A New Model Proposal for a Paradigm Shift for Strategic Management in the Context of Chaos Theory

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ABSTRACT

The 21st-century business world is characterized by a multitude of dynamics, which are evolving at an unprecedented pace. Many academic studies have analyzed this volatile business environment using the concepts of chaos and complexity. In such an unpredictable context, planning for the future has become increasingly challenging. Strategic management, as a process, plays a crucial role in enabling managers to assess the organization's position, identify opportunities arising from environmental changes, and evaluate both internal and external factors. Consequently, it embodies a structure that is inherently sensitive to environmental changes. The turbulent and chaotic nature of contemporary environmental conditions necessitates a paradigm shift in the strategic management process. Chaos theory, which emphasizes the unpredictability and interconnectedness of systems, offers a valuable lens to understand and explain the dynamics driving this shift. This study proposes an alternative model for the strategic management process, aiming to enhance its adaptability to rapid and unpredictable environmental changes by integrating the principles of chaos theory.

INTRODUCTION

Many concepts such as time, flexibility, questioning of existence, making sense of goals, existence and harmony of the environment, consistency and internal control, leadership, are considered to understand and create strategy. In particular, the movement and change of the environment persuade managers and organizations to go beyond the meaning and existence of concepts and re-question them for the formation and execution of strategy. Especially since the mid-1700s, the pace of industrial and economic development has been growing geometrically with the reflection of inventions and discoveries on production, capitalism, and companies. This opens up the formation and execution of the strategy, which is the guide of the future, to discussion. In the last century, the rediscovery of man, the decisive presence of communication, the expansion of the domain of technology, and the re-awareness of culture have led to a more critical questioning of strategic changes. Especially the remarkable spread of global integration after 1989,

companies relocating to new areas of sovereignty through network relations, and multipolarity exercises make it necessary to consider strategy and the management of the process in the context of new paradigms (Galambos 2005; Guillory 2007; Miles and Snow 2010; Smith *et al.* 2017).

In other words, the two basic questions asked by Drucker (1954), titled

- What is our job?
- And what should happen?

must find new answers and solutions within the framework of this change.

The new geography that emerged with the last great war in the twentieth century, traces left by the oil/energy and financial crises that continue to create an uninterrupted impact from the past to the future, contributions of the bipolar world to the war industry and resource distribution, problems in resource management of countries governed by coups and civil wars, and the redefinition of the values of living spaces all describe a difficult period in terms of how companies are managed. Difficulties have increased even more since the beginning of the 1990s. While strong crises are now affecting the whole world by emerging with short time intervals and high fluctuations, chaos has begun to be used as

a method and approach in learning and managing crises. In the twenty-first century, the world is witnessing new and deeper shifts, and in this context, it becomes necessary to reconsider strategy and the concepts that make up strategy. This requirement is a priority for all institutions and organizations involved in strategic planning, but especially for companies spread all over the world. In other words, the strategy, along with its existing components, implementation tools, and methods, seems to need a paradigm shift.

In this study, we first focused on the traditional meaning of the concept of strategy in the literature and then determined the existence of variables foreseen for change, revealing how the strategy evolved in response to the paradigm change. At this point, the existence of chaos is discussed to understand and manage the paradigm shift. In the last part of the study, the validity and meaning of the paradigm shift in strategy for managers and organizations were investigated. For the research, interviews with senior managers of global companies operating in Türkiye, and senior managers of Turkish companies operating globally, were conducted and measured using the qualitative method.

A DISCUSSION ON CHANGE IN STRATEGIC MANAGEMENT

The concept of strategy, which refers to the Latin word startum, stands out as the most frequently used concept in the comprehensive planning and direction of every operation carried out between the parties during war and peacetime (Freedman 2018; Earle 2015; Akad 2001). According to Chandler (1962), who was very careful and courageous about the inclusion of strategy in the field of business management, strategy is the determination of a company's long-term goals, objectives, and field of activity, and allocating the resources necessary for these actions.

The definitions diversify as strategy intersects with management or begins to be used for management. Hunger and Wheelen (2003) underline a common assessment. According to them, strategic management refers to managerial decisions and actions, which determine the future performance of the business. Nutt and Backoff (1987) state that strategic management requires short-term, sequential, and consistent solutions for long-term problems while maintaining organizational integrity. De Bono (1996) argues that strategic management is a mental process and attitude towards being superior to competition. Drucker (1999) states that strategic management is answering the questions, "What is our job and what should it be?" and anticipating the future consequences of the decisions that can be made in line with the determined goals and objectives.

According to Hamel and Prahalad (1989), the intention emerges with the three basic characteristics of direction, discovery, and destiny, and expresses a certain perspective on the long-term market or competitive position that one hopes to build within ten years. While Mintzberg (1987) defines strategy as Plan, Pattern, Position, Perspective, and Ploy, strategic management is the concept of identification, implementation, and management of the strategies that managers carry out to achieve organizational goals and objectives. According to Mintzberg, the features that the strategic management process should have are: to be carried out consciously, to preserve the model, which plays an important role in establishing order between the internal and external environments, to be sustainable, to be unique, clear, and simple, and to be fully formulated before implementation (Mintzberg 1990).

In the light of this information, it becomes clear that strategic management should have the following points;

- explain the ontological justification,
- long-term planning related to short and medium term,
- the ability to act consistently with planning,
- integrity and consistency of action,
- a control covering the entire process,
- understanding the environment and managing environmental awareness,
- the existence of a competitive ability,
- the ability to use intuition,
- having a mind that gives importance to the minds of others,
- ultimately learning sustainability,

The elements of this intersection cluster are parallel to the historical development of the strategic management process. As shown in Figure 1, these elements are connected to the historical process.
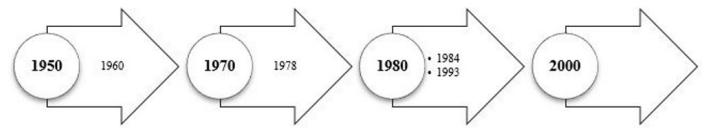

Figure 1 Historical development of strategic management (created by the author)

Figure 1 conveys the development of the strategic management process, which started in the 1960s, both in its current and future forms. In this context, while the debate initiated by Peter Drucker on "what the purpose of businesses is and what it should be" is evaluated from a strategy perspective focused on organization and management (Drucker 1942), Selznick (1957) emphasizes the distinctive features of organizations and the necessity of harmonizing the resources of organizations with environmental demands and expectations. Chandler (1962) emphasizes that the organizational structure should follow the strategy adopted by the business. Therefore, he defines strategic management as determining the long-term goals of businesses and allocating the resources the business has to achieve these goals. By combining the ideas of Drucker and Chandler, Andrews made evaluations from a more holistic perspective, including what the business of the enterprise should be, its goals and resources (Ansoff 1965).

Ansoff (1965), who is considered to be the founder of corporate strategy, approached the idea of strategic management in a more product-and market-focused manner. He stated that the basic nature of the current and future business is determined by product and market activities. While Mintzberg focuses on the strategy formation process in his work *Patterns in Strategy Formation* Mintzberg (1978), Porter (1985) considers the structure-strategy and performance paradigm as a remarkable strategic approach. de Bono (2000) emphasized that the ability to compete alone is not enough; it is necessary to go beyond competition, being supra-competitive, and create value monopolies. Most importantly, being supra-competitive is a mental attitude.

Porter (1985) expresses a mental attitude of superiority over the competition, which is foundational, whereas positional superiority in a business sense is defined as achieving this superiority through lower costs or differentiation from competitors. According to Prahalad and Hamel (1990), core competence, which is the main element that a strategy must include, can be defined as "a harmonious combination of multiple resources and skills that differentiates a firm in the market" and is therefore the basis of companies' competitiveness. In all the approaches listed above and those that will be discussed further, the effort to build the future by using time and knowledge as well as technology can be explained ontologically.

This new situation that emerged towards the end of the twentieth century and its use as a justification for the twenty-first century has prompted a review of the relations. Organizational and managerial systems, like economic and political systems, cause hardening in the vessels of the organism and cause it to lose its vitality due to the changes experienced over time (Fukuyama 2002). The metaphor of blood vessels hardening and losing their vitality points out the dysfunctionality of existing systems and highlights the necessity to adapt to the emergence of new systems. Due to the recent developments in the world, it becomes clear that current approaches in the organizational and managerial field require discussion and new approaches to be addressed.

If we were to discuss the change using the literature under headings, we could list the following elements.

- Change in the concept of Time:In the words of Dedyukhina, present time refers to any time period, regardless of day or night. Technology compresses time (Dedyukhina 2017). Smart factories, houses, buildings, cryptocurrency markets that do not close, and social media platforms that facilitate digital communication are technologies that destroy people's perception of time and create a new, altered consciousness regarding time in our current century. Information and digital technologies disconnect objects from their local, cultural, historical, and geographical meanings; past, future, and present are transmitted within the same message, erasing the perception of time, and the concept of simultaneity emerges. The change of order in the relationship between past, future, and present, that is, the validity of disorder, brings about the indifferentiation of time (Castells 2008).

- Collaborative structures gaining ımportance:It is stated that organizations are considered to be innovative forms characterized by flexibility and adaptation because of their more chaotic environments (Dijksterhuis et al. 1999). This situation highlights new forms of relationship and existence. These new forms support less hierarchy. Focusing on core competencies enables businesses to gain competitive advantage and respond to customer needs faster (Kabue and Kilika 2016). At this point in competition, many factors such as the speed of product and service implementation, differentiating aspects, and the availability of personal demand and product personalization opportunities propel businesses into a new realm. The interconnection of all systems within an intelligent and global network reveals the necessity of a brand new economic system (Rifkin 2015). Therefore, in terms of current reasons, the connection and interaction with the external environment need to be changed (Jacobides 2021).

- Economy, trade, and political uncertainty in the New World Order:The existence of a global economy is revealed by examining the scope of the impact of the economic crises. Today, economic crises initiated by the world's central authorities are affecting the economies of many countries and causing bottlenecks. For example, the 2008 crisis is regarded as a global crisis caused by the collapse of the American mortgage market (Alantar 2008). Globalization, which emerged as a paradigm at the end of the 20th century, describes a technology-oriented unified globe that McLuhan metaphorizes as the "Global Village" (Mcluhan and Powers 2020). These unification efforts are not only social or cultural, but also have political and ecological consequences (Dirlik 2012). As a matter of fact, according to Frase (Frase 2018), companies, which are the new actors of globalization, have to create different scenarios about the future, consider the possibility of each scenario coming true, and keep themselves ready.

- The change that emerged with Industry 4.0, when the definitions of technology and its effects on the business world are evaluated, brings Schumpeter's concept of creative destruction to mind. The most striking example of the concept of creative destruction is Industry 4.0, which has been discussed frequently in recent literature. Industry 4.0, first put forward in Germany in 2011, has resonated in many areas since then (Roblek et al. 2016; Vaidya et al. 2018; Xu et al. 2018; Yang and Gu 2021). With digitalization, collaborative shared resources have increased. It is predicted that this system will be the dominant economic paradigm in the world.

- Changing human resource: The supreme role of man over nature, in the words of Julian Huxley, "his role, whether he wants it or not, is to be the leader of the evolutionary process on Earth, and his task is to manage and direct it in the direction of general development" (Peccei 2013). It creates a new classification of society in which the role of people today is in managing and directing. This society is described as the smart society, Society 5.0, which came into prominence especially with the Industry 4.0 technological transformation (Fukuyama 2018). The society characterized by the notion of "Smart Society" is introduced as a smart society philosophy that will manage technological power correctly and promises a life worthy of humanity (Onday 2019; Arıcıoğlu et al. 2020). This life interacts with culture and suggests the rediscovery of humanity. In their studies, several authors also bring to light discussions on how this transformation affects culture (Harvey 1990; Smith 1990; Barber 1996; Ritzer 1998; Lieber and Weisberg 2002; Dirlik 2009). The arguments presented suggest that the change encompasses more than just the world economy and the increase in trade across national borders. In an age of uncertainty, where constant change is experienced, managers need both their previous experiences and something different from what has been done. Anticipating and dealing with the unexpected require a different managerial mentality. The COVID-19 epidemic can be considered the most current example of the subject. The global pandemic has created new norms and made uncertainty more noticeable for managers. Due to the daily changes affecting the activities of businesses, the decision-making process that responds to this rapid

change has become as important as the decision itself (Naidoo 2020).

- Global temperatures are increasing every year, and the global warming trend is occurring much faster than past experiences (National Geographic 2021). Due to a number of events that have global consequences, such as acid rain, oil pollution, depletion of water resources, fluorocarbon propellants, radiation leaks, toxic waste, and infectious diseases, national borders become less relevant and countries become ecologically interdependent (Barber 1996). The interdependence of every country in the world on environmental issues has led to the emergence of market-based mechanisms for emission reduction and the formation of a new market. This emissions trading system, defined as the carbon market, is the cornerstone of the policy to combat climate change and the main tool used to effectively reduce greenhouse gas emissions and their associated costs (European Commission 2021).

What has summarized above is not only related to the environment, which is generally recognized. It also emphasizes how new situations and complexities should be managed. In other words, the birth of a new era leads to an understanding of the naturalness of chaos, not order. In this context, it is necessary to discover a learning method while updating perspectives through it.

LEVERAGING THE EXISTENCE OF THE CHAOS APPROACH TO DISCOVER AND MANAGE CHANGE IN STRATEGIC MANAGEMENT

Contrary to Classical physics, which models the universe as a "continuity," Quantum theory has revealed that both light and energy exhibit discontinuity (Norton 1993). Thus, it was discovered that the quantum mechanical laws governing the behavior of atoms and their components are apparently probabilistic, meaning that only the probability of something allows prediction. This discovery shows us that the universe and reality are no longer concepts that work like a clock, and that events in real life are complex and do not proceed in a linear flow (Açıkalın 2015). Therefore, unpredictability now prevails, and the traditional understanding of science is replaced by a new understanding of science that defines itself in terms of quantum, chaos and complexity. The nature of the new science includes non-linear chaotic systems. Chaos theory deals with phenomena that are difficult to predict, in contrast to the more predictable phenomena addressed by traditional science (Straussfogel and Schilling 2009).

According to Kellert (1992), chaos theory is the qualitative study of unsteady aperiodic behavior in deterministic nonlinear dynamical systems. So it can be said that it deals with nonlinear phenomena that are virtually impossible to predict or control, such as turbulence, weather, the stock market, and our brain waves. The literature on chaos theory is enriched by the studies of meteorologists, biologists, and even social scientists. The common output of researchers in this huge literature is that experiments show that nature has unpredictable behavior and that these create some random and complex patterns that are not compatible with linear calculations and formulas (Namaki 2018).

Chaotic systems are characteristically sensitive to initial conditions (Straussfogel and Schilling 2009). One of the most important clues to understanding chaos is the term "Butterfly effect," which is used for the phenomenon of sensitive dependence on initial conditions, and this is illustrated by the saying "If a butterfly flaps its wings in China, there will be a hurricane in Texas" (Stewart 1990).

In this way, Lorenz not only discovered chaos with his butterfly effect theory, but also determined its key mechanism (Halpern 2018). In a way, he brought the theory, put forward by Poincaré, at the level of scientific philosophy to the level of quantitative science (Ruelle 1990). Another name that made important contributions to the theory is Lev D. Landau (Landau 1944). Landau explains the turbulence situation as follows: If a certain number of modes of a fluid affected by an external force are motionless, smooth flow occurs; if a single mode is in motion, periodic flow; if more than one mode is in motion, irregular flow; and if many modes are in motion, turbulence occurs (Ruelle 2006). Another characteristic related to chaos theory is strange attractors. The 'strange attractor' described by Ruelle and Takens was described by Lorenz in 1963.

As can be seen, chaos theory focuses on unpredictability in events and behavior. Natural living systems and organizations are also much more complex than mechanical ones. Organizations consist of many integrated subsystems. Many dynamics, including external and internal conditions, organizational culture, leadership styles, teams and people in teams, and people's personality traits, can change the course of the organization and reshape the process (Harris 2022). The complexity of business organizations is further increased by many micro and macro factors, such as personality diversity among organizational members, the complex nature of operations, changes in interpersonal relationships, ever-changing macroeconomic variables, and the policy environment. In this context, Thietart and Forgues (1995) argue that organizations are "nonlinear dynamic systems subject to forces of stability and forces of instability that push them towards chaos."

Applying chaos theory to organizational behavior allows theorists to take a step back from the management of daily activities and understand how organizations function as unified systems. In this context, Tom Peters first stated in the 1980s that managers should be prepared for environmental and technological changes. Peters offers a strategy to help companies cope with the uncertainty of competitive markets and states that the focus should be on customer sensitivity, rapid innovation, empowering staff, and most importantly, learning to work in a changing environment (Peters 1987). 21st century realities confirm Peters' analysis by making the deficiency in these tools more evident.

The organizational system of companies that expand rapidly in the 21st century is becoming more complex and unpredictable, and this causes existing theories to be inadequate in explaining the system. Traditional hierarchy-based approaches exclude this complexity, and explain business organizations as logical entities. However, it looks at the nature of contemporary business organizations from multiple perspectives using new approaches (Llora and Cordero 2016). Companies, vendors, and suppliers are in constant interaction with each other due to direct or indirect competition. According to Levy (1994), all interactions in which companies participate are strategic in the sense that one company's decisions take into account the expected reactions of others. Therefore, institutional macro, and micro actions will be interdependent. In chaos theory, small disturbances in a company multiply non-linearly over time. As a result, every action can affect other companies. Traditional strategy concepts and paradigms suggest that small changes in parameters upset the balance and require a corresponding renewal.

Chaos theory contradicts this concept. Additionally, chaos theory forces us to analyze how small changes can have enormous consequences. In other words, chaos theory does not explain every variable affecting the organization, but emphasizes that balance will be restored, and chaos inherently leads to order. In other

words, what managers must accept is that in complex systems, planning and control, before action, cannot solve everything. Additionally, managers need to learn how to manage the change process (Morgan 1997).

In recent years, we have come across many examples confirming this thesis. For example, Industry 4.0 technologies and the digital transformation process propel businesses to a very different dimension. While technologies such as the Internet of Things (IoT), cyber-physical systems (CPS), smart manufacturing, smart factories, cloud computing, cognitive computing, and artificial intelligence cause changes in business processes, they also create uncertainty and confusion for the industry of the future (Majocco et al. 2024). The direction and severity of this transformation are not clear in terms of its details and consequences. Another example is the pandemic process. The pandemic has shown companies the change in the global climate, the economic interdependence among countries, what technological changes mean for the activities of businesses, and the vulnerability of human-based production processes.

The ongoing crisis since 2020 is still felt in the business world. This situation further increases the uncertainty and complexity of the business world (Sharma et al. 2020). Another ongoing example is the Russia-Ukraine war that broke out in 2022. It reveals the process of the war and its resulting effects of this war between the two countries on other countries, and their global economic dependency. The dependency on raw materials and energy is becoming more evident. As can be seen, Industry 4.0, the pandemic, and the Russia-Ukraine war reveal disorder in the business world.

Chaos theory explains how businesses can navigate this disorder. While chaos theory involves the effort to understand and define the environment, it also brings with it the effort to define and understand the organization (Arıcıoğlu and Berk 2022). The underlying premise of chaos theory is the belief that there is disorder within order. In other words, while there is disorder at lower levels in a system, there is order throughout the system. Chaos theory views a company as a self-organizing living system that allows its employees and management to adapt and develop to environmental changes (Smith 2011). The key to survival for organizations is to develop rules that can keep an organization operating "on the edge of chaos," as in natural systems (Stacey et al. 2000; Arıcıoğlu and Berk 2022).

PARADIGM SHIFT IN THE STRATEGIC MANAGEMENT PROCESS

The strategic management process shows the steps taken by managers and organizations in planning, formulating, implementing the strategy, and creating new plans and practices through feedback. While Hunger and Wheelen (2003) define a process through environmental scanning, formulation, implementation, and control, Hofer and Schendel (1978) evaluate the strategy process as a seven-stage process. Steiner (1969) explains the stages of the strategy management process in six steps in his book *Top Management Planning*. Nutt and Backoff (1987) discussed the process in six stages.

According to the design school called "The Basic Design School Model" by Mintzberg, which includes founders such as Andrews, Selznick and Chandler, the main steps of the strategic management process are: external evaluation, internal evaluation, formation of strategic options, evaluation and strategy selection, and strategy implementation (Mintzberg 1990). Bryson and Alston (2004) evaluate the strategic management process as comprising six stages. According to Morden (2007), the strategic management

process is a four-stage process.

When evaluating the approaches and models in the literature:

1. The strategic management process is commonly seen as a five-stage model: *Goal Definition & Strategist Selection, Environmental Analysis, Organizational Direction, Implementation, Control* (see Figure 2).

2. The process follows a deterministic, sequential mechanism, where each step depends on the completion of the previous one.

3. External environmental factors are considered beyond the company's influence or control.

4. Errors in the process can only be addressed by relating them to the output of the previous stage or through interventions made during the process.

5. Time is typically measured in long-term values like 5 or 10 years, which include considerations for operational strategies.

6. The methods and tools used are standardized and fixed throughout the analysis and control stages.
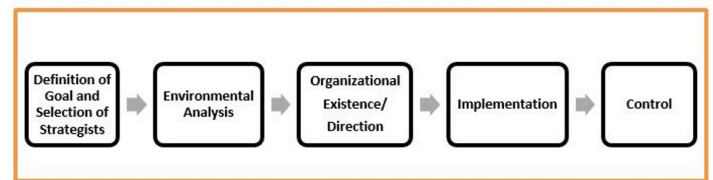

Figure 2 The five-stage strategic management process

In summary, the strategic management paradigm focuses on aligning organizations with their environment to gain a competitive advantage (Bain & Company 2018). As changes arise, fundamental concepts governing this relationship must be re-evaluated, signaling a paradigm shift. This shift can be explained through the theses of Kuhn and Feyerabend and , where scientific theories are debated in terms of their relative or universal nature. In other words, the claim of incommensurability of scientific theories is criticized by many philosophers of science. The basis of these criticisms is the debate about whether knowledge is relative depending on time, place, society, culture, historical period, conceptual framework, personal tendencies, beliefs, or whether it is possible to reveal absolute and universal knowledge independently of these issues. The introduction of an innovative and previously unknown definition, the assertion of new values, or a new style of presentation, understanding, or approach is also described as a paradigm. Feyerabend argued that the move from Newtonian to Einsteinian physics was driven by practicality, not accuracy.

This study highlights the need for a new paradigm in strategic management, as current theories fail to address present realities. The required paradigm shift involves both structural and process changes, with the process aspect addressing abnormalities that current paradigms cannot explain. Structurally, it calls for a redesign of the strategic management process.

The history of strategic management shows that each era developed its own approach based on its context. Today, these approaches face validity issues. The dynamics highlighted in this

study reveal that current strategic management processes are inadequate and require new experiences. This calls for a flexible and adaptable structure, emphasizing a proactive rather than reactive approach. The strategic management process is now designed in a cyclical, multidimensional relationship (see Figure 3), providing the flexibility and dynamism needed for today's environment. In this structure, all steps, especially strategic awareness, interact continuously, driving dynamism. Redesigning the process in response to changing conditions requires up-to-date information from the environment at each step. Businesses must maintain both strategic awareness and leverage insights from other stages of the process. The dynamics in Figure 3 reflect the need for this new approach, reshaping the strategic management process.
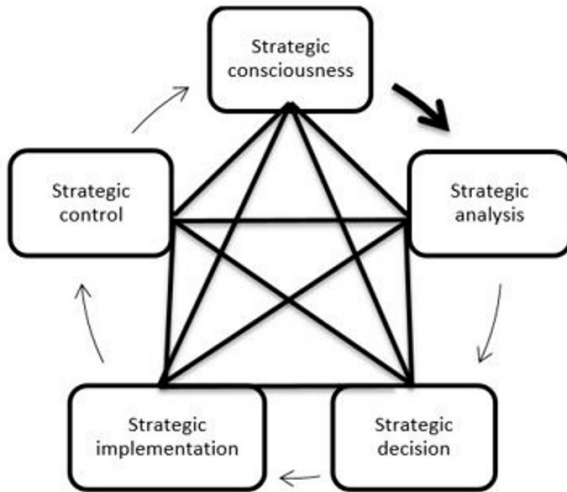

Figure 3 The new strategic management process

The structural form of the strategic management process needs a paradigm shift. The structure and process should be dynamic, as shown in the figure. A dynamic structure is a structure that can easily adapt to change and affect change. The conjunction of the age we live in requires a proactive approach rather than a reactive process, as explained in detail above.

METHODOLOGY

Sample and Data Collection

This study employed qualitative research methods, with a focus on content analysis. Qualitative research aims to explore and understand the meaning individuals or groups attribute to social or human problems (Creswell and Creswell 2018). It involves open-ended questions, data collected in natural settings, inductive analysis, and the researcher's interpretation of the data. Content analysis, a tool used in qualitative research, measures the presence and associations of specific words, themes, or concepts in data. Data for this study were gathered through semi-structured interviews, each lasting 45 to 90 minutes. The interviews, conducted online between April 1 and July 31, 2022, were recorded and transcribed. As shown in Table 1, a total of nineteen administrators constitute the study group of the research.

The participants were informed to ensure a better understanding of the concepts, and the consistency of their answers. In line with the events explained by the participants, different questions were asked according to the situation, and the data were obtained reliably.

Table 1 The sample of research

Participant No	Sector	Position
K1	Energy	Sales Manager
K2	Food	R&D Manager
K3	NGO	Head of Overseas Org.
K4	Consultancy	Business Partner
K5	Food	General Manager
K6	Software	Partner & Manager
K7	Software	Partner & Manager
K8	Paper	Executive
K9	Petrochemical	Deputy General Manager
K10	Software	Partner & Manager
K11	Automotive	Factory Manager
K12	Automotive	Production Manager
K13	Electronics	R&D Manager
K14	Food	Production Manager
K15	Iron & Steel	Executive
K16	Food	Production Manager
K17	Food	Executive
K18	Automotive	Executive
K19	Energy	Sales Manager

DATA ANALYSIS AND RESULT

Hierarchical code-sub code

In this study, we defined the hierarchical code-sub code structure. According to the results of hierarchical code-sub code sections, the environmental changes in the 21st century world are summarized in Table 2.

Environmental change awareness has six different subcategories and a total of fifteen codes related to these categories. In Table 2. , the frequencies of all codes related to environmental change awareness and the distributions of these codes are shown. In the category of environmental change awareness, the subcategory, which is expressed as "Technological Change", comes to the fore. This is followed by the categories of "New World Order", "Change of Human Quality", "Collaborative Structuring", "Change in the Concept of Time". The least mentioned environmental change theme was 'changes in the ecosystem'. Therefore, 19 of the interviewed managers evaluated technological changes as a priority environmental factor in the context of strategic management. In environmental changes category, participants usually expressed such as the following sample quotes:

"The nineties were a period when technology was less pervasive than it is today. Today, technology is used extensively. I would say this is the biggest difference." (K6)

"Now, due to the impact of technology, the concepts of digital consumer manager concepts dominate in the business world. Now we see that people are increasingly becoming digital consumers." (K7)

Table 2 Environmental Change Awareness – Hierarchical Code Subdivision Model

Theme	Code Frequency
Technological Changes	1270
New World Order	742
Multipolarity	173
Trade	334
Economic Dependency	336
Political and Political Relations	165
Globalization	360
Company Sizes	76
Time Concept Change	336
Change of Meaning of Time	26
Planning Period	140
Flexible Planning	191
Collaborative Structure	427
Importance of Collaborative Structure	148
Cooperation in SMEs	21
Digital Platforms	289
Human Quality Change	452
Consumer	235
Worker	226
Executive	228
Change in Ecosystem	191

Code-sub code

The model for the code sub-code section related to the chaos theory category examined within the scope of the research is presented in Table 3. According to the code-subcode model, chaos theory has four different subcodes.

Table 3 Chaos Theory – Code and Subcode Model

Theme	Code Frequency
Turbulence	372
Strange Attractors	420
Interaction	52
Butterfly Effect	73

Table 3 shows the frequencies and distributions of all codes related to chaos theory. In the chaos category, the sub-code which is expressed as "strange attractors" stands out. This code is followed by the 'turbulence, 'butterfly effect, 'mutual interaction' codes, respectively. According to these findings, the criteria of strange attractors (420) and turbulence (372) are at the forefront of the basic elements that shape chaos theory. Therefore, according to these findings, it can be said that the basic elements that shape the chaos theory are the factors that are coded as strange attractors, disrupting a linear process and are difficult to predict. The second factor is the turbulence code, which also expresses the gradual shortening of the foresight ability. The number of interaction codes is the lowest among all code categories. This code expresses

the interaction between the parts that make up a system. The code was mentioned the least by the managers in the research. In chaos theory category, participants usually expressed such as the following sample quotes:

"We have all witnessed major changes in companies, especially in the 21st century. The world has become a very dynamic and changeable environment. So where is this going? They refer to it as turbulence or chaos theory. Unpredictability, uncertainty, feedback, I know, the butterfly effect, etc." (K4)

"There is a constantly changing structure. This shows that there is a somewhat dynamic structure involved. The occurrence of such consecutive crises as pandemics, wars, and economic crises is an indication that businesses live in a chaotic environment." (K7)

Table 4 presents a code-subcode section model for the strategic management process of all managers examined within the scope of the research. According to the code-subcode model, there are five different subcodes of the strategic management process.

Table 4 Strategic Management Process – Code and Subcode Model

Theme	Code Frequency
Strategic Awareness	857
Strategic Analysis	809
Strategic Decision	803
Strategic Implementation	657
Strategic Control	638

Table 4 shows the frequencies of all codes related to the strategic management process and the distribution of these codes. In the category of strategic management process, the sub-code, which is expressed as "strategic consciousness", is highlighted. This code is followed by "strategic analysis", "strategic decision", "strategic control", and "strategic implementation" codes, respectively. According to these findings, although strategic consciousness (857) is at the forefront of the basic elements that shape the strategic management process, every other element is equally important for the process. In the strategic management category, participants usually expressed thoughts similar to the following sample quotes:

"What we call the big picture is this: it is the ability to make connections between different events in different parts of the world. This is a strategic awareness." (K4)

"Businesses should follow environmental changes. They should consciously execute their strategies with the information they have obtained." (K2)

In this study, participants usually described the strategic management process as a cyclical and multifaceted interrelationship that supports the organization-environment relationship. In strategic management category, participants usually expressed such as the following sample quotes:

"Each step of the strategic management process is important, and it must be carried out interactively. Consciousness must be present at every stage of the process. Environmental analysis

Themes	Chaos	Interaction	Turbulence	Strange attractors	Butterfly effect	Strategic management process	Strategic awareness	Strategic analysis	Strategic decision	Strategic implementation	Strategic control	Total
Environmental change awareness	619	33	213	396	49	850	659	611	643	497	507	5077
Technological Changes	323	15	134	204	13	445	353	299	268	208	207	2469
New world order	213	29	57	135	43	265	187	194	219	158	159	1659
Multipolarity	23	5	13	12	5	66	44	51	46	34	34	333
Trade	109	9	26	84	16	167	115	124	135	96	98	979
Economic Dependency	152	20	33	97	33	142	102	115	119	91	93	997
Political and Political Relations	42	8	16	26	7	86	55	66	64	45	45	460
Globalization	108	17	37	62	26	163	112	122	129	92	94	962
Company Sizes	4	3	4	2	2	33	16	21	20	12	12	129
Time Concept Change	94	6	65	29	7	148	100	106	135	96	106	892
Change of Meaning of Time	5	1	3	3	1	2	1	1	2	1	1	21
Flexible Planning	50	1	30	21	2	109	74	82	98	72	81	620
Planning Period	36	1	30	7	1	50	30	30	48	30	33	296
Collaborative Structure	108	9	20	89	8	107	90	94	90	81	82	778
Cooperation in SMEs	1	1	1	1	1	8	6	5	7	5	5	41
Importance of Collaborative Structure	19	1	2	18	2	34	29	32	29	27	27	220
Digital Platforms	89	3	10	81	3	75	62	68	62	57	58	568
Human Quality Change	87	9	23	67	6	85	69	68	58	51	50	573
Consumer	54	4	14	43	2	46	31	39	31	26	26	316
Worker	36	4	12	26	2	63	49	51	43	39	38	363
Executive	29	4	11	20	2	62	47	49	39	35	34	332
Change in Ecosystem	34	8	13	20	7	120	102	109	106	96	96	711
Chaos	0	52	372	420	72	259	184	183	199	144	149	2034
Interaction	52	0	29	24	28	13	10	12	13	9	9	199
Turbulence	372	29	0	45	24	113	74	79	81	58	62	937
Strange Attractors	420	24	45	0	25	148	111	104	121	87	88	1173
Butterfly Effect	72	28	24	25	0	16	11	13	15	11	11	226
Total	3151	324	1237	1957	387	3675	2723	2728	2820	2158	2205	23385

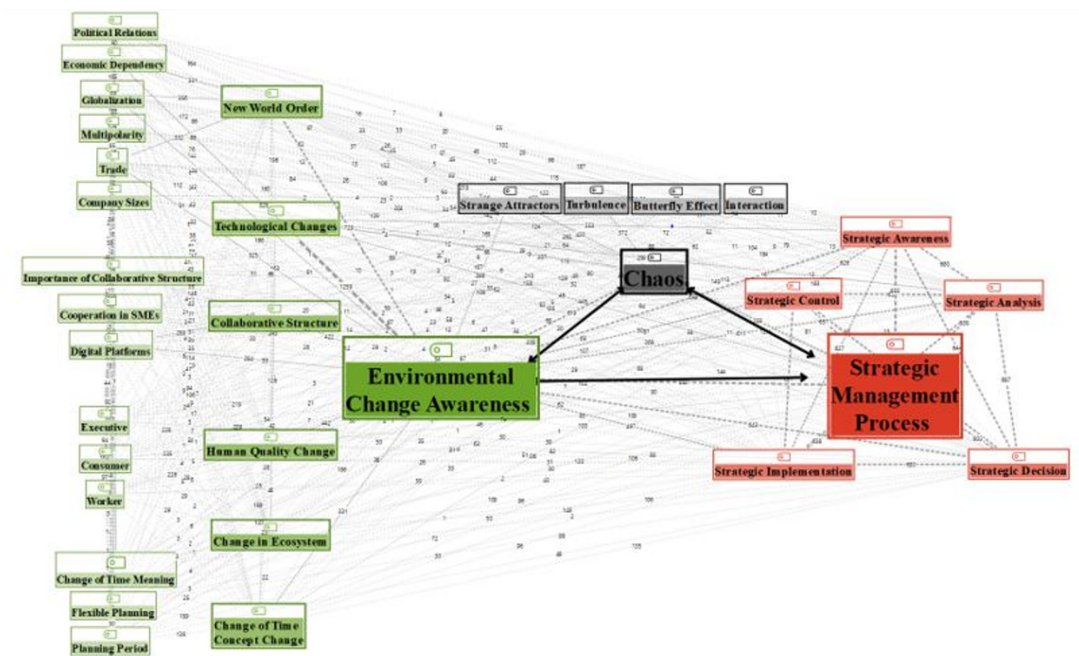**Figure 4** Relational analyses results

Figure 5 Code co-occurrence model

must be constantly revised. There is so much change happening." (K2)

"I agree that the strategic management process should be a cyclical and multifaceted interrelated ." (K6)

"Considering the environmental changes of the strategic management process, I think that such things and practices should be cyclical." (K10)

"Such a period also shows us that the strategy should be flexible." Regarding this, the process should be carried out cyclically with consciousness and awareness." (K12)

Relational analysis

Relational analysis results are summarized in Figure 4. The color tones in the relationship matrix express the frequency of the codes' relationship . Relational analyses reveal that environmental change awareness is related to both chaos theory and the strategic management process.

Code co-occurrence analysis

Figure 5 presents the "Code Co-occurrence Model," which visualizes the co-occurrence of codes as a network. Line width in the model represents the strength of relationships between variables the thicker the line, the greater the coding overlap between two variables. Although all variables are related, the model highlights clusters where environmental change awareness and chaos

strongly connect to the strategic management process. Similarly, technological changes, strange attractors, and the new world order form another cluster linked to strategic management. Additionally, the model identifies key factors driving environmental change awareness, and chaos.

CONCLUSION

At the end of the 20th century, strategic management and the organization-environment relationship underwent significant changes (Arıcıoğlu and Berk 2022). Factors such as technology, globalization, pandemics, wars, and climate change have created an uncertain and chaotic world, rendering traditional approaches insufficient. Chaos theory has become an increasingly important tool in understanding the modern business environment. The unpredictability and dynamic nature of today's business world can be explained through the fundamental principles of chaos theory. This theory suggests adopting an adaptive approach to strategic management, emphasizing that small changes in the business environment can lead to significant impacts. In competitive conditions, chaos theory enables businesses to continuously analyze their environments, develop flexible strategies against rapid changes, and seize opportunities within uncertainties. This study examines paradigm shifts in strategic management by considering environmental changes and chaos theory, presenting an alternative model. The study contributes uniquely to the literature with its subject, findings, qualitative methods, and multivariate analysis.

The findings of the study reveal that participants emphasized the chaotic nature of competition and the need for new business models and management tools in the business world. In the context of a chaotic environment, technological changes were found to drive new business models and competition, making changes in management tools inevitable. Since the last quarter of the 20th century, the world has witnessed the rapid spread of information and communication technologies (ICT), leading to significant changes and structural transformations (Lechman and Marszk 2019). The impact of technology is also related to the subprocesses of strategic management. In the analysis of code relationships conducted in the study, the technological dimension was found to be associated with processes such as strategic awareness, strategic analysis, strategic decision-making, strategic implementation, and strategic control. Additionally, changes in human behaviors, particularly consumers and employees adapting to digital processes, were highlighted as critical components of the strategic process.

Collaborative structuring has emerged as another important trend that businesses have adopted, especially in chaotic business environments. Collaboration creates a system in which even small enterprises can generate significant changes. In a chaotic environment, collaboration can provide businesses with a competitive advantage. This is because it enables companies with different areas of expertise to come together to develop innovative products and services, share risks to cope with uncertainties more effectively, facilitate access to new markets, and support their growth on a global scale.

The concept of time has also undergone changes, leading to a need for more flexible planning. Supported by chaos theory, the study highlights the unpredictable nature of today's business environment and emphasizes the necessity of strategic adaptation. In an environment where competitive conditions constantly change, businesses' ability to adapt to these dynamic variables becomes more comprehensible through the flexibility and adaptability framework offered by chaos theory. The need for different timeframes in strategic plans compared to previous periods, alongside the requirement for flexibility and dynamic revisions in planning processes, has been highlighted. Expressions related to this theme were organized, which resulted in subcodes such as "changes in the meaning of time," "planning periods," and "flexible planning. Participants emphasized the importance of strategic awareness and analysis. The findings suggest that in a chaotic world, new approaches are essential for managing the organization-environment relationship. The proposed model is structured as a cyclical and multidirectional process that accommodates sudden changes and allows for continuous environmental analysis. Future studies may examine these shifts in an international context or use quantitative research methods to gain broader insights.

This study involved interviews with senior executives from both national and international companies in Turkey. Future studies may expand the research by focusing on foreign companies, providing global support for the study results. Additionally, this study exclusively utilized qualitative research methods. In future research, the topic could be explored using quantitative research methods or a mixed-methods approach to obtain more comprehensive results and contribute to the strategic management literature. Considering that the pace of environmental change may vary across sectors, future studies could focus on conducting more sector-specific research.

Ethical standard

The authors have no relevant financial or non-financial interests to disclose.

Availability of data and material

Not applicable.

Conflicts of interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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