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**IMPROVING COMPETITIVENESS IN PRODUCTION BY INTEGRATING
TRANSFORMATIONAL LEADERSHIP WITH HUMAN RESOURCE
STRATEGY**

Case study: WISCO

Master's thesis in
Economics and Business Administration

Industrial Management

VAASA 2011

ACKNOWLEDGEMENT

I would like to thank my supervisor Professor Josu Takala and PhD researcher Mr. Yang Liu, who has given me supports and guidance throughout my master thesis. This work would not been achieved without their contributions.

I am also very grateful for all the input I received from the managers in Wuhan Iron and Steel (Group) Corp. Their excellent expertises on WISCO have added enormous value to this work.

Last but not the least; I would like to thank my dearest family and friends. Their unconditional love and supports have encouraged me going forward at difficulties, which made this work into one of the greatest experience in life.

TABLE OF CONTENTS

ABSTRACT	7
1. INTRODUCTION	8
1.1 Research background.....	8
1.2 Research questions	9
1.3 Outline	9
2. THEORETICAL BACKGROUND	11
2.1 Manufacturing strategy and analytical model	11
2.2 Transformational leadership and analytical model.....	12
2.3 Overall competitiveness analytical model.....	16
3. RESEARCH METHODOLOGY	19
3.1 Analytic Hierarchy Process	19
3.2 Questionnaires	21
3.3 Data collection.....	22
3.4 Data analysis.....	24
4. CASE COMPANY: WISCO.....	26
4.1 Overview of Chinese steel industry.....	26
4.2 Case company: WISCO.....	29
5. WISCO EVALUATIONS	31
5.1 Evaluation of manufacturing strategy.....	31
5.2 Evaluation of transformational leadership.....	38
5.3 Evaluation of overall competitiveness.....	42
6. DISCUSSION AND RESULTS.....	44
6.1 Empirical findings on WISCO	44
6.1.1 Findings on WISCO's M&A strategy	44

6.1.2 Findings on WISCO's HRS.....	47
6.2 Improvement proposal for overall competitiveness analytical model.....	49
6.3 Measure HRSI using AHP.....	50
7. CONCLUSION	54
REFERENCES	55
APPENDICES	59
APPENDIX 1. Manufacturing Strategy AHP questionnaire.....	59
APPENDIX 2. Transformational leadership AHP questionnaire.....	62

TABLE OF FIGURES

Figure 1. Sandcone model of deep leadership.....	13
Figure 2. Improved Sandcone model with technology index.....	14
Figure 3. Concept model of transformational leadership and market orientation.....	17
Figure 4. AHP method applied on manufacturing strategy.....	20
Figure 5. CSOME organization structure.....	23
Figure 6. Flowchart of data analysis.....	24
Figure 7. An example of erroneous questionnaire answer.....	24
Figure 8. Crude steel production 1995-2009.....	28
Figure 9. Crude steel consumption and production 1995-2009.....	28
Figure 10. EC manufacturing strategy template: main criteria.....	31
Figure 11. EC manufacturing strategy template: sub criteria.....	32
Figure 12. An example of EC pair-wise comparison result on manufacturing strategy.....	33
Figure 13. An example of MATLAB analysis source code.....	34
Figure 14. Analytical results of WISCO's MSI: before and during crisis.....	36
Figure 15. WISCO TLI before and during crisis.....	41
Figure 16. WISCO MSI vs. TLI before crisis.....	42
Figure 17. WISCO MSI vs. TLI during crisis.....	42

TABLE OF TABLES

Table 1. WISCO MSI analysis results before crisis.	35
Table 2. WISCO MSI analysis results during crisis.	35
Table 3. WISCO transformational leadership parameter analysis results before crisis.	39
Table 4. WISCO transformational leadership parameter analysis results during crisis.	39
Table 5. WISCO TLI analysis results before crisis.	40
Table 6. WISCO TLI analysis results during crisis.	40
Table 7. WISCO HRS innovation detail	48
Table 8. Transformation from a control to commitment model of HRS.	51
Table 9. Selection of main criteria of HRS AHP hierarchy.	52

ABBREVIATIONS

AHP	Analytical Hierarchy Process
EC	Expert choice
CSOME	China state-owned manufacturing enterprises
CISA	China Iron & Steel Association
HRS	Human resource strategy
HRSI	Human resource strategy index
M&A	Merger and acquisition
MSI	Manufacturing strategy index
OCI	Overall competitiveness index
RAL	Responsiveness Agility Leanness
SASAC	State-owned Assets Supervision and Administration Commission
TLI	Transformational leadership index
WISCO	Wuhan Iron and Steel (Group) Corp

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Topic of the Master's Thesis:

Improving competitiveness in production by integrating transformational leadership with human resource strategy case study: WISCO

Instructor:

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Degree:

Master of Science in Economics and Business Administration

Department:

Department of Production

Major subject:

Industrial Management

Year of Entering the University:

2008

Year of Completing the Master's Thesis:

2011

Pages: 66

ABSTRACT:

Year 2008, world economy experienced another economic downturn triggered by the collapse of U.S. financial system. This placed many industrial organizations and manufacturers in dilemma, whereas on the other hand, China demonstrated continues growth in national GDP. These phenomena drew enormous attention from practitioners and academics. The most frequently asked questions in academic research are: Can we gain an insight of Chinese companies' outperformance by evaluating it with the existing overall competitiveness analytical model? Would this competitiveness explained by the strategies Chinese companies adapted? Furthermore, could these finding on Chinese firms used as a feedback to improving the current overall competitiveness model?

To answer the preceding research questions, this thesis work focuses on Chinese state-owned manufacturing enterprises (CSOME) as they are the backbone of Chinese economy. Competitiveness evaluation is performed on case company Wuhan Iron and Steel (Group) Corporation (WISCO) using the overall competitiveness analytical model. The results indicate WISCO is highly competitive as organization type of analyzer.

From the further empirical research, it is found that WISCO has gone through continues organization transformations since 2005, it has also adapted new innovative human resource strategy to cope with the organizational changes. These findings indicate insufficient measurability of the existing overall competitiveness model in measuring organization's efficiency on aligning its employees with the organizational changes. By integrating transformational leadership theory with WISCO's human resource strategy, an AHP hierarchy is developed at the end of this study.

KEYWORDS: Competitiveness evaluation, transformational leadership, human resource strategy

1. INTRODUCTION

Summer 2008, as mortgage-related securities collapsed in value, financial crisis spreads across U.S. and global financial system. Looking back in history, this crisis is seen as another systemic crisis of capitalism (Kotz, 2009). The crisis developed significant impact on the global economy with a remarkable speed. It undermined many industrial companies and organizations worldwide. Meantime, China revealed its impressive GDP growth, averaging 10.2 percent per year from year 2001 to 2008, driven by the growth in industrial sector (China Statistical Yearbook, 2009).

1.1 Research background

Different from western economies, state-owned enterprises are the most common and active enterprises in China. It is a legal entity created by Chinese central party to undertake commercial activities on behalf of the government and it is overseen by a special commission in China, named State-owned Assets Supervision and Administration Commission (SASAC).

According to China's statistical report (China Statistical Yearbook, 2009), industrial products crude steel and rolled steel had growth rate of 18.5% and 20.5% between year 2001 and 2008. Additionally, Chinese state-owned enterprises have undergone substantial reform that merge small size enterprises into media- large size enterprises to gain internationalization and competitiveness in global context (Benson & Zhu, 2003). The preceding facts indicate that medium, large size Chinese state-owned steel manufacturing enterprises are the backbone of the China's GDP growth. Therefore this thesis work is determined to focus on Chinese state-owned manufacturing enterprise in metal and steel industry.

1.2 Research questions

As Chinese companies' competitiveness emerged in the circumstances of the global economic crisis, the following research questions are raised in relation to CSOMEs:

1. Can we gain an insight of Chinese steelmaker's outperformance by evaluating its competitiveness with the existing overall competitiveness analytical model?
2. If analytic result implies high competitiveness, what are the competitive strategies the company adapted?
3. Could these findings from previous question used as a feedback to improving the current overall competitiveness analytical model?

1.3 Outline

In order to answer the above research questions, a large size Chinese state-owned steel manufacturing enterprise is selected as the case study company. The empirical data are gathered using questionnaires. Ten informants are chosen from different departments of the case company, and nine out of the ten answers were valid for analysis. The qualitative information is converted into quantitative data using Analytical Hierarchy Process (AHP)-based software called ExpertChoice, and the converted data are fed to MATLAB for analyzing Company's overall competitiveness.

The analyze results indicate high competitiveness on the case company. The work is then carried on with collecting information on company's competitive strategy and the corresponding organizational changes made in the past five years. The major findings on this refer that the case company maintained its competitiveness through merge and acquisition (M&A) strategy during past decade, and it is sustained by company's effectiveness in deploying human resource strategies (HRS).

In the last part of this work, with the inspiration of Avolio's theory in transformational leadership (Avolio 1994, 173–202) an improvement idea for the existing competitiveness analytical model is proposed. An AHP hierarchy is designed for measuring organizations HRS, which can be used in developing human resource related questionnaires and gathering empirical data in further researches in this field. This is meant to increase the measurability in organization's capability to align its people with its undertaken organizational changes in a dynamic environment.

It is internationally known, China's central party has a strong influence on the Chinese economy. The competitiveness strategies articulated by the Chinese central party is followed by all CSOMEs as an externally strategy. Due to the cultural and language barrier, the information it is somewhat less transparent on what kind of organizational changes and practices are carried out by CSOMEs internally. Therefore, another main contribution of this work is the detailed knowledge in case company's HRS used to smooth the organizational changes. Additionally, this case study finding are integrated with Avolio's approach in HRS to form a great start point for further research on evaluating organization competitiveness in a global context.

2. THEORETICAL BACKGROUND

2.1 Manufacturing strategy and analytical model

Miles and Snow categorized organizations into four groups: Prospector, Analyzer, Defender and Reactor (Snow & Miles 1978, 20–40). Prospector identifies the company which continuously searches for new market opportunities, and interested in broad domain of development and product lines. Defender group on the other hand have the main focus on certain or narrow product market and try to improve within the current product line. Analyzer group behaviors between prospector and defender, it normally maintains a core product line while same time follows the new market closely for gaining new ideas. In reactor group, often top managers perceive frequently changes and uncertainties however it unable to response efficiently. It shows lacks of consistent strategy-structure relationship. Therefore it is normally advised to transform into one of the other three groups.

Base on this theory, Takala et al. (Takala , Kamdee, Hirvela & Kyllonen, 2007b) has introduced an analytical model called RAL which is short for responsiveness, agility, leanness, to evaluate global competitiveness rankings for manufacturing strategies for organizational type of prospector, defender and analyzer. The model uses four main measurement criteria: Quality, Cost, Time, and Flexibility. These four measurement criteria is then measured based on sub-criteria. For instance, “Quality” is determined based on sub-criteria such as: defect rate, product reliability, product performance, and etc. In Takala et al.’s work (Takala et al, 2007b) an analytical model is introduced for evaluating the competitiveness of organization’s manufacturing strategy. In the analytical model, organization’s operational competitiveness is measured through an index named Manufacturing Strategy Index (MSI). MSI is modeled as a function of the four main criteria: Quality (Q), Cost (C), Time (T), and Flexibility (F)

Q, C, T, and F are calculated as follows:

$$Q\% = \frac{Q}{Q+C+T} \quad (1)$$

$$C\% = \frac{C}{Q+C+T} \quad (2)$$

$$T\% = \frac{T}{Q+C+T} \quad (3)$$

$$F\% = \frac{F}{Q+C+T+F} \quad (4)$$

The model evaluates the MSI of the operational competitiveness of each group as following:

$$f_{MSI_Prospector} = 1 - (1 - Q\%^{1/3}) \times (1 - 0.9 \times T\%) \times (1 - 0.9 \times C\%) \times F\%^{1/3} \quad (5)$$

$$f_{MSI_Analyser} = 1 - (1 - F\%) \times \left(ABS \begin{pmatrix} (0.95 \times Q\% - 0.285) \times \\ (0.95 \times T\% - 0.285) \times \\ (0.95 \times C\% - 0.285) \end{pmatrix} \right)^{1/3} \quad (6)$$

$$f_{MSI_Defender} = 1 - (1 - C\%^{1/3}) \times (1 - 0.9 \times T\%) \times (1 - 0.9 \times Q\%) \times F\%^{1/3} \quad (7)$$

2.2 Transformational leadership and analytical model

A formal theory of transformational leadership as well as a model which measures leadership behavior factors was presented by Bass in year 1985 (Bass, 1985). Together with Avolio J. Bruce, they refined the previous theories on leadership and introduced the new concept of full range of leadership model (Bass & Avolio, 1990), which includes two types of leadership: transactional and transformational leadership.

According to Bass and Avolio (Bass & Avolio, 1994), transactional leaders reward and discipline the follower depending on the adequacy of the follower's performance, while

the transformational leaders master four I's in managing its followers: Idealized influence, inspirational motivation, intellectual stimulation, and Individualized consideration. With results of research studies done in business, government, military, and educational sectors, it is proven that transformational leaders were more effective and satisfying as leaders than transactional leaders. In Bass and Avolio's work, transformational leadership is expected to contribute to an organization's efforts to improve its operations and the best use of its human resource.

In the recent years, Takala integrated same cone model with transformational leadership to measure the direction of outcome of the leadership (Takala, Leskinen, Hirvelä & Kekäle, 2006), the concept model is illustrated by the Figure 1 below:

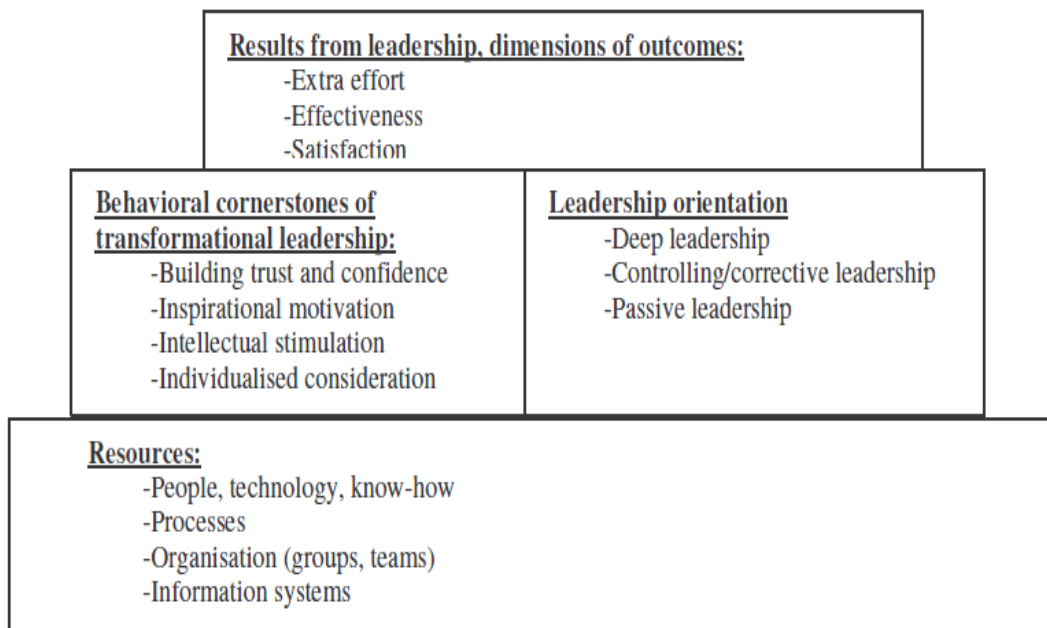


Figure 1. Sandcone model of deep leadership.

This model represents the idea of which organization's resources are transformed into the outcome of the organization with support of its leadership. It evaluates the level of outcome direction, leadership behavior and resource allocation of transformational leadership (Takala, Pennanen, Hiippala, Maunuksela & Kilpiö, 2008).

Later the analytical model is further refined by Liu & Takala (Liu & Takala, 2010). It introduces the technology index into the previous resource index in order to measure whether the technology used by the organization is most adequate. The technology index includes three categories of technology types: spearhead, core, and basic technology. The spearhead technology refers to the most advanced technology in the field; core technology is the technology that sustains the company's core competitiveness in the market, and the basic technology is the most common technology that can be easily gained or purchased. The improved analytical model of transformational leadership is illustrated as figure below:

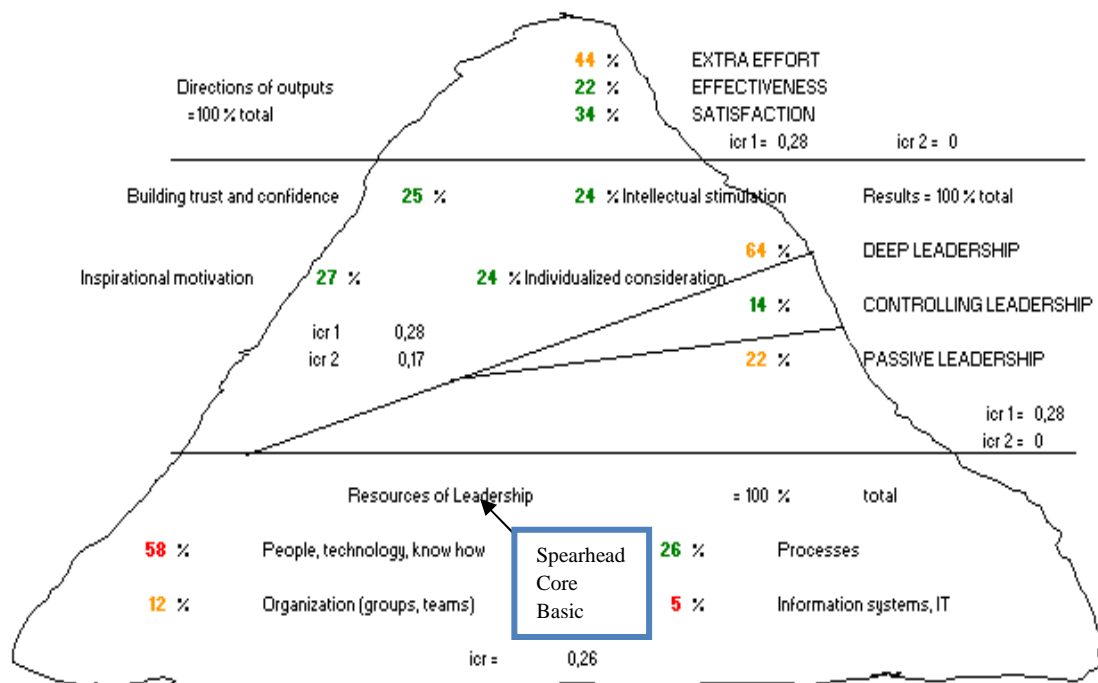


Figure 2. Improved Sandcone model with technology index.

In this study, this latest analytical model is used for measuring case company's transformational leadership level. The analytical model of transformational leadership is expressed in formulas as below:

Outcome index (OI):

Without classification:

$$f_{OI} = 1 - \max\{|1/3 - EF|, |1/3 - SA|, |1/3 - EE|\} \quad (8)$$

With classification:

$$f_{OI_Prospector} = 1 - (1 - EE^{1/3}) \times (1 - SA) \times Std\{EE, SA, EF\}^{1/3} \quad (9)$$

$$f_{OI_Analyser} = 1 - (1 - SA^{1/3}) \times (1 - Std\{EE, SA, EF\}^{1/3}) \quad (10)$$

$$f_{OI_Defender} = 1 - (1 - EF^{1/3}) \times (1 - EE) \times (1 - SA) \times Std\{EE, SA, EF\}^{1/3} \quad (11)$$

Where:

EE = effectiveness;

SA = Satisfaction;

EE = Extra effort;

Leadership index (LI):

$$f_{LI} = DL \times (1 - \max\{PL, CL\}) \times \left(1 - \left|\frac{1}{4} - \max\{IC, IM, IS, BT\}\right|\right) \quad (12)$$

Where:

DL = Deep leadership;

PL = Passive leadership;

CL = Controlling leadership;

IC = Individualized consideration;

IM = Inspirational Motivation;

IS = Intellectual Stimulation;

BT = Building trust and confidence;

Technology index (TI):

$$f_{TI} = 1 - \max\{|SH_{Optional} - SH|, |CR_{Optional} - CR|, |BS_{Optional} - BS|\} \quad (13)$$

Where:

SH = Spearhead technology;

CR = Core technology;

BS = Basic technology;

Resource index (RI):

$$f_{RI} = (1 - PT(1 - TI)) \times (3 \times \min\{PC, IT, OR\} \times TI) \quad (14)$$

Where:

PT = People, technology, know-how;

PC = Process;

IT = Information system;

OR = Organization (groups, teams);

TI = Technology index;

Combined Total Leadership Index (TLI) is then:

$$f_{TLI} = f_{OI} \times f_{LI} \times f_{RI} \quad (15)$$

2.3 Overall competitiveness analytical model

A resource-based view of the firm is introduced by Wernerfelt back in 1984 (Wernerfelt, 1984). Later Menguc studied the relationship between transformational leadership and market orientations using this resource-based approach, where competences are considered as resources of an organization. A concept model is developed to describe the relationship between transformational leadership and market orientations, as illustrated in Figure 3 below:

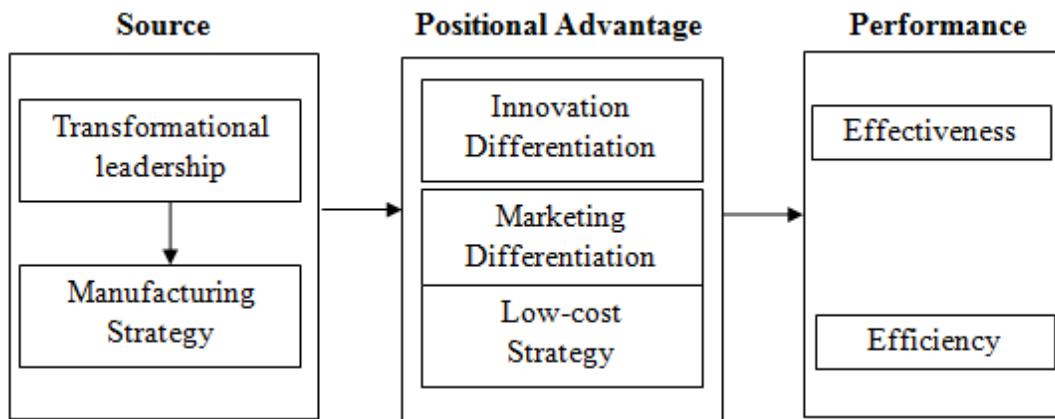


Figure 3. Concept model of transformational leadership and market orientation.

In Menguc's study, transformational leadership is considered as a managerial-based competency of an organization. It refers to leader's ability of articulating the company's vision, mission and values to its employees. It directly reflects leader's purpose, commitment, and direction of outcome. It is considered a central role in an organization because it strives to align the value and goal of employees with organization's goal. It is concluded in the study that improvements done in transformational-based managerial competencies will have a positive impact on organization's positional advantage in the marketplace (Menguc, 2007).

As mentioned earlier, companies are classified into four categories base on their focus on market position, and Takala (Takala et al, 2008) integrated transformational leadership and manufacturing strategy to form an new analytical model which measures organization's overall competitiveness. The overall competitive analytical model has been applied to different kind of industrial companies; it is proven that transformational leadership is the main drive of efficiency improvement (Liu, Si & Takala, 2009). Meaning an improvement effort applied to transformational leadership will improve the organization operational efficiency and ultimately lift up the overall competitiveness as a whole.

The overall competitiveness analytical is modeled as a function of TLI and MSI, and it is calculated as follows:

$$f_{OCI} = f_{TLI} \times f_{MSI} = f_{OI} \times f_{TI} \times f_{MSI} \quad (16)$$

3. RESEARCH METHODOLOGY

In this study, all the empirical data are gathered using questionnaires from one of the largest (by production size) Chinese state-owned steel manufacturing enterprises. The interviewees are selected throughout the case company. They are required to provide their expertise on the company's manufacturing strategies and leadership. The qualitative information is converted into quantitative data which is used as inputs for competitiveness analysis in latter part of this work.

3.1 Analytic Hierarchy Process

The questionnaires used in this study are designed base on Analytic Hierarchy Process (AHP) created by Saaty. According to Saaty (Saaty 1980, 17–18):

“AHP is a method of breaking down a complex, unstructured situation into its component parts, arranging these parts or variables, into hierarchy order; assigning numerical values to subjective judgments on the relative importance of each criterion, and synthesizing the judgments to determine which variables have the highest priority and should be acted upon to influence the outcome of the situation.”

Simply put, AHP is a multi-criteria based decision making process, which utilities the pair-wise comparison between the chosen criteria in order to calculate the weight of prioritization for each criteria, then all different criteria are integrated into one score for ranking decision alternatives.

Base on Saaty's approach, Takala et al (Takala, Hirvela, Liu & Malindzak, 2007a) applied AHP to decision-making process in manufacturing strategy. Four main criteria are determined in relation to manufacturing strategy decision making: Quality, Costs, Time, and Flexibility. There are then 19 sub-criteria under those four main criteria as shown in Figure 4 below:

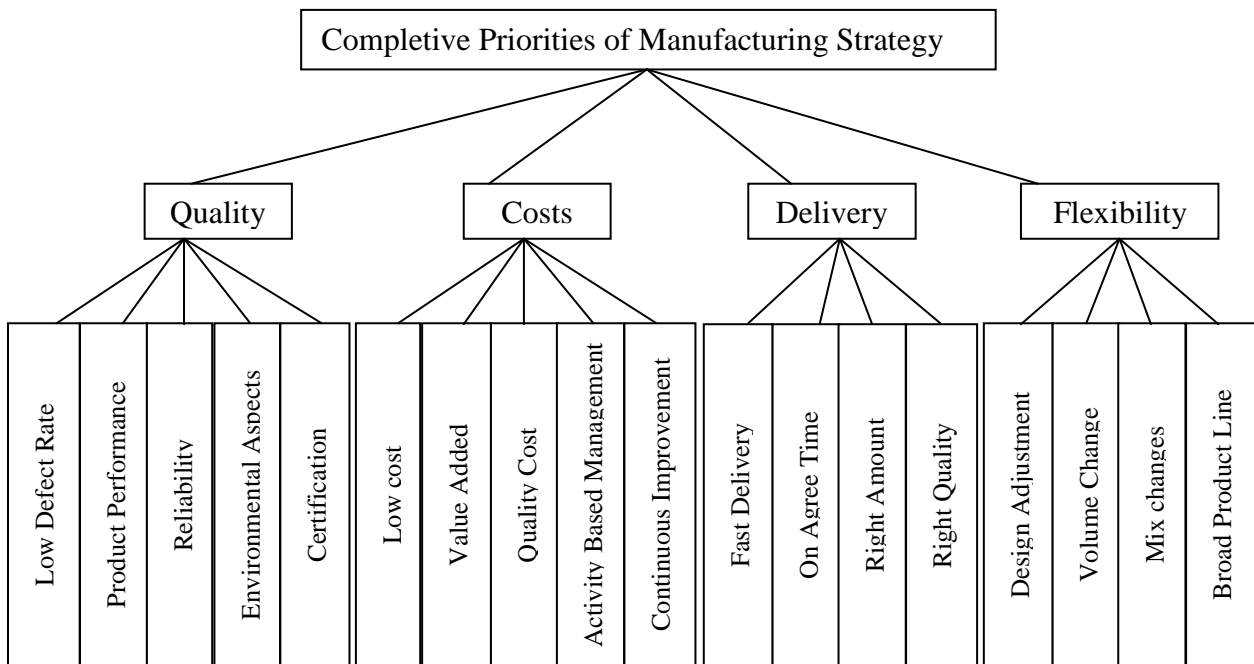


Figure 4. AHP method applied on manufacturing strategy.

Most frequently, empirical data for the research based studies are retrieved using questionnaires. It is a valuable method of collecting information and expertise relating a given field. A properly constructed questionnaire is important for any surveys or case studies because inappropriate questions, incorrect question ordering, lousy questionnaire format and ambiguous filling instructions can lead to valueless result. The answers may not reflect the respondents' opinions accurately, and result in drawing incorrect conclusions on the research eventually.

Normally, in the questionnaire construction phase many aspects have been taken into account. In this work, severe attentions are paid for the following three aspects at the questionnaire construction stage:

- Determine the type of scales, index, or typology which will be used for design the questionnaire

- Endure that the type of questions is fitted to the statistical data analysis technique
- Adequate respondents are selected. They shall have the backgrounds which are concerned as the most relevant to the research field.

3.2 Questionnaires

The questionnaire is constructed following the logic of AHP hierarchy. Base on the selected criteria and sub-criteria listed above, questions are designed in a pair-wise comparison fashion. For instance, questionnaire designed for obtaining opinions relating to the manufacturing strategies about production cost is designed as a scaled question as follows:

Low cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Value added
----------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-------------

Respondent is entitled to determine which one of the two sub-criteria is more important: the “low cost” or “value added” in a sense of manufacturing. It takes two step of thinking to complete this question. Firstly the respondent needs to select one criterion which he/she considered as the more important, then he/she need to give a number within scale of 1-9 to indicate to what extent the selected criterion is more important than the other one. If the respondent marked the answer as follows:

Low cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Value added
----------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-------------

This result can be interpreted as: The respondent think to keep the cost low in production is more important than bringing in value added features to the products. The low cost is considered more much more important up to a great extent. Likewise, if the answer is marked on the right side of the scale as below:

Low cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Value added
----------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-------------

This result indicates that the respondent think adding value to the product is more important than maintain the low cost level, but it is only slightly more important.

In this study, each questionnaire set contains two questionnaires: manufacturing strategies questionnaire and the transformational leadership questionnaires. The questionnaires are originally designed in English. All the questionnaires are translated into Chinese to overcome the language barriers as the targeted response group is mainly Chinese speaking. Examples of the English versions of questionnaires are attached in APPENDIX 1 & 2.

3.3 Data collection

The same respondent is requested to answer both manufacturing strategy questionnaire and transformational leadership questionnaire and this requires the respondents to have a holistic knowledge on the company. This exigent requirement directly impacts the respondent selection phase that only experienced expert and senior managers are considered as the target response group.

In general, CSOMEs have comparatively complex and hierarchal organization structure. Below, Figure 5 presents the organization structure as an example (BAOSTEEL official website)



Figure 5. CSOME organization structure.

This complexity of the organization structure is taking into account at the informant selection phase, the target group is first narrowed down to experienced experts and senior managers from finance, planning, and operational sectors. Later, ten informants are selected arbitrarily from this target group.

There are many ways to approach the respondent of the questionnaires, such as through post, email, telephone interview, face-to-face interview and etc. In this study, all the selected informants are interviewed face-to-face. In order to retrieve the answer in a timely manner, each interview included few informants instead of one. In the interview, informants are firstly explained and taught to understand the pair-wise comparison logic used in the questionnaire. Later, when they are answering the questionnaires, discussions between informants are prevented in order to avoid bias of opinions.

Furthermore, each informant is requested to answer the questionnaires from two perspectives: before and during crisis, to reflect case company's performance in

different macro economy environments. It is believed that, by gaining informants opinion in these two different periods of time will better indicate what kind of manufacturing strategy and leadership have changed to cope with the economy turmoil.

3.4 Data analysis

Once the all the questionnaire answers are collected, they will be processed through few stages until the final analytical conclusion is reached. Figure 6 below illustrates the data analysis process in a format of flowchart.

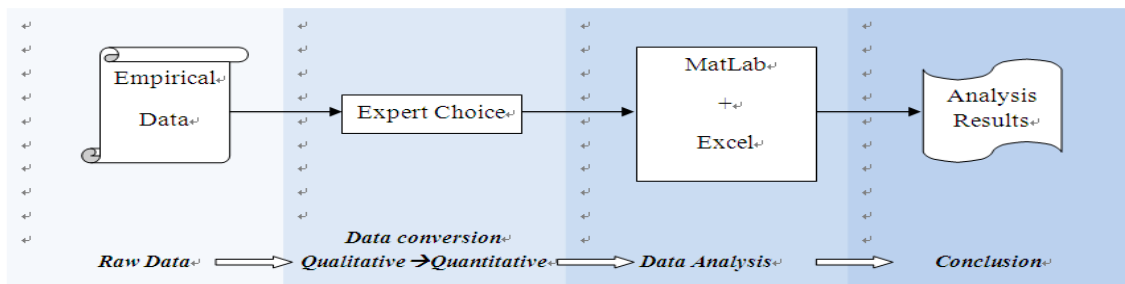


Figure 6. Flowchart of data analysis.

The answers in the questionnaires are converted into quantitative figures using AHP-based software called ExpertChoice (EC). EC performs pair-wise comparison and inconsistency ratio (ICR) calculation (Expert Choice website). The ICR figure is used to capture errors in the questionnaire answers. The most common error is the contradictory answers. An example is demonstrated by Example1 in Figure 7 below.

Example 1:

1	A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	B
2	A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	C
3	B	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	C

Figure 7. An example of erroneous questionnaire answer.

EC software interprets the answer in Example1 numerically and technically: in the first answer A is 3 points more important than B, EC understands it as $A > B$. For the second answer EC interprets that $A < C$, however in the last answer $B > C$, which is contradictory to the first answer $A > B$. This error is detected by high value in ICR, therefore as an attempt to ensure the reliability of the final analysis results, data sample which give an ICR value higher than 0.1 or 0.3 are considered as defect and excluded from analysis.

After the data are converted into numerical data, they are used as input and applied to the manufacturing, transformational leadership, and overall competitiveness analytical models for calculating MSI, TLI, and OCI indices. This calculation is performed with the help of mathematical software MATLAB and Microsoft Excel for plotting. At the end of the data analysis, the analytical conclusions are draw base on these analytical results.

4. CASE COMPANY: WISCO

4.1 Overview of Chinese steel industry

Chinese economy's overall performances composite of many key industries, such as automotive, textile, petrochemical, and steel. The steel industry is considered as one of the most crucial industry because crude steel is used as raw material in infrastructures projects, automotive production and many other industries. Price fluctuation in crude steel passes through the price of cars and other machineries and eventually influences the overall performance of the Chinese economy.

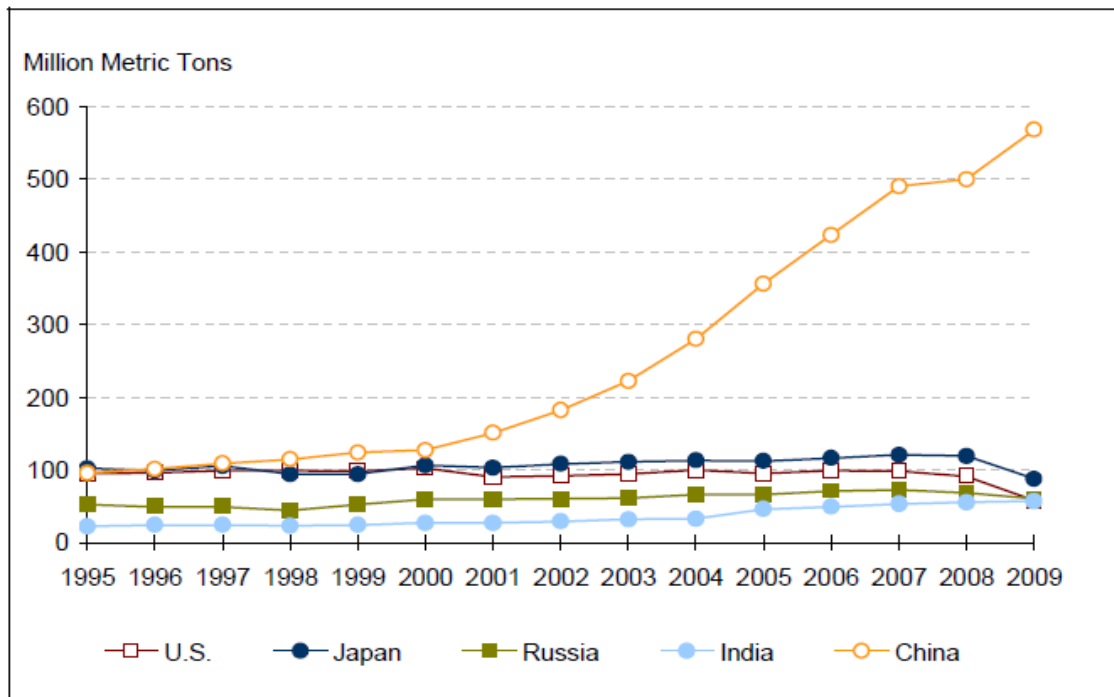
China's steel industry has gone through major transitions since 1949. When China was found in 1949, its national crude steel output was a negligible 158,000tons, and China's domestic steel demand is met by importing from western steelmakers. Due to the unstable political status between 1960s and 1970s, China's crude steel production increased slowly. However, by end of 1980s, China's steel production output has grown significantly due to the blooming in domestic economy. Base on the statistics compiled by world steel association (World Steel Association, 2010), as shown in Figure 8, China's production in crude steel has accelerated between 1995 and 2009. This production magnitude is accounted for about 46% of the world's total crude steel output. During this time horizon, by the time of 2006, China's steel production exceeds its consumption illustrated by Figure 9 below. This figure shifted China's role from a steel importer to an exporter. As Figure 9 also shown, that the crude steel exporting to westerns excelled further between 2008 and 2009. This led us to believe China's steel industry is one of the backbones supported its economic growth during 2008 crisis.

Chinese steel industry has its own structure and compositions. According a news analysis released on official website of the Chinese government (Government of People's Republic of China, 2009), there are reportedly 1200 steel manufacturers in China, and about 70 are large and medium-sized manufacturers. Almost all the major steel manufacturers are state-owned, except Shagang Steel, albeit it still needs to follow

the guidelines that China Iron & Steel Association (CISA) publishes, and its top management personnel are Communist Party members (World Steel Dynamics, 2009).

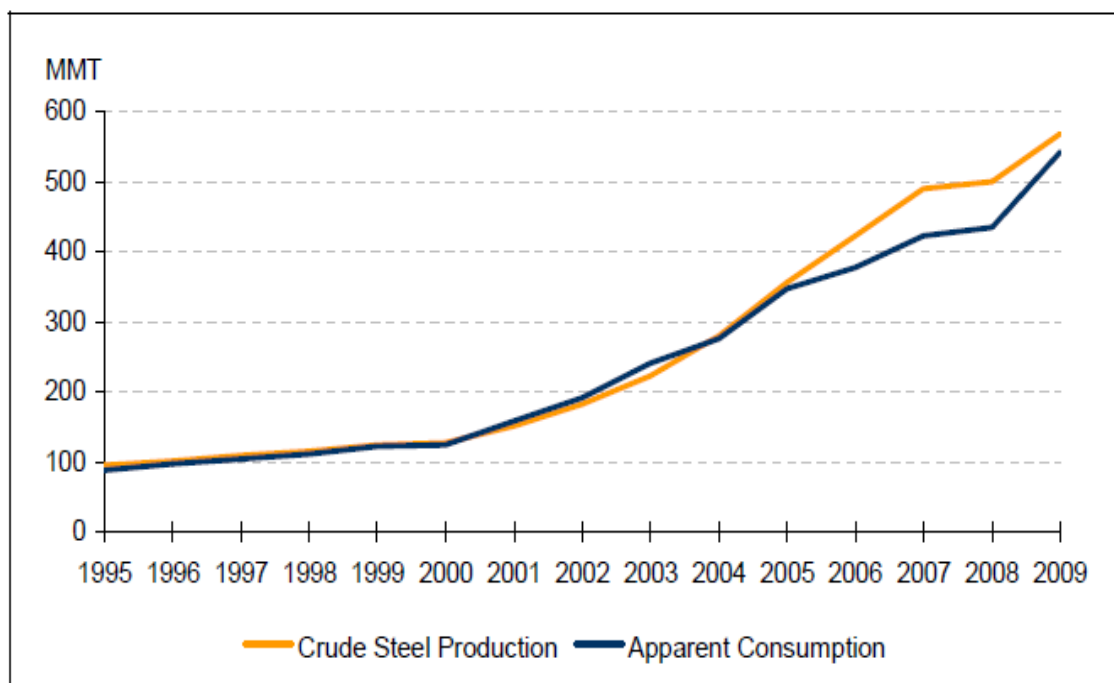
When China's steel capacity accelerated between 2000 and 2009, the overcapacity appeared since 2006 has added pressure to the domestic steel price. In the worst time, the steel spot price dropped below steelmaker's production cost. In spring 2009, the Chinese state council issued a set of three-year industry revitalization plans with steel and automotive plan approved first (SASAC, 2009). The Steel Plan issued by the state council encourages the industry to improve technology levels in steelmaking and be more environmental friendly. In order to improve efficiency, reduce production costs, improve product quality, and optimize product offering structure, the government calls for mergers and acquisitions among steel manufacturers. The goal is to have top five steelmakers holding 45% of Chinese steel production output. According to Tang (Tang 2009: 19), CISA named Baosteel Group Corp., Angang Steel Co. Ltd, and Wuhan Iron & Steel (Group) Corp. as the leading steelmakers that are capable of global competitions.

In this study, with the interests of analyzing Chinese steel manufacturer's competitiveness in a global context, one of the three leading steel manufacturers mentioned above is selected as case study company. WISCO, as the third biggest steel and iron manufacturer in China showed profound interests in understanding its own competitiveness, and agreed to be the case company and cooperated in this thesis work.



Source: World Steel Association.

Figure 8. Crude steel production 1995-2009.



Source: World Steel Association, *World Steel in Figures: 2005, 2008, 2010*.

Figure 9. Crude steel consumption and production 1995-2009.

4.2 Case company: WISCO

Wuhan Iron and Steel (Group) Corporation (WISCO) was found 1955 and firstly running in production in 1958. The company was later merged with Echeng Iron and Steel Company and Liuzhou Iron and Steel Company to form the WISCO group. Nowadays WISCO is a media-large size Chinese state-owned corporation with 83,735 employees. It is ranked as 3rd biggest iron and steel manufacturer domestically and 16th worldwide. (WISCO official website)

According to WISCO's organizational structure (WISCO official website), the group is composed of the following departments:

- Planning & developing department
- Finance department
- Enterprise management department (legal affair department)
- Security & environmental protection department
- Project management department
- Science & technology innovation department (intellectual property management)
- Audit Department
- Office (the party committee office, foreign affairs office)
- Human resources management department
- Propaganda department
- Discipline supervision committee institution
- The party committee institution
- The trade union committee institution
- Communist youth league committee institution

Base on the data collection method mentioned in the preceding chapter, informants are selected accordingly from the following departments at WISCO:

WISCO departments	No. of informants selected
Planning & developing department	1 person
Finance department	1 person
Project management department	2 persons
Science & technology innovation department (intellectual property management)	2 persons
Audit Department	1 person
Enterprise management department (legal affair department)	1 person
The trade union committee institution	1 person

5. WISCO EVALUATIONS

While converting WISCO's questionnaire results into numerical data, one of the results appeared a very high ICR value and it is disregarded from the further analysis. Hence, the following analysis and conclusions are based on nine valid questionnaire results.

5.1 Evaluation of manufacturing strategy

A pair-wise template has set up beforehand in EC in order to performing pair-wise calculation on manufacturing strategy questionnaire results. As described in the proceeding theoretical background chapter, that the manufacturing strategy is determined by four main criteria: Cost, Quality, Delivery, and Time, therefore the template is first set up with these four categories as shown in figure11 below:

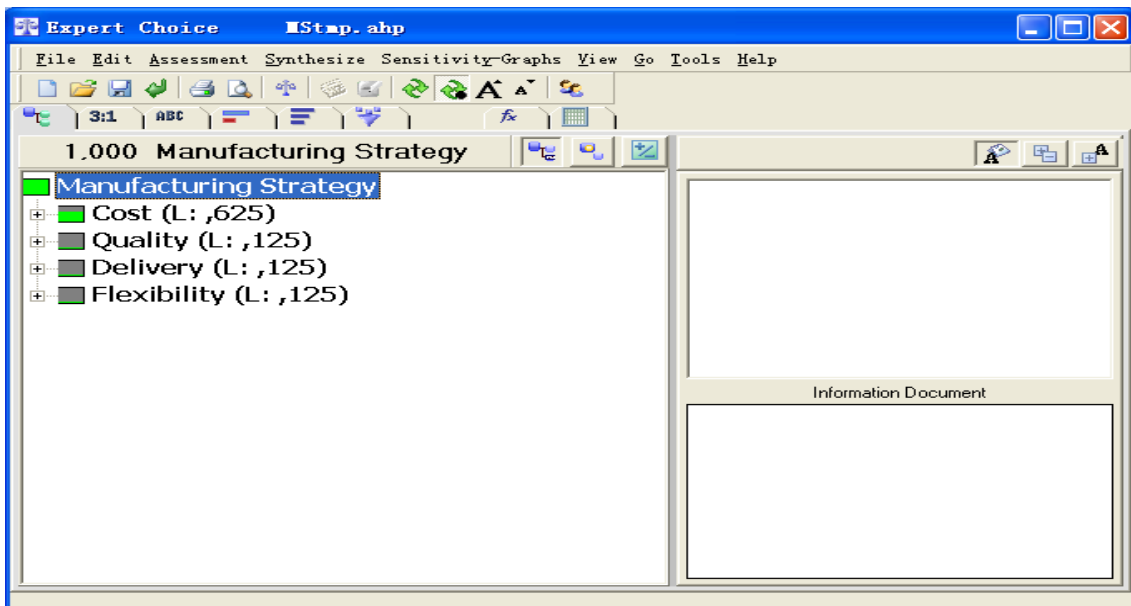


Figure 10. EC manufacturing strategy template: main criteria.

The other 19 sub-criteria under these main criteria are then set up in EC as shown by the snapshot in figure12 below:

Questionnaire

File Edit Assessment Go Help

Compare the relative importance

LOW COST *versus* **VALUE ADDED**

with respect to: Cost (L: ,625)

1	Low Cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Value Added
2	Low Cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Quality Costs
3	Low Cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Activity Based Measur
4	Low Cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Continuous Improvem
5	Value Added	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Quality Costs
6	Value Added	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Activity Based Measur
7	Value Added	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Continuous Improvem
8	Quality Costs	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Activity Based Measur
9	Quality Costs	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Continuous Improvem
10	Activity Based Measur	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Continuous Improvem

1 = Equal 3 = Moderate 5 = Strong 7 = Very Strong 9 = Extreme

Invert Calculate Close Cancel

Figure 11. EC manufacturing strategy template: sub criteria.

The answers from the physical questionnaires are manually typed into these questionnaires template in EC, it then calculate the weight of prioritization for each main criteria automatically as an outcome. For example, in the result shown in Figure13, the Cost criterion is weighted as 62.5 percent among all these four criteria (summation of the four criteria equals to one). The figure refers that the corresponding informant perceives that the company concerns the cost factor the most while making manufacturing decisions.

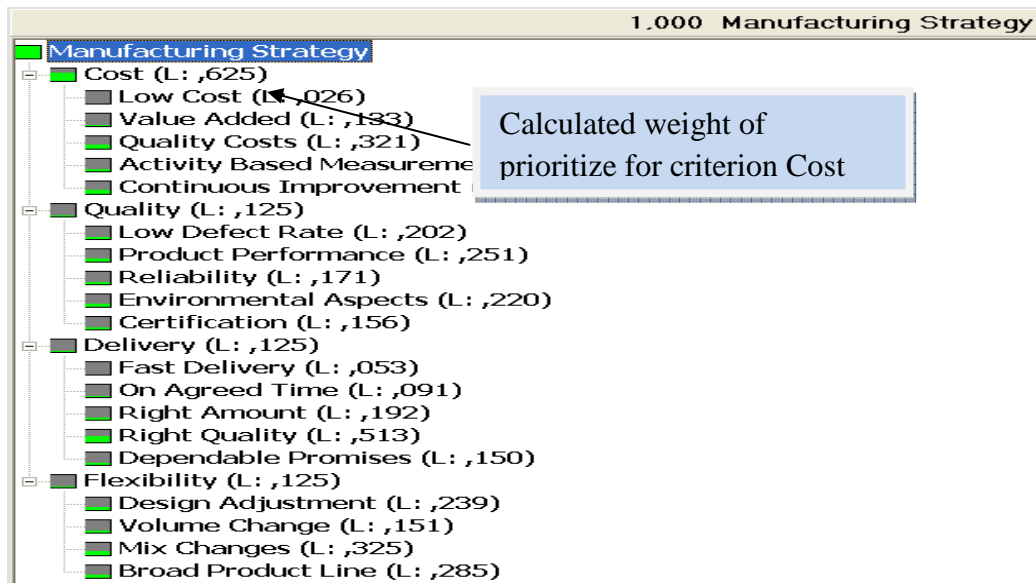


Figure 12. An example of EC pair-wise comparison result on manufacturing strategy.

These prioritization weights of four main manufacturing strategy criteria can be interpreted and written in a mathematical format as follows:

$$C = 0.625; Q = 0.125; T = 0.125; F = 0.125$$

Where :

$C = Cost$

$Q = Quality$

$T = Time$

$F = Flexibility$

Next these figures are applied to the MSI formulas introduced previously in analytical model of manufacturing strategy session to calculate the value of MSI. The mathematical formulas of MSI are coded in MATLAB, where C, Q, T, F are predefined variables and EC numerical results treated as input that assigned to each variable. Figure14 below shown part of the MATLAB code as an example:

```

1  %For test only
2  - clear
3  - format compact
4  - hold on
5  - n=1;%number of answers
6  - Q=[.125]
7  - C=[.625]
8  - T=[.125]
9  - F=[.125]
10
11 - x=0:.1:1;
12 - for i=1:n
13 -     check(i)=Q(i)+C(i)+T(i)+F(i);
14 -     Qa(i)=Q(i)/(Q(i)+C(i)+T(i));
15 -     Ca(i)=C(i)/(Q(i)+C(i)+T(i));
16 -     Ta(i)=T(i)/(Q(i)+C(i)+T(i));
17 -     Fa(i)=F(i)/(Q(i)+C(i)+T(i)+F(i));
18 -     P(i)=1-(1-Qa(i)^(1/3))*(1-.9*Ta(i))*(1-.9*Ca(i))*Fa(i)^(1/3);
19 -     A(i)=1-(1-Fa(i))*(abs((.95*Qa(i)-.285)*(.95*Ta(i)-.285)*(.95*Ca(i)-.285)))^(1/3);
20 -     D(i)=1-(1-Ca(i)^(1/3))*(1-.9*Ta(i))*(1-.9*Qa(i))*Fa(i)^(1/3);
21 - end

```

Figure 13. An example of MATLAB analysis source code.

Similar kinds of data converting using EC and MATLAB are done for nine informants answers, their results are listed in detail in the Table 1 and Table 2 below:

Competitive index

Informants	Competitive index					
	Quality	Cost	Time	Flexibility		
			Prospector	Analyzer	Defender	
WISCO_1	0,4070	0,0740	0,3450	0,9327	0,8679	0,8929
WISCO_2	0,4510	0,0490	0,3320	0,9381	0,8583	0,8892
WISCO_3	0,3590	0,4280	0,1410	0,9430	0,8876	0,9468
WISCO_4	0,2000	0,1210	0,2920	0,8933	0,9546	0,8772
WISCO_5	0,4230	0,1370	0,2660	0,9326	0,9328	0,9037
WISCO_6	0,3450	0,3710	0,1750	0,9332	0,9140	0,9349
WISCO_7	0,6400	0,0980	0,2100	0,9667	0,8383	0,9378
WISCO_8	0,1520	0,4930	0,2880	0,9302	0,9426	0,9521
WISCO_9	0,2430	0,2810	0,3190	0,9155	0,9749	0,9192

Table 1. WISCO MSI analysis results before crisis.

Competitive index

Informants	Competitive index					
	Quality	Cost	Time	Flexibility		
			Prospector	Analyzer	Defender	
WISCO_1	0,3190	0,1570	0,2810	0,9154	0,9332	0,8947
WISCO_2	0,2400	0,5190	0,1110	0,9275	0,9113	0,9467
WISCO_3	0,3050	0,1130	0,2770	0,9115	0,9185	0,8814
WISCO_4	0,3000	0,3170	0,3170	0,9383	0,9716	0,9394
WISCO_5	0,3640	0,2800	0,1710	0,9247	0,9356	0,9171
WISCO_6	0,0590	0,1150	0,3130	0,8657	0,9271	0,8852
WISCO_7	0,6550	0,1090	0,1500	0,9648	0,8113	0,9324
WISCO_8	0,1760	0,0460	0,3480	0,8978	0,9544	0,8606
WISCO_9	0,2860	0,2860	0,2860	0,9215	0,9729	0,9215

Table 2. WISCO MSI analysis results during crisis.

In order to analysis the difference among these nine informant's opinions on different time periods, the figures from previous tables are visualized into plot, shown in Figure 14 below:

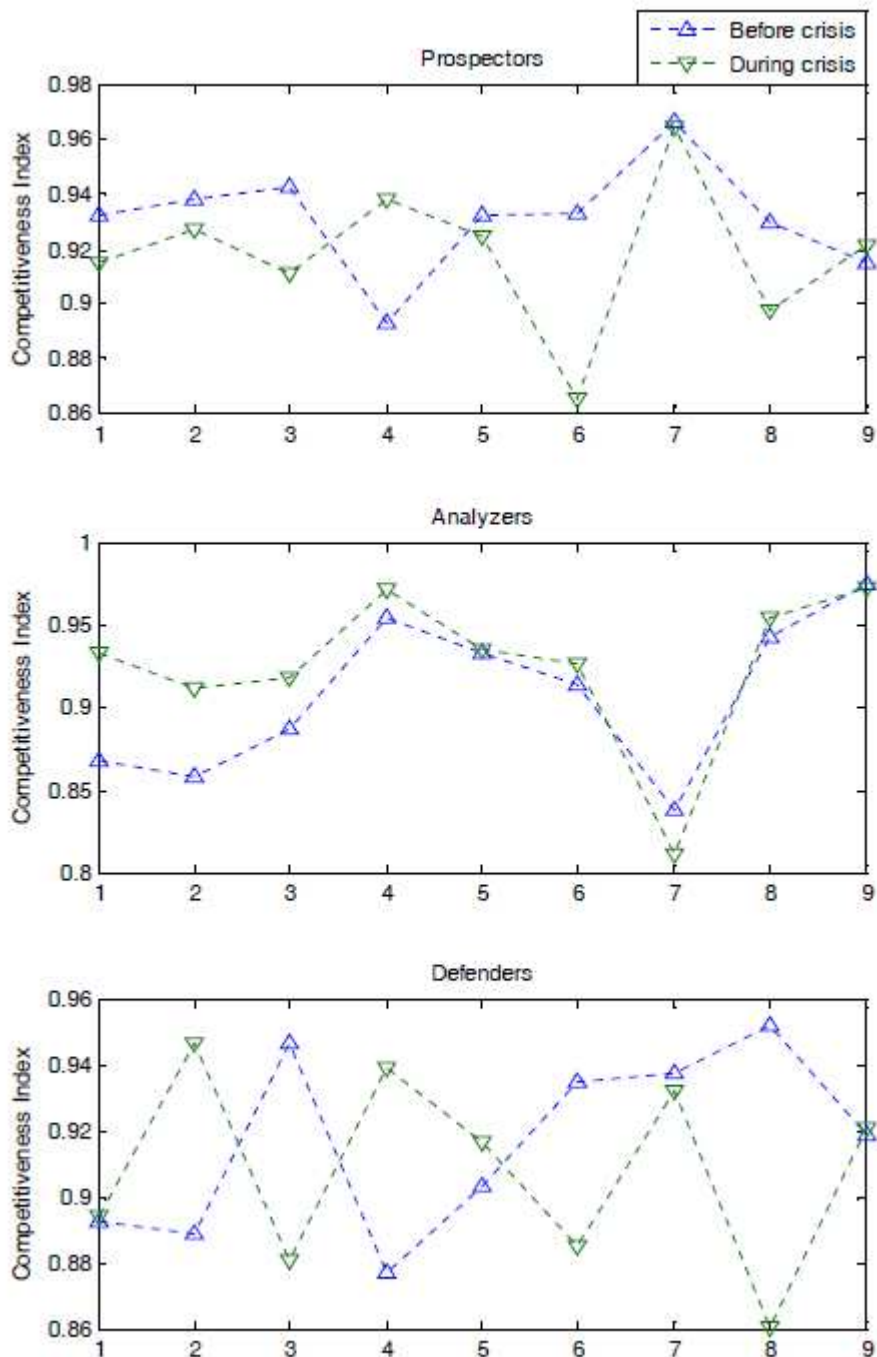


Figure 14. Analytical results of WISCO's MSI: before and during crisis.

From Figure 14, we can see that when analyze WISCO using prospector's formulas, the 4th and 6th informants perceptions on WISCO's manufacturing strategy changed significantly. Base on the 4th informants' opinion, WISCO has comparatively low competitive manufacturing strategy before crisis and WISCO have made changes in its manufacturing strategies to better cope the crisis. On the other hand, the 6th informant holds the opposite opinion that WISCO didn't have efficient changes in manufacturing strategy to cope with crisis. In this case, other informants have given rather similar opinions that if consider WISCO as a prospector type of manufacturer, it is more competitive in production before crisis, and its manufacturing didn't maintain its competitive level during the crisis.

In the last chart, WISCO is analyzed using defender's formulas and it gives rather arbitrary results. It is believed that in general WISCO does not follow the defender's approach as operational strategy. In contrast, informants' opinion appeared most consistent when WISCO is analyzed using analyzer formulas. Most of the informants believe that WISCO's manufacturing competitiveness has improved during crisis.

Base on the WISCO company production categories (WISCO official website), WISCO retains a wide range of products lines, and it has been expanding its market in 2009 by launching a new production line which produces hot-rolling steel plates used for car ceiling constructions. This empirical information is considered as proves that WISCO operates as an Analyzer, and it did improving its production capabilities during crisis.

5.2 Evaluation of transformational leadership

Data gathered on transformational leadership has also been converted and analyzed using EC and MATLAB. Table 3 and Table 4 below represents the analysis results per informants per transformational leadership parameter, while Table5 and Table6 listed the analysis results of transformational leadership index for each informant.

For the ease of analysis and conclusion, these analysis results of TLI are plotted in MATLAB and illustrated as Figure15 below. Interpreting from Figure 15, on the RI, OI, and LI curves, most value of the points have increased, this implies that the majority of the informants believed that resources are better allocated and clearer leadership and guidance are demonstrated by WISCO's leadership during the crisis. On the other hands, few informant results resulted a decrease in the TLI which implies that those informants consider their management tends to be more passive while coping with crisis. It could be the case that managers waiting for managerial solutions coming from top management or central government.

As a conclusion, the majorities believe that WISCO's leadership have been proactive in managing crisis and maintain its competitiveness. Furthermore, based on the TLI result, it is shown that TLI result is consistent with MSI that most of the informants agree that in WISCO most of the managers have prioritized their goal and manage with clearer mission.

Informants	EF	SA	EE	PL	CL	DL	IC	IM	IS	BT	PC	PT	IT	OR	SH	CR	BS
															%	%	%
WISCO_1	0,3505	0,1065	0,5425	0,3405	0,0960	0,5645	0,1005	0,2515	0,3810	0,2665	0,1720	0,2350	0,2350	0,3570	10	30	60
WISCO_2	0,4140	0,1990	0,3870	0,4405	0,1010	0,4585	0,2235	0,1235	0,3275	0,3255	0,2430	0,1570	0,3190	0,2810	20	50	30
WISCO_3	0,4430	0,1315	0,4255	0,4605	0,1810	0,3590	0,1885	0,1840	0,2810	0,3465	0,2100	0,2460	0,2460	0,2980	8	80	12
WISCO_4	0,3665	0,3830	0,2500	0,1700	0,1655	0,6645	0,1230	0,1495	0,6300	0,0970	0,4310	0,1010	0,1350	0,3330	20	50	30
WISCO_5	0,2980	0,3465	0,3555	0,3595	0,1960	0,4455	0,2160	0,1395	0,3705	0,2750	0,2780	0,1960	0,1410	0,3850	10	30	60
WISCO_6	0,4505	0,3485	0,2010	0,3380	0,3340	0,3280	0,1615	0,2075	0,3410	0,2895	0,3380	0,2050	0,2880	0,1690	20	50	30
WISCO_7	0,5220	0,2510	0,2270	0,4025	0,2975	0,3000	0,0890	0,0925	0,3775	0,4415	0,3320	0,1340	0,4020	0,2320	10	45	45
WISCO_8	0,3635	0,3065	0,3300	0,7245	0,1090	0,1665	0,3035	0,1340	0,1640	0,3980	0,1780	0,1440	0,2780	0,4000	20	30	50
WISCO_9	0,4365	0,2405	0,3230	0,1715	0,3900	0,4385	0,0730	0,1775	0,3860	0,3635	0,1500	0,2820	0,3680	0,2000	20	40	40

Table 3. WISCO transformational leadership parameter analysis results before crisis.

Informants	EF	SA	EE	PL	CL	DL	IC	IM	IS	BT	PC	PT	IT	OR	SH	CR	BS
															%	%	%
WISCO_1	0,3200	0,1235	0,5570	0,3885	0,1735	0,4380	0,0715	0,3260	0,1965	0,4065	0,1400	0,158	0,1580	0,5440	20	40	40
WISCO_2	0,5090	0,2835	0,2065	0,1420	0,6375	0,2205	0,0610	0,2540	0,4590	0,2270	0,1370	0,174	0,2660	0,4230	30	50	20
WISCO_3	0,4155	0,1785	0,4060	0,1985	0,2295	0,5720	0,0985	0,1830	0,3195	0,3990	0,2870	0,136	0,3400	0,2370	8	80	12
WISCO_4	0,3530	0,3465	0,3005	0,2060	0,2130	0,5815	0,1145	0,2505	0,3155	0,3195	0,1890	0,205	0,2010	0,4050	10	40	50
WISCO_5	0,2980	0,3465	0,3555	0,2590	0,3055	0,4355	0,2520	0,3265	0,2365	0,1855	0,2070	0,161	0,4640	0,1680	10	60	30
WISCO_6	0,4605	0,1755	0,3640	0,5245	0,2220	0,2535	0,1490	0,2875	0,2675	0,2965	0,3070	0,27	0,0810	0,3420	15	60	25
WISCO_7	0,5220	0,1780	0,3000	0,5920	0,1675	0,2450	0,0565	0,1765	0,3495	0,4175	0,1180	0,118	0,2760	0,4870	5	35	60
WISCO_8	0,2610	0,2815	0,4575	0,5090	0,1430	0,3485	0,1800	0,4065	0,1430	0,2705	0,0780	0,335	0,3540	0,2330	10	40	50
WISCO_9	0,2850	0,2605	0,4550	0,2085	0,3310	0,4605	0,1135	0,1765	0,3990	0,3105	0,1010	0,187	0,4030	0,3100	40	30	30

Table 4. WISCO transformational leadership parameter analysis results during crisis.

Informants	OI (Prospectors)	OI (Analyzers)	OI (Defenders)	LI	TI	RI	TLI (Prospectors)	TLI (Analyzers)	TLI (Defenders)
WISCO_1	0,7732	0,9355	0,9274	0,3235	0,5000	0,2277	0,0570	0,0689	0,0583
WISCO_2	0,8657	0,9377	0,9388	0,2366	0,6000	0,4099	0,0840	0,0910	0,0764
WISCO_3	0,7982	0,9329	0,9337	0,1750	0,4800	0,2637	0,0368	0,0431	0,0362
WISCO_4	0,9167	0,9397	0,9451	0,3420	0,6000	0,2332	0,0731	0,0749	0,0670
WISCO_5	0,9647	0,9580	0,9561	0,2510	0,5000	0,1908	0,0462	0,0459	0,0381
WISCO_6	0,8677	0,9258	0,9392	0,1974	0,6000	0,2793	0,0478	0,0510	0,0470
WISCO_7	0,8113	0,9236	0,9383	0,1449	0,5000	0,3247	0,0382	0,0435	0,0392
WISCO_8	0,9698	0,9583	0,9593	0,0391	0,6000	0,3019	0,0114	0,0113	0,0091
WISCO_9	0,8968	0,9380	0,9427	0,2311	0,6000	0,2395	0,0496	0,0519	0,0441

Table 5. WISCO TLI analysis results before crisis.

Informants	OI (Prospectors)	OI (Analyzers)	OI (Defenders)	LI	TI	RI	TLI (Prospectors)	TLI (Analyzers)	TLI (Defenders)
WISCO_1	0,7763	0,9365	0,9263	0,2259	0,9000	0,3720	0,0652	0,0787	0,0779
WISCO_2	0,8243	0,9224	0,9382	0,0632	1,0000	0,4110	0,0214	0,0240	0,0244
WISCO_3	0,8452	0,9362	0,9366	0,3751	0,8000	0,5533	0,1754	0,1943	0,1944
WISCO_4	0,9672	0,9573	0,9590	0,4258	0,8000	0,4350	0,1792	0,1773	0,1776
WISCO_5	0,9647	0,9580	0,9561	0,2793	0,9000	0,4463	0,1203	0,1194	0,0992
WISCO_6	0,8422	0,9332	0,9373	0,1149	0,9500	0,2277	0,0220	0,0244	0,0207
WISCO_7	0,8113	0,9274	0,9374	0,0817	0,7000	0,2390	0,0158	0,0181	0,0158
WISCO_8	0,8758	0,9420	0,9330	0,1443	0,8000	0,1747	0,0221	0,0237	0,0207
WISCO_9	0,8783	0,9422	0,9348	0,2622	0,9000	0,2676	0,0616	0,0661	0,0568

Table 6. WISCO TLI analysis results during crisis

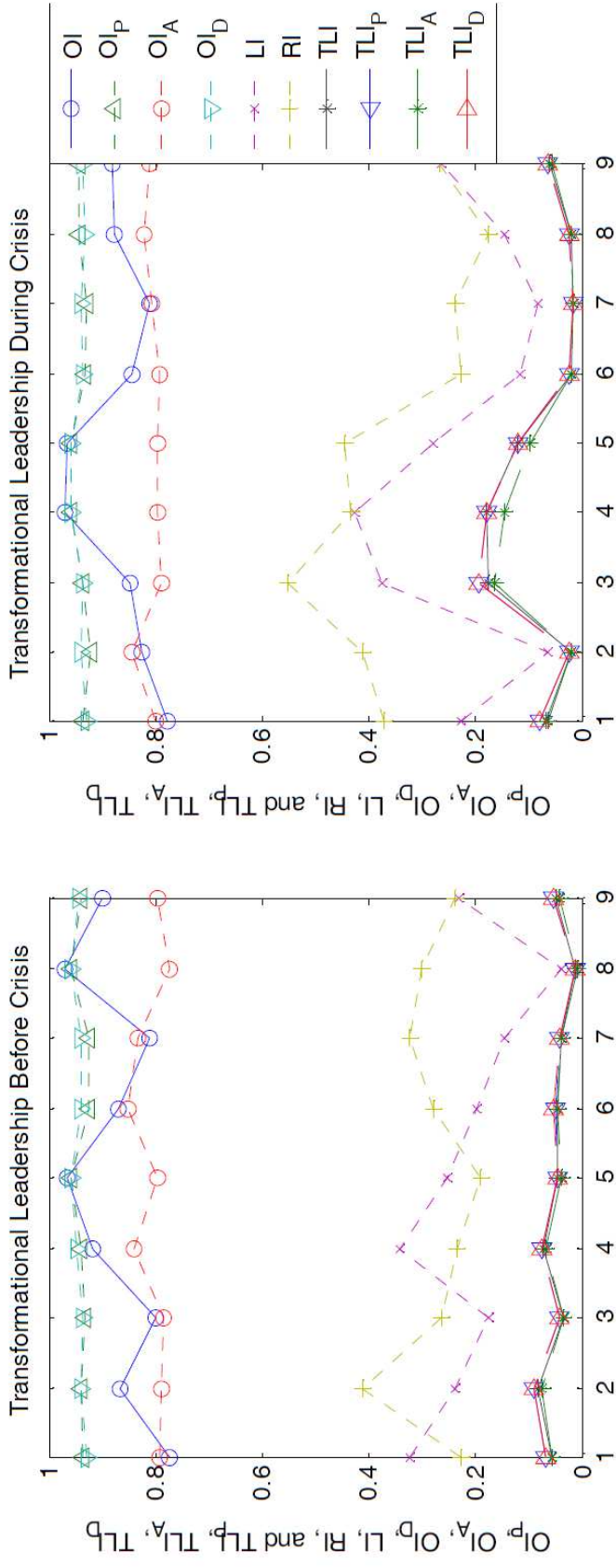


Figure 15. WISCO TLI before and during crisis

5.3 Evaluation of overall competitiveness

In theory, the overall competitiveness index is a linear function with two variables MSI and TLI. Therefore in order to find out what is WISCO's overall competitiveness, it is most efficient to find out how MSI and TLI interact with each other. Figure 17 and Figure 18 below present the linear relationship between MSI and TLI.

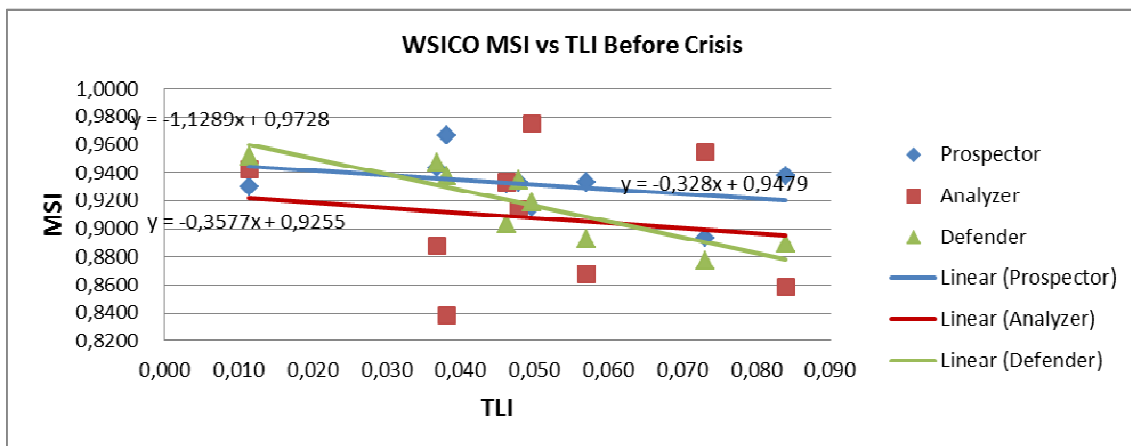


Figure 16. WISCO MSI vs. TLI before crisis.

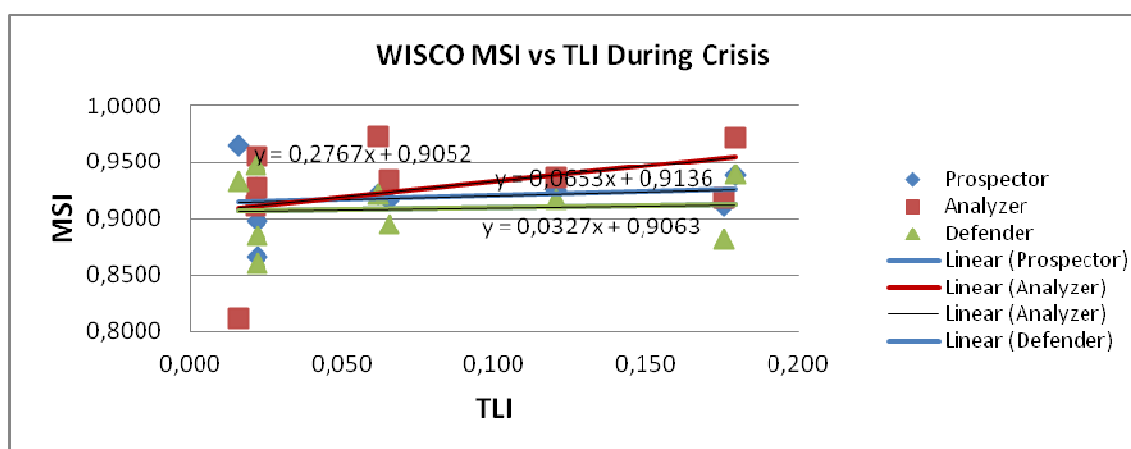


Figure 17. WISCO MSI vs. TLI during crisis.

Figure 16 above it is a linear plot of MSI and TLI before crisis, and they have a negative relationship among three different organizational types. This means the extra effort put into leadership did not result better productivities. In Figure 17, it is the plot of MSI and TLI during crisis, the slope of have changed into positive for all three different organizational types. For analyzer group, the improvement has been the most significant, this can be interpreted as during crisis, the improvement in leadership steering WISCO's manufacturing strategy. As a conclusion, WISCO have revealed most competitive as an analyzer during crisis, and its competitiveness is driven by its leadership

As a conclusion that for the overall competitiveness of WISCO, it is believed that WISCO is most efficient and competitive as an analyzer type of organization and this answers to research question number one.

6. DISCUSSION AND RESULTS

It is concluded in proceeding chapter that WISCO is highly competitive as an analyzer. This interesting result lured further information gathering on WISCO empirically as an attempt to understand the roots of its competitiveness. This beginning part of this chapter listed the findings on WISCO's empirical practices since year 2005. Among those findings, WISCO's innovation in human resource strategy initiated in year 2005 stands out as key factor interact with WISCO's competitiveness today. Integrating with the human resource approach mentioned in Avolio's transformational leadership literately, an idea is formed to enhance the current overall competitiveness analytical mode, and this brings a closure to this thesis work.

6.1 Empirical findings on WISCO

According to SASAC (SASAC, 2005), China's central party articulated its new competitive strategy to all the CSOMEs, that small and median size CSOMEs shall be merged to reform larger size CSOME in order to gain competitiveness in globally.

6.1.1 Findings on WISCO's M&A strategy

WISCO as one of large size CSOMEs, and is entitled to follow the competitiveness strategy issued by China's central party. However, looking back in time, WISCO is already the pioneer in merger and acquisition in the metal industry, it has undertaken the following merger and acquisition changes since year 1999 (WISCO official website):

- *Year 1999:* WISCO merged HaiNan TengDa Corporation Ltd, and renamed the firm under name: WISCO HaiNan Corporation Ltd.
- *Year 2000:* WISCO purchased XiangFan Iron and Steel (Group) Corp with acquisition price of 74 million RNB (approximately 925,000\$)

- *Beginning of year 2005*: HuBei SASAC spinoff 51% of EZhou Iron and Steel capital injection to WISCO, WISCO EZhou Corporation Ltd is put into production on 30th of April 2005.
- *End of year 2005*: WISCO and GuangXi SASAC co-found LiuZhou (Group) Corporation Ltd. Total capital injection of 127.57 billion RNB (approximately 16.3billion \$), which 51% invested by WISCO, 40% by SASAC.
- *Year 2007*: WISCO tender-off 48.41% of KunZhou Iron and Steel Corporation Ltd, WISCO KunZhou Iron and Steel (Group) Corp is up running in August 2008.

As shown above, WISCO has been active in M&A since year 2005 onwards. According to Deng Qilin (WISCO official website, 2005), WISCO's CEO, it is essential to adopt M&A in order to reform the iron and steel manufacturers into larger size as he believed that the competitiveness will be gained in many perspectives. For instance, through merging, more financial capital and liquidity will be gain. This will provide better opportunities in investing in streamlining production process, and large scale of production. With abundant demand from international and domestic market, the merged firm could easily benefit from the previously mentioned scale of economy and appearing more competitive in cost wise.

Theoretically, organization's competitiveness is a reflection of its internal efficiency and effectiveness. Conventionally, most of the improvements in organization's efficiency and effectiveness are recognized in financial terms externally, such as a firm's increased revenue, or a better result on its return over investment ratio. The success of WISCO's continues M&A strategies has revealed slowly on the following years in profitability terms. According to Fortune 500 (Fortune 500, 2010), WISCO was ranked as 428th competitive firm worldwide with net profit of 174million dollars by year 2010. This is concerned as a success from its continue M&A operations and organization transformations.

M&A in practices means reorganization and resizing. It associates high operational risk and normally encounters obstacles from different areas of an organization during its

transformation phase. It is cited by Avolio (Avolio 1994, 177–182) and illustrated in Figure 18 below that during organizational transformation, there are four phases which effect productivity and morale.

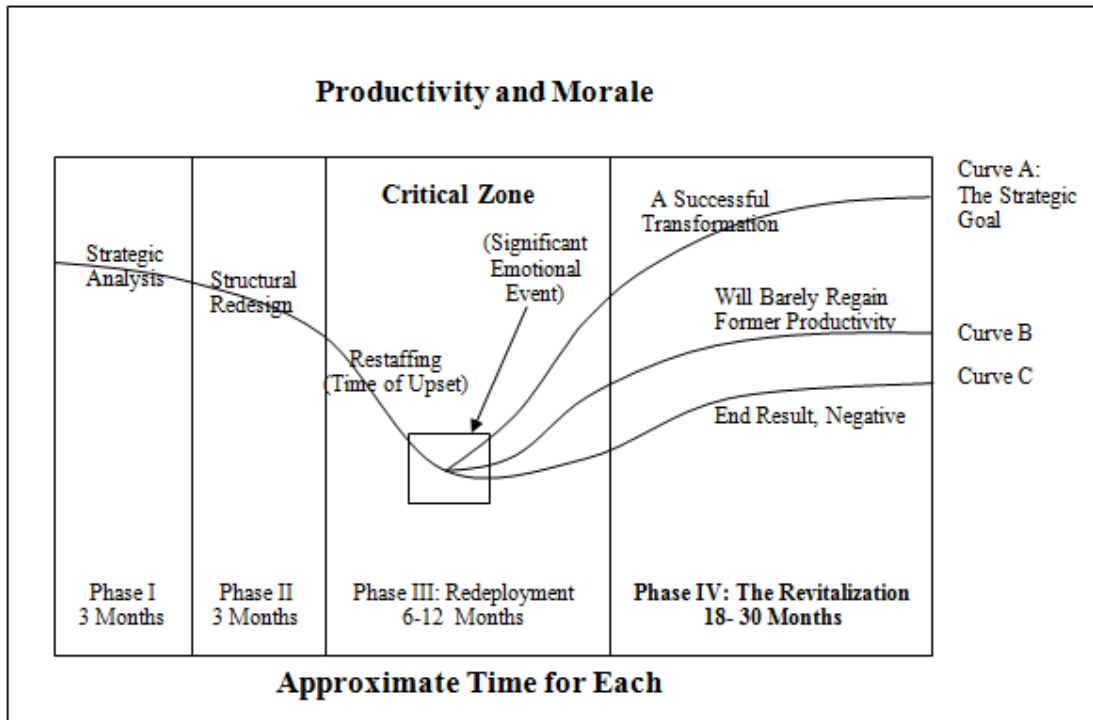


Figure 18. Organization Transformation.

According to Avolio (Avolio 2005, 198), transformation in human resource strategy is the core of organizational transformation. It should be calibrated accordingly to support organizational changes so that the outcome of a firm would lean towards curve B or A shown above. Inspired by this theory, a question is naturally asked: Is WISCO's HRS the core contributor to WISCO's success in gain competitiveness through reorganization and resizing. In order to answer this question, further researches were carried out to obtain information on WISCO's HRS since 2005 onwards.

6.1.2 Findings on WISCO's HRS

It is interesting to find that WISCO undertook a transition in its human resource strategy (HRS) in parallel to its M&A strategies, in order to provide sufficient supports to WISCO's reorganizations (Deng Qilin et al, 2005). It is documented in WISCO's HRS innovation report that the main objective of the HRS innovation is to overcome the following three drawbacks in the existing HRS:

1. The traditional HRS which pursued "headcount" management method, delegate tasks and personal develop plans according to the static concern of employee's capabilities and backgrounds. This leads to pool job rotation and incentive system.
2. The current focus on team building was to consider each employee as agent who is mostly rewarded base on the emphasized of pay, benefits, and perquisites. This leads to pool employee focus as employees should be paid more attention individually and rewards for improving organizational performance.
3. Compare to other world's best large-size iron and steel manufacturers, WISCO have more employees with basic capabilities rather than highly skilled ones. This leads to comparatively low creativity and learning capabilities presented by employees' performance.

According to Deng Qilin et al (Deng Qilin et al, 2005), WISCO's HRS innovation is aim at improving leadership style at all managerial level throughout the organization. The new HRS mainly empowered following practices and policies for managing mangers in four main HRS areas. These information are documented in Chinese, therefore they are first interpreted into English the concluded as in Table 7 below.

HRS Innovation Areas	Performance Evaluations	Compensation Policies	Employee Focus	Job Design
Innovation Objectives	To establish comprehensive mechanism in performance evaluation to boost employees' awareness of effectiveness and performance	To establish a compensation system in a more dynamic format, which based on employees' performances and contributions	To provide training to employee based on individual potential and interest, therefore improving the creativity.	To reduce the quantity of managerial positions in order to flat the organizational structure.
Innovation Principals	<p>Performance evaluation is based on monthly and yearly assessments on term goals.</p> <p>Performance is evaluated qualitatively and quantitatively with emphasizes on quantitative assessment results.</p> <p>Performance should be evaluated scientifically with transparency, fairness, and standard norms.</p>	<p>Adhere to people-oriented concept, that organization will provide gradually wage increase when performance is improved</p> <p>Reward according to work performance and contribution. Each department is allocated with bonus for rewarding its employee accordingly.</p> <p>All employees' wage will be adjusted according to organization's profitability.</p>	<p>Delegate the tasks base on individual skills and capabilities rather than educational backgrounds and previous experiences.</p> <p>Downside the level of hierarchy in management, so employees are more involved in decision making process.</p> <p>Create synergy between coworkers and promote learning through rewards</p>	<p>To downsize the headcounts by 15%</p> <p>Jobs are designed with higher requirements and broader responsibilities, to drive further improvements in individual skills.</p> <p>Throughout the entire organizational , the percentage of managerial positions should not exceed 11%</p>
Polices and Methods	<p>Total performance = $(0.6 * \text{Individual Job Performance}) + (\text{Individual Skills} * 0.2) + (\text{Individual Sustainability} * 0.1) + (\text{Co-work Feedback} * 0.1)$</p> <p>Individual Job Performance indicates level of fulfillment and complement of its work task</p> <p>Individual Skills indicates skills or knowledge required for performing its duties.</p> <p>Individual Sustainability indicates the capability of implementing sustainability scientifically and efficiently in team building, constructing corporate culture, and etc.</p>	<p>The performance evaluation results are sorted descending then categorized into three categories. The top 10 percentile is considered as top group, the last 5-8 percentile is consider the last group, the rest is considered as middle group.</p> <p>Top group is rewarded in term of bonus while the last group is eliminated.</p>	<p>Tasks are assigned through demonstrations of individual skills and everyone is given equal opportunities for competing for the positions.</p> <p>Individual attentions are paid during selection for training course so that each employee maximizes its potential and talent.</p> <p>Incentive learning through rewarding improved job performance or bringing in creativities.</p>	<p>Define clear relations between job and responsibilities.</p> <p>Strictly follow the rule of ratio set up for managerial positions</p> <p>Thoroughly analysis job responsibility to eliminate job duplications within the organization.</p> <p>Promote long term optimizations in job responsibilities.</p>

Table 7. WISCO HRS innovation detail

6.2 Improvement proposal for overall competitiveness analytical model

Mentioned by Avolio (Avolio 1994, 186), many firms are becoming transformed from a model of control of human resources to one of mutual commitment between employees and organization. Simply put, how well the firm manages to transform its HRS from the controlled model to commit module directly indicate organization's efficiency during transformation period. As listed previously, WISCO has paid significant attention to its HRS during its transformational stages. These theoretical and empirical evidences have both revealed that human resource strategy is one of the crucial areas which determine whether an organization could continuously improve its efficiency and competitiveness.

During evaluating WISCO's competitiveness, it is noticed that the current overall competitiveness analytical model does not include an explicit measurement on organization's HRS. As an attempt to improve the measurability of the existing model, it is proposed that a new measurement index, Human Resource Strategy Index (HRSI), will be introduced into the existing transformational leadership index as an enhancement.

6.3 Measure HRSI using AHP

HRSI is measured using the same methodology as in measuring transformational leadership index and manufacturing strategy index. An AHP hierarchy is designed for HRS based on the Avolio's theory and empirical findings on WISCO case study.

It is concluded by Walton (Walton, 1985), that the control model and commit model contrasts each other in eleven sub-strategic areas as illustrated in Table 8 below. Later in Avolio's work (1994, 186), it is pointed out that the commit model is identified by broadly defined job responsibilities, ambitious performance expectations replacing minimum work standards, more direct involvement of employees in decision making process, and new compensation and evaluation policies based on skill acquisition. In this case study, WISCO's new principals and policies mentioned in new HRS also has shown similar response to these four strategic areas: Employee Focus, Job Design, Performance Expectations, and Compensation Policies. Based on these findings, out of eleven sub-strategic areas in HRS, these four sub-strategic areas were selected as main criteria in HRS AHP hierarchy as marked in Table 9. Integrating WISCO's human resource practices and polices listed in session 6.1.2 together with Avolio's strategies in improving creativity and compensations. The hierarchy is shown in details in Figure 19 below.

Strategic Area	Control model	Commitment model
Theme	To establish order, exercise control, and achieve efficiency of operations and people	To foster commitment with the expected results of efficiency and effectiveness
Philosophy	Obligation to stockholders	Expanded obligation to stockholders, employees, customers, and public
Employee Focus	Individual attention given to job performance	Individual attention and rewards as compensation for responsibility of improving organizational performance
Job Design	Narrow, fixed jobs; concern for individual performance; separate thinking and doing	Broad, flexible jobs, concern for team performance, combined thinking and doing in multifunctional teams
Organizational Structure	Many layers of management; control based on rules and position of authority	Few layers of management, control based on shared goals, values, traditions, and expertise
Status Symbols	Distributed to reinforce hierarchy of positions	Minimized to reduce emphasis on hierarchical structure
Performance Expectations	Minimum standards monitored for the job	Focus on excellence, dynamic personal competence skill, expertise, and striving toward continuous improvement
Compensation Policies	Incentives based on individual performance; equity based on comparison of jobs in organization; attempts at cost reduction focus on hourly payroll reduction	Incentives based on team performance, equity based on comparison of employee skills and expertise, attempts to cut costs focus on equality of sacrifice
Employment Assurance	Employees considered to be variable costs	Layoffs avoided, training retraining, and cross-training program developed, assistance provided to obtain reemployment
Employee Participants	Provide narrow information on a "need to know" basis. Information obtained from employees by attitude surveys and grievance procedure	Provide broad information on a variety of issues, extensive sharing of business data, participation encourage on wide range of corporate governance issues
Labor Relations	Adversarial: emphasis on conflicts of interest regarding specific agendas in collective bargaining; transitional union leader, manager, and worker roles maintained	Mutuality in labor relations, emphasis on joint planning and problem solving on expanded agendas, union leaders, managers, and workers redefine their respective roles within the context of a global organizational vision

Table 8. Transformation from a control to commitment model of HRS.

Strategic Area	Control model	Commitment model	Main AHP Criteria
Theme	To establish order, exercise control, and achieve efficiency of operations and people	To foster commitment with the expected results of efficiency and effectiveness	
Philosophy	Obligation to stockholders	Expanded obligation to stockholders, employees, customers, and public	
Employee Focus	Individual attention given to job performance	Individual attention and rewards as compensation for responsibility of improving organizational performance	*
Job Design	Narrow, fixed jobs; concern for individual performance; separate thinking and doing	Broad, flexible jobs, concern for team performance, combined thinking and doing in multifunctional teams	*
Organizational Structure	Many layers of management; control based on rules and position of authority	Few layers of management, control based on shared goals, values, traditions, and expertise	
Status Symbols	Distributed to reinforce hierarchy of positions	Minimized to reduce emphasis on hierarchical structure	
Performance Expectations	Minimum standards monitored for the job	Focus on excellence, dynamic personal competence skill, expertise, and striving toward continues improvement	*
Compensation Policies	Incentives based on individual performance; equity based on comparison of jobs in organization; attempts at cost reduction focus on hourly payroll reduction	Incentives based on team performance, equity based on comparison of employee skills and expertise, attempts to cut costs focus on equality of sacrifice	*
Employment Assurance	Employees considered to be variable costs	Layoffs avoided, training retraining, and cross-training program developed, assistance provided to obtain reemployment	
Employee Participants	Provide narrow information on a "need to know" basis. Information obtained from employees by attitude surveys and grievance procedure	Provide broad information on a variety of issues, extensive sharing of business data, participation encourage on wide range of corporate governance issues	
Labor Relations	Adversarial: emphasis on conflicts of interest regarding specific agendas in collective bargaining; transitional union leader, manager, and worker roles maintained	Mutuality in labor relations, emphasis on joint planning and problem solving on expanded agendas, union leaders, managers, and workers redefine their respective roles within the context of a global organizational vision	

Table 9. Selection of main criteria of HRS AHP hierarchy.

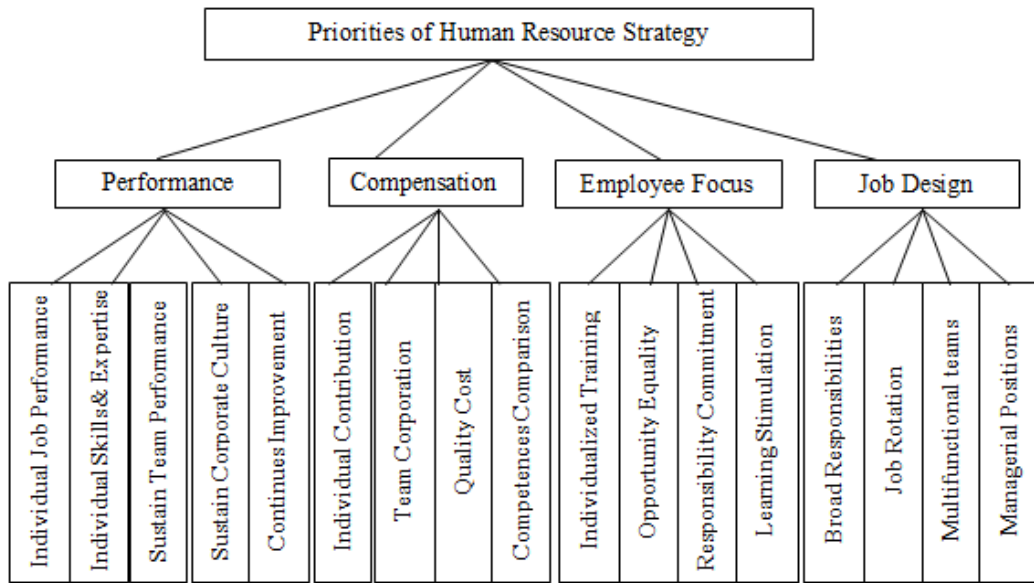


Figure19. HRS AHP hierarchy.

7. CONCLUSION

This thesis work has been a great learning experience in both theory and empirical. It is rewarding to learn more insights on the practices of a highly competitive CSOME in depth. The outcome of this work, the AHP hierarchy of HRS as an extension to the current overall competitiveness analytical model, can be used later as a base for HRS questionnaire design. However, the validity of this improvement can only be verified through future case studies.

Additionally, due to the scope of this thesis work there are many interesting topics relating to CSOMEs left unexplained. For instance, what kind of role does communist policy plays in relation to CSOME's competitiveness? Is it easier for a CSOME to implement changes in HRS due to the high level of governance and control from the national level?

On the other hand, all these unsolved limitations create interesting reach topics and case study objectives for later work, and hopefully contributing to research in transformational leadership area.

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APPENDICES

APPENDIX 1. Manufacturing Strategy AHP questionnaire

This questionnaire contributes to part of our global manufacturing strategy research. The questions are structured in a relatively simple form following the logic of AHP method. The results of this questionnaire will reveal the most weighted criteria among other criteria in the organizations' manufacturing strategy. Filling this questionnaire may take 15-30minutes approximately.

INSTRUCTION OF FILLING GLOBAL MANUFACTURING STRATEGY QUESTIONNAIR

AHP method uses pair-wise comparison among all the factors to support decision making process. All questions in this questionnaire are designed following AHP logic. It takes two thinking steps to answer each question. For instance, you are given two different criteria which affect manufacturing decision making. Firstly you need to compare these two given factors and select one factor which you considered as more important than the other (for example: A is more important than B or wise alike). Secondly you need to give a number within scale of 1-9 to indicate to what extent you think this selected factor is more important than the other one.

A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	B

1 = A and B equally important

A is slightly more important than B = 3 3 = B is slightly more important than A

A is more important than B = 5 5 = B is more important than A

A is much more important than B = 7 7 = B is much more important than A

A is extremely important than B = 9 9 = B is extremely important than A

Note: You can also use even numbers from the scale, if your answer is better suited between odd numbers.

The scale is expressed in two directions with number 1 in the middle indicating that A and B are equally important. As shown in the

example above, number 9 from the right side is selected and it implies that B is more important than A in an intensive level.

EXPLANATION OF INCONSISTENCE RATIO (ICR)

In order to ensure usability and quality of the answers, figures below illustrate two examples of incorrect answers with high inconsistency ratio. All the answers from this questionnaire are then input into software which does pair-wise comparisons in numerical way. As example 1 implies below, A is 3 points more important than B, the analytical software understand it as $A > B$, and the second comparison is interpreted as $A < C$, and last comparison as $B > C$. Logically this three statement contradicting each other and cause logic inconsistency during analyze phase. With an understanding of ICR, informants are recommended to recheck the consistence of its own answer after answer all the questions.

Example 1:

1	A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	B
2	A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	C
3	B	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	C

This means $A > B$ & $B > C$ & $C > A$ which is impossible and totally contradictory, so this will cause high icr.

Example 2:

1	A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	B
2	A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	C
3	B	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	C

This means A is much bigger than B, and A is a little bigger than C, from these two conditions we can conclude that C should be bigger than B, but last condition put B is bigger than C, which is contradictory and cause high icr.

Please mark the evaluation values in GREEN colour for normal business situation (before crisis) and in RED colour for crisis situation (during crisis). If they are happened to be the same value in both situations, please mark in YELLOW colour.

NAME of the ANSWERER _____
 ORGANIZATION _____
 COUNTRY _____
 BUSINESS AREA _____

Costs	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Quality
Costs	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Delivery
Costs	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Flexibility
Quality	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Delivery
Quality	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Flexibility
Delivery	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Flexibility

THANK YOU FOR YOUR ANSWERS!

APPENDIX 2. Transformational leadership AHP questionnaire

This questionnaire contributes to part of our leadership development research. The questions are structured in a relatively simple form following the logic of AHP method. The results of this questionnaire can be used to generate personal leadership profile for the leader. Filling this questionnaire may take 15-30minutes approximately.

INSTRUCTION OF FILLING PERSONAL LEADERSHIP QUESTIONNAIR

AHP method uses pair-wise comparison among all the factors to support decision making process. All questions in this questionnaire are designed following AHP logic. It takes two thinking steps to answer each question. For instance, you are given two different factors which describe different aspects of your leadership. Firstly you need to compare these two given factors and select one factor which you considered as more important/describe your leadership better than the other (for example: A is more important than B or wise alike). Secondly you need to give a number within scale of 1-9 to indicate to what extent you think this selected factor is more important than the other one.

A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	B
										1 = A and B describes my leadership equally good (or bad)								
										1 = A and B describes my leadership equally good (or bad)								
										3 = B describes my leadership slightly better than A								
										5 = B describes my leadership better than A								
										7 = B describes my leadership much better than A								
										9 = B describes it extremely much better than A								

Note: You can also use even numbers from the scale, if your answer is better suited between odd numbers.

The scale is expressed in two directions with number 1 in the middle to indicate that A and B describe your leadership equally good (or bad). As shown in the example above, number 9 from the right side is selected and it implies that B describes the leadership better than A does in a extreme level.

EXPLANATION OF INCONSISTENCE RATIO (ICR)

In order to ensure usability and quality of the answers, figure below illustrate two examples of incorrect answers with high inconsistency ratio. All the answers from this questionnaire are then input into software which does pair-wise comparisons in numerical way. As example 1 implies below, A is 3 points more important than B, the analytical software understand it as $A > B$, and the second comparison is interpreted as $A < C$, and last comparison as $B > C$. Logically this three statement contradicting each other and cause logic inconsistency during analyze phase. With a understanding of ICR, informants are recommended to recheck the consistence of its own answer after answer all the questions.

Example 1:

1	A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	B
2	A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	C
3	B	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	C

This means $A > B$ & $B > C$ & $C > A$ which is impossible and totally contradictory, so this will cause high icr.

Example 2:

1	A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	B
2	A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	C
3	B	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	C

This means A is much bigger than B, and A is a little bigger than C, from these two conditions we can conclude that C should be bigger than B, but last condition put B is bigger than C, which is contradictory and cause high icr.

It is recommended that all the questions for every pair-wise comparison are answered in order to form a useable result. We would prefer you answers to be as correct as possible and corresponds to your current leadership in your current position or the leadership of the person under evaluation at the moment. There are no right, best or preferable answers to this questionnaire. The leadership profile obtained from the results is intended to describe the answerers' utilization of resources, leadership and expert activities. The results of questions are used only in order to create personal leadership profile for each answerer, which is meant for the personal use of the answerer to support personal development as a leader and building the leadership development plan. It is kept confidential and will not be published anywhere. We are using the answers in order to collect statistical data, from which no individual answerers can be recognized.

Please mark the evaluation values **in GREEN colour for normal business situation** (before crisis) and **in RED colour for crisis situation** (during crisis). If they are happened to be the same value in both situations, please mark **in YELLOW colour**.

NAME of the ANSWERER _____

Leadership position _____

DESCRIBE YOUR OWN LEADERSHIP AT THIS MOMENT (or the leadership of the person evaluated) by comparing the following:

Utilizes individual considerations	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Supports and encourages
Utilizes individual considerations	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Emphasize creativity and learning
Utilizes individual considerations	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Acts as an example
Supports and encourages	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Emphasize creativity and learning
Supports and encourages	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Acts as an example
Emphasize creativity and learning	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Acts as an example
Utilizes genuine interest of other people	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Motivates and rewards
Utilizes genuine interest of other people	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Encourages and challenges to develop
Utilizes genuine interest of other people	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Utilize the mutual trust
Motivates and rewards	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Encourages and challenges to develop
Motivates and rewards	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Utilizes the mutual trust
Encourages and challenges to develop	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Utilizes the mutual trust

Operational business process and work flows	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Utilize the know-how
Operational business process and work flows	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Utilizes the information system
Operational business process and work flows	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Utilizes different organizing practices such teams, matrixes, projects etc.
Utilizes the know-how	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Utilizes the information systems
Utilizes the know-how	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Utilizes different organizing practices like teams, matrixes, projects etc.
Utilize the information	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Utilizes different organizing practices like teams, matrixes, projects etc.
Achieves the settled goals	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Succeeds as a leader
Achieves the settled goals	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Creates entrepreneurship to the team
Succeeds as a leader	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Creates entrepreneurship to the team
The goals are often even surpasses	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Leadership corresponds to the expectations
The goals are often even surpasses	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	People are willing to do even extra effort
Leadership corresponds to the expectations	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	People are willing to do even extra effort
The decisions can be made slightly late and by avoiding situations	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Mistake must be examined, corrected and sometimes those who are responsible for the problem must be punished
The decisions can be made slightly late and by avoiding situations	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Creativity, learning and “as an example” behavior must be emphasized
Mistake must be examined, corrected	9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9	Creativity, learning and “as an example”

and sometimes those who are responsible for the problem must be punished

behavior must be emphasized

The work can be done alone 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9

The job tasks must be monitored and done as much as possible by yourself

The work can be done alone 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9

Stimulating, encouraging and utilizing individual consideration is important

The job tasks must be monitored and done as much as possible by yourself 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9

Stimulating, encouraging and utilizing individual consideration is important

Please fill in the demanded weights of different technology levels from your own leadership point of view:

Note: Percentage of Spearhead, Core, and Basic technology altogether is 100%, which means the sum of every row should be 100%.

	Spearhead Technology (%)	Core Tecnology (%)	Basic Technology (%)
Before Crisis			
During Crsis			
After Crisis			

Explanations:

Spearhead Technology: Technologies more orientated for the future

Core Technology: Company's core competitive technologies for today

Basic Technology: Technologies that are commonly used everywhere and can be bought from other companies or outsourced

THANK YOU FOR YOUR ANSWERS!