	3	4	5	6	**Wide**	**3,40**
OB2	**Decision Making Processes in Operations**							
Centralized	1	2	3	4	5	6	Decentralized	**2,90**
OB3	**Multi-Skilled Labor**							
Narrow	1	2	3	4	5	6	**Wide**	**2,60**
OB4	**Level of Labor Flexibility**							
Low	1	2	3	4	5	6	High	**2,94**
Overall operative behaviors score								**2,96**

Operative behaviors elements' scores indicate that white collar employees perceive that team work is not widely applicable at operational level tasks and OB1 profile is compatible with NB8 (see Table 5.128) profile. *Decision making process in operations* score illustrates a *centralized* decision making profile.

Level of labor flexibility is perceived as *mid-low* profile, which indicates to the perception that the capability of the employees to perform more than one task is lower than the competitors'. Overall operative behaviors score is 2,96 and refers to a *mid-low management capability profile* with respect to IFMMM. The operative behaviors profile of Company 7, based on white collar employees' perception, is illustrated with the radar diagram in Figure 5.92.

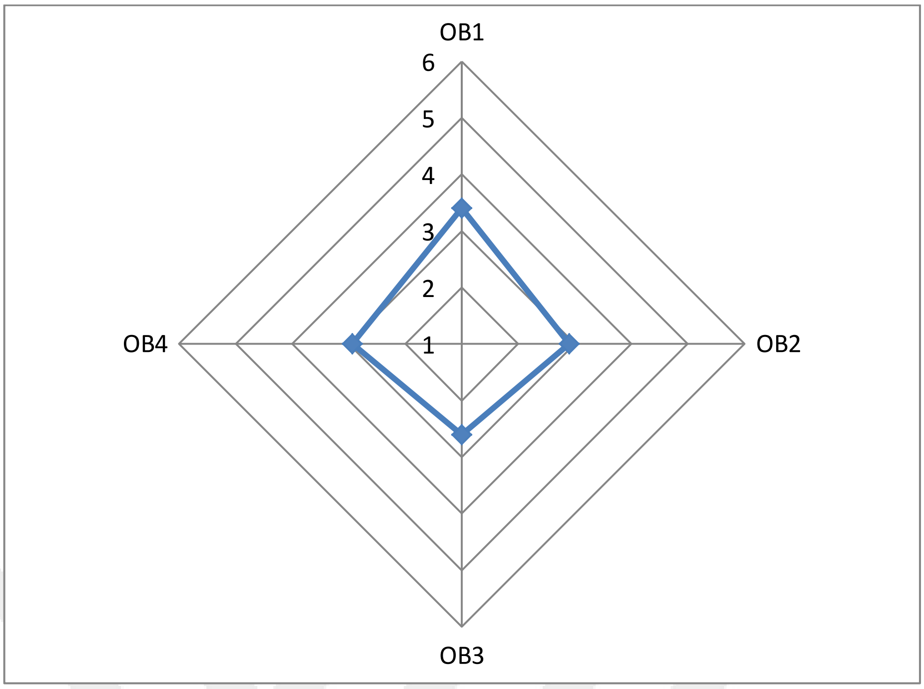


Figure 5.92 Operative behaviors profile for Company 7- white collar perception

5.2.7.6 Manufacturing Flexibility Profile-Company 7- White collar perception

The list of the manufacturing flexibility dimensions along with the corresponding scores of Company 7, based on white collar perception is available in Table 5.135.

Table 5.135 Manufacturing flexibility perception of Company 7- White collar perception

MANUFACTURING FLEXIBILITY (MF)		**SCORE**
SG9	**Level of Product Flexibility**	**3,10**
SS9	**Level of Expansion Flexibility**	**4,10**
OG5	**Level of Volume Flexibility**	**4,30**
OG6	**Level of Mix Flexibility**	**4,20**
OS4	**Level of Machine Flexibility**	**3,75**
OS5	**Level of Routing Flexibility**	**3,90**
OS6	**Level of Operations Flexibility**	**3,80**
OB4	**Level of Labor Flexibility**	**2,93**
Overall Manufacturing Flexibility Score		**3,76**

Manufacturing flexibility scores indicates that white collar employees perceive that Company 7 has flexibility levels, except *level of labor flexibility*, better than the competitors. The overall flexibility score illustrates that the perceived manufacturing flexibility level is above the competition. Manufacturing flexibility profile of company 7, based on white collar employees' perception is illustrated with the radar diagram in Figure 5.93.

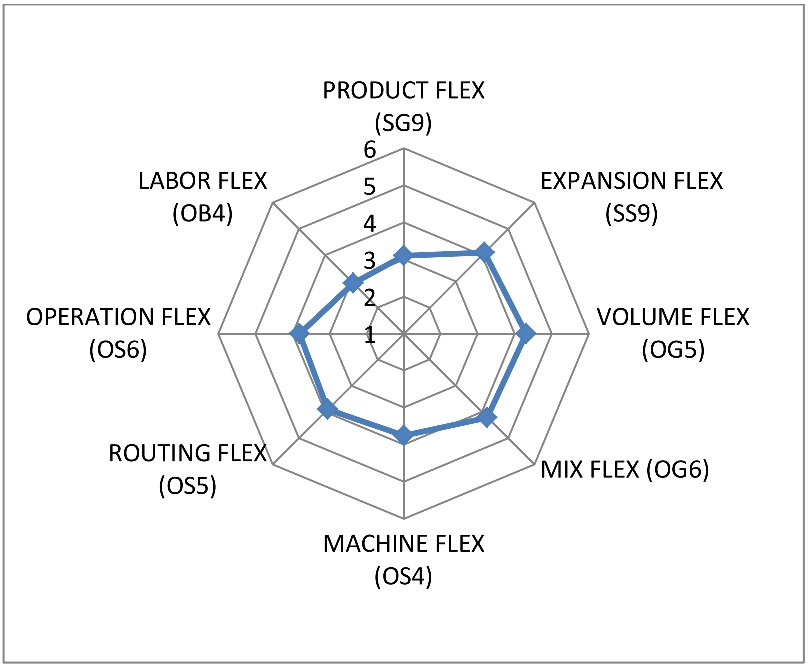


Figure 5.93 Manufacturing Flexibility Profile for Company 7- White collar perception

5.2.7.7 Market Dynamism – Company 7- white collar perception

The perceived market dynamism scores upon white collar survey are illustrated in Table 5.136.

Table 5.136 Market dynamism – Company 7 – white collar perception

MARKET DYNAMISM (MD)		**SCORE**
MD1	**Dynamism in Competition Intensity**	**3,53**
MD2	**Dynamism in Customer Preferences**	**3,60**
MD3	**Dynamism in Technology**	**3,60**
Overall Market dynamism		**3,58**

The perception of the management about dynamism in competition intensity is mid-high. Dynamism in customer preferences and technology are perceived mid-high. Overall market dynamism score is 3,58 and refers to a perceived mid-high market dynamism.

5.2.7.8 Firm Performance – Company 7- white collar perception

The perceived firm performance scores of Company 7 based on white collar survey, are listed in Table 5.137.

Table 5.137 Firm performance Company 7 – white collar perception

FIRM PERFORMANCE (FP)		**SCORE**
FP1	**Financial Performance**	**3,93**
FP2	**Market Performance**	**4,07**
FP3	**Innovation Performance**	**3,80**
FP4	**Manufacturing Performance**	**3,61**
Overall Firm Performance		**3,85**

The scores of firm performance show us that, white collar employees perceive that company 7 performs better than the competitors for each performance element. Overall firm performance score is 3,85 and refers to a perception of *mid-high* aggregate performance.

5.2.7.8.1 Manufacturing performance

The subconstructs of manufacturing performance with the scores, based on white collar survey, are listed in Table 5.138.

Table 5.138 Manufacturing performance Company 7- white collar perception

MANUFACTURING PERFORMANCE (FP4)		SCORE
FP41	**Manufacturing quality performance**	**3,93**
FP42	**Manufacturing cost performance**	**3,43**
FP43	**Manufacturing flexibility performance**	**3,97**
FP44	**Delivery performance**	**3,10**
Overall Manufacturing performance		**3,61**

Overall manufacturing performance score (3,61) indicates that white collar employees that their manufacturing performance is better than the competitors'. Manufacturing quality performance refers to a high level performance. White collar employees also perceive that their manufacturing flexibility performance is also better than the competition. However they perceive that Company 7 has a lower manufacturing cost and delivery performance than the competition.

The comparison of the scores of manufacturing performance subconstructs with the corresponding operative goals subconstructs is listed in Table 5.139

Table 5.139 Comparison of manufacturing performance scores and operative goals scores- Company 7- white collar perception

MANUFACTURING PERFORMANCE (FP4)		SCORE	OPERATIVE GOALS		SCORE
FP41	**Manufacturing quality performance**	**3,93**	**OG2**	**Quality performance goal**	**4,80**
FP42	**Manufacturing cost performance**	**3,43**	**OG1**	**Manufacturing cost reduction performance goal**	**5,00**
FP44	**Delivery performance**	**3,10**	**OG3**	**Delivery performance goals**	**5,00**

5.2.7.9 Company 7 – Comparison of results

The results of the both top management interview and white collar employee survey are illustrated in detail in previous sections. In this section, comparison of both results is given.

5.2.7.9.1 Comparison of Normative level IFMMM profiles – Company 7

The comparative scores of normative level items, derived from top management interview and white collar survey as listed in Table 5.140.

Table 5.140 Comparison of normative level items – Company 7

		Top Management Results		White Collar Results	
NORMATIVE GOALS (NG)		Score	Profile	Score	Profile
NG1	Internal Direction of the Mission	4,67	Social Economic	4,27	Social Economic
NG2	Time Perspective of the Goal	4,50	Long Term	5,10	Long Term
NG3	Chance Perspective	5,00	Progressive	4,80	Progressive
NG4	Risk Perspective	4,00	Vulnerable	4,30	Vulnerable
NG5	Objective Performance goals	5,34	Strong	5,07	Strong
NG6	Financial Value Goals	4,50	Strong	4,80	Strong
NG7	Ecological Goals	4,00	Strong	4,80	Strong
NG8	Social Goals	5,34	Strong	4,47	Strong
Overall normative goals score		4,67		4,70	
NORMATIVE STRUCTURES (NS)		Score	Profile	Score	Profile
NS1	Representation of interests in board	5,00	Stakeholder	3,90	Stakeholder
NS2	Art of Conflict Resolution	4,34	Consensus	4,14	Consensus
NS3	Economical, Legal and Social Structure	6,00	Differentiated	1,00	Non-differentiated
NS4	Distance of Management to Real Life	4,00	Far-Strategic	3,20	Close-Operative
NS5	Competence Distribution of Management	1,50	Single level	3,60	Multilevel
NS6	Division of Executives	5,50	Staff,Team	4,70	Staff,Team
NS7	Sense of Responsibility of Top Management Team	4,00	Multiplier	5,00	Multiplier
NS8	Rationale of Top Management Team	5,00	Consulting	5,14	Consulting
Overall normative structures score		4,42		3,84	
NORMATIVE BEHAVIORS (NB)		Score	Profile	Score	Profile
NB1	Cultural Openness	4,67	Outside oriented	4,74	Outside oriented
NB2	Attitude Towards Change	4,34	Friendly	4,20	Friendly
NB3	Orientation of Management	4,50	Basis	3,90	Basis
NB4	Subcultural Differentiation	4,67	Functionally differentiated	3,94	Functionally differentiated
NB5	Cultural expression	4,25	Development oriented	4,00	Development oriented
NB6	Value Added Orientation	2,00	Cost oriented	2,55	Cost oriented
NB7	Role of employees	5,00	Actors	4,20	Actors
NB8	Employee engagement	2,50	Individual, Hero	2,90	Individual, Hero
Overall normative behaviors score		3,99		3,80	

The normative goals elements' profiles of company 7, based on top management perception and based on white collar perception are all same. All elements of normative goals perceived with same profile by both top management and white collar employees. The overall normative goals score of company 7, based on top management perception is **4,67** and based on white collar employees is **4,70.**

When we compare the normative structures elements, white collar and top management of company perceive profiles of 3 elements different than each other, namely NS3, NS4 and NS5 and both perceive the remaining elements' profile same. While top management perceives that *distance of the management to real life* profile is *far-strategic;* white collar employees perceive that top management team members are closely dealing with operational activities. NS5 profile indicates that according to top management, audit and execution functions are performed by the same team. However white collar employees perceive that there is a separate audit team. The overall normative structures score of company 7, based on top management perception is **4,42** and based on white collar employees is **3,84** and both indicates a *mid-high* IFMMM profile**.**

The normative behaviors elements' profiles of company 7, based on top management perception and based on white collar perception are all same. All elements of normative behaviors perceived with same profile by both top management and white collar employees. The overall normative behaviors score of company 7, based on top management perception is **3,99** and based on white collar employees is **3,80.**

The normative level IFMMM profiles for Company 7, based on top management perception and white collar perception are illustrated in Figure 5.94 for better visual comparison.

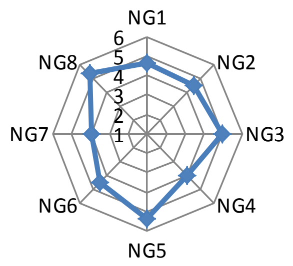
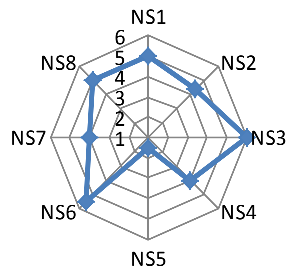
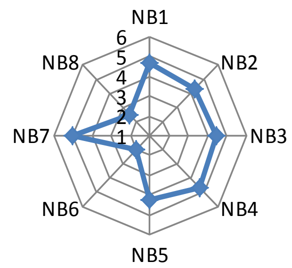
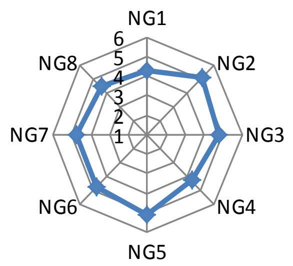
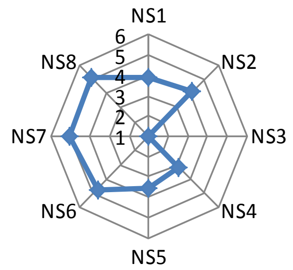
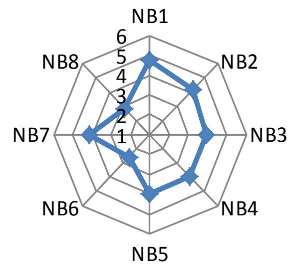
<table>
<tr><th></th><th>NORMATIVE GOALS</th><th>NORMATIVE STRUCTURES</th><th>NORMATIVE BEHAVIOURS</th></tr>
<tr><td>TOP MANAGEMENT PERCEPTION</td><td>
</td><td>
</td><td>
</td></tr>
<tr><td>WHITE COLLAR PERCEPTION</td><td>
</td><td>
</td><td>
</td></tr>
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Figure 5.94 Comparison of normative level profiles- Company 7

5.2.7.9.2 Comparison of strategic level IFMMM profiles – Company 7

The comparative scores of strategic level items, derived from top management interview and white collar survey as listed in Table 5.141.

Table 5.141 Comparison of strategic level items – Company 7

		Top Management Results		White Collar Results	
STRATEGIC GOALS (SG)		**Score**	**Profile**	**Score**	**Profile**
SG1	**Supply of performance**	**4,00**	**Broad**	**3,67**	**Broad**
SG2	**Individuality of problem solving**	**4,50**	**Individual**	**4,20**	**Individual**
SG3	**Competitive posture**	**5,00**	**Offensive**	**3,70**	**Offensive**
SG4	**Leader-follower behavior**	**4,50**	**Leader**	**4,40**	**Leader**
SG5	**Value added activities**	**3,50**	**Customer focused optimization**	**4,20**	**Customer focused optimization**
SG6	**Dependency of value added activities**	**3,00**	**Individual**	**4,50**	**Networking**
SG7	**Deployment of resources**	**1,00**	**Fixed**	**4,30**	**Flexible**
SG8	**Performance of resources**	**4,00**	**Generalist**	**4,00**	**Generalist**
SG9	**Level of product flexibility**	**3,50**	**High**	**3,10**	**Low**
Overall strategic goals score		**3,67**		**4,00**	
STRATEGIC STRUCTURES (SS)		**Score**	**Profile**	**Score**	**Profile**
SS1	**Focus**	**1,00**	**Issue oriented**	**3,00**	**Issue orieted**
SS2	**Reference points**	**3,67**	**Symbols**	**3,60**	**Symbols**
SS3	**Extent of rules**	**5,00**	**Effectiveness oriented**	**4,20**	**Effectiveness oriented**
SS4	**Time orientation**	**5,00**	**Unlimited period**	**3,20**	**PredicTable period**
SS5	**Synergy orientation**	**3,00**	**Centralized**	**3,53**	**Decentralized**
SS6	**Hierarchy**	**4,00**	**Low**	**3,20**	**High**
SS7	**Organizational development**	**2,33**	**Inwards, efficiency**	**3,10**	**Inwards, efficiency**
SS8	**Starting point of organizational development**	**4,00**	**Bottom-Up**	**3,40**	**Top-down**
SS9	**Level of Expansion flexibility**	**4,50**	**High**	**4,10**	**High**
Overall strategic structures score		**3,61**		**3,49**	
STRATEGIC BEHAVIORS (SB)		**Score**	**Profile**	**Score**	**Profile**
SB1	**Level of Participative Behavior**	**4,67**	**High**	**3,94**	**High**
SB2	**Focus of behavior development**	**5,34**	**Team**	**4,14**	**Team**
SB3	**Desired management behavior**	**4,34**	**Entrepreneurial**	**3,47**	**Risk-Averse**
SB4	**Desired Competency Potential**	**4,67**	**Generalist**	**4,07**	**Generalist**
SB5	**Authority development**	**6,00**	**Comunication-specialist based**	**3,90**	**Comunication-specialist based**
SB6	**Focus of desired responsibility**	**5,34**	**Delegation-autonomous**	**4,27**	**Delegation-autonomous**
SB7	**Place of Behavior Development**	**5,00**	**On the job**	**3,80**	**On the job**
SB8	**Type of Desired Learning Behavior**	**4,34**	**Horizontal**	**3,80**	**Horizontal**
Overall strategic behaviors score		**4,96**		**3,92**	

When we compare the strategic goals profiles of company 7, based on top management perception and based on white collar perception, all profiling elements except SG6 and SG9, all other elements' perceived with the same profile by top management and white collar employees. While top management perceives that their *dependency of value added activities* profile is *individual*, white collar employees perceive a *networking* profile. The other difference is about SG9 profile, *level of product flexibility.* Top management perceives a *mid-high* level of product flexibility (score is 3,50); but white collar employees perceive a *low* level of product flexibility (score is, 3,10).

The overall strategic goals score of company 7, based on top management perception is **3,67** and based on white collar employees is **4,00.**

The comparison of strategic structures scores and profiles derived from top management interview and white collar survey illustrates us that the perception of both about SS1, SS2, SS3 and SS7 profiles are same. Moreover both top management and white collar employees of company 7 think that the company's *expansion flexibility* level is higher than their competitors. On the other hand, the perceived profiles of SS4, SS5, SS6 and SS8 upon top management interview and white collar survey are different. While top management thinks that the *level of hierarchy* is *low;* white collar employees feel a *high level of hierarchy.* Similiarly, while top management perceives a *bottom-up* profile for SS8, white collar employees perceive the same as *top-down*. However, SS5 profiles illustrate that, while top management thinks that the *synergy orientation* is *centralized;* white collar employees perceive a *Decentralized* profile.

The overall strategic structures score of company 7, based on top management perception is **3,61** and based on white collar employees is **3,49.**

All of the strategic behaviors' elements are perceived with the same profile by top management and white collar employees of company 7 except SB3 (*desired management behavior)*. Top management perceives that they have an *entrepreneurial behavior,* white collar employees perceive a *risk averse* profile. Even though NB2, *attitude towards change* (see Table 5.140) profile upon white collar survey is *friendly* and NG4, *risk perspective* is *vulnerable;* SB3 profile is perceived as *risk-averse.* However we have to state that the score of SB3 element, based on white collar perception, is *3,47,* which is very closed to the medium value.

The overall strategic behaviors score of company 7, based on top management perception is **4,96** and based on white collar employees is **3,92.**

The strategic level IFMMM profiles for Company 7, based on top management perception and white collar perception are illustrated in Figure 5.95 for better visual comparison.

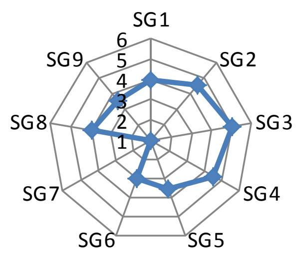
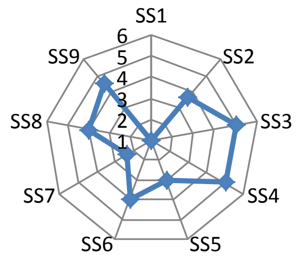
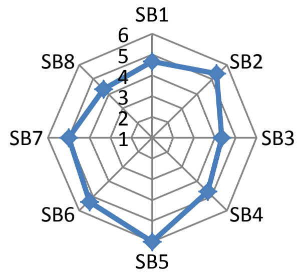
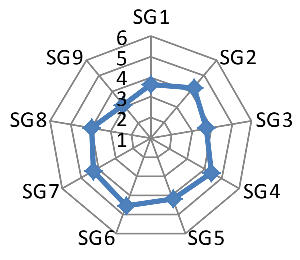
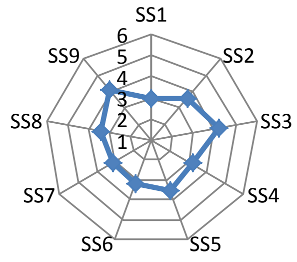
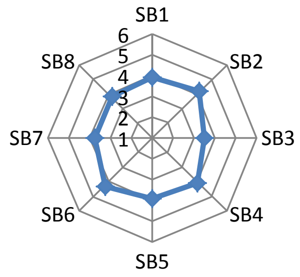
	STRATEGIC GOALS	STRATEGIC STRUCTURES	STRATEGIC BEHAVIOURS
TOP MANAGEMENT PERCEPTION			
WHITE COLLAR PERCEPTION			

Figure 5.95 Comparison of strategic level profiles- Company 7

5.2.7.9.3 Comparison of operative level IFMMM profiles – Company 7

The comparative scores of operative level items, derived from top management interview and white collar survey as listed in Table 5.142.

Table 5.142 Comparison of operative level items – Company 7

		Top Management Results		White Collar Results	
OPERATIVE GOALS (OG)		**Score**	**Profile**	**Score**	**Profile**
OG1	**Manufacturing cost reduction goal**	**4,00**	**High**	**4,80**	**High**
OG2	**Quality performance goal**	**5,00**	**High**	**5,00**	**High**
OG3	**Delivery performance goal**	**4,00**	**High**	**5,00**	**High**
OG4	**New product introduction performance goal**	**4,67**	**High**	**3,54**	**High**
OG5	**Level of 352olüme flexibility**	**4,50**	**High**	**4,30**	**High**
OG6	**Level of mix flexibility**	**4,00**	**High**	**4,20**	**High**
Overall operative goals score		**4,36**		**4,47**	
OPERATIVE STRUCTURES (OS)		**Score**	**Profile**	**Score**	**Profile**
OS1	**Production Systems Applications**	**5,67**	**Wide**	**4,27**	**Wide**
OS2	**Infrastructural Production Support Systems Applications**	**3,63**	**Wide**	**2,33**	**Narrow**
OS3	**Design Applications**	**6,00**	**Wide**	**3,10**	**Narrow**
OS4	**Level of machine flexibility**	**4,25**	**High**	**3,75**	**High**
OS5	**Level of routing flexibility**	**4,00**	**High**	**3,90**	**High**
OS6	**Level of operation flexibility**	**4,50**	**High**	**3,80**	**High**
Overall operative structures score		**4,67**		**3,52**	
OPERATIVE BEHAVIORS (OB)		**Score**	**Profile**	**Score**	**Profile**
OB1	**Team Work**	**6,00**	**Wide**	**3,40**	**Narrow**
OB2	**Decision Making Processes in Operations**	**4,00**	**Decentralized**	**2,90**	**Centralized**
OB3	**Multi skilled labor**	**4,00**	**Wide**	**2,60**	**Narrow**
OB4	**Level of labor flexibility**	**3,34**	**Low**	**2,94**	**Low**
Overall strategic behaviors score		**4,34**		**2,96**	

All elements of operative goals profiles are perceived with the same profile by top management and white collar employees of company 7. They both perceive that they emphasis on manufacturing cost; quality, delivery and new product development goals are *high*. Moreover *level of volume* and *mix flexibilities* is perceived *high* by both parties.

The overall operative goals score of company 7, based on top management perception is **4,36** and based on white collar employees is **4,47.**

The perceived operative structures profiles differ for OS2 and OS3 elements. Top management perceives that the *infrastructural production support systems* and *design applications* are widely used within company 7. However white collar employees perceive that both *infrastructural production support systems* and *design applications* are not widely applicable, but application of both is limited. But both parties perceive a *high* level of *machine, operation and routing flexibilities.*

The overall operative goals score of company 7, based on top management perception is **4,67** and based on white collar employees is **3,52.**

The operative Behaviors profiles illustrate us that the perception of top management and white collar is different for OB1, OB2 and OB3 elements. Top management thinks that, their employees are *multi-skilled;* can work as a *team* and decision making process at operational level is *decentralized.* White collar employees perceive that *teamwork* is not widely applicable at operational level, their employees are not *multi-skilled* and decision making process at operational level is *centralized*. However both, top management and white collar employees perceive that *level of labor flexibility* is *lower* than the competitors.

The operative level IFMMM profiles for Company 7, based on top management perception and white collar perception are illustrated in Figure 5.96 for better visual comparison.

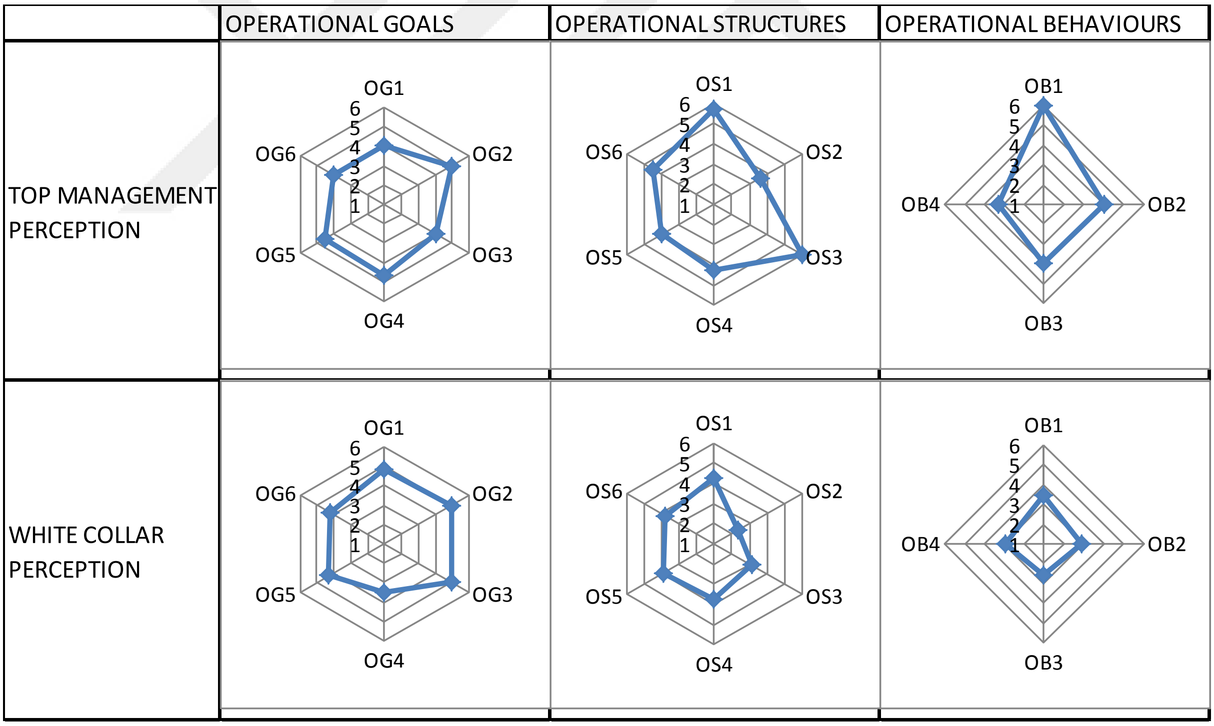


Figure 5.96 Comparison of operative level profiles- Company 7

5.2.7.9.4 Comparison of manufacturing flexibility scores – Company 7

The comparative scores of manufacturing flexibility items, derived from top management interview and white collar survey as listed in Table 5.143.

Table 5.143 Comparison of manufacturing flexibility– Company 7

MANUFACTURING FLEXIBILITY (MF)	**Top management perception scores**	**White collar employees perception scores**
Level of Product Flexibility	**3,50**	**3,10**
Level of Expansion Flexibility	**4,50**	**4,10**
Level of Volume Flexibility	**4,50**	**4,30**
Level of Mix Flexibility	**4,00**	**4,20**
Level of Machine Flexibility	**4,25**	**3,75**
Level of Routing Flexibility	**4,00**	**3,90**
Level of Operations Flexibility	**4,50**	**3,80**
Level of Labor Flexibility	**3,34**	**2,93**
Overall Manufacturing Flexibility Score	**4,07**	**3,76**

While top management perceives that company 7 has a *high* level of product flexibility, white collar employees perceive the same as *low.* However we have to state that the *level of product flexibility* score of top management perception is *3,50* and of white collar perception is *3,10.* The profiles of the all remaining flexibility dimensions are same for both parties. Both perceive *levels of* expansion*, volume, mix, machine, routing* and *operations flexibilities* are *high;* and perceive *level of labor flexibility* is *low.*

5.2.7.9.5 Comparison of market dynamism scores – Company 2

The comparative scores of market dynamism, derived from top management interview and white collar survey as listed in Table 5.144.

Table 5.144 Comparison of market dynamism– Company 7

MARKET DYNAMISM (MD)		Top management perception scores	White collar employees perception scores
MD1	Dynamism in Competition Intensity	5,00	3,53
MD2	Dynamism in Customer Preferences	3,50	3,60
MD3	Dynamism in Technology	4,00	3,60
Overall Market dynamism		4,17	3,58

Both top management and white collar employees of company 7 perceive that the market that they operate in is a dynamic market. They both perceive that the dynamism in competition intensity; customer preferences and technology is high.

5.2.7.9.6 Comparison of firm performance scores – Company 2

The comparative scores of firm performance, derived from top management interview and white collar survey as listed in Table 5.145.

Table 5.145 Comparison of firm performance– Company 2

FIRM PERFORMANCE (FP)		Top management perception scores	White collar employees perception scores
FP1	Financial Performance	4,00	3,93
FP2	Market Performance	5,67	4,07
FP3	Innovation Performance	4,43	3,80
FP4	Manufacturing Performance	4,42	3,61
Overall Firm Performance		4,63	3,85

Both top management and white collar employees of company 7 perceive that their companies financial, market, innovation and manufacturing performance is better than the competitors. The overall firm performance score of company 7, based on top management perception is *4,63* and based on white collar perception is *3,85* .

5.3 Cross- Case Analysis

In this section we present the comparison of the IFMMM scores and profiles of the 7 cases included in the study. Besides we have included white collar employee survey for company 2 and company 7; we only include IFMMM scores and profiles, based on top management perception for all 7 cases. For better understanding of the section, we summarize the company profiles in Table 5.146.

Table 5.146 Case profiles – All companies

Case	Industry	Years in Business	Subsidiary of a Group	No of Employees	No of Products	Annual Turnover (Million USD)	Single Site/ Multisite	Region
Company 1	2820- Plastic Compounding	10-19	No	50-99	100-499	10-49	Single Site	Marmara
Company 2	2673-Plastic Packaging	30-39	Yes	100-249	1000 and more	50-99	Single Site	Marmara
Company 3	3050- Plastic Hose and Construction Materials	50-59	Yes	500-999	100-499	Over 100	Multi-Site	Marmara, Souteast Anatolian
Company 4	3080-Plastic Containers	0-9	No	250-499	500-999	10-49	Multi-Site	Marmara, Mediterannian
Company 5	3080-Plastic Containers	30-39	No	50-99	100-499	10-49	Multi-Site	Aegean
Company 6	2211- Fabric Production	10-19	No	250-499	1000 and More	50-99	Multi-Site	Marmara
Company 7	3460- Metal Forging and Stamping	50-59	No	250-449	100-499	50-99	Single Site	Marmara

The companies included in the study have various profiles in terms of industry, size, and number of employees. The company profiles will also be encountered in cross case analysis.

5.3.1 Comparison of perceived IFMMM capabilities scores

In section 5.2., we have presented IFMMM scores and profiles of each company in detail. For each IFMMM field, we have calculated an overall IFMMM field score as a *mean* value of each elements score of that field. The overall IFMMM field scores of each case are listed in Table 5.147.

Table 5.147 Perceived IFMMM scores for all cases

	Co1	Co2	Co3	Co4	Co5	Co6	Co7	Min	Max	Mean	Std Dev
NG	5,04	5,31	5,04	4,71	4,81	4,27	4,67	4,27	5,31	4,84	0,31
NS	5,00	4,83	4,67	5,25	4,92	3,83	4,42	3,83	5,25	4,70	0,43
NB	4,00	4,34	4,26	4,87	4,06	3,71	3,99	3,71	4,87	4,18	0,34
SG	4,11	5,06	4,72	4,70	4,68	4,15	3,67	3,67	5,06	4,44	0,44
SS	3,05	4,42	3,46	3,87	3,94	3,35	3,61	3,05	4,42	3,67	0,42
SB	4,52	4,71	4,87	4,99	4,83	3,92	4,96	3,92	4,99	4,69	0,35
OG	5,50	5,22	5,17	4,58	4,94	5,19	4,36	4,36	5,50	4,99	0,37
OS	4,14	4,22	4,42	4,67	4,17	4,06	4,67	4,06	4,67	4,34	0,23
OB	3,75	4,00	4,92	4,33	4,67	4,50	4,34	3,75	4,92	4,36	0,36
IFMMM	**4,35**	**4,68**	**4,61**	**4,66**	**4,56**	**4,11**	**4,30**	**4,11**	**4,68**	**4,47**	**0,20**

Except Company 4 and Company 5, we can observe that at normative level, scores of normative goals is higher than normative scores and is higher than normative behaviors. This pattern is compatible with IMM's assumption that after goals are determined, structures are manipulated and a behavioral pattern is created (Alsan and Oner, 2003). At strategic level, despite strategic goals scores are higher than strategic structures scores for all companies; strategic behaviors scores are higher than strategic structures scores. At the operative level, all operative goals scores are higher than operative behaviors scores. Moreover, except company 4 and company 7, all operative goals scores are higher than operative structures scores. But we observe the decreasing pattern at vertical integration only in company 1 and company 2.

The strategic structures scores are the lowest scores for all cases except company 2. There is no company which has a *high* strategic structures capability and two cases (company 1 and company 2) have *mid-low* strategic structures capability. These perceived scores illustrate us that the companies can focus on developing their managerial capabilities related with strategic structures.

If we analyze the mean values of the IFMMM fields, we observe that only normative goals and operative goals fields mean values indicate an average *high* capability. Therefore, we also state that there are several improvement areas for IFMMM capabilities at all levels.

Particularly operative structures scores indicate the need for improvement for all companies. As discussed in section 5.2., the companies can improve their OS1 capabilities with the installation and usage of relevant production system applications and OS2 capabilities with the application of relevant infrastructural production support systems (details are available in Table 3.10).

Company 6, which is operating in textile industry, has the lowest perceived scores for all normative level IFMMM fields. Moreover, strategic behaviors and operative structures scores of company 6 are also the lowest among 7 companies. These scores might indicate that management of company 6 can focus on improving IFMMM capabilities at normative level and as well as other related strategic and operative level items.

We observe the lowest aggregate IFMMM capability score in company 6 and highest aggregate IFMMM score in company 2.

The IFMMM profiles of seven companies are illustrated together as a radar diagram in Figure 5.97.

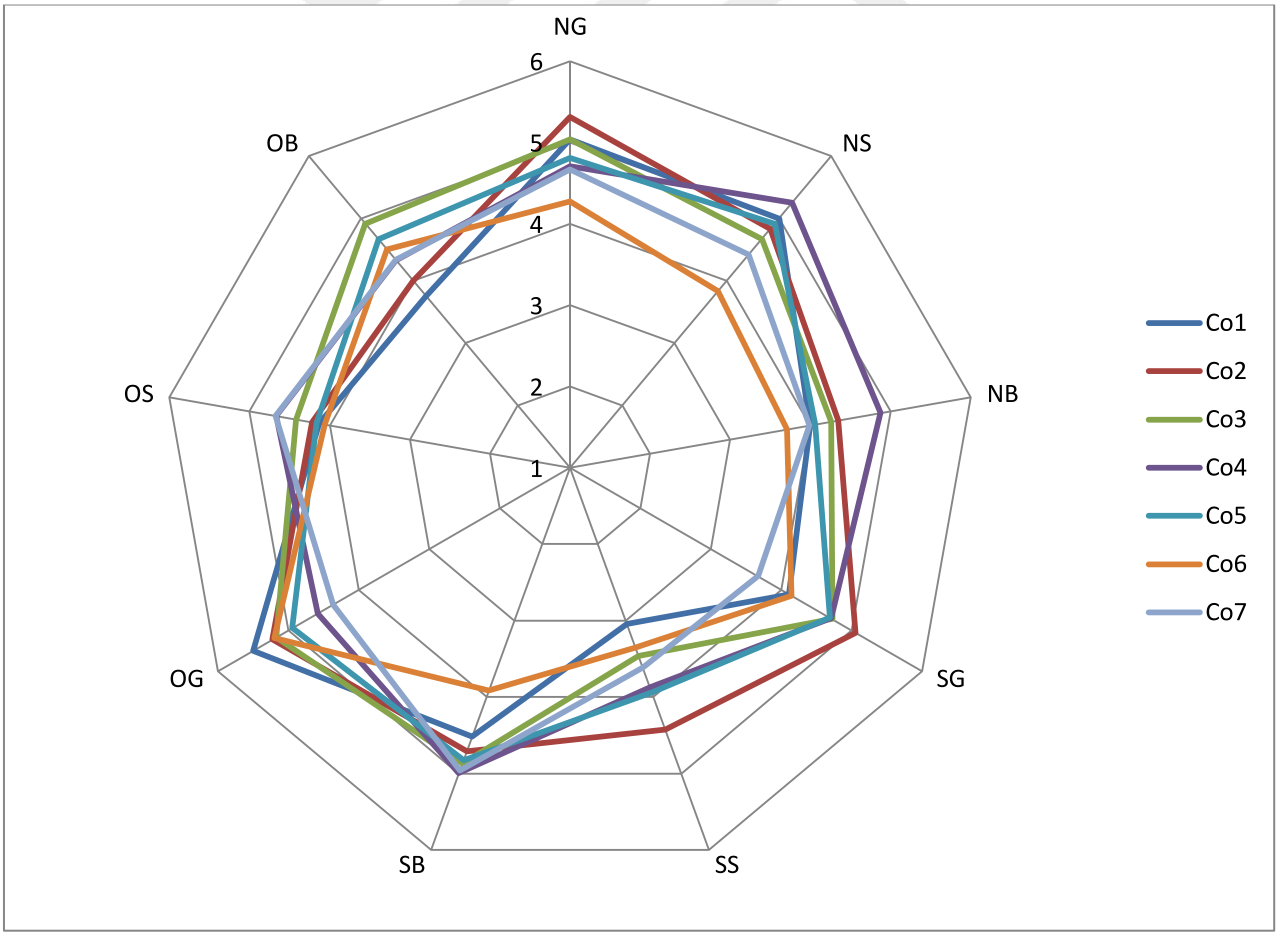


Figure 5.97 Comparison of IFMMM Profiles – All Cases

We can see that IFMMM profiles of all cases are different than each other. Normative Goals and Operative Goals scores of the companies illustrate *high* IFMMM capability.

Detailed comparison Tables and illustrated radar diagrams for each IFMMM field are available in Appendix 5.

5.3.2 Comparison of perceived manufacturing flexibility scores

The perceived scores of manufacturing flexibility dimensions for all cases are listed in Table 5.148.

Table 5.148 Perceived manufacturing flexibility scores- all companies

Company	Co1	Co2	Co3	Co4	Co5	Co6	Co7	Min	Max	Mean	Std Dev
PRODUCT FLEX (SG9)	5,50	5,00	4,14	5,00	4,14	2,50	3,50	2,50	5,50	4,25	0,95
EXPANSION FLEX (SS9)	4,00	6,00	5,00	6,00	6,00	5,00	4,50	4,00	6,00	5,21	0,75
VOLUME FLEX (OG5)	4,00	4,14	2,00	4,14	4,00	5,00	4,50	2,00	5,00	3,97	0,87
MIX FLEX (OG6)	5,00	4,14	5,00	2,00	4,14	3,50	4,00	2,00	5,00	3,97	0,95
MACHINE FLEX (OS4)	4,58	5,00	5,00	2,75	2,75	5,00	4,25	2,75	5,00	4,19	0,95
ROUTING FLEX (OS5)	5,00	5,00	4,14	5,00	5,00	3,50	4,00	3,50	5,00	4,52	0,58
OPERAT FLEX (OS6)	5,00	4,00	2,00	4,14	4,14	4,50	4,50	2,00	5,00	4,04	0,89
LABOR FLEX (OB4)	3,00	4,00	5,66	4,33	4,33	4,00	3,34	3,00	5,66	4,09	0,79
Aggregate MF	**4,51**	**4,66**	**4,12**	**4,17**	**4,31**	**4,13**	**4,07**	**4,07**	**4,66**	**4,28**	**0,21**

The highest perceived scores among manufacturing flexibility dimensions occur for level of expansion flexibility. The top managers of all companies except company 1 and company 7 perceive high level of expansion flexibility. Managers of company 1 and company 7 perceive mid-high level of expansion flexibility. The top management of the companies is confident about their capability to expand production capacity effectively, when needed.

Since product flexibility has a direct impact on the competitive position of a company (Suarez et al., 1996), we have considered product flexibility as a strategic goals element. Company 6 has the lowest perceived level of product flexibility and also has the lowest perceived IFMMM capability at normative and strategic levels. Moreover, company 7 has the second lowest perceived of level of product flexibility, and also the second lowest perceived IFMMM capability at normative and strategic levels.

The lowest perceived flexibility scores have been observed in mix and volume flexibility dimensions. Company 4 has a low level of mix flexibility, where company 3 has a low level of volume flexibility. Company 3 also has the lowest level of perceived operation flexibility score. This perception could be associated with the continuous flow, mass production system available in company 3. On the other hand, company 3 has the highest level of perceived labor flexibility. The reason is that the blue collar employees are able to perform multi tasks in company 3. However, we omit labor flexibility; company 3 has the lowest level of manufacturing flexibility score. This situation could be related with the size, since company 3 is bigger than the other companies in terms of sales revenue and number of employees.

Company 4 and company 5 are operating in the same industry and have similar production systems. The second order flexibility dimensions, including machine, routing, operations and labor flexibility scores of the two companies are also similar. We can say that similarity of production systems can lead the similarity of the perceived scores of the second order flexibility dimensions. Machine flexibility scores of these two companies are both mid-low level, since the equipment used in production are not general purpose machinery. However level of routing flexibility of both are high, since they have several identical machines, which can be used for the same operations are available within production system.

Except company 6 and company 7, remaining five companies are operating in plastic related industries. The product flexibility scores of company 6 and company 7 has the lowest scores, compared with the remaining companies. Even though the level of product flexibility is determined upon the perception of the top managers by comparing with the competitors, the reason behind might be that introducing a new product to the market or modifying an existing product is relatively easier in plastic related industries, due to ease in molding and compounding. Similiarly, routing flexibility scores of company 6 and company 7 are relatively lower than the remaining five cases. The reason might be that the plastic processing technologies requires similar machines and tools within the production units. By changing the molds, alternative operation centers can be used to produce alternative products, therefore routing flexibility is expected to be higher in plastic processing factories.

The perceived manufacturing flexibility profiles of seven companies are illustrated together as a radar diagram in Figure 5.98.

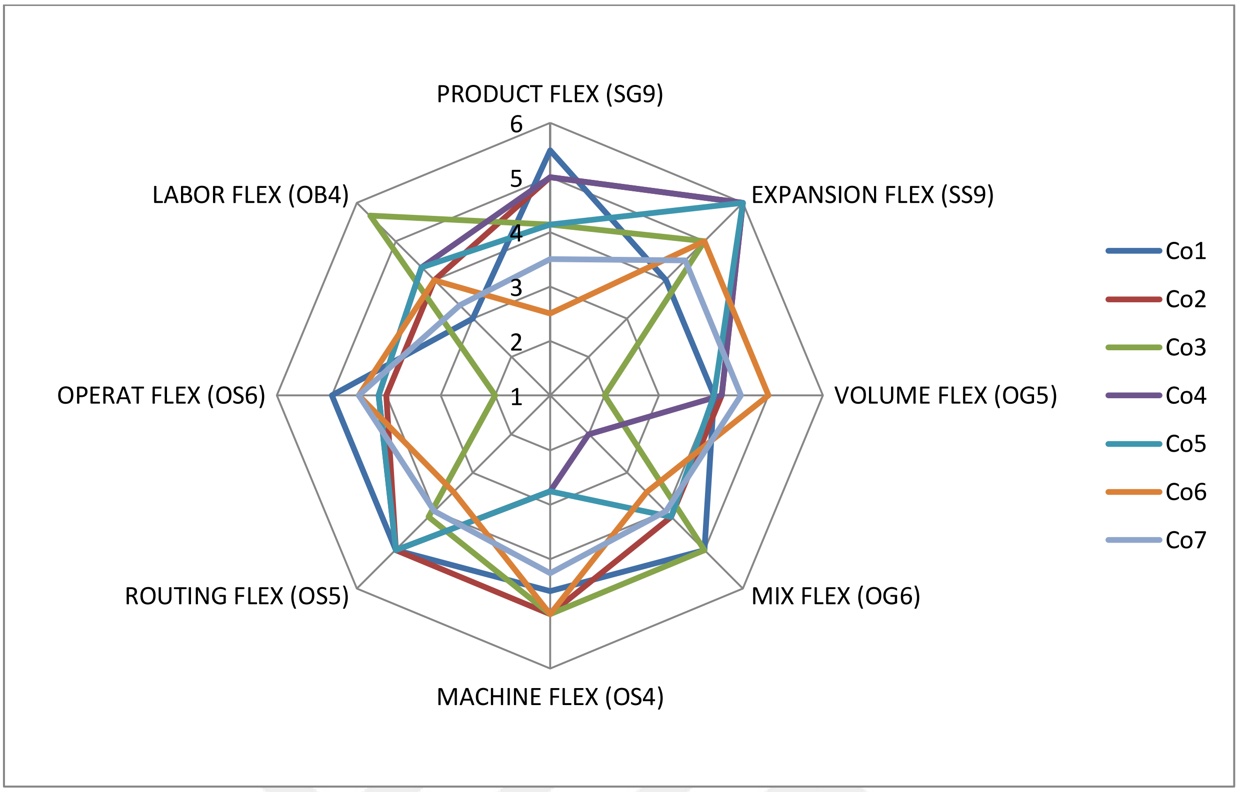


Figure 5.98 Comparison of perceived manufacturing flexibility profiles – All Cases

5.3.3 Comparison of perceived market dynamism scores

As illustrated in Table 5.146, the companies included in the study are operating in different industries. Only company 4 and company 5 are operating in the same industry. The perceived market dynamism scores are illustrated in Table 5.149.

Table 5.149 Perceived market dynamism scores- all companies

CO	Co1	Co2	Co3	Co4	Co5	Co6	Co7	Min	Max	Mean	Std Dev
MD1	2,00	6,00	4,00	4,66	5,00	6,00	5,00	2,00	6,00	4,67	1,27
MD2	4,00	4,00	4,33	4,00	4,50	4,50	3,50	3,50	4,50	4,12	0,33
MD3	3,00	4,00	6,00	4,00	5,00	3,00	4,00	3,00	6,00	4,14	0,99
MD	**3,00**	**4,67**	**4,78**	**4,22**	**4,83**	**4,50**	**4,17**	**3,00**	**4,83**	**4,31**	**0,59**

Top manager of Company 1 perceives mid-low dynamism for the market that they operate in. Especially dynamism in competition intensity (MD1) is perceived as a low degree of dynamism. During the interview, the manager informed us that the plastic compounding market in Turkey is relatively a stable market. Company 2, Company 5, Company 6 and

Company 7 perceives high degree of dynamism in competition intensity. Company 6 is operating in fabric production industry and the top management of the company perceives dynamism in technology as a mid-low dynamism. Company 7, which is operating in the metal forging and stamping industry, but producing parts for automotive industry, has the lowest perceived dynamism score for customer preferences (MD2).

Company 4 and company 5 are operating in the same industry, namely plastic containers industry. Company 5 perceives more dynamic industry then company 4. The difference could be related with the consumer markets of the companies. Company 4 is producing plastic containers mainly for logistics industry and company 5 is producing similar products for food industry. The difference in MD1 and MD2 could be explained due to the different customer groups.

The lowest overall market dynamism is perceived by company 1 and the highest market dynamism is perceived by company 5.

5.3.4 Comparison of perceived firm performance scores

We have compared the perceived firm performance scores of the seven companies as listed in Table 5.150.

Table 5.150 Perceived firm performance scores- all companies

CO	Co1	Co2	Co3	Co4	Co5	Co6	Co7	Min	Max	Mean	Std Dev
FP1	6,00	4,00	5,00	4,00	4,00	4,00	4,00	4,00	6,00	4,43	0,73
FP2	4,67	5,33	6,00	5,33	4,33	5,00	5,67	4,33	6,00	5,19	0,53
FP3	5,71	5,43	6,00	5,71	4,43	4,28	4,43	4,28	6,00	5,14	0,68
FP4	4,38	4,73	4,31	4,90	4,39	4,74	4,42	4,31	4,90	4,55	0,21
FP	**5,19**	**4,87**	**5,33**	**4,99**	**4,29**	**4,51**	**4,63**	**4,29**	**5,33**	**4,83**	**0,35**

Market performance (FP2) has highest perceived scores among all firm performance dimensions. Except company 1 and company 5, all other companies have a high level of perceived market performance and company 1 and company 5 have a mid-high level of perceived market performance scores.

Financial performance (FP1) scores show us that all of the managers perceive that their companies have a better financial performance than the competitors.

Innovation performance (FP3) scores illustrate that company 3 has the highest score and company 1, company 2 and company 4 have high level of innovation performance. If we recall product flexibility scores, company 1, company 2 and company 4 also have high level of product flexibility.

Aggregate firm performance values shows us that all of the top managers perceive that their companies have better performance than their competitors, where company 1, company 2, company 3 and company 4 have high level of perceived firm performance and remaining company 5, company 6 and company 7 have mid-high level of perceived firm performance scores.

6 CONCLUSION

In this study, in order to answer the research questions, we have developed a conceptual model named IFMMM (integrated flexible manufacturing model). IFMMM is developed upon two concepts; Integrated Management Model (Bleicher, 1999) and manufacturing flexibility concept. Integrated management model is used as a basis for IFMMM and as well as the profiling elements of integrated management model are included in IFMMM.

A comprehensive literature review on manufacturing flexibility and integrated management model has been done and presented within the study.

IFMMM is constructed both with elements adapted from integrated management model and elements adapted from manufacturing flexibility concept. Each profiling element of integrated management model, presented by Bleicher (1999) is analyzed within manufacturing flexibility concept individually and relevant profile is determined for each element upon the manufacturing flexibility body of research. Normative level fields of IFMMM are constructed upon these surveyed integrated management elements and relevant elements are also used as strategic level elements of IFMMM.

Manufacturing flexibility dimensions, flexibility enablers and as well as the interrelation between these dimensions and enablers are studied with an integrated management concept view. The selected flexibility dimensions and flexibility enablers are used as elements of strategic and operative levels of IFMMM.

We also aimed to explore the impact of the market dynamism on the management capabilities of flexible manufacturing companies in our research. A literature survey on the concept of market dynamism is presented in the research. The subconstructs of market dynamism are determined by the researcher within the study upon past research on market dynamism.

Another research variable included in the research is the firm performance. The impact of management capabilities of flexible manufacturing companies on the perceived firm performance is aimed to be explored within the research. In that sense, a literature survey on firm performance is presented and the subconstructs of firm performance are adapted from existing literature.

The research is exploratory in nature and aimed to develop a conceptual model, we have used case study as research methodology. We have selected seven manufacturing companies operating within Turkey but from different industries with different sizes and different production technologies to be included in our research.

In order to Figure out the management capabilities of the flexible manufacturing companies based on perceptions of managers and employees based on IFMMM, a questionnaire is developed as a data collection tool. The questionnaire also included items for the measurement of perceived market dynamism and perceived firm performance constructs.

As the final preparation for the case study (Yin, 2009), a pilot study has been conducted to refine the data collection methods, including the questionnaire. Pilot study helped us in various aspects of the methodology including testing the questionnaire, presentation of the results and preparations for field study.

Structured interviews with top managers of the companies included in the research have been conducted during the field study. Management capabilities of each of the seven companies, based on IFMMM, are figured based on the perception of the top managers and presented within the research. Along with IFMMM based management capabilities, perceived market dynamism and perceived firm performance scores of each case are presented.

The results of the application of IFMMM indicated similarities and differences in perceived IFMMM based management capabilities at all management levels for each studied company, which is compatible with the existing literature. For each studied company special focus areas identified to improve IFMMM based management capabilities.

The cross case analysis results illustrate the trend of decreasing scores from goals to behaviors at vertical dimension of IFMMM at normative level, which is compatible with the existing literature. Strategic structures field occurred as the IFMMM field with the lowest perceived scores and indicate that there are several improvement areas related with organizational structures and programs in all companies. Any IFMMM element which has a score not associated with a *high* capability profile is considered as a possible improvement area with respect to IFMMM.

The lowest scores, commonly in all seven companies belong to NB6, value added orientation of the management item, which illustrates that top managers of the selected companies focus on the cost of the activities more than the value creation. The perceived SG5, value added activities, scores also support the findings.

Company 6, which is operating in textile industry has the lowest IFMMM normative level capability scores and as well as overall IFMMM score.

Besides structured interviews, within 2 cases, namely company 2 and company 7, in order to obtain perception of white collar employees regarding IFMMM based management profiles, market dynamism and firm performance, web based surveys are conducted for each of these two companies. The results of the white collar employee surveys are presented separately within the research and a comparison of the perception of white collar employees and top management is reported for each company.

The results derived from white collar employee surveys illustrate a significant difference from the results derived from top management interview in company 2. The difference of the perception of the employees and top managers on the same subjects might address to several organizational issues, which could be the subject of a future work.

When we compare the perceived IFMMM capabilities of white collar employees of company 7 with the perceived top management perception, even though the differences exist, the similarities are frequently obtained.

The difference between these two cases could be explained by the profile of the participants of the white collar surveys. While all white collar employees of company 2 participated in the survey, only functional managers of company 7 participated in the study. Therefore a comparative study for employees from different levels of the organization might be suggested for future studies.

Despite manufacturing flexibility dimensions are included in the study as elements of IFMMM, manufacturing flexibility capabilities of the companies are presented also separately. We have observed different levels of manufacturing flexibility capabilities for each company and presented the similarities and differences within the study.

Perceived level of market dynamism for each company is presented in the study. Except company 1, remaining companies have a high level of market dynamism. The comments of the top managers regarding market dynamism are also presented.

Even though analyzing the impact on market dynamism on the management capabilities of the companies was a research objective, due to the sample size, the correlation between market dynamism and IFMMM capabilities was not searched in the study, however proposed as a future work.

Perceived firm performance scores of the companies illustrate us that all of the top managers interviewed perceive that their companies have higher level of financial, market, innovation and manufacturing then their competitors.

Analyzing the impact of the level of management capabilities on level of firm performance is also proposed as a future work.

The results of this study indicate that IFMMM provides a useful framework for determining current flexible manufacturing management capabilities of the companies and guide the managers about the possible improvement areas at all levels.

Finally, our study has a significant contribution to the existing body of research by presenting integrated flexible manufacturing management model, developed upon integrated management concept and flexible manufacturing research, which is unique in operations management research.

3.2 Limitations of the study

For some of the research variables, as manufacturing flexibility dimensions and firm performance scores, instead of perceived scores, objective data could be obtained and ncluded in data analysis. However, due to the privacy considerations, such data could not be obtained. We have applied white collar employee survey in two companies out of seven, with the permission of the top managers of these two companies, and could not have the chance for the remaining five companies. Since we have conducted a case study in this research, size of the data is not sufficient for analyzing the correlations between market dynamism, IFMMM capabilities and firm performance.

3.3 Future work

As an exploratory study, our research develops new ideas for futher studies (Yin, 2009).

The possible interrelations between IFMMM fields, and the impact of IFMMM capabilities on manufacturing flexibility dimensions could be investigated by explanatory studies. Statistical validity tests of the model could be performed as part of these studies.

Secondly the impact of market dynamism on IFMMM capabilities can be subject for a future explanatory study. Moreover manufacturing companies from different industries can be included in a longtitudinal study for better analysis.

Another subject might be the analysis of the perception of employees from different functions and managerial levels of a manufacturing company regarding IFMMM capabilities of the company.

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8 APPENDICES

8.1 Appendix 1 Instrument for measurement of flexibility dimensions (Gupta and Somers 1996)

Item / Indicators	Constructs	Alpha Coefficients
J. Time that may be required to double the output of the system is likely to be extremely low. I. Cost of doubling the output of the system is likely to be extremely low. K. The capacity (e.g., output per unit time) of the system can be increased when needed with ease. L. The capability (e.g., quality) of the system can be increased when needed with ease. A. Time required to introduce new products is extremely low. D. Time required to add a unit of production capacity is extremely low.	Expansion/market flexibility	0.75
Z. The ability of material-handling systems to move different part types for proper positioning and processing through the manufacturing facility is extremely high. AA. The ratio of number of paths the material-handling systems can support to the total number of paths is very high. BB. The material-handling system can link every machine to every other machine.	Material-handling flexibility	0.80
Q. Decrease in throughput because of a machine breakdown is extremely low. P. Cost of the production lost as a result of expediting a preemptive order is extremely low.	Routing flexibility	0.79
DD. The number of different operations that a typical machine can perform without requiring a prohibitive **cost** in switching from one operation to another is very high. CC. The number of different operations that a typical machine can preform without requiring a prohibitive **time** in switching from one operation to another is very high.	Machine flexibility	0.85
E. Shortage cost of finished products is extremely low. F. Cost of delay in meeting customer orders is extremely low.	Market flexibility	0.81
S. Number of new parts introduced per year is very high. G. Size of the universe of parts the manufacturing system is capable of producing without adding major capital equipment is extremely large.	Product/production flexibilty	0.89
X. Changeover cost between known production tasks within the current production program is extremely low. Y. The ratio of the waiting costs of processed parts and the total output is extremely low.	Process flexibility	0.85
H. The manufacturing system is capable of running virtually unattended during the second and third shift.	Programming flexibility	0.70
N. The range of volumes in which the firm can run profitably is extremely high.	Volume flexibility	0.75

8.2 Appendix 2 Instrument for measurement of Flexibility Dimensions (D'Souza and Williams, 2000)

Theoretical premise		Measurement items		Scale				
Dimension	Element	Symbol	Description	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
Volume flexibility	Range	Vol1	Range of output volumes at which the firm can run profitably is high	1	2	3	4	5
	Mobility	Vol2	Time required to increase or decrease output volume is high	1	2	3	4	5
		Vol3	Cost incurred to increase or decrease output volume is high	1	2	3	4	5
Variety flexibility	Range	Vri1	A large number of different products are produced by the manufacturing facility	1	2	3	4	5
		Vri2	A large number of new products produced every year	1	2	3	4	5
	Mobility	Vri4	The time required to introduce new products is high	1	2	3	4	5
		Vri5	The cost of introducing new products is high	1	2	3	4	5
Process flexibility	Range	Pr1	A typical machine can perform number of different operations without requiring a prohibitive amount of switching time	1	2	3	4	5
		Pr2	A typical machine can perform a number of different operations without requiring a prohibitive amount of switching cost	1	2	3	4	5
	Mobility	Pr3	Time required to switch from one part-mix to another is high	1	2	3	4	5
		Pr4	Cost required to switch from one part mix to another is high	1	2	3	4	5
Materials handling flexibility	Range	Mat1	The material handling system id designed to link every machine with every other machine on the shop floor	1	2	3	4	4
		Mat2	The material handling system can move every part for proper positioning and processing through the manufacturing facility	1	2	3	4	5
	Mobility	Mat3	Process inventory cost as a percentage of total production cost is high	1	2	3	4	5

Cronbach's alpha for:

1. Volume Flexibility Mobility (Vol2 and Vol3): 0,76

2. Variety Flexibility Range (Vr1 and Vr2):0,68

3. Variety Flexibility Volume (Vr4 and Vr5): 0,83

4. Process Flexibility Range (Pr1 and Pr2): 0,94

5. Process Flexibility Volume (Pr3 and Pr4):0,90

6. Materials Handling Flexibility (Mat1 and Mat2):0,80

8.3 Appendix 3 Instrument for the measurement of flexibility dimensions (Koste et al., 2004)

Appendix 3.1 Instrument for measuring *machine flexibility*

Construct and items	Coeff. alpha	Composite reliability	Inter-rater agreement	Standardized loading	*t*-value	Fit indices	Average variance extracted
Range-number, $n = 152$	0.80	0.79	0.85				0.58
A typical machine can perform a large percentage of the total number of operations performed in the plant (MF1)[a]							
A large number of operations can be performed by more than one machine (MF2)				0.61	7.57		
A typical machine can use many different tools (MF3)				0.88	11.02		
The number of different operations that a typical machine can perform is high (MF4)				0.78	9.77		
Range-heterogeneity, $n = 150$	0.87	0.87	0.79			GFI = 0.95; TLI = 0.84; RNI = 0.94	0.63
Machines can perform operations which are not very similar to one another (MF5)				0.79	10.92		
Machines can perform various types of operations (MF6)				0.88	12.75		
Existing machines cannot be used to perform new operations (MF7)[a]							
Machines can perform a variety of operations (MF8)				0.75	10.28		
Machines can perform operations which differ greatly from one another (MF9)				0.74	10.09		
Mobility, $n = 151$	0.84	0.83	0.93				0.65
Machine changeovers between operations are easy (MF10)				0.85	11.47		
Machine set-ups between operations are quick (MF11)				0.89	12.19		
A lot of available capacity is used in changing between machine operations (MF12)[a]							
Machine tools can be changed quickly (MF13)				0.65	8.47		
Uniformity, $n = 152$	0.94	0.93	0.83			GFI = 0.82; TLI = 0.77; RNI = 0.88	0.74
All machines achieve similar performance across all operations (MF14)				0.85	12.79		
Machines are equally effective, in terms of productivity, for all operations (MF15)				0.92	14.64		
Machines are equally efficient for all processing operations (MF16)				0.94	15.20		
Machines are equally effective, in terms of quality, for all operations (MF17)				0.79	11.56		
Machines are equally reliable for all operations (MF18)				0.81	11.86		
The processing cost (in dollars) of an operation is not affected by machine choice (MF19)[a]							

[a] Item deleted during scale purification.

Appendix 3.2 Instrument for measuring *labor flexibility*

Construct and items	Coeff. alpha	Composite reliability	Inter-rater agreement	Standardized loading	*t*-value	Fit indices	Average variance extracted
Range-number, $n = 155$	0.89	0.89	0.96			GFI = 0.97; TLI = 0.94; RNI = 0.97	0.67
Workers can perform a large number of tasks (LF1)				0.87	13.09		
Workers are responsible for more than one task (LF2)				0.93	14.70		
A large number of job classifications exist in the workforce (LF3)[a]							
Workers are cross-trained to perform many different tasks (LF4)				0.79	11.35		
Workers possess many different skills (LF5)				0.66	8.89		
Range-heterogeneity, $n = 156$	0.80	0.82	0.94				0.61
The tasks which workers perform are very similar to one another (LF6)[a]							
Workers perform a diverse set of tasks (LF7)				0.80	10.22		
Workers can perform various types of tasks (LF8)				0.94	12.22		
Workers can perform tasks which differ greatly from one another (LF9)				0.55	6.99		
Mobility, $n = 155$	0.83	0.84	0.86				0.65
A short time delay occurs when workers are moved between different tasks (LF10)				0.57	7.38		
It is easy to move workers between different tasks (LF11)[a]							
A small cost is incurred (in dollars) when workers are moved between different tasks (LF12)				0.85	11.66		
A small cost is incurred (in terms of lost productivity) when workers are moved between different tasks (LF13)				0.95	13.37		
Workers can move easily between different tasks (LF14)[a]							
Uniformity, $n = 152$	0.94	0.94	0.95			GFI = 0.86; TLI = 0.90; RNI = 0.93	0.73
Workers are equally effective, in terms of quality, for all tasks (LF15)				0.82	12.13		
Workers are equally efficient at all tasks (LF16)				0.88	13.67		
Workers achieve similar performance levels for all tasks (LF17)				0.87	13.35		
Worker choice does not affect the processing cost (in dollars) of a task (LF18)				0.71	9.92		
Workers are equally reliable for all tasks (LF19)				0.90	14.09		
Workers are equally effective, in terms of productivity, for all tasks (LF20)				0.92	14.79		

[a] Item deleted during scale purification.

Appendix 3.3 Instrument for measuring *material handling flexibility*

Construct and items	Coeff. alpha	Composite reliability	Inter-rater agreement	Standardized loading	t-value	Fit indices	Average variance extracted
Range-number, $n = 147$	0.84	0.85	0.78			GFI = 0.99; TLI = 0.98; RNI = 0.99	0.59
Material can be routed along many paths (MHF1)				0.70	9.16		
There are many different material handling paths between processing centers (MHF2)				0.88	12.46		
Many processing centers are linked by the material handling system (MHF3)[a]							
There are a large number of material handling paths (MHF4)				0.83	11.47		
There are a limited number of material handling paths between processing centers (MHF5)				0.64	8.16		
Range-heterogeneity, $n = 146$	0.82	0.84	0.95			GFI = 1.00; TLI = 1.00; RNI = 1.00	0.57
The material handling system can transport materials of different shapes (MHF6)				0.63	8.22		
The material handling paths used by the system are very different from one another (MHF7)[a]							
The material handling system uses a large proportion of general purpose pallets (MHF8)				0.48	5.96		
The material handling system uses a large proportion of general purpose fixtures (MHF9)[a]							
The material handling system can transport materials of different sizes (MHF10)				0.95	14.19		
The material handling system can transport a wide variety of materials (MHF11)				0.87	12.49		
Mobility, $n = 148$	0.95	0.95	0.84			GFI = 0.86; TLI = 0.85; RNI = 0.92	0.81
Changing a material handling path is easy (MHF12)				0.90	14.06		
Changing a material handling path is inexpensive (MHF13)				0.92	14.73		
Changing a material handling path is quick (MHF14)				0.98	16.24		
Material handling paths can be easily added (MHF15)				0.85	12.75		
Material handling paths can be easily removed (MHF16)				0.83	12.37		
Uniformity, $n = 145$	0.85	0.85	0.92			GFI = 0.90; TLI = 0.81; RNI = 0.90	0.55
The choice of material handling path does not effect the material transfer time (MHF17)				0.86	12.30		
The choice of material handling path does not affect the efficiency of material transfer (MHF18)				0.89	13.11		
The quality of materials is not affected by the material handling path used (MHF19)				0.49	6.03		
The choice of material handling path does not affect the material transfer cost (in dollars) (MHF20)				0.78	10.76		
All material handling paths exhibit similar performance (MHF21)				0.60	7.52		

a Item deleted during scale purification.

Appendix 3.4 Instrument for measuring *mix flexibility*

Construct and items	Coeff. alpha	Composite reliability	Inter-rater agreement	Standardized loading	t-value	Fit indices	Average variance extracted
Range-number, $n = 151$	0.85	0.86	0.85			GFI = 0.97; TLI = 0.95; RNI = 0.96	0.56
A large number of products are produced in the plant (MXF1)				0.86	12.43		
The average number of products produced in the plant is large (MXF2)				0.69	9.09		
A large number of product lines are produced in the plant (MXF3)				0.85	12.34		
A limited number of products are produced in the plant (MXF4)				0.71	9.50		
Existing product lines are very broad (MXF5)				0.58	7.40		
Range-heterogeneity, $n = 150$	0.85	0.85	0.90			GFI = 0.92; TLI = 0.86; RNI = 0.90	0.50
The variety of products produced in the plant is extensive (MXF6)				0.63	8.14		
The processing requirements for the products produced in the plant vary greatly from one product to another (MXF7)				0.82	11.65		
The products produced in the plant are very different from one another (MXF8)				0.83	11.75		
Products are only slightly different from one another (MXF9)				0.59	7.42		
A diverse set of products is produced in the plant (MXF10)				0.75	10.20		
The material requirements for the products produced in the plant vary greatly from one product to another (MXF11)				0.56	6.96		
Mobility, $n = 151$	0.84	0.86	0.85			GFI = 0.96; TLI = 0.90; RNI = 0.96	0.62
The cost (in dollars) of including a product in the product mix is small (MXF12)[a]							
The product mix produced by the plant can be changed easily (MXF13)				0.72	9.67		
The time required to change to a different product mix is short (MXF14)				0.69	9.23		
The manufacturing system can quickly changeover to a different product mix (MXF15)				0.89	13.01		
The cost of changing to a different product mix is small (MXF16)				0.83	11.87		
Uniformity, $n = 150$	0.85	0.86	0.90				0.68
Productivity levels are not affected by changes in product mix (MXF17)				0.84	11.68		
The efficiency of the production process is not affected by changes in product mix (MXF18)				0.96	13.92		
Product quality is not affected by changes in product mix (MXF19)[a]							
The performance of the system is not affected by changes in product mix (MXF20)				0.65	8.47		

[a] Item deleted during scale purification.

Appendix 3.5 Instrument for measuring *new product flexibility*

Construct and items	Coeff. alpha	Composite reliability	Inter-rater agreement	Standardized loading	*t*-value	Fit indices	Average variance extracted
Range-number, $n = 152$	0.90	0.90	0.92			GFI = 0.96; TLI = 0.96; RNI = 0.97	0.66
The number of new products introduced into production each year is high (NPF1)				0.89	13.81		
A limited number of new products are introduced each year (NPF2)				0.70	9.72		
A large number of new product prototypes are produced in the system each year (NPF3)				0.75	10.68		
A large proportion of our products have been introduced within the past year (NPF4)				0.72	10.08		
A large number of new products are introduced each year (NPF5)				0.95	15.34		
Range-heterogeneity, $n = 148$	0.79	0.80	0.97			GFI = 0.89; TLI = 0.65; RNI = 0.81	0.46
New products are very similar to existing products (NPF6)				0.45	5.21		
New products are incremental improvements of existing products (NPF7)				0.77	10.00		
New product variety is extensive (NPF8)[a]							
New products are often extensions of existing product lines (NPF9)				0.74	9.51		
New products are often improvements of existing products (NPF10)				0.74	9.57		
New products are very innovative (NPF11)[a]							
New products are very different from existing products (NPF12)[a]							
New products are refinements of existing products (NPF13)				0.63	7.74		
Mobility, $n = 149$	0.84	0.84	0.94			GFI = 0.96; TLI = 0.92; RNI = 0.94	0.52
The managerial effort required to introduce a new product into full scale production is low (NPF14)				0.66	8.34		
The cost (in dollars) required to design and develop new products is extremely high (NPF15)				0.63	7.93		
The start-up cost (in dollars) of introducing new products into full-scale production is low (NPF16)				0.75	10.03		
The number of months from the earliest stage of design to production of a saleable product is low (NPF17)				0.77	10.39		
The time required to develop and introduce new products is extremely low (NPF18)				0.77	10.35		
Uniformity, $n = 152$	0.80	0.81	0.90			GFI = 0.96; TLI = 0.84; RNI = 0.94	0.52
Manufacturing system performance is not affected when a new product is introduced into the production system (NPF19)				0.56	6.85		
The quality of existing products is not affected when a new product is introduced into the production system (NPF20)				0.65	8.30		
The average cost/unit of products is not affected when a new product is introduced into the production system (NPF21)				0.81	10.74		
Productivity levels are not affected when a new product is introduced into the production system (NPF22)				0.83	11.12		

[a] Item deleted during scale purification.

8.4 Appendix 4 – Introduction Letter for Questionnaire

Yeditepe Üniversitesi
Yönetim Uygulama ve Araştırma Merkezi

Değerli Katılımcı,

Bu anket çalışması, T.C. Yeditepe Üniversitesi Sosyal Bilimler Enstitüsü'nde devam etmekte olan "Entegre Esnek Üretim Yönetimi Modeli'nin Geliştirilmesi ve Uygulanması" başlıklı doktora tez araştırmasının bir parçası olarak yapılmaktadır. Sorulara vereceğiniz cevaplar sadece bilimsel amaçlarla kullanılacak olup, hiçbir kurum veya kişi ile paylaşılmayacaktır.

Çalışmamıza vermiş olduğunuz destek için şimdiden teşekkür ederiz.

Orhan Göçer
Yeditepe Üniversitesi
Sosyal Bilimler Enstitüsü

8.5 Appendix 5 – Detailed comparison of IFMMM scores of cases

Table 8.1 Comparison of normative goals scores

CO	Co1	Co2	Co3	Co4	Co5	Co6	Co7	Min	Max	Mean	Std Dev
NG1	5,00	5,33	5,66	4,66	4,66	5,33	4,67	4,66	5,66	5,04	0,37
NG2	6,00	5,50	6,00	6,00	6,00	4,00	4,50	4,00	6,00	5,43	0,78
NG3	5,00	5,50	5,00	4,00	4,00	5,00	5,00	4,00	5,50	4,79	0,52
NG4	4,50	5,00	3,00	4,00	5,00	3,50	4,00	3,00	5,00	4,14	0,69
NG5	5,66	5,66	4,66	5,66	4,33	4,33	5,34	4,33	5,66	5,09	0,58
NG6	4,50	5,50	5,00	5,00	4,50	5,00	4,50	4,50	5,50	4,86	0,35
NG7	4,66	5,00	6,00	3,33	5,00	3,00	4,00	3,00	6,00	4,43	0,97
NG8	5,00	5,00	5,00	5,00	5,00	4,00	5,34	4,00	5,34	4,91	0,39
NG	**5,04**	**5,31**	**5,04**	**4,71**	**4,81**	**4,27**	**4,67**	**4,27**	**5,31**	**4,84**	**0,31**

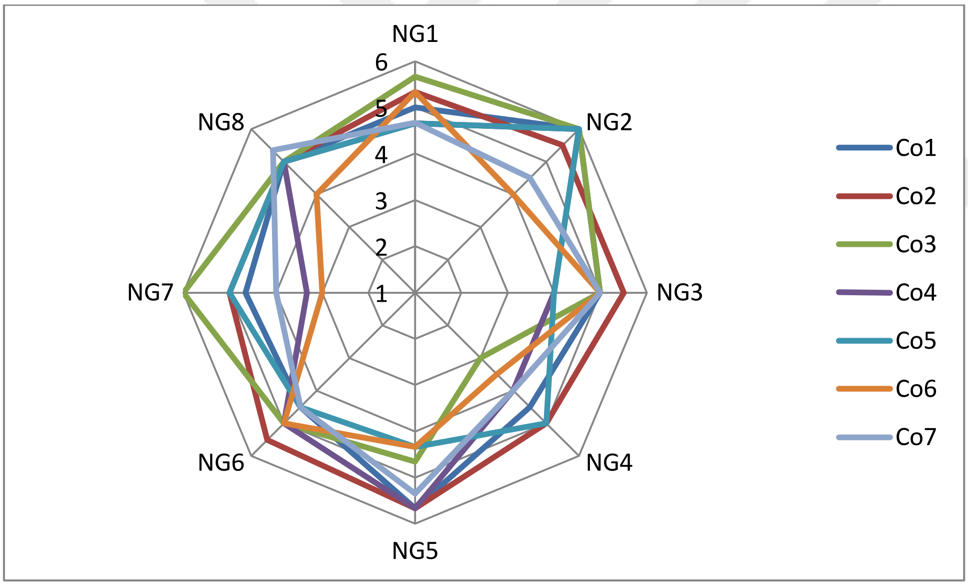

Figure 8.1 Comparison of normative goals profiles

Table 8.2 Comparison of normative structures scores

CO	Co1	Co2	Co3	Co4	Co5	Co6	Co7	Min	Max	Mean	Std Dev
NS1	2,00	5,50	3,00	4,00	5,00	2,00	5,00	2,00	5,50	3,79	1,36
NS2	5,00	5,00	3,33	6,00	5,00	2,67	4,34	2,67	6,00	4,48	1,05
NS3	6,00	6,00	6,00	6,00	6,00	5,00	6,00	5,00	6,00	5,86	0,35
NS4	4,00	5,00	3,00	4,00	5,00	2,00	4,00	2,00	5,00	3,86	0,99
NS5	6,00	4,00	5,00	5,00	3,00	5,00	1,50	1,50	6,00	4,21	1,41
NS6	6,00	3,50	6,00	6,00	5,00	5,00	5,50	3,50	6,00	5,29	0,84
NS7	5,33	5,00	6,00	5,66	5,33	4,33	4,00	4,00	6,00	5,09	0,66
NS8	5,66	4,66	5,00	5,33	5,00	4,67	5,00	4,66	5,66	5,05	0,33
NS	**5,00**	**4,83**	**4,67**	**5,25**	**4,92**	**3,83**	**4,42**	**3,83**	**5,25**	**4,70**	**0,43**

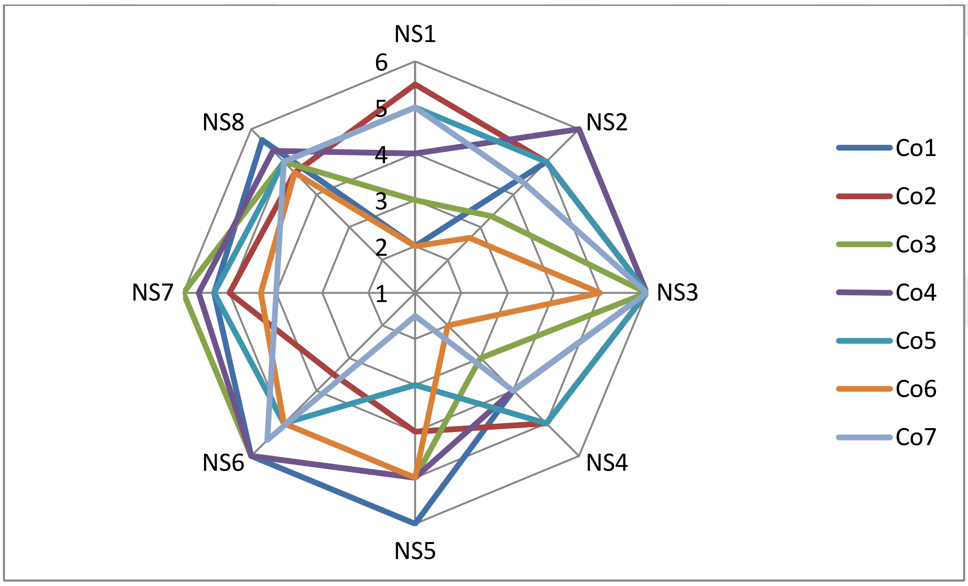

Figure 8.2 Comparison of normative structures profiles

Table 8.3 Comparison of normative behaviors scores

CO	Co1	Co2	Co3	Co4	Co5	Co6	Co7	Min	Max	Mean	Std Dev
NB1	4,67	5,00	6,00	3,66	5,00	4,67	4,67	3,66	6,00	4,81	0,64
NB2	4,33	5,00	4,00	4,66	5,33	5,00	4,34	4,00	5,33	4,67	0,44
NB3	2,50	4,50	4,50	5,00	5,00	3,00	4,50	2,50	5,00	4,14	0,91
NB4	4,00	4,00	3,66	4,66	4,66	2,67	4,67	2,67	4,67	4,05	0,68
NB5	3,50	4,00	3,67	6,00	2,75	5,83	4,25	2,75	6,00	4,29	1,12
NB6	2,75	3,00	2,00	4,00	2,00	1,75	2,00	1,75	4,00	2,50	0,74
NB7	6,00	5,00	6,00	6,00	5,00	4,00	5,00	4,00	6,00	5,29	0,70
NB8	4,25	4,25	4,25	5,00	2,75	2,75	2,50	2,50	5,00	3,68	0,91
NB	**4,00**	**4,34**	**4,26**	**4,87**	**4,06**	**3,71**	**3,99**	**3,71**	**4,87**	**4,18**	**0,34**

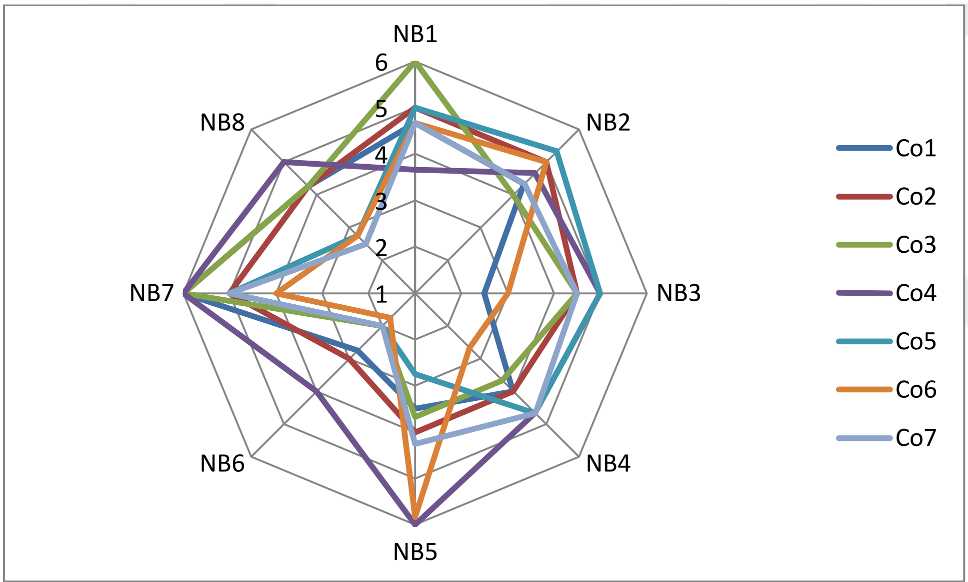

Figure 8.3 Comparison of normative behaviors profiles

Table 8.4 Comparison of strategic goals scores

CO	Co1	Co2	Co3	Co4	Co5	Co6	Co7	Min	Max	Mean	Std Dev
SG1	5,00	5,00	4,00	5,33	4,66	5,33	4,00	4,00	5,33	4,76	0,53
SG2	5,00	6,00	5,50	6,00	4,00	4,50	4,50	4,00	6,00	5,07	0,73
SG3	4,00	6,00	6,00	5,00	5,00	5,00	5,00	4,00	6,00	5,14	0,64
SG4	6,00	6,00	6,00	4,50	5,00	4,50	4,50	4,50	6,00	5,21	0,70
SG5	2,00	5,00	3,50	4,50	3,50	2,50	3,50	2,00	5,00	3,50	0,96
SG6	2,00	4,50	4,00	4,00	5,50	3,50	3,00	2,00	5,50	3,79	1,03
SG7	3,50	4,00	3,00	4,00	4,50	5,00	1,00	1,00	5,00	3,57	1,21
SG8	4,00	4,00	5,00	4,00	5,50	4,50	4,00	4,00	5,50	4,43	0,56
SG9	5,50	5,00	5,50	5,00	4,50	2,50	3,50	2,50	5,50	4,50	1,04
SG	**4,11**	**5,06**	**4,72**	**4,70**	**4,68**	**4,15**	**3,67**	**3,67**	**5,06**	**4,44**	**0,44**

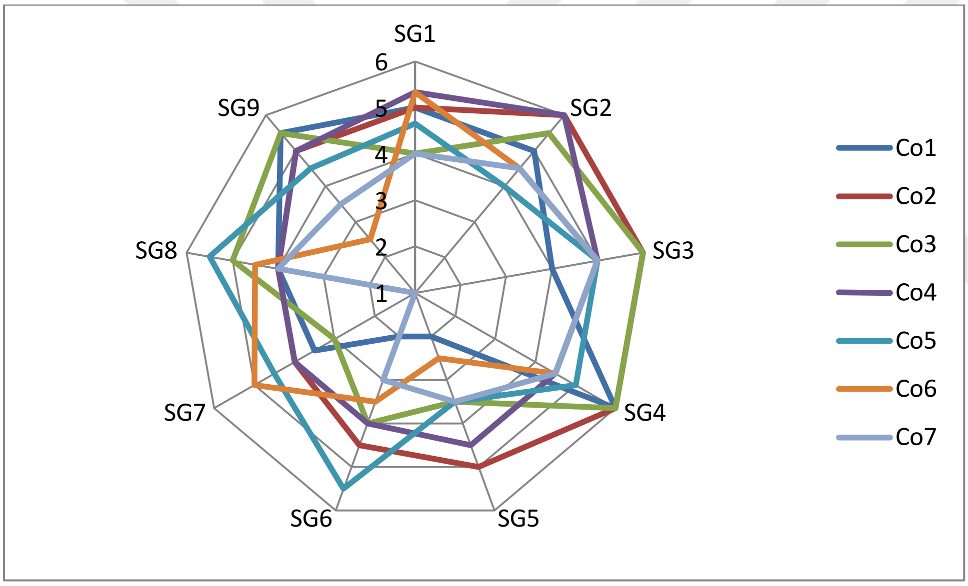

Figure 8.4 Comparison of strategic goals profiles

Table 8.5 Comparison of strategic structures scores

CO	Co1	Co2	Co3	Co4	Co5	Co6	Co7	Min	Max	Mean	Std Dev
SS1	2,00	1,00	2,66	2,66	2,66	2,67	1,00	1,00	2,67	2,09	0,73
SS2	1,33	6,00	3,66	4,30	3,66	3,00	3,67	1,33	6,00	3,66	1,30
SS3	4,00	5,33	2,60	5,00	5,00	4,67	5,00	2,60	5,33	4,51	0,87
SS4	3,25	3,50	3,25	3,25	3,50	2,50	5,00	2,50	5,00	3,46	0,70
SS5	4,00	5,00	3,66	3,33	3,66	3,33	3,00	3,00	5,00	3,71	0,60
SS6	2,50	6,00	4,00	5,00	5,00	4,00	4,00	2,50	6,00	4,36	1,03
SS7	3,33	2,33	2,66	1,66	2,00	2,00	2,34	1,66	3,33	2,33	0,50
SS8	3,00	4,66	3,66	3,66	4,00	3,00	4,00	3,00	4,66	3,71	0,55
SS9	4,00	6,00	5,00	6,00	6,00	5,00	4,50	4,00	6,00	5,21	0,75
SS	**3,05**	**4,42**	**3,46**	**3,87**	**3,94**	**3,35**	**3,61**	**3,05**	**4,42**	**3,67**	**0,42**

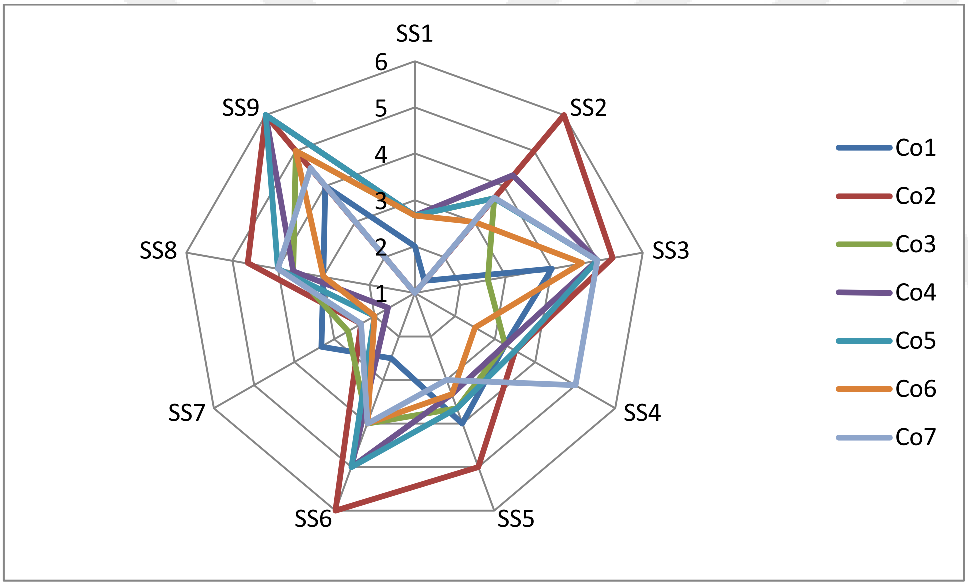

Figure 8.5 Comparison of strategic structures profiles

Table 8.6 Comparison of strategic behaviors scores

CO	Co1	Co2	Co3	Co4	Co5	Co6	Co7	Min	Max	Mean	Std Dev
SB1	4,00	4,00	3,66	4,66	4,33	3,67	4,67	3,66	4,67	4,14	0,39
SB2	4,00	4,66	6,00	6,00	5,66	3,00	5,34	3,00	6,00	4,95	1,05
SB3	3,00	5,00	4,30	5,30	5,00	3,67	4,34	3,00	5,30	4,37	0,76
SB4	5,33	5,00	5,00	5,00	5,33	4,33	4,67	4,33	5,33	4,95	0,33
SB5	5,00	4,00	6,00	5,00	5,00	3,00	6,00	3,00	6,00	4,86	0,99
SB6	5,00	5,00	4,66	4,33	4,33	4,33	5,34	4,33	5,34	4,71	0,38
SB7	4,50	5,00	5,00	5,00	5,00	5,00	5,00	4,50	5,00	4,93	0,17
SB8	5,33	5,00	4,33	4,66	4,00	4,33	4,34	4,00	5,33	4,57	0,42
SB	**4,52**	**4,71**	**4,87**	**4,99**	**4,83**	**3,92**	**4,96**	**3,92**	**4,99**	**4,69**	**0,35**

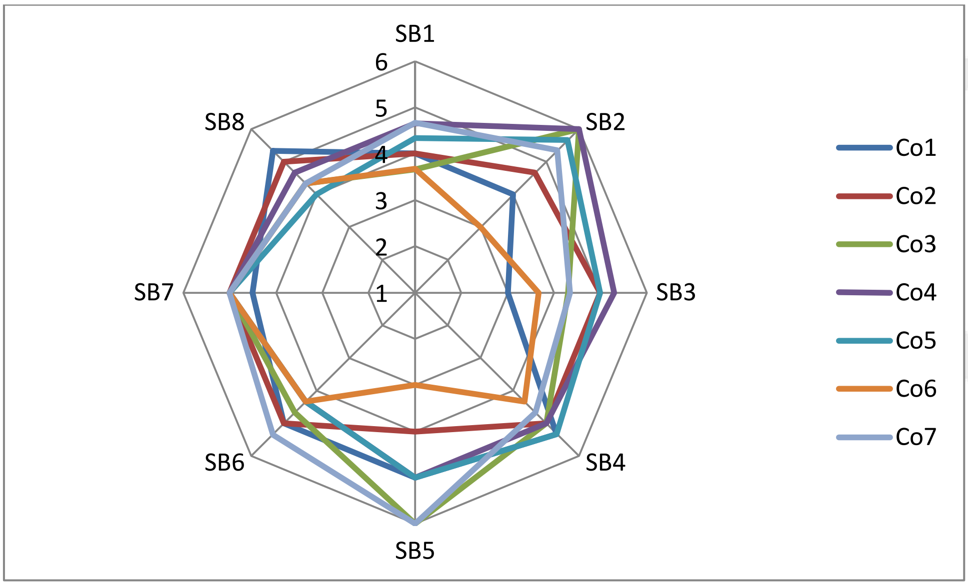

Figure 8.6 Comparison of strategic behaviors profiles

Table 8.7 Comparison of operative goals scores

CO	Co1	Co2	Co3	Co4	Co5	Co6	Co7	Min	Max	Mean	Std Dev
OG1	6,00	6,00	6,00	5,00	5,00	6,00	4,00	4,00	6,00	5,43	0,73
OG2	6,00	6,00	6,00	5,00	6,00	6,00	5,00	5,00	6,00	5,71	0,45
OG3	6,00	6,00	6,00	5,00	5,00	6,00	4,00	4,00	6,00	5,43	0,73
OG4	6,00	5,33	6,00	6,00	5,66	4,67	4,67	4,67	6,00	5,48	0,56
OG5	4,00	4,00	2,00	4,50	4,00	5,00	4,50	2,00	5,00	4,00	0,89
OG6	5,00	4,00	5,00	2,00	4,00	3,50	4,00	2,00	5,00	3,93	0,94
OG	**5,50**	**5,22**	**5,17**	**4,58**	**4,94**	**5,19**	**4,36**	**4,36**	**5,50**	**5,00**	**0,37**

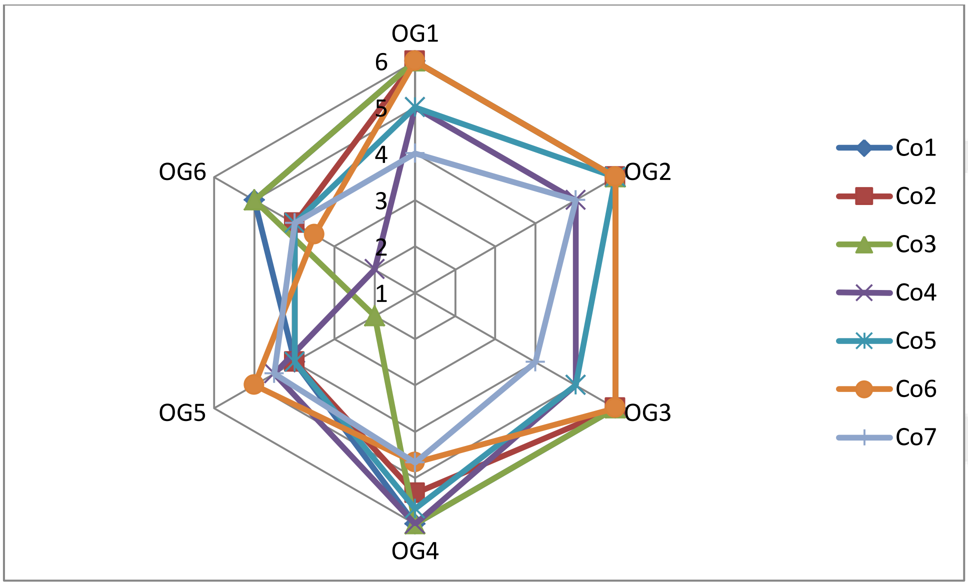

Figure 8.7 Comparison of operative goals profiles

Table 8.8 Comparison of operative structures scores

CO	Co1	Co2	Co3	Co4	Co5	Co6	Co7	Min	Max	Mean	Std Dev
OS1	3,66	2,33	4,00	4,66	4,00	3,00	5,67	2,33	5,67	3,90	1,00
OS2	4,57	3,00	5,00	5,12	3,75	3,88	3,63	3,00	5,12	4,13	0,72
OS3	2,00	6,00	6,00	6,00	6,00	4,50	6,00	2,00	6,00	5,21	1,41
OS4	4,58	5,00	5,00	2,75	2,75	5,00	4,25	2,75	5,00	4,19	0,95
OS5	5,00	5,00	4,50	5,00	4,50	3,50	4,00	3,50	5,00	4,50	0,53
OS6	5,00	4,00	2,00	4,50	4,00	4,50	4,50	2,00	5,00	4,07	0,90
OS	**4,14**	**4,22**	**4,42**	**4,67**	**4,17**	**4,06**	**4,67**	**4,06**	**4,67**	**4,34**	**0,24**

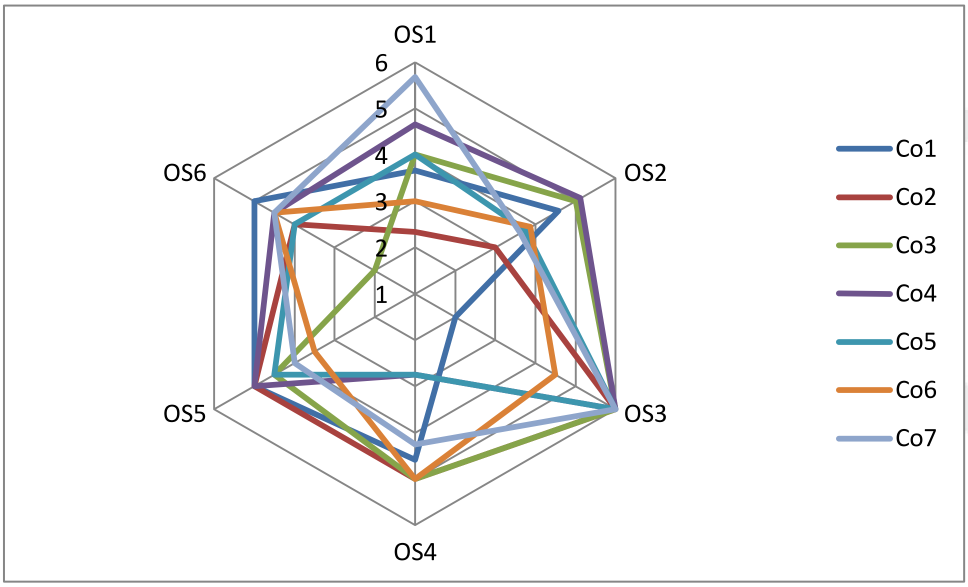

Figure 8.8 Comparison of operative structures profiles

Table 8.9 Comparison of operative behaviors scores

CO	Co1	Co2	Co3	Co4	Co5	Co6	Co7	Min	Max	Mean	Std Dev
OB1	4,00	4,00	6,00	4,00	4,00	5,00	6,00	4,00	6,00	4,71	0,88
OB2	4,00	4,00	3,00	4,00	4,00	5,00	4,00	3,00	5,00	4,00	0,53
OB3	4,00	4,00	5,00	5,00	5,00	4,00	4,00	4,00	5,00	4,43	0,49
OB4	3,00	4,00	5,66	4,33	5,66	4,00	3,34	3,00	5,66	4,28	0,96
OB	**3,75**	**4,00**	**4,92**	**4,33**	**4,67**	**4,50**	**4,34**	**3,75**	**4,92**	**4,36**	**0,36**

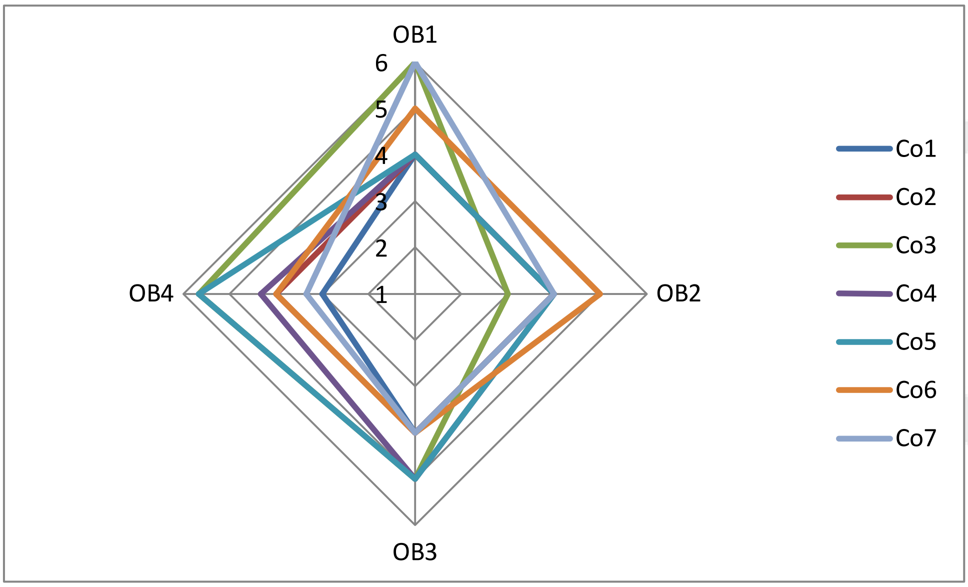

Figure 8.9 Comparison of operative behaviors profiles

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