

A Study on the Future Food
Industry Development through the
4th Industrial Revolution Technology

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Abstract

Along with the recent development of IT (Information Technology) and BT (Bio Technology) technologies, new industrial areas are being created through convergence with IT technologies in various industrial areas. In particular, inter-industry convergence is actively succeeding in the food industry, and new food areas are being created. All successful global food companies, including Nestle, a leading global food company, are promoting technology development investment in the food tech sector and developing through changes to invest in new areas. This study analyzes what successful food companies have in common and whether technology development and leadership are essential factors to succeed in innovation. In particular, through the cases of Beyond Meat, Tesco, and CJ Cheil-Jedang, which have achieved results in the new food industry, it empirically examines what excellent aspects they have in terms of technology development and leadership. Through this, it also discusses what areas and efforts food companies should be interested in for successful innovation in the future.

Key words: Food industry, Innovation, R&D, Food-Tech, Leadership, Global food company, K-food, Korea food company

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Chapter 1. – Introduction

1.1 The Research Background and purpose of the study

In modern society, the success of companies cannot be guaranteed in the existing uniform way. The market is in a more uncertain situation due to the long-term global low growth trend and COVID-19. In addition, due to the development of various IT technologies called the Fourth Industrial Revolution and the collapse of barriers between technologies, companies are required to adapt and innovate in a new environment more quickly.

The 4th Industrial Revolution refers to the convergence of advanced information and communication technologies such as artificial intelligence, big data, and mobile with existing industries, resulting in new innovative changes. For example, it can be seen that new technologies such as 3D printing and robotics and existing products are combined to perform advanced surgical operations using robots. This can be said to be a revolution that has evolved one step further from the 3rd Industrial Revolution, which is explained by the development of existing computers and the Internet.

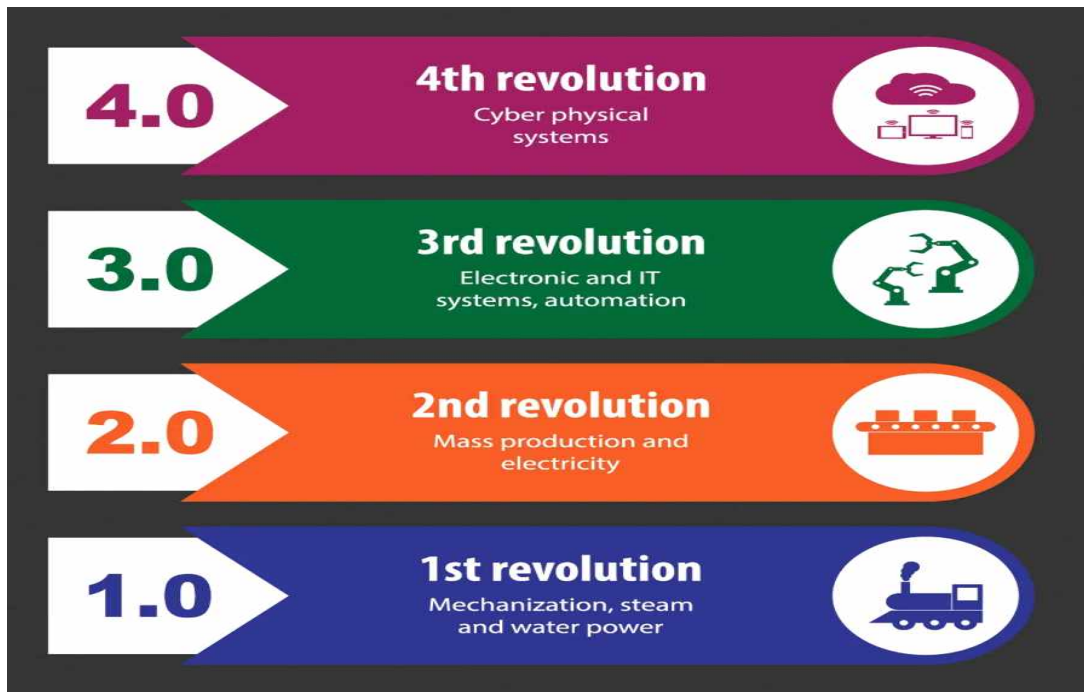


Fig.1: The Fourth Industrial Revolution. Source: (Schwab, 2016)

1.2 A statement of the Research Topic and aim

As such, people live in a society where innovation is important for the success of companies or industries. On the other hand, it is necessary to first define what innovation is. Innovation, as Schumpeter said, is ‘creative destruction’ (Schumpeter & Backhaus, 2003). In other words, it refers to destroying the existing thing and escaping from the familiar in order to creatively create something new. In addition, creating a completely new product or service that did not exist through the process of innovation can be called innovation (Bessant & Tidd, 2015).

On the other hand, what factors should be supported in order to succeed in this innovation? Just because there is technological development does not mean that a company succeeds in innovation. In addition, for innovation, technical improvements must be

accompanied (Neck & Murray, 2019). In other words, a company's new product or service can succeed only when it is supported by technological development that can improve the product or service, the leadership, organizational culture, promotion and marketing ability for new products, and stakeholders' consent (Blowfield, 2016).

Therefore, the purpose of this study is to analyze the factors that lead to successful innovation. To this end, it will first measure the relationship between technology development, leadership factors, and innovation. In addition, it analyzes successful cases of corporate innovation in various fields. In addition, through interviews with organizational members, important factors for successful innovation of a company are evaluated. And finally, it evaluates the location and degree of innovation of the global food industry, especially in the era of the Fourth Industrial Revolution. In addition, the goal is to provide advice that can be referred to other companies and countries in the future by analyzing the background and success factors of global companies that have succeeded in innovation.

1.3 A statement of the Research Objectives

The main goal of this study is to study the correlation between the success of innovation and technology development, leadership, and organizational culture to reveal the main success factors of the company that succeeded in innovation. To this end, it is necessary to first analyze cases of successful innovation in various industries. Since then, it is necessary to analyze cases of how recent innovations have occurred in the food sector, and what changes global food companies such as Nestle and Starbucks have recently succeeded. In addition, it

will look at the cases of companies that have succeeded in innovation and entered new fields such as Beyond Meat. In particular, the reason why the company was able to succeed in innovation regardless of the size and diesel of the start-up company is investigated through organizational research.

The research also investigate how answers can be find when presenting new ideas or problem solutions to various members of the organization, including researchers, leaders, and marketers who provide sources of innovation. Finally, this research can find the most important elements of innovation.

Through these studies and investigations, it is expected to be able to visualize the correlation and importance between key factors leading to innovation.

Chapter Two – Literature Review

2.1 Key concept: Innovation

Innovation refers to all productive changes in a company, such as technological advancement, leadership innovation, utilization of new resources, and organization of new organizations, introduction of new production methods, and development of new markets (Kline and Rosenberg, 2010).

These innovations can be classified into ‘Incremental Innovation’ and ‘Radical Innovation’. Incremental innovation is an innovation that is in line with the existing one, and refers to developing existing products or incorporating new technologies through research or development in a specific area. On the other hand, radical innovation means that resources or attributes that have not been used at all in the existing industry are applied to other industries to develop into a changing form (Christensen and McDonald, 2013).

It would be helpful to explain the concept with a specific example. First, the development process of mobile storage devices for storing and moving data can be explained as an example of innovation. Mobile storage devices were initially developed in the form of floppy disks. Since then, as the diskette size has become smaller or in the form of a CD, storage has become more solidified and portability has increased. Then, USB, which is surprisingly small in size and has a huge storage capacity, was developed to reflect the demand of consumers who want to improve the lack of storage capacity and inconvenience of carrying around. Since then, USB has continuously developed into a form in which the size and storage capacity are

gradually reduced. However, despite its smaller size and larger capacity, inconvenience has been raised in that it has to be carried all the time. This eventually led to the development of a 'cloud' that allows users to share necessary data at any time without having to carry it around. The "cloud," which is now such a natural means of storing documents and photos, is in fact a success story that innovation has been continuously and creatively achieved by consumer demand (Lin and Chen, 2012).

If it analyzes the concept of innovation here, the process of a large size disk becoming a very small USB is a successful example of gradual innovation through technological progress. In other words, it can be said to be a successful case of gradual innovation that has developed through steady research as an extension of the existing industry. However, the fact that tangible USB has become an intangible "cloud" is a successful case of destructive innovation that has created a new type of product and new attributes that are completely different from the existing method by creating a cloud concept through a change of ideas.

Meanwhile, the food industry has traditionally been an industry that has not undergone major changes or innovations. In other words, there have been continuous changes and innovations, but it has been all gradual innovation, and it has been difficult to find examples of destructive and radical innovation (Verbeke, 2005). However, as IT technology and AI technology, referred to as the Fourth Industrial Revolution, developed, a new wave of revolution began to affect the food market. In other words, new markets continue to be created that were previously unimaginable (Traill and Meulenber, 2002).

Specifically, as more and more people are interested in health in modern society, people are starting to think about how to eat healthy food. To this end, they began to produce vegetable meat or dairy products to replace existing animal meat. In addition, food companies have developed alternative sugar products that taste the same but have low calories. However, this can be said to be a process of moving from a kind of gradual innovation to creative innovation. However, as technology advances, a new market is forming. For example, creating food through 3D printing is an example of creating a disruptive innovation market. In addition, creating an online food market by establishing a food ordering and distribution platform through IT technology, which was only sold in off-line market, is a successful case of creative innovation that has created a new market that has not existed before. In other words, new market formation and innovation continue to be created in the food market, where people's tastes traditionally do not change significantly, so changes are slow and innovation is not only evaluated as desirable (Birkshaw and Gary, 2008).

2.2 Conceptual framework and recent findings

In innovation, the inflow of technologies and ideas for growth and development from outside, not inside, is called 'Open innovation' (Chesbrough and West, 2006). The form of technology development or innovation ideas derived through the company's own R&D (Research and Development), which is a form of innovation mainly promoted by companies, is called 'Closed innovation'. On the other hand, 'open innovation', a recent new type of innovation trend, means deriving ideas beyond the organization through mutual information sharing

(Bessant and Tidd, 2015). Therefore, open innovation has the advantage of enabling radical innovation by helping to transform new ideas that completely go beyond existing thinking, institutions, and products.

Among the examples of open innovation, it would like to look at companies that have succeeded in developing completely new types of products or services by applying IT technology to existing services. First, it is possible to explain the case of service innovation of Mercedes-Benz companies that increased customer satisfaction by introducing ‘Artificial Intelligence (AI)’ chatbot services. This is an example of technology partnership, investment attraction, and sales improvement through collaboration between start-ups and mid-sized companies. Such as a start-up called “LANCODE“ which have new technologies and Mercedes-Benz Group introduced AI chat-bot services through collaboration. As a result, Mercedes-Benz achieved open innovation success in improving consumer satisfaction and improving sales performance.

Meanwhile, the food industry can look at the case of Starbucks. Starbucks has been operating mainly in off-line stores, but recently attempted digital innovation through the combination of IT services. As a result, they developed a ‘Siren Order’ and a ‘driver-thru’ order system, which resulted in successful sales. In particular, such digital innovation is maximizing its effectiveness as the demand for non-face-to-face consumption increases in line with the COVID-19 era. It also provides user-centered customized services such as consumer menu recommendation functions by utilizing big data, not just online orders. In addition, by introducing a digital survey program,

customers' opinions are frequently collected and used as a source of big data to actively reflect various product development and service improvement. As a result, the number of siren orders recorded 180 million in 2020, and more than 50% of Starbucks' total orders in December 2020.

This successful innovation factor was first possible due to the support of technological advances. Through big data analysis, it was able to identify customer demand and find appropriate technologies to provide the level of service required by customers. In other words, in this information age where innovations such as the launch of new products are attempted, data analysis on the market must be supported to succeed (Dover and Dierk, 2010).

However, technological development is not the only important factor, and entrepreneurship is also an important factor in driving innovation to success (Bessant and Tidd, 2015). In other words, 'successful development of new ideas' is needed. It is important to have an idea of what kind of technology will be needed for technology development (R&D etc) or technology partnership. Innovative entrepreneurs should exercise leadership to find out what technologies can implement these ideas and to commercialize products or services that incorporate them. Of course, these ideas do not have to be completely new, and innovation does not necessarily mean the simple commercialization of technological development (Eckhardt and Shane, 2003). However, in order for the idea to be embodied and sold as an actual product or service, it needs the determination and support of the leader to commercialize it.

Meanwhile, the "four-stage transition model" describes

organizational innovation by dividing the process of innovation into four stages (Layne and Lee, 2001). First, leadership plays an important role in designing new areas that require innovation and introducing or accelerating that change. In the second stage, if a leader effectively persuades stakeholders such as followers, corporate shareholders, and organizational members, the third stage, “Reading and Transformation,” will also succeed naturally (Freeman and De, 2010).

Of course, in the process of demonstrating such leadership, big data analysis increases persuasion. If the results of big data analysis on consumer demand explain why innovation is needed, it will be easier to persuade stakeholders and succeed in innovation. This is because, according to the stakeholder theory, organizations inherently dislike change and resistance to change is inevitable. At this time, it is necessary to allow the organization to change through persuasion, and leadership is absolutely necessary in the process of persuasion process. However, what should not be overlooked here is that technical support such as big data analysis also greatly helps leadership exert influence.

Therefore, technological development is essential for innovation, and in order for such technological development to be commercialized, leadership that can silence various objections and have practical power is needed. And this leadership becomes more influential when there is a technical support that can show the need for change. In this respect, technology development and leadership, which are important factors of innovation, have a complementary relationship with each other.

2.3 Related Theory: Innovation Theory, Leadership Theory

2.3.1 Innovation Diffusion Theory

The spread of innovation refers to the process in which innovation is communicated among members through various methods over time, such as new ideas, products, services, behaviours, and organizational culture. In other words, it means that the adopted innovation is used in various forms. Innovation diffusion theory is a useful way to explain the diffusion rate of innovation and technology acceptance of individuals or organizations.

Everett M. Rogers published the ‘Innovation Diffusion Theory’ in 1962. He explained in various ways the cause of the difference in the speed at which ideas or behaviours that organizational members perceive as new is adopted. The process of determining the acceptance of innovation proceeds by first recognizing innovation and forming an attitude toward it, and consequently adopting or rejecting innovation (Rogers, 2005). While defining innovation, he argued that the factors that have an important influence on the spread of innovation are technological innovation, communication channels, time, and social system. And he describes five characteristics of innovation as Relative advantage, Compatibility, Observability, Trialability, Observability and Complexity (Rogers and Shoemaker, 1971).

Relative advantage of innovation that provides greater value than existing products or services. Compatibility that is perceived to meet existing values or needs, Trialability that can be experienced before

innovation adoption, Observability that can see the results of innovation adoption. Complexity means the extent to which people find innovation difficult to understand. Through these five characteristics, he explains the rate of innovation adoption. In particular, it was mentioned that relative advantage and compatibility are the most important variables in the rate of innovation adoption. Rogers' theory is characterized by the fact that various factors affecting the adoption rate of innovation were presented through empirical research and practical verification of what variables had an effect.

Meanwhile, discussions have been raised pointing out the ambiguity of the concept of relative advantages explained by Roger's theory of innovation diffusion or the abstraction of the theory itself (Tornatzky and Klein, 1982). To supplement this, an alternative was suggested to explain the concept of relative advantage as 'the degree to which one perceives that one's image or position will be increased by using innovation' (Gary and Izak, 1991).

Later, he used the theory of diffusion of innovation to explain the growth process of demand after the launch of the new product from the perspective of the audience for technological innovation. Over time, the process of adopting new products to potential consumers generally appears in the following S-shape (Rogers, 2005).

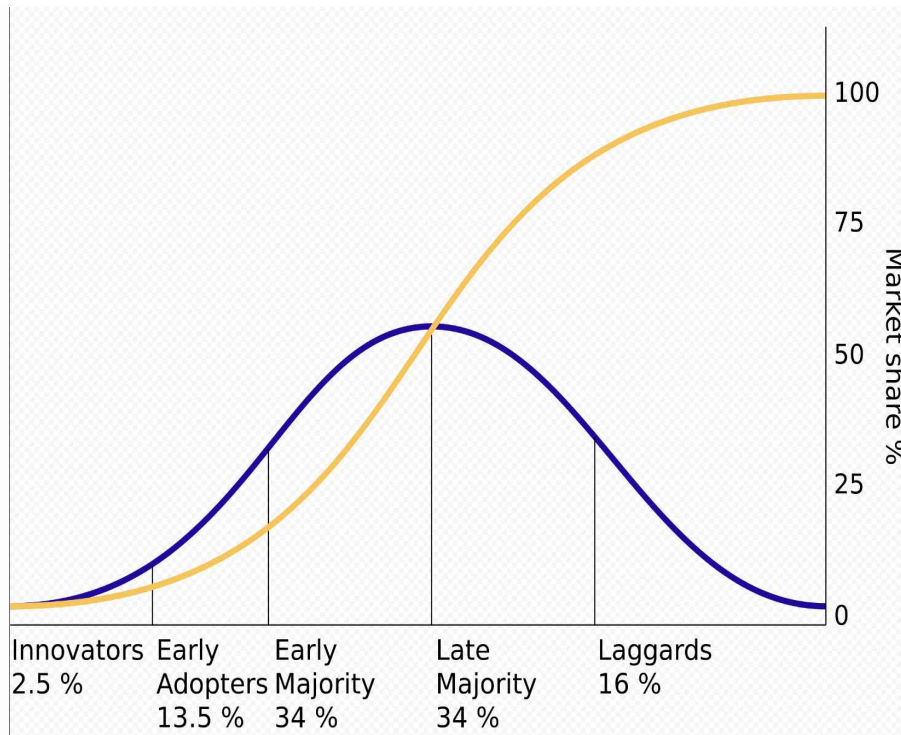


Fig.2: Acceptor Type Classification. Source: (Rogers, 2005)

In addition, Roger presents the concept of innovation propensity when it comes to the speed difference in which innovation is accepted by members. In other words, innovation tendency refers to the degree of adoption of new ideas relatively faster, and social members are classified into five categories: innovators, early adopters, early majority, late majority, and laggards based on the relative time required (Dearing, 2009).

Innovator is the type that likes adventure, acquires various information through multiple channels, and is the first to innovate. They are very few and are not bound by traditional institutions, products, ideas, etc.

Early Adopter is a social leader group that accounts for about 13.5% of the total, which is a little slower than Innovator, but is

respected within the group as an opening leader and exerts a great influence. In particular, they play a role in persuading early Majority to adopt a new product.

Early Majority is 34% of total potential demand and somewhat slow acceptance of innovation. However, it is very influenced by early adopters. Late majorities are a group that is slow to accept changes due to suspicion. Laggard is 16% of total potential demand. Demand for innovation is the slowest, information channels are limited to neighbours and friends, and have extreme risk aversion.

As can be seen from Rogers' innovation acceptance curve, the role of innovators and early audiences is important so that ideas for new innovations can spread and be adopted faster when they arise (Sahin, 2006).

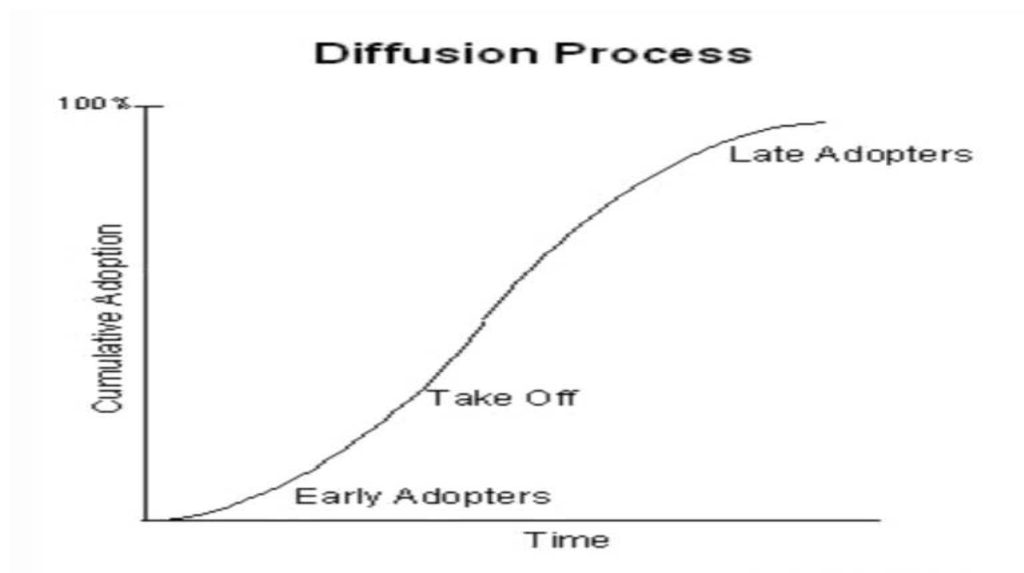


Fig.3: Rogers' Innovation Acceptance Curve. Source: (Rogers, 2003)

This innovation tendency was confirmed as the factor that best

explains innovation adoption among the various characteristics of consumers. Innovative consumers try new products or unfamiliar technologies easily. In other words, the higher the innovation, the more positive the acceptance of new technologies. In addition, the higher the innovation of the leader in introducing innovation to the organization, the faster the new technology is expected to be adopted (Rogers, 2003).

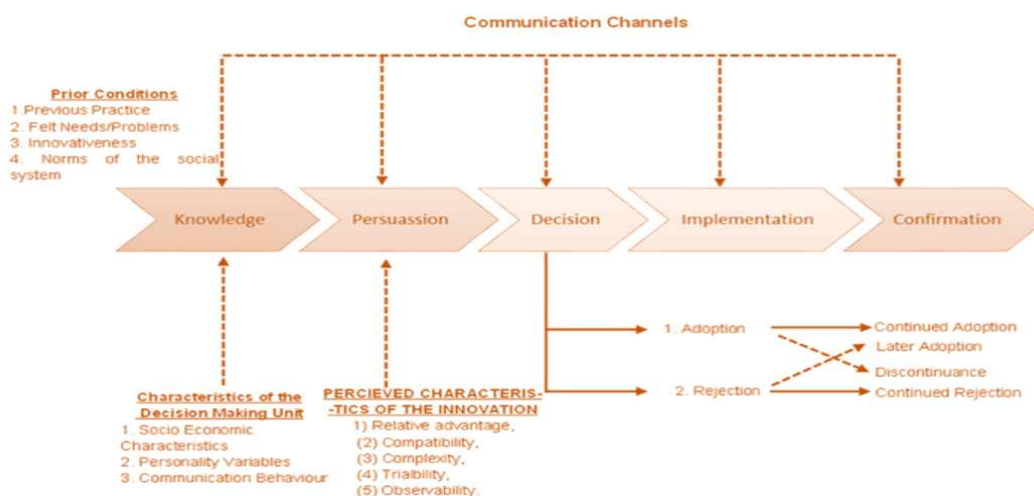


Fig.4: The Decision-Making Process for Adoption of Innovation. source: (Rogers, 2003)

On the other hand, the decision-making process of such innovation occurs through five steps: knowledge, persuasion, decision, execution, and confirmation. First, it is the stage where consumers understand innovation with knowledge, the stage of persuading them to form a favorable or unfavorable attitude toward innovation, the stage where consumers accept or reject innovation, the stage where they implement innovation, and finally strengthen and confirm innovation decisions.

Communication strategies that share information between members are very important in increasing the adoption rate and spread rate of innovative products (Rai and Henry, 2016).

The lessons learned through Roger's analysis of innovation diffusion theory are as follows. First, although there may be differences in degree, all individuals and organizations have a tendency to avoid change and maintain the current situation. Therefore, innovators who lead the change are needed for organizational innovation and investment in new product development. Depending on the role of innovators, commercialization is possible through R&D investment in new technologies or technology introduction. In addition, from the perspective of consumers, it can be seen that marketing using early adopters is important for new products to spread among consumers. In other words, it is necessary to focus on the roles of innovators and early adopters who influence the spread of innovation in the production of new products and the success of new products. This is because they can serve as supporters to help innovation spread quickly by providing a motif for the spread of innovation through various forms of communication.

2.3.2 Leadership Theory

Leadership refers to the ability to push in the direction they want to achieve their aims (Hemphill and Coons, 1957). Leadership within an organization refers to the skills or influence that allows members to collaborate toward goals together to achieve an organization's goals. Through leadership, the organization can flexibly adapt to the changing environment (Rouch and Belling, 1984),

maintaining cultural harmony within the organization and inducing the motivation of the members of the organization to develop themselves (Drath and Palus, 1994).

Leadership is also different from headships in that it does not pressure individuals to co-operate forcibly using force, but voluntarily empathize with and cooperate with organizational goals (House et al, 1999).

On the other hand, there are various leadership theories that explain this depending on the way leadership exerts influence on its followers (Antonakis and Day, 2018).

In addition, according to the ‘Stakeholders Theory’ (Freeman, 1983), stakeholders are increasingly diversifying into shareholders, consumers, governments, and environmental organizations as there are many stakeholders, the role of leadership has become more important in the process of overcoming this because there are more resistances to change.

A leader refers to a person who influences in the direction of achieving an organization’s goals (Bryman, 1992). The leadership theory of these leaders’ characteristics has continued to change. In the early days, the ‘Leadership Characteristic Theory’ (Northouse, 2021) that values the characteristics and qualities of a leader drew attention. He saw leaders as charismatic and studied the common characteristics of successful leaders to emphasize that they have superior characteristics (Bass, 2008).

This later changed to a ‘Leadership Behavioral Theory’ (Lewin, 1939) that values the behavior of the leader. It emphasizes that,

unlike the quality theory that good leaders are born with the characteristics of leaders from the beginning, they can be created through education (Northouse, 2021). Unlike trait theory, which presented the type of good leader, behavior theory classified the type of leadership. Jane Merton argued that through the theory of management deficit, the type of leader's behavior is visualized through the degree of interest in production and people (Blake and Mouton, 1964).

However, since the 1970s, it has developed into a 'Leadership Situational Theory' (Hersey and Blanchard, 1977) that focuses on the situation in which the leader is in. It is difficult to explain the success of leadership only with the characteristics and actions of the leader, and it is necessary to review these two together (Casimir and Ng, 2010). According to Fiddler, there are three situations in which leadership effects can be determined: fitness of the leader-member relationship, position power and task structure.

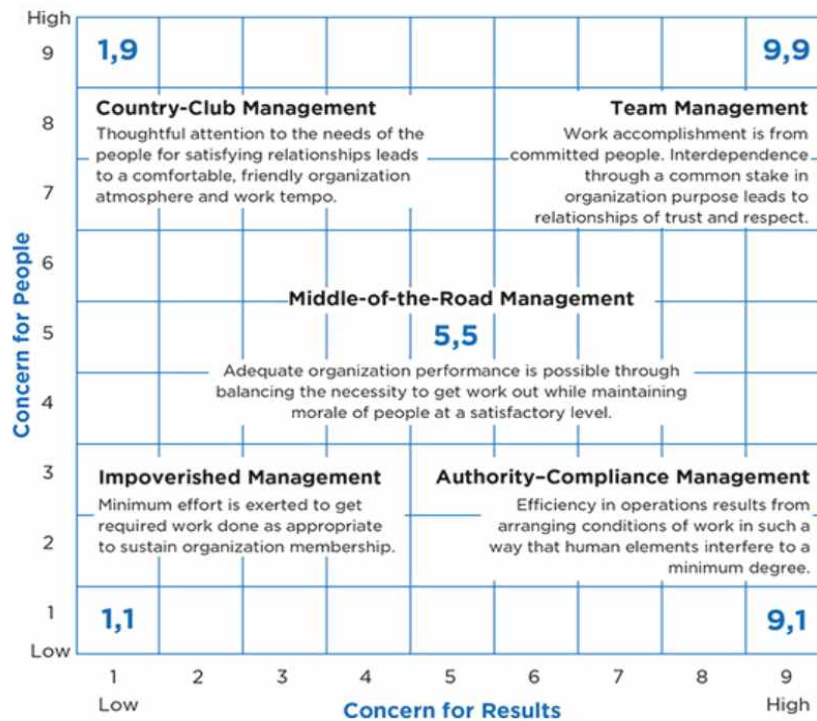


Fig.5: The Leadership Grid. Source: (Northouse, 2021).

‘Leadership Grid Theory’ (Northouse, 2021) can be used to classify the characteristics of leadership. Leadership types were divided into five based on interest in results and interest in people. The most ideal leadership can be said to be team management leadership that values goal achievement and human relations within the organization.

In addition, a new leadership, ‘Transformational Leadership (Bass and Riggio, 2006)’, is also attracting attention recently. It is a leadership in which all employees become leaders and delegate authority to set their own organizational and individual goals and determine the means to achieve them.

Servant Leadership is the most democratic form of leadership and

achieves goals together so that individual goals and members' goals can be achieved in harmony (Van, 2011). Executives and employees respect and encourage each other, and solve problems through conversations rather than instructions (Sendjaya and Sarros, 2002).

Each of the various theories of leadership has its strengths and weaknesses, and the contents that can be explained are different. This is because leaders often have excellent qualities and at the same time behave more desirable through education. For example, even if some leaders are not born with leadership qualities such as attractiveness or charisma that drives people's support, one can have good leadership in education or in situations. On the other hand, like transformational leadership, which has recently been attracting attention, transformational leadership that is created together by actively delegating authority to employees so that they can decide on their own from goal setting, means, and compensation.

2.4 History of Food Industry Innovation

As mentioned before, the agricultural and food industries are areas where change and innovation occur very slowly (Verbeke, 2005). However, in recent years, the food sector has also shown a very rapid change unlike in the past. Therefore, after analyzing the existing innovation patterns, processes, and success factors that have occurred in these traditional industrial fields, I would like to compare the continued creation of new markets, products, and services through recent radical innovations. Through this, it will be possible to study in depth the impact of technological development, which is a

key factor causing innovation.

Economic, political, and social uncertainties and instability are increasing around the world, with the rise of international issues such as climate change, food security, COVID-19, and the Russian war. In the midst of this, the importance of food security has become more prominent, and the world has begun to consider ways to eat safer foods more stably. Reflecting this, global companies are expanding R&D investment in the food sector, and innovation in the agri-food sector is taking place. In particular, various personalized foods are being developed through convergence with the IT industry, and the expansion of food distribution networks through online platforms has also formed a new market. Amid these changes, various food R&D are being conducted in major countries such as the United States, Europe, Japan, and Korea to preoccupy the global market in the food sector. In addition, at the national level, policy investment or guidelines are being prepared to accelerate the formation of new markets (Trienekens and Zuurbier, 2008).

This change is why the food industry was chosen in this study to examine the correlation between R&D and leadership in the innovative success of the industry. It was hard to find innovation and entrepreneurial spirit, and in the food sector, which did not value technology development, certain food companies succeeded in creating new markets through innovation. It also succeeded in developing the food technology area through investment in technology development. It will be meaningful to look at the background of this success from the perspective of innovation theory and leadership theory.

To this end, first of all, it is necessary to look at the areas where major countries and major global companies have recently invested for innovation with high interest. After analyzing what areas global food companies are investing in recently, find common areas and look at recent trends.

Chapter Three – Research Methodology and Methods

3.1 Introduction

This chapter discusses how this study will be conducted and how data collection and analysis will be conducted. Then, select the most appropriate research method to analyze the research topic, “The Success Factors of Innovation in the Food Industry,” and to present future development plans. On the other hand, it is important to define research ethics in conducting research.

The research methodology of this study consists of research design and data collection methodology. First, this study examines research philosophy in the research design part. Among the spectra of Positivism, Realism, and Interpretivism, this study is conducted from the perspective of Interpretivism. It examines the success factors of a company and derives meaning through interpretation of what the success factors were. Next is the research approach. Among the inductive and deductive methods, this study focuses on the inductive aspect. In addition, there are qualitative and quantitative studies in terms of methodology, and this study selects the methodology of qualitative research. This is because it is not a method of verifying hypotheses by analyzing various cases, but by analyzing successful companies’ cases, it is a study that finds their commonalities and finds a correlation between corporate technology development and leadership in the process. In other words, this is a case study method in research strategy. The final conclusion is drawn through case study,

analysis, and interpretation.

3.2 Research Design

3.2.1 Research Philosophies

Research philosophy refers to the view of the research subject. The answer to the best philosophy does not exist, and it is important to think about what research philosophy and research methodology best fit the research question (Saunders, 2016).

The research philosophy is connected to the research methodology and also influences the method of data collection and how to analyze data. In other words, first, the research philosophy is determined, and the theory of the approach and the research question are determined. Therefore, maintaining consistency in each process is the basis of research (Saunders, 2016).

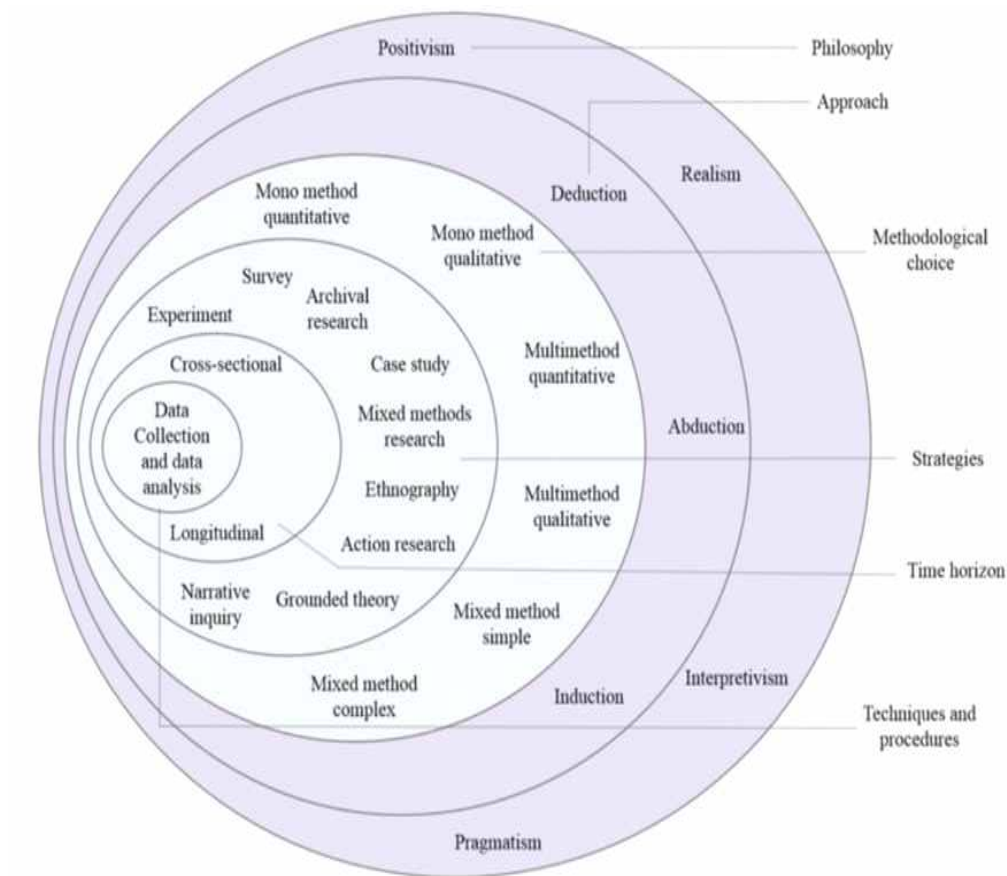


Fig.6: The research ‘onion’. (Source: Saunders, 2016)

These research philosophies include positivism, Interpretivism, etc. Positivism is a theory that creates hypotheses and attempts to generalize through observation. Interpretivism is a paradigm that focuses on finding the meaning of the behavior of the investigated person. In this respect, this study examines the problem from the perspective of interpretivism.

This is because it is an analysis method that examines the background of food companies’ success, the behavior of the company’s leaders, the content of technology development research invested by the company, and the background of investment.

3.2.2 Research Approach and Mono Methodology: Deductive approach and Qualitative Research

Research approaches include inductive and deductive methods. The inductive method is a method of obtaining a universal proposition through individual examples (Ketokivi and Mantere 2010). On the other hand, the deductive approach is a method of finding individual principles through universal premises (Blaikie, 2010).

This study follows a deductive approach because it is demonstrated through individual case analysis on the premise that technology development and leadership have played an important role in the recent success of food companies.

Research methodologies include quantitative analysis methods and qualitative analysis methods. Quantitative Research emphasizes how much content is analyzed in analyzing data from the stage of collecting data (Bryman, 2012). Therefore, from an epistemological perspective, a positivist approach is applied that the entity can be verified through actual case studies to reveal the definitive truth. In addition, the consistency of surveys is important because conclusions are drawn through experiments or surveys. In order to confirm the relationship between variables inferred through quantitative research, a model that socially and scientifically applies natural science experimental logic that derives results through variable manipulation is used. In other words, in explaining a specific phenomenon, a hypothesis or premise is drawn through theory and verified through experiments or surveys. Therefore, at the same time, quantitative

research is deductive research.

On the other hand, qualitative research has an interpretive philosophy in that it is interested in how social phenomena are interpreted. It is Interpretivism, a study that criticizes quantifying phenomena and explaining them with uniform principles, and compares their own attributes, quality. Therefore, it is not aimed at finding general principles through research, but it is an inductive study in that individual studies can be accumulated to form new theories.

	Quantitative	Qualitative
Typical role of theory in relation to research	Deductive; testing of theory	Inductive; generation of theory
Epistemological orientation	Natural science model, in particular positivism	Interpretivism
Ontological orientation	Objectivism	Constructionism

Fig.7: The stereotype of differentiating quantitative and qualitative research strategies. source:(Clark and Bryman, 2021).

This study is promoted through qualitative research. Since it is a study that finds common factors that can succeed in innovation through analysis of various food industry cases, it can be said to be qualitative research, interpretive method, and deductive research method. In particular, the fact that the characteristics of a specific company are examined in depth is aimed at Interpretivism. Instead of explaining all the factors in one principle, a qualitative study is conducted to examine the background in which success was

possible through the specificity of each individual company.

3.2.3 Research Strategies

This study aims to analyze the main success causes of food companies that have succeeded in innovation and to confirm the correlation between innovation and technology development. With various factors such as technological development, leadership, and organizational culture as variables, it evaluates how important each factor played a role in corporate innovation through an interpretive approach.

For this evaluation, a case study of global food companies is conducted. A survey of food companies' statistics, sales, and financial statements is conducted. It also evaluates the importance of leadership in commercializing and commercializing successfully promoted technology development. Based on the leadership theory, it evaluates what form of leadership the leaders of these successful companies show. Due to the characteristics of closely investigating the characteristics of such a successful company, qualitative investigation is preferable rather than quantitative investigation (Bauer & Gaskell, 2000).

First, in order to analyze the success factors of global food companies, financial statements are analyzed such as sales and R&D investment amount of food companies, and the proportion of R&D investment to sales. In other words, objective evaluation of the main factors of innovation is verified through objective figures and statistics such as financial statements and global sales rankings. It also

investigates the current status of food R&D policy support in the United States, the EU, Japan, and Korea, where the company's headquarters are located. Meanwhile, companies that have succeeded in innovation in terms of 'Food Technology', which is a recent innovation trend keyword in the food industry, are separately investigated. It qualitatively evaluates the extent to which technology development has affected through objective secondary data surveys of Starbucks, Beyond Meat, and CJ Cheil-Jedang.

Second, according to the theory of innovation diffusion, the factors affecting the spread of innovation at actual stages and the actors who play an important role are identified (Rogers, 2003). It also evaluates whether the theory of diffusion of innovation is easy to explain the innovation of the actual food company through case analysis. And evaluate what kind of leadership the company's leaders exert when evaluating using leadership theory and how important it played a role in success.

3.3 Data Collection Method and analysis

First, it is necessary to analyze the flow of changes occurring in the food industry. This is to solidify the theoretical premise that successful companies were possible when they succeeded in innovation by responding quickly to social and environmental changes and consumer needs. To this end, the following data are collected and analyzed. Changes in consumer demand and perception conducted by global research institutes, expert assessment of modern society and secondary data such as research papers and journals, books, and

statistical institution data such as Statista.

Next, in order to empirically prove the premise mentioned, it is necessary to analyze the common cause of success through case analysis of successful food companies. It also analyzes the cases of companies that are evaluated as representative companies that have succeeded in various fields of food technology. In other words, it analyzes the background and specificity of companies' success using a qualitative analysis method under a deductive approach. In investigating these cases, the company's website, financial statement analysis, and expert journals are used.

3.4 Ethical Consideration

If the study uses primary data, it is an important principle to keep research ethics in the process of research. The information acquired in the research process should be used only for academic research, and in principle, it should be private. In addition, all acquired information will be destroyed after a certain period of time. To this end, the investigator must sign the principle of confidentiality and notify the investigator and the investigator of this content (Oliver, 2010). In addition, before conducting an interview and survey, the purpose, time required, and contact information of this study are sent together and started after obtaining consent. During this study, people who conduct interviews and surveys should not take any risks (Loue, 2007).

This research follows the Coventry University London Campus standards. This study does not collect primary data, but uses only

secondary data. Therefore, it is not necessary to submit an ethical form according to Coventry University regulations.

Chapter Four – Data Findings and Analysis

4.1 The development of Food industry

The trends of the global food industry were divided into technology development, consumer trends, and environmental changes surrounding the food industry. In order for a company to operate successfully in such a rapidly changing environment, it must actively utilize the wave of change and succeed in innovation. But it is not easy to succeed in change and innovation. In particular, the more companies enjoying the preoccupation effect in the existing market, the more difficult it is to push for a change and risk-taking choice to create a new market. However, there are some global food companies that recognize the need for change, persuade stakeholders to oppose, and promote R&D investment to launch new products, achieving greater success. There are also start-ups that have created new markets that have never existed before. It empirically analyzes the cases of food companies that have succeeded in such innovation and analyzes what factors have been able to succeed in innovation and what factors have served as the most important variables.

It is necessary to look at the success stories of companies that quickly responded to changes in consumer demand discussed above by field. This study examines the success factors of Beyond Meat, which newly created the plant-based meat market in the field of alternative foods. And this looks at the success factors of Tesco, which succeeded in converting online distribution and e-commerce. Finally, CJ Cheil-Jedang, Korea's leading food company contributing to the spread of K-Food, examines how the latest demand and technological

change trends are being applied, whether innovation has actually succeeded, and what factors played a role in success such as technological innovation, organizational culture improvement, and leadership.

4.1.1 Supply side: Technological development

The recent technology trends represented by the Fourth Industrial Revolution accelerate attempts to converge between industries, thereby easing boundaries by area. As barriers between areas are lowered through convergence with IT technology in existing industries, new products and services that have not existed before are being created, resulting in the creation of new markets.

As these technological advances were also incorporated into the food sector, the concept of ‘Food-Tech’ emerged. This is a compound word of food and technology, which means a new food industry created by applying artificial intelligence (AI), the Internet of Things, and information and communication technologies to the food industry. It means producing, selling, and consuming different types of food through technology application in the entire process, such as predicting demand for food using big data and distributing and selling food using IT technology.

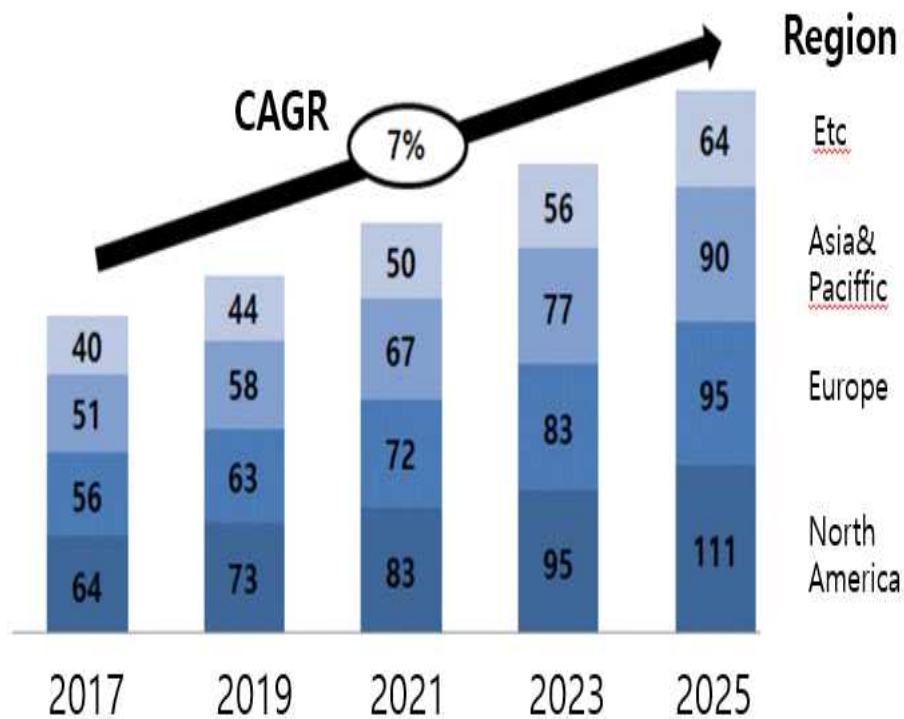


Fig.8: Global Food Tech Market Size Forecast (2017-2025), Source: (Innova Market Insight, 2019)

The global Food-tech market was \$21 billion in 2017, but is expected to grow to \$360 billion by 2025. This can be said to be a high annual growth rate of 7%. In addition, as of 2017, the North American market was the highest in the entire Food-tech market, accounting for 31% of the total market. It shows the market size in the order of Europe and Asia-Pacific (Innova Market Insight, 2019).

As such, the Food-tech market is expected to grow even more in the future, and preparations for global food companies to dominate the market are expected to accelerate.

4.1.2 The Demand Side: Changes in Consumer Needs

Worldwide, consumers' consumption trends for food are focused on "sustainability," "health," "customized personal demand," and "convenience." In other words, consumers want to eat healthier food, but they want to eat it more conveniently. Also, I hope you experience new things such as new flavors and new textures while preferring familiar flavors. At the same time, they want to consume products from companies that value more environment or ethics.

The desire for sustainable and healthy consumption was expressed as a desire for 'alternative food (or substitute food)', a vegetable meat or dairy product that replaces conventional animal meat. The demand for individually customized consumption according to one's taste, preference, and health condition, away from simple consumption of standardized industrial products in the past, has created a new market called "personalized food." A variety of products are being developed to meet the needs of detailed and diverse consumers, such as menu development reflecting gluten-free diets, products for people with dietary restrictions such as diabetes and high-protein, low-calorie diets for weight loss. In addition, the 'meal-kit' market was formed to satisfy the convenience of being a key keyword for busy modern people. For the meal-kit, simply add the ingredients in the kit, which includes vegetables, meat, and spices according to the recipe, and cook them.

In addition, the online food market, where food ingredients and cooked food can be ordered online, continues to grow remarkably.

4.1.3 Environmental Change: Increasing Uncertainty

With the spread of COVID-19, uncertainties have increased, and people's interest in health has increased extremely. They want to steadily manage their health through normal food, not medicine, and this has raised interest in nutrient balance, low calories, and customized foods that can be consumed according to individual health conditions. In addition, the demand for sustainability in terms of food security has increased. As a result, it becomes sensitive to carbon emissions and demands that food be produced in a more environmentally friendly manner. In addition, development related to food packaging containers such as eco-friendly packaging and decomposable plastic is increasing. Meanwhile, interest in ways to produce and consume food more efficiently has also increased in that the population is continuously increasing. But the number of producible agricultural products and food is decreasing. In this respect, research and development on plant-based meat and cultured meat are also continuously required. In addition, due to COVID-19, the demand for non-face-to-face consumption in all industries has increased. Consumption of agri-food is no exception, and online transactions of agri-food have increased rapidly through the expansion of online platforms and improvement of logistics systems. Various online ordering platforms are being developed, and on the same day, real-time delivery as well as online offline (O2O) services have increased.

4.2 The newest Trend of Food industry: Food-Tech

The trends of the global food industry were divided into technology development, consumer trends, and environmental changes surrounding the food industry. In order for a company to operate successfully in such a rapidly changing environment, it must actively utilize the wave of change and succeed in innovation. But it is not easy to succeed in change and innovation. In particular, the more companies enjoying the preoccupation effect in the existing market, the more difficult it is to push for a change and risk-taking choice to create a new market. However, there are some global food companies that recognize the need for change, persuade stakeholders to oppose, and promote R&D investment to launch new products, achieving greater success (Van Dierendonck, 2011). There are also start-ups that have created new markets that have never existed before. It empirically analyzes the cases of food companies that have succeeded in such innovation and analyzes what factors have been able to succeed in innovation and what factors have served as the most important variables.

It is necessary to look at the success stories of companies that quickly responded to changes in consumer demand discussed above by field. This study examines the success factors of Beyond Meat, which newly created the plant-based meat market in the field of alternative foods. And this looks at the success factors of Tesco, which succeeded in converting online distribution and e-commerce. Finally, CJ Cheil-Jedang, Korea's leading food company contributing to the spread of K-Food, examines how the latest demand and technological change trends are being applied, whether innovation has actually

succeeded, and what factors played a role in success such as technological innovation, organizational culture improvement, and leadership.

4.2.1 Substituted Food

Demand to replace livestock foods with vegetable foods is rapidly increasing, especially in the North American and European markets. The plant-based alternative food market has drawn attention as an alternative to solving problems such as obesity and adult diseases caused by animal protein and fat intake, and solving livestock manure and environmental sustainability problems while emphasizing animal welfare and bioethics.

The size of the global alternative food market is expected to increase to \$9 billion in 2017 with an average annual growth rate of 9.5%, to \$17.9 billion in 2025 (Meticulous Research, 2019).

Plant-based meat refers to a product that uses plant-based proteins such as soy protein to flavor animal-based meat. Recently, vegetable meat has developed to the level of taste, aroma, and texture similar to actual meat, and the market is growing at a rapid pace worldwide.

‘Beyond Meat’ is the most representative company and has the highest market share by selling processed products such as sausages and hamburger patties as well as vegetable meat. In addition, major global food companies such as Nestle (Swiss), Unilever (U.K), and Danone (France) are also pushing for their own R&D investments to develop alternative foods.

The global Plant-based meat market is expected to grow 14.9%

annually from \$121 million in 19 years to \$279 million in 2025 (Markets and Markets, 2019).

Although it started as a product for vegetarians, not only startups but also existing large global food companies are seeking to invest in combination with changes in consumption trends and development of Food-tech technologies.

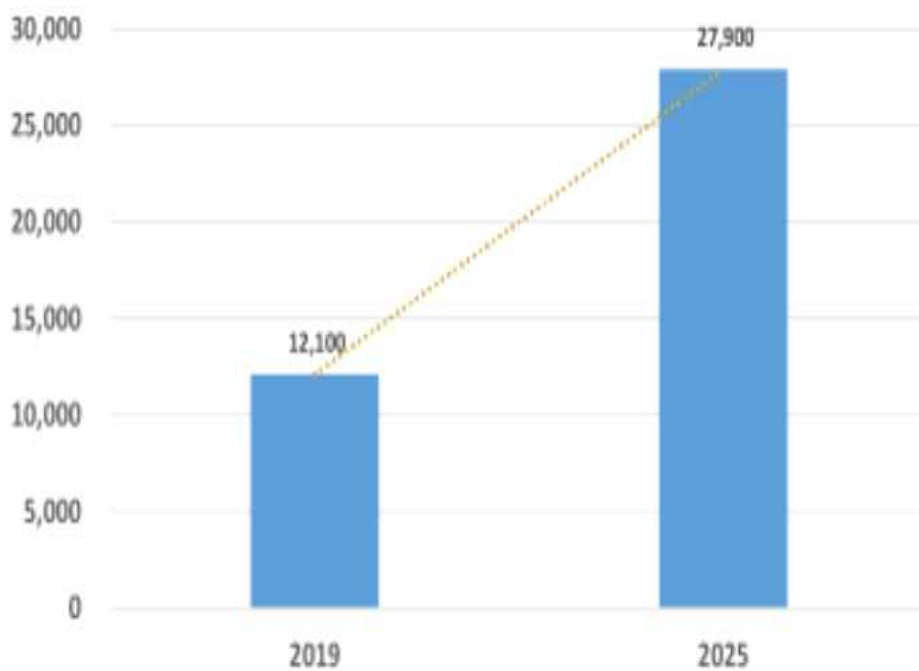


Fig.9: Plant-based Market scale, Source: (Markets and Markets, 2019)

Cell-based meat refers to animal cells grown and made in a form similar to meat in taste and nutritional content. Various studies are being carried out for development and commercialization. Singapore's Eat Just succeeded in producing chicken through cell culture for the first time in the world, and in 2020, it was approved by the Singapore government to sell and produce cultured chicken and

commercialize it (Tuomisto and Teixeira de Mattos, 2011). In addition, ‘Upside Foods’ and ‘New Age Meets’ in the U.S. have succeeded in developing cultured meat products and are currently waiting to be approved by the U.S. Food and Drug Administration (FDA).

	Name	Year of establishment	Investment quantity (million \$)
America	JUST	2011	372.53
	Memphis Meats	2015	22
	BlueNalu	2017	24.5
Israel	SuperMeat	2015	4.22
	Aleph FArms	2016	14.4
Netherland	Mosa Meats	2015	9.09
Japan	Integriculture	2015	2.73
Singapore	Shiok Meats	2018	5.11

Fig.10: Major companies and investment attraction for cultivated meat production, Source: (KISTEP, 2021)

4.2.2 E-commerce market

The online market, which allows people to purchase goods more conveniently, has continued to grow due to the advantage of overcoming space-time constraints. Looking at the size of the global Ecommerce market, it surpassed \$2 trillion in 2018 and accounted for 11.6% of the total retail distribution market. In 2020, it entered \$4 trillion and accounted for 14.8% of the total retail distribution market (Statista, 2022). Increasingly, retail distribution is breaking down the

boundaries between online and offline regardless of field, and purchases in the form of offline pickup are also increasing after online purchases.

Retail e-commerce sales worldwide from 2014 to 2026 *(in billion U.S. dollars)*

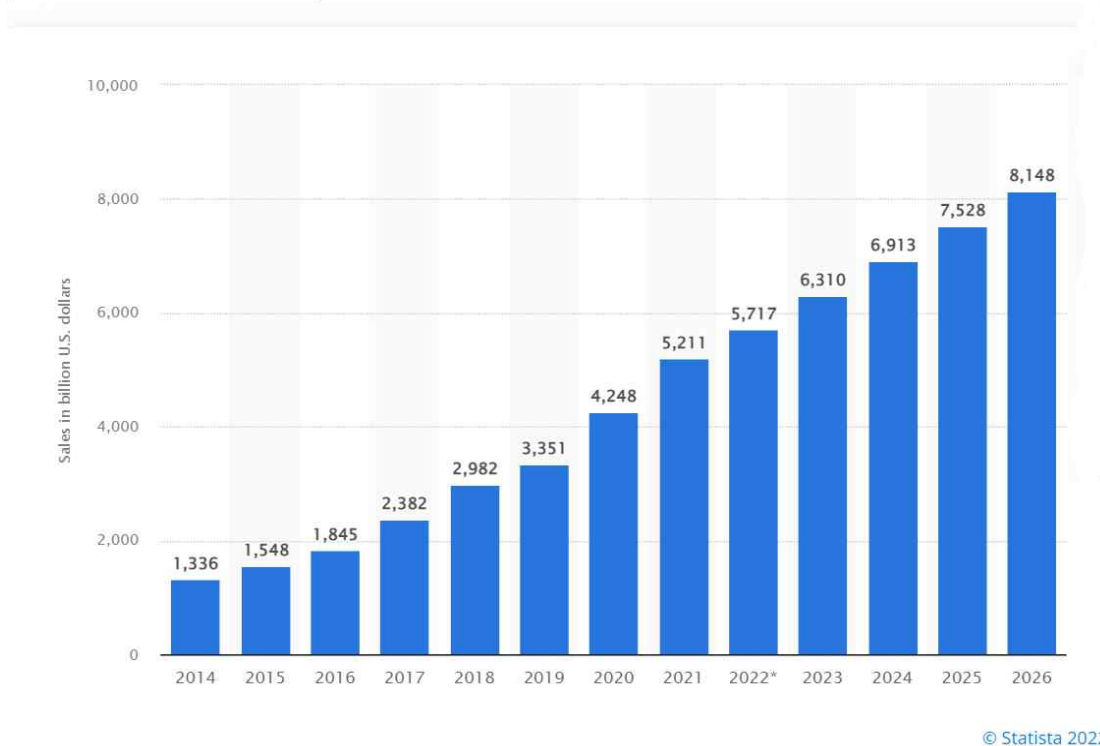


Fig.10: Retail e-commerce sales worldwide from 2014 to 2026.

Source: (Statista, 2022).

Meanwhile, traditionally, the proportion of online purchases of food ingredients and food has been relatively low (Euro Monitor, 2020). This is because of the belief that fresher ingredients can be purchased only when viewed and purchased offline, and in the case of online delivery, it takes time, so freshness has decreased in the process of delivery. However, due to the development of IT technology, the purchase rate has increased significantly due to the

introduction of “live commerce“ that allows real-time communication between sellers and buyers about the condition of products. In addition, the online food market has been able to grow as convenient payment systems, cheaper prices than offline, faster delivery systems, and cold chain distribution networks are combined.

In particular, as the desire for non-face-to-face consumption increases due to COVID-19, the e-commerce market in the food sector is also exploding.

For this reason, existing distribution network platform companies such as Amazon launched food delivery services on the same day through collaboration with food distributors. In addition, in the UK, self-distribution platform startups such as ‘Hello Fresh’ and ‘Getir’ are also growing, and existing offline-oriented retailers “Tesco“ and “Sainsbury“ are also securing their own distribution networks and establishing online platforms to carry out various port services and digital marketing. Morrisons also collaborated with Amazon, a large distribution network, to expand its platform to make it easier for consumers to access.

4.3 Substituted Food Company: Beyond Meat

4.3.1 The success point of Beyond Meat

Beyond Meat is a food company founded in California in 2009 by Ethan Brown. Beyond Meat has grown significantly since its establishment and was listed on NASDAQ 10 years later in 2019. Beyond Meat has 472 employees as of 2019, achieving sales of about \$46.8 million (as of 2020).

The products made by Beyond Meat are very diverse. It is making various plant-based meat processed products such as sausages, meatballs, hamburger patties, and sausages, as well as instant food that can be easily eaten. Currently, Beyond Meat is exporting to more than 80 countries around the world, and it launches products in collaboration with various global franchise food companies such as Starbucks, KFC, McDonald's, and Subway, making it easier for consumers to meet Beyond Meat's products. Beyond Meat values people's health and nutrition while considering environmental protection and animal welfare through efficient use of resources. Therefore, they create plant-based meat products to replace animal-based meat to help achieve this vision and try to help more people empathize with their vision and mission through active marketing (Beyond Meat, 2021).



Fig.11: The Various Beyond Meat Products. Source: (Beyond Meat, 2022)

Plant-based alternative meats initially began with meat made from vegetarian beans. The world's vegetarian population is 180 million, accounting for only 2.3% of the world's population, and has been fiercely competing for market share centered on startups in a very low-demand market. Also, large companies did not want to enter the market. However, Beyond Meat has changed the consumer's concept of selling plant-based meat itself. He judged that it would be very difficult to make people vegetarian, but if healthy vegetable meat tasted good, it would persuade consumers to buy it. Therefore, general consumers who enjoy meat, not vegetarians, were targeted. And it delivered the message of delicious but healthier meat, and this strategy was successful (Ansoff and Ansoff, 2018).

Even if consumers agree with Beyond Meat's social value and vision of "reducing environmental pollution and inefficiency during livestock breeding, pursuing animal welfare, and eating more nutritious food for health," they do not buy it if it tastes bad. Beyond Meat also recognized that consumers could not lead to continuous purchases even if they purchased once or twice in sympathy with the value. Therefore, they focused on research to improve the taste. While using plants such as beans and wheat as ingredients, appropriate materials were discovered and processing technologies were developed to realize a texture, taste, and flavor similar to actual meat. After a long period of research, the company successfully launched Beyond Burger Patty in 2016, which uses coconut oil and beet to make red gravy come out of meat. And it sold 50 million units in three years. Since then, they have focused on research that embodies the texture

of ripping chicken and succeeded in commercializing artificial chicken in 2012 after endless experiments and trials and errors. In addition, more diverse products are constantly being developed and marketed so that consumers can choose more. This makes it easier for consumers to access, taste, and consume Beyond Meat products.

In other words, they continue to make aggressive investments in R&D and production facilities so that they can satisfy the level of taste, price, and diversity that consumers can satisfy. Beyond Meat invested \$31.5 million in R&D in 2020, about 8% of its annual sales in the previous year. In addition, about 10% of average sales are invested in R&D to develop new products, improve quality, and improve process efficiency every year.

Looking at Beyond Meat's financial statements, it can be seen that despite the explosive growth in sales, operating profit and loss have continued to be in the red. However, in 2019, it turned into a surplus due to a large increase in sales, but it is still a very small size compared to the size of sales. The reason for this can be seen by looking at the asset size, capital ratio, and investment cost. The asset size increased from \$66.5 million in 2017 to \$450 million in 2019, and the capital size also increased from -95.9 million to \$384 million. This means that operating sales are being used for capital and asset investment at a high rate, and it seems that the size of investment in technology and facilities to improve the production process continues to increase. In fact, it has been investing to explore the European market by operating local plants in Europe since 2020. It also established a manufacturing plant in China in 2021, and plans to open the Shanghai R&D Center this

year. It is also continuously promoting investment in marketing for products (Beyond Meat, 2022).

(thousand \$)	2017	2018	2019
Revenue	32,581	87,934	297,897
Operating profit and loss	-25,056	-26,474	4,380
Property	66,463	133,749	451,923
Debit	162,376	54,809	67,833
Capital	-95,913	78,940	384,090

Fig.12: Financial statements of Beyond Meat, Source: (Beyond Meat,2021)

Despite the continued operating loss deficit, the leadership of founder Ethan Brown is considered to have played a big role in making these aggressive investments. He is a leader with practical skills as a social activist and insight to read economic and social structures. At the same time, it can be evaluated that servant leadership, which induces public sympathy for their social values, has also become an important success factor (Russell & Stone, 2002).

4.3.2 Implementations

The SWOT analysis of Beyond Meat can evaluate the success factors through the strategies they promoted (Carayannis and Sindakis, 2017). First of all, Beyond Meat's strength is that it is the No. 1 in the industry. Since it is the first company to popularize food to

replace animal meat, its brand awareness has increased to the point of being recognized as “plant-based meat = Beyond Meat,” and many loyal customers have been created. That means they are market leaders with preoccupation effects (Kolpin, 2021).

On the other hand, it is a weakness in itself to make a product that is not made of meat but tries to imitate the taste and texture of meat. In other words, in order to be more perfect, continuous R&D is essential, which causes costs (Segovia-Siapco, 2019). In addition, innovation should be continuously promoted to meet consumers’ demand for new things. This part necessarily causes costs, and due to this high-cost structure, net profit often suffers a deficit despite increased sales. The opportunity factor is that consumers’ desire to pursue new flavors is increasing, and consumption trends are changing in the direction of emphasizing values such as health and environmental protection, resulting in greater potential market value (Renda, 2019). However, there is a threat that there are many potential competitors, such as companies that manufacture cultured meat (Segovia-Siapco, 2019).

Beyond Meat	Strengths 1. No1. share(Kolpin, 2021) - a market leader 2. Existing customer base(Kolpin, 2021) - customer royalty	Weakness 1. Technology(Segovia-Siapco, 2019) - high cost of production
Opportunities 1. Alternative feed needs (Kolpin, 2021) - “The new wave” 2. Consumer Trend change(Renda, 2019) - concerns on health and environment	SO strategies	WO strategies
Threats 1. High price, low revenue(Segovia-Siapco, 2019) - the cost of product is the barrier of consumption 2. New entrants(Segovia-Siapco, 2019) - cultivation company, new brands	ST strategies	WT strategies

Fig.13: SWOT Analysis of Beyond Meat, Source: (Author, 2022)

In this situation, Beyond Meat seems to be pursuing a strong 'SO' strategy. In order to take advantage of their strengths, they have continued to invest in R&D for more complete product quality. It has also continued to invest aggressively to create new markets to save opportunities. It started in the U.S. market at first, and now it is actively entering more diverse countries such as Asia beyond North America and Europe, aiming for a preemptive effect (Regner and Johnson, 2019). In particular, the construction of production plants and R&D centers in China seems to have judged that China, Korea, and Japan, which have high consumption power, can be attractive markets while there are no companies that manufacture plant-based products themselves.

Taken together, the most important success factors for Beyond Meat can be evaluated as technological development. This is because,

basically, food technology is a field that requires high-level technology, so it can succeed only when technological advances related to product quality are supported. However, the support of leadership also played a big role. It was possible to create a new market that did not exist and redefine the concept of consumers because of Innovative leadership (Lussier and Achua, 2015). And it is because Servant leadership played a role in overcoming stakeholders' resistance to change by inducing empathy for value (Van Dierendonck, 2011).

4.1 E-commerce market leader: Tesco

4.4.1 The success point of Tesco

Tesco was founded by Jack Cohen in 1919 and is a multinational grocery retailer headquartered in the United Kingdom. Tesco is a leader in the food market in the UK and is the world's third-largest global retailer in terms of sales. The number of employees exceeds 350,000. Since 2020, the CEO has been Ken Murphy. Tesco aims to provide affordable, healthy and sustainable food every day to improve the quality of life of its customers and enjoy more comfortable ways (Tesco PLC, 2022). In the UK, Tesco and Sainsbury's are now almost bisecting the market. Comparing sales in 2019, Tesco is worth 72.3 billion pounds, Sainsbury's 23.3 billion pounds, and Max & Spencer's 10 billion pounds. In other words, the combined sales of Sainsbury's and M&S are less than half of Tesco's sales.

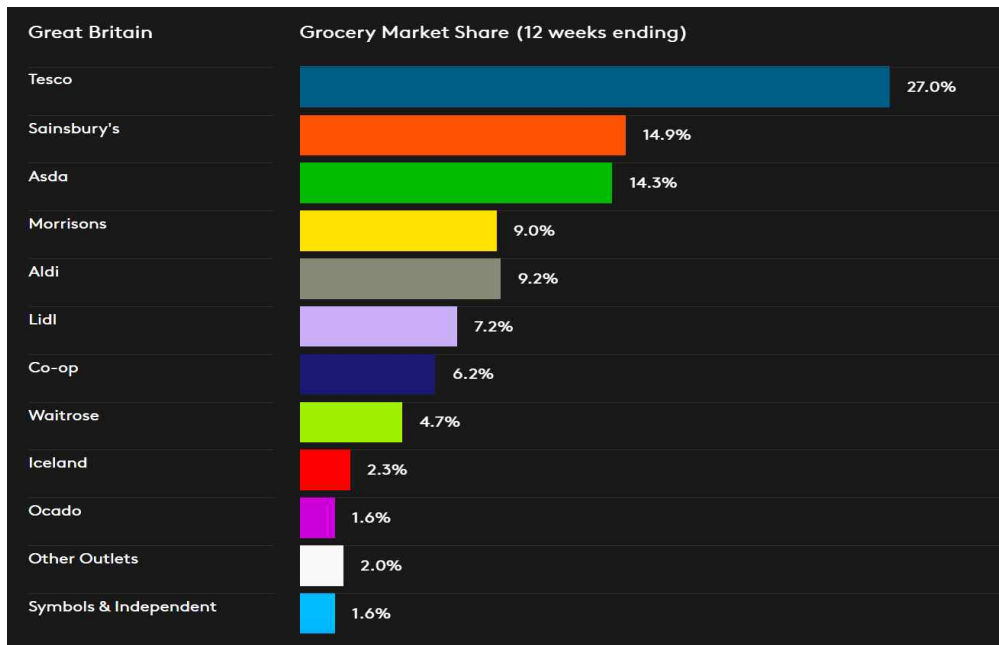


Fig.14: Market share of four largest grocery companies in U.K, Source: (Kantar, 2018).

In this study, for the analysis of Tesco's success factors, the success factors are analyzed by SWOT analysis and grasping the strategies being pursued by Tesco.

Tesco	Strengths 1. nol share 2. Existing customer base	Weakness 1. cross-channel support 2. skills
Opportunities 1.New service ex) meal kit, click collect 2.co-branding ex) Jamie Oliver Tesco	SO strategies	WO strategies
Threats 1.Customer's choice ex) high quality, low price 2.New entrants ex) Getir, Gopuff	ST strategies	WT strategies

Fig.15: Tesco's SWOT Analysis. Source: (Author, 2022)

First of all, Tesco's strength is that it has the largest market share in the food market. The weakness is that unlike startups that are newly challenging the grocery distribution market, their own platforms are operating stably, making it difficult to choose a way to increase consumer accessibility by utilizing various other platforms (Chaffey and Ellis-Chadwick, 2019). Tesco's opportunity factor is that a new market that has not existed before is being formed due to recent changes in consumption trends. For example, the popularity of meal-kits and instant foods has increased due to the demand of modern customers who want to eat delicious but fast and convenient meals. This is opening up a new market for Tesco. But at the same time, it is also a risk factor that increases costs. In addition, new competitors such as 'GETIR' and 'GOLLIARS', who deliver groceries ordered in as long as hours or as short as a dozen minutes, are rapidly increasing (Mari, 2021).

Recently, Tesco has been making various new attempts. It develops and distributes many kinds of meal-kits, and develops and distributes recipes that can be easily cooked. At this time, consumers can order while watching the recipe online and clicking on the necessary ingredients right away. In order to utilize existing customers, which is Tesco's strength, it is actively utilizing the "club card" system that increases loyal customers to increase the repurchase rate of customers as much as possible. Of course, the club card discount system is also applied to online purchases. It also operates an online coupon discount system to actively utilize

the online e-commerce market to save time and make it easier to purchase. In addition, an O2O service that provides on-day delivery services for online orders and allows you to pick up items purchased online directly from offline stores is also naturally provided. Analyzing these characteristics of SWOT, it seems that Tesco is pursuing a strategy to maximize opportunity factors by utilizing its strengths. (So-called 'SO strategy') As the online market does not have a leader yet, digital marketing for online activation is being strengthened to take the first place in the e-commerce market.

In order to revitalize the e-commerce market, it is important to establish an online purchase platform through IT technology and grafting, identify consumer demand through big data analysis, recommend products, and secure a distribution network for fast delivery. To this end, research is needed on how to update the existing online website and improve the efficiency of logistics delivery. Accordingly, it is constantly reinvesting in digital technology development and marketing.

In 1993, Tesco was less than one-third the size of Max & Spencer and less than half the size of Sainsbury's. But Tesco's sales have increased 4.5 times because of former CEO. He introduced club cards and provided coupons to suit consumption habits and tastes in order to actively identify customers' needs and focus on their voices (Tesco PLC, 2021). Also, in 1996, when online shopping was not common, it created the online shopping mall Tesco Dotcom, which became the basis for Tesco to become the world's No. 1 online shopping mall. It is not too much to say that the insight ahead of the times, innovative

leadership that does not hesitate to innovate, and servant leadership that listens to customers' voices and demands have made Tesco present. (Northhouse, 2021)

4.4.1 Implementations

When analyzing Tesco's success factors, it can be said that innovative leadership based on insight and technological development that can support leadership are important factors. Of course, Tesco's success factors can be discussed in various ways, but these two key factors can be said to draw public sympathy. The fact that the club card system was introduced for the first time to improve customer loyalty and that the online market was created for the first time was enough innovation to enjoy the preoccupation effect of the distribution market. It is also constantly trying to change and develop even after taking the No. 1 position in the industry. Recently, after the COVID-19 situation, Tesco is trying to increase the size of online shopping malls and provide customer-oriented services for more convenience. Of course, technology development and digital marketing investment have been naturally supported to expand online platforms, expand AI functions for big data analysis, and expand logistics functions for same-day delivery services.

4.5. Korea's food market leader: CJ Cheil-Jedang

4.5.1 The success point of CJ Cheil-Jedang

Founded in 1953, CJ is Korea's first food manufacturing company, making flour, condiments, sugar, and condiments. In order to invest in

technological research in food manufacturing, the Food Research Institute was established in 1977 and the General Food Research Institute was established in 1984 to focus on technological investment. CJ Cheil-Jedang exports not only to Korea but also to 15 countries around the world, including Europe, the United States, and China. CJ's sales rose 11 percent year-on-year to \$12 billion (CJ, 2021).

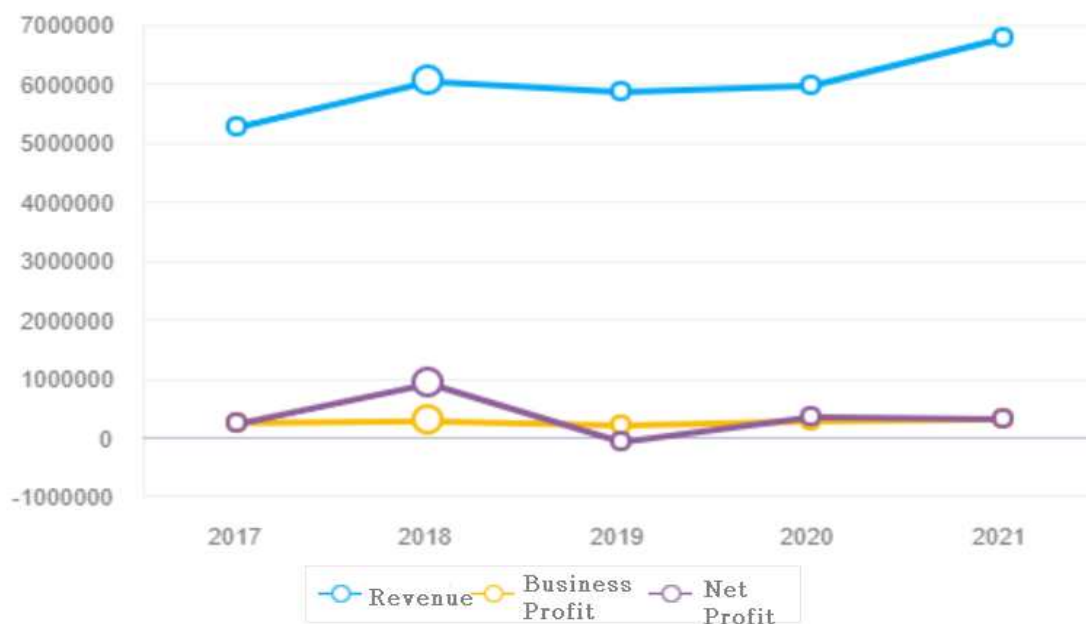


Fig.16: Financial information of CJ Source. Source: (FIS, 2022)

CJ Cheil-Jedang is Korea's first food manufacturer and currently the nation's largest food exporter. Recently, exports of Korean food have increased as interest in K-Food and K-culture (so called "Han-Ryu", it means Korea wave) has increased around the world. In particular, dumplings made by CJ Cheil-Jedang are gaining huge popularity, and exports are growing rapidly. CJ's success may have various causes, but in this study, it will be analyzed from the

perspective of R&D technology investment and leadership.

CJ has established a food R&D research institute to develop innovative new products and to improve product quality. It has steadily promoted the goal of continuing innovative growth through strategic R&D investment. As of 2019, CJ Cheil-Jedang's R&D expenses were KRW 143.2 billion, investing 1.12% of its sales. In 2021, R&D expenses were increased to 169.3 billion won. Through the Food Research Institute, instant rice, dumplings, and ready-meals were developed and high sales performance was achieved. It developed vegan dumplings in 2021 years and launched a vegan brand called 'Plantable'. In addition, it is investing in overseas cultured meat companies such as Singapore and Israel and expanding its cultured meat business in combination with its technology. As a result of these efforts, sales of 14.1637 trillion won were achieved as of 2019, and it increased by 11% from the previous year's sales of 12.7668 trillion won. Although the proportion of R&D expenses to sales is small compared to overseas global food companies, it has achieved high performance by focusing on technology development centered on core products. This success would not have been possible without investment in technology development.



Fig.17: The products from CJ- Cheil-Jedang. Source: (CJ, 2022)

CJ Cheil-Jedang was the parent company of Samsung, Korea's leading company (Samsung.co.kr, 2022). Samsung's founder set an innovative goal of "being the world's best with differentiated products and services" in Korea, which was a primary industry-oriented economic structure at the time. His entrepreneurial and charismatic leadership had a great influence on the establishment and growth of the first manufacturer in Korea (Irland & Hitt, 1999). He established Cheil-Jedang under the judgment that the industrial structure should be shifted from light industry to heavy industry in order to reduce the dependence on imports of the Korean economy. Since then, he has also developed the semiconductor industry.



Fig.18: CJ Cheil-Jedang’ s mission, Source: (CJ, 2022)

Thanks to Samsung’s successful operation, Korea’s economic status has also increased (Bel, 2010). He presented innovative goals and visions without fear of challenges and failures. It has led to the perfect follow-up of executives and employees by hiring excellent human resources to the organization, providing education for their self-development, and providing accurate compensation (Koreabiz Review, 2021). Meanwhile, as the CEO changed, CJ’s organizational management direction changed slightly from the existing charismatic leadership based on entrepreneurship to transformative leadership. CJ Cheil-Jedang’s business direction was set as a high-tech food industry

that combines AI and other technologies in the food industry while setting organizational goals and discussing how to achieve them together with team members. As a result, especially for dumplings, the production process improved and the taste improved, resulting in a significant increase in sales in Korea and global exports (CJ, 2021).

4.5.2 Implementation

CJ's success can also be analyzed in the same context as the Tesco case and the Beyond Meat case. Their generous investment in technological development and leadership based on entrepreneurship played an important role. In addition, while other Korean food companies focused on domestic sales, CJ focused on overseas export areas, which allowed it to achieve much better sales than other companies. In addition, it has actively entered the food tech sector such as plant-based meat and health functional foods. Of course, in order to improve the quality of existing products such as dumplings and instant rice, investment in smartening the production process and developing food preservation technologies was also continuously promoted.

CJ's technology investment relative to sales was significantly higher than that of other food companies in Korea. This can be said to be a key factor in success, and what made this decision was that the first thing that the leader had was the insight he had, and secondly, the leader listened to his followers and sympathized with the direction they wanted to go. With this servant leadership, CJ was

able to reach its current position thanks to persuading stakeholders who opposed investment in technology development and developing technology.

Chapter Five – Conclusions and Recommendations

5.1 Conclusions

Earlier, this study investigated environmental changes surrounding the food industry, changes in consumer attitudes, and technology development represented by IT and AI. In addition, we looked at what efforts successful food companies made in this rapidly changing environment in common. In addition, two successful companies were analyzed in depth to examine which factors played a key role in occupying and maintaining the current No. 1 position. In conclusion, in order to succeed without being eliminated in modern society, it must constantly change. And for this change, the role of R&D investment and leadership is essential. In addition to R&D investment and leadership, there are various factors that made the company successful, but none of the successful companies was supported by R&D investment and leadership. This leads to the conclusion that it is essential to invest in technology and operate appropriate leadership for success, although various attempts can be made depending on the specificity of the company.

5.1.1 R&D

Looking at the R&D investment of 10 companies included in the EU's top 2,500 R&D investments in 2019, Nestle, the world's No. 1 food company, is also making the largest technology investment, focusing on customized nutrition, plant-based alternative meat, and eco-friendly plastic development (EU, 2019). Other global food companies are also continuously increasing investment in plant-based

alternative foods and cultured meat, personalized foods, smart production processes using robots, AI-based e-commerce markets, and sustainable foods. In other words, it can be understood that continuous growth is impossible unless the food industry makes R&D investments for technology and convergence amid rapidly changing consumer demands and environments. On the other hand, when looking at Beyond Meat, which is considered the most leading company in the field of alternative meat, it seems that it is investing an average of 10% of its sales for technology development. In other words, compared to Nestle, the world's No. 1 company, investing about 1% of its sales, Beyond Meat was able to occupy the No. 1 position in the current industry as a result of focusing more on technology development (Beyond meat, 2021).

Therefore, one of the most important factors for the success of innovation in food companies in the current era is technological development and R&D investment.

R&D Ranking	Company	Nation	Net Revenue (million €)	R&D Investment (million €)	R&D Concentration Ratio(%)
82	NESTLE	Switzerland	81,100	1,763	2.2
173	UNILEVER	U.K	50,982	900	1.8
242	PEPSICO	U.S	56,473	594	1.1
300	KIRIN	Japan	15,213	458	3.0
344	VILMORIN	France	1,346	382	28.4
387	DANONE	France	24,651	335	1.4
406	MONDELEZ	U.S	22,653	316	1.4
436	KERRY	Ireland	6,608	286	4.3
494	ANHEUSER-BUSCH INBEV	Belgium	47,702	249	0.5
518	MEIJI	Japan	9,885	230	2.3

Fig.19: The 2019 EU Industrial R&D Investment Scoreboard ('19), Source: (Each company's website, 2022)

5.1.2 Leadership

It is necessary to discuss the role of leadership. Leadership refers to the ability to make members strive to achieve their organizational goals (Hemphill and Coons, 1957). Thus, leadership becomes the driving force for organizations to overcome limitations and adapt to changing environments (Rouch and Belling, 1984) to improve organizational culture and serve as the basis for self-development for members (Drath and Palus, 1994). Organizational effectiveness refers to the degree to which the goals of the organization are achieved and the excellence of organizational operations in the process of achieving organizational goals. (Bunchanan and Huczynski, 2019). On the other hand, the stakeholder theory influences organizational effectiveness (Blowfield, 2016). However, the stakeholder theory also defines effectiveness as diverse as the stakeholder surrounding the organization (Freeman, 2010). For example, organizations seek to maximize long-term or short-term benefits (Donald's and Prest, 1995). Customers want to buy better quality goods at a lower price. In addition, shareholders demand higher wages and a good working environment to maximize return on investment (Laplume and Litz, 2008).

Therefore, in order to improve organizational effectiveness, the organization must actively respond to the opinions of various stakeholders. In addition, if stakeholders refuse to change, organizational effectiveness can be improved only when they overcome it. Leadership plays a role in this process. In other words, it is basically the role of leadership to persuade stakeholders who are

characterized by resisting change to sympathize with the direction of new change (Antonakis and Day, 2018). As previously analyzed, Tesco's success stems from the leader's excellent quality of insight to find blue ocean that the former CEO has. In addition, he focused his attention on the voices of customers and developed various products and services to meet the needs of customers. It was possible because of his servant leadership. Of course, it would not have been possible without technology development such as payment function, logistics delivery function, and big data analysis of customer information for e-commerce market operation, but more importantly, leadership that recognized the need for change and persuaded stakeholders through vision for the future played the most important role. In other words, many other companies can introduce the same technology, but it is analyzed that Tesco's CEO's leadership helped create new markets and preoccupy them by entering the online market first.

5.2 Recommendations

5.2.1 Overall

The most necessary factor for a food company to succeed in a rapidly changing environment is to understand the changing demand. Through this, it is necessary to judge what areas and directions to invest in technology in the future, and persuade stakeholders who oppose change while presenting a vision for the future. It should also investigate marketing of new products and other companies' strategies. Unlike other consumer goods, food consumption cannot increase indefinitely because the extent to which people can consume per person is limited. Therefore, in order for food companies to grow

without limits, they must form a new market that is completely different from existing foods or create “healthier, simpler, and new” foods that consumers demand. For this, the part that should be most interested in is ‘Food-Tech’. Looking at the major investment areas of the world’s 10th-largest food company, all of them are related to food technology (The 2019 EU Industrial R&D Investment Scoreboard, 2019). New food markets can be created through barrier-free inter-industry convergence. Therefore, it is predictable that food companies’ technology development and investment in the area will determine the future of the company (Fuller, 2016). In addition, a further look at the areas where food companies can promote technology investment can be analyzed as follows.

First of all, plant-based meat and cultured meat already have a market to some extent, and companies are expanding their investment in creating more popular products similar to real meat at a cheaper price. Therefore, it would be important for companies seeking to enter and succeed in this field to develop a cheaper way to produce products with more perfect quality.

Second, it is the food industry area using robotics. By producing food using machine or robot technology, it is possible to pursue safer, more accurate, and cost-effective production. In addition, the creation of food using 3D printers or the cooking of food using robots, serving restaurants, and delivery can also be new investment areas. Third, it is a customized food related to individual health. It is possible to develop health supplement production or dietary advice services using individual genetic information. It is also possible to develop products that reflect health conditions such as obesity, adult diseases, diabetes,

and maintaining healthy weight, or reflect individual preferences for taste and texture.

Finally, technology investment for long-term storage of food or development of environmentally friendly packaging containers is also proposed. Taken together, in order for food companies to succeed in the modern era, investment in innovation and technology development beyond the existing areas is essential. It is also desirable to create and preoccupy the market by providing products or services that other companies have not developed. And in this process, it is important to appoint a leader who has the long-term and short-term vision to persuade stakeholders, the goal setting, and the leadership to realize it as CEO.

5.2.2 Korea Food Industry

Korea's food industry has a very high potential for future growth. In particular, as the current trend of consumers places importance on health and convenience, demand for customized foods for individual health conditions and alternative foods is rapidly growing. Meanwhile, investment in technology development in IT, BT, and AI technologies, which are the fourth industrial revolution technologies, is accelerating in Korea, and integration with the food sector is also actively being promoted. In that respect, it was meaningful to find examples of advanced countries such as the United States, the United Kingdom, and Europe in the food tech sector.

In the case of Korea, it continues to promote R&D support for the discovery of raw materials for the production of alternative foods or the development of cell culture technologies. Nevertheless, Korea's

growth rate in the global market is very slow. In terms of the diversity, quality, and market capacity of plant-based foods, the level of development is behind that of overseas countries. In addition, there is a limit to leading active development efforts of food companies due to the lack of alternative food safety management standards. In this respect, the government should support the promotion of R&D at the national level to support the production of plant-based foods, while supplementing the deficiencies in terms of laws and institutions. In addition, since the domestic market is still lacking, support to promote exports should be promoted. And food companies should also recognize that actively pursuing and investing in technology development to create new markets is the best way to enjoy market preoccupation in the long run. Under this recognition, it is necessary to more actively promote corporate technology development investment and strive to improve product diversity or quality. When these efforts by the government and food companies create synergy effects together, the Korean food industry will be able to continue to developing.

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