

Management for Professionals

Zheng Qin
Yan Li
Yinzhou Yang

Management Innovation and Big Data

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Management for Professionals

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Zheng Qin · Yan Li · Yinzhou Yang

Management Innovation and Big Data

Zheng Qin
School of Business
Southern University of Science
and Technology
Shenzhen, Guangdong, China

Yan Li
School of Business and Management
Shanghai International Studies University
Shanghai, China

Yinzhou Yang
School of Business
Southern University of Science
and Technology
Shenzhen, Guangdong, China

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Preface

Management innovation is constantly developing along with human wisdom and social progress, and countless vivid and successful cases are creating brilliance every moment, and the practice of management innovation and big data is even more fascinating.

Based on absorbing the latest research results and practical experience of management innovation and big data practice, this book introduces and summarizes the basic concepts, basic methods and management cases in management and big data analysis at home and abroad, researching and exploring the role played by management innovation and big data in the economy, society, business, and government.

In terms of content selection, the book insists on combining theoretical introduction and practical case introduction, drawing on and referring to the achievements and application of management innovation and big data practice at home and abroad, especially the cases based on advanced network platforms and big data analysis that have emerged in recent years.

In terms of content organization, the chapters in this book are both interrelated and independent of each other, and the content of each chapter forms its own system. The structure in the book not only facilitates readers' fragmented learning, but also becomes convenient for readers to study and discuss in depth on a certain interested issue, case, and practical content. The close connection between the chapters logically ensures that the overall content of the book is constantly open and innovative.

The compilation of this book refers to many domestic and foreign literature books, whose achievements have played an important role in the manuscript of this book. Students Hanlin Xiao and Liya Su participated in the collection of data and the writing of the "case part" of the book, and we would like to express our sincere thanks to them. It is inevitable that there are deficiencies in the book, so we would like to thank the readers for their criticism and correction.

Shenzhen, China
Shanghai, China
Shenzhen, China

Zheng Qin
Yan Li
Yinzhou Yang

Executive Summary

This book introduces the basic concepts, basic methods and practical cases of management innovation and big data practice. It is divided into two parts. The first part is management innovation, which mainly introduces the basic concepts, basic methods, and management practice cases of organization, leadership, control, decision-making, and innovation; the second part is big data, which mainly introduces the basic concepts, basic methods, and management practice cases of big data.

This book can be used as a textbook for undergraduates or postgraduates majoring in economics and management, which is also suitable for experts, scholars, and researchers engaged in higher education. At the same time, it can be used as an innovative teaching material or reference book for universities, training institutions, enterprises, governments and related research and practice departments to explore management innovation and big data practice.

Contents

Part One

1	Decision-Making	3
1.1	Basic Concepts	3
1.2	Basic Methods	4
	Environmental Analysis Methods	4
	Research Methodology for Decision Context (Key teaching materials for Marxist theoretical research & construction projects, 2019)	10
	Method of Selecting the Direction of Activity (Sanduo et al., 2018)	11
	Activity Schema Generation Method	14
	Methodology for Evaluation of Programs of Activities	15
	Methodology for Selecting Programs of Activities	16
	Programming Methods for Implementing Decisions (Key teaching materials for Marxist theoretical research & construction projects, 2019)	20
	Methodology for Advancing the Plan (Key teaching materials for Marxist theoretical research & construction projects, 2019)	24
	Methodology for Decision Tracking and Adjustment (Key teaching materials for Marxist theoretical research & construction projects, 2019)	29
	Ways to Encourage Employee Participation in Decision-Making (Guohua, 1998)	31
1.3	Management Practice Cases	33
	Case 1	33
	Case 2 (Midea's Official Website)	34
	Case 3 (Nanjing Korun Company)	36
	References	37
2	Organization	39
2.1	Basic Concepts	39
	Organization	39
	Organizational Culture	40

2.2	Basic Methodology	41
	Approach to Organizational Integration (Key teaching materials for Marxist theoretical research & construction projects, 2019)	41
	Leader's Approach to Team Building (Guohua, 1998)	42
	Methods to Prevent Tissue Ageing (Guohua, 1998)	44
	Approach to Implementing Organizational Change (Guohua, 1998)	45
	Ways to Reduce Resistance to Organizational Change (Guohua, 1998)	46
	Systematic Approach to Human Resources Management (Koontz & Weihrich, 2014)	47
	Ways and Means of Selecting and Recruiting Personnel (Key teaching materials for Marxist theoretical research & construction projects, 2019)	50
	Methodology for the Recruitment of Personnel (Key teaching materials for Marxist theoretical research & construction projects, 2019)	51
	Methodology of Personnel Appraisal	52
	Training Methods for Managers	53
	Methods of Training Personnel (Key teaching materials for Marxist theoretical research & construction projects, 2019)	58
	Ways to Improve the Efficiency of the Commission's Work (Sanduo et al., 2018)	60
	Ways to Avoid Organizational Conflict (Sanduo et al., 2018)	62
	Ways in Which Employees Learn About Organizational Culture (Robbins & Kurt, 2017)	63
2.3	Management Practice Cases	64
	Case 1	64
	Case 2 (Adapted from: Liu Zhiying, Et Al, Xxxx)	65
	Case 3 (Deng, 2017; Listening to the Voice of Growth, 2015; Zhilin & Fei, 2012)	67
	References	69
3	Leadership	71
3.1	Basic Concept	71
	Leadership	71
	Incentives	72
	Communication	72
3.2	Basic Methodology	73
	Ways for Leaders to Build Prestige (Guohua, 1998)	73
	Methods of Motivation (Key teaching materials for Marxist theoretical research & construction projects, 2019)	74

	Ways to Overcome Communication Barriers (Sanduo et al., 2018)	83
	Methods of Conflict Suppression (Key teaching materials for Marxist theoretical research & construction projects, 2019)	86
	Methods for Stimulating Conflict (Key teaching materials for Marxist theoretical research & construction projects, 2019)	89
	Ways to Improve Business Leadership and Execution (Argyris, 2004)	90
3.3	Management Practice Cases	93
	Case 1	93
	Case 2 (According to 'Endeavour-Oriented' & Related Materials. Hang Weiwei, 'Endeavour-Oriented?', 2014)	94
	Case 3 (King, 1998)	95
	References	98
4	Control	99
4.1	Basic Concepts	99
4.2	Basic Methodology	100
	Methodology for Determining Control Criteria (Key teaching materials for Marxist theoretical research & construction projects, 2019)	100
	Methods of Control of the Organization	100
	Methods of Control of Personnel Behaviour (Guohua, 1998)	113
	Quality Control Methods (Key teaching materials for Marxist theoretical research & construction projects, 2019)	116
	Information Technology Methods for Modern Control (Key teaching materials for Marxist theoretical research & construction projects, 2019)	120
	Methods of Crisis Control (Sanduo et al., 2018)	121
	Methodology for Risk Identification (Key teaching materials for Marxist theoretical research & construction projects, 2019)	122
	Methodology for Risk Assessment (Key teaching materials for Marxist theoretical research & construction projects, 2019)	125
	Methods for Controlling Risks (Key teaching materials for Marxist theoretical research & construction projects, 2019)	128
4.3	Management Practice Cases	131
	Case 1	131
	Case 2 (Prepared on the Basis of Relevant Media Reports. The Case is Taken from Management)	132

Case 3 (Xi & Maher, 2014)	134
References	138
5 Innovation	139
5.1 Basic Concepts	139
5.2 Basic Methodology	140
Approaches to Creating a Learning Organization (Key teaching materials for Marxist theoretical research & construction projects, 2019)	140
Ways to Deal with Resistance to Change (Key teaching materials for Marxist theoretical research & construction projects, 2019)	140
Ways to Promote Innovation in Organizational Development (Guohua, 1998)	141
Ways for Managers to Effectively Organize Innovation Within the System (Sanduo et al., 2018)	142
Ways to Think Outside the Box (Yiqun, 2019)	144
Approaches Suitable for Managing Innovation (Yiqun, 2019)	146
Approaches to Autonomous Innovation (Ziming et al.)	149
5.3 Management Practice Cases	150
Case 1	150
Case 2 (Xiaojuan, 2010)	151
Case 3 (Hufeng & Manyu, 2014, Sanduo et al.)	153
References	157

Part Two

6 Basic Concepts	161
6.1 Big Data	161
6.2 The Age of Big Data	163
6.3 Managing Change in the Era of Big Data	163
6.4 Frontier Technologies Related to Big Data Communications	164
4.1 5G-Related Technologies	164
4.2 6G-Related Technologies	167
Basic Root Server Technology	170
Satellite and 5G/6G Terrestrial Mobile Convergence Technologies	171
References	173
7 Decision-Making	175
7.1 Basic Storage Methods for Big Data	175
Distributed Data Storage	175
Cloud Storage	175
Edge Storage	176
7.2 Basic Processing Methods for Big Data	176

	Distributed Computing	176
	Graph Calculation	177
	Batch and Flow Calculations	181
	Cloud Computing	183
	Edge Computing	185
7.3	Basic Methods of Data Analysis in the Field of Management ...	188
	Basic Methods of Descriptive Statistical Analysis	188
	Basic Methods of Testing	189
	Basic Methods of Correlation Analysis	191
	Basic Methods of Regression Analysis	193
	Basic Methods of Correlation Analysis	196
	Basic Methods of Cluster Analysis	197
	Basic Methods of Classification Analysis	199
	References	200
8	Management Practice Cases	203
8.1	Case 1: Artificial Intelligence Empowers New Retail in Enterprise A	203
8.2	Case 2: Big Data Reengineering Company B	205
8.3	Case 3: Big Data Driven C Convenience Store	206
8.4	Case 4: Enterprise D: Using Artificial Intelligence to Help Circle Marketing	207
8.5	Case 5: Data-Driven E Convenience Store Relies on “Store Portraits” to Open Convenience Stores	208
8.6	Case 6: The Age of the Big Smart Cloud, an Opportunity or a Threat?	209
8.7	Case 7: G Enterprise IoT Era Takes off	210
8.8	Case 8: Big Data Helps Group Rent Governance (Jian, 2020) ...	210
8.9	Case 9: I Features of Enterprise Big Data Applications (China Case Sharing Center Case Library)	211
8.10	Case 10: Features of Big Data Applications in Company J (Xing, 2016)	212
	References	213
	Bibliography	215

About the Authors

Zheng Qin male, Han nationality, CPC member. Professor, doctoral supervisor. He serves as founding vice president of Southern University of Science and Technology, and founding dean of the School of Information Management and Engineering, Shanghai University of Finance and Economics.

He has taken charge of and finished many academic projects of national natural science foundation, provincial natural science foundation and at provincial and ministerial-level. He has published more than 100 theses at home and abroad, and has finished 16 works and 2 national patents. He has won provincial and ministerial science and technology progress awards, 2005 Citigroup Financial Information Technology Education Fund Project Excellence Award Teaching Fellowship, 2006 Shanghai University of Finance and Economics Outstanding Communist Party Member, 2006 Baosteel Outstanding Teacher Award., etc.

Yan Li female, Han nationality, CPC member. Associate professor and master supervisor of Shanghai International Studies University. Visiting scholar of University of Michigan, USA.

She has presided over and completed a number of scientific research projects, such as the National Natural Science Foundation of China, sub-projects of major Social Science Projects, and Special Fund for Outstanding Young Teachers in Shanghai Universities. Published more than 30 papers at home and abroad; She was awarded the International Paper Award in 2016, The National Excellent Case Award in 2014, the Shao Yibing Teaching Award in 2018, the Backbone Teacher in 2016, and the march eighth Pace-setter of Shanghai International Studies University in 2012.

Yinzhou Yang female, Han nationality, member of the Communist Youth League, master of Finance in Southern University of Science and Technology.

In 2019, she joined the research group led by Professor Qin Zheng, focusing on the bottleneck and countermeasures of the local government's introduction of university resources, and published papers at international conferences as the corresponding author. She has won the second prize of university-level outstanding students for many times.

Part One

The first part is about management innovation, which mainly introduces the basic concepts, basic methods, and practical cases of decision-making, organization, leadership, control, and innovation in management.

1.1 Basic Concepts

Decision-making is an important process to realize management. It is the behavior of the organization to identify problems, solve problems, take advantage of opportunities and choose reasonable solutions.

The basic concepts of decision-making are also expressed in several different forms:

- (1) In the narrow sense, decision-making is an act that makes choices in several action plans. If there is only one course of action, there is no choice, therefore, there is no decision-making. Decision-making requires two or more options that can be substituted by each other. In the broad sense, decision-making is a process that includes all the activities that must be carried out before the final choice is made. Generally speaking, decision-making refers to the analysis and judgment process of selecting one plan among several alternatives to achieve a certain goal (Key teaching materials for Marxist theoretical research & construction projects, 2019).
- (2) Decision-making is what managers do (or try to avoid), which refers to choosing between two or more alternatives (Robbins & Kurt, 2017).
- (3) Decision-making is the process by which managers identify and solve problems, and take advantage of opportunities (Sanduo et al., 2018).
- (4) Decision-making is a process of analysis and judgment in which a satisfactory solution is selected from several feasible solutions in order to achieve a specific purpose (Yiqun, 2019).
- (5) Decision-making refers to the selection and determination of action measures from alternatives, which is the core of the plan (Koontz & Weihrich, 2014).
- (6) Decision-making is a reasonable process of choosing an effective scheme (or means) from more than two alternatives to achieve a certain purpose (Guohua, 1998).

1.2 Basic Methods

Environmental Analysis Methods

- (1) General environmental analysis method—PEST analysis (Key teaching materials for Marxist theoretical research & construction projects, 2019)

PEST analysis means exploring and recognizing the important factors that affect the development of an organization in four aspects: political and legal environment (P), economic environment (E), social and cultural environment (S), and technological environment (T). For a certain organization, a general environmental analysis within a specific period of time also requires particular identification of the specific elements of each aspect.

As already highlighted in the hierarchical analysis of environmental factors, many general environmental factors tend to affect businesses by influencing specific environmental factors. This requires the organization to identify the sensitivity of the specific environment to general environmental factors. For the enterprises, it means analyzing factors in the general environment that are closely related to the industry where it is, which actually means that the enterprises need to identify a set of factors in various general external environmental factors that are meaningful to the industry and themselves, thus significantly narrowing the scope of the enterprises' analysis of the general environment.

PEST analysis usually draws on the existing research results in various economic, social and other relevant disciplines, but on the basis of these results it is necessary to conduct further research on issues relevant to the organization. Since general environmental analysis relies on knowledge from many relevant disciplines and the situation of each organization varies considerably, there is no general and generic approach to PEST analysis and it needs to be problem-specific.

- (2) Specific environmental analysis method—Porter's five forces model (Key teaching materials for Marxist theoretical research & construction projects, 2019)

The specific environment has a more direct and frequent impact on the organization and is therefore the focus of the organization's analysis of the external environment. In this regard, Michael Porter's five forces model is an effective method. Michael Porter found that there are five main factors in the business environment that can frequently provide opportunities or create threats for the firm, which come from other existing firms in the industry, sellers (suppliers), buyers (customers), potential entrants among other industries and substitute products, as shown in Fig. 1.1.

Analysis of potential entrants means potential competitor analysis in terms of entry barriers. A barrier to entry is a loss that a firm outside the industry must pay to enter and that a firm within the industry does not have to pay again. Obviously, the greater the entry barriers, the lower the threat of potential entrants. In addition, the attractiveness of the industry, the risk of industry growth, and the likelihood

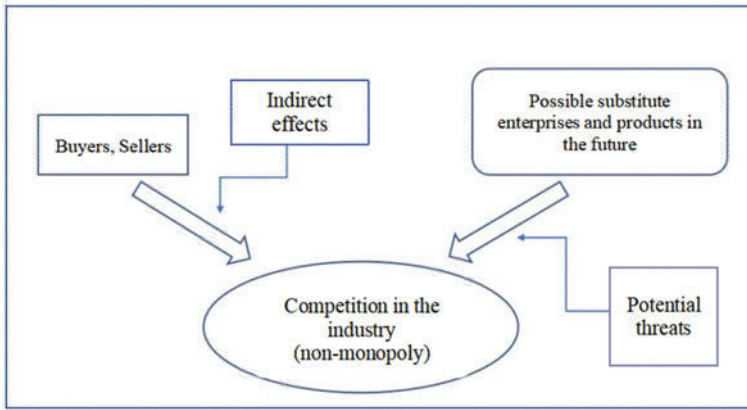


Fig. 1.1 Five forces model. *Source* [US] Michael. Porter, *Competitive Strategy*, translated by Xiaoyue Chen, Huaxia Press, 1997 edition, p. 12

of collective retaliation by firms within the industry all influence the magnitude of the entry threat.

Analysis of substitute products, i.e., identification of substitution threats. Substitution is the process by which one product replaces another product in meeting a particular customer need or multiple needs. The existence of substitute products expands the customer's choice. In the short run, the price and performance of one product are limited by the substitute; in the long run, the rise of one product or industry has the potential to cause the disappearance of another.

Analysis of buyer and seller bargaining power refers to assessing the ability of buyers and sellers to control the price of a transaction. There is both cooperation and conflict of interest among firms, their customers and suppliers. Both sides of a transaction always want to compete for a price favorable to themselves, and price changes make one side gain excess revenue while directly causing the other to lose. In specific trading activities, there are many factors that affect bargaining strength, such as the location of the transaction negotiation, the quality of personnel, the schedule and so on, but these are all operational-level factors. At the industry level, the bargaining strength of both deal parties is governed by several industry characteristics. Through these one can better recognize how firms build relationships that are compatible with the external environment.

Analysis of industry competitors, i.e. the present and future of competitors. There is usually more than one manufacturer and distributor of the same product, and multiple enterprises producing the same product are bound to take various measures to compete for users, thus creating competition in the market. Within the industry, the basic information about the main competitors, the reasons for the threat posed to the enterprise and the development of the competitors are analyzed.

Michael Porter's Five Forces model is applicable to both businesses and other types of organizations. This model helps one to deeply analyze the sources of competitive pressure in an industry and provides a clearer understanding of the

strengths and weaknesses of an organization, as well as the opportunities and threats in the trends of the industry in which the organization is operating.

- (3) Integrated analysis method of internal and external environment (Key teaching materials for Marxist theoretical research & construction projects, 2019)

Management is achieved through various resources and conditions within the organization. Therefore, while analyzing the external environment, an organization must also analyze its internal environment, that is, its own capabilities and constraints, and identifying the strengths and weaknesses that characterize it.

The business process of any organization is actually a continuous search for a dynamic balance among internal environment, external environment and business objectives. The internal and external environment of an organization can never be separated. If a company is very capable and has a clear competitive advantage, then uncertainty in the external environment will not pose too big threats to it. On the contrary, a company that does not have any business characteristics will not grow rapidly even if the external environment is favorable. Therefore, the opportunities and threats in the external environment should be compared with the internal strengths and weaknesses of the organization in order to make full use of the organization's strengths, seize the external opportunities, and avoid internal weaknesses and external threats.

SWOT analysis is the most commonly used technique for comprehensive analysis of internal and external environment and is proposed by Andrews team in Harvard University. SWOT analysis is short for Strengths, Weaknesses, Opportunities and Threats analysis method. It summarizes the results of environmental analysis into four parts: strengths, weaknesses, opportunities, and threats, forming an environmental analysis matrix.

The reason why SWOT analysis is widely used in management practice in various industries and has become one of the most commonly used management tools is that, firstly, it organically combines the internal and external environment, thus helping people to understand and grasp the dynamic relationship between them, adjust the organization's business strategy in a timely manner, and seek better development opportunities. Secondly, it reflects the complex relationship between internal and external environment in a intuitive and simple two-dimensional matrix. Thirdly, it encourages people to think critically. Strengths, weaknesses, opportunities and threats are all relative and can only be identified in comparative analysis. Finally, SWOT analysis can lead to a variety of choices of action plans which are based on careful comparative analysis, so that it can improve the quality of decision-making.

- (4) Analytical approach to environmental change (Key teaching materials for Marxist theoretical research & construction projects, 2019)

In order to enable organizations to face different possible outcomes of environmental changes with comfort, in the long run, a method—the scripting method

(scenario analysis)—has been applied and continuously refined by many large international companies in response to environmental changes.

The original intent of the scripting method was scenario analysis. Scenarios can be applied both to environmental forecasting and to the formation of decision options. In environmental analysis, a scenario or a set of scenarios can also be referred to as a script; in organizational decisions, a script is a decision scenario. Clearly, scenario scripts are based on environmental scripts, that is, environmental scripts are formed first and then based on them the scenario scripts for the decisions are made.

Scenario analysis methods can be divided into quantitative and qualitative scripting methods according to different methods of compiling scripts during use. The quantitative scripting method builds models based on econometric or other quantitative analysis methods and generates different scripts by selecting and adjusting various parameters. With the aid of computer simulations, this method can quickly generate a large number of scripts, some as many as 1,000 or more. The analysts then assess the plausibility and occurrence probability of each script. In the generation process, one variable is changed, keeping the others constant, to produce a different script. The qualitative scripting method identifies important environmental factors through human thoughts and judgments and analyzes their relationships, overcoming the mechanics inherent in the seemingly precise and complex methods of the quantitative scripting method. Also, based on human thinking, the qualitative scripting method can focus on and identify a wide range of factors. However, demanding data requirements of the quantitative scripting method limit the range of factors to be selected, despite it can consider many factors.

The advantage of the scripted approach is that it opens the minds of business managers, expands their horizons, increases their alertness to environmental threats, and allows for greater flexibility in business strategies, without hampering efforts to seize long-term growth opportunities. Even if some scenarios do not actually occur, it is beneficial to take contingency measures in advance to build up a firm's responsiveness to accept uncertain changes.

(5) TOWS matrix (Koontz & Weihrich, 2014)

The TOWS matrix has a wide range of applications and is a conceptual framework for systems analysis, which facilitates the combination of external threats and opportunities and internal organizational strengths and weaknesses.

Companies are often advised to understand their strengths and weaknesses as well as the threats and opportunities in the external environment. However, it is often overlooked that bringing these factors together may require clear strategic choices to be made. To systematize these choices, the TOWS matrix uses a "T" for external threats, an "O" for external opportunities, a "W" for internal weaknesses and an "S" for internal strengths. The TOWS matrix starts with a threat because in many cases it is the perception of a crisis, problem or threat that leads a company to focus and develop a strategic plan.

(1) Four alternative strategies

Figure 1.2 presents the four alternative strategies of the TOWS matrix, which are based on a combined analysis of the external environment (threats and opportunities) and the internal environment (weaknesses and strengths).

The WT strategy minimizes disadvantages and threats and can be called a “very small, very small” strategy. This may mean, for example, that companies need to form joint ventures, shrink or even liquidate.

The WO strategy seeks to minimize disadvantages while maximizing opportunities. In this way, firms that are disadvantaged in certain areas address these issues either through the firm itself or by acquiring the required capabilities from outside (such as technology or people with the required skills) so that the firm can take full advantage of opportunities in the external environment.

ST strategy is the use of an organization’s strengths to counter threats in the environment with the aim of maximizing organizational strengths and minimizing threats. In this way, a company may use its technical, financial, managerial or marketing strengths to neutralize the threat posed by a competitor’s new product.

SO strategy is the most ideal situation. Managers can build on their strengths and take advantage of external opportunities while leveraging the company’s internal strengths. Indeed, the aim of the company is to move from the other quadrants of the matrix to the SO strategy item. If the company has a disadvantage, it has to work to overcome it and turn it into a strength. If it faces threats, it has to face them head-on and take them in stride so that it can focus on opportunities.

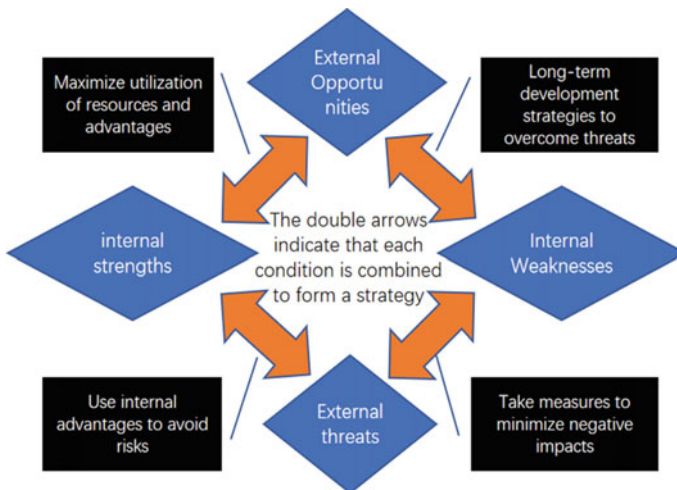


Fig. 1.2 Application of TOWS matrix in strategy development

So far, the TOWS matrix analysis of the relevant factors has all fallen under the concept of a specific point in time. However, the external and internal environment of a firm is dynamic: some factors change over time, while others may be relatively stable. Thus, the strategy designer must prepare TOWS matrices for several different points in time, so that one can start the analysis with the past TOWS matrices, then analyze the current situation, and perhaps most importantly focus on different periods in the future (T1, T2, etc.).

(2) Application of blue ocean strategy in TWOS matrix

In a red ocean scenario, the traditional competitive strategy is to be stronger than competitors by fighting them in their existing markets. In contrast, the blue ocean strategy concentrates on unopposed markets, where a distinctive product or service is offered. Blue ocean strategy avoids competition in existing markets and attempts to create and develop new products or services that trigger new demand. At the same time, those companies that are successful will use more differentiation and low-cost strategies.

Those companies proposing to adopt a blue ocean strategy should consider four courses of action.

- a. Identify and eliminate those factors that are not relevant to the customer.
- b. If they cannot be eliminated, consideration should be given to reducing them.
- c. Enhance or add those elements of uniqueness.
- d. Develop new or novel and unique factors that customers want and competitors ignore.

How to apply Blue Ocean Strategy to the TOWS Matrix? The traditional Red Ocean strategy is similar to the ST strategy (Strengths + Threats) in that a company can respond to the threats posed by competition with its strengths. Overly aggressive competition under a red ocean strategy is often a red sea. Conversely, a blue ocean strategy is similar to an SO strategy (strengths + opportunities) where the company uses its strengths to seize external opportunities. There is also a blue ocean strategy option, the WO strategy (disadvantage + opportunity), where the company recognizes its disadvantages and finds a solution, seeking special opportunities to overcome its disadvantages. Often, the disadvantaged company is demoralized and more motivated to seek opportunities that are not considered by its competitors, which is precisely what happens when a blue ocean strategy is employed.

In summary, companies adopting a blue ocean strategy can resort to the two choice matrices, SO and SW, shown in Fig. 1.2. Although it is sometimes inevitable to encounter the ST strategy option, it is nevertheless advisable for firms to try to plan a blue ocean strategy before using it in order to avoid a bloody competitive situation due to being forced to choose the ST strategy.

Research Methodology for Decision Context (Key teaching materials for Marxist theoretical research & construction projects, 2019)

The steps in the analysis of the decision context are as follows.

(1) Clarifying the subject of decision-making

It is only when the themes are clearly identified that the various tasks of contextual analysis for decision-making have a clear direction and focus. The identification of themes may relate to the entire organization's activities or to only one aspect of them.

(2) Formulation of hypotheses

Based on the identification of the topic, the environmental researcher also conducts a preliminary analysis, using the information available to the organization and based on his or her experience, knowledge and judgement, to formulate preliminary hypotheses about the problems encountered in the organization's activities: to determine which factors may be responsible for the organizational problems and which of the many possible causes are the most important.

(3) Collection of information

Testing the hypothesis requires the possession of information that reflects the internal and external environment of the organization. This information can be obtained from two sources: first, from a variety of sources that exist inside and outside the organization, such as various records of organizational activities, published press literature external to the organization, etc. The second is adequate environmental research and specialized environmental surveys. The collection of information is often done in the course of scanning and monitoring.

(4) Collation of information

The original information collected by the environmental survey is processed and organized in order to be meaningful and to reflect the objective environment more correctly. The processing of information consists of two tasks: firstly, the accuracy and authenticity of the information is reviewed in order to remove the falsehoods and remove the roughness and refinement; secondly, the processed information is used to analyze the relationship between the various factors affecting the organization's activities and to verify whether the assumptions made earlier about the causes of the problem are correct. If so, the information can be used to make predictions about the likely effects of the measures taken.

(5) Trend forecasting and assessment

Using certain scientific methods and the information obtained from environmental surveys, trends in the environment and the future development of the organization