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IMPLICATIONS OF RISK MANAGEMENT IN THE CASE STUDY OF POLAROID COMPANY

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December 2024

CONTENTS

INTRODUCTION

1. Introduction and the method of the study

Risk is everywhere, and it is clear that any company will face risk-related problems. These risks lead to serious losses for companies in unexpected situations. There exists a common misconception about risk management: the goal of risk management is to completely eliminate risk in a business. This is not actually true since it is almost impossible to eliminate risk. Instead, the goal of risk management is primarily to ensure that each company has a clear idea of the level of risk it is willing to take, and to implement practical measures to manage the impact of risk through analysis. In the case study of Polaroid, there are different approaches to analysing the impact of risk management, and these approaches have revealed different reasons for Polaroid's bankruptcy. Thus, when researching the reasons for the bankruptcy of the Polaroid company – a company with scientific foundations – it is always necessary to justify new conclusions.

The goal of this paper is to explore the reasons why Polaroid faced bankruptcy despite having the full resources necessary to turn its business around.

In the case study of Polaroid, it is important to analyse the results of decisions based on knowledge and experience of top managers in studying the impact of risk management, since these figures knew that the instant camera and film market was dominated by digital imaging. Leveraging opportunities is critical to a company's competitive advantage, and it is not surprising that top managers are very interested in the process of focusing on potential opportunities. With that said, decisions made based on potential opportunities, in some cases, lead to failure. This work also examines how strategic actions or decisions of top managers may have affected Polaroid's bankruptcy.

1) Reason behind Polaroid’s selection or the study.

There exist many prior studies on risk management theories designed to avoid business failures. Many of these theories are normative; indeed, numerous companies have faced bankruptcy despite being highly concerned about avoiding risks. Prior to its downfall, Polaroid was amongst the world’s most excellent companies in terms of financial strength, band, human resources, and patents, but nevertheless faced bankruptcy, even after trying to implement many to avoid risk. Indeed, the Polaroid case is selected for this paper with a view to exploring the reasons for the above-mentioned occurrences.

2) About Polaroid company

Polaroid was an American company founded in 1937 by Edwin H. Land, providing its customers with the best service in instant cameras and film, in addition to revolutionising instant photography and film production, gaining a large market share. Employing polarised technology, the company first worked on polarised sunglasses, before then starting to produce 3-D films and protective gear for military dogs using the same technology. The company reached its pinnacle of development by creating innovative technology of its time for instant photography and occupying the photography market. The main products manufactured by the company include instant cameras, instant films and digital cameras. Using this polarised technology, the company successfully gained a huge market value and, in 1991, achieved its highest revenue level, at approximately - 3 billion US dollars. It is important to examine the positive or negative consequences of the business model that Polaroid created over time during its economic development.

I believe that this business model was created after studying the current market conditions and consumer needs. The model itself was developed from the establishment of the company to the crisis, and reached the system level. In my opinion, this system was a major strength of the company's risk management, and therefore, the study of the Polaroid company has not lost its relevance.

3) Goal of the study

The goal of this study is to analyse the reasons why Polaroid had to face bankruptcy despite being an excellent company, that tried to implement numerous measures to transform and adapt to the new market conditions.

The creation of the above-mentioned system made Polaroid the leader in the photography market for decades after World War II. Polaroid had a very unique strategic competitive position in the instant camera market, introducing its first instant camera in December 1948. The company continued to sell instant cameras until 1976 thanks to a powerful patent. Polaroid sued Kodak in 1976 for infringing on its patents. Finally, in 1985, Polaroid won the lawsuit and Kodak paid the company $909.5 million in damages. Polaroid had a virtual monopoly on instant cameras, with its threats not coming from direct competitors, but indirect competitors. Polaroid's instant cameras steadily lost market share to disposable, 35mm, video, and digital cameras. The company also continued to lose market share due to declining product sales at one-hour photo processing shops and many retail outlets.

It was the above misbehaviour controversy, and inability to adapt to changing times that led to Polaroid's bankruptcy. Polaroid was a victim of patent infringement and poor company policies and was unable to adapt quickly to market conditions.

In general, the Polaroid company was one of the world's most profitable and fastest-growing enterprises, but changes in the business environment left the company bankrupt. The purpose of this study is to investigate the reasons for the bankruptcy of such a large company based on risk management theories.

As regards Polaroid's bankruptcy, the long-term consequences of every decision and the application of new business management led to a crisis. In general, the Polaroid company did very well to avoid bankruptcy. Polaroid had enough positive factors to rebuild its business: that is, it had the resources needed to rebuild the business, such as technology, human resources, and brand reputation. The company carried out scientific research in advance of the continuous analysis and study of market changes, whilst it also undertook practical work in creating a strong innovative technological system. In order to gain a major share in the digital imaging market, it tried to create a system that was fully responsive to market changes and greatly affected the analogue imaging business with films.

However, since the 1980s, the weakening of Polaroid's successful system has been substantially influenced by digital imaging technology, the spread of one-hour photo lab development, and improved options for video technology (for example, Sony Betamax). It is important to examine the reasons why Polaroid was unable to successfully adapt its business to the new market environment, and I wish to focus on any processes and changes that led to Polaroid's crisis, including delays in resolving the crisis, economic and business trends, financial costs, etc.

2. Research on prior studies about the Polaroid case

In comparing my research with previous research on the Polaroid case, I would suggest the following differences.

1) Tripsas, M., and Gavetti G., "Capabilities, cognition, and inertia: evidence from digital imaging", The SMS Blackwell Handbook of Organisational Capabilities (2017), pp., 393-412.

In the face of rapid technological change and different management methods, Polaroid's efforts to succeed depend on traditional beliefs whilst reviews of specific asset positions can ensure the competitive advantage of the company. Although Polaroid recognises the need to adjust in response to changes in their external environment, they often fail to respond

effectively. This paper analyses how managerial knowledge affects the evolution of capabilities and thus contributes to organisational inertia.

I propose to additionally examine the reasons why Polaroid's top management team's decisions failed to effectively respond to market changes through capabilities, cognition, and inertia.

2) Lathrop, A. (2008). Polaroid practice in the digital age: A brief analysis on Polaroid revival. Brandenburg Center for Media Studies.

This article focuses on the stability of Polaroid instant photography and the relationship users form with their cameras. The focus is on the sustainability and revival of Polaroid technology as an old media technology. In addition, the events related to the existence of old analogue technologies and their subsequent difficulties are studied in the period when digital photography and digitisation processes were very widespread.

I propose to also consider the failure of the company as a result of the decisions of Polaroid's top management team, the existence of old analogue, technologies, and the subsequent difficulties in an era where digital photography and digitisation processes are very common.

3) Garud, R., & Munir, K. (2008). From transaction to transformation costs: The case of Polaroid's SX-70 camera. Research Policy, 37(4), 690-705.

In this article, it is shown that innovations in the design of the SX-70 technology can have important implications for the organisation of competencies throughout the production network. Currently, product design discussions and distribution of power across production lines are based on consideration of transaction costs. However, such a view does not take into account the transformation costs that arise when competencies in the production network are reorganised due to design changes. The article examines the dynamics of transaction and transformation, as well as the nature of these costs.

I have seen Polaroid's digital technology (such as SX-70, Polavision, Printer in the Field («PIF" (PRINT IN THE FIELD)), PDC-2000, Swinger) not pay for itself. I propose to consider the fact that the transaction and transformation costs of these technologies have increased and the decisions of top managers are the main factor in the failure of technologies in business.

4) Buse, P. (2010). Polaroid into digital: Technology, cultural form, and the social practices of snapshot photography. Continuum, 24(2), 215-230.

This article is part of a larger project on the cultural history of Polaroid photography, drawing on research conducted at the Polaroid Corporate Archives of Harvard and at the Polaroid Company itself in

Waltham and Concord, Massachusetts. It aims to add to the understanding of the new social practices created by digital photography, but does so by studying the old technology and old business methods, neglecting the new projects. It also describes the Polaroid crisis.

I analyse the importance of speed in bringing the new social practices created by digital photography to the market at Polaroid and suggest that the main emphasis should be placed on the decisions of top managers who do not always take into account the activities of competitors in a complete market study.

3. Method and steps of the study

Based on the above research pertaining to prior studies, it can be said that the following methods are important for my study.

- The scope of the research should span from the foundation of the company to the bankruptcy, because the causes of the failure may be realised not only in the stagnant period but also in the growing period of the company.
- The history of Polaroid should be analysed in relation to multiple aspects: product R&D and marketing, finance, and succession of the head of the company.
- In order for Polaroid to be successful, they have continually improved their processes to meet ever-changing needs. It is always important for Polaroid to analyse thought-provoking discussions regarding competitor and cost-based competition, total quality management, value-based strategies, and new concepts for simultaneous design and manufacturing.
- In Polaroid's customer-orientated management system, it is important to analyse the results of the activities of three divisions (consumer, commercial, and new business) and the ability of the top management team to make decisions and implement long-term plan.
- It is important to analyse the operating and transaction costs affecting Polaroid's economic growth, taking into account the conditions of competition in the photography market at that time.
- From a marketing point of view, to ensure the revival of Polaroid in the digital technology market, the most important aspects to consider – in order to maintain its core strengths – the uniqueness of its product and the changes in the capital structure of the company.
- It is important to discuss the factors behind Polaroid's failure to restructure the business into a new environment with the strong influence of digital imaging.
- It is important to analyse the actions of the Polaroid company when it fully responded to the changes in digital imaging technology which

became the main technology in the photography market and greatly impacted the business of analogue imaging with films**.**

To achieve its goal, the scope of this study includes collecting information regarding the impact of risk management on the Polaroid case study, the results of any decisions made by a group of top managers, the processes of Polaroid's innovative activities, and the careful analysis of those processes. Therefore, qualitative research and case study analysis were adopted as the research methodology a methodology which provides rich data collection and rich analysis to introduce a new theoretical framework that cannot be found in previous studies. Many scholars have already emphasised the effectiveness of case studies (e.g., Eisenhardt, 1989; Pettgrew, 1990; Yin, 1994). Case studies are based on qualitative data and include a comprehensive examination of the relationship between the causes and outcomes of business failure in companies. Such studies constitute another example of a very effective research approach with which to explain deep insights regarding the company and the researchers' subjective interpretation of individual cases that cannot be obtained from statistical data.

Case studies are important not only in generalising through statistical methods, but also in generating new, creative theories. This article focuses on research questions related to the impact of risk management in the Polaroid case study and provides in-depth analysis and observations of how this company achieved unsuccessful change. The Polaroid case study, which is the subject of this research, relies on an analysis of the decisions of the top management team that led the company, an analysis of previous research on Polaroid, and internal data and statistical analysis (including corporate information prepared by the company for the general public). Based on the above research approach, firstly, the practical details of events, strategic decisions and the management system of Polaroid were compiled into a system. Subsequently, based on the analysis of Polaroid's case studies, an analysis of the company's risk management was carried out, as were observations.

I feel that the studying of factors that caused the Polaroid crisis will continue, and thus I believe that scientific work is still relevant and important when it comes to studying the gaps in risk management.

4. Contents of the study

When writing a research paper, it is vital to first clarify what a crisis is, based on the topic. Therefore, the first chapter discusses the nature and necessity of crisis management, the concept of crisis, the types and stages of crisis, and the causes of economic and financial crisis.

The second chapter describes, in detail, the features of industrial management during the crisis, the possibilities of effective use of endogenous factors, the possibilities of involving exogenous factors in ensuring the stability of enterprises, and the strategy of crisis management: its essence, concept, and development trends.

Additionally, this paper explores the reasons why Polaroid, a great company, faced bankruptcy despite knowing that its business would be affected by digital images and thus trying many projects with new technologies.

Furthermore, the new projects tested by the Polaroid company relied on the decisions made by top managers based on the wishes of consumers. Although the managers had high management obligations, the results show that some of the decisions made were not positive for the company's new projects. Indeed, there were clearly systemic problems in the management of Polaroid's managers. It is always relevant to study the causes of systemic problems when it came to the actions of Polaroid's managers. It is always relevant to study the causes of systemic problems in management decisions.

In the third chapter, based on previous studies of the Polaroid case, the history of Polaroid is described with reference to three periods: the initial period of starting the business, the period of growth, and the period when various concerns about bankruptcy were considered important to illuminate. This article covers numerous previous works on Polaroid cases, such as history books and management documents.

The fourth chapter analyses three aspects highlighted in Chapter 3, namely: product development history, financial results, and management change with clear evidence.

Based on the results of the fourth chapter, the factors that failed to successfully transform Polaroid's business are discussed. The discussion is followed by a consideration of the risk management implications associated with Polaroid.

Polaroid's cameras are considered a clear manifestation of social innovation, with journalists, historians, and insiders all writing about the company's processes and changes, from its emergence to the day it gave way to digital cameras. Although several factors have been mentioned in term of leading to the company's collapse, there insufficient – information regarding what actually happened, how it happened, who was involved, and in what context the events occurred. In terms of the business management system, data related to production processes, sharp turns in innovative change, and change of company presidents and their strategies, although taken from different sources, confirmed the above.

In total, I read and analysed approximately 50 periodicals, most of which were published in internationally recognised journals with some sourced from online databases. I also read two books on Polaroid, namely

“Instant the story of Polaroid” by Christopher Bonanos, and “Fall of an Icon: Polaroid after Edwin H. Land: An Insider's View of the Once Great Company” by Milton P. Dentch.

During the data analysis, a database was created containing the events that occurred, the sources that identified these events, and the comments.[1] As regards the emergence of Polaroid's SX-70 model, in the early stages of the crisis and after, the changes caused by economic and financial decisions as a result of managerial decisions in technical and social architecture were observed and given special attention. According to the process perspective (Mohr, 1982), each individual event is viewed as a significant event in a larger flow of events (Campbell, 1975; March et al., 1991; Van de Ven, 1992).[2] This “contextual” approach helped us to gain a deep and coherent understanding of the evolving processes. It was through this arrangement of events that Polaroid's failure was felt to have occurred. However, by analysing the tension that created the sequence of events, one becomes aware of the paradoxes associated with the implementation and commercialisation of innovative achievements. Opinions regarding decisions and market changes that caused the crisis are available and based on analysis.

[1] Miles and Huberman, 1984; Glaser and Strauss, 1967

[2] From transaction to transformation costs: The case of Polaroid’s SX-70 camera. Raghu Garud, Kamal Munir, The Pennsylvania State University, 430 Business Building, University Park, PA 16802-3603, United States, University of Cambridge, Judge Business School, Cambridge CB2 1AG, United Kingdom Received 4 September 2006; received in revised form 28 November 2007; accepted 24 December 2007, Available online 4 March 2008

CHAPTER 1. THE NATURE AND NECESSITY OF CRISIS MANAGEMENT

1.1. The concept of crisis

Today, “crisis” is probably one of the most frequently used words in everyday speech. It is employed to describe personal, private situations but, more frequently, is used to describe a state in which society as a whole or individual organisations and systems within it, find themselves, with potentially negative consequences. Still, despite its frequent use, the term “crisis” does not have clear or uniform conceptual content. Instead, there are numerous and often mutually divergent interpretations.

Etymologically speaking, the word “crisis” comes from the Greek language. In ancient Greece, the word “crisis” (κριςις) meant “judgement” or “decision” the decisive moment that determines the further positive or negative development of a thing or a situation. The essence of crisis is that one must decide, but that no decision has yet been made.

The COVID-19 crisis, which began in early 2020, has put countries in a much more precarious position. Businesses around the world have been forced to close their doors. Millions of employees were sent home, and the operating of important services was difficult. It is clear that even the best-managed enterprises can be in crisis due to external or internal events.

The global financial and economic crisis, which has gone down in history and still has negative effects, has seriously damaged the national economy of every country. In particular, the measures taken by the US and other countries whose economies were affected by the development of the crisis (UK, Germany, Japan, etc.) did not justify themselves. In this context, it can be said that the crisis has created a situation in which every economic system and the sectors in which it operates are left behind. A crisis in an industrial enterprise can be caused by difficulties in another industry or economic system as well as in the industrial sector itself. At the same time, all the causes related to other sectors that can lead to a crisis also lead to crises in industrial enterprises. When discussing the crisis concept, there is no materiality in front of man and there is no form of crisis. This abstract concept, which has no material form, has the power to cause socio-economic problems such as destabilisation of commodity-money relations, macroeconomic destabilisation, hunger, shortages, costs and other levels of hardship. When material things are used inefficiently or when they stand in one place, it can harm the life of a society, but there is also the idea of how something invisible can harm life. In this case, it is possible to understand that almost all abstract concepts can change a person’s life in one way or another with positive or negative features. For example, a shareholder who owns a manufacturing company will certainly be depressed when his/her

business goes backwards and the market value of his/her shares is lower than what when he/she bought them. In this case, too, abstract concepts demonstrate their power.

Studies show that people only remember a crisis when it happens. If it does not exist, no one will remember it. It should not be forgotten that this was also one of the causes of the economic crisis. This is an objective law. Therefore, when expressing crises in terms of stages, it can be seen that at least once the beginning of each period has passed. This is the nature of a crisis; a broader analysis of crisis as a concept shows that it is a process of events that results in both material and moral damage creates various difficulties for people. The nature of crisis and its definitions provide a unique understanding. When discussing the nature of crises, depending on their origin, the destruction of economic, political, and social systems and large economic and financial losses are understood. Therefore, a crisis is not a bright positive event in anyone's imagination, but creates negative impressions. In order to fully understand the nature of the crisis, it is necessary to consider the views and opinions expressed regarding that crises, as well as the definitions one by one.

Since the phenomenon of crises has attracted the attention of a number of researchers from different scientific disciplines and fields (economics, history, politics, medicine, ecology, psychology, etc.), it is clear that the concept of crisis, in addition to certain general characteristics (a situation that has reached a critical point and a turning point, either towards something better or something worse), is often used in quite specific meanings characteristic of different research fields. Thus, psychology talks about the crisis of personality, medicine about the crisis as the culmination of a serious disease (or crisis in a country's health system), and ecology thinks about a critical threat to the environment. Even within the bounds of the same science, such as economics, there are differences regarding the use of the concept; thus, macroeconomics talks about the crisis as a turn in a previously regular market cycle, and microeconomics about the crisis as a condition that threatens a company, i.e. an individual economic actor. In our efforts to harmonise various perspectives, the term crisis is usually used as a "universal box" i.e. as a concept that encompasses all types of negative events. In an even broader perspective, the term crisis is applied to situations that are unwanted, unexpected, unpredictable, and almost unthinkable, which cause disbelief and uncertainty. Referring to the numerous definitions in the International Encyclopedia of Social Sciences, James Robinson concludes that they are either overly precise and specific and thus not broadly applicable to different situations, organisations, and actors, or, conversely, they are overly broad, i.e. unbounded in their meanings, which makes it difficult to distinguish a crisis from a non-crisis. Kathleen Fearn-Banks defines crisis

as a "larger event with potentially negative consequences affecting an organisation, company or industry, as well as its target public, products, services or good name". For Hamblin, a crisis is an "urgent situation in which all the members of a group are faced with a common threat", whilst Pauchant and Mitroff see it as a "disruption that physically affects the system as a whole and imperils its fundamental premises, its autonomy, and essence"[3]. Fink claims that a crisis is any event that can escalate in intensity, become the focus of attention of the media and the government, obstruct normal business operations and negatively affect a company's image and profit. Moreover, Barton sees a crisis as a "larger and unpredictable event with potentially negative consequences. This event and its consequences may cause significant damage to a company, its employees, products, services, financial state, and reputation".[4]

Finally, Pearson and Clair define a crisis as an "event of small probability and great consequences, which imperils the life of an organisation, being characterised by unclear causes, effects, and means of solution, as well as a conviction that decisions must be made quickly"[5]. Paul t'Hart has given a contemporary definition of crisis, describing it as an "unpleasant event that represents a challenge for decision-makers, tempts them to act under conditions of imperilment, time constraint and unpreparedness". He also states that a crisis is a "serious threat to the basic structures or fundamental values and norms of a social system, which, under conditions of time pressure and very uncertain circumstances, demands the bringing of critical decisions". This definition has two important characteristics. Its significant advantage lies in the fact that it can be applied to all types of disruptions (ecological threats, breakdowns of informational-communications systems, economic crisis, intrastate conflicts, jail mutinies, regional wars, factory explosions, and natural catastrophes). This very characteristic demands a multidisciplinary approach in understanding crises. Secondly, such a definition directs our attention towards decision-making: crises are seen as an opportunity to make critical decisions. Even though the suggested definition is relatively the most acceptable, it is, nevertheless, not totally unquestionable.

In the National Encyclopedia of Uzbekistan, the word "crisis" is defined as a setback in development. It would not be incorrect to say that

[3] Crisis Prone Versus Crisis Avoiding Organizations Is your company's culture its own worst enemy in creating crises? Thierry C. Pauchant, Ian I. Mitroff First Published March 1, 1988 Research Article https://doi.org/10.1177/108602668800200105

[4] L. Barton, Crisis in Organizations: Managing and Communicating in the Heat of Chaos, South-Western Publishing Company: Cincinnati, OH, 1993, p. 2

[5] C.M. Pearson, J.A. Clair, "Reaffirming Crisis Management", Academy of Management Review 23, 1998, p. 60

this definition is the most scientific of the crisis definitions.[6] This is because the crisis definitions given by scientists are one-sided, adopting only the economic and financial point of view. There is still no single consensus in the modern literature on the state of crisis in the process of socio-economic development. There is a perception that crises occur in a market economy but do not exist in an administrative system. Some people discuss economic crises not just at the national level, but also at the micro level, and explain that corporate crises are problems, mistakes and shortcomings in management. Such notions are misconceptions; if the opinions are considered correctly and the situation is evaluated from this point of view, then the development of the crisis and the strategy of the company's management cannot be predicted. The concept of crisis is intertwined with the concept of risk, the latter of which has a multi-faceted impact on the way management decisions are made.

A sudden and unexpected event leading to major unrest amongst the individuals at the workplace is termed an organisation crisis. In other words, a crisis is defined as an emergency situation that disturbs the employees whilst also leading to instability in the organisation. A crisis affects an individual, group, organisation, or society as a whole. The characteristics of a crisis are as follows:

- A crisis is a sequence of sudden disturbing events which harm the organisation.
- A crisis generally arises quickly, with those around given short notice.
- A crisis triggers a feeling of fear and threat amongst the individuals.

A crisis can arise in an organisation due to any of the following reasons:

- Technological failure and the breakdown of machines lead to crisis. Problems on the internet, corruption of the software, and password errors all result in crisis.
- A crisis arises when employees do not agree with each other and fight amongst themselves. A crisis also arises as a result of boycotts, strikes for indefinite periods, disputes, and so on.
- Violence, thefts, and terrorism at the workplace result in organisational crises.
- Neglecting minor issues, in the beginning, can lead to a major crisis and a situation of uncertainty at the workplace. The management must have complete control over their employees and should not adopt a casual attitude at work.

[6] National Encyclopedia of Uzbekistan. Volume 4. Zebuniso-Konigil. Editorial Board: M. Aminov, T. Daminov T.: - National Encyclopedia of Uzbekistan. State Scientific Publishing House, 2002. - 704 p. 197.

- Illegal behaviours such as accepting bribes, fraud, and data or information tampering all lead to organisational crisis.
- A crisis arises when an organisation fails to pay its creditors and declares itself bankrupt.

Representatives of the Russian School of Crisis Management have also commented on the crisis concept. According to E.A. Babushkina, O.Y. Biryukova, and L.S. Vereshagina, a crisis is a process that has the maximum opposite effect on the life of the enterprise, and is unique to the capitalist system.[7] Similar views have been expressed by E.P. Kharkovskaya and B.E. Brodsky: a crisis is the aggravation of the enterprise's internal production and socio-economic relations with the external environment.[8] A crisis can be reflected in the development and recovery of the enterprise, as well as in the expansion of production. John Von Eiken's description of a crisis differs from that of other British economists. He described the crisis concept in a numerous way.

Definition 1: A crisis is a dangerous unstable situation and a state of affairs in which the event has the greatest influence on the development of events for better or worse;

Definition 2: A crisis is any adverse event that affects an organisation's financial position or reputation;

Definition 3: A crisis is a recurring situation that forces an enterprise's management and partners to make decisions about opening up opportunities for themselves. It is clear from the above definitions that, although the said definitions differ, their essences are united by a single idea.[9] However, it should be noted that the given definitions analyse the crisis concept from different viewpoints. Certain aspects can be observed when analysing the definitions. For example, with regard to Babushkina E.A., Biryukova O.Y., and Vereshagina L.S, in their definitions, a crisis is described as a phenomenon that occurs only in the capitalist system and is alien to the socialist economic system. The reason for this view is the notion that state-owned enterprises will always be under state control and will never be in crisis. However, there is also a crisis in socialist systems, as was pointed out by one of the founders of the socialist system, K. Marx, also pointed out in his theoretical curve of the Economic Cycle. In other words, the economy has proven that it will inevitably experience crises after reaching a certain peak. So, if there were no crises in the socialist system, Marx would not have confirmed this idea. Only in the system, unlike the

[7] Babushkina, Y.A., Anti-crisis of management / Ye.A.Babushkina, O.Yu.Biryukova, L.S. Vereshagina. - M.: Eksmo, 2008. – 160p.
[8] Yarkovskaya E. P. Anti-crisis management: Textbook - ed., - M.: Omega - 2007. – p. 365.
[9] Von Eyken Dj. Crisis - stay alive! Handbook for CEOs, Entrepreneurs and Business Owners / John von Aiken. - M.: Alpina Business Books, 2009.- p. 352.

market economy, does the state first come to the brink of crisis.[10] It should also be noted that the above-mentioned authors expressed the view that a crisis would never occur in subsistence farming. However, the crisis concept is also described by them as a process that has the opposite effect on economic activity. Some many forces and factors oppose the activities of the subsistence economy; it is sufficient to give an example of natural factors. It can be concluded that, although the first part of the definition of the crisis concept was given purposefully, in their analysis, the scientists did not take into account the factors influencing crises. E.P. Kharkovskaya and B.E. Brodsky, in contrast to the above scientists, described a crisis in terms of external and internal factors that affect it, explaining that it leads to the aggravation of the overall relationship of the enterprise.

An analysis of this definition suggests that the idea is one-sided, because the crisis concept is defined in terms of economic and financial aspects. However, the crisis in the economic activity of the enterprise does not arise only as a result of economic and financial factors, but also as a result of the consequences of such factors. Indeed, it turns out that the definition is focused on these consequences. Although the consequences of a proper crisis can be perceived as dangerous in terms of economic and financial damage, the psychological consequences should also be borne in mind. Therefore, a crisis is a whirlwind of dangers that can only cause harm, regardless of its form. There are also benefits to a crisis, which will be discussed later. John Von Eiken is one of the most prominent scientists in the business activation and entrepreneurship field, boasting. 17 years of experience in developing enterprise restructuring strategies.[11] He explained several definitions with an analysis, which can be considered as the most accurate ideas of our time. In all his descriptions of the crisis concept, he has taken into account its origin, the influence of the factors, and the consequences. At the same time, it is noteworthy that a crisis is not only a bad situation, but also a chance for managers and employees to exploit opportunities. A crisis has additionally been described as a process that will accelerate the development of science and technology in the future and help employees to demonstrate their potential at a high level. Similar economists have given many definitions of the crisis concept, each of which, by its very nature, represents one or another aspect of the risk that affects the economic activity of the enterprise.

Research shows that, in fact, a crisis is a setback in the development of an object or subject that is developing in a vital system. In a crisis, a moving body will inevitably disappear if it cannot recover. A crisis can

[10] Babushkina, E.A., Anti-crisis management: lecture notes / E.A. Babushkina, O. Yu. Biryukova, L.S. Vereshchagin. - M.: Eksmo, 2008.-p. 160 - (Pocket exam)

[11] Von Aiken, J. Crisis - stay alive! Handbook for CEOs, Entrepreneurs and Business Owners / John von Aiken. - M.: Alpina Business Books, 2009.- p. 52.

occur suddenly or at any stage of the activity and process for known and unknown reasons and push the said activity and process away from the direction in which they were moving. This feature also makes the crisis concept a source of danger. No economic system is complete without crises. With this in mind, it is necessary to constantly develop additional measures with which to combat crises. In term of assessing a crisis in the economic cycle, it can occur at any stage of the said cycle, as well as during a period of recovery, upswing or recession. By its very nature, a crisis is reflected in each chart as a downturn. From the viewpoint of this science, amongst the concepts related to a crisis, such concepts as bankruptcy, economic insolvency, and loss-making work are also used.

When evaluating the process of anti-crisis management from the economic viewpoint, first of all, the financial and economic rehabilitation of economically insolvent and loss-making enterprises is the driving force of this method of management. In the legislation of the Republic, economic insolvency is used in the same way as the concept of bankruptcy. This can be seen from the definition given in the first part of Article 3 of the Law "On Bankruptcy": bankruptcy (economic insolvency) - recognised by the economic court is designed to satisfy creditors' claims on the debtor's monetary obligations and inability to satisfy and (or) fulfil its obligation on mandatory payments in full. In other CIS countries, including the Russian Federation, these concepts are synonymous.[12] Research has shown that bankruptcy has two meanings in practice. On the one hand, it is used in relation to a set of procedures pertaining to the rehabilitation or liquidation of economically insolvent enterprises, and, on the other hand, it is employed to assess the status of unpromising enterprises during the liquidation period. The term bankruptcy refers to a system of transactions and the state of an unpromising enterprise. Some scholars have argued that the terms "poverty" and "bankruptcy" should be distinguished from those not related to criminal law. O. Bulko and L. Shefchuk[13] forwarded belief that the concepts of insolvency and bankruptcy should be differentiated according to the sign of insolvency. According to Le Hoa, poverty and bankruptcy should not be understood as synonyms. Insolvency is the inability of a debtor to pay his/her debts on time. Constant and ongoing insolvency leads to absolute insolvency. In that case, the debtor will not be able to restore his/her financial position, and will also be unable to continue his activities, which is not purposeful. Such a helpless organisation will go bankrupt. Therefore, according to Le Hoa,[14] bankruptcy is a decision made by the debtor to be

[12] Baldin K.V., Bystrov O.F. and Rukosuev A.V., Anti-crisis management: macro and micro level: Textbook. - M.: Dashkov and Co, 2005.- S. 316.

[13] Bulko O. and Shevchuk L. Bankruptcy legislation. Variant of Belarus // Economy-law. - Moscow, 1992. - No. 5. - from. 42.

[14] Le, X., The new law of the Russian Federation on insolvency (bankruptcy): the view of a foreign economist // Economics and Life. - Moscow, 1998. - No. 1. - from. 20.

liquidated. B. Klob suggests that the concepts of insolvency and bankruptcy ough to be formed as follows[15]: — Recognition of insolvency by an arbitral tribunal or failure to fully satisfy creditors' claims and using external management procedures against the debtor in order to restore its solvency, making mandatory payments. Bankruptcy – arbitration is the recognition by the court or the declaration by the debtor of the inability to fully satisfy creditors' claims on monetary obligations and the application of a selection procedure against the debtor in order to satisfy creditors' claims within the debtor's existing assets fulfilment of payment obligations. Therefore, the above-mentioned group of authors considered insolvency as insolvency for ordinary payment, and bankruptcy as – insolvency recognised by the economic court. Therefore, this group of authors suggested that insolvency should be viewed as insolvency (inability to fulfil obligations), and bankruptcy should be recognised by the court. In our opinion, this view is controversial, since it stems from economic goals rather than legal ones. As a result of the company's bankruptcy, there is a need for pre-trial rehabilitation.[16]

Economic insolvency refers to the decrease in the financial results, economic condition and solvency of an enterprise which occurs when that enterprise fails to meet its obligations on time. In fact, insolvency creates economic hardship. In practice, an organisation is referred to as an economically insolvent enterprise after insolvency, but at the same time the term bankruptcy is still used. Therefore, it is necessary to develop clear criteria for how the category of economic insolvency differs from the category of bankruptcy in terms of time of occurrence and content. The distinguishing features of the categories of insolvency and bankruptcy are as follows:

- Arbitral tribunal ruling on the presence of signs of bankruptcy in the absence of the ability to restore the solvency of the enterprise after the application of revitalising procedures;
- A ruling of an arbitral tribunal on civil law when describing the financial condition of an enterprise as having lost all solvency.

Insolvency then leads to economic insolvency, financial instability, and an imbalance of enterprise resources. If the enterprise falls into this state and rehabilitation is not possible, then liquidation procedure is applied. This can also be seen in Figure 1.1.1 below.

Losses represent a loss of resources in an enterprise during the reporting period. Losses are the costs incurred by producing a product in

[15] Klob, B., Corpus delict and the concept of bankruptcy // Legality. - Moscow, 1998. - No. 1. - from. 48-49.

[16] Signs of bankruptcy are non-fulfillment by the debtor-enterprise of the relevant obligations and (or) payment obligations within three months from the date of occurrence, the debtor's ability to meet creditors' claims on monetary obligations and its obligation to make mandatory payments if not able to perform.

excess of the proceeds from the sale of that product in the market. Costs are determined by the number of resources a business expends, and the return will be in the form of income. An enterprise uses its resources in a risky way to make a profit. The essence of the loss is the return of the spent resources relative to the spent state. If the issue is approached dialectically, it can be concluded that the wealth of society does not decrease in this case. However, if the lost resource is not returned to the enterprise, given that the product sold is undervalued by consumers, it can be said that when the enterprise suffers, the resources are unevenly distributed amongst the members of society and negatively affect market competition. The cause of damage is not only the sale of cheap products, but also the fact that the finished product can remain in the warehouse, rot, and lose its naturalness before reaching the consumer. In this case, the depletion of enterprise resources in the form of losses leads to a decrease in the wealth of society. Therefore, in the analysis of the insolvency and loss-making performance of enterprises, it is important to assess the amount of damage and lost resources, rather than their number.

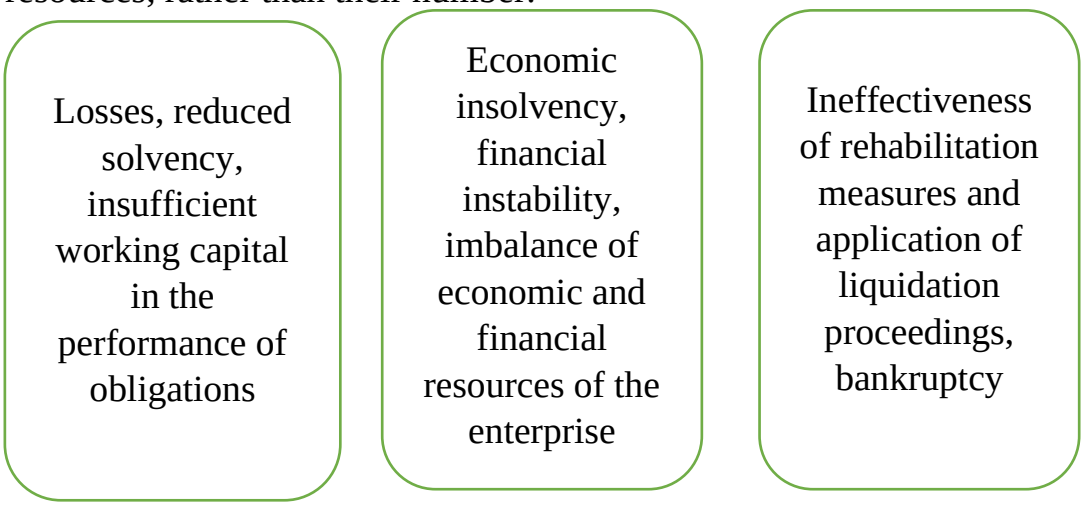

Figure 1.1.1. The sequence of stages of the origin of the bankruptcy of industrial enterprises[17]

At the same time, the analysis of the amount of damage makes it easier to predict the future state of the enterprise and demonstrates the effectiveness of the management decision-making process. As mentioned, the steady decline in economic resources due to the loss of industrial enterprises indicates that the company is experiencing financial difficulties. An increase in accounts payable necessitates bankruptcy proceedings. Economic poverty is the product of loss-making work due to the fact that, as the amount of damage incurred by the enterprise increases, so does the solvency. Analysis of this situation using the formation of enterprise capital makes it possible to determine the probability of an economic crisis. The

[17] Compiled by the author based on information from https://zelengarden.ru/2-foto/prezentaciya-vidy-krizisov.html

impact of losses on economic insolvency depends on the source through which the company's capital is generated. From the economic analysis viewpoint, the source of formation of the total economic resources of the enterprise can be divided into two major groups. Signs of economic insolvency arise from the proportionality of these groups (Figure 1.1.2).

As shown in Figure 1.1.2, economic insolvency in industrial enterprises is caused by loss-making operations. However, the threefold impact of losses on enterprise resources determines the degree of economic insolvency and the likelihood of a crisis.

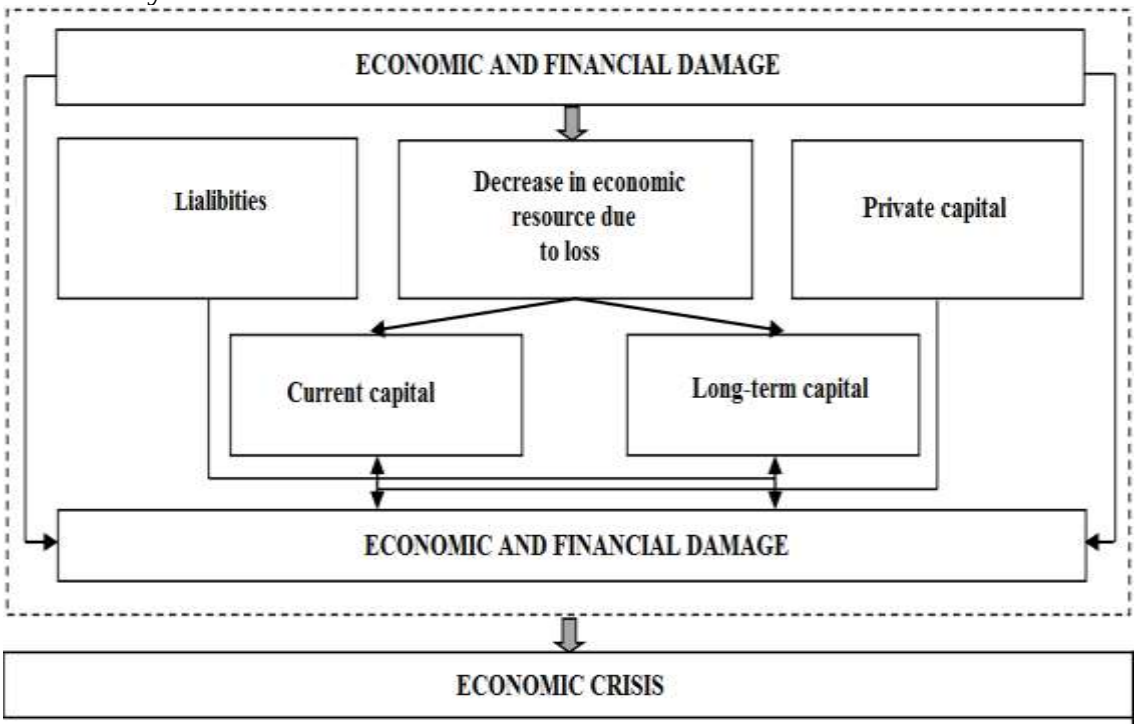

Figure 1.1.2. The structure of the crisis environment as a result of economic and financial damage in an industrial enterprise[18]

In the first case, if it is assumed that the bulk of the capital of an industrial enterprise will usually consist of long-term assets, then foreign-borrowed funds will be the basis for the formation of more working capital. Regularly low-profit or loss-making operations, as mentioned above, provide an outflow of economic resources to the enterprise. As long as private capital does not change, foreign capital will naturally decrease. As a result, the funds raised in the enterprise are reduced, as is the solvency, whilst the overdue part of the creditor's debt appears, and there are signs of economic insolvency in the enterprise. In the second case, if industrial enterprises build their long-term assets by attracting foreign capital and use their own funds as working capital, the reduction in losses will affect their capital and reduce it. Unlike in the first case, during the process, economic instability is caused by the outflow of the enterprise's own funds. In the

[18] Compiled by the author based on information from https://zelengarden.ru/2-foto/prezentaciya-vidy-krizisov.html

third case, if it is not possible to identify the sources of assets located in the enterprise, the loss generally reduces the assets again, as well as the solvency. In each of these cases, given the periodic decline in the inflow of assets relative to the outflow, there is economic insolvency in the enterprise, regardless of the reduction of its own funds or the reduction of borrowed funds, and the enterprise, in any case. This suggests that raising funds from outside the enterprise is a misappropriation, and those funds must be repaid regardless of whether the enterprise is profitable or unprofitable. Economic hardship occurs when an enterprise attracts foreign capital. However, it should be noted that, in the first case, the probability of bankruptcy is higher than in other cases, since the payback period of working capital is much shorter than in the long run. The loss-making operation of the enterprise reduces the chances of that enterprise returning. Therefore, the probability of bankruptcy is reduced if the funds raised from abroad in the process of establishing the capital of the enterprise are used to invest in long-term assets and the enterprise's own funds are used to form working capital.

1.2. Types and stages of the crisis

The effective development of crisis management in enterprises and its outcome directly depend on the degree to which the type, description and characteristics of the crisis are determined. This is due to the fact that correctly identifying the type and nature of the crisis, diagnosing the economic activity of the enterprise and helping to find the source of the problem are all crucial steps. Proper identification of the problem will increase the effectiveness of subsequent troubleshooting. For example, being able to pinpoint the exact nature of a patient's illness requires experience and knowledge from the physician, whilst at the same time, it is important to prepare the ground for a quicker treatment of the disease during the treatment process. If the doctor misdiagnoses, then the disease process will take longer and may worsen. There is still no single consensus in the modern literature on the state of the crisis in the process of socio-economic development.

There is a perception that crises exist in a market economy but do not exist in an administrative system. Such notions are misconceptions. If opinions are correctly calculated and the situation is evaluated from this point of view, then the development of the crisis and the strategy of the company's management cannot be predicted. The crisis concept is intertwined with the concept of risk, the latter of which has a multi-faceted impact on the way management decisions are made. With regard to the crisis concept, a crisis is of great importance not only as a cause but also as a consequence. The consequences of a crisis are related to two factors: the causes and the possibilities of managing the development of the crisis. The

various consequences of a crisis determine not only its nature, but also the nature of the crisis management that can mitigate or exacerbate the crisis. Management capabilities in these relationships depend on professionalism, the art of management, a description of motivation, an understanding of cause and effect, and the goals of responsibility.

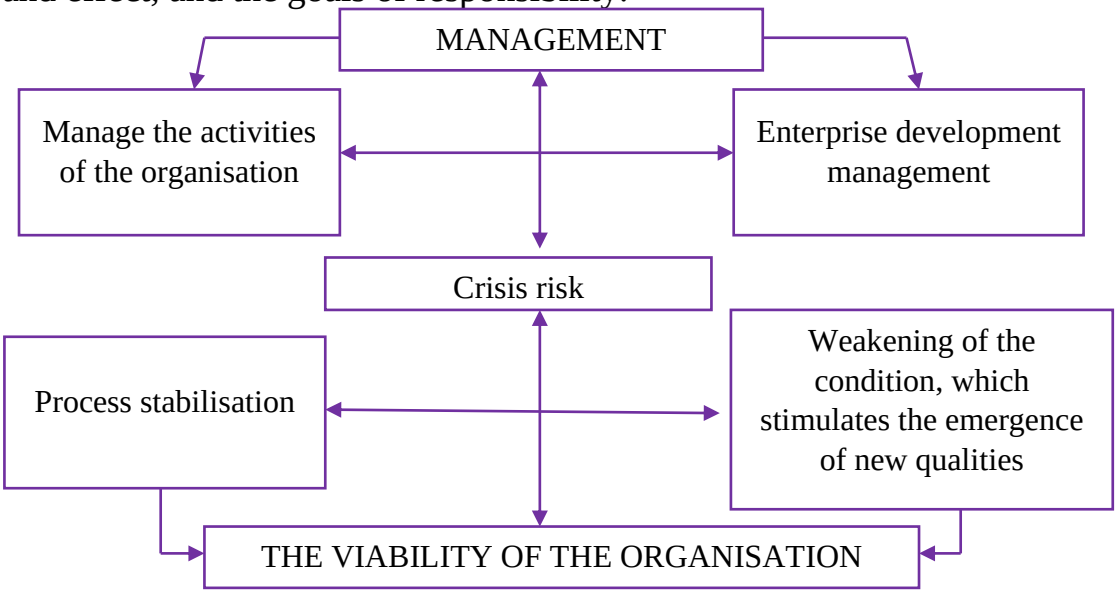

Figure 1.2.1. Risk of crisis in the socio-economic system of the organisation[19]

Being able to correctly identify the types of crises and differentiate them by type simplifies the anti-crisis management process and accelerates the recovery of insolvency. In practice and in theory, there are many types of crises, which can in turn be divided into specific groups, and their characteristics determined. However, it should be noted that there is some confusion surrounding the division of crises into groups, i.e. the causes of the crisis become mixed up, regardless of the cause and effect. Practice shows that crises are different, not only in terms of their goals and consequences, but also in their nature. If the nature of the crisis is clear, then the chances of weakening it and reducing the time and cost needed to ensure security will increase.

Studies show that crises are divided into the following types of factors that lead to them:

1. Political crises
2. Social crises
3. Natural crises
4. Economic crises

[19] Compiled by the author based on information from https://zelengarden.ru/2-foto/prezentaciya-vidy-krizisov.html

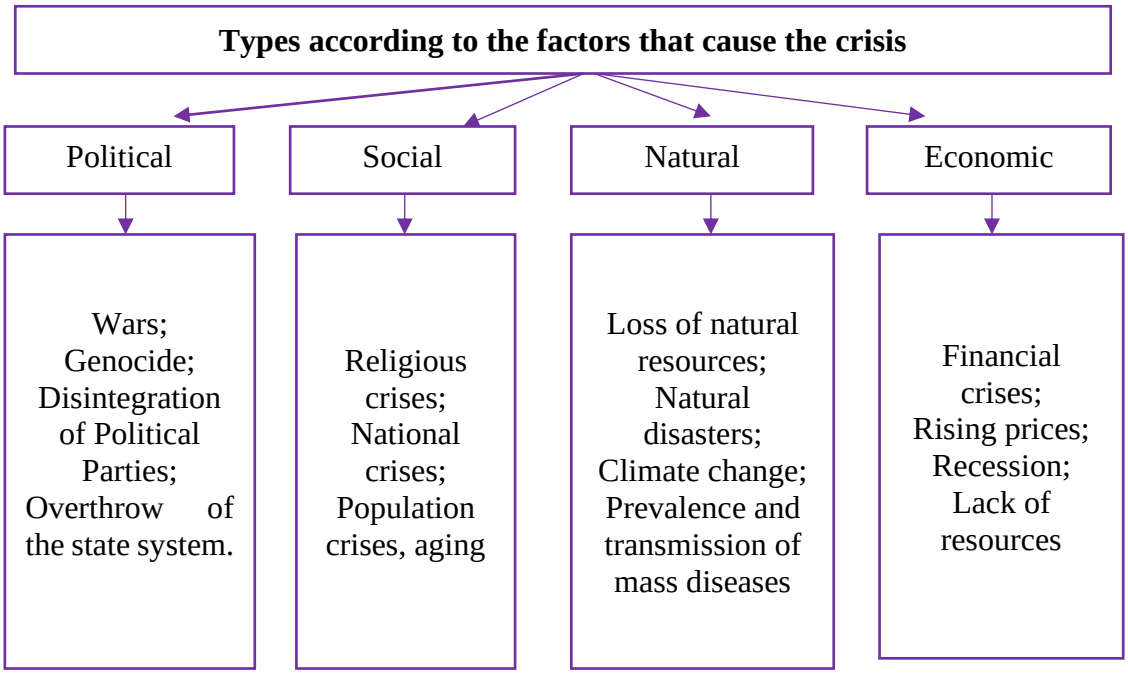

Figure 1.2.2. Categorised according to the factors that cause the crisis[20]

The above groups are the largest in terms of the occurrence of crises. These types of crises can lead to crises in other activities. It is clear that they, in turn, can be divided into other special types of crises which can be approached at the macro and micro levels. In general, they are interpreted as follows:

Political crises occur at the macro-level and are associated with the weakening of public policy. Political crises result from major wars, the destruction of nations, the disintegration of ruling parties, and the overthrowing of the state. The subject of a political crisis may not disappear, but its dominance will weaken and the sphere of governance will narrow. This can include:

- wars;
- genocide – the extermination of an entire nation;
- fragmentation of parties;
- overthrowing of the state system.

Social crises are increasingly related to the secular and religious views of populations, nations and peoples. As a result of social crises, people turn away from certain religions and switch to another, whilst nations forget their traditions, causing their language to die; in term of the population, there is – an increase in ageing, a decrease in fertility, and problems such as rising mortality rates. These kinds of events can include:

- religious crises;
- national crises;

[20] Compiled by the author based on information from https://zelengarden.ru/2-foto/prezentaciya-vidy-krizisov.html

- population crises, ageing.

Natural crises are formed and arise against the will of man. There are only certain natural crises that can be caused by man, but they cannot be stopped or controlled. Natural crises include:

- loss of natural resources;
- various natural disasters;
- climate change, etc.

Economic crises. Scientists A.V.Vahobov, N.H.Jumaev and E.A.Hoshimov expressed their views on economic and financial crises. In their view, the economic crisis is tantamount to a recession. There are two types of crises in terms of scale: macro and micro-crises. Macro-level crises begin with a large ― BOOM when problems in finance and economics are made invisibly when the decisions are made in contrast to real economic laws. This can be seen by studying the world's largest crises. Today, there are differences of opinion amongst scholars as to which countries experienced the first crises and the mechanisms for overcoming them.

Some economists[21] attribute the first crisis to ancient Rome 2,200 years ago, whilst others attribute the first crises to the US in the 19th century. However, one point must be admitted: if history is to be deepened, the expulsion of Adam and Eve from heaven can be called the first crisis of humanity. But such an understanding of the issue only complicates matters. Therefore, when studying the history of crises, it is appropriate to start with the 1857 US crisis. This view is confirmed by data from the magazine "Financial Director". Thus, the first crisis arose in the fall of 1857 in the US as a result of declining stock market quotations. The crisis affected the UK that year, and Germany the following year. The cause of this crisis is also related to the banking system. In a short time, approximately 200 banks were closed for 6 months. On October 13, 1857, the banks operated from morning to noon and declared themselves bankrupt in the afternoon. The light industry and the machine-building industry also suffered the most from the crisis. By the end of 1858, the US economy was recovering from the crisis. British banks initially tried to double the refinancing rate to escape the crisis, but when this failed, they began issuing additional banknotes, and, by the fall of 1858, they had managed to dig themselves out of the crisis.

A long crisis. In May 1873, as a result of stock market riots, the greatest crisis in Vienna's history began. The crisis was caused by the rapid growth of the property market in Austria-Hungary and Germany. Homebuilders were given large amounts of credit but were unable to repay it in the end. The panic that began in European stock markets spread to the

[21] Popov A. Financial crisis 2009. How to survive? / A. Popov. - M.: AST; SPb.: Astrel-SPb, 2009. p. 218 [6].

US and subsequently to Russia. In the late 19th century, the governments of Austria-Hungary, France, and Germany provided funding for the capital. After that time, separate banks were involved in the project for construction work, and mortgage securities were issued and put up for sale for the first time. Debts of construction companies increased rapidly, and with it the market prices of real estate. On Friday, May 9, 1873 (Black Friday) prices on the stock exchange fell sharply. By the fall of 1873, the unemployment rate in Europe and the US had risen to 25 – 30%; there was panic amongst the population.

In overcoming this financial crisis, one of America's leading bankers, J. P. Morgan played an important role. He handed over $62 million worth of gold to the government, which eased the crisis and led to the formation of new corporations. In 1876, for example, Thomas Edison opened his own labouratory. A few years later, in 1896, the Edison General Electric Company was formed, which went down in history as the Dow Jones Industrial Average.

The Great Crisis. There is no single opinion on the causes of the Great Crisis. The main reasons are:

- disproportionality between money and commodity mass;
- stock bubbles (excessive investment in production);
- an increase in customs duties on imports and a consequent decrease in the solvency of the population.

The worst-hit countries were the US, the UK, Germany, France and Canada. The crisis intensified to such an extent that in 1933, one in six people lost their jobs. Industrial production fell 3 to 4 fold. The Great Crisis covered the years 1929 – 1933. The main measures implemented to overcome the crisis were government support for industry, the reduction of the number of banks, and the depreciation of the dollar.

Energy crisis. The biggest energy crisis occurred in October 1973, when Syria and Egypt went to war with Israel. OPEC countries have reduced oil production and raised oil prices by 70% for the US, the Netherlands and Israel's allies. The number of unemployed in the US during the period was 15 million. From that time onwards, retraining and advanced training courses were organised. The work was first initiated by John Sperling a university lecturer. Moreover, 85% of the US population owned a private car during this period. As a result, the lines of cars at gas stations stretched for miles. Austria also banned cars in the Federal Republic of Germany.

"Black Monday". On October 19, 1987, the Dow Jones Industrial Average fell sharply. As a result of the dreaded wave of the American stock market, the overall capitalisation of a number of large multinational companies declined and there was a fall in stock quotes across Australia, New Zealand, Hong Kong, South Korea and certain Latin American

countries. The next day, the index rose 12% and continued to rise steadily, but the country's financial sector collapsed on the day of the crisis. As a result, 15,000 brokers and traders lost their jobs. After this time, the Dow Jones index returned to its previous position only in 1989. In the 1990s, there were several other major crises in Russia and Asia, the main reasons for which were the damage to the banking system and that to the financial system.

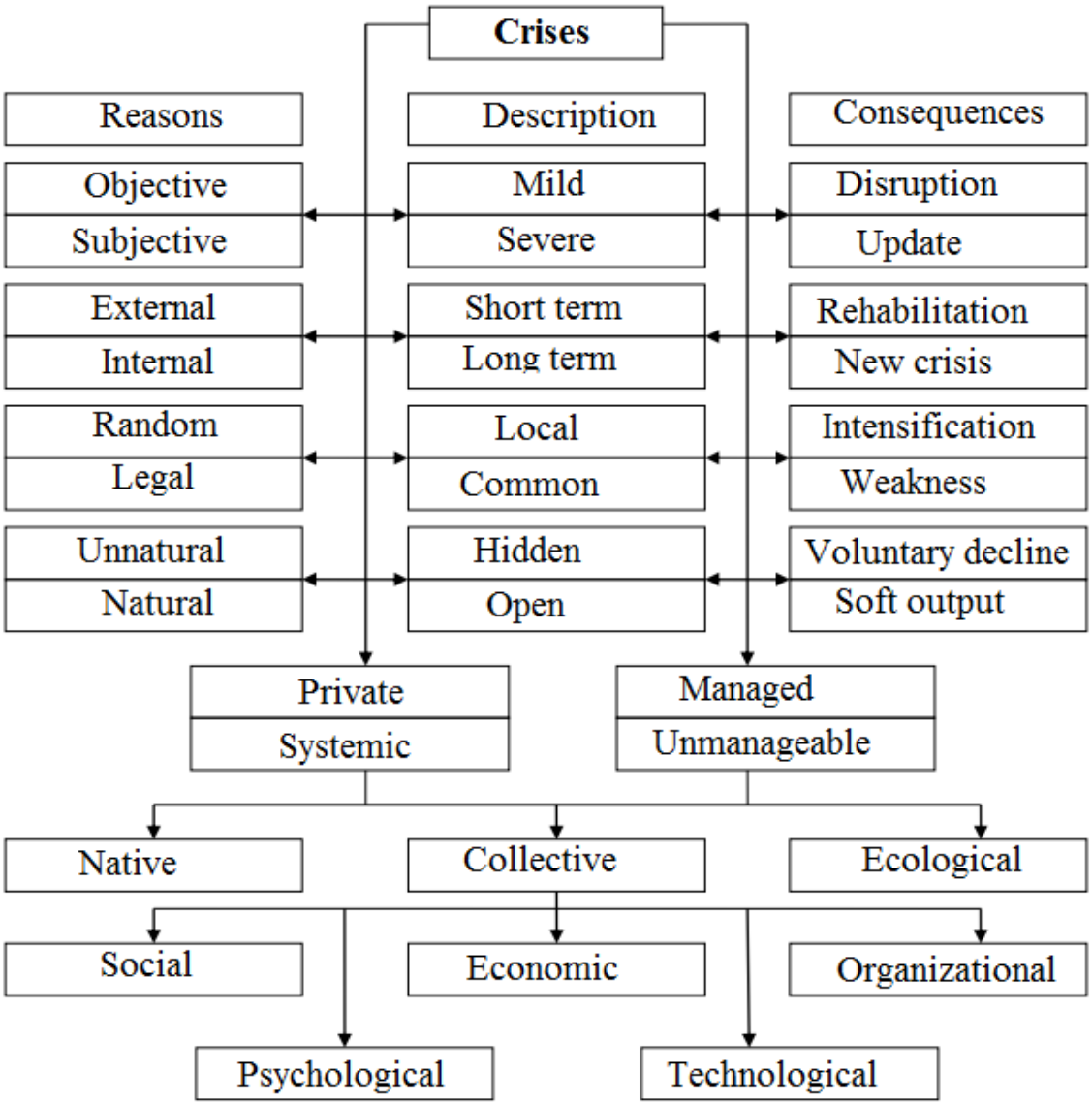

Figure 1.2.3. Classification of crises[22]

Micro-crises also occur on a small scale, unlike macro-crises, although they occur over a period of time. Micro-crises are mainly characterised at the level of crises of enterprises, organisations and firms. They primarily fall into the economic type of crisis and end in material damage to the object, regardless of the cause. Micro-crises include:

[22] https://cspsid-pechatniki.ru/raznoe/vidy-krizisov-v-psixologii-psixologicheskie-krizisy.html

economic collapse of enterprises; structural change; and liquidation proceedings, such as merging with other companies.

The damage from micro-crises may not be as great as that from their macro-scale counterparts, but if the former are not addressed in time, they will inevitably escalate into macro-level crises. Therefore, as soon as a symptom of a crisis appears, it is necessary to take measures to combat it. In fact, the development of immunity against a crisis in any enterprise makes it easier to deal with it, even if it does not pose a threat. Micro-crises often occur as a result of incorrect decisions. The extent of the crisis is determined by the level and status of the decision. According to Professor E.M. Korotkova's textbook, Crisis Management, published in Moscow, the types and consequences of crises depend on the cause. Such categorisation of crises is undertaken according to their nature, causes and consequences (Figure 1.2.3).

The figure shows that the effective organisation of anti-crisis management depends on the causes, descriptions and consequences of crises. A crisis is formed as a result of a cause, then there is the character, and the cause and the description are the result of a mutual crisis.

The figure shows the causes of a crisis in general order: objective, subjective; internal, external; random, legitimate; unnatural and natural. As a result, depending on the nature of the crisis: light, heavy; short-term, long-term; local, general; can be hidden or open. The severity of the crisis depends on two previous-mentioned factors.

By explaining the crisis in this way, an attempt has been made to show that any form of crisis can have mild or severe consequences. Indeed, the purpose of studying the crisis concept is to make it easier to deal with crises. The diagram also lists the types of crises, which are said to be manifested as indirect causes, descriptions, and consequences. Natural, collective, and ecological types of crises are presented first. Collective crises are divided into social, organisational, economic, social, psychological and technological groups. In Figure 1.2.3, the crisis is approached from a general perspective, not at the macro or micro level.

1.3. The causes of the economic and financial crisis

An economic crisis is a state of imbalance between supply and demand for goods and services. The consequences of such a crisis include a decline in real gross domestic product (GDP), mass bankruptcy and unemployment, and declining living standards. An economic crisis (recession) can also be described as a state of the economy in which the absolute volume of GDP of the country decreases for at least two quarters in a row. The economic crisis is a phenomenon typical of a market economy and recurs periodically. In economic theory, this kind of crisis is a sudden

deterioration of the country's economic situation, which is manifested in a sharp decline in production, disruption of production ties, bankruptcy of enterprises, mass unemployment, devaluation of the national currency, capital flight, and decline in living standards. A financial crisis is a term used to describe a sudden drop in the value of a particular financial instrument, as well as a lack of money. Additionally, the term is employed to describe the “burst of soap bubbles” in the financial market, especially in the stock market, which occurs as a result of the unbalanced formation of the price of financial assets.

The financial crisis is a systemic disruption of the public financial mechanism, which includes a significant increase in inflation, instability of stock prices, a sharp mismatch between budget revenues the enterprise’s expenditures, instability and decline in the exchange rate of the national currency, and economic entities. There is an increase in the problem of insolvency, the rapid outflow of capital from the country, and the non-compliance of the money supply with the requirements of the law on money circulation. A financial crisis is declared when there is a more than 20% decrease in the size of the stock market a doubling of interest rates in the interbank credit market, and a greater than 10% decrease in the national currency exchange rate.[23]

Thus, economic crises – include the monetary, financial, budgetary and economic sectors of the state, as well as the production and services sector of enterprises, alongside the decline in the end result and solvency levels of the state and the economy of the enterprise. Economic crises are explained by the effects of rising interest rates, declining and rising prices for consumer goods, shortages of material resources, declining levels of production, recession, disproportion, and other declining overall economic performance. They occur in the context of the main problem of the economy “scarcity of resources and infinite needs”. This is due to the fact that the state and its subjects, operating in a situation of resource scarcity, constantly face various problems and obstacles from society.

Facing these challenges is a crisis and failure to escape it will prolong the crisis. Economic crises include:

- Financial crises are characterized by an increase in the money supply, a state budget deficit, a fall in the price of securities, a decline in investment, and a fall in the value of the currency;

- Crises caused by rising prices are related to a decrease in the ability of the population to pay, as well as to real incomes, which leads to a decline in living standards. At the same time, the price of raw materials will rise, and this is also the case for market prices, due to the increase in the cost of

[23] Vahobov, A.V., Jumaev, N.H. and Hoshimov, E.A., “The global financial and economic crisis: causes, features and ways to mitigate the impact on the economy”. T.: Akademnashr-2009. - pp. 23-24.

manufactured products. Such crises are more severe in a market economy than in other countries. The reason is that the existence of free-market prices deprives the state of the opportunity to control prices;

- Disproportion is a violation of the equilibrium in the economy, with an example being the loss of the connection between commodity and money and the growth of commodities relative to money or money multiplied by commodities. At the same time, if money grows relative to commodities, then prices will rise, as will inflation. If the commodity rises against money, there will be deflationary processes in society. Turnover is declining and it can eventually lead to rising unemployment and declining incomes. Therefore, efforts are made to keep all indicators in the economy in order:

- A recession is a reduction in a country's GDP or other output and services for two quarters or 180 days. A recession occurs when unemployment rises and production capacity is under utilised;

- Crises caused by a shortage of material resources. Such crises are common in the world economy. As a result, the cost of scarce resources increases or companies that use them in their production processes are forced to shut down;

- Insolvency is a concept associated with a crisis in an enterprise, which arises when it is impossible for that enterprise to fulfil its obligations;

- Bankruptcy occurs when companies are unable to cover their debt obligations with their assets. Bankruptcy is a very broad concept that applies to economically insolvent enterprises around the world. In anti-crisis management, it is ineffective to deal with a crisis in the enterprise without finding the cause and identifying its type. Thus, the first condition of crisis management is to study its cause. Many economists have blamed marketing failures crises. Disruption or interruption of the exchange of information between the production and market activities of the enterprise can lead to some degree of problems. These problems are caused by stagnation of production, reduced working capital turnover, and insufficient cash flow. As a result, the crisis begins to threaten the company's operations. If the crisis is not prevented in time, it will create other crises in the form of multiplication. From this viewpoint, the causes of the crisis are many, and the biggest reason is the crisis itself. If the causes of the crisis are categorised, their specifics can be identified. However, there is no consensus amongst scientists on the definition of the causes of a crisis, since such causes are not the same. Crises are triggered by accumulated mistakes and shortcomings, meaning that there is no list of recognised causes. This idea has been confirmed by Russian economists in their scientific work.[24]

[24] Babushkina E.A. Anti-crisis management: the concept of lectures / E.A. Babushkina, O. Yu. Biryukova, L.S. Vereshchagin. - M.: Eksmo, 2008.- p. 160. - (Pocket exam)

It also identifies the cause of the crisis in the analysis of the consequences. Some crises can indeed be predicted depending on the course of economic processes, but crises related to the human factor cannot be predicted in this way. They are determined only as a result.

In studying the causes of a crisis,[25] some scholars describe it as the cause of insolvency. In this case, the reason is not the imbalance between production and the market, but the excess of liabilities over assets. A crisis revolves around the structure of financial processes and the disruption of the company's finances. Observing the correctness of distinguishing between insolvency or causes of crisis, it can be said that a crisis occurs when an enterprise becomes insolvent. This is the first stage of the crisis. The aforementioned is due to the fact that, when diagnosing the economic and financial performance of enterprises, insolvency is mainly analysed likely a factor in terms of why they are doing so poorly. It is necessary to study the causes in two categories: the cause of insolvency and the cause of the crisis. The causes of the crisis will be investigated only if the company's solvency is not restored. If a crisis-stricken enterprise recovers, then the causes of insolvency will be investigated. However, such an understanding takes the idea away from the core concept. To get to the heart of the matter, stopping production can be interpreted as reducing profits and, consequently, delaying the payment of liabilities. With that said, there are causes of crisis other than those related to production.

These additional causes impede the timely fulfilment of obligations, and all of the reasons lead to a decrease in solvency and, consequently, a crisis. Therefore, from the management viewpoint, it is appropriate refer to the causes of the crisis, whilst from the analysis viewpoint it is appropriate to refer to the causes of insolvency. The causes of corporate crises are divided into objective and subjective types, depending on the influence of individuals. Objective causes shape crises that occur more naturally, e.g. the product developed by the enterprise is outdated, science and technology are lagging behind, and so on. Subjective causes are understood to be the intentional or artificial organisation of a crisis as a result of human influence. The causes of a crisis can be divided into external and internal, depending on the scope of the enterprise. Whilst internal causes are measured by an organisation’s decision-making scope, external causes are outside the scope of the enterprise’s influence and cannot be managed.

Internal causes of a crisis include:

First, the low qualifications of staff. This factor creates staffing problems for the company. Today, many light industry enterprises in Uzbekistan are engaged in marketing research, the development of practice-based business plans, effective management, reconstruction of the

[25] Yarkovskaya, E. P., Anti-crisis management: Textbook - ed., - M.: Omega - 2007. – p. 365.

production process or re-equipment in accordance with market requirements, and similar production processes. The low level of qualifications of personnel in existing enterprises hinders the implementation of related activities. As a result, newly-invested enterprises are also in crisis due to lack of skills in internal management;

Second, the evil of labour discipline. The largest and most important share in the production process of the enterprise is occupied by the team of workers engaged in the main production. The aforementioned team produces the product by interacting with the fixed asset and the raw material. For this reason, disorders in the workforce and incapacity for work, teamwork, late arrival and early departure in enterprises disrupt the positive emotional environment in the team and, as a result, worsen the interest in work amongst employees. Such factors are a clear example of a breach of labour discipline in an enterprise. This happens not only amongst the workers who produce the product, but also among the administrative staff, and failure to prevent it in time can lead to the subsequent looting of the enterprise.

Studies show that in light industry enterprises today, labour discipline amongst administrative employees is violated as a result of more grouping, whilst discipline of workers is violated due to the large number of young workers amongst them;

Third, the poor quality of the product. The success of an enterprise in the market and amongst its competitors depends on the purchasing power and quality of its products. If the quality of the product is poor, the demand for that product of the enterprise decreases, resulting in a decrease in the turnover of working capital, which in turn leads to a lack of cash in the enterprise. Subsequently, the cost of maintaining the finished product in the enterprise increases, as does the number of liabilities, and the solvency of the enterprise decreases whilst there are also signs of bankruptcy. The obsolescence of technology leads to the deterioration of product quality and causes our enterprises to lose the market for products of foreign countries in competition;

Fourth, there is an increase in scrap and waste in production. Increasing amounts of waste during production occurs when the production technology is chosen incorrectly and the skills of the workers are low. This leads to an increase in production costs, a decrease in net profit which is the end goal of the enterprise, and a decrease in profitability;

Fifth, the obsolescence of production technology. The obsolescence of production facilities and the problem of their renewal are now observed in the countries that broke away from the former Soviet Union. In other countries that entered the market economy early, the focus is on the psychological impact on the human mind in order to increase

production. One of the biggest problems is the obsolescence of technology, which creates other negative situations;

Sixth, the growth of unprofitable production. An increase in unprofitable production, in turn, reduces profitability and production efficiency. This is also due to the above factors;

Seventh, the increase in accounts payable and the inability to repay them. This internal reason can be termed non-financial management of the enterprise. It has been said that not selling the product on the market will reduce the company's working capital. This process creates a cash problem in the company and leads to an increase in debt. There are also external reasons for the increase in the mass of debt, one of which is the depreciation of the national currency against the foreign exchange rate as a result of the government's monetary policy. The external causes of the crisis occur outside the management environment and capabilities of the enterprise, and it is almost impossible to manage them. Only by using the internal capabilities of the enterprise can that enterprise create immunity against such causes. Therefore, a company is advised to constantly monitor the external environment and be prepared for any situation.

External causes of the crisis include:

First, competition in the market. Increased competition in the market makes the enterprise inactive and reduces the turnover of working capital. The company cannot control other competitors, and has to use internal capacity to avoid defeat in the market;

Second, the fall in market prices from cost. The fact that the price of a product falls below the market cost means that dumping is being used by competitors. This forces the company to operate at a loss for a period of time.

Third is the training to take on the attitude of success and achievement whilst undergoing emotional states. There are many reasons for the neglect of consumers, one of which is the lack of perfect advertising, with the second being the deterioration of product quality. This is an external reason which influences customers, but an internal reason for the quality of the enterprise and the management of advertising activities;

Fourth, the formation of legislation against the activities of the enterprise. This condition is rare. When an enterprise produces a product or service that is contrary to the interests of the population and the state, that enterprise may be subject to antitrust law imposed by the state;

Fifth, the deterioration of the government's monetary policy and the growing exchange rate gap. Deterioration of monetary policy poses a serious financial risk to the activities of enterprises that receive loans in foreign currency or purchase products from foreign countries. This is due to the fact that such enterprises will suffer a lot from the exchange rate,

specifically the depreciation of that exchange rate and the increase in the said rate. In this case, the total assets of the enterprise are at risk of collapse in exchange for liabilities;

Sixth, the poor quality of raw materials. Poor quality of raw materials is related to the activities of partner companies, and can be avoided even if the company cannot manage the said materials. This is because poor-quality raw materials reduce the overall quality of the product and lead to an increase in defects in production;

Seventh, the increase in the minimum wage. An increase in the minimum wage is also beyond the control of the enterprise, and an increase at the state level will force the enterprise to raise its costs. It is true that the minimum wage is set only for employees of organisations financed by the state budget, but other companies are also forced to increase it since failure to do so would result in various protests and strikes by workers, with enterprises eventually forced to increase the wage anyway;

Eighth, rising transportation costs. Transportation costs increase when taxes, fees, or fuel prices rise. This causes the enterprise to increase the cost of production or other costs, and, as a result, the enterprise either raises the price or covers the costs in return for a portion of the net profit;

Ninth, bad weather and disruption of the rhythm of the enterprise seasonality. If an enterprise produces a seasonal product, how the annual climate affects it is very important. This is because bad climate can have a very serious impact, especially on enterprises in the agro-industrial complex or other similar industries;

Tenth, receivables increase unexpectedly and delay repayments. The development stage of many enterprises are interconnected as a chain. Since no company can operate effectively in the market for a down payment, businesses are sometimes forced to sell stagnant or other goods at the expense of their creditors, even at the risk of their partners, because some goods lose their quality as they stand and can cause great damage to the enterprise. Selling goods on credit increases the turnover of the company's assets, if the debts are paid on time, otherwise, the company's solvency will decrease and it may be on the verge of bankruptcy. The listed reasons that lead to the crisis of industrial enterprises disturb the overall economic balance of the enterprise. As a financial difficulty, the enterprise arises in economic activities. The consequences can be grouped as follows (Figure 1.3.1).

The graphic shows that the consequences of crises often negatively impact the enterprise. Only in some cases is it possible to gently escape a crisis. The results of an economic and financial crisis can lead to the following consequences when specialising at the enterprise level:

- Retention of working capital as receivables and finished goods;
- Proportional increase in accounts receivable and accounts payable;

- Increase in overdue accounts payable over 3 months;
- Decrease in net cash flows from operating and financing activities;
- Weakening of financial security;
- Failure to implement the budget plan of the enterprise due to increased costs;
- Exceeding liabilities from current assets;
- Inability to cover the obligations of the enterprise at its own expense;
- Decrease in investment activity;
- Increased depreciation of fixed assets;
- The emergence of riots and looting, etc.

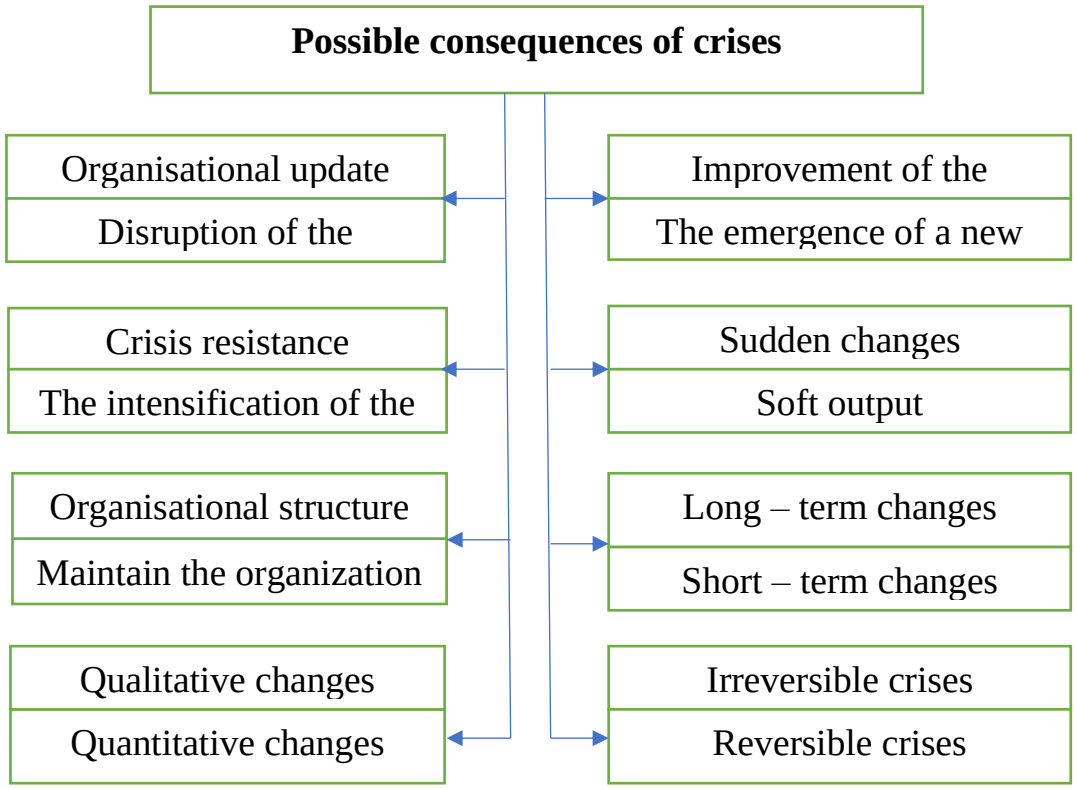

Figure 1.3.1. Possible consequences of crises[26]

If the crisis, which threatens the activities of industrial enterprises, is not prevented in time, its consequences will lead to social problems.

Research and studies show that the activities of an enterprise can be linked to the actions of a person in the enterprise. Many aspects of business are directly related to human life. According to the researchers E.P. Kharkovsky and B.E. Brodsky,[27] there is a certain connection between human life and business. This connection is divided into 10 stages, and can be expressed using Table 1.3.1 below.

Table 1.3.1

[26] Compiled by the author based on information from https://triptonkosti.ru/2-kartinki/prichiny-ekonomicheskih-krizisov-kartinki.html

[27] Yarkovskaya, E. P., Anti-crisis management: Textbook - ed., - M.: Omega - 2007. – p.365.

Stages of human life and enterprise activity[28]

	Stages of human life and enterprise activity	
	Stages of human life	**Stages of enterprise activity**
1.	The birth of man	Enterprise registration
2.	Human growth and development	Enterprise development and growth
3.	Having a child as a parent	Establishment of a subsidiary
4.	The development of various diseases in humans	Symptoms of insolvency and financial instability
5.	Analyse and diagnose a person based on their illness and compile a list of medications for their treatment	Carrying out business diagnostics of enterprise activity and development of measures for its restoration of stability
6.	Medication is the key to healing	Implement the measures identified as a result of the diagnosis for the implementation of financial recovery
7.	Deterioration of human health, lack of treatment	Deterioration of recurrent financial instability
8.	Surgical operation to save people	Reduction of unprofitable production
9.	Save in the resuscitation section	The emergence of a crisis situation
10.	The death of people	Termination proceedings

As can be seen from Table 1.3.1, there are many complex situations in the activities of the enterprise, as well as in human life. It is important to prepare in advance to avoid these situations. The root cause of macroeconomic and global crises lies not in people's ignorance of governance, but in the accumulated shortcomings during the implementation of natural economic laws; not everyone may understand this. Specifically, any economic law does not apply in real life as if it were a theory. The shortcomings in its implementation grow and become a crisis. The aforementioned is akin to time; there are 365.25 days in a year, and every four years there is a one-day mistake. To eliminate this mistake, a leap year was established. The fourth year is set to 366 days and the time error is corrected. Therefore, understanding the essence of a crisis is not necessary to exclude it completely from the vocabulary of mankind, but only to be able to resist it at the time of its emergence and to overcome it quickly. Crises can never be completely eradicated, but they can be

[28] Vorobyov A.A. Identification of the presence and determination of the causes of the crisis at an industrial enterprise / A.A. Vorobyov //Problems of modern economics. - 2014. - No. 4 (52). − pp.127–130.

prevented. It is natural not to study this concept when there are no crises, and when a crisis does occur, everyone wants to study it. In order to introduce crisis immunity in industrial enterprises, it is necessary to constantly monitor the activities of the enterprise and solve existing problems in a timely manner. It is also advisable to create the impression, amongst the company's employees, that all decisions are a manifestation of the fight against the crisis.

CHAPTER 2. FEATURES OF INDUSTRIAL MANAGEMENT IN TIMES OF CRISIS

2.1. Opportunities for effective use of endogenous factors

Any enterprise, like an open operating system, interacts with the external environment, adapting its internal structure to changes in the said environment. All elements that an enterprise can change this depends on the decisions made and what is controlled are called manageable variables (endogenous factors).

These are factors that depend on the enterprise itself and the management decisions made. Then, in turn, they affect the final results of the enterprise. It should be noted that endogenous factors are not entirely dependent on the decisions made by the enterprise. They are also under the influence of certain exogenous factors, i.e. changes that occur in the external environment.

Thus, managed variables are internal endogenous factors of enterprise development. Amongst them, first of all, there is organisational structure horizontal or vertical (taking into account the internal links of management) of management. The share of management and operational staff, the number of staff and, structural units affect the final results of the enterprise's economic activity.

The controllable variable is also the production and turnover costs of the part that can be regulated. For example, the cost of the loan depends on the decision regarding the need to obtain a loan, the right choice of bank, and the terms of obtaining a loan from the company.

Other controlled variables can also be classified as endogenous factors, in particular:

- Scope of activities independent of changes in the external environment;
- The structure of the property of the enterprise and the sources of its formation (involved, credit, own, borrowed, leased);
- Technologies and efficiency of their use in the enterprise, etc.[29]

Endogenous factors play an important role in the management of enterprises, as they are crucial when it comes to the economic and financial development of the enterprise. First of all, I would like to discuss the impact of endogenous factors on the activities of enterprises. Endogenous factors primarily emphasise that the long-term economic growth and development rate of an enterprise depends on policy measures. For example, research and development for subsidies or education is about increasing the growth

[29] Snitko, L.T., Economics of the enterprise textbook recommended by the Interuniversity Academic Council of the Central Union of the Russian Federation as a textbook for students of economic specialties Belgorod "cooperative education" 2001

rate in certain endogenous growth models by increasing the incentive for innovation.

The essence of endogenous growth theory is that policies which include openness, competition, change, and innovation help growth. Conversely, policies that have the effect of limiting or slowing change by protecting or giving preference to certain existing industries or firms, over time, slow down growth and turn it into a detrimental aspect of society.

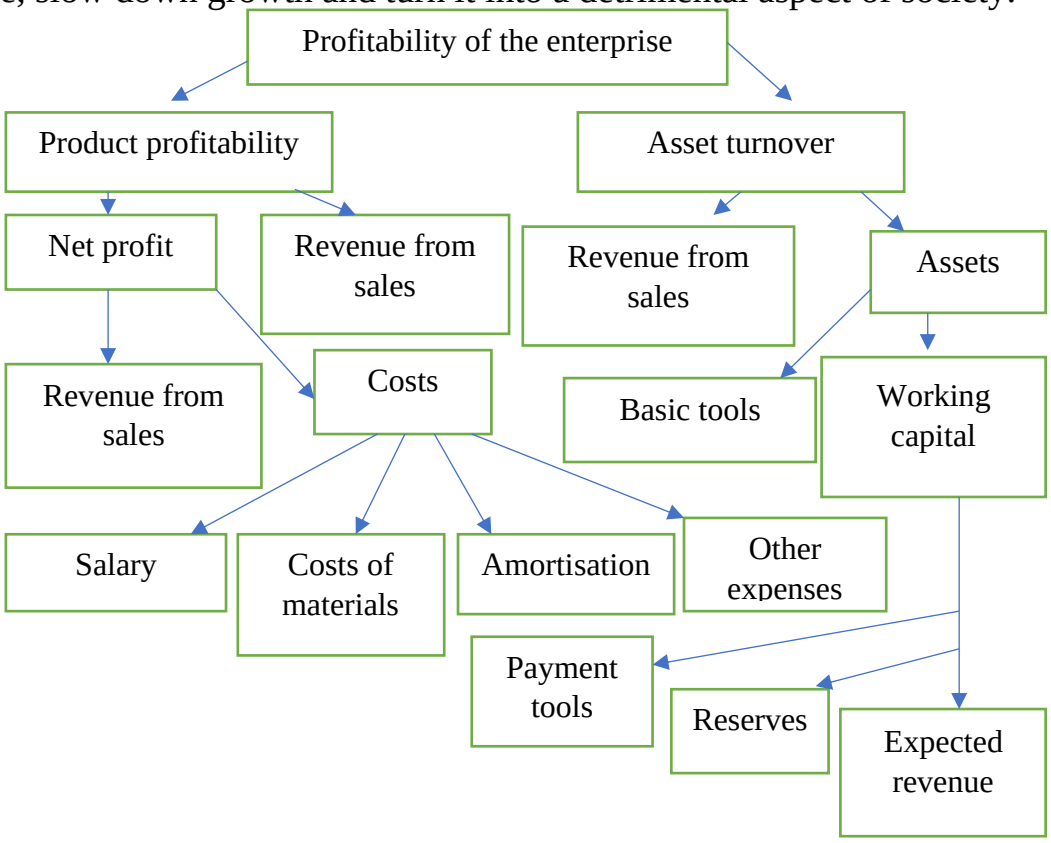

Figure 2.1.1. Profitability of the enterprise[30]

At this point, it is fitting to refer to the words of Peter Howitt: Sustainable economic growth is a process of constant change everywhere and at all times. The economic development that the richest countries have achieved since the Industrial Revolution would not have been possible if people had not undergone serious change. Economies that stop change need to get out of the way of economic growth. The countries that deserve the title of "developing" are not the poorest countries in the world, but the richest. If they are to enjoy constant prosperity, they must deal with the never-ending process of economic development.[31] The above economic growth and sustainable prosperity are also a key goal for businesses and companies. Business's economic and financial well-being is a key factor in

[30] Compiled by the author based on Internet information.

[31] Howitt, P. (April 2007), Growth and Development: The Schumpeterian Perspective (PDF). C. D. Howe Institute Review. D. D. How Institute. ISBN 978-0888067098. ISSN 0824-8001. Archived original (PDF) on July 17, 2011. Retrieved August 16, 2018.

preventing the effects of crises. It should not be forgotten that economic well-being largely depends on the profitability of the enterprise.

Where and when is this indicator used?

- In managing the firm. Knowing the profitability of the enterprise for a certain period, the manager identifies the problem by analysing the components of the formula (profit and cost);
- Predicting potential benefits. With information about the average profitability of an enterprise, managers can make predictions with sufficient accuracy;
- Substantiation of investment projects. This is a cantilevered indicator, because the profitability of the enterprise is the biggest argument for potential investors: having an idea regarding the amount of investment and average return of the enterprise, the investor can easily calculate future benefits from the investment project;
- An enterprise is a commercial subject. The fact is that the profitability of the enterprise, along with liquidity, is one of the most important categories affecting the value of the company.

What factors affect the profitability of the enterprise?

The reasons for the change in the index under consideration can be divided into endogenous and exogenous. Exogenous reasons include:

- Geographical location. The localisation of production has a strong effect on the price level, which represents price.
- Selection level. Competitions affect the price and therefore the level of profit;
- Market conditions. This price determines how much the product will sell for;
- Quantitative parameters of categories such as money market and asset market;
- Tax policy status. Taxes have a direct impact on how much profit an entrepreneur makes;
- Political situation. For example, recent sanctions against Russia have negatively affected the profitability of Russian companies.

Endogenous factors are as follows:

- Logistics chains and marketing efficiency. This factor affects the cost to the entrepreneur;
- Necessity. Measures to eliminate or compensate for the nature of industrial activity’s impact. If the law requires that measures be taken to remedy the adverse effects of the production process, these costs are incurred;
- Availability of conditions for normal operation. When an employee is provided with the infrastructure necessary for normal operation, an increase in labour productivity reduces the cost of producing that product.
- Fiscal policy. In many types of financial activity, efficiency is

also here and in different forms;

For example, because of a good game in the asset market, a company will have more resources to cover its obligations without attracting credit funds for use, for which it will have to pay interest. Indeed, this is reflected in the company's overall costs.

Endogenous production factors that affect the profitability of the enterprise are also divided into:

- Quantitative (e.g. an increase in the number of workers, means of production, and products of labour);
- Quality (use of progressive, resource-saving technologies in other words, increased labour productivity).

Thus, the profitability of an enterprise is a fundamental, key indicator that allows it to assess its own effectiveness. Amongst the factors influencing this is the need to organise the production qualitatively, because the increase in labour productivity brings about a net profit.

A market economy does not guarantee the safety of enterprises in the market. For this reason, healthy businesses often suddenly fall into a crisis without complying with market laws. In the US, for example, 50% of newly-established small and medium-sized businesses close within a year; however, businesses recognised by state bankruptcy law make up an average of 1% of total businesses.[32] This shows that anti-crisis management should be practised regularly in every enterprise and organisation.

However, the question arises regarding how to organise an effective form of crisis management in enterprises, and whether there is any methodology for this. It should be noted that there is no single model of anti-crisis management a phenomenon for which there are numerous reasons. Most importantly, a crisis manifests itself in different ways in each enterprise, depending on the nature of the network, geographical location and the specifics of the external and internal environment. Even in two companies with the same conditions, overcoming the crisis can be achieved through different plans. The process depends on how managers and executives in the enterprise respond to the opposition. However, in many cases, the causes of that crisis reflect the nature of the crisis, which plays an important role in overcoming the crisis in the enterprise.

The causes of an enterprise crisis can be divided into two groups according to the scope of the enterprise:

- A group of external factors that are not related to the enterprise or that can have an insignificant impact on the enterprise;
- Internal factors arising from the activities of the enterprise.

[32] Crisis Management: Textbook. - 2nd ed., add. and revised / Ed. Prof. E.M. Korotkova - M.: INFRA - M, 2009. – p. 620. - (Higher education)

Research shows that, in some industrial enterprises in Uzbekistan, the economic crisis was first caused by internal factors and then by external factors. In this case, the chain of specific problems is formed in the following order:

First of all, there are problems with the qualifications of employees in industrial enterprises. In the early years of the transition to a market economy, large industrial enterprises were naturally forced to lay off many skilled workers as a result of their economic inefficiency. Relatively small enterprises were formed during this period. They hired workers who were willing to take as low as a pay possible. However, in the past, experienced workers lived far away from industrial enterprises, and for large enterprises, bringing them from home was not a major problem. Small-scale industrial enterprises were also forced to hire young and inexperienced workers because they could not afford to transport workers. As a result, if new employees were not trained in production management and development, the productivity of workers engaged in the main production process fell due to insufficient work skills;

Second, in the context of declining state ownership and privatisation of many enterprises, owners were not able to effectively manage their property in the first place, whilst the quality of industrial products, especially light industry products, both declined and fell behind. This was further exacerbated by internal factors such as the massive mental and physical deterioration of production equipment;

Third, the above circumstances undermined the competitiveness of enterprises in the local and global markets. As a result, the economic crisis of industrial enterprises was hit by external factors due to internal stimuli;

Fourth, insolvent enterprises did not choose specific anti-crisis strategies and tactics to address these problems. Many industry leaders have been waiting for government help in overcoming the economic crisis. In addition, despite the effective implementation of the anti-crisis programme in the country, some enterprises have not yet been able to fully address their strategies and tactics to combat the crisis itself. This is because entrepreneurs still have insufficient-skills to know how to deal with a crisis or assess its symptoms.

Research shows that today regional programmes have been developed to overcome the crisis and ensure the financial recovery of industrial enterprises in the region. Not surprisingly, this will serve as an impetus for future industrial development.

The global financial and economic crisis, which began 14 years ago, has hit the economies of numerous countries, large multinational companies and financial institutions, with the number of unemployed rising and incomes falling. In this context, within the framework of the programme, the country will intensify the process of modernisation,

technical and technological re-equipment in basic sectors of the economy, the introduction of modern flexible mini-technologies to ensure the production of quality, export-orientated competitive products, and rationalisation of technological processes. This includes a sharp reduction in production costs and product costs by reducing other costs, ensuring their uninterrupted and efficient operation, replenishment of working capital on their reasonable orders and the provision of credit resources for the implementation of investment projects, including paying great attention to the allocation on a preferential basis.

At the same time, significant investments and credit resources of commercial banks will further increase the level of capitalisation and financial stability of enterprises in the real sector of the economy, whilst also improving financial recovery and management mechanisms of economically insolvent enterprises, restructuring the economy, modernising production, and technical and technological restructuring focused on the equipping process.

It should be noted that the experience of involving commercial banks in the process of rehabilitation of loss-making and economically insolvent enterprises has fully justified itself. The mechanism of extensive use of the financial and organisational capacity of commercial banks in the rehabilitation of economically insolvent enterprises was a novelty and was not used in the world banking practice. Under this method, commercial banks buy bankrupt manufacturing enterprises through auctions and tenders; at the same time, banks undertake investment commitments to financially rehabilitate and rehabilitate bankrupt enterprises, ensure their technical and technological modernisation and re-equipment, and organise the production of competitive products in domestic and foreign markets; the banks then sell these enterprises to strategic investors at market value.

The mechanism of rehabilitation of economically insolvent enterprises is as important as the introduction of new products, the introduction of modern management methods, the creation of new jobs, and the timely payment of salaries and vacation pay to employees due to bankruptcy. This also serves a socio-economic function.

February 7, 2017, saw the issuing of the Decree of the President of the Republic of Uzbekistan “On the Strategy of Actions” for the further development of the Republic of Uzbekistan. This document clearly identifies five priority areas for the development of Uzbekistan in 2017 – 2021.[33] All of the tasks to be implemented within the framework of the Action Strategy developed on the initiative of President Shavkat

[33] Decree of the President of the Republic of Uzbekistan No. PF-4947 of February 7, 2017 "On the Action Strategy for the five priority areas of development of the Republic of Uzbekistan for 2017-2021".

Mirziyoyev have raised, to a high level, the quality of work on the integrated development of the country.

The scope of work under the third direction, "Further development and liberalisation of the economy," is very wide. In this direction, the plan is to implement sectoral programmes for integrated economic development, in particular to support entrepreneurship, increase investment attractiveness for foreign investors, and improve tax administration as well as modern principles of banking regulation and 649 investment projects. As a result, over the past five years, industrial production has increased 1.5 times, with its share going from 33.6% to 36%, and the share of the processing industry from 80% to 85%.

Within the framework of the Action Strategy, a great deal of work is being done in the Republic of Uzbekistan on the development of industry and its new branches. According to results from 2021, the enterprises of the nation produced industrial products worth 144.2 trillion sums a growth rate of 107.0% compared to the same period last year. The main factor in the growth of total industrial output was the increase in production in the processing industry by 6.4% (contribution to the growth of total industrial output by 5.2%), in mining and open pit mining – by 12.9% (contribution to growth by 1.3), in electricity, gas, steam supply and air conditioning by 4.9% (contribution to growth by 0.4%) and water supply, sewerage, waste disposal by 13.5% (contribution to growth by 0.1%).

The volume of industrial production amounted to 144.2 trillion sums – an increase of 7.0%.

Growth rate of consumer goods production –102.7%

The share of consumer goods in total industrial production – 38.9%

The share of small business in industry – 39.6%

The share of industry in GDP – 26.7%

The industrial capacity of each country, as well as the indicators of scientific and technological development and modernisation of the economy, is determined primarily by large enterprises. Therefore, one should not forget the place and role of large enterprises in the development of the "small" economy, opening a wide path for small businesses and micro-enterprises. In addition to the large number of employees, these enterprises have ample opportunities for the implementation of scientific and technological advances, the production of high-quality products, labour incentives and the development of friendly partnerships (including with foreign companies and firms). Therefore, the optimisation of large and small enterprises is the most important task of science and economic practice, based on the general production requirements and prospects for the development of the national economy. Methods used to solve this problem in each sector of the economy may not be similar or have the same

description. It is necessary to act in accordance with the existing conditions and development advantages in each individual economic situation.

The activities of enterprises directly impact the national economy and its sectors. The better, more efficient and more profitable the enterprises, the higher the performance of the whole economy, including their own. It is believed that a market economy liberalises the activities of enterprises, strengthens their independence, and creates ample opportunities for the organisation of production and achieving high profitability; indeed, perhaps this truly is so. However, not only the enterprises, but also the state, should pay attention to how the enterprise, especially the state-owned enterprise, works, its benefits to society, the level of profitability, and the employment of workers. For the same reason, the state not only creates great opportunities for enterprises, but also controls them in the prescribed manner. The "fate" of state-owned enterprises cannot remain indifferent to the final results of their production activities. Bankrupt enterprises, loss-making production, and economic insolvency – all create a heavy burden for both the business community and the state.

World experience shows that, in a market economy, not all enterprises can overcome competition, operate efficiently and earn a profit. As a result, thousands of enterprises will be established and included in the scope of economic activity, whilst almost all of them will be liquidated for various reasons. Therefore, bankruptcy and liquidation of enterprises are common in a market economy, and it is necessary to be careful not to fall into this trap, but it should not be a tragedy.

There is a saying amongst the people: "It is better to be rich and healthy than to be poor and sick". In this case, it is better not to lead the company to bankruptcy, and to take all necessary measures to ensure its economic independence, ability to work, and profitability. It is important to remember that the ability and profitability of the enterprise not only contribute to the national economy, but also play an important role in the employment of the growing population of the country. It is obvious that the role and importance of any enterprise in the national economy depend not only on the products produced, and the amount of profit or income, but also on the participation of the enterprise in employment. By providing employment to the population, in addition to performing their direct production functions, enterprises also contribute to the reduction of unemployment, and, consequently, to an increase in labour activity and the improvement of social conditions.

Of course, everything here does not depend only on the company itself. In the process of carrying out its activities, the company interacts with other companies that supply raw materials, equipment and other means of production or act as consumers of products. In this regard, any

shortcomings and deficiencies, including late delivery of raw materials, materials and equipment, late payment, late payment of debts and other violations of the rules and obligations of the enterprise lead to the deterioration of that enterprise's economic condition and its helplessness. As such, the need for effective and highly profitable activities of enterprises is inextricably linked with the discipline of all enterprises to properly organise production and strictly fulfil their obligations to their partners and the state.

There are many manufacturing enterprises in Uzbekistan, which cover almost all sectors of the economy – from heavy industry to light industry, and from processing of agricultural products to scientific production. Currently, there are more than 49,000 industrial enterprises in the country, including 10,200 enterprises established in January-December 2017, encompassing: 2,600 enterprises in Tashkent, 1,144 enterprises in the Fergana region, 1,057 enterprises in the Tashkent region, 895 enterprises in the Samarkand region, more than 800 enterprises in the Namangan and Andijan regions, approximately 500 enterprises in the Bukhara region, more than 400 enterprises in the Jizzakh and Kashkadarya regions, and more than 300 enterprises in the Republic of Karakalpakstan, Surkhandarya and Khorezm regions, whilst the Navoi and Syrdarya regions have more than 200 enterprises.

In their activities, these enterprises use all the factors of production – land, natural and labour resources, equipment and technology, investment, and modern information systems which is referred to by modern science as the basis of production or the national wealth of the country. It is well known that wealth or potential is created through the actions of several generations and society as a whole. The task of enterprises is to preserve and effectively use this wealth. Even a slight deviation from the aforementioned principles of management leads to a decrease in the efficiency of public production, homelessness and waste. Businesses are no exception.

At the same time, the government must provide tax and customs benefits for the successful operation of rehabilitated enterprises. Newly established business entities are exempt from property tax, single tax, income tax and land tax from the date of state registration until they are sold to a strategic investor. In addition, tax incentives have been provided to enterprises that have resumed operations and have been acquired by investors.

However, the long-term sustainability of enterprises does not depend on government programmes alone. This is because that government programmes are being implemented regularly to establish enterprises and increase their competitiveness. The future of private enterprises will depend on the strategy and tactics which they choose. One of the conditions for

sustainable development in the industrial enterprise, along with long-term, targeted programmes of the state, is the development of internal anti-crisis strategy and tactics for each enterprise, which encourages the implementation and effective operation of internal anti-crisis management mechanisms.

Today, specific programmes have been developed for industrial enterprises in crisis in the regions to overcome the causes of such crises. Planning the process of overcoming the crisis is based on the strategy and tactics of anti-crisis management. Many economists describe an anti-crisis management strategy as a long-term recovery plan and a tactic as an operational plan. Looking at the issue from this perspective, it seems that companies have an anti-crisis management strategy. However, the problem here is that the regional industrial enterprises are reflecting the strategic anti-crisis recovery plans as a business plan. This naturally reduces the effectiveness of crisis management.

Anti-crisis management strategies do not exist only in economically insolvent and insolvent enterprises. Because every company operating in a competitive market is between a constant crisis and stability, crises are close to all businesses and require constant action. This measure will strengthen the resilience and immunity of sustainable enterprises to adverse changes in the external and internal environment.

Therefore, the development of anti-crisis management strategies and tactics should be based on clear plans. According to the development of the strategy consists of nine stages in total.

In the first stage, economically viable enterprises develop a risk management plan to manage the said risks. Economically insolvent enterprises can formulate a plan similar to that of sustainable enterprises once they are economically stable.

In the second stage, when developing an anti-crisis management strategy, the enterprise is first diagnosed. If the analysed economic indicators suggest the existence of an economic crisis, then the causes of the crisis and its possible consequences will be analysed first.

In the third stage, a working group will be set up to overcome the crisis and improve the company's financial health. The working group should be composed of mature employees, depending on the nature of the industry of the enterprise or the industrial enterprise engaged from abroad. The number of people in the working group depends on the size of the enterprise and the speed of development of the rehabilitation programme. They can consist of five to eleven people. The fact that they are odd in number helps keep the votes from being unequal in the decision-making process. The anti-crisis programme will be developed by the working group and put into practice.

In the fifth stage, the implementation of the programme is regularly monitored by the working group. If there is a change in the internal and external environmental factors during the process of combatting the crisis, then the programme will be operatively and tactically changed. Once the programme is fully implemented, the resolution of the crisis will be re-evaluated using the diagnostics of the enterprise. If the crisis is resolved, then the programme will move on to the next, and eighth stage; otherwise, the sequence of stages returns to the fourth stage. In economically sustainable industrial enterprises, the implementation of the strategy consists of three stages, starting with the eighth stage rather than the second. The final and ninth phase, namely the anti-crisis strategy, is regularly updated tactically and continues to achieve its goal.

Anti-crisis management strategies and tactics, according to Russian scientists, are interrelated processes, one of which is inseparable from the other. Whilst an anti-crisis management strategy is a whole period of overcoming a crisis or building immunity against it in a crisis-threatening situation, anti-crisis tactics constitute a way of managing a long-term plan at the same intervals.

Implementation of the above stages of the anti-crisis strategy in industrial enterprises will eliminate the chaos in the industry and increase the level of flexibility of anti-crisis management programmes[34] in the activities of the enterprise. The implementation of anti-crisis strategies and tactics is inextricably linked to the decision-making process in the development of rehabilitation and risk management programmes. In this regard, the most basic process of crisis management is not the determination of the cause and type of crisis, but the decision-making stage to overcome the crisis, because the cause and effect of the crisis will be clear from simple analysis. However, dealing with this is a very complex process. Therefore, businesses need to have a perfect programme through which to deal with crises. Because the process of developing a program for financial rehabilitation of enterprises in crisis is the most important. Today, industrial enterprises face numerous challenges in developing and implementing an internal anti-crisis programme, which include:

- Lack of understanding of the structure of the anti-crisis programme;
- Mixing the programme with a business plan;
- Problems with funding for the programme in economically insolvent enterprises;
- Lack of qualified staff for the implementation of the programme, etc.

[34] Note: If the rehabilitation program is developed in a crisis-ridden enterprise, the risk management programme will be developed in a financially stable enterprise. Hereinafter referred to as the anti-crisis programme.

Just as there is no single model of crisis management, the programme is not systematised for all businesses. This, on the one hand, creates problems in attracting investors and on the other hand, creates certain problems in understanding and implementing the content of the programme. For this reason, the practice requires the development of a single standard of anti-crisis programme at the state level. The template of this programme should be simple, easy to understand and free of any redundant information. According to the results of the research, the structure of the Anti-Crisis programme for economically disadvantaged enterprises should be developed on the bases of the following criteria recommended by the researcher:

First of all, the financial and economic situation of the company in times of crisis is taken into account.

Second, the company's financial security is analysed;

Third, the level of production and market demand for the finished product are studied;

Fourth, the external environment and the economic situation of the partners and the relationships associated with them are monitored;

Fifth, the adaptation of the enterprise to the restructuring and the possible outcome will be determined;

Sixth, based on the above criteria, the management decision is made regarding the form of the structure of the anti-crisis enterprise programme.

The following principles should be considered when developing a strategic anti-crisis management plan:

Timely submission of reports. It is known that in the current situation, manufacturing companies pay a lot of attention to the internal management accounting policy. This is because it is very helpful in the effective management of production activities by the management. In many cases, certain numbers and indicators in the internal management accounting policy are not disclosed to external users – they are kept confidential. By submitting reports in a timely manner, information about the company's processes becomes clearer. Therefore, it is necessary to report the events in each department of the company in a centralised manner and submit them to the manager. This has many positive consequences. In particular, the timely submission of reports to the manager during the period in which anti-crisis management is in place will facilitate a rapid decision-making process. Increasing the amount of objective information regarding the case when compiling reports reduces the flow of misinformation. To achieve this, it is necessary to increase the information on the levels of profitability of the movement of more cash in the internal management accounting policy.

Details. Based on the principle of timely submission of reports, the information submitted by the branch, subsidiary, regional offices and all other departments on the balance sheet of the enterprise and directly

dependent on it should be as detailed as possible, divided into parts. Information pertaining to the controlled objects is provided in detail when presented. This information simplifies the decision-making and management of the enterprise in any situation.

The specifics of cost reductions. Management needs to be careful when cutting costs, since reduced costs can also hurt the company. Many current expenses are reflected as vital costs for the product and cannot be reduced. Therefore, at the first stage of planning, the business entity should reduce the costs associated with long-term development: for example, reducing the costs associated with research, capital construction, multifaceted marketing and other secondary costs. Personnel management, such as layoffs or reassignments, should not be addressed until the threat of an economic crisis has been fully identified. The only necessary measure is to stop hiring new workers and specialists.

Redevelopment of plans. Any strategy that leads to financial loss needs to be changed. To achieve this, first of all, an alternative plan will be developed since a business plan that does not meet the requirements loses control over the implementation of the goals and objectives of the enterprise. This leads to a decrease in management efficiency and the expected outcome of the enterprise.

Action against the culprits. When an enterprise is threatened by a crisis, action must be taken against those responsible, regardless of who is at risk. If the unstable situation in the enterprise is due to the personal interests of the responsible person, then the issue should be prosecuted, as this will motivate other employees to take further action.

Always be prepared for potential threats. The emphasis is on early detection and response. The business manager must constantly monitor external and internal risks and keep them under control with countermeasures. The enterprise then creates immunity against all subsequent threats. This is a guarantee of business success.

Regular business analysis and early diagnosis. This includes continuous analysis and diagnostics to avoid constant threats, whilst at the same time regularly calculating the potential use of the enterprise internally.

Differential approaches to economic crises that hinder the development of the enterprise. This involves categorising each emerging risk and developing a strategy accordingly, which will make the company more vulnerable to the crisis.

Flexibility to any financial risks. With this principle, the company must be able to adapt to the threat it anticipates and take full control of it. Taking full control of a crisis means controlling and managing it as well as eliminating risks.

Ability to fully use all the capabilities of the enterprise to overcome the economic crisis. It is necessary to assess the internal capacity of the

enterprise and develop a strategy to use all available resources when necessary. Maximising the utilisation of the economic potential of the enterprise reduces the need for external sources of financing and leads to the improvement of the economic mechanism.

It is clear that the structure of an enterprise's financial recovery programme is determined by its general criteria. Therefore, it is recommended that the structure of the anti-crisis programme consist of the following blocks:

1. Block to determine the type and cause of the crisis.
2. Block of analysis and monitoring of the current state of the enterprise.
3. A block of measures to improve the health of the enterprise.
4. Funds needed to overcome the crisis and their source block.
5. If necessary, the restructuring method selection block.
6. Enterprise budget block during the crisis management period.
7. Block of management and staff of the enterprise in times of crisis.
8. The benefits provided by the state to the enterprise and the block of persons responsible for improving relations with the state.
9. The period of overcoming the crisis of the enterprise and the block of persons responsible for the work.

2.2. Opportunities to involve exogenous factors in ensuring the sustainability of enterprises

One of the basic concepts of economics is the category of "crisis", which is often understood as an unwanted and stressful stage of development of the economic system, characterised by oscillations and adverse events, as well as interventions.[35] To date, there is no generally accepted definition of this category in the scientific literature, as each researcher tries to explain different aspects of the concept. An industrial enterprise is an important component of the economy and is an open system that actively interacts with the external environment.

In the general theory of management, the interrelated concepts of 'system' and 'element', which have many interpretations, are fundamental. A system is understood as a set of interacting components or a set of elements that have a certain relationship with each other or with the environment. Using a set of elements, the system displays properties that cannot be obtained by simply assembling the properties of individual elements. The system is first described by a goal, the realisation of which leads to the formation of this system; second, there is an object consisting

[35] Matthew, N.V., Economic security of the enterprise. - M., 1999. -S. 63-67

of many elements connected in one piece by symbols that are important in terms of purpose; third, there is the subject that makes up the system.

The element is, as a rule, considered a relatively independent part of the whole, having a single and indivisible, integral behaviour at a certain level of analysis, which is aimed at performing the function inherent in the whole.[36] It has features such as performing one or more functions, the presence of a specific behavioural basis, and use in one or more contexts.

According to the general theory of systems,[37] any system consists of three subsystems: elementary, functional, and organisational. The aforementioned theory also holds that any system has a certain limit of stability, which cannot be overcome by negative factors. Thus, an industrial enterprise, as an open system, has the ability to resist the factors that could lead it to crisis. Therefore, the sustainability category of an industrial enterprise should be considered as its ability to withstand the effects of negative factors of the internal and external environment.

Table 2.2.1

Theoretical approaches to the concept of sustainable operation of the enterprise[38]

Author	Approach	Relationship with the activities of the enterprise
J. M. Keynes, A. Marshall, A. Smith.	the condition in which the enterprise is able to maintain a certain level of profit	maximum benefit
A. Kolobov, I. Bogdanov, V. Kornienko	the state of optimal regulation of relations and the formation of a spatial and temporal sequence of interactions between the material, information and financial elements of the organisation	the optimal ratio of all elements of the system
E. Korotkov, D. Kovalyov, A. Sheremet, E. Negashev,	the financial condition of the enterprise, which continues to operate under normal conditions, and the fulfilment of all	related to the financial stability of the enterprise

[36] Demyanov A.A., Integrated system for the effective functioning of industrial enterprises in conditions of economic instability (theory and practice): dis. Doctor of Economics: 08.00.05 / Anatoly Alekseevich Demyanov. - M, 2011. – p.308.

[37] Gig J. V., Applied General Systems Theory / Ed. PhD. Sciences Sushkov B. G., Doctor of Philosophical Sciences Tyukhnin V. S. - M.: Publishing House "Mir", 1981 – p.336. In two books.

[38] Vorobyov A.A., Identification of the presence and determination of the causes of the crisis at an industrial enterprise / A.A. Vorobyov //Problems of modern economics. - 2014. - No. 4 (52). − pp.127–130.

R. Sayfulin, Z. Korobkova, A. Borisov, V. Barylenko, I. Kosorukova	obligations to all market participants and internal structures	
G. Merzlikin, E. Bodryashov, S. Chuprov, V. Kolosov, V. Kretinin, E. Kucherova, L. Shaxovskaya	its state of equilibrium, which implies that it adapts to change, primarily to the external environment	ability to change internally under external influences
L. Abalkin, A. Bobrov, D. Gordienko, A. Livshits, T. Konoplyanik, N. Matveyev	ability to function normally under the influence of various factors	connection with the concept of security
V. Roshchin, V. Medvedev, I. Omelchenko, E. Borisova	sustainable operation and development of the enterprise	connection with the concept of sustainability
B. Reisberg	the financial condition of the enterprise, which ensures the fulfilment of all obligations to employees, other organisations, and the state due to sufficient income under normal conditions of economic activity	the relationship of the enterprise with solvency

Sustainability of economic entities or other structures means their ability to withstand the effects of harmful factors in emergencies in order to keep production at the planned volume and range, as well as to prevent or limit the threat to the life and health of employees, and the population and material damage, whilst also to ensuring the restoration of damaged production as soon as possible.[39] According to the author, sustainable activity means the ability of the production system to return to its normal state under the influence of negative factors and to withstand threats on its own or by using debt resources. However, there remains no generally accepted approach to defining the nature of enterprise sustainability in the modern literature (Table 2.2.1).

[39] Gubaidullin, N.M., Life safety: textbook. manual for all specialties / N. M. Gubaidullin, V.Z. Faskhutdinnov, V. P. Boyko; Bashkir State Agrarian University. - Ufa: BSAU, 2006. – p. 246.

An industrial enterprise's level of sustainability is defined as its ability to minimise the effects of the crisis and its negative factors, as well as to prevent their occurrence. To achieve this, it is necessary to identify the occurrence of the crisis or its factor in a timely manner, and to determine the extent of its impact as well as the possibility of implementing the most effective countermeasures.

In defining the category of "crisis" in the scientific and technical literature, various authors consider the whole system or its individual subsystems without separating the subsystems. In order to systematise the definitions of the "crisis" category available in the scientific and technical literature, it is necessary to consider them according to a separate subsystem. (Table 2.2.2).

Table 2.2.2

Systematising the definitions of "crisis"[40]

Source	Content	Subsystem
A.D. Chernyavskiy	a turning point in the functioning of any system that is exposed to external influences	Functional subsystem
V.A. Barinov	dangerous condition, fracture	Organisational subsystem
A.N. Ryaxovskaya, S.E. Kovan, O.G. Kryukov,	an extreme form of escalation of contradictions in the socio-economic system that threatens its life	The development stage of the system
A.S. Bolshakov	the economic condition of the economic organisation resulting from the violation of the correspondence between supply and demand for goods and services due to negative external (exogenous) factors, negative internal (endogenous) factors or their combination	Element subsystem (production)
J. Schumpeter	the causes of crises are an insufficient number of innovations or an oversupply of innovations with their untimely implementation or slow growth of staff skills.	Organisational subsystem

[40] Vorobyov A.A., Identification of the presence and determination of the causes of the crisis at an industrial enterprise / A.A. Vorobyov //Problems of modern economics. - 2014. - No. 4 (52). − pp.127–130.

A.Yu. Goncharuk	the situation characterised by the inefficiency of certain processes in the enterprise, as well as such a state of resources or means of production, which in the near future will lead to a sharp decline in the value of the business	Item subsystem
A.A. Bogdanov	as a process of disproportion and, at the same time, the transition to a new equilibrium, which is the limit of systemic changes that occur during a crisis	Organisational subsystem
E.A. Jarkovskaya, B.E. Brodskiy	aggravation of intra-production and socioeconomic relations, as well as the organisation's relations with the external economic environment	Organisational subsystem
Ayvazyan Z. va Kirichenko V.	crisis is a change in the upward trend of the downward trend, an integral feature of a market economy	Organisational subsystem
E.A. Faynshmidt	the avalanche-like self-destruction process of the system and the cycles of this process are exactly the same for different systems	Organisational subsystem
E.M. Korotkov, E.A. Tatarnikov, L.M. Mixaylov, K.V. Baldin, I.I. Perederyaev, A.V. Rukosuev	strong contradictions within the system (enterprise) are of particular importance for the continuation of its activities	Functional subsystem

It can be concluded that the category of “crisis” is defined as one of the basic concepts of economics and is considered a situation that requires immediate resolution due to the presence of internal and external threats in the scientific and technical literature for its sustainable operation.

The author proposes the following definition of the category of “crisis”: it is the state of the system, in which the factor that makes up the system – the purpose of operation – elements or part, the whole system does not perform the specified functions. Accordingly, the goal of a production system is to produce a certain number of competitive products promptly with a certain amount of profit.

In the scientific literature, the category of "crisis" is also described as a process that can have a positive effect, which can be a means of renewal and development of the enterprise.

The basis of scientific views of the crisis as a potential positive (negative) phenomenon is the recognition of its random nature, which predetermines changes in the socioeconomic nature. In particular, the Dutch School of Crisis Studies describes it as "a serious threat to the basic (social) structures or core values or norms of the system that force a radical decision to be made in a limited time and significant uncertainty."[41] According to the author, this definition illustrates significant changes in the system, but at the same time does not give a clear definition of crisis situations.

Table 2.2.3

Factors determining the economic condition of an industrial enterprise[42]

External factors	Internal factors
Market factors: - decrease in domestic market share; - increased competition in the market; - instability of the foreign exchange market; - adverse price fluctuations in foreign and domestic markets; - relations with contractors (suppliers, consumers, etc.); - growth of analogue deliveries.	Control factors: - inefficient organisational and legal form of the enterprise (in terms of legal, financial and tax consequences); - inefficient management structure; - low qualification of production staff; - management errors related to incompetence; - lack of flexibility, mobility, and efficiency in the management system; - inconsistency of strategy and tactics in management; - insufficient knowledge of market conditions; - use of outdated forms, methods and mechanisms of enterprise management
Political factors: - political instability; - commencement of hostilities;	Factors of production: - physical or obsolescence of fixed assets;

[41] Vorobyov A.A., Identification of the presence and determination of the causes of the crisis at an industrial enterprise / A.A. Vorobyov // Problems of the modern economy. - 2014. - No. 4(52). - S. 127–130.

[42] Compiled by the author based on Internet information.

- Political changes in the global arena that affect the financial and economic cooperation of countries, etc.	- low labour productivity; - improper construction of business processes; - incompatibility of the enterprise's operation as a single property complex; - inertia of the existing structure of production, delayed reactions to development.
Legal factors: - changes in the system of taxation and licensing; - errors in antitrust regulation; - Underdeveloped legal framework.	Marketing factors: - low competitiveness of products; - dependence on regular suppliers and customers.
Socio-economic factors: - changes in the economic and legal space as a result of state or municipal regulation; - changes in the country's development priorities; - reassessment of security indicators of the country, region, and municipality; - lack of solidarity in national, regional and municipal development strategies, which creates additional financial and legal risks; - high inflation, its level, trends, and increase in tariffs. Socio-cultural factors: - high corruption; - decrease in real incomes of the population. Natural factors: natural disasters; environmental disasters.	Financial factors: - Lack of a modern system of financial management in the enterprise as a whole; - inefficient use of financial management methods; - misdiagnosis of financial indicators, errors in business plans, the state of the enterprise; - errors in the organisation of accounting and tax accounting; - unreasonable saving or waste of a number of costs that cause management, financial and other risks; - high cost of goods (works, services), including high-energy costs, unregulated procurement and supply of raw materials.

Thus, the above suggests that the crisis is understood as an inconvenient possible consequence of the activity of the entire production system, as well as structural subsystems (elementary, functional, organisational) that can contribute to both its development and decline.

Signs of a crisis at the macro-level of the economy include a decline in the economic performance of a region or industry (gross regional / industry output, industrial production in a region or industry, rising unemployment, inflation, etc.). Signs of a crisis at the micro level determine the causes of the crisis, such as loss of stability of the enterprise, the presence of losses on performance, loss of solvency, etc., associated with changes in current liquidity.[43]

Based on the analysis of scientific and technical literature, the author presents the characteristics of external and internal factors that affect the sustainability of the enterprise the most important crisis factors in terms of the degree of impact on the state of the enterprise (Table 2.2.3).

External factors do not depend on the activities of the enterprise, but always affect those activities. They can be divided into three subgroups:

a) general economic factors – negatively impact the economic activity of a particular enterprise and pose a risk in terms of it potentially becoming bankrupt, e.g.:

- rising inflation;
- decline in national income;
- slowdown in the turnover of payments;
- instability of the tax system;
- instability of regulatory legislation;
- decrease in the level of real incomes of the population;
- rising unemployment, etc.;

b) market factors – for this organisation the development trends of commodities (raw materials and manufactured products) and financial markets are negative:

- reduction of domestic market capacity;
- strengthening of monopoly in the market;
- significant decline in demand;
- growth in the supply of substitute goods;
- decline in stock market activity;
- currency market instability, etc.

c) other factors – their composition is determined independently, taking into account the specifics of the enterprise:

- political instability;
- negative demographic trends;
- natural disasters;
- deterioration of crime and so on.

[43] Vorobyov A.A., Identification of the presence and determination of the causes of the crisis at an industrial enterprise / A.A. Vorobyov // Problems of the modern economy. - 2014. - No. 4(52). - S. 127–130.

Internal factors depend on the activities of the organisation, which are divided into three subgroups depending on the characteristics of the formation of the enterprise's cash flows:

a) operational factors – factors related to operational activities, e.g.:

- inefficient marketing;
- inefficient current cost structure (high share of fixed costs)
- low use of fixed assets;
- high amount of insurance and seasonal reserves;
- insufficient diversification of the product range;
- inefficient production management, etc.

b) investment factors – factors related to investment activities, e.g.:

- inefficient stock portfolio;
- high duration of construction and installation works;
- significant overspending of investment resources;
- non-achievement of the planned amount of profit on the implemented real projects;
- inefficient investment management, etc.

c) financial factors – factors related to financial activities:

- inefficient financial strategy;
- inefficient asset structure (low liquidity);
- excess share of debt capital;
- high share of short-term sources of loan capital;
- growth of receivables;
- high cost of capital;
- exceeding the acceptable level of financial risks;
- inefficient financial management, etc.

With regard to general and specific factors, changes in the external and internal environment may affect the development of a sufficiently large number of organisations or may belong to only one organisation.

The causes of a crisis are the sources of the crisis in the enterprise, i.e. the events (events, processes) during which the crisis occurred. The reasons for a crisis in an organisation can be financial and economic miscalculations, the general state of the economy, low qualification of employees, and shortcomings in the system of motivation, amongst others.

The main signs that a crisis is approaching are as follows:

A decrease in demand for company products and at the same time an increase in demand for products of competing enterprises;

Negative dynamics from the external environment of the organisation: a decrease in the volume of material and raw materials as well as an increase in the cost of raw materials and technical equipment;

Reducing the production rates of neighbouring industries;

Loss of competitive status against the background of the general intensification of competition in the market;

Undesirable state measures in the field of enterprises: customs duties, increase in tax rates, unwanted changes in the ruble exchange rate;

Unstable situation in the area where the enterprise is located (social, environmental, political, etc.);

Instability of actions of foreign partners;

New discoveries and innovative developments by competing enterprises;

Ageing and deterioration of the technical base of the enterprise: the use of technologies that lead to wear and tear, obsolescence, losses and deterioration of product quality;

Difficulties related to employees: insufficient level of professionalism, incompatibility of staff qualifications with new requirements and technologies, decreased interest;

Insufficient organisation of the management structure and its stability;

Fiscal policy is characterised by the availability of borrowed funds and the devaluation of company shares.

Thus, the symptoms of the crisis are many. They are manifested in various indicators and, most importantly, in the dynamics that characterise the activities of the enterprise, e.g. analysis of indicators such as labour productivity, financial condition, efficiency, staff turnover, financial-economic and socioeconomic indicators. Symptoms of the pre-crisis situation may include deviations from the norm, deviations from the average value, and so on.

Symptoms do not always reflect the causes of the crisis. The causes are often deeper than the external manifestations of crisis symptoms.

Recognition of a crisis involves identifying the signs, factors and causes of that crisis, to determine its content, characteristics and nature.

Crisis recognition tools – intuition, experience, specialised knowledge, analysis, research, and diagnostics.

Crises should be assessed not only in terms of their symptoms, but also in terms of their causes and real factors.

For example, inflation is a crisis factor, caused by an increase in the money supply, signs of rising prices, unexpected increase in wages, and so on.

Signs of a crisis in the enterprise include, for example, a decline in product quality, large debt on loans, the cause of financial and economic difficulties, the deterioration of the general state of the economy, employees' insufficient level of professionalism, and so on. Symptoms are the first indicators of negative dynamics, the growth of financial problems, and so on.

Knowledge of a crisis in the management of the organization and its possible manifestations in the life of the system is the main basis for the development of an effective programme of anti-crisis measures.

Modern trends in the placement of enterprises in all types of markets are associated with the spread of new knowledge, which is the basis for the development of information and communication technologies, as well as technological and non-technological innovations.[44]

On the one hand, the transformation of knowledge into a competitive advantage has a positive impact on increasing the productivity and profitability of enterprises; on the other hand, it provides an opportunity to introduce innovations that increase product competitiveness and promote the formation of leading enterprises. In other words, one of the key factors in shaping strategic guidelines for industrial enterprises is the rapid development of the economy, which is based on knowledge.

It should be noted that there is no consensus in the scientific literature on the definition of modern economics. Today it is possible to distinguish several approaches on the basis of the characteristics of this phenomenon, depending on which features of economic systems, their subsystems and individual elements are considered in the most depth.

The aim of the work is a comprehensive analysis of exogenous factors influencing the strategic directions of development of local enterprises in the context of globalisation of markets. In this regard, consideration is given to three main groups of factors affecting the development strategy of the local producer, namely: development of a modern innovative economy based on knowledge; strengthening the influence of information on production; cluster-network feature of production organisation and management.

1) A resource-based economy based on natural rent (capital, property, or land income that does not require the recipient to do business) obtained as a result of the export of natural resources (raw materials) rather than using the intellectual potential of the enterprise. The main feature of such an economy is the low level of development of human capital, which predetermines the scientific and technical backwardness of enterprises and their dependence on the world economy. With the development of a resource-based economy, extractive industries are becoming market leaders. It should be noted that, in terms of the system of external economic stratification, such enterprises are characterised by vertical subordination to the leaders of the manufacturing industry in the world division of labour.

2) The real sector of the economy is an industrial economy based on increasing labour productivity by raising capital investment in the means

[44] Dorofeyeva, V.V. and Khivrich, A.Yu., Influence of exogenous factors on the imperatives of the development of domestic enterprises 2020 No. 2. Pp.20-26

of production. The basis of all relations (production and non-production) is private ownership of capital; this according to Marx, means "self-increasing value", which implies the following: the existence of a highly developed financial credit and monetary system; the dominance of machine production based on mechanisation and reorganisation of production; and human capital development. The source of leadership in the market of enterprises will begin to increase production at the expense of material costs. The development of corporate human capital will become a key criterion in shaping the overall strategy of enterprise development in the market.[45]

3) The post-industrial economy is characterised by the existence of a creative economic layer – the economic elite which provides production with information, scientific knowledge and high-level technology. In connection with the restructuring of the market, the development of industries with great demand in all types of markets is observed; incapable economic entities are being reorganised and conditions are being created for the development of high-tech enterprises that require knowledge.

The technical basis for the formation of strategic guidelines for enterprise development in the post-industrial economy is the widespread use of ICT and automated management systems (AMS). Accumulated knowledge as a source of technological and non-technological innovation begins to move, and the dominant property is corporate and institutional ownership of the means of production, rather than private.[46] The life cycle time of a product update from the time a creative idea emerges until it is put into practice and put into production is also significantly shortened. In order to organise innovative activities, enterprises have established research departments, and organisational forms of production management are changing (from large bureaucratic structures to small hierarchical associations).

Thus, the epicentre of the strategic criterion of commodity producers in national and global markets is gradually shifting from individual producer cost savings to social cost savings by improving the management efficiency of integrated production systems.[47] In other words, the transition to the post-industrial type of development is associated with changes in both the socio-cultural, technical and technological spheres, which have a synergistic impact on strategic directions and prospects for the development of commodity producers. This involves the following components[48]:

[45] Dorofeeva V.V. and Zlenko N.G. Knowledge management: new competencies of managers and entrepreneurs // Problems of socio-economic development of Siberia. 2018. No. 2. pp. 5–24.
[46] Miles, R. and Snow C., Fit, Failure, and the Hall of Fame: How Companies Succeed or Fail. Free Press, 1994. p. 218.
[47] Parshutina I.G. and Samorodova E.N. Endogenous and exogenous factors of concentration and scale of industrial production growth // Vestn. OrelGIET. 2013. No. 1(23). pp.18–23.
[48] Bell, D. Social framework of the information society. M.: Economics, 2004. P. 308.

1) Sectors of the economy that require knowledge and the transition to intangible sectors;

2) The field of employment, characterised by the dominance of the class of specialists and technical staff, which is the basis for the formation of the intellectual and creative elite;

3) The "axial principle", according to which the source of innovation is theoretical knowledge. As such, science will become a direct productive force, and scientific activity will become a leading field of activity. The direct transformation of science into a productive force leads to an increase in the share of knowledge in the products produced, which in turn gives rise to a decrease in the resource intensity of production, an increase in the competitiveness of products and a higher position in the economy snd stratification system;

4) Future orientation based on technical and technological activities;

5) Creation of new "smart technologies".

Another factor influencing the strategic directions and prospects of development of the national producer is the information pressure on production, which is associated with:

First, information becomes an economic factor of production along with knowledge.[49]

Second, the number of professionals involved in the production of ICT and information products and services is growing, which increases the share of information products and services in the product. As a result of the emergence of information networks, a single information space is being created to meet the demand for information products and services. Consequently, the transformation of information into the most important resource for the development of the modern economy, the understanding of information as a commodity and a tool of power, and the constant growth of information volume all require the use of new information technologies. Indeed, this makes economic agents world leaders.

2.3. Crisis management strategy: essence, concept, development trends

An analysis of the scientific and economic literature has shown that there are different theoretical approaches to the content of anti-crisis management, which explains the need to classify definitions in this category. However, according to most authors, crisis management should always be present in the management system. In other words, the objective task of anti-crisis management is to prevent a crisis.

[49] Innovation-technological clusters of the ICSTI member countries (inform. materials) [Electronic resource]. // International scientific center and technical information. URL: http://www.icsti.su/uploaded/201304/cluster.pdf.

Table 2.3.1.

Analysis of the conceptual apparatus of crisis management[50]

Author	Content
Bukreev A.	The essence of anti-crisis management is professional management aimed at neutralising the most dangerous phenomena, stabilising the enterprise, and preventing bankruptcy through the optimal use of resources.
Korotkov E.	Any governance is anti-crisis to some extent, but the latter has a separate theme – a set of manifestations of the intensification of the contradictions that cause the crisis, first of all, as well as problems and crisis factors (real or imagined)
Pomigalov I.	Crisis management is a continuously managed process of preventing or overcoming a crisis, which meets the objective development trends and goals of the enterprise.
Krutik A., Muravyov A.	Crisis management is described as a process of uneven development of the economy, and even more so its individual parts, changes in production and sales, and a significant decline in production.
Xit R.	Crisis management is characterised by: organisational and environmental compatibility of crisis management; ability to respond to potential crises.
Mav V.	Crisis management as a rapid response to changes in the external environment
Avgustin N.	The term “crisis management” emphasises a wide range, from trying to avoid a crisis to benefiting from it.
Barmuta K.	Crisis management involves completing the following tasks: creating an anti-crisis management structure; timely implementation of anti-crisis management, assessment of the consequences of decisions made and diversification of activities; increasing management flexibility and resilience; determining the degree of centralisation of management; developing initiative among employees; collective problem solving; developing a crisis recovery program; increase the mobility of financial resources.
Pavlova A.	Tasks of anti-crisis management depending on the stage of the life cycle of the organisation: active management prevails in the crisis phase, as well as in other stages of the cycle – planned and reactive.

[50] Parshutina, I.G. and Samorodova E.N. Endogenous and exogenous factors of concentration and scale of industrial production growth // Vestn. OrelGIET. 2013. No. 1 (23). pp. 18–23.

From a terminological viewpoint, it should be noted that, in foreign literature, anti-crisis management is interpreted as “crisis management”. Crisis management is inseparable from core management, so it should be considered a continuous monitoring of the state of the enterprise, rather than a separate case. Therefore, the essence of crisis management of the enterprise can be defined as maintaining balance in all subsystems, ensuring resistance to external influences.

Additionally, many authors consider anti-crisis management a process aimed at eliminating or minimising the onset of a crisis. In other words, the goal of anti-crisis management is to escape a crisis situation. It should be noted that the above definitions reduce crisis management to a set of tasks or measures aimed at preventing and mitigating crisis situations, without affecting the nature of changes in the management system itself, instead only defining its appearance. Note that in crisis management, the maintenance of the system is not always considered, but, in particular, the separate subsystems of this system are preserved.

Table 2.3.2.

Analysis of the conceptual apparatus of anti-crisis management as enterprise management in a crisis situation[51]

Author	Content
Ryaxovskaya A.	Crisis management by improving the financial condition of unprofitable and low-profit enterprises.
Pokritan P.	The crisis management of an enterprise is not management itself, since it does not always ensure the maintenance of the managed system as the main goal of management.
Bogdanov A.	Formation of new systems from the destroyed system is one of the options through which to escape the crisis.
Belyaev S., Broilo E., Goremykin V., Koshkin V., Minaeva E., Lapenkovi V.	Crisis management is a set of forms and methods of implementing anti-crisis procedures against a particular debtor enterprise.
Ayvazyan Z., Kirichenko V., Makarov A., Vorobieva O.	Anti-crisis management is aimed at overcoming the impending crisis, ensuring short-term survival.

[51] Parshutina, I.G. and Samorodova E.N. Endogenous and exogenous factors of concentration and scale of industrial production growth // Vestn. OrelGIET. 2013. No. 1 (23). pp.18–23.

Patlasov O., Sergienko O.	The main tasks of anti-crisis management are: to analyse the characteristics of the crisis in a particular enterprise and to develop a rational strategy for overcoming the crisis.
Risin I., Treshchevskiy Yu.	Anti-crisis management focuses primarily on the composition of management entities and their interests. At the same time, it should be noted that, if the enterprise is not in the process of bankruptcy, the composition of the management entities will not change in practice.
Blahman L.	Anti-crisis management of enterprises is aimed at preventing their bankruptcy by liquidating the affected divisions, selling part of the property, reducing overhead costs, and reorganising finances.

Amongst the shortcomings of the concept of anti-crisis management in many of the proposed opinions, first of all, there is a rejection of the strategic component of corporate management, as well as a lack of integrity in management. Anti-crisis management should not be deprived of a strategic start whilst ensuring a way out of the current crisis. Anti-crisis measures should be based on defining the mission and strategy of the enterprise; otherwise, the way out of the crisis, even if it happens under these conditions, puts the enterprise in a state of high uncertainty, which inevitably leads to a weakening of positions in a competitive environment. An additionally, continuity in the operation of management mechanisms is lost.

In general, the essence of anti-crisis management is to restore or maintain the stable operation of the enterprise depending on the impact of the crisis, based on the constant adaptation of the enterprise to environmental factors.

It is generally accepted that anti-crisis management production processes differ significantly for each group of participants:

1) For senior managers (strategic management) – in accordance with the system of knowledge regarding the opportunities for the formation of the resource base, the level of responsibility for its effective use and decision-making in the management of the enterprise and its subsystems;

2) For the leaders of the second generation (current management), this type of management is a direct intervention in the system itself in order to bring it out of crisis;

3) For the owners, the anti-crisis management of the enterprise is designed to ensure that the capital operates independently of a particular object.

According to many authors, there is an alternative approach to the separation of crisis events in enterprises and their appropriate anti-crisis measures; the said approach is based on the criteria of financial condition. According to this approach, the authors distinguish the following stages: normal, pre-crisis, crisis, and helplessness. The normal financial and economic condition of the enterprise is considered when the production of the enterprise is within the standard values, i.e. when the production is stable and stable. The goal of anti-crisis measures at this stage is to eliminate deviations and prevent the organisation from transitioning to a pre-crisis financial position. The pre-crisis financial situation is a "hidden" crisis characterised by the deterioration of certain economic indicators and the manifestation of problems in various areas of enterprise activity. At this stage, anti-crisis management should return the enterprise to its normal financial condition or at least maintain its pre-crisis state. The financial situation of the crisis leads to long-term insolvency of the enterprise, low liquidity of its assets and a serious violation of its financial stability, all of which hinder its normal operation; economic indicators fall below threshold values.[52] Based on the above analysis, numerous of modern approaches can be identified, and are discussed in Table 2.3.3. The main goal of anti-crisis management is to ensure the stable operation of the enterprise in the context of possible economic, political and social disruptions. In this regard, as a rule, under certain conditions, the most effective management tools are used, not only in overcoming temporary financial difficulties, but also in solving all the current problems of the enterprise.

Table 2.3.3.

Application of scientific approaches in the management of industrial enterprises in crises[53]

The name of the approach	Description of the approach	Application in an enterprise crisis
Process	Consider the management process as a set of interrelated functions.	A process approach to management should be worthy of the manager's attention only when the enterprise is in a crisis of the stratification phase. One of the mechanisms to increase the efficiency of the enterprise at the stage of integration is evolutionary

[52]Vorobyov A.A., Identification of the presence and determination of the causes of the crisis at an industrial enterprise / A.A. Vorobyov // Problems of the modern economy. - 2014. - No. 4(52). - S. 127–130.

[53]Vorobyov A.A., Identification of the presence and determination of the causes of the crisis at an industrial enterprise / A.A. Vorobyov // Problems of the modern economy. - 2014. - No. 4(52). - S. 127–130.

		reengineering. In other cases, reengineering may not be effective.
Systematic	Consider any system as a set of interconnected elements.	Managers have the ability to combine their work with the work of the entire enterprise if they have an understanding of the system and the enterprise's place in it. A systematic approach encourages the manager to maintain the necessary balance between the needs of individual departments and the goals of the entire enterprise, which is especially important in crisis situations. A systematic approach helps identify the causes of inefficient decision-making, whilst also providing tools and methods to improve planning and control.
Administrative	Regulation of functions, rights, obligations, and elements of the management system in the regulatory documents of the company.	Its application in a crisis situation can lead to the following action: the introduction of additional reporting forms; setting of mandatory standards; compulsory liability insurance; and the introduction of additional restrictions.
Quantitative	Use of quantitative estimates using mathematical, statistical, engineering calculations, and more.	Allows for the application of scientific research methods to the operational processes of the enterprise. In a crisis, enterprise management is seen as a logical process, and complex organisational situations are modelled. The use of mathematical and statistical methods in making management decisions in crises is effective.
Complex	Taking into account technical, economic, social and other aspects	An integrated approach is a specific methodological strategy aimed at obtaining multidimensional, interdisciplinary knowledge regarding complex objects of different qualities and their multiple causes that lead to an

	of management.	integrated view of the object. It is this strategy that is based on the current interpretation of crisis prevention technologies.
Integration	Establish relationships between individual subsystems and elements, levels, management entities of the management system.	An integrated approach to enterprise management in a crisis allows the interested customer to offer an attractive product most optimally with lower distribution costs, and thus achieve market advantages. The concept of integration includes the optimal allocation, distribution and control of investment, human, marketing and technological resources, the combination of which ensures the maximum profitability of the enterprise.
Normative	Comparison of several financial indicators with established standards. Failure is a sign of bankruptcy.	This makes it possible to determine the extent to which all urgent liabilities of the enterprise can be satisfied at the expense of highly liquid assets within the statutory period. If the value of this coefficient is less than one, then the current state of payment security should be considered unfavourable.
Dynamic	Consideration of the object of control in dialectical development, cause-and-effect relations, and subordination.	The dynamic approach sees crisis as a process; all indicators used in the model are analysed as time functions. In such an analysis, the focus is not on some “final” indicator of stability, but on the structural features of the system’s change over time.
Functional	Consider it as a set of functions that must be performed to meet a need.	In its pure form, its use in crisis conditions is not recommended, as the increase in specialisation which accompanies it leads to the isolation of functional units and the weakening of functional connections. In today’s dynamic environment, this is

		unacceptable for an enterprise as a single "organism".
Marketing	Orientation of the control subsystem to the consumer.	Applying this approach implies that the company has a well-organised system for data collection and monitoring, so there is time to minimise the negative and turn it into a benefit. The marketing approach in solving the main problems of the enterprise in times of crisis will help that enterprise to continue its active commercial activity. Businesses with intangible marketing assets – a large number of loyal customers, a good reputation, a well-known brand, and professional marketing – have more opportunities to escape the crisis.
Reproductive	Focus on continuous resumption of commodity production to meet market needs at a lower cost.	The regeneration approach involves identifying important connections between the stages of the life cycle and the individual cycles of the crisis process. As for the management of the enterprise in times of crisis, the approach is aimed at validating, correcting or rebuilding the structural quality of the elements of the reproduction process, substantiating strategies and tools to ensure the elimination of crisis factors.
Behaviour	Help the employee realise their full potential.	In a crisis, effective management is achieved not only through the personal qualities of the leader, but also through the way he/she behaves towards his/her subordinates. This approach focuses on the actual behaviour of the leader who wants to motivate people to achieve the goals of the enterprise.
The project	Consider the crisis in the enterprise as a project	View the set of tasks designed to bring an enterprise out of crisis as a general set of sub-tasks of the project or group of projects (programmes).

Crisis management is defined by the ability to use mechanisms in the following subsystems of the enterprise: personnel, finance, production and

marketing; these subsystems help the enterprise to overcome the crisis with minimal allowable costs. The relationship between the types of anti-crisis measures and the types of crises is discussed in Table 2.3.3. Numerous anti-crisis measures are being taken for enterprise management to restore the activities of enterprises. The development of measures for crisis management of the enterprise is a complex and time-consuming process that ensures the mandatory implementation of all key management functions: analysis, planning, organisation, promotion and control.

The main tasks of anti-crisis measures are:

- overcoming the insolvency of the enterprise;
- restoration of financial stability;
- prevention of bankruptcy and liquidation of the enterprise;
- minimisation of the negative consequences of the crisis.

Table 2.3.3.

Anti-crisis measures and their relationship with crisis types[54]

Types of crises	Anti-crisis measures
Regular – triggers a new cycle, during which the economy goes through four consecutive stages and lays the groundwork for subsequent crises. These types are characterised by the fact that they cover all sectors of the economy and achieve great depth as well as sustainability.	The next steps are strategic and tactical management decisions to overcome the deep crisis, which include major structural changes in the enterprise, where the application of other measures is already ineffective.
Periodic – crises that recur with a certain cycle.	Preventive measures are tactical and strategic management decisions that reduce the risk of future insolvency.
Incorrect – does not cause a new cycle, but stops the ascent or recovery phase for a whilst. It is less deep and less long compared to periodicity and, as a rule, has a local character.	Emergency measures are urgent measures aimed at quickly restoring solvency in a scenario which is already a crisis.

In the context of a protracted crisis, enterprise management cannot be effective without developing appropriate principles that are taken as a basis.

The main principles of enterprise management are as follows:

- The principle of consistency is aimed at ensuring the development of all areas of the enterprise based on the identification of internal reserves;

[54]Vorobyov A.A., Identification of the presence and determination of the causes of the crisis at an industrial enterprise / A.A. Vorobyov // Problems of the modern economy. - 2014. - No. 4(52). - S. 127–130.

- The principle of authenticity necessitates the study and comparison of the quality of the company's products and competitors;

- The principle of impartiality allows the company's management to make management decisions, taking into account the real state of the market environment;

- The principle of novelty; scientific and technological development means a continuous process of improving the scientific and technical level of the enterprise;

- The principle of sustainability depends on the ability to predict situations aimed at preventing or reducing economic risks.

The development of anti-crisis measures should be based on methodological and methodological tools, whilst also taking into account the requirements of the legislation on bankruptcy of enterprises. The process of establishing crisis management can be divided into the following stages:

1) Making decisions on the need for anti-crisis management;

2) Establishment of a committee responsible for the development of anti-crisis management measures;

3) Definition of the purposes, tasks, functions and powers of the department;

4) Development of measures to eliminate or minimise crisis factors;

5) Performance monitoring.

It should be noted that each company chooses anti-crisis management methods that are consistent with its overall strategy, market position, and so on. The factors that create this crisis depend on the degree of impact of the factor and the degree of sustainability of the enterprise. The results of such a rating allow management to highlight the tasks that need to be addressed in the first place to prevent the formation of a crisis. It should be noted that the rating of factors affecting the sustainability of the enterprise may have individual characteristics for enterprises in different industries and scales of activity. The sustainability of an industrial enterprise is viewed as its ability to minimise or prevent the effects of crisis factors, via timely forecasting of the occurrence of negative factors; determine the nature of the affected object; developing of effective anti-crisis measures; and implementing the set tasks. The current dissertation offers a scale for assessing the level of resilience of the enterprise to the effects of negative factors. The specifics of the choice of management decision to be made by the management of an industrial enterprise depend, in many respects, on the nature of the crisis events and the circumstances and actions that give rise to them.

CHAPTER 3. A CASE OF POLAROID COMPANY

3.1. Early period to start the business

Founding

Polaroid was an American company best known for its instant film and cameras. In 1937, Edwin Land and physics teacher George Wheelwright founded the Polaroid Company in Cambridge, Massachusetts [55] to develop and commercialise polarising polymers. [56] Polaroid's initial market was polarised sunglasses which grew out of Land's self-directed research on the polarisation of light. Wheelwright was an organisation with the necessary financial capacity and agreed to finance the company. The first customer was Kodak. After some initial success developing polarising filters for sunglasses and photographic filters, Land received funding from numerous Wall Street investors to expand further.[57]

At first, none of Polaroid's operations were related to photography. Indeed, polarised 3D glasses were privately demonstrated in 1934 for use in projecting and viewing 3D images. 3D glasses were shown to the public at the New York World's Fair in 1939-1940. These glasses began to be used in practice only after the invention of plastic polarisers by Edwin Land.

In December 1936, the Polaroid on Parade at the New York Museum of Science and Industry introduced the first 3D film to the general public. No details about the glasses are available. In 1939, New York World's Fair, a short polarised 3D film, was shown in the Chrysler Motors Pavilion and was seen by thousands of visitors each day. Cardboard glasses could be used and taken away as free souvenirs. Following this, the purchase of real glasses by consumers increased. Polaroid holds a patent for its polariser technology and began using polarisation in products including 3D films and safety glasses for military dogs.[58]

Military business

Military production and development began in 1940. In 1939, an order was received from the American government for the development of projectiles. Binoculars, periscopes, night vision devices, and optical devices for aerial reconnaissance were developed during World War II. From the early years of the Cold War, Land played a major role in the development of photographic reconnaissance and intelligence-gathering efforts. Projects included the Genetrix balloon-borne cameras, the U-2

[55] https://en.wikipedia.org/wiki/Polaroid_Corporation
[56] "History of Polaroid and Edwin Land". *Boston.com*. Boston: The New York Times Company. 2012-10-03. Retrieved 2015-01-31.
[57] https://www.polaroid.com/history
[58] Earls, A. Rohani, N. (2005). *Polaroid*. Charleston, SC: Arcadia. p.41. ISBN 9781531621797.

programme, the Corona and Samos photographic satellites, and a manned orbital laboratory. In addition to all of this, he was a consultant for the National Defence Research Committee, which focused its efforts on non-governmental scientific research.

In the military business, Land mainly produced and sold the following products: 1) Production of army glasses; 2) Optics and sights were developed for reconnaissance aircraft and bombers; 3) Photo 3D technology.

Edwin Land fully formed the company's primary financial support and capabilities during World War II. This was because, during the said war, the company had 1,250 employees, and an annual turnover of $16 million whilst 87% of the sales of the company's products were used for military purposes. [59] During the war, Polaroid contributed $2 million towards Hectograph production and established the Polaroid War School, where more than 1,500 military personnel learned how to make Hectographs.[60]

After the war, the business was forced to change. From 1943 to 1946, the development of the Polaroid instant camera was a closely guarded secret. One of the main problems was the durability of the cassette: in order to reach the final customer, it had to go through conveyor belts, warehouses, trucks, stores, bags and illegal routes, where the product would not be damaged by pressure cracking or impact.

After the war and instant camera idea

After the war, the growth of the American economy made it possible for new industries to flourish. One of these industries was instant photography. Following the said war, the American government ordered Polaroid to produce a product for mass consumption by people. In 1944, Edwin Land began thinking about creating a device that would allow one to take pictures.

One day in 1943, whilst vacationing in Santa Fe, Land's three-year-old daughter, Jennifer, asked why the photograph could not be viewed immediately after it was taken. It was this simple childish question that became the starting point for Land's work on a new kind of film. Later, Land recalled that in an hour he put together in his head all the conditions and components necessary to implement the technology. It was then that he

[59] Sales figures based on "Net Sales and Income from Royalties, Research and Other Sources," Polaroid Corporation Annual Report 1941, and "Net Sales & Income from Royalties, Research and Other Sources," Polaroid Corporation Annual Report 1945, 5. Employee figure from Polaroid Corporation: A Chronology, 1930–1980, 1, Polaroid Public Relations and Communications, 1983, Polaroid Corporation Administrative Records, Box I.243, Folder 2, Baker Library, Harvard Business School.

[60] https://www.library.hbs.edu/hc/polaroid/a-research-and-manufacturing-company/innovation-and-the-war-effort/

decided to develop instant photography. Obtaining a patent and implementing the idea took five years.

In 1947, a new type of camera was presented at the meeting of the Optical Society of America. The camera had special mechanisms that pulled the film and applied reagents to it, with those reagents developing the image inside the device and the finished photo being produced. The quality of the pictures was lower than those obtained in photo shops, but the fact that there was no need to spend time and effort acquiring the finished result made this device very attractive to the average user.

1948 was an important year for Polaroid, since it saw the first cameras enter the retail market. Also developed were special cassettes that were easy to carry and install on the device. Such a camera was not cheap, but it was not considered a luxury. This invention was aimed at the middle class. By 1950, the millionth cassette package had been produced. It was a success.

The world of amateur photography had changed. Polaroid cameras were used more and more on holidays and at various party gatherings. They were very convenient, because the guests could immediately take ready-made pictures with them. The use of photo labs became less frequent.

Polaroid photography focused on minimising the time between taking the photograph and viewing the image. However, the first Polaroid camera, which debuted in 1948, still relied on the photographer to time the development of the film, pull out the print to burst a pod of developing chemicals and peel away the top film. These first film prints were in sepia-tone, followed by black and white prints in 1950. The Polaroid company actually published a magazine advertisement for their black and white film before it was available, and their employees worked quickly to meet the public demand.

3.2. Period of growth

Instant camera

The instant Polaroid cameras introduced between 1948 and 1972, despite being very popular with customers and financially successful projects, did not fully meet Land's vision of what instant photography could be. In 1944 Edwin Land developed an instant black and white photographic system and launched an intensive research programme. It aimed to create black and white photographs using research software. In 1947, he released the first instant camera.

This invention allowed Polaroid to launch its first instant camera, the Polaroid Model 95, in 1948; the product sold out nearly immediately. Instant cameras proved to be a success, although they were first popular mostly amongst the affluent, who could pay the high price. In 1949,

Polaroid film and cameras created black-and-white photos in 60 seconds. Over 4,000 dealers across America sold Polaroid cameras and film. This kick started economic growth.

Instant film

a) Model Swinger – $19.95

During the 1950s and 1960s, Polaroid cameras became smaller, better, and more popular, especially after the company introduced the first colour film in the Colourpack camera in 1963, as well as a cheaper camera model, the Swinger, in 1965, which was aimed at teens.[61] In 1957, the Polaroid Instant Black and White Transparency System was introduced for medical applications, followed by in 1960, the introduction of the first automatic exposure camera with an electric eye. Although Polaroid sales reached $400 million in the late 1960s, Land wanted to go a step further and find a way to create an even more compact camera that could be carried around at all times and could easily shoot in an auto mode.[62] The razor-blade (Teece, 2010) business model played a key role in the company's economic growth, and there was a strong belief in the said model (Teece, 2010). Whilst Polaroid had initially made money on both camera hardware and film, in 1965, with the introduction of the "Swinger" model, a decision was made to adopt a razor-blade pricing strategy. The firm dropped prices on cameras in order to stimulate adoption and subsequent demand for film.[63]

b) Model SX-70

In 1966, Polaroid began developing Instant Colour Movies, Polavision. This concept materialised into another popular model, the SX-70, which sported a collapsible design and required an extensive amount of money to be spent on developing a more complex camera system and manufacturing power to keep up with the demand. In 1971, the Photo Identification System was introduced.

In 1972, the revolutionary SX-70 photographic system implemented Dr. Land's concept of absolute one-step colour photography, producing a dry photo developed in full sunlight in seconds. In the same year, after much development and an investment of $600 million, Polaroid introduced the SX-70; Edwin Land had, in fact, bet the company on the new camera

[61] https://petapixel.com/2021/08/25/the-rise-fall-and-revival-of-polaroid-the-instant-photography-icon/
[62] https://petapixel.com/2021/08/25/the-rise-fall-and-revival-of-polaroid-the-instant-photography-icon/
[63] Tripsas, M. and Gavetti, G., "Capabilities, cognition, and inertia: evidence from digital imaging". The SMS Blackwell Handbook of Organizational Capabilities (2017), pp. 393-412.

system. A billion Polaroid images were taken in 1974, and within a few years Polaroid had reached over $1 billion in annual sales.[64]

Polaroid's R&D department has been involved in digital photography since the 1960s. By 1970, the Polaroid company was growing rapidly, as it owned 15% of the camera market in the US.[65] Edwin Land also developed and filed dozens of patents for high-speed imaging solutions. In 1972, the Polaroid SX-70 became the world's first fully automatic pocket camera. It was produced from 1972 to 1981.

In 1972, the Polapulse battery was developed to power the SX-70 camera and was introduced for other commercial applications. In 1974, Polaroid estimated that more than 1 billion instant prints would be made.

c) Pronto! and OneStep series

The Polaroid Pronto![66] is an instant camera for the SX-70 format. Priced at $66 (approximately $270 in 2014) when it was introduced in 1976, it was a third of the price of the SX-70, the latter of which was the first non-folding SX-70 camera. Polaroid's SX-70 camera may have been inventor Edwin Land's instant photography breakthrough, but it came at a price. To bring the joy of SX-70-style instant photography to everyone, Polaroid needed to introduce a cheaper camera, and the Pronto! was it. The Pronto! was sold to the international market, outside of the US.

Pronto! offered an electronic shutter and fully automatic exposure, as well as a three-element, 116mm f/9.4 plastic lens. For indoor photos, one could clip a flash bar to the socket above. Pronto! was an approximate focus camera – the user rotated the ring around the lens to set the distance to the subject. Otherwise, everything about this camera was fairly basic.

In 1977, Polaroid introduced the $39.95 OneStep.[67] In the late 1970s and early 1980s, this camera was advertised endlessly on television. Achieving this price point by offering a fixed-focus and single-element 103mm f/14.6 lens was the key to success.

The Pronto! body was also adapted into a top-of-the-line rigid-bodied camera for SX-70 film, namely the Pronto Sonar OneStep.[68] It sold for $99.95 upon introduction in 1978. This was the second most fully featured Polaroid camera available, after a variant of the SX-70 that shared this camera's innovative sonar autofocus system. The Pronto Sonar OneStep

[64] https://notquiteinfocus.com/2014/07/22/a-brief-history-of-photography-part-9-polaroid-instant-film/
[65] https://predictableprofits.com/the-collapse-of-polaroid-4-reasons-why-polaroid-failed-and-what-we-can-learn/#:~:text=By%20the%201970s%2C%20Polaroid%20had,cameras%20in%20the%20late%201990s
[66] https://blog-jimgrey-net.translate.goog/2014/02/24/polaroid-pronto-and-polaroid-pronto-sonar-onestep/?_x_tr_sl=en&_x_tr_tl=uz&_x_tr_hl=uz&_x_tr_pto=wapp
[67] https://www.polaroid-passion.com/manuel/manuel-polaroid-onestep_pronto.pdf
[68] https://filmphotography.eu/en/polaroid-pronto-sonar-onestep/

also featured a tripod socket and a cable-release socket not present on the plainer Pronto! Pronto Sonar OneStep came with the Polatronic 2 electronic flash (model 2209). It clipped on and off the camera and connected to the flash bar socket.

Polavision

As the revenue kept growing, the instant Polaroid cameras became a household name and proved to be popular both amongst celebrities, such as Andy Warhol, and regular families who wanted to capture memories, holidays, and other personal moments. To introduce something new into the market, Land wanted to apply his instant photography idea to moving images through his initiative of Polavision – an 8mm movie system that could produce instant moving pictures. Polavision was an "instant" colour home movie system launched by Polaroid in 1977.

The Polavision system was a major commercial failure, and was discontinued in 1979. However, the underlying technology was improved and used as the basis for the Polachrome instant colour transparency system introduced in 1983.

One market niche that Polaroid promoted was the field of industrial testing, where the camera would record, for example, the destruction of a pipe under pressure. This type of use was moderately price-insensitive, with the ability to acquire the images quickly (thus reducing wasted crew time) – a very positive selling feature.

The system was late to market and had to compete with upcoming Betamax and VHS videocassette-based systems, which in the pre-camcorder era of the late 1970s had the disadvantages of much greater bulk and much higher initial hardware cost.[69] However, a standard videocassette ran for at least an hour at the highest-quality speed, whilst a Polavision cartridge contained less than 3 minutes of film, at a far higher per-minute cost than the finest videocassette tape. The cartridge could not be erased and reused, or shown on a real television set with a larger screen, and there was no sound. Polavision proved to be an expensive failure, and most of the manufactured equipment was sold off in 1979 as a job lot at a loss of $68.5 million.

A large number of patents guaranteed the preservation of an absolute monopoly. Edwin Land stated that his idea was unusual, and the entire success of the company was based solely on it. Additionally, only patents protected this idea. Polaroid abandoned its Polavision Instant Movie development programme, which had been in operation since 1977, resulting

[69] Giambarba, P. (2004-09-01), "The Last Hurrah – Polavision, 1977". *The Branding of Polaroid 1957-1977 (giam.typepad.com)*. Archived from the original on 2006-11-15. Retrieved 2006-12-01

in a $500 million loss.[70] In the wake of those losses, Polaroid Chairman and founder Edwin H. Land resigned as the chief Executive position in 1980 and left the company two years later.

The battle between Polaroid and Kodak

Despite the popularity of Polaroid cameras, the stock price was falling and, equally ominous, Kodak had gained nearly 30% of the instant camera market. In 1976, Kodak entered the instant photography market. A legal and business battle ensued between Polaroid and Kodak for a monopoly on the photography market. Polaroid alleged that it had suffered losses of nearly $4 billion when Rochester-based Kodak infringed on Polaroid's instant photography patents. Polaroid sued Kodak for infringing on 14 fundamental technology patents.

Polaroid alleged that Kodak illegally incorporated the technology into instant photography products it sold from 1976 until early 1986. Polaroid sought trebled damages of $12 billion, claiming it suffered severely at Kodak's hands through loss of market share and unfair price competition. However, Kodak claimed it had only cost Polaroid $343 million and termed Polaroid's claim "excessive."[71]

Table 3.2.1.

Technologies produced by the Polaroid company (over the years)[72]

Year	Product
Instant camera	
1938	Polarising products.
1948	Model 95, the first instant camera: sepia (brown and white) film.
1958	4x5 instant sheet film.
1959	Polaroid 80B Highlander instant camera.
1960	Passport, macro and copy cameras (Polaroid Model 900).
1963	Instant pack film (Polaroid Land Model 100 camera).
1963	First instant colour print film.
1964	Colorpack camera.
Instant film	
1965	Model Swinger
1972	SX-70 (one-step development with no waste).
1972	Polapulse battery.
1977–1981	Pronto! and OneStep series.
1977	Polavision.

[70] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf#:~:text=1977%3A%20Polaroid%20gives%20up%20on,the%20Sonar%20Auto%2Dfocus%20system%20for

[71] https://www.latimes.com/archives/la-xpm-1990-10-13-fi-1997-story.html

[72] Compiled from POLAROID-COMPLETE's data.

1984	An instant digital camera/printer product termed "«PIF" (PRINT IN THE FIELD)".
1992	Helios Medical Graphic Imaging
1994	Captiva.
Digital camera	
1996	PDC-2000.
1999	Polaroid SprintScan 4000 35mm scanner (the first scanner with a 4000 DPI CCD).[73]
1999	I-Zone camera.
2000	Polaroid PrintScan 120.
2001	Digital imaging and printing technology that integrates the wireless phone, the palm pilot, kiosks, and hand-held printers.

Table 3.2.2.

Polaroid company management system[74]

Year	Management
Dr. Edwin Land (1937–1980)	
1937	Formed Polaroid Corporation.
1940	Hectograph three-dimensional pictures system.
1944	Instant black and white, peel-apart photographic system.
1957	Instant Black and White Transparency System.
1960	Automatic exposure camera.
1963	Instant Colour Photography.
1966	Instant Colour Movies, Polavision.
1971	Identification System.
1972	Full one-step colour photography.
1972	Polapulse Battery.
1974	1 billion instant prints.
1976	A legal and business battle ensued between Polaroid and Kodak for a monopoly on the photography market. Polaroid sued Kodak for infringement of 14 fundamental technology patents.
1977	Gave up on its Instant Movie development programme, Polavision.
1978	Sonar technology.
1980	Edwin Land resigned as Chief Executive Officer.
1991	Edwin Land died
William McCune (1980–1985)	
1980	Vice President of Engineering, became CEO.

[73] "The Polaroid SprintScan 4000". Shutterbug.com. 1999-09-01. Archived from the original on 2015-05-18. Retrieved 2015-05-09.

[74] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf

1980	Substantial investment in digital imaging technologies.
1981	An Electronic Imaging Group was formed.
1981	The strategic planning document identified the following technological areas for exploration: micro-electronics, IC design, advanced optical design, image processing, software design, PC board design, surface mount assembly, CAD/CAM/FEA design, and fibre optics.
1982	Polaroid loses its marketing edge.
1983	Polaroid enters the magnetic video and diskette markets using non-proprietary technology.
	Polychrome Instant Colour Transparency System.
1984	The Micro-Electronics Laboratory (MEL) was established to compete in the emerging digital technology market with cutting-edge imaging, coating and micro-electronics.[75]
	New hybrid imaging systems that combined instant photography and electronics.
	Growth strategy with video feeds in the US electronic video market.
1985	McCune resigns as Chief Executive Officer
Mac Allister Booth (1985–1996)	
1985	Vice President of Operations, became CEO.
	Edwin Land sold all shares of Polaroid Corporation.[76]
	Established marketing development and formal market research function. Market penetration had also become a formal part of the product development process.
	The first conventional colour transparency films were distributed on a limited basis for commercial and industrial photographers.
1986	Polaroid and Toshiba Corporation jointly developed the freeze-frame video recorder.
1988	Shamrock Holdings, led by Roy Disney and Stanley Gold, attempted a hostile takeover of Polaroid under the guise of investment. This move was halted by Polaroid's stock buyback.
1989	Almost, 42% of all its R&D expenditures went on digital imaging.
1990	Three market-focused divisions – Consumer, Business, Scientific, and "Technical Imaging" – were formed in addition to a fourth: the Electronic Imaging Division.
	An electronic image marketing group was formed with new employees to focus more on the market.

[75] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf
[76] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf

	Electronic camera system with the detachable printer.
1991	Polaroid was successful in its lawsuit against Kodak.
1992	Helios Medical Graphic Imaging under development.
1995	Polaroid's state-of-the-art Micro-Electronics Lab was sold to Massachusetts Institute of Technology (MIT).
1995	Booth retired as Chief Executive Officer.
Gary Di Camillo (1995–2002)	
1995	Gary DiCamillo, a former marketing Executive at Black and Decker, was elected Polaroid's first externally elected CEO in 1995.
1996	Development and commercialisation of advanced digital cameras for use with Polaroid film.
1997	Pursues Polaroid's core technology of instant photography
1999	The success of Polaroid's new marketing strategy with the I-Zone camera resulted in a profit rebound.
2000	Polaroid captures a 16% market share with its digital still camera. Sony has 27%.[77]
2001	A poor earnings report and a heavy $935 million of debt led to mass layoffs and a collapse of Polaroid's stock price.
	Polaroid introduced a new product line of digital imaging and printing technology that integrates the wireless phone, the palm pilot, kiosks, and hand-held printers.
	Polaroid divested its Identification System business.
	By that time, a new modern hybrid industry had emerged. This industry included information imaging (INFOIMAGING), and wireless printing of files, and images. Major electronics, photography, telecommunications, and copier companies were targeting $200 billion in profits from the industry.
	Polaroid filed for protection under the bankruptcy laws of Delaware.
	Trading in Polaroid stock was terminated; the company was acquired and privatised.
2002	**Bankruptcy** (Federal filed for Chapter 11 bankruptcy protection)[78]
2001-2008	"Bank One's Chicago Branch" was purchased by One Equity Partners
	The company announced a plan that would give bonuses to the top 45 executives just for staying in the job. Additionally, the sale of these shares was prohibited.

[77] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf

[78] https://www.uscourts.gov/services-forms/bankruptcy/bankruptcy-basics/chapter-11-bankruptcy-basics

	The Polaroid Corporation changed its name to Primary PDC, Inc.[79]

Many experts believe that the dispute took a creative and financial toll on Polaroid, which was one of the earliest post-war high-tech pioneers in the US and whose founder, Edwin H. Land, holds more patents than any inventor with the exception of Thomas Edison.

The lawsuit lasted approximately 10 years, but, in the end, Kodak's behaviour was found to be incorrect. The company had to stop all development in the field of instant photography and pay Polaroid $925 million.

The image quality of the SX-70 was still inferior to that of ordinary cameras, but people did not care, because the joy of taking pictures made up for all the shortcomings. Edwin Land owned the rights to the snapshot technology, and when Kodak decided to sell its photographic equipment, Polaroid undermined the initiative with numerous lawsuits. Kodak was forced to leave this market.

3.3. Period when various bankruptcy concerns emerged

Digital camera

By the late 1970s, Polaroid was one of the leading companies in Massachusetts, with approximately 15,000 employees in the state and thousands around the world. The mistake was made in the late 70; at that time, Polaroid released a new device for recording instant film. The camera was called Polavision.

This innovation was not very successful. The videos were extremely short and silent. Tape recording, developed by many companies at that time, became more widespread due to the availability and high quality of sound. Polaroid suffered losses. The video market bypassed Edwin Land. He was so worried about this that he resigned and left his position as company manager.

At the beginning of the new century, Polaroid remained on the fringes of the photography market, as it was impossible to compete with digital photography, and Polaroid's digital technology was underdeveloped.

The first reason was the complexity and inconvenience of the Polavision technology, which led to a financial loss of $500 million. The second reason was the availability of magnetic videotape and diskettes in the photography market, which were simpler and more convenient than the Polavision technology of competing small companies. The financial loss ended Edwin Land's 43-year tenure as CEO and Chairman. He resigned

[79] https://mentalitch.com/why-did-polaroid-fail/#:~:text=The%20old%20Polaroid%20Corporation%20changed,no%20commercial%20operations%20or%20employees

from Polaroid in 1980 and pursued his technological passions at the Rowland Institute of Science. He left a legacy of a strong entrepreneurial culture.[80]

William McCune the CEO of Polaroid and Direction of Electronic Imaging

McCune was named president and CEO of Polaroid in 1980.[81] McCune had a lifelong career at Polaroid and, whilst CEO, created the MEL and began using the Polaroid global brand for non-proprietary technologies such as magnetic video and diskettes. McCune began by investing heavily in digital imaging technologies.

When McCune took over the management of Polaroid, he began to further develop research for electronic technology. For this purpose, in 1981, he organised an Electronic Imaging Group as a part of the company's MEL. For the Electronic Imaging Group, research into electronic technologies such as micro-electronics, IC design, advanced optical design, image processing, software design, PC board design, surface assembly, CAD/CAM/FEA design, and optical fibre was the main task.[82] In addition, this new group of electronic technologies was supposed to form the scientific basis of Polaroid's research projects. Therefore, approximately 90% of the employees of the MEL were newly hired. The development of completely new electronic technology possibilities was intended to ensure the priority of Polaroid in the electronics and photography market.

"PIF" (Print in The Field) concept

The Electronic Imaging Group conducted continuous research to ensure Polaroid's primacy and to create competitive technology in the electronics and photography markets. As a practical result of this research, it produced a rapid digital camera/printer technology called "PIF" (Print in The Field). The technology was an innovative hybrid product that combined electronic semiconductor (CCD) sensors for image acquisition, software for image enhancement, and fast film for image output. A patent (US No. 4,937,676) was obtained in 1990 for this innovative hybrid product.[83]

The "PIF" (Print in The Field) concept was clearly intended to be commercialised based on Polaroid's business model. This technology took advantage of the firm's strong film production capabilities, as the release was to be on instant film. Since the digital camera came with Instant Movie

[80] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf
[81] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf
[82] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf
[83] Tripsas, M. and Gavetti.G., "Capabilities, cognition, and inertia: evidence from digital imaging". The SMS Blackwell Handbook of Organizational Capabilities (2017), pp.393-412. https://faculty.tuck.dartmouth.edu/images/uploads/faculty/giovanni-gavetti/capabilities_cognition.pdf

output, the product had specific software. In addition, the technology product was convenient for users to always print in hard copy.[84]

During the early years of William McCune's management, Polaroid faced stagnant growth for the first time in the 1980s due to declining demand in the traditional instant photography market. After 30 years of double-digit annual sales growth, overall sales actually declined between 1980 and 1985.

MacAllister Booth the CEO of Polaroid

MacAllister Booth succeeded McCune in 1985 and became Polaroid's third CEO. Booth was also a lifelong employee of Polaroid, rising to Executive Vice President of Operations before being promoted to CEO.

To stem the decline in overall sales, Mac Allister Booth initially focused heavily on marketing and established a formal market research function. Market penetration also became a formal part of the product development process.

In 1981, MacAllister Booth encouraged investment in the electron imaging group and MEL founded by William McCune. As a result, the MEL opened in 1986 after a capital investment of approximately $30 million and an operating budget of approximately $10 million per year. By 1989, 42% of R&D dollars were devoted to research into a broad spectrum of digital imaging technologies.

By the end of 1989, Polaroid had not only continued to develop its expertise in technologies related to traditional instant photography, but had also developed advanced technical capabilities in numerous areas related to digital imaging. Under Edwin Land and William McCune, from 1976 to 1980, the share of the firm's patents related to electronics was only 6%, but as a result of Mac Allister Booth's management success, this figure increased to 28% from 1986 to 1990.[85]

Polaroid's research also included promising practical developments. In particular, Polaroid's image sensor technology had a strong track record and a number of advantages over competing companies. These advantages were as follows:

1) Whilst competing companies had sensors that produced quality files of up to 480,000 pixels, Polaroid had managed to create sensors that produced extremely high-quality files of 1.9 million pixels.

2) Polaroid also held a patent on the ability to use rectangular rather than square pixels, which improved colour reproduction of varying quality.

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[84]Tripsas, M. and Gavetti.G., "Capabilities, cognition, and inertia: evidence from digital imaging". The SMS Blackwell Handbook of Organizational Capabilities (2017), pp.393-412.

[85] Tripsas, M. and Gavetti.G., "Capabilities, cognition, and inertia: evidence from digital imaging". The SMS Blackwell Handbook of Organizational Capabilities (2017), pp.393-412.

3) Most compression algorithms in the camera had developed proprietary lossless compression algorithms that prevented data loss and image quality degradation.

Thus, by 1989, Polaroid had a number of options to develop and commercialise an advanced digital camera. Although, these opportunities could not be turned into a successful business,[86] in 1989, almost 42% of all Polaroid's R&D expenditures went on digital imaging. Polaroid was the largest seller of digital cameras in the late 1990s. In 1990, electronic imaging moved up in the corporate hierarchy as part of a major reorganisation. An Electronic Imaging Department was established to deliver technological project products for Polaroid's market-orientated (consumer, business, scientific/technical imaging) divisions. Research into fibre optics, solar cells, and disk drives ceased in the 1990s as a result of research and development cuts in the 1980s. Additionally, in 1993, the MEL was sold to MIT. Therefore, most of Polaroid's basic micro-electronics research was completed.[87] Besides, in 1991, under MacAllister Booth's leadership, Polaroid prevailed in a patent infringement lawsuit against Kodak and was awarded $925 million.[88]

The Helios Graphic Medical Imaging System

The Polaroid company continued to finance digital imaging and implemented the Helios (medical system) project as its second direction. This project aimed to develop and implement medical imaging systems, a dry treatment laser imaging device, and a printing device for X-rays in hospitals. In 1993, the Helios project was produced and commercialised, and Polaroid believed it would provide a competitive edge in the imaging market. Helios used a high-energy laser to open the dry film material. Polaroid intended to provide radiologists with a high-quality product for X-rays in hospitals.[89]

However, the product never covered its costs. The Polaroid Helios was presented as a work in progress at the 1989 meeting of the Radiological Society of North America (SCAN1/17/90). The company received 510(k) clearance for Helios from the Food and Drug Administration.

The starting price of Helios was $55,000 for a video image processing printer and $60,000 for a printer configuration with a digital image interface. It was considered the key to Polaroid's success in the markets and the corporate achievement of the decade's high profits. Helios also fits with the belief in large-scale invention. Despite huge investments in Helios, commercialisation was delayed by three years. The Helios

[86] https://faculty.tuck.dartmouth.edu/images/uploads/faculty/giovanni-gavetti/capabilities_cognition.pdf
[87] Tripsas, M. and Gavetti.G., "Capabilities, cognition, and inertia: evidence from digital imaging". The SMS Blackwell Handbook of Organizational Capabilities (2017), pp.393-412.
[88] https://www.middletownpress.com/news/article/After-years-of-success-Polaroid-develops-problems-11915889.php
[89] https://faculty.tuck.dartmouth.edu/images/uploads/faculty/giovanni-gavetti/capabilities_cognition.pdf

Graphic Medical Imaging system failed during commercialisation ($-600 million).

In 1990, Polaroid's Electronic Imaging Group underwent drastic structural changes. Because the Polaroid company focused on the production of digital technologies, in addition to its internal staff with long-term digital technology experience, new external staff with experience in digital imaging and other high-tech fields were recruited. In line with the company's market-orientated strategy in business management, an electronic image marketing group with a completely new staff was established. This group was tasked with conducting research to develop a digital camera product. These case studies were necessary to advance Polaroid's overall development projects. Therefore, in 1994, another outsider was recruited to lead the entire group. This outsider brought in experienced people from outside to implement the company's overall development strategy and appointed them to key strategic positions in the Electronic Imaging Group.[90]

Gary DiCamillo the CEO of Polaroid

In 1995, the board of directors appointed Gary DiCamillo as CEO and Chairman of Polaroid. DiCamillo had been vice president of marketing at Black and Decker before becoming Polaroid's first outside Executive. He brought with him a new top management team. Of 25 directors listed in the 1998 Annual Report, 15 had joined Polaroid after DiCamillo's arrival.[91] With a back-ground in consumer marketing, DiCamillo decreased the focus on technology even more.[92] Under DiCamillo's leadership, a new state-of-the-art hybrid industry emerged. This industry included information imaging (INFOIMAGING), and wireless printing of files, and images. Major electronics, photography, telecommunications, and copier companies were targeting $200 billion in industry profits.

Gary DiCamillo's early career focused on reducing financial hardship. After Helios lost $180 million in the digital imaging market in 1994 and $190 million in 1995, Polaroid completely abandoned its medical imaging venture, dubbed Project Helios, in 1996. Polaroid invested $800 million in the Helios project. However, Helios sold most of the device to Sterling Diagnostic Imaging Inc. Consistent with this approach, research and development expenses were reduced from $165.5 million in 1995 to $116.3 million in 1996. DiCamillo and his team once again focused on marketing in the instant photography and digital imaging industries. Although the

[90] Tripsas, M. and Gavetti.G., "Capabilities, cognition, and inertia: evidence from digital imaging". The SMS Blackwell Handbook of Organizational Capabilities (2017), pp.393-412.

[91] https://faculty.tuck.dartmouth.edu/images/uploads/faculty/giovanni-gavetti/capabilities_cognition.pdf

[92] https://www.bain.com/insights/the-breakthrough-imperative-how-the-best-managers-get-outstanding-results/

amount of money allocated to R&D decreased, the amount spent on advertising in 1996 was $134.6 million.[93]

PDC-2000

Polaroid was positioned to excel in digital technology. The company's digital technology was ready for production and commercialisation in 1992. Polaroid's marketing department also emphasised that its new digital technology (PDC-2000 camera) was superior to that of other competitors in terms of price. However, in 1996, the PDC-2000 camera was brought to the market with many delays. Nevertheless, by this time there were more than 40 successful companies selling digital cameras in the photography market. The PDC-2000 was released on March 11, 1996 in the US, and on August 30, 1996 for mass sale. The product was a high-end professional digital camera with a CCD designed by Polaroid, and was manufactured entirely in Massachusetts, New England. The ETIPA (European Technical Image Press Association) selected this camera as the best digital product of 1996. First, it was unlike any other camera on the market at the time. Its body was made of durable and indestructible magnesium alloy, and it had a sonar autofocus mechanism. For a long-delayed digital camera, Polaroid's old razor-blade (Teece, 2010) business model had to take a different path when selling to customers. This was due to the fact that the competitor selling digital cameras in the market had to ensure an advantage over the successful companies. Therefore, the Electronic Imaging Division has requested sales support for the PDC-2000 separately. However, these efforts were ineffective.

The camera was considered a highly refined variant of the SX-70 model. Another interesting feature was the ability to remove the lens and replace it with an optional 17 mm lens ($199). Additionally, the camera had a large and expensive 40/60MB hard drive on board. Other cameras at the time only had a 1 – 2 MB equivalent. Its unique design was created by Matthew Hearn of FITCH and Product Genesis.

The product's image dimensions were 800x600 pixels and could be interpolated to 1600x1200. The camera weighed a little over two pounds. It had a SCSI-2 connector so that images could be transferred faster than with the regular serial port.[94] Because the camera had no manual focus the images appeared soft and a sharpening filter substantially helped improve the image quality. On the downside, the camera did not allow the user to manually change anything. There was simply no way for the user to

[93] Tripsas, M. and Gavetti.G., "Capabilities, cognition, and inertia: evidence from digital imaging". The SMS Blackwell Handbook of Organizational Capabilities (2017), pp.393-412.
[94] https://www.digitalkameramuseum.de/en/cameras/item/polaroid-pdc-2000

manually change focus, exposure, shutter speed, aperture settings, metering, or red-eye reduction.

In 1996, with ease for customers in mind, the Polaroid PDC-2000 was made available in three different editions.

PDC-2000/40 – internal 40MB memory hard disk ($3,695)

PDC-2000/60 – internal 60MB memory flash drive ($4,995)

PDC-2000/T – no internal memory; the camera had to be tethered to a computer ($2,995)

Polaroid occupied a unique space in the digital market, offering exceptional image quality and special features to support studio photography. In 1996, Polaroid released the PDC-2000, setting a new standard for image quality at a retail price of $2.495, “Studio Kit”.[95]

Polaroid soon discovered that many of its units were finding use in studio-based product photography, and, with remarkable agility for a corporation of their size, responded with a “Studio Kit” which provided studio strobes, and gave the photographer more control over the camera. Polaroid's PDC-2000 cameras cost from $2,995 to $4,995, depending on the specification; the PDC-2000 could take “high definition” photos at 1600x1200 pixels, both at 24 bits per pixel. For $3,695, a consumer could buy a PDC-2000 with 40 megabytes of storage on a tiny hard drive. Additionally, for $4,995, one could buy a camera with 60 megabytes of memory and solid-state flash memory. Whilst the PDC-2000 was slightly pricey for home use, it was essential for commercial photographers and graphic designers who needed a quick way to put high-quality images onto their computers.[96]

Bankrupt

DiCamillo pursued Polaroid's core technology by developing and marketing a variety of new instant cameras and film products. Polaroid introduced its digital camera line in 2000 and quickly captured a 16% market share of the digital camera industry. In 2001, Polaroid introduced a new product line of digital imaging and printing technology that combined a cordless phone, palm pilot, kiosks, and hand-held printers. On October 31, 2001, Polaroid filed for bankruptcy protection under Delaware's bankruptcy laws. Polaroid shares were suspended and a private investment group bought the company to continue its operations.

It turned out that the management of the company was not ready for changes. Polaroid still released digital cameras in the shadow market, but the Japanese manufacturers had by then taken a big step in this direction and Polaroid could not catch up. People's interest in instant photography

[95] https://www.imaging-resource.com/PRODS/P3K/P3KA.HTM
[96] http://www.epi-centre.com/reports/9604ahs.html

faded, and digital technology excited the masses. Indeed, after a potential purchase of Polaroid by another firm proved unsuccessful, the company found itself mired in substantial debt. Huge losses forced the company to declare bankruptcy in 2001.

Gary T. DiCamillo, Chairman and CEO of Polaroid Corporation, resigned effective July 1, 2002. He continues in his position at Polaroid to this day and remains a member of Polaroid's board of directors.[97]

Part of the company was taken over by Imaging Corporation. In 2003, there was another attempt to return to the market. The company released a digital camera, which also failed to sell. Polaroid filed for bankruptcy five years later. The company has long been restructured and, in 2009 another Polaroid PoGo Instant Digital Camera was introduced. It had an internal colour printer that allowed users to print colour pictures. All of this happened because of the sudden rise in popularity of Polaroid non-ready digital cameras. In 2011, a new hybrid digital camera Polaroid Z340, was released; this product took into account all the shortcomings of the bulky classic camera and used the latest digital technologies, with Polaroid making a triumphant return to the world market.

[97] https://www.dpreview.com/articles/6538916897/polaroidsale

CHAPTER 4. FINDINGS

4.1. History of product development and introduction

The Polaroid Corporation is one of the most scientifically researched, controversial, and obscure companies of all time. Some might argue that it has been seriously mismanaged throughout its complicated history. The original research and development was conducted by Edwin Land, the founder of Polaroid, from 1926 to 1901. Because his research was aimed at a specific goal, the Polaroid company spent 42% of its annual income on scientific research and design work, moving from practical research to experimental research. From 1948 to 1978, Polaroid grew at an average rate of 23% per year. However, this growth could not ensure its continuous development. Polaroid filed for bankruptcy in 2001 and was painfully broken into pieces. In 2002, an investment group bought part of Polaroid,[98] following which the Polaroid company did not recover.

1. Land Camera (Model 95)

Applied research on the polarisation of light. Edwin Land's research, led to glasses that protected against the polarisation of sunlight, capturing the initial market through an innovative product of its time. As a result, Land founded Polaroid.

Based on his practical research, he implemented experimental developments; that is, during World War II, as a state contractor company, Polaroid produced weapons for the war. Polaroid patented its polariser technology and began using polarisation in products including 3D films and safety glasses for military dogs. During World War II, Polaroid designed and manufactured many products for the armed services, including an infrared night vision device.

The second of Edwin Land's case studies is the Land Camera (Model 95). The first public demonstration of his new Land Camera was held in February 1947; this product is a self-developing film camera model produced by Polaroid between 1948 and 1983. During the period spanning 1943–1947, Land developed the process of self-photography. When he retired from Polaroid in 1982, the "Land" name was dropped from the camera name. The first commercially available Model was the 95. In 1948, the first Land Camera, the Model 95, was sold in Boston at the Jordan Marsh department store on November 26 for $89.75. This model was the prototype for all Polaroid Land cameras produced for the next 15 years.[99] In 1949, photographic sales of the Land Model 95 camera exceeded $5

[98] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf
[99] https://srbijafoto.rs/en/2013/08/24/kratka-istorija-polaroid-fotografije/

million during the first year. Land hired Ansel Adams as a film consultant, initiating a long tradition of working with and supporting photographic artists. Several young photographers, including Paul Caponigro, William Clift, Nick Dean, and John Benson, joined the company in the 1950s and 1960s. Polaroid Land Model 95 made by Polaroid in the US throughout the period spanning 1948–1953.

The product was a folding camera for self-processing film packs measuring 3 ¼ by 4 ¼ inches. It had a lens sporting a rotating plate with apertures marked 1-8. It also had a T/I shudder, lever focusing, and folding optical frame finder with front ball sight on a spring stalk, as well as an accessory show. Further, it was flash synchronised, with bayonet fitting.

Polaroid Corporation was most famous for its instant cameras. Early models were called Land Cameras, after the founder of Polaroid Edwin Land. Model 95 was the first of Polaroid's instant picture cameras and over 1.5 million Models 95, 95A and 95B were made. The technology packed the chemistry of a darkroom into a hand-held camera. As mentioned above, the Model 95 was a folding camera for self-processing film packs of 3 ¼ by 4 ¼ inches.[100]

2. Land Pack Film "Black & White film"

Applied research for Polacolour package film. Edwin Land's laboratory for practical and experimental research was expanded after the success of the initial cameras. Because early products at Polaroid were dependent on outsourcing to vendors or stores, with the advent of instant film around 1950, Land decided to establish a product facility to support his vision of the great demand for film, as well as to ensure the safety of his prized invention. He wanted to be near his laboratories in Cambridge, and so he located the plant 15 miles west on a farm in Waltham, Massachusetts. The building, named W1, was built in 1953 and was Waltham's first. It had a roll film receiving sheet, and Polaroid continued to purchase negative film from Eastman Kodak or Dupont. Shortly after W1 was opened, W2 was added to provide space for the stocking of roll films and later the reagent products (the developing chemicals that make it possible for the image to be transferred from the negative to the positive sheet).

With the move from Cambridge Labs to Waltham, new fast film products emerged, with huge investment in factories, workers and equipment. With regard to "Type 108 Colour" and "Type 107 Black & White film", these prototypes in package form differed from the roll version in that the negative-positive receiver sheet and the developing chemicals (pod) were packed into a rectangular package. In addition to his vision of

[100] https://collection.sciencemuseumgroup.org.uk/objects/co8085283/polaroid-land-camera-model-95-instant-film-camera-folding-camera

the perfect Instant System, Land Pack Film responded to concerns about excessive litter. With the "Type 107-108" product, the positive sheet remained with the photographer, whilst the leader, light mask sheet, and reagent pods could be carelessly thrown away, and in fact this happened quite often. Such "excess waste", which polluted national parks, recreation areas, and all public spaces became a major concern for the company and gave it a reputation that no consumer company wants.

Land also decided that the battery technology and reliability of the 1960s were not worthy of a new product. Customer services learned that the majority of film defects returned as customer complaints during the lifetime of roll and roll film sales were caused by dead batteries in the cameras. Polaroid had no control over this circular cell life, but often had to appease customers with replacement film for flash or photographic defects caused by dead batteries. The year 1961 saw the introduction of Polaroid "Positive/Negative 4×5" film "Type 55" the first black-and-white film capable of producing both a positive and a negative.

In 1963, Polaroid introduced Polacolor, following the invention of the instant colour film. The Model 100 Land camera, the first fully automatic pack film camera to include automatic exposure control, was introduced, as were the Type 48 and Type 38 Polacolor Land roll films.

The year 1965, witnessed the release of the inexpensive Swinger camera a $20 camera that took wallet-sized black-and-white photographs. This camera, until 1972, required the user to manually release the film, pull the tab, and clear the negative from the finished positive print. The first version to eliminate these intermediate steps was the 1972 "SX-70", which automatically ejected the print. The transformation of the Land Camera from practical research to experimental research is connected with the SX-70 model.

3. SX-70

In 1944, Polaroid created a special project dedicated to instant photography, code-named SX-70 ("SX" meaning Special Experiment).[101] Land devoted massive efforts to the secret project, which took place concurrently alongside other routine Polaroid manufacturing activities. Although Polaroid's "instant" cameras had been around since 1948, the first truly "one-step, instant" camera was not a reality until the SX-70's release in 1972. Until the SX-70, Polaroid instant cameras required the user to perform additional steps after taking a photograph in order to develop the photo; some cameras required the user to apply a coating to the front of the photograph, whilst others required the user to peel the negative away from

[101] SX-70 also referred to the camera system which Polaroid introduced in 1972. The camera automatically ejected images that developed in the daylight without any chemical residue.

the positive to reveal the photo. However, with the SX-70, all the user had to do was take a photo and wait approximately 1 minute for it to develop. The SX-70 was also the first instant, single – lens – reflex (SLR) camera, meaning that the camera uses a mirror and prism to enable the user to view exactly what will be photographed, rather than simply looking through a rangefinder. The SX-70 was an immediate success and popular with beginners and professionals alike; both Ansel Adams and Andy Warhol were said to have used the SX-70.[102]

The high point of experimental research on the Polaroid system was the development of the SX-70 camera and film. The project was very simple and rewarding for photographers – they only had to press the camera button and watch the image appear before their eyes. For photographers, the simplicity of the SX-70 system belied its technical complexity. A 2 mm thick film unit contained a sandwich of thin polymer sheets, a positive image-receiving sheet, reagent, time- and light-reflecting layers, and a three-colour negative – a total of 17 layers.[103]

4. *Pronto and OneStep series*

Polaroid's SX-70 camera may have been inventor Edwin Land's instant photography breakthrough, but it came at a price. The company tried to change the main shortcomings of the SX-70, which was a technologically advanced model, but a commercial failure. The SX-70 model was modified to reduce costs, and make production more efficient, and achieve consistent product quality. These models were the Pronto! and OneStep. To bring the joy of SX-70-style instant photography to everyone, Polaroid needed to introduce a cheaper camera. Pronto! and OneStep were such cameras. The result was one of the best-selling series in Polaroid history.

Polaroid OneStep Land Camera debuts. Polavision announced – a colour motion-picture system that produced 2½-minute films in self-developing cassettes. The endeavour was a short-lived commercial failure and resulted in large losses for the company.

The Polaroid Pronto![104] is an instant camera for the SX-70 format. At $66 when it was introduced in 1976, it was a third of the price of the SX-70, the latter of which was the first non-folding SX-70 camera. Polaroid's SX-70 camera may have been inventor Edwin Land's instant photography breakthrough, but it came at a price. To bring the joy of SX-70-style instant photography to everyone, Polaroid needed to introduce a cheaper camera,

[102] https://www.edmondhistory.org/polaroid-sx-70-land-camera/

[103] Edwin Land and Instant Photography, by Polaroid Corporation Laboratory, Cambridge, Massachusetts American Chemical Society on August 13, 2015.

[104] https://blog-jimgrey-net.translate.goog/2014/02/24/polaroid-pronto-and-polaroid-pronto-sonar-onestep/
?_x_tr_sl=en&_x_tr_tl=uz&_x_tr_hl=uz&_x_tr_pto=wapp

and the Pronto! was it. The Pronto! was sold to the international market, outside of America. With the Pronto! approximate focus camera, the user had to rotate the ring around the lens to set the distance to the subject. Otherwise, everything about this camera was fairly basic.

In 1977, Polaroid introduced the $39.95 OneStep.[105] In the late 1970s and early 1980s, this camera was advertised endlessly on television. Achieving this price point by offering a fixed-focus and single-element 103mm f/14.6 lens was the key to success.

The Pronto! body was also adapted into a top-of-the-line rigid-bodied camera for SX-70 film, namely the Pronto Sonar OneStep.[106] It sold for $99.95 upon introduction in 1978. This was the second most fully featured Polaroid camera available, after a variant of the SX-70 that shared this camera's innovative sonar autofocus system. The Pronto Sonar OneStep also featured a tripod socket and a cable-release socket not present on the plainer Pronto! Pronto Sonar OneStep came with the Polatronic 2 electronic flash (model 2209). It clipped on and off the camera and connected to the flash bar socket.

5. Polavision studies (produced in 1977–1980)

The Polavision was introduced in 1977 and was to be Polaroid's greatest technological breakthrough – an instant film system similar to Polaroid's instant camera. Polavision included a camera, film, and a special movie viewer that was used to develop the film and then view it. Although the system used a new type of colour addition process that allowed for immediate development, its disadvantages were significant – films lasted only 2.5 minutes; there was no sound; and the very slow hard speed required very bright lights when taking the film. The project had been in the R&D pipeline for over a decade and was championed personally by Edwin Land. Others within Polaroid were not so confident in the outcome. Polaroid's president, Bill McCune, was probably the most sceptical; he felt that Polaroid was making too big a technology bet on a new product that lacked any type of market research. After many delays, Polavision hit the market in 1977 – the same time that video-based systems were being introduced by competitors.[107]

Using Super 8mm film cartridges and a 12-inch rear-projection player, the Polavision was a proprietary system for capturing, processing, and showing film – a revival of the three-way functionality of the first

[105] https://www.polaroid-passion.com/manuel/manuel-polaroid-onestep_pronto.pdf
[106] https://filmphotography.eu/en/polaroid-pronto-sonar-onestep/
[107] https://customerthink.com/polavision_polaroids_disruptive_innovation_failure/

Lumière Cinematography. It entered the amateur arena in 1977 with a starting price of $699.[108]

Polavision promised immediacy, simplicity and efficiency; Land greatly limited the variables involved in every step of the filmmaking process in hopes of making it possible for almost anyone to make and show films. User participation was encouraged not only by offering flexibility and customisation, but also by dramatically reducing the need for expertise and decision-making.

The Polavision system was designed to be a convenient and easy-to-use alternative to traditional film-based home movie systems. It was particularly popular in the late 1970s and early 1980s, but it ultimately failed to gain widespread adoption due to the cost and various technical issues, as well as the increasing popularity of video cassette recorders (VCRs).

It is difficult to determine exactly how much Polaroid Corporation spent on developing the Polavision home movie system. The company was known for its extensive research and development efforts, and it likely invested significant resources in the aforementioned development.

The system was late to market and had to compete with upcoming Betamax and VHS videocassette-based systems, which in the pre-camcorder era of the late 1970s had the disadvantages of much greater bulk and much higher initial hardware cost. [109] However, a standard videocassette ran for at least an hour at the highest-quality speed, whilst a Polavision cartridge contained less than 3 minutes of film, at a far higher per-minute cost than the finest videocassette tape.[110] It could not be erased and reused, or shown on a real television set with a larger screen, and there was no sound. Polavision proved to be an expensive failure, and most of the manufactured equipment was sold off in 1979 as a job lot at a loss of $68.5 million. The system was discontinued in the late 1980s. In the wake of those losses, Polaroid Chairman and founder Edwin H. Land resigned from the Chief Executive position in 1980 and left the company two years later.[111]

Reasons for the failure of Polavision

1) Lack of confidence in success

Edwin Land's decision to market Polavison was widely opposed. Because the other top management team at Polaroid wasn't so sure about

[108] According to the US Bureau of Labor Statistics' Consumer Price Index inflation calculator, http://www.bls.gov/data/inflation_calculator.htm.

[109] https://en.wikipedia.org/wiki/Polavision

[110] Giambarba, P. (2004-09-01), "The Last Hurrah – Polavision, 1977". *The Branding of Polaroid 1957-1977 (giam.typepad.com)*. Archived from the original on 2006-11-15. Retrieved 2006-12-01.

[111] Blumstein, Michael (1982-07-28) "Era Ends as Land Leaves Polaroid", The New York Times. Retrieved 2008-11-06.

Polavison's success. McCune in particular was very skeptical of the success of this decision and felt that Polaroid was betting too much technology on a new product without any market research.

2) Delay of commercialisation

After many delays, Polavision hit the market in 1977 – at a time when video-based systems were being introduced by competitors.[112]

3) Non-competitiveness

The results were amazing, but expected. Polavision did not find a place in the market. The product, with its high price and poor film quality, was unable to compete in the market with Super 8 cameras and projectors whose days were already numbered due to the arrival of new video-based systems on the market.

4) Non-reimbursed costs

Polavision spent $5 million on advertising.[113]

Ansel Adams studied the system by photographing the waves off the coast of California, whilst the Eameses made several Polavision films.

Additionally, Andy Warhol and his friends documented the events in his factory.

John Lennon's home movies of Yoko Ono and their son Sean were also Polavision movies.

However, the number of buyers could not cover the development costs. Sales, projected at 200,000 systems, started sluggishly and then slowed. The failure forced Eumig, a camera contractor, into bankruptcy. Exact totals are hard to come by, but Polaroid sold approximately 60,000 systems. The actual development cost is also hard to pin down, but most sources say it was around $500 million.

Polaroid was forced to write off all R&D costs and most of the manufactured products at great cost to the company. Polaroid lost $68 million in inventory[114].

After approximately $200 million was spent on research, development, product, and marketing, Polavision was a commercial failure. By the end of the year, some retailers had cut prices by 60% (Fanelli, 1979).

5) Reviews of consumers, analysts and users

Paul Giambarba, a former Polaroid freelancer, said of the new Polavision system: “I tried to use the product, but it was a turkey compared to anything Kodak had to offer [...] Instant film was an engineering achievement, but it was Polaroid's pragmatists who developed the Polaroid technique that's what set it apart. There were few customers who practiced magic there.”

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[112] The Sony Betamax video system was introduced and commercialised in 1975.

[113] https://epdf.tips/instant-the-story-of-polaroid-5ea6c70b7cf56.html

[114] https://www.nytimes.com/1979/09/13/archives/polaroid-writes-off-68-million-itt-to-report-loss-in-quarter.html

Wall Street analyst Marvin Saffian was equally unforgiving, criticising Polavision's triple functionality as well: “Polavision is the incorrect product at the incorrect time in the incorrect market” (Langway and Malamud 1979, n.p).

6) Poor management in commercialisation

The same mismanagement that allowed Polavision to enter the market without proper market research later allowed Polaroid to completely misunderstand the impact of digital imaging on the highly profitable instant film business. The failure of Polavision was the first step in the eventual demise of the Polaroid Corporation.

7) Polaroid shares' price decline in the stock market

The company, long a favourite of investors because of the success of its high-speed cameras, declined to give details, but Wall Street analysts said there was every reason to believe the company would remain in the black in 1979. Still, Wall Street viewed the report as bullish. Polaroid shares rose 11/2 to close at $29 on the New York Stock Exchange. Polaroid shares traded as high as $54 in January of 1979, but fell steadily over the following few months due to the company's problems and turmoil on Wall Street, which some analysts attributed to the company's resistance to close scrutiny.

At the company's annual meeting in 1979, President William J. McCune Jr. stated that sales of Polaroid cameras and film had fallen short of projections. As a result, the company laid off 800 workers due to overstocking unrelated to the film system. In July 1980, after forecasting “sharply lower” profits for the second quarter, Polaroid reported a 49 % drop in profits to $13.3 million, or 40 cents a share.

8) Polavision market price was expensive

One analyst, speaking on condition of anonymity, said: “In short, Polaroid is in trouble with Polavision because the price is too high [list price $675 for the movie camera and player] and the quality is low. Unless you're sitting directly in front of the screen, you can't get a good picture”. Polaroid would soon introduce a widescreen player that it said would solve this problem.

Another analyst stated that the write-off could mean the waning influence of Polaroid's 70-year-old Chairman and a major backer of Polavision, Edwin H. Land, as well as a shift in the balance of power at Polaroid.

Robert L. Renck Jr., a photography analyst at Oppenheimer & Company, said he had not recommended Polaroid for the past year because “the price was too high and there was a potential for depression.” However, he added that he saw Polaroid's writing as a positive.

The move, he said, suggests the cutting of consumer advertising, experimenting with different price points, and the “repositioning” of the system as an industrial product.

Polaroid spokesman Donald A. Dery denied the suggestion that recording would lead to failure. “We don't consider it a failure now”, he said. “We don't see it as a marketing or financial success”.

Polaroid said in a statement that it is “strongly committed to the marketing and financial success” of Polavision. Dery announced plans for a consumer marketing experience and several special Polavision products.

9) Long-term planning of the project

For the first time, Land's originality and high-handedness were not backed up by a perfect sense of what people viscerally wanted. Morita was right: the project took too long. Polavision, which appeared in the 1940s, was a different world. In the early 1960s, when additive – colour – film research began, it was still revolutionary. If Polaroid had brought it to market in 1965, it would have been the gadget of the year, and many baby boomers would have grown up with Polavision cassettes instead of Kodak Super 8 rolls.

10) Competitor or substitute products

These years were the beginning of a worldwide technological shift. In 1964, at RCA Laboratories in Princeton, New Jersey, research began on a machine that could play television programmes from a pre-recorded disc. Inexpensive lasers (which later made CDs possible) were not yet available, and so RCA's system used a stylus that tracked a variable-depth groove.

A small, electrical capacitance across the variable gap between the needle and the disc stored the television signal. It was as bold as three technological ideas, with 000 lines of colour paint per inch. The RCA disc player came to market in 1981 under the name Selecta Vision.

Already common, Japanese-made VCRs could record as well as play. (Additionally, if one touches a Selecta Vision disk with one’s finger, the disc will be destroyed.) RCA executives believed that their player would be much cheaper than a disc that used magnetic tape. They did not believe in the amazing ability of Japanese electronics companies like Sony to make products smaller, cheaper, and thinner, and to do it quickly.

Betamax[115] recorded an analogue television signal, but it did so on magnetic tape. Recordable media that could be erased and edited became the standard because their content could be reproduced (with difficulty) over long distances, and even over the telephone.

[115] **Note:** Beta is an analog video cassette format that was introduced as a competitor to VHS in the late 1970s. Betamax was developed by Sony and was designed to offer superior picture and sound quality compared to VHS. Betamax (also known as Beta, as in its logo) is a consumer-level analog recording and cassette format of magnetic tape for video, commonly known as a video cassette recorder. It was developed by Sony and was released in Japan on May 10, 1975, followed by the US in November of the same year. Betamax is widely considered to be obsolete, having lost the videotape format war which saw its closest rival, VHS, dominate most markets. Despite this, Betamax recorders continued to be manufactured and sold until August 2002, when Sony announced that it was discontinuing production of all remaining Betamax models. Sony continued to sell Betamax cassettes until March 2016.

In the early 1970s, a company called Berkey Photo did just that. Ben Berkey has been in the photo business for 40 years, running a chain of Willoughby-Peerless stores in New York and producing cameras under the Keystone brand.

Polavision's underlying technology was eventually refined to be used in the Polarchrome instant slide film system. Without Edwin Land in command, Polaroid attempted to recast itself in the 1980s by moving away from a reliance on consumer photography, a sector that was in constant decline. Polaroid declared, in 1984, that it planned to join the US electronic video industry with its own range of Polaroid videotapes. At this point, Polaroid was compelled to implement drastic measures, including the layoff of thousands of employees and the closure of many factories. The 1990s witnessed the introduction of new technologies that significantly altered the field of photography: one-hour colour film processing, rival single-use cameras, VHS[116] camcorders, and, later, digital cameras.

6. Helios

In 1985, McCune committed substantial funds to undertake R&D on digital imaging technologies. The aim was to combine digital imaging and instant photography. Ultimately the specified goal was to develop an instant digital camera and printer product "PIF" (Print in The Field).

The other area of research was on a medical system, Helios, which was seen as offering a high-resolution substitute for X-rays. Senior management was initially very supportive of these projects because it mistakenly believed that digital imaging could be made to fit the beloved razor-blade business model (Teece, 2010). Scientists with an understanding of digital imaging were recruited. They recognised that neither project would be able to duplicate the instant camera model because digital

[116] **Note:** VHS (short for Video Home System) is a standard for consumer-level analog video recording on tape cassettes, and was invented in 1976 by the Victor Company of Japan, competing with the ill-fated Sony Betamax system. Magnetic tape video recording was adopted by the television industry in the 1950s in the form of the first commercialised video tape recorders (VTRs), but the devices were expensive and used only in professional environments. In the 1970s, videotape technology became affordable for home use and widespread adoption of videocassette recorders (VCRs) began, largely as a means for television viewers to watch programmes at more convenient times or more than once. In the later 1970s and early 1980s, the home video industry experienced a "format war" between incompatible tape standards backed by competing technology companies. Two of the standards, VHS and Betamax, received the most media exposure. VHS eventually won the war, gaining 60% of the North American market by 1980 and emerging as the dominant home video format throughout the tape media period. Optical disc formats later began to offer better quality than analog consumer video tapes such as VHS and S-VHS. The earliest of these formats, LaserDisc, was not widely adopted across Europe, but was hugely popular in Japan and had minor success in the US. After the introduction of the DVD format in 1996, however, the market shares for VHS began to decline. In 2003, DVD rentals surpassed those of VHS in the US, and by 2008, DVD had replaced VHS as the preferred low-end method of distribution. Sony Pictures Home Entertainment ceased production of VHS in late 2010 in South Korea. The last known company in the world to manufacture VHS equipment (VCR/DVD combos), Funai of Japan, ceased production in July 2016, citing shrinking demand and difficulties procuring parts. (Source: Boucher, G. (December 22, 2008), "VHS era is winding down". *Los Angeles Times*. Retrieved July 11, 2011.)

imaging is a profoundly different market. Furthermore, the development team recognised that success required investment in overcoming the firm's basic weaknesses in the areas of low-cost electronics, mass manufacturing, and rapid product development. Senior management was highly resistant to recommendations addressing these problems. It also started to become concerned that the products under development did not fit the razor-blade model (Teece, 2010). Additionally, these individuals continued to express the view that consumers would always want instant prints, rather than the ability to take a digital photograph and store the picture on a computer for printing at a later date.

Despite having created a viable prototype in 1992, Polaroid did not launch its first digital camera until 1996. Although the product received several industry awards for technical achievement, by this time there were over 40 other firms in the market selling digital cameras. The other problem was that the retail price of $1,000 required the product to be marketed through specialist retailers. Unfortunately, the Polaroid marketing and sales team had the experience of gaining distribution only in the mass market, with price-based retailers. The result was that the product failed to gain market share.

Helios was a Polaroid Medical Imaging Systems and dry treatment laser imager (printing device for X-rays in hospitals). It was produced and commercialised in 1993. The purpose of the product was to provide the company with a springboard for more rapid expansion into the imaging markets. Because Helios required no food and operated during the day, Polaroid touted it as a quality product for hospital radiology departments. Helios envisioned science and graphics as a viable technology platform for high-resolution imaging products aimed at fields beyond the cabinet.

The Polaroid Helios was presented as a work in progress at the 1989 meeting of the Radiological Society of North America (SCAN1/17/90). The company received 510(k) clearance for Helios from the Food and Drug Administration.

Polaroid's Helios project consisted of a four-stage series.

According to Heath and Smith (1996), the first study concerned the opening of a factory by a "start-up team" in the mid-1990s.

The latter also provides a point of connection with previous studies that trace the evolution of the Helios project from the R&D phase to the redesign phase and the large-scale product phase.

This project was carried out in a special NB6 factory belonging to the Polaroid company.

Polaroid's years of applied research resulted in the Helios Medical Imaging System, a unique digital imaging product. For the Helios project, Polaroid invested $120 million annually. Additionally, the Department of Electronic Imaging was deemed as a separate group, and allocated an

annual expenditure of $30-40 million. From this, it can be concluded that Helios was a very large-scale project, and Polaroid aimed to outdo its competitors by commercialising the said project. Therefore, Helios gave strong support to the project. In addition, a spinoff of the Helios technology, dry film for graphic arts, was also supported for the same reasons. Helios finally hit the market in 1993 as a result of almost 10 years of practical research. Unfortunately, despite being technologically innovative, Helios did not succeed in the digital technology market, in the field of medicine, Helios failed to demonstrate that it was a perfect technology. Digital imaging losses of $180 million in 1994 and $190 million in 1995 were primarily attributable to Helios. Therefore, in 1996, most of Helios was sold to Sterling Diagnostic Imaging Inc.[117]

NB6 is Polaroid's full-size, high-volume (Helios) film product facility

The NB6 was located in New Bedford ed. The NB6, or High Precision Medium Manufacturing Facility, was built in 1991 as the new home for the carbon-based Helios medium manufacturing system. It was a greatly expanded version of the Waltham plant that produced the engine to feed the 8x10 system in use at the time. The value of the plant is variously estimated to be in the millions of dollars. The main thing that distinguished NB6 from other product enterprises of this scale was the experience of the Polaroid company in the framework of opening a new organisational structure. Prevailing notions of how a factory should be organised to maintain a high level of innovation to accommodate this new technology have changed in the 20 years since NB1 was built. Many companies the business environment have changed their organisational structure to better adapt to the ever-changing business world. This change resulted in the creation of a small, "elite", well-paid but cross-trained workforce within the company. Their decisions were usually based on how they solved problems and how they interacted with each other. The process was seen by the rest of the staff as time-consuming but an investment.

The NB6 team was considered a privileged group at Polaroid, a part of the future, a prototype of the new Polaroid Corporation, and the next technological "leap" the company would make. The fate of Polaroid was left in the hands of the NB6 staff. Everything else was considered to be work, buying time and providing resources for the transition to the new core technology.

As the development of Helios continued, more people were assigned to the project. The technical team proved the feasibility of the concept in 1986–1987. In 1988, the Helios project achieved great success, as that year Polaroid won a lawsuit against Eastman Kodak for nearly $900 million.

[117] Tripsas, M, and Gavetti, G., "Capabilities, cognition, and inertia: evidence from digital imaging". The SMS Blackwell Handbook of Organizational Capabilities (2017), pp.393-412.

With a solid foothold in the instant camera market and new funding, Polaroid chose Helios from a pool of as-yet-unconfirmed projects to develop. Polaroid had two particularly promising projects in the works: the Helios laser engraving project and a magnetic storage media project that still needed more development. Polaroid chose to spend more time and money on the Helios printer for the medical market. Although senior management probably thought that Polaroid was in the imaging business rather than the magnetic (digital) business, the company had been trying to produce some video and high-density diskettes. Both were technical successes but did not sell effectively due to their relative cost. Thus, perhaps Polaroid's executives had some bad experiences trying to enter the digital space of data storage. Ultimately, Polaroid abandoned the project and accelerated bankruptcy with huge losses.

Additionally, the other major project, Helios, hit a number of problems, such as gaining distribution and offering an unacceptable film size to the users, namely hospital radiologists. Having generated a loss of over $300 million, the entire division was eventually sold to Sterling Diagnostics.

Helios is the name given to an imaging technology process that uses laser processing to produce a higher-quality image than a normal X-ray. The main market was expected to be in medical imaging because the product was black and white (grey-shaded image). The first picture size that Polaroid started with was 8x10 inches. It was the best low-competition market to enter during process improvement.

Because chest X-rays were typically larger, Polaroid later created a 14x17-inch development team. This team was tasked with perfecting the process for the highly-competitive imaging market, increasing its volume, and changing the configuration of the images to determine the location captured by this type of existing X-ray imaging machine. The 14x17 team was the focus of a second mechanical design team study by Campbell and Convent (1994). A third project was completed by Heath and Smith in 1996 and dealt with the start-up (or implementation) that opened NB6. The NB6 was an experiment for Polaroid both organisationally and technologically.

What were the financial costs or investments for Helios?

1) Construction of NB6-centralised plant

2) Attracting highly qualified and high-quality personnel

It was the first time Polaroid had used a highly-decentralised, heavily-automated, and aggressively-cross-trained organisational structure. This led them to blur the lines between product, support, engineering, and management. The recruitment process for NB6 staff was thorough and unique within Polaroid, with existing staff taking the time to review the results of a role-playing exercise to select each new member of the NB6 team. At that time, approximately two out of every ten applicants were

lucky enough to work at NB6. The idea behind this process was to produce a committed, stable, dedicated and talented team with minimal turnover. Adaptability and interpersonal skills were key criteria for a job offer at NB6. The focus of the initial team project was to compare the cognitive distribution of a mechanical design team (14x17 team) to a manufacturing engineering team assembled as a plant implementation team.

Reasons for abandoning the project

1) Technological turbulence and shifts or changes in management and corporate governance

Technological turbulence and shifts or changes in management and corporate governance led to the sale of the Helios technology to another company. Polaroid had no mission, and so the product staff had to learn how to produce a variety of products to justify this very expensive (high cost) high-volume facility, as it was fully committed to producing the Helios film product. However, the staff still had to produce the Helios environment for the customer, and would lose money unless they could lower product costs or lower quality requirements to minimise waste. The pressure to innovate, change and adapt the system remained with the NB6, four years after its launch. This situation coincided with rumours of the sale of the plant and the possible bankruptcy of the company, as well as the actual abandonment of other units and facilities that were sold to keep the company stable until the new product was brought to market. The unique organisational structure was broken and became traditional. The ongoing unrest forced many to leave and seek other job options.

2) Dominant uncertainty

Study 4 deals with Helios' recent efforts at Polaroid and the repurposing of the NB6.

3) Lack of confidence in the success of the project

The original goal of this project was not to make a lot of money, but to gain experience. Only 5% of the medical imaging market was 8x10, and so it would not have been a visible threat to established competition. The highly competitive, high-end, demanding market was for 14x17 bust-sized images. Once the technology had advanced enough to be competitive, Polaroid would eventually have to enter the high-end market. Larger hospital and clinic X-ray departments required a completely different size and shape of the tool, as well as larger sheets of film media. The time it took to get 8xl0 up and running reliably was longer than Polaroid expected, and so it was a problem getting into the 14x17 project, which actually had a chance of making money. Eventually, the backlog of 8x10 and the new second-generation 14x17 projects were implemented simultaneously; some 8x10 people were reassigned to scale up, and more people joined the Helios project over time.

In 1996, Polaroid brought in an outsider by appointing Gary DiCamillo as the new CEO. Although an apparent supporter of the razor-blade model (Teece, 2010), his management background was in consumer marketing and he immediately applied this philosophy to the Polaroid operation. Research expenditure was drastically cut and funds were diverted to up-weighted spending on advertising. The historic commitment to innovation through research was replaced with a philosophy of developing only new and improved versions of existing products. The dominant players in the world of digital cameras were consumer electronics giants such as Sony, Toshiba, Hitachi, and Canon. Polaroid's products were unable to compete against firms that better understood the new technology and had the expertise to produce large volumes of low-unit-cost output.[118]

7. PDC-2000

With the PDC-2000 in 1996, the business was one of the early creators of digital cameras; nonetheless, it failed to secure a considerable market share in that sector. Polaroid released the PDC-2000 and established a new image quality benchmark, at a retail price ($2,495) that fell squarely between digital point & shoots and the much more expensive high-end portable digital cameras.

The main selling point of the PDC-2000 technology was that the product was designed to fit between high-end professional digital cameras that sold for more than $10,000 and inexpensive cameras that sold for less than $1,500 from Eastman Kodak, Canon, Fuji, and Nikon. However, during this period there were more than 30 companies in the digital camera market. Fearing opposition, Polaroid executives delayed the launch of the product to try to perfect it.

Disagreements between senior management and the Electronic Imaging Division resulted in continuous delays in digital camera development. Additionally, the investor could not establish relations with strategic partners. As a result, there were long delays in the commercialisation of the digital camera. Polaroid's digital technology was ready for production and commercialisation in 1992. However, in 1996, the PDC-2000 camera was brought to market with considerable delays.

It was released on March 11, 1996 in the US and on August 30, 1996 for mass sale. The product was a high-end professional digital camera with a CCD designed by Polaroid, and was manufactured entirely in Massachusetts, New England. The ETIPA selected this camera as the best digital product of 1996. First, it was unlike any other camera on the market

[118] Chaston, I., Strategy for Sustainable Competitive Advantage: Surviving Declining Demand and China's Global Development, Routledge, 2012, p.151

at the time. Its body was made of durable and indestructible magnesium alloy, and it had a sonar autofocus mechanism.

The camera was considered a highly-refined variant of the SX-70 model. Another interesting feature was the ability to remove the lens and replace it with an optional 17mm lens ($199). Additionally, the camera had a large and expensive 40/60MB hard drive on board. Other cameras at the time only had a 1 – 2 MB equivalent. Its unique design was created by Matthew Hearn of FITCH and Product Genesis.

The image dimensions were 800x600 pixels and could be interpolated to 1600x1200. The camera weighed a little over two pounds. It had a SCSI-2 connector so that images could be transferred faster than the regular serial port.[119] Because the camera had no manual focus the images appeared soft and a sharpening filter substantially helped improve the image quality. On the downside, the camera did not allow the user to manually change anything. There was simply no way for the user to manually change focus, exposure, shutter speed, aperture settings, metering, or red-eye reduction.

In 1996, with customer ease in mind, the Polaroid PDC-2000 was made available in three different editions.

PDC-2000/40 – internal 40MB memory hard disk ($3,695)

PDC-2000/60 – internal 60MB memory flash drive ($4,995)

PDC-2000/T – no internal memory; the camera had to be tethered to a computer (S2,995)[120]

By this time, more than 40 successful companies were selling digital cameras in the photography market. The PDC-2000 won several awards for its technical achievements (Net-guide Magazine State-of-the-Art Award, the magazine's Impact Award, and the European Technical Imaging Press Association's Best Digital Product of 1996),[121] but did not do well in the market. The long-delayed launch of a digital camera forced Polaroid to take a different path from its old razor-blade (Teece, 2010) business model in marketing to customer needs. Because the competitor selling digital cameras in the market had to ensure an advantage over the successful companies, the Electronic Imaging Division requested sales support for the PDC-2000 in a separate manner. However, these efforts were ineffective. In 1997, the next PDC-3000 was announced, after which development activities were suspended. By this time, most of the individuals hired to staff the Electronic Imaging Division in the early 1990s had left Polaroid.

PDC-2000. Delay of the introduction to the market, and the reason

[119] https://www.digitalkameramuseum.de/en/cameras/item/polaroid-pdc-2000

[120] https://www.youtube.com/watch?v=Lg271TDD4Mc Polaroid 1947 紹介　Model 95 (1948 年から販売 https://www.youtube.com/watch?v=Lo_1pyQ7xvc

[121] https://www.bitmedia.com/ar96/commercial.html

1) The company's internal disputes

From 1990 to 1996, there was disagreement between senior management and newly-recruited members of the Electronic Imaging Division regarding the appropriate business model for digital imaging.

2) Distrust

Senior management expressed disbelief that the Electronic Imaging Group did not understand the limitations of Polaroid's manufacturing and product development capabilities.

3) Late introduction of investment for product

Given Polaroid's strong belief in the razor-blade model (Teece, 2010), Polaroid did not invest in developing the manufacturing capabilities necessary to make money on the razor (products, rather than films or consumables). Additionally, projects with high-volume products and long development cycles precluded investment in rapid product development capabilities.

4) Fear of competition in the digital imaging market

Polaroid did not feel comfortable competing with firms with top management, that is, Polaroid was not ready to compete against Kodak, Fuji and 30 other consumer electronics companies - Sony, Toshibas, Hitachi, Intel and others.

5) Postponing the organisation of unique ideas and innovative business management

An attempt was made to come up with a unique idea that matched Polaroid's core capabilities and market response. There was also concern about Polaroid's ability to manage different businesses at the same time, with another top Executive asking: “Can we be an innovator here and be a down-and-dirty manufacturer at the same time? Can you have two different philosophies?”

In addition, the company produced scanners, such as the Polaroid SprintScan 4000 in 1999. The scanners garnered mixed reviews and were up against Minolta and Nikon equipment. When Polaroid declared bankruptcy in 2001, the whole series was cancelled.

8. Bankruptcy

On October 11, 2001, the Polaroid Corporation filed for bankruptcy. Within 10 months, the majority of the company had been sold to One Equity Partners, which then changed its name to Polaroid Holding Company. This new firm, however, functioned under the name of the Polaroid Corporation. The takeover was heavily criticised since it provided enormous compensation to corporate leaders whilst leaving investors, as well as existing and retiring employees, without anything. The corporation unveiled a proposal to reward the top 45 executives just for remaining in the job. Other employees, however, were prohibited from selling their stock

before quitting their positions. The failure of Polaroid's top management to predict the impact of digital cameras on its film-selling industry was largely blamed for the company's eventual decline and demise.

4.2. Financial Results

1. 1937 – 1980 – Dr. Edwin Land Era

Summary. Polaroid was founded in 1937 by Edwin Land based on the invention of light polarising filters and was able to use them commercially. Initially, the company was not engaged in the creation and production of high-speed cameras, with its first products being sunglasses and polarised glasses for various purposes, military equipment and other devices. After the end of the war, Edwin Land was finally able to do exactly what he wanted – he developed a camera that combined the processes of photography and image processing and managed to patent many inventions.

In 1948, the company introduced the first instant camera. The price of each photo was $1, which was a huge amount at that time, because the cartridges for Polaroid were created using a more complex technology that was significantly different from that utilized today. Despite the high price, the products of this brand were in great demand.

In 1972, a new model of the Polaroid camera appeared. The camera was the first fully "motorised" model that took colour photographs and did not require precise aiming. Following this, an increasing number of affordable camera models emerged. Edwin Land tried to promote his products not only to the public, but also among artists, which was why he achieved economic growth. Edwin Land's scientific achievements and inventions during his 43 years at the helm contributed to the company's success. Firm performance was exceptional, with average annual compounded sales growth of 23%, profit growth of 17%, and share price growth of 17% between 1948 and 1978.[122]

1) Start-up of the company

Sales. Edwin Land led the company as CEO for 43 years, transforming it from a small research and marketing firm into a prominent high-tech enterprise. During the period spanning 1929–1932 at Harvard, Edwin H. Land worked on the development of synthetic polarisers. In 1932, Land and his Harvard physics teacher George W. Wheelwright III founded the Land-Wheelwright Laboratories to research and manufacture synthetic polarisers. In 1935, Land-Wheelwright Laboratories signed a contract with Eastman Kodak for polarising filters for cameras and with American Optics for polarising lenses for sunglasses.

[122] Tripsas, M, and Gavetti, G., "Capabilities, cognition, and inertia: evidence from digital imaging". The SMS Blackwell Handbook of Organizational Capabilities (2017), pp.393-412.

The history of Polaroid is very similar to the rise and fall of the American industry during the same period. The US industrial base developed after the Great Depression in the 1930s. In 1937, Clarence Kennedy, professor of art history at Smith College, a fellow at Harvard University and consultant to Land-Wheelwright Laboratories, proposed the name Polaroid. In its first year, Polaroid achieved net sales of $141,935 and grew rapidly through support for World War II. In 1939, the Polaroid Corporation moved to Kendall Square in Cambridge.

William J. McCune, Jr., an engineer and MIT graduate, became a quality control officer at Polaroid. He used the same technology to develop stereoscopic (3D) motion pictures, which were first shown at the 1939 World's Fair. In 1941, Polaroid's sales stood at $1 million, and by the end of the war, sales in 1945 had reached $16,752,465. With the end of the war and the decline of trade, Land discovered a new scientific pursuit thanks to a question from his daughter. In 1947, Edwin Land demonstrated instant photography at a meeting of the Optical Society of America in New York City on February 21. Indeed, as a result of commercial contacts made at this exhibition, Polaroid's net sales for that year amounted to 1,503,608 dollars.

Profit. In 1937, Polaroid's net profit was $8,677. The company earned most of this in its early years as a contractor during World War II. By 1945, the enterprise’s earnings were $449,424. World War II created the basis for the development and increase of income of the Polaroid company. However, setting the course for the post-war era, the net loss in 1947 was $954,410 due to the use of funds to create the instant camera.

2. 1948 – 1978 – Stable growth of the company

2) Land Camera, Model 95.

Sales. The commercial launch of the Polaroid Land Camera, Model 95, took place on November 26 at the Jordan Marsh store in Boston. By 1948, Polaroid was selling its first camera, the Model 95, for $95. In 1949, Land invited famous photographers to cooperate with the company in order to develop sales. The Polaroid Land Model 95 camera was introduced in 1948, putting this revolutionary technology into the hands of the general public. The original model contained two distinct negative and positive rolls, allowing the picture to be developed within the camera.

Polaroid initially produced only 60 units of the Land Camera, but the firm grossly misjudged demand every single one of the units sold out in just one day. The introduction of instant photography by the Polaroid brand generated a new business line that did not merely sell cameras. It charged roughly $1 per sheet of film that seemed to magically turn into a photograph

right in front of people's eyes. With little competition, the film's sales generated enormous profit margins.[123]

Photographer Ansel Adams became Polaroid's artistic and technical adviser. In 1950, Polaroid introduced "Type 41 black and white film". During that year, 4,400 dealers across the US sold Polaroid cameras and film products. In 1950, Polaroid's net sales were $13,393,259.[124] Polaroid went from a company on the brink of disaster after World War II to a $100 million concern, a process that was fuelled by the transition to colour film.

In 1950–1954, Polaroid sales exceeded $23 million and over 4,000 dealers in the US alone sold Polaroid cameras, films, and accessories. Polaroid leased additional office space in Cambridge and also opened a new manufacturing plant in Waltham. In 1951, sales stood at $7,394,355, in 1952 at $11,076,969, and in 1953 at $17,212,784.[125]

During the period spanning 1956–1958, The company spent most of its advertising budget on network television programmes, whilst the one-millionth camera rolled off the assembly line. Polaroid products were distributed in over 45 countries worldwide. The Waltham manufacturing site was expanded with the construction of an additional building.[126]

By 1963, over 5 million Polaroid instant cameras had been sold using black and white roll film. That year saw the first colour Polaroid film and the automatic 100-pack film camera. "Type 107" was introduced with black and white and "Type 108" colour pack films.

The Type 108 and 107 set films were very successful. Polaroid's sales grew to $465 million by 1969, with the number of employees increasing to 9,000. The introduction of packaged film increased Polaroid's sales fivefold, reaching $500 million by 1970. A manufacturing plant in Waltham 3 was also built around this time. Although Land's goal was to create unique, profitable products whilst ensuring employee well-being, he was very committed to building his company using profits, as opposed to borrowing. Perhaps this was more of a traditional business model of the 1960s.

Profit. By 1948, Polaroid had experienced a significant and sustained increase in net income due to the release of its first camera, the Model 95. Polaroid's expenses and net income from the sales in 1951, 1952, and 1953 were:

Table 4.2.1.

Polaroid's expenses and net income from the sales in 1951, 1952, and 1953[127]

	Sales ($)	Expenses ($)	Net income ($)

[123] https://artincontext.org/history-of-polaroid/
[124] https://www.library.hbs.edu/hc/polaroid/timeline/
[125] https://www.jstor.org/stable/20013438?seq=11
[126] https://srbijafoto.rs/en/2013/08/24/kratka-istorija-polaroid-fotografije/
[127] Reports of the Tax Court of the United States, Volume 33, p.293

1951	7,394,385	6,164,973	1,229,412
1952	11,076,969	9,611,657	1,465,312
1953	17,212,784	14,727,692	2,485,092

The expenses incurred by the petitioner in the invention and development of Polaroid Land cameras, photographic packs, or photographic accessories from 1944 through 1953 were:

Table 4.2.2.

1944 – 1953 years Polaroid Land cameras, photographic packs, or photographic accessories

Year	Expenses ($)
1944	7,150
1945	96,943
1946	388,667
1947	300,369
1948	365,332
1949	267,425
1950	267,733
1951	148,986
1952	213,776
1953	243,986

The sales of the Polaroid Land equipment during the year 1948 through 1953 resulted entirely from its capacity to produce a picture in a minute. If this equipment had not made an instantaneous positive print, there would have been no demand for the camera or photographic pack during that period.

The Polaroid camera was hailed as a revolutionary invention. In terms of camera sales, the company made a $5 million profit in 1949. The film used in Polaroid pictures was light-sensitive and capable of receiving incoming light. The film was immediately turned into a negative image after being developed. The same principle was used to create coloured photographs. When a light was shone into a silver halide film, it disrupted the molecules that surrounded it. The dense accumulation of silver atoms caused the film to be much darker than it would have been otherwise due to the amount of light that was absorbed by it.

To produce a negative effect, a coating that combineed green and blue reacted with Cyan, magenta, and yellow. A dye was formed in these plants. The reactive agent or reagent that causeed the dyes to move upwards was one of the chemicals that reacted. A mechanism inside the camera transmitted the film between two rollers in order to apply the reagent to the film. Reorientated silver atoms were mixed with dyes to colour three

coatings on the film. In subsequent models, the reagent was applied to a film that had been coated with photographic film. The colours that appeared on the white plastic were caused by incident light reflected off of its surface through the dyes that had been smeared there.[128]

In 1956, the one-millionth Polaroid Land Camera (a Model 95A) rolled off the Polaroid assembly line. The company celebrated distribution reach into 47 countries.

Except for $100 million raised by the sale of stock in 1969, Polaroid financed the entire SX-70 project from current earnings. In 1968, the company had estimated profits of $55 million; earnings reached a peak of $71 million in 1969.[129]

Land and Polaroid called this the biggest consumer product gamble ever: an eight-year programme to release the SX-70 camera and film. Although the company never officially disclosed the cost of the project, Land called the SX-70 "a half-billion-dollar investment" in one of his interviews.

3) SX-70

Sales. In, 1972, The revolutionary SX-70 photographic system implemented Dr. Land's concept of absolute one-step colour photography, producing a dry photo developed in full sunlight in seconds. In 1972, after years of development and an investment of $600 million, Polaroid introduced the SX-70; Edwin Land had, in fact, bet the company on the new camera system. A billion Polaroid images were taken in 1974, and within a few years Polaroid had reached over $1 billion in annual sales. Additionally, Polaroid spent over $2 million on the development of the eyepiece for the SX-70 camera in the mid-1970s. The company first sold the SX-70 in Miami, Florida in late 1972, and began selling it nationally in the fall of 1973. Although the high cost of $180 for the camera and $6.90 for each film pack of ten pictures ($1,259 and $48, respectively, adjusted for inflation) limited demand, Polaroid had sold 700,000 by mid-1974.

Profit. In 1972, Polaroid introduced a sleek folding camera, the Model SX-70. The film used with this camera was developed without any special handling by the user and, because the film was exposed and viewed from the same side, the peel-off, protective paper was eliminated. Perhaps the most amazing feature of the SX-70 system was that the picture developed before the eyes of the consumer. The SX-70 was so revolutionary that both Time and Life magazines reported its introduction as a cover story in 1972. Although almost a million SX-70 cameras were sold in 1974, a record for cameras priced over $100, Polaroid did not earn a satisfactory profit on this model. First, Polaroid predicted greater demand

[128] https://www.digieffects.com/the-different-types-of-camera-instants-you-can-buy/
[129] https://opensx70.com/posts/2021/01/bet

in 1973 and 1974 than actually materialised. Therefore, when sales failed to measure up, Polaroid was forced to cancel the planned construction of additional manufacturing facilities and lay off workers. Second, the first three years of the SX-70 product were plagued with manufacturing problems. For the first time in its history, Polaroid manufactured many of the components for its cameras instead of contracting outside vendors for their product. Modules were always in short supply. The precision plastics and the film batteries also created a great deal of trouble. It was not until 1975 that Mr. William McCune, then Chief Executive Officer of Polaroid, believed that all the SX-70 problems had been worked out.

These problems chipped away at both Polaroid's profit margins and its public image. The company had been aiming for a profit margin 40-50% on cameras and between 50 and 60% on film, but it never came close to achieving these goals. In 1974, Polaroid sold SX-70 film at a loss. A battery problem required costly repair and the company had to give away a great deal of replacement film. Manufacturing difficulties prevented Polaroid from meeting the demand for cameras in 1973. These problems also hurt Polaroid's image with consumers; SX-70's problems were well publicized and market research as late as 1978 revealed lasting negative impressions of the SX-70 system. The "top-of-the-line" SX-70 was originally priced at $120 and remained at that price until 1976. Polaroid did not raise prices for fear demand would be adversely affected. In 1974, Polaroid introduced the SX-70 Model 2, a slightly less sophisticated camera that sold for $102. In 1975, Polaroid went one step further and introduced the Model 3, priced at $83, $13 below what it cost Polaroid to manufacture the camera. Sales of Model 3 were particularly disappointing. In 1975, total SX-70 sales fell to 741,000 units.

In 1975, Polaroid's profit declined by 17%.[130] In 1973, sales were more than $650 million.[131] Edwin Land's leadership until 1975 built a $1 billion company and provided capital for growth with profits. Although financial analysts felt he spent too much on developing the SX-70 programme in the late 1960s and early 70s, he did so with Polaroid's money. The stock film sales allowed Polaroid to grow to a $1 billion business with profits sufficient to finance the new SX-70 films, resulting in a company profit of over $2 billion. The Polaroid SX-70 camera was produced from 1972 to 1981.

Sales were $950.03 million, whilst net income was $79.69 million, or $2.43 a share, compared with $1.91 a share in 1975. Net income in 1976 rose 27% above the 1975 figure of $62.59 million, whilst earnings on operations rose 33% to $143 million, and sales increased 17% from $813

[130] https://www.nytimes.com/1975/04/18/archives/polaroid-profit-declines-by-17-forecast-of-75-gain-eludes-company.html
[131] https://opensx70.com/posts/2021/01/bet

million.[132] Net income for 1978 was $118.4 million, or $3.60 per share, compared with $92.3 million, or $2.81 per share, in 1977. [133]

4) Pronto! and OneStep

The Polaroid Pronto![134] was an instant camera for the SX-70 format. At $66 when it was introduced in 1976, it was a third of the price of the SX-70.

In 1977, Polaroid introduced the $39.95 OneStep.[135]

Sales. Despite selling $950 million worth of cameras in 1976, Polaroid needed all the power it could muster to compete for the booming amateur photography market with Eastman Kodak, which saw $5.4 billion in sales that same year. Eastman Kodak had a growing share of the instant photography market, with sales of over $4 billion in the US alone. In this competition, Polaroid Company sought to increase sales by offering the Pronto! camera.

After years of supplying Polaroid with colour negatives, Kodak began selling its own instant cameras and colour film in 1976. The move sparked a flurry of patent lawsuits that are still pending in the US, Canada, and abroad. In contrast, Polaroid, with its SX-70 and Pronto! Systems made it easy to shoot colour images that rotated out of the camera and developed during the day, unlike previous in-camera images, and the inexpensive Pronto! provided more than five years of income growth with cameras.[136]

Amongst the major product moves that Polaroid expected to make with the Pronto! cameras were the following:

- Replacement of the previously-cleaned colour film with the new Polacolor material, using fade-resistant inks developed for the SX-70;

- New film for the SX-70, with a wider temperature range than the original, and with an electric eye-controlled shutter that could shoot from 45 to 95 degrees without special shutter settings;

- The company introduced the Pronto! camera at a suggested list price of $66, then announced a fixed-focus version called the OneStep, which was later reduced in price and sold for $40;

- The sale of many Pronto! cameras as special editions, guaranteed replacements for bad prints, and long-term service from specialised dealers changed Polaroid's previously-frosty relationship with dealers, according to several analysts;

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[132] https://www.nytimes.com/1977/02/18/archives/polaroid-increases-earnings-in-quarter-291-for-a-record-po

[133] https://www.nytimes.com/1979/02/23/archives/earnings-polaroids-profits-up-151-in-quarter-pepsico.html

[134] https://blog-jimgrey-net.translate.goog/2014/02/24/polaroid-pronto-and-polaroid-pronto-sonar-onestep/
?_x_tr_sl=en&_x_tr_tl=uz&_x_tr_hl=uz&_x_tr_pto=wapp

[135] https://www.polaroid-passion.com/manuel/manuel-polaroid-onestep_pronto.pdf

[136] https://www.nytimes.com/1977/04/24/archives/polaroids-coup-instant-movies-polaroids-coup-as-it-battles.html

- Some observers believe that Polaroid dramatically increased its previous advertising levels in the first phase of its rivalry with Kodak, despite Pronto!'s price reductions and large increases in advertising rates.

According to estimates, the steps cut Polaroid's earnings by $20 million, or 60 cents per share, despite an after-tax profit of $80 million. or $2.43 per share a record. Moreover, the company raised its dividend to 50 cents at midyear from the 32 cents it had held since 1967.

However, sales of Kodak's relatively inexpensive cameras increased, with 1.1 million units sold in 1976. To Polaroid's detriment, this situation reduced sales of its high-priced SX-70 cameras by 80%, from 1 million to 200,000. Sales of such cameras in the US fell from $130 million in 1975 to $26 million in 1976.

	1976	**1975**
Revenues	$950,032,000	$812,703,000
Net income	79,690,000	62,590,000
Earnings per share	$2.43	$1.91

Kodak's easy-to-hold, fixed-focus, crank-operated camera, called the Handle, sold to dealers for approximately $27, with a suggested list price of just under $40. Polaroid also had such a camera, namely the Pronto! It offered the $40 fixed-focus version to dealers for $26, around $7 above production costs. Polaroid also spent an average of $12 on advertising per camera sold.

Table 4.2.3.

Number of Polaroid Pronto! and OneStep cameras produced and sold[137]

Year	**Cameras**
1977	928,500
1978	8,166
1979	247,666
1980	129,166

Profit. By 1976, Polaroid had invested approximately $600 million in the SX-70 project. In March of 1976, Polaroid introduced the Pronto! a non-folding integral camera, which retailed for approximately $60. Polaroid had begun work on the Pronto! as early as 1973, aiming to incorporate the new integral technology, but making the camera simpler to produce, thereby increasing gross profit margins to a goal of 40%. The

[137] chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.oppedahl.com/apl/kodak1.pdf

Pronto! body was one piece of precision plastic moulding which required only a single screw. It did not have the SX-70 through-the-lens viewing, but it used SX-70 film. As early as 1970, Polaroid had received strong signals that Kodak was going to enter the instant market, but Mr. McCune testified that the design, price and timing of the introduction of the Pronto! would not have been any different without Kodak's entry into the market. In 1976, Polaroid sold 1,788,000 Pronto! cameras worldwide.[138]

Polaroid tested, packaged and shipped the assembled product to ensure the successful sale of Pronto! cameras. Three important factors affected the number of cameras Polaroid could produce: (1) the ability of suppliers to produce parts; (2) the number of workers employed; and (3) the rate at which Polaroid employees assembled the cameras. Parts were produced with special tools such as dyes, jigs, fixtures, and moulds, and so the number of tools largely determined how quickly parts could be produced.

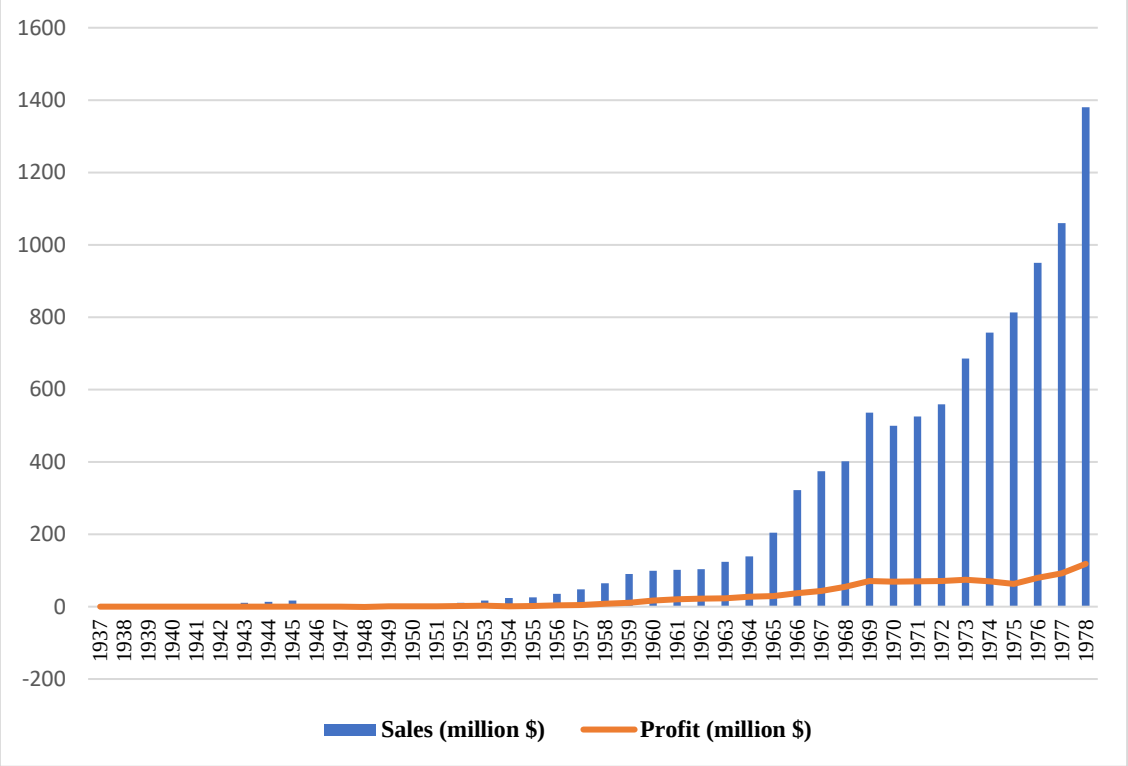

Figure 4.2.1. Polaroid camera sales (1937-1978)[139]

In 1976, Polaroid's suppliers had fixed work schedules and enough tools per day on a five-day schedule to produce 15,000 Pronto! kits. By 1978, equipment capacity had tripled, and suppliers were producing up to 50,000 Pronto! and OneStep cameras per day. Polaroid had to authorise the funds and order to reproduce the instruments. Depending on the complexity of the tool, there was the possibility that it would take longer for the tool to

[138] chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.oppedahl.com/apl/kodak1.pdf
[139] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf

be ready and longer for the spare parts to reach Polaroid from the supplier. Within the complimentary constraints of available equipment, the supplier's raw material purchase rate and machine operating hours determined the production level. Polaroid was able to significantly increase its workforce.

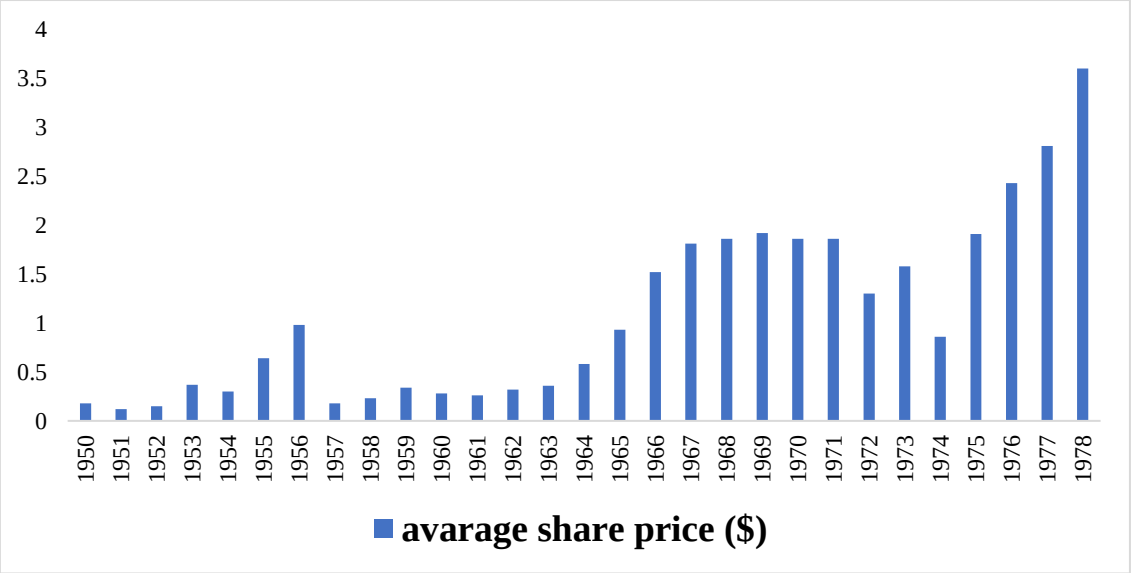

Figure 4.2.2. Polaroid camera average share price (1950 – 1978)[140]

Polaroid and Kodak (1976–1990). In 1976, Kodak brought its instant film cameras to market. Kodak achieved this dominance in the photography market by blatantly copying Polaroid's patented scientific research.[141] Polaroid found out about this and had to sue them. In the two years following this lawsuit, total sales of instant cameras increased from 7.4 million cameras in 1976 to 10.3 million in 1977 and 14.3 million in 1978. The lawsuit between Polaroid and Kodak lasted for 10 years. In 1978, the company's annual sales volume totalled $1.38 billion, a 5.7% increase over 1977's $1.06 billion result.[142] In 1976, film sales were lost due only to marketing factors. In 1977–1980, film sales were constrained by Polaroid's ability to manufacture film. From 1981 to 1985, only Polaroid's marketing capabilities constrained film sales.

The average revenue per film pack is simple to determine because Kodak and Polaroid film was priced essentially the same throughout the infringement period. Revenue per pack was multiplied by the number of incremental sales to arrive at incremental revenue.

[140] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf
[141] "History of Polaroid and Edwin Land". *Boston.com*. Boston: The New York Times Company. 2012-10-03. Retrieved 2015-01-31.
[142] https://www.nytimes.com/1979/02/23/archives/earnings-polaroids-profits-up-151-in-quarter-pepsico.html

Table 4.2.4.

Polaroid's lost profits for camera and film resulting from Kodak's infringement[143]

Year	Profit loss
1976	$16,484,089
1977	$9,605,722
1978	$92,875
1979	$1,625,833
1980	$708,379
1981	$47,699,169
1982	$56,893,666
1983	$51,636,093
1984	$42,346,817
1985	$20,944,876
Total	**$248,037,519**

1. Kodak's infringement of any one or more of the patents in the suit was not willful and deliberate.

2. In accordance with 35 U.S.C. §284, the amount of damages adequate to compensate Polaroid for Kodak's infringement is $454,205,801.00. The prejudgment and post-judgement interest award to date is $455,251,766.00. The total award is $909,457,567.00.

3. Costs will not be taxed against either party.

4. Polaroid is not entitled to its reasonable attorneys' fees because this is not an "exceptional case" within the meaning of 35 U.S.C. §285. Judgement will issue in accordance with this award.[144]

3. William McCune Era 1980-1985-years

Summary. By the late 1970s, problems arose for the company as Kodak surpassed Polaroid in-camera production. Kodak also announced its new and affordable camera. However, as stated above, Edwin Land was able to sue for copyright infringement, with the trial lasting approximately 10 years. The problems that began with the lawsuit led to economic stagnation under William McCune. One of the main reasons for this was the decisions made by the company's managers. Their main mistake was that in the 80s, despite already having prototypes of digital cameras in

[143] V0KEV0QP.doc (oppedahl.com)

[144] https://silo.tips/download/1-of-2-polaroid-corp-v-eastman-kodak-co-dc-mass-16-uspq2d-1481-polaroid-corp-v-e

production, the company decided not to deal with electronics. In 1980, Land stepped down as CEO, continued as Chairman, and assumed the new position of consulting director of basic research in Land photography. McCune was appointed CEO.

During McCune's tenure, the Polaroid company introduced new film and cameras. By doing so, the company tried to increase its income, but it lost those earnings due to lagging sales and a higher tax rate. During the recession, the company's sales fell by 1.6%. The decrease in revenue was mainly due to the strengthening of the dollar against foreign currencies in foreign exchange markets.

5) The stagnation started.

a) Polavision (1977–1980). The problem with Polaroid's strategy (as with most technology-based companies) was that it began to see its business as a series of technological problems rather than market problems. It assumed that once its technological innovation was ready, the market would follow with the result of ever-increasing profits. Whilst the strategy worked for the better part of the company's existence, it all stalled as Polaroid focused on one big technology.

Sales. Sales were $950.03 million, whilst net income was $79.69 million, or $2.43 a share, compared with $1.91 a share in 1975. Net income in 1976 rose 27%above the 1975 figure of $62.59 million, whilst earnings on operations rose 33% to $143 million, and sales increased 17% from $813 million.[145] Net income for 1978 came to $118.4 million, or $3.60 a share, compared with $92.3 million, or $2.81 a share, for the previous year.[146]

The Polavision was an "instant" colour home theatre system launched by Polaroid in 1977. The Polavision system was a major commercial failure and was discontinued in 1979. However, the underlying technology was improved and used as the basis for the Polachrome instant colour transparency system introduced in 1983. Polavision turned out to be an expensive failure, and most of the equipment produced was sold as a job lot in 1979 at a loss of $68.5 million. A large number of patents guaranteed the preservation of an absolute monopoly. Edwin Land said that his idea was unusual, and the entire success of the company was based solely on it. Additionally, only patents protected this idea. Polaroid abandoned its Polavision Instant Movie development programme, which had been in operation since 1977, resulting in a $500 million. In the wake of these losses,

[145] https://www.nytimes.com/1977/02/18/archives/polaroid-increases-earnings-in-quarter-291-for-a-record-po

[146] https://www.nytimes.com/1979/02/23/archives/earnings-polaroids-profits-up-151-in-quarter-pepsico.html

Polaroid Chairman and founder Edwin H. Land resigned as chief Executive in 1980 and left the company two years later.[147]

The workers at the Polaroid factories worked three shifts around the clock, and the Vale factory worked two shifts at this time. The population of the chamber department numbered more than 4,000 in the Norwood factories that year. Camera product peaked in 1978 and the first half of the 1980s, and then reached 2.8 million worldwide in 1984.

In 1979, the Polaroid Corporation laid off 800 workers in its camera division as a belt-tightening measure caused by slowing sales and severe inventory build-up. The layoffs came after sales rose 10% to $264.9 million, but fell short of forecasts due to inflation and continued energy problems. In recent years, the increase in the energy crisis across the world and the increase in inflation have led to a decrease in trade. In 1981, sales fell 1.6%. The drop in earnings was mainly attributable to the dollar's strength on foreign exchange markets in relation to overseas currencies.[148] In 1980, Polaroid's sales were $1,351 million, and, in 1985, stood at $1,295 million. In 1983, Polaroid had 13,000 employees and $1.3 billion dollars in sales. Four years later in 1987, Polaroid celebrated its 50th anniversary. During the late 1990s, digital camera sales made Polaroid the number one digital camera seller in the US.[149]

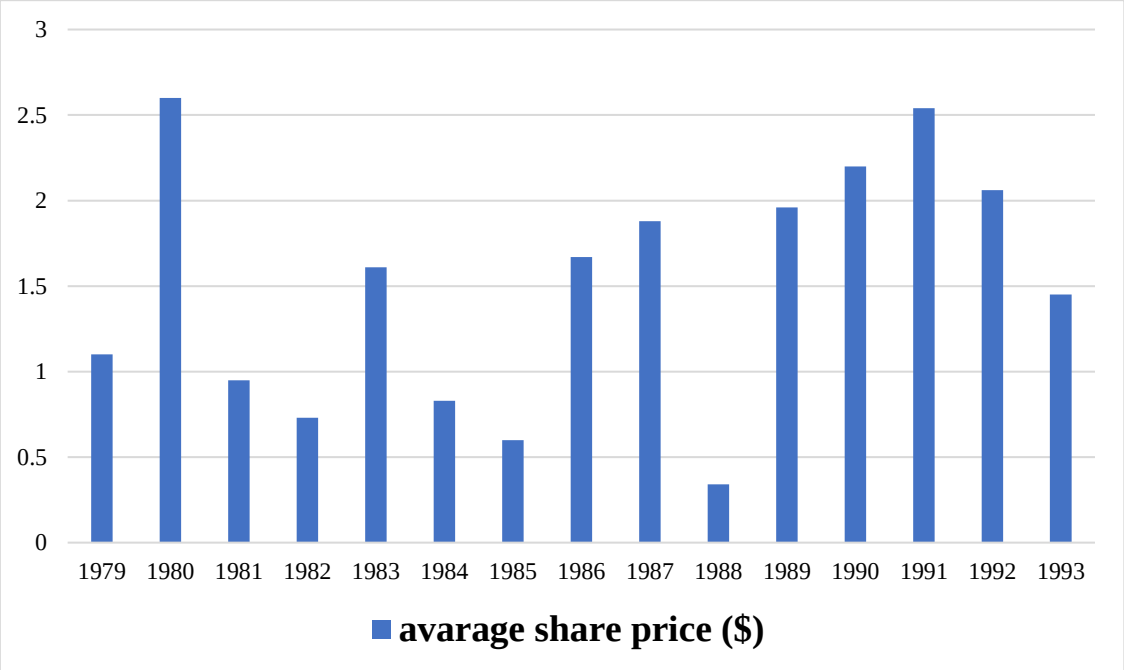

Figure 4.2.3. Polaroid camera average share price (1979 – 1993)[150]

[147] Fall of Icon, Polaroid after Edwin H. Land, An Insider's View of the Once Great Company. Milton P. Dentch, p64-66.
[148] https://www.nytimes.com/1981/10/21/business/polaroid-net-off.html
[149] https://prezi.com/xp08lozpwg5c/first-polaroid-camera/
[150] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf

The attention paid to market research and the lavish advertising budget this year testified to new directions at Polaroid. In the past, Mr. McCune had acknowledged that Polaroid had concentrated on technical issues and was not always astute in marketing.

Perhaps partly as a result, Polaroid cameras gained a reputation as blue-collar products. Sales dived from a peak of 9.4 million units in 1978 to 3.5 million in 1985. Overall revenues and earnings both declined in the last five years.

To appeal to the white-collar consumer, Polaroid hired Ben Cross, a young, urbane actor, and star of Chariots of Fire, as its advertising representative. Although some billboards had already been installed, the Spectra was launched across the US in May 1985, with publicity hitting high gear. Revenue was $1.25 billion, compared to $1.29 billion in 1982.

Retail outlets were expected to sell Spectra for less than its $225 list price, and sometimes for less than $200. The film was also expected to sell for less than the $11.75 list price for a 10-exposure pack. Sales of Polaroid cameras increased that year, and in 1986 the factories shipped a total of 5 million cameras.[151]

4. 1985 – 1996 – MacAllister Booth era

In 1985, MacAllister Booth became the president of Polaroid, with the recession continuing under his reign. A federal appeals court upheld a district court's 1985 decision, ruling that Eastman Kodak had infringed on Polaroid's patent rights in the manufacturing of instant cameras and film.

The company produced and sold new films, batteries and films to overcome the recession and achieve economic growth. These products began production in Mexico and China.

Shamrock Holdings, Inc. initiated hostile takeover attempts. In 1985, McCune committed substantial funds to undertake R&D on digital imaging technologies. The aim was to combine digital imaging and instant photography. Ultimately, the specified goal was to develop an instant digital camera and printer product "«PIF" (PRINT IN THE FIELD)". In 1990, Polaroid was awarded $909 million from Kodak lawsuit – short of the $5.7 billion Polaroid had cited in lost profit and interest in 1988.

a) Helios. The other area of research was on a medical system, Helios, which was seen as offering a high-resolution substitute for X-rays. Senior management was initially very supportive of these projects because it mistakenly believed that digital imaging could be made to fit the beloved razor-blade business model (Teece, 2010). Scientists with an understanding of digital imaging were recruited. They recognised that neither project would be able to duplicate the instant camera model because digital

[151] https://www.nytimes.com/1986/04/03/business/polaroid-bets-on-new-camera.html

imaging is a profoundly different market. Furthermore, the development team recognised that success required investment to overcome the firm's basic weaknesses in the areas of low-cost electronics, mass manufacturing, and rapid product development. Senior management was highly resistant to recommendations addressing these problems. It also started to become concerned that the products under development did not fit the razor-blade model (Teece, 2010). Additionally, these individuals continued to express the view that consumers would always want instant prints, not the ability to take a digital photograph and store the picture on a computer for printing at a later date.

The MEL opened up in 1986 after a capital investment of approximately $30 million, and with an operating budget of around $10 million/year. In 1987, there were earnings of $116 million on net sales of $1.76 billion, compared to 1986 earnings of $103.51 million.[152]

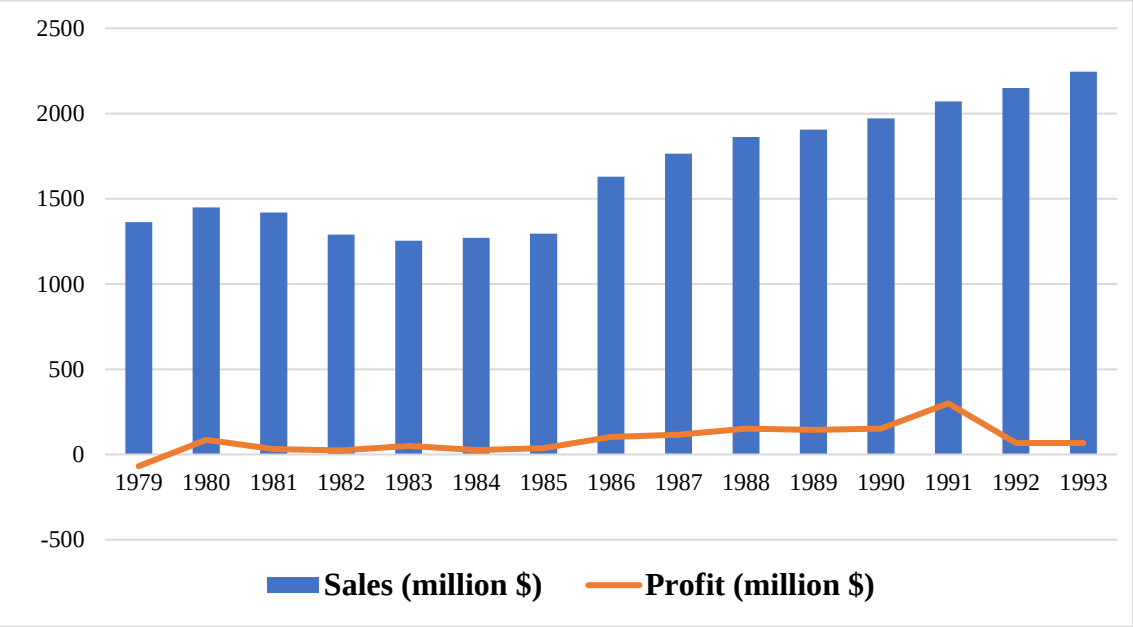

Figure 4.2.4. Polaroid camera sales (1979-1993)[153]

By 1989, 42% of R&D dollars were devoted to exploring a broad range of digital imaging technologies. Polaroid's years of applied research have resulted in the Helios Medical Imaging System – a unique digital imaging product. For the Helios project, Polaroid invested $120 million annually. In addition, the Department of Electronic Imaging was made as a separate group and allocated an annual expenditure of $30 – 40 million. From this it can be concluded that Helios was a very large-scale project, and Polaroid aimed to outdo its competitors by commercialising this project. Therefore, Helios gave strong support to the project. The Polaroid Corporation hit a revenue peak of $3 billion in 1991.[154] Unfortunately,

[152] https://apnews.com/article/700bbcbe83674b1267911f2984d49b09
[153] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf
[154] https://amateurphotographer.com/technique/film-photography/the-rise-and-fall-of-polaroid/

despite being technologically innovative, Helios did not succeed in the digital technology market. The reason for this failure was that, in the field of medicine, Helios failed to demonstrate that it was a perfect technology. Digital imaging losses of $180 million in 1994 and $190 million in 1995 were primarily attributable to Helios. Helios was a Polaroid Medical Imaging Systems and dry treatment laser imager (printing device for X-rays in hospitals). It was produced and commercialised in 1993.

5. 1995 – 2002 – Gary Di Camillo Era

Summary. Gary DiCamillo, former head of marketing at Black and Decker, became Polaroid's first externally elected CEO in 1995. In 1996, the company released its first digital camera but it was too late. Young firms from various foreign countries were able to seize the initiative long ago and overtake US production. At the beginning of the 21st century, Polaroid could not compete adequately with other manufacturers of photographic equipment, and so, in 2001, a period of bankruptcy began.

In 1996, the new CEO, Gary DiCamillo, began to reduce investments in scientific research. Consistent with this approach, research and development expenses were cut from $165.5 million in 1995 to $116.3 million in 1996.[155]

The Joshua system was a smaller integral film and folding, single-lens reflex camera with a camera on the back that captured the image as it emerged from the spread rolls; it was launched in 1993 as Captiva in the US, Vision in Europe, and JoyCam in Japan. This design allowed the user to take multiple shots without having to worry about where to put the images coming out of the camera, as with earlier designs of Polaroid integral film cameras. In 1993, a new Polaroid camera manufacturing plant was opened in Shanghai and operated for the next seven years. From 1993 to 2000, the Shanghai factory produced 9.6 million cameras. Additionally, in the same year, a small Polaroid camera factory was opened in Moscow and operated from 1993 to 1998, producing approximately 600,000 cameras.

From the mid-1990s, signs of bankruptcy began to appear at Polaroid. The future of the company was at stake. Although the total 1992 sales of $2.15 billion were repeated in 1997, in 1998 the result of 1.89 billion dollars was announced.[156] From 1992 to 1997, Polaroid's sales were stagnant. The demand for instant film was partly driven by the rapid growth of one-hour Photoshop for traditional film, and the company's other achievements were less than general successes. Polaroid's new project, the Captiva, made a strong debut, but after a whilst, sales declined and Polaroid discontinued

[155] Tripsas, M, and Gavetti, G., "Capabilities, cognition, and inertia: evidence from digital imaging". The SMS Blackwell Handbook of Organizational Capabilities (2017), pp.393-412.
[156] http://www.fundinguniverse.com/company-histories/polaroid-corporation-history/

the new technology. Due to this stagnation and failure, Mac Allister Booth retired at the end of 1995.

He was succeeded as Chairman and CEO by Gary T. DiCamillo, former Executive director of Black & Decker Corporation. Polaroid's new CEO tried to establish a successful management system to reduce costs, increase efficiency, and rapidly develop new products. However, this action negatively affected the results of reforms in Polaroid and led to bankruptcy.

His first reform was to get Polaroid back on its feet and revitalised. To achieve this, he reduced the company's workforce by approximately 15% or 1,570 jobs. Annual employee benefits before the cuts tottaled $247 million in 1995, followed by a net loss of $140.2 million for the year. DiCamillo also revamped the company's management team, bringing in additional executives focused on marketing and product development from firms such as RJR Nabisco and Kraft Foods.[157]

The second reform was in 1996 when Polaroid completely abandoned its venture into medical imaging, namely Project Helios. Polaroid had invested $800 million in the Helios project, but Helios sold most of the device to Sterling Diagnostic Imaging Inc. The $33 million paid for the sold portion was used to cover Polaroid's 1996 net loss of $41.1 million.[158]

In terms of the third reform Polaroid's new management team aimed to diversify the company's offerings by focusing on launching 30 to 40 new products each year. These included disposable light bulbs, alkaline batteries and a new line of polarised sunglasses.[159]

The fourth reform, in December 1997, proposed to cut Polaroid's additional workforce by 15%, or around 1,500 jobs. In 1997, the company posted a net loss of $126.7 million after paying $323.5 million to restructure the company.[160]

In its latest reform, Polaroid announced that it would lay off 600 to 700 additional employees during 1998, take an additional $50 million in restructuring charges, and close with a net loss of $51 million.[161]

a) PDC-2000. An interesting side-effect was that most of the sold PDC-2000 ended up in photography studios, with Polaroid responding to this by offering a studio set that included strobes and software to give the users more control over their cameras.

Polaroid occupied a unique space in the digital market, offering exceptional image quality and special features to support studio photography. In 1996, Polaroid released the PDC-2000, setting a new

[157] http://www.fundinguniverse.com/company-histories/polaroid-corporation-history/
[158] http://www.fundinguniverse.com/company-histories/polaroid-corporation-history/
[159] http://www.fundinguniverse.com/company-histories/polaroid-corporation-history/
[160] http://www.fundinguniverse.com/company-histories/polaroid-corporation-history/
[161] http://www.fundinguniverse.com/company-histories/polaroid-corporation-history/

standard for image quality at a retail price of $2,495 (not available “Studio Kit”).

Polaroid soon discovered that many of its units were finding use in studio-based product photography, and with remarkable agility for a corporation of its size, responded with a “studio kit” providing studio strobes, and giving the photographer more control over camera operation.

Polaroid's PDC-2000 cameras cost from $2,995 to $4,995 depending on the specification; the PDC-2000 could take “high definition” photos at 1600x1200 pixels, both at 24 bits per pixel. The PDC-2000 with 40 megabytes of memory on a small hard disk, could be purchased for $3,695, and a camera with 60 megabytes of memory and a hard disk flash memory could be purchased for $4,995. Users were impressed with the quality of the PDC-2000's images. The company's advertising slogan was “See the picture, not the pixels”. Customers could take an ultra-high-resolution PDC-2000 photo, print it on a photographic-quality 8.5x11-inch printer, and see an image that looked as good as a 35mm enlargement.

Whilst the PDC-2000 was slightly pricey for home use, it was essential for commercial photographers and graphic designers who needed a quick way to get high-quality images onto their computers.

Following the commercial failure of the PDC 2000, Polaroid decided to outsource digital camera product. That is, in 1997, the company introduced cheap PDC-300 digital cameras to the public; they were OEM licensed, with a price of $299, but the quality was lower. These Polaroid cameras were perfect for the time when an affordable camera was in demand. The company also presented a PDC-800 digital camera for real estate agencies, priced at $799.

The highest-quality PDC-3000 digital camera was produced, but consumers did not buy it because of the high price. Following, this production of the digital camera stopped. Subsequently, in 1998, the PDC-640 digital camera was produced by Shanghai Seagull, a Chinese-Vietnamese joint venture, and Shanghai Fudan Micro-Electronics Co., Ltd. The price was $219.

In 1999, Polaroid produced the PDC-700, priced at $349, but it did not sell at all and is currently available for prices as low as $5. In its filing, the company listed $1.81 billion in assets and $948.4 million in debts.

6) The start of the crisis and bankruptcy

The original Polaroid Corporation filed for federal Chapter 11 bankruptcy protection on October 11, 2001.[162] The outcome was that within 10 months, most of the business (including the “Polaroid” name itself and

[162] https://todayshistory.org/11-october-2001-2/12543/

non-bankrupt foreign subsidiaries) had been sold to Bank One's One Equity Partners (OEP).[163]

The company, which had been struggling with more than $900 million in debt, considered an outright sale of all or part of the company, and it planned to cut further staff, close facilities and sell non-core assets to reduce costs. The company went into debt after successfully fending off a hostile takeover by Shamrock Holdings in 1989.

During the period spanning 1977–1980s, the effects of film production restrictions on camera production increased. After 1976, limiting factors appeared in the sale of Polaroid cameras. These limitations were marketing factors: loss of sales in Latin America and South Africa. From 1977 to 1980, the most important limitation was Polaroid's film production capacity. Polaroid's lost sales from 1981 to 1983 resulted from its limited premium sales channel in the Middle East, Latin America, and South Africa. [164]

Figure 4.2.5. Polaroid camera sales (1994-2001)[165]

Due to the limitations of Polaroid film production, Mr. McCune decided to limit the number of Polaroid cameras available for sale in 1978–1979. On October 10, 1978, Mr. McCune told Polaroid's board of directors: "We will have to limit the number of cameras we sell this year because we

[163] https://en.wikipedia.org/wiki/Polaroid_Corporation#:~:text=The%20original%20Polaroid%20Corporation%20filed,One's%20One%20Equity%20Partners%20(OEP)

[164] V0KEV0QP.doc (oppedahl.com)

[165] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf

will not be able to produce enough film to meet projected demand". Similarly, Mr. Booth wrote to Mr. McCune on November 1, 1978, stating "We must control the number of cameras sold in 1979 as we do this year". As a result, Polavision turned out to be an expensive failure, and most of the equipment produced was sold as a workplace in 1979 at a loss of $68.5 million.

The ability to produce high-capacity batteries for the solar system was the most important constraint on Polaroid's ability to produce more film packs in 1981. In that year, Polaroid began switching to a new type of P-80 battery to power new, more energy-demanding solar cameras. However, since the P-80 was not ready in time for the sunrise, Polaroid modified its older battery, the P-70, by adding more active ingredients. Unfortunately, the pollution problem identified earlier was even greater. Thus, Polaroid workers spent a lot of time sorting out bad batteries, and Polaroid shipped some batteries that did not age properly. Because of these problems, the backup time and revenue were very low (Appendix 1).

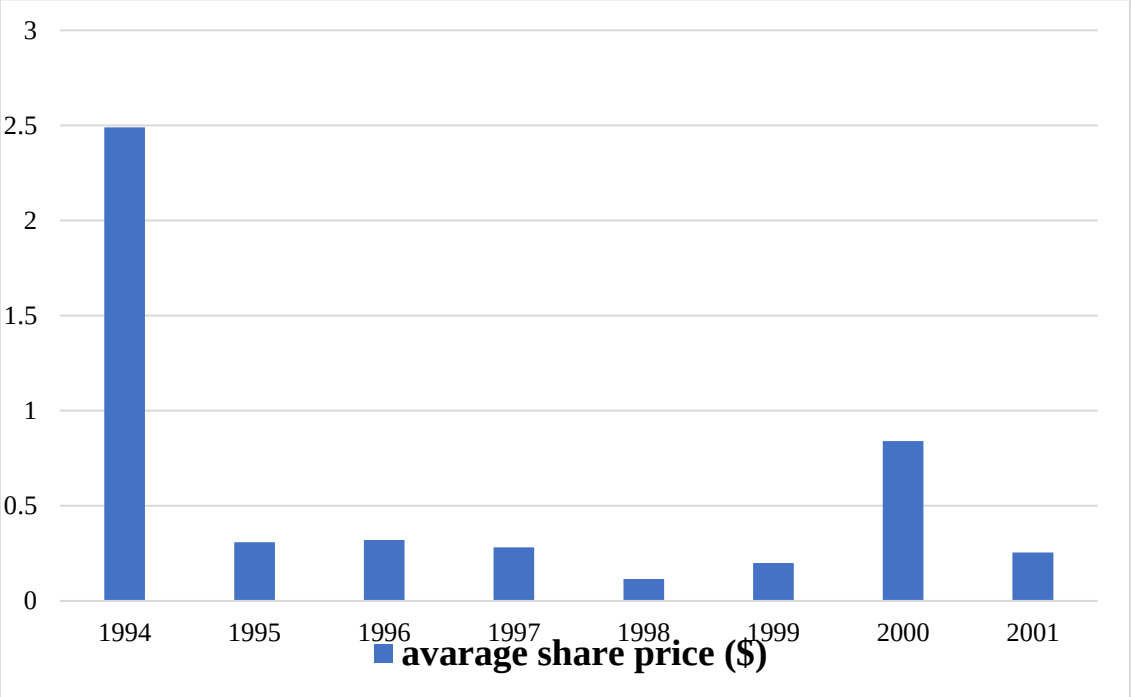

Figure 4.2.6. Polaroid camera average share price (1994-2001)[166]

Polaroid's images required a lot of processing. Reflecting its past, the firm continued to engage in "primarily one line of business, the worldwide availability, production and sale of high-speed photography", and, in 1995, the photographic product made up 90% of the company's income. Second, sales to markets had strong growth potential. In many emerging markets, there was no infrastructure to develop 35mm film. With rising living

[166] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf

standards around the world, there was a huge untapped market for instant photography.

Strong demand for Polaroid cameras fuelled international revenue growth. From 1993 to 1995, the percentage mix of US and international trade changed almost exactly. This change reflected steady growth of 3% to 8% per year in the international segment. Contrastingly, sales in the US fell 2% in 1994 and 12% in 1995. In the latter year, sales to Russia alone accounted for 9% of total sales. DiCamillo was seen as a leader whose efforts were instrumental in developing a new line of products that helped revitalise the Black & Decker brand. He brought the same energy and plans to Polaroid. Shortly after his arrival, he announced a major restructuring of the firm to cut the workforce by approximately 2,500 positions (around 20%) and cut costs by more than $150 million annually. In particular, Polaroid halted production of the Captiva camera and scaled back several major research and engineering programmes, instead emphasising projects with the greatest potential for commercialisation. Finally, he drastically cut corporate overheads. The impact of this restructuring resulted in a special charge to earnings of $247 million in 1995 stemming from severance and early retirement programmes, equipment and inventory write-downs. As a result, Polaroid reported a net loss of $140.2 million, compared with 1994's income of $117.2 million. The company sought to more effectively direct and unify product development responsibilities within each group.

4.3. Management Changes

Summary. Polaroid Corporation was amongst the most creative and technologically innovative companies of the 20th century. After founding the company, Edwin Land has always supported small and science-based research, as well as innovative creativity for production.[167]

The business model operated like a traditional razor-blade model (Teece, 2010). Polaroid anchored its business in the sales of film and produced new cameras as a means to capture those sales. Indeed, instant photography offers some unique benefits. It bridges the gap between digital images and waiting for traditional film to be developed. The price point of instant film and the quick development into a physical photo give the technology interesting features.

Polaroid Corporation invented and produced the widest range of instant film. Roll film was distributed in two separate negative and positive rolls and developed inside the camera. It was introduced in 1948 and was manufactured until 1992.

[167] https://www.library.hbs.edu/hc/polaroid/

1. Dr. Edwin Land, 1937–1980: instant camera and instant film

Key characteristics of management. Edwin Land's management was based on a strategic management system, namely the traditional razor-blade model (Teece, 2010), capturing international markets (in 1958, Polaroid opened its first foreign offices in Canada and West Germany, then the company's branches in Great Britain, France, and Italy, before appearing in Japan and even in the USSR in 1989). Land was famous for selling and promoting Polaroid products based on this strategy. Polaroid products could be found everywhere easily and at low prices. The right planning of the management system created the Polaroid brand.

Land (1909–1991) served as Chairman of the Board of Directors until 1982, leading the Polaroid Corporation in its development of the first instant photography system. Founded in 1937 by Land himself, Polaroid had four leaders during its 65-year history. Dr. Land directed all aspects of the company from 1937 until his less-than-successful retirement as President and Chief Executive Officer in 1975. This novel technology, demonstrated in 1947, produced photographs by means of a complex sequence of chemical reactions contained within the film unit. Land directed numerous improvements to the original one-step, sepia-toned film until Polaroid introduced a truly integral instant colour photography system in 1972. The immediacy of the Polaroid system revolutionised the industry, and instant photography grew rapidly as a popular and artistic medium. Land, an innovative scientist and businessman, earned 535 patents in the course of conducting and directing research at Polaroid.[168]

1) The history of Polaroid and the creation of the company's management system.

In the process of analysing the Polaroid company, I aimed to explain management decisions from simple control elements to a perfect or successful management system.

- Edwin Land – from invention to product and to the first successful business and the first steps of initial critical management.

1). Synthetic Polariser

1929, Obtaining the first patent for the product of polarisable sheets.

1930, Perfecting and commercializing the product of polarisable sheets

In 1932, Edwin Land and George W. Wheelwright III, founded the Land-Wheel Wright Laboratory to manufacture polarisers.

Inexpensive polarisers were used in photographic filters that gave the illusion of three-dimensional (3-D) images, anti-glare sunglasses, and stereoscopic products.

[168] Edwin Land and Instant Photography, by Polaroid Corporation Laboratory, Cambridge, Massachusetts American Chemical Society on August 13, 2015.

Inventing the Hectograph product – combining two still images taken from slightly different positions and printed as oppositely polarised images; using polarised glasses, viewers saw a 3-D image of the object.

In 1937, Land-Wheelwright became a public company under the name Polaroid Corporation, after the trade name of the firm's polar films.

Initial Investment – Eight original shareholders received $375,000 to support Land-Wheelwright and its projects.

In general, the company did good business with polarising films, and these films were indeed the main financial career of the creation of the Polaroid company.

- ***Polaroid's decision to develop scientific research useful for economic development and society.***

1943, The first idea is instant photography

The revolutionary invention was first demonstrated on February 21, 1947 at a meeting of the Optical Society of America in New York City.

The cameras sold out in minutes. The production of Polaroid Land 95 cameras was launched, creating a ready-made picture immediately after taking a picture. In addition, the company also released special cassettes for these cameras. The cassette contained photo materials or a combination of photo materials and reagents, resulting in a paper-based positive image. A picture taken by the first Polaroid cameras was very expensive - $1. At the time, this was a very decent amount of money. It cost $89.75, and Land deliberately did not raise the price of the camera above the $100 mark. Land considered the main consumer group to be the middle class, who would spend money on entertainment and such goods after the war. Polaroid defined its business as “Developing and promoting instant photography to meet the needs of wealthy families for love, friendship, fond memories, and humor”. It can be understood that Land introduced a strategic management system. By 1950, more than 4,000 dealers were selling Polaroid cameras. Revenue was $5 million.

2) The Polaroid company and business opportunities in World War II

The decision was taken to direct management and product in the interests of the state and society. The company thus launched products necessary for the war.

Polaroid delivered anti-glare goggles for soldiers and pilots, as well as gun sights, viewfinders, cameras, and numerous other optical devices with polarising lenses.

Polaroid took the lead in the war for the delivery of optical technology to national targets.

With the end of World War II and the end of the company's military service, the company faced a new problem: What would Polaroid do after the war? Now running a much larger company with more employees and

more research experience than a few years ago, Land decided to keep his company and its workers in peacetime.

After World War II, under Edwin Land's management system, important innovative products were created and commercialisation processes took place. In addition, he took unique and important steps in the management system to develop the company and bring it to the international level.

By 1949, under the relentless leadership of Dr. Land,[169] Polaroid had developed and commercialised the Land Camera – the first instant black and white camera and film system capable of producing exceptional photos in 60 seconds.

Edwin Land formed Polaroid's board of directors and included respected figures from finance and academia. Additionally, Polaroid employees had high incomes, and bonuses were always encouraged. In 1960, Polaroid had 3,000 workers, and by 1978, this had risen to 20,000 full-time employees. The instant colour peel-apart system was introduced in 1963.

In the early 1960s, Edwin Land decided to open international branches of the Polaroid company. Having successfully launched the first mass-market camera in the US through its own internal sales department and through subsidiary marketing companies in Europe and other parts of the world, Polaroid set up product in Europe to capitalize on this success. Accordingly, in 1965, the Polaroid Corporation established film factories in Leven Vale, the Netherlands, Dumbarton, Scotland, and Enschede to produce Type 20 film (used in the Swinger camera), and expanded these factories to produce 107/108 package film, which was to be a source of eyeglass blanks for sunglasses in Europe. For Polaroid, Europe was rightly considered a good place to work; the employees were always well-treated and very well-paid. It was a resounding success over the years. Standards and styles are set by branch directors. Polaroid has also established its own management method there. All of the directors, together with a dedicated management team and a team of staff, managed to establish the Polaroid way of doing things during Strathleven's formative years – a period of high growth. Additionally, for these 30 years, Vale stood in good stead. In the late 1960s, 1970s, and 1980s, the workforce grew to a peak of more than 2,000. Sister plants were opened in Enschede, Holland, and Newbridge, Ireland, to which Vale employees were occasionally sent to assist with their startups. In 1979, efforts began to break into Polaroid's potentially huge Chinese market.

[169] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf

In 1972, SX-70 full one-step colour photography was introduced.[170] This model made Polaroid a monopoly in the camera market and was considered successful. In 1975, the Polavision Instant Movie camera, film, and projector system[171] emerged as a result of the complexity of the technology and the simultaneous emergence of magnetic video tapes and diskettes. Polavision was a commercial failure, resulting in a financial loss of $500 million.

In 1982, Dr. Land was largely ousted from the board he chaired due to differences of opinion over the issue behind the failure.

The W1 was built without windows for safety reasons. In addition, Land assigned Polaroid's top engineer, Otto Wolf to design and build machines to apply complex chemicals to the positive layer in a continuous format. Initially, various shops built the equipment used in the Cambridge laboratories, but over the following decades, Polaroid built an elite engineering and mechanical structure with close to 1,000 employees. After 43 years as CEO and Chairman of the Board, Edwin Land resigned from Polaroid in 1980 to pursue his technological passions at his Rowland Institute for Science.[172] Edwin Landan left Polaroid a strong entrepreneurial culture.[173]

Table 4.3.1

Changes during Edwin Land's management of the Polaroid company[174]

Year	Management
DR. EDWIN LAND (1937-1980)	
1937	Formed Polaroid Corporation
1940	Hectograph three-dimensional pictures system
1944	Instant black and white, peel-apart photographic system
1957	Instant Black and White Transparency System
1960	Automatic exposure camera
1963	Instant Colour Photography
1966	Instant Colour Movies, Polavision
1971	Identification System
1972	Full one-step colour photography
1972	Polapulse Battery

[170] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf
[171] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf
[172] https://schoolingwordpresscom.wordpress.com/category/instant-history/#:~:text=Land%20resigned%20as%20Chairperson%20of,at%20the%20age%20of%2081
[173] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf
[174] Compiled from POLAROID-COMPLETE's data.

1974	1 billion instant prints
1976	A patent lawsuit between Polaroid and Kodak began. Polaroid sued Kodak for infringement of 14 fundamental technology patents
1977	Gives up on its Instant Movie development programme, Polavision.
1978	Sonar technology
1980	Edwin Land resigns as Chief Executive Officer.
1991	Edwin Land dies.

William McCune served as president and CEO from 1975 to 1986. A 1937 graduate of MIT, he joined Polaroid in 1939, two years after the company was founded by Dr. Land. During World War II, he worked with Land on the development of the heat-seeking guided missile project and in the late 1940s, he helped design the original Land Camera and film – the first successful instant photography system.

McCune is credited with expanding Polaroid's instant camera market to industrial applications and with the company's ventures into non-photographic technologies. He was named CEO in 1980.

2. William McCune, 1980 – 1985: instant film and digital imaging

Key characteristics of management. It should be mentioned that the management of William McCune continued the position of Edwin Land and developed special directions in the management of the Polaroid company. First of all, an Electronic Imaging Group was formed, investing heavily in digital imaging technologies. The strategic planning document focuses on the development of technological areas for research. Polaroid lost its marketing advantage due to the failure of Polavision. Polachrome introduced a system of instant colour transparency. Moreover, the William McCune Micro-Electronics Laboratory (MEL) introduced new hybrid imaging systems that combine state-of-the-art imaging, coating and microelectronics, high-speed imaging, and electronics to compete in the evolving digital imaging market. Additionally, the US made major moves in implementing a growth strategy with video feeds in the electronic video market.

William McCune was associated with Polaroid for 52 years and succeeded the company's founder, Edwin H. Land, as Chairman. Mr. McCune's first job was to establish the company's quality control programme. During World War II, Mr. McCune worked with Dr. Land on Polaroid's guided missile project. After the war, he worked with Dr. Land on the development of the original Polaroid Land Camera and film. Mr. McCune was appointed president and CEO in 1975 and was elected to the

board. Mr. McCune continued to serve as Chairman when Mr. Booth assumed the position of Chief Executive in 1986. Mr. McCune retired in 1991.[175]

Table 4.3.2

Changes during William McCune's management of the Polaroid company[176]

Year	Management
WILLIAM MCCUNE (1980 – 1985)	
1980	Vice President of Engineering, becomes CEO
1980	Substantial investment in digital imaging technologies
1981	An Electronic Imaging Group was formed
1981	The strategic planning document identified the following technological areas for exploration: micro-electronics, IC design, advanced optical design, image processing, software design, PC board design, surface mount assembly, CAD/CAM/FEA design, and fibre optics
1982	Polaroid loses its marketing edge
1983	Polaroid enters the magnetic video and diskette markets using non-proprietary technology
	Polachrome instant colour transparency system
1984	The MEL was established to compete in the emerging digital technology market with cutting-edge imaging, coating and micro-electronics.[177]
	New hybrid imaging systems that combine instant photography and electronics
	Growth strategy with video feeds in the US electronic video market
1985	McCune resigns as Chief Executive Officer

Mr. McCune was one of the key figures in the company's development and in Polaroid's history, working alongside Mr. Edwin Land for 46 years. At Polaroid, McCune was known for his simplicity as well as his strictness – both as an administrator and in his personal life. Mr. McCune reached the peak of his career at Polaroid. Prior to becoming Polaroid's director, McCune was head of marketing at high-powered advertising agency Doyle Dane (the firm responsible for Polaroid's

[175] http://www.polaroidretirees.org/NewsletterBOD/Q2NL2018.pdf
[176] Compiled from POLAROID-COMPLETE's data.
[177] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf

innovative technological global brand). Under his leadership, Polaroid achieved success in the following areas.

1) He created the Polaroid MEL during his tenure as CEO.

2) Mr. McCune broke this exclusive dependence on amateur photography and took Polaroid in new directions.

3) Polaroid began using its global brand on non-proprietary technologies such as magnetic video and diskettes.

4) The Polaroid company secured the lead in the commercial and industrial use of its traditional instant photography process. This advantage was achieved through the commercialisation of rapid imaging for medical diagnoses and security identification cards.[178]

3. MacAllister Booth 1985 – 1996: marketing development and Electronic Imaging Division

Key characteristics of management. During MacAllister Booth's presidency, restoring Polaroid's marketing dominance was set as a major task, an involved establishing marketing development and formal market research functions. Market entry also became a formal part of the product development process. An electronic image marketing group was formed with new employees to focus more on the market.

Significant steps were also taken in the development of cooperation with competing companies. As a result, Polaroid and Toshiba Corporation jointly developed a freeze-frame video recorder. Efforts were made to counter hostile companies (a hostile takeover attempt by Shamrock Holdings, led by Roy Disney and Stanley Gold, which Polaroid stopped through a share buyback) and to establish an effective management system.

Almost 42% of Polaroid's R&D spending went towards digital imaging. Three market-orientated divisions – Consumer, Business, Scientific, and Technical Imaging – were established in addition to a fourth division, namely Electronic Imaging. During his presidency, Polaroid won a lawsuit against Kodak. Polaroid's state-of-the-art MEL was sold to MIT.

MacAllister Booth was born on December 7, 1931, in Atlanta; he was the son of Charles Victor and Charlotte Ann (Beattie) Booth. After completing qualifications in Biomedical Engineering at Cornell University, 1955, and obtaining a Master of Business Administration from Cornell University, 1958, Booth joined Polaroid in 1958 and was president from 1983. He held various positions in the company’s film and engineering divisions.

MacAllister Booth took over, whilst McCune chaired the board of directors until 1992, when he assumed the titles of president and CEO.

[178] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf

With, Polaroid Corporation, Cambridge, Massachusetts, since 1958; vice president, 1976–1978; Executive vice president, 1980–1984; chief operating officer, 1982–1986; president, since 1984; chief Executive officer, since 1986; Chairman of the board, president, chief Executive officer, Polaroid Corporation, since 1991; also, board director.[179] Booth retired at the end of 1995 and elected Gary DiCamillo as CEO and Chairman.

Much happened during MacAllister Booth's reign as leader:

It is worth mentioning the following actions, both unsuccessful and successful, in his efforts to eliminate the factors that affected Polaroid financially.

Polaroid won a patent infringement lawsuit against Kodak and was awarded more than $900 million.

A hostile takeover attempt by a corporate raiding party was thwarted by a share buyback;

The Helios Graphic Medical Imaging System failed during commercialisation. This failure resulted in a net loss of $600 million;

Polaroid's Micro-electronic Lab was sold to MIT, whilst there were many other external and internal situations, as detailed in the milestones below.[180]

Table 4.3.3

Changes during Mac Allister Booth's management of the Polaroid company

Year	Management
MAC ALLISTER BOOTH (1985–1996)	
1985	Vice President of Operations, became CEO.
	Dr. Land sold all his shares of Polaroid Corporation.
	Established marketing development and formal market research function. Market penetration also became a formal part of the product development process.
	The first conventional colour transparency films were distributed on a limited basis for commercial and industrial photographers.
1986	Polaroid and Toshiba Corporation jointly developed the freeze-frame video recorder.
1988	Hostile takeover attempt by Shamrock Holdings, headed by Roy Disney and Stanley Gold. Polaroid thwarted the takeover by buying back its stock.[181]
1989	Almost, 42% of all its R&D expenditures went on digital imaging.

[179] https://prabook.com/web/israel_macallister.booth/1674370

[180] Compiled from POLAROID-COMPLETE's data.

[181] https://www.courtlistener.com/opinion/2334065/shamrock-holdings-inc-v-polaroid-corp/

1990	Three market-focused divisions – Consumer, Business, Scientific, and "Technical Imaging" – were formed in addition to a fourth: Electronic Imaging Division.
	An electronic image marketing group was formed with new employees to focus more on the market.
	Electronic camera system with the detachable printer.
1991	Polaroid was successful in its lawsuit against Kodak.
1992	Helios Medical Graphic Imaging under development
1995	Polaroid's state-of-the-art Micro-Electronics Lab was sold to MIT.
1995	Booth retires as CEO.

In 1998, the Polaroid Corporation expanded distribution to over 150 countries worldwide. They are currently manufacturing in China, India, Mexico, Netherlands, and Scotland. Polaroid has 35 marketing and manufacturing subsidiaries all over the world.

4. Gary DiCamillo 1995–2002: marketing and bankruptcy

Key characteristics of management. Gary DiCamillo's presidency coincided with a difficult time for Polaroid. Nevertheless, he was able to make changes in the management system, developing and commercialising advanced digital cameras for use with Polaroid film. To achieve this, he used Polaroid's main technology of instant photography. Along with the new management system, the success of the new marketing strategy with the new I-Zone camera led to an increase in revenue. By leading the commercialisation of digital cameras, Polaroid captured – a 16% market share, with Sony owning 27%. However, the actions taken turned out to be ineffective. Poor earnings, long-term and short-term debt, and layoffs at the public company caused Polaroid's stock price to collapse. Polaroid thus exited the ID system business. A new hybrid industry subsequently emerged. With major electronics, photography, telecommunications and copier companies, DiCamillo sought to save the company from bankruptcy by introducing a new direction. However, Polaroid filed for protection under Delaware's bankruptcy laws. Polaroid shares were suspended and the company was acquired and privatised.

Gary T. DiCamillo was born in 1952. He graduated from the Rensselaer Polytechnic Institute, where he earned a Bachelor of Science in chemical engineering in 1973, followed by a Master in Business Administration from the Harvard Business School in 1975. DiCamillo began his career at Procter & Gamble, later working for McKinsey &

Company, followed by Black & Decker. He served as the Chairman and CEO of the Polaroid Corporation from 1995 to 2001.

As Polaroid's efforts to stave off bankruptcy and recover became increasingly ineffective, hostile takeover attempts intensified. Therefore, risk management at Polaroid continued to be very difficult. DiCamillo, who came to the leadership of the company, initially emphasised the expansion of the company's product range.

In early 1999, Polaroid announced the sale of four business units a key component of its diversification efforts. These businesses included sunglasses, graphics, anti-glare polarisers, and holography.[182]

DiCamillo focused the company on the instant photography business, and particularly the development of instant cameras (I-Zone Instant Pocket Camera) for the consumer market, especially for young people. However, the pocket camera was developed by Japanese companies and launched in the summer of 1999 in the US photography market, achieving great success.

The company launched PopShots (the first disposable camera) and JoyCam (a smaller, more affordable version of Polaroid's standard instant camera) amongst other products, so as to secure its future.

The company also tried to create the first digital camera with instant printing. However, the risks posed by the technological obsolescence of Polaroid instant photography could not save the company.

DiCamillo was a partner at Eaglepoint Advisors and was also an adjunct lecturer at Babson College. He served on the boards of directors of the Whirlpool Corporation and Pella.[183]

DiCamillo led the company and left after Polaroid filed for bankruptcy in 2001 and before it went private. Under DiCamillo, a new modern hybrid industry emerged. This industry included information imaging (INFOIMAGING), and wireless printing of files and images. Major electronics, photography, telecommunications, and copier companies were targeting $200 billion in industry profits. DiCamillo implemented Polaroid's core technology by developing and marketing a variety of new instant cameras and film products. Polaroid introduced its digital camera line in 2000 and quickly captured a 16% market share in the digital camera industry. In 2001, Polaroid introduced a new product line of digital imaging and printing technology that combined a cordless phone, palm pilot, kiosks, and hand-held printers. On October 31, 2001, Polaroid filed for bankruptcy protection under Delaware's bankruptcy laws. Polaroid shares were suspended and, in 2002, an investment group bought the company.[184]

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[182] https://www.referenceforbusiness.com/history2/65/Polaroid-Corporation.html
[183] https://en.wikipedia.org/wiki/Gary_T._DiCamillo
[184] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf

According to Polaroid followers, the main reason for this was the advent of digital photography and the failure of Polaroid's management to adapt to the new technology. Many elements contributed to Polaroid's downfall, but the main factor was Polaroid's unique management culture.

Certain concepts or principles were embedded in Polaroid's way of running the company. Despite digital challenges, these changes prevented Polaroid from continuing as a viable enterprise:

1) The business model was always based on cameras that were "given" to sell the film – income was in the media;

2) Well-being of employees was important; no one to be fired;

3) Leaders hired from outside of Polaroid would not succeed – Leaders would not understand or embrace concepts 1 or 2. Although Dr. Land created this culture, his successors could do better. Top managers failed to apply the positive aspects of the Polaroid tradition to the next generation of technology.

Table 4.3.4

Changes during Gary Di Camillo's management of the Polaroid company[185]

Year	Management
GARY DI CAMILLO (1995-2002)	
1995	Gary DiCamillo, a former marketing Executive at Black & Decker, was chosen as Polaroid's first externally elected CEO in 1995.
1996	Development and commercialisation of advanced digital cameras for use with Polaroid film.
1997	Pursuit of Polaroid's core technology of instant photography
1999	The success of Polaroid's new marketing strategy with the I-Zone camera resulted in a profit rebound.
2000	Polaroid captured a 16% market share with its digital still camera. Sony had 27%.[186]
2001	A bleak earnings report and burdensome $935 million debt resulted in massive layoffs and the collapse of Polaroid stock price.
	Polaroid introduced a new product line of digital imaging and printing technology that integrated the wireless phone, the palm pilot, kiosks, and hand-held printers.
	Polaroid divested its Identification System business.
	By that time, a new modern hybrid industry had emerged. This industry included information imaging (INFOIMAGING), and wireless printing of files and images. Major electronics, photography, telecommunications, and copier companies were targeting $200 billion in profits from the industry.

[185] Compiled from POLAROID-COMPLETE's data.

[186] https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf

	Polaroid filed for protection under the bankruptcy laws of Delaware.
	Trading in Polaroid stock was terminated; the company was acquired and privatized.
2002	**Bankruptcy** (Federal has filed for Chapter 11 bankruptcy protection).
2001-2008	"Bank One's Chicago Branch" was purchased by One Equity Partners
	The company announced a plan that would give bonuses to the top 45 executives just for staying in the job. Additionally, the sale of these shares was prohibited.
	The Polaroid Corporation changed its name to Primary PDC, Inc.[187]

Each of Land's successor CEOs ignored advice or counsel from other executives, employees, financial advisers, and shareholders that could have changed the company's ultimate fate.

[187] https://mentalitch.com/why-did-polaroid-fail/#:~:text=The%20old%20Polaroid%20Corporation%20changed,no%20commercial%20operations%20or%20employees

CHAPTER 5. DISCUSSION

5.1. Positive factors for Polaroid in restructuring its businesses

Before discussing the factors in Polaroid's failure to restructure its businesses to the new environments with the strong influence of digital imaging, I would like to highlight the positive side of Polaroid in restructuring its businesses.

- The company was an excellent enterprise and had all the resources necessary to restructure the businesses, such as cash flow, technologies, human resources and brand.
- The company had to fully respond to the market changes, i.e. that digital imaging would be the main technology and would have a major impact on the analogue imaging business with films.

1) The company was an excellent enterprise and had all the resources necessary to restructure the businesses, such as cash flow, technologies, human resources and brand.

Polaroid was a great company, since it was full of financial resources and experienced professionals, whilst it also applied the innovation of its time for society, becoming a brand in the process. I believe that the success of the company depends on making the right decisions and the right management. Important moments in the development of the company included, the level of human resource provision of the organisation (engineers, mechanics, marketers, sales staff led by Edwin Land, etc.); readiness of the structure and management culture created by the company to implement the idea; and management readiness for changes in the implementation of new projects. For the growth of the company, it was necessary to consider the justification of management decisions, as well as the impact of the company on the market and its interaction with society. The company was initially led by Edwin Land, an innovator of his time and became a successful enterprise, based on the following positive factors.

a) Founder's Power (Edwin Land). Polaroid, which started in Cambridge and spread to several cities, was the pioneer of innovation. Edwin Land used the combination of scientific and leadership skills of his time to make quick decisions and was recognised as an innovator. He also demonstrated his leadership skills and leadership of the company as CEO for several decades. In addition, the company was a pioneer in combating copycats by competitors through legal patenting of all scientific work.

b) The Polaroid company had a management system that was flexible to any situation of the time. Based on the situation at that time, Land set the right strategy with the availability of high skills that meet the needs of the market. During World War II, Polaroid designed and

manufactured many products for the armed services, including a polarising infrared night vision device and colour filters for rangefinders and periscopes.

The main innovative brand created various technologies (Model 95, Land Pack Film “Black & White film”, SX-70, Pronto and OneStep series, Polavision, Helios, PDC-2000) and became a staple product in the photography market for several decades.

c) Turned the name of the company into a brand. By showing the importance of the image to the consumers, the management system obtained its own branding and logos. This was a key tool for the company in attracting consumers from all areas. Edwin Land never undertook another business, never sold out to another company, and grew Polaroid into a large company without borrowing for a long time. The company lost its competitiveness in the photography market after the departure of Edwin Land as the company's president. The main reason for this was the negative impact of some management decisions on the development of the company.

d) Ability to produce competitively priced products. The company was unable to outperform competitors and develop competition in the digital imaging market through low prices and high-quality services to target consumers. Although successful as a manufacturing company, it did not invest in clear strategies to improve business performance. There was a national marketing imperfection in management. In the current market, there is no incentive for the development of supply and demand analysis firms.

2) The company had to fully respond to the market changes, i.e. that digital imaging would be the main technology and would have a major impact on the analogue imaging business with films.

Polaroid was the largest employer of its time. The company's peak employment was 21,000 in 1978. The enterprise was made up of highly-qualified employees who conducted scientific research for the development of innovative projects. More than 42% of the company's budget was spent on scientific research. These developments summed up Polaroid's strategy of always being ready for market changes.

Edwin Land and his staff knew that digital imaging could take over the photography market, hence why Polaroid's R&D department was involved in digital photography from the 1960s onwards. Polaroid was not unaware of the development of electronic imaging; rather, the company was an early adopter of changes in the industry. In the mid-1960s, Polaroid received the first patents for electronic shutters. Subsequently, in 1981, the Official Electronic Imaging Group was formed to develop a “«PIF” (PRINT IN THE FIELD)” that produced a film-based print from a digital image. Polaroid channeled much of its profits from its instant photography

business into high definition imaging and electronic imaging systems – used in everything from computerised X-rays to car licenses.

Additionally, taking into account the market changes, the company was active in launching several projects on the market. After the business failure of the Polavision project, commercial delays in digital imaging led to financial difficulties for the company.

As a result of making a decision without taking into account financial risks, the company sold part of its shares for the production of the SX-70 model, which meant that there were financial difficulties. The SX-70 model was technologically universal, but failed in business. There was hesitation and doubt in developing a clear marketing strategy. Any management situation and market changes in Polaroid had a negative effect. In fact, the video-based system Polavision may have been the greatest technological breakthrough, but it was brought to market after many delays and was unsuccessful due to employee doubts regarding the success of the new technology. Following this, as a result of the Helios and PDC-2000 projects failing, the Polaroid company gave way to other competing companies in the digital imaging market. This caused Polaroid to go bankrupt.

5.2. Major changes in the business environments

Three factors had major impact on Polaroid from the 1980s.

- ✧ Diffusion of one-hour photo lab development
- ✧ Improving video technologies (such as Sony Betamax)
- ✧ Digital imaging technology

In the early 1980s, Polaroid's share of the US photo market was declining. The main reason for this was believed to be Kodak's entry into the instant camera market. Additionally, traditional 35mm photography was a huge obstacle. After the late 1980s, three factors greatly influenced Polaroid. Digital imaging technology, one-hour photo lab developments, and video technology improvement projects transformed the photography market.

1) One-hour photo lab development (to develop film and print the photos).

In response, the Polaroid company launched a business project to recycle colour film. The one-hour photo lab project restarted the entire business. This marketing project created convenience for people. However, photos printed in these one-hour photo labs were of average quality, hence why people used cheap and improved Japanese 35mm cameras. Mini-laboratories specializing in 35mm cameras were launched all over the US. Many minilabs now prefer to emphasise quality and personal service over speed. With the rise of film and the decline of photo printing, the one-hour

photo print project became the fastest-growing business in the US. Despite spending hundreds of millions of dollars on the quality of photos and film, the Polaroid company began to lose its place in the photography market.

2) Improving video technologies (such as Sony Betamax).

After the failure of Polavision, Polaroid tried to grow the business without taking the risk of diversifying its projects, since at this time the company was also going through a period of turbulent earnings and workforce reductions.

The 1970s and 1980s were filled with innovations such as VCRs, video-making technology, and personal computers that changed the way people lived. It was also a time of technological failures and marketing blunders by companies known for innovation, including Apple, Polaroid, Sony, and others. As a result of the development of video technologies, high-tech products appeared at Polaroid: Polaroid disks, floppy disks, video-tapes. However, none of them could change the business environment in a positive direction. In fact, the Polaroid company hid the main problem, namely that Polaroid's video technology was not a new invention, with Sony, Betamax, VHS, Canon and other companies' products occupying the video film market.

3) Digital imaging technology

In the 1980s, Polaroid tried to turn around a sector that had been in steady decline by breaking away from its reliance on consumer photography. Polaroid announced plans to enter the US electronic video industry in 1984 with its Polaroid videotapes. At this point, Polaroid was forced to take drastic measures, including laying off thousands of employees and closing many factories. The company built a laboratory dedicated to micro-electronics and tried to create new digital imaging projects. As a result, in the late 1980s, it carried out successful projects on electronic cameras and digital cameras. In 1987, there were hesitations and delays in bringing these projects into production. The 1990s saw the introduction of new technologies that significantly changed the field of photography: one-hour colour film processing, rival single-use cameras, VHS camcorders, and, later, digital cameras. There were many innovative technologies. Polaroid's digital imaging technology was affordable and effective, and the camera was ready for sale. However, the company lost time due to the leaders' hesitation to fully approve the project. Polaroid lost out to competitors due to disagreements amongst the company's top managers over the sale of digital cameras. The problem with Polaroid's strategy was that the company saw its business as a technological problem rather than a problem of changing consumer needs in the marketplace.

5.3. Reasons why Polaroid could not successfully transform its businesses to the new market environments

Based on the research of Polaroid in relation to three aspects (product development, financial results and management changes), I would like to discuss the reasons why Polaroid could not make the successful business transformation, resulting in its bankruptcy, even though it was fully aware of the market changes, i.e. from analogue film technology to digital imaging technology, and it had all the resources necessary to achieve the transformation, such as financial strength, technologies, human resources and brands.

Based on the analysis of Polaroid's history in relation to three aspects, the following were the key reasons for its unsuccessful business transformations:

1) Belief in the high-quality photo printed on paper amongst Edwin Land and the top management team, and incorrect interpretation of digital imaging technology
2) Management patterns to create new businesses
3) Influence of the founder (Edwin Land) until the late 1970s and lack of proper successor planning

1) Belief in the high-quality photo printed on paper amongst Edwin Land and the top management team *(ref. Tripsas and Gavetti, 2000)* ***and incorrect interpretation of digital imaging***

The company always relied heavily on photos with high quality which were printed on paper, even if digital technologies were used.

As a result, the enterprise was not satisfied with the printing quality of inkjet printers or the PDC-2000 digital camera which it developed. Additionally, the company could not grow the business of digital camera or inkjet printers, and discontinued such projects. The decision making was supposedly influenced by the mindset amongst the management teams, i.e. that high-quality photos printed on paper constituted a very important goal, even in the digital imaging age.

Additionally, instant cameras forgot the need to create convenience for people when printing their photos, because they did not even think about imagining the convenience and creative scope that digital cameras offered. Although Polaroid worked to introduce new business lines to regain success in the photography market, it was unable to produce a quality Polaroid-style print that could match and compete with the versatility of digital camera capabilities. Thus, although Polaroid photography was a fantastic technology of its time, it had to give way to digital photography.

There was also a misunderstanding regarding the digital imaging market. From the mid-1990s, the internet and emails were becoming more popular, and people started to send photos by email as the attached data, instead of printing the data on paper. Additionally, they did not care so much about high-quality imaging for attached photos.

2) Management patterns to create new businesses

Decisions of the Polaroid management team were always based on strategic objectives such as economic development, strengthening financial stability and achieving the company's goals. However, many problems were created by the delay of Polaroid's top management in developing other new business lines for the company, the management's reluctance to change and the lack of innovation Polaroid indeed used every opportunity to protect the technology, limit competition in the instant camera market, and maintain a successful company in the camera industry. However, the use of these opportunities was reversed, as the Polaroid management team made the following management decisions based on certain rules.

1. Polaroid management teams had **basic rules** for their decision making, i.e.:

- The company spent a long period on R&D, pursuing the very high-quality image data or high-quality printing for new devices. Polaroid was very successful in developing several new technologies that gave it an edge over the competition. Even if the new technologies could not be managed commercially, the company generated successful products in terms of scientific research. Funds spent on R&D should be properly and accurately directed, because correct and precisely directed funds are the reason for successful commercialisation of new technology. It is also important to make quick and effective decisions in order to achieve an advantage in meeting the company's market needs. Nevertheless, although Polaroid's difficulties in developing R&D processes and managing the implementation of new projects successfully changed over the years, some problems remained in place. These problems included long R&D and decision-making delays in pursuit of high-quality printing for new devices.
- The company was rather reluctant to introduce new products without printing media (without the razor-blade model). The main factor in the effective organisation of the results of scientific research or the introduction of new technologies is the improvement of the decision-making process in management. Instead of accelerating the commercialisation of its new product, Polaroid focused more on improving it. As a general decision, Polaroid did not want to introduce new products.
- The company was rather reluctant to keep modifying the new products based on the feedback from the market or make the decision to

discontinue the new products if the market feedback was not favourable or the products were not commercially successful at the beginning. This was due to the fact that the management team analysed the current market situation, evaluated the company's long-term strategies and analysed the consequences of commercialisation. Additionally, Polaroid's management team did not want to use another business model for integrating the new technology into the market without the razor-blade model (Teece, 2010).

- Polaroid used patents to protect its technology, limit competition in the instant camera market, and maintain a successful company in the camera industry. However, this protective measure also lost its meaning with the development of digital technologies.

2. These rules were formed due to the following reasons.

- The core profits were traditionally coming from the high gross margin of printing medial (film of instant camera).
- The company's uniqueness was the high-quality printing of the instant camera.
- The instant camera was a stand-alone product and did not rely on other technologies.

3. Results of the rules were as follows.

- The company needed to spend a very long period on R&D pursuing high-quality image data or high-quality printing for new devices.
- The introduction was substantially delayed compared with its competitors.
- The company lost the chances to test with other technologies. For example, the digital camera could not test with the internet environments as attached data for the Internet. Additionally, the company could not introduce the products matching with new technological environments.

Examples of these patterns.

Polavision. Polavision turned out to be an expensive failure, and most of the equipment produced was sold as a workplace in 1979 at a loss of $68.5 million. Polaroid abandoned its Polavision Instant Movie development programme, which had been in operation since 1977, resulting in a loss of $500 million. The Polavision system was a major commercial failure and was discontinued in 1979.

Helios. Produced in 1992, Helios failed at a total cost of $600 million, including development and manufacturing facilities.

Captiva. In 1994, the new instant camera Captiva, a smaller format film, failed and was discontinued that year at a loss of $300 million.

PDC-2000. In 1996, the PDC-2000 camera was released to the market with significant delays. Photography had not been able to secure an advantage over the competing successful companies selling digital cameras in the market. The Electronic Imaging Division separately requested sales

support for the PDC-2000. However, these efforts were ineffective. In 1997, the next PDC-3000 was announced, after which production was discontinued.

Although Polaroid's management models were successful in certain traditional photography markets, it was because of the above business models that these models were prevented from undergoing proper business transformation in the digital technology market.

Most likely, the Polaroid management team could not understand the importance, because the analogue instant camera was stand-alone without influence from other technological development.

3) Influence of the founder (Edwin Land) until the late 1970s and lack of proper successor planning

Edwin Land (the founder of Polaroid) was very successful in business right from the time he started the company until the early 1970s. However, success could not be achieved in areas other than fast camera and film technology. Nevertheless, until the late 1970s, Land was very influential in making company decisions, as he appointed intelligent and managerial personnel who could correctly assess the future risks in the company to research and management positions. As a result, until the late 1970s, Edwin Land continued to exert a strong influence in the management of his employees and in the development of decisions.

Further-more, when Edwin Land was in a top management position, he did not undertake proper succession planning to maintain the company, instead leading the company’s transformation to the new business environment.

Edwin Land's decision-making influences were as follows.

a) Failure of the decision to produce the SX-70 model. In 1972, when Edwin Land made a decision without taking into account financial risks, the company sold some of its stock to produce the SX-70 model, which meant that financial difficulties arose. The SX-70 model was technologically universal, but failed in business because innovations in product design significantly impacted the organisation of directions along the production network. Directions were based on consideration of transaction costs in product design discussions and distribution of power across production lines. However, the transformation costs that arise when the directions in the production network are reorganised due to changes in

the design of such a view are extremely large.[188] In the case of the SX-70 camera, Polaroid's relationships with key stakeholders were adversely affected and, as a result, its competitive position deteriorated.

b) The detrimental effect of Polaroid's management team's strong reliance on Edwin Land's decisions. Edwin Land told the Boston Globe, in 1976, that "nothing or no one can stop me from experimenting." This statement alone shows his strong influence on Polaroid. Polaroid was the largest employer of its time, with peak employment of 21,000 in 1978, hence why Edwin Land won the full trust of the employees and management team. Through this, Edwin Land exerted a strong influence in the management of his employees.

c) Polavision project commercialisation decision. The management team was unsure about introducing Polavision, as Sony's Betamax (video technology for home movies) had been introduced in 1975. Despite the situation, Polavision was introduced in 1977 with huge marketing expenditures. Shortly after its introduction, the product was discontinued due to unsuccessful sales. The system's failure led to Edwin Land's eventual marginalization within the firm. After the commercial failure of the Polavision project, commercial delays in digital imaging led to financial difficulties for the company.

In conclusion, Edwin Land strongly influenced Polaroid's management team in making key decisions on major projects until he stepped down as CEO in 1980 and left the company in 1982. Due to Edwin Land's strong influence on any decision-making until the late 1970s, the damage done to Polaroid was enormous. According to estimates, Polavision turned out to be an expensive failure, and most of the equipment produced was sold as a workplace in 1979 at a loss of $68.5 million. Polaroid abandoned its Polavision Instant Movie development programme, which had been in operation since 1977, resulting in a loss of $500 million.[189] The financial losses in the lawsuit against Polaroid and Eastman Kodak cost Polaroid approximately $6.1 billion.[190] In addition, the Polaroid company could not escape from its swamp of debts.

The lack of a successor to transform Polaroid into a new business environment can be seen from the analysis. Edwin Land ran Polaroid until 1982, when he retired, turning the company into a multi-billion-dollar enterprise. However, 20 years after that, the Polaroid company collapsed. The actions of the presidents of the company after Edwin Land were not very effective in these processes. Edwin Land decided to hand over the

[188] Garud, R. and Munir, K. (2008), "From transaction to transformation costs: the case of Polaroid's SX-70 camera", Research Policy, No.37(4), pp.690-705.

[189] https://www.digitalcameraworld.com/news/polaroid-the-instant-camera-trend-that-has-gone-full-circle

[190] https://www.company-histories.com/Polaroid-Corporation-Company-History.html

management of Polaroid to his colleagues, deciding that it should be passed on to a specialist who thoroughly understood the production in the field of photography.

William McCune ran the company from 1980 to 1985 as the first heir to Polaroid. During his tenure, Polaroid's international branches were profitable. In addition, he established marketing companies, and half of Polaroid's entire business was used for industrial purposes. The occurrence of the oil crisis in 1973 directly impacted on the sales of camera film. Inflation and economic growth problems also had a negative impact on Polaroid.

As the second heir, Mac Allister Booth ran Polaroid from 1985 to 1995. During the company's management, there was a challenge to dominate the competition from companies that produced digital technologies. Polaroid's digital cameras were a commercial failure. As a result of investing heavily in the electronics industry, Polaroid faced financial problems.

As the third heir, Gary DiCamillo led the company from 1995 to 2002. Based on his experience in marketing and outsourcing, there was hope that Polaroid would achieve business stability. His strategy of increasing profits by cutting costs did not pay off for Polaroid, instead causing the company to fall apart.

5.4. Implications of risk management on the case study of Polaroid company

The theories of crisis and risk management extensively cover the events and factors that threaten the life of any organisation, characterised by uncertain causes, consequences and solutions, with small probability and large consequences. These consequences are:

1) Risk aversion theory
2) The risk management cycle.
3) Identifying potential risks
4) The Comprehensive Business risk
5) Diversification strategy and systematic risk

Some comments on the theories of crisis management related to the history of Polaroid. (Relationship between Chapter 1 & 2 and 5.3. of discussion.)

1) Risk aversion theory

Theory and the name of paper (name, year)	My research paper
Rosenthal, U. R. Boin, A. and Comfort, L.K., "The changing world of crisis and crisis management", *Managing Crises: Threats, Dilemmas, Opportunities* 5 (2001), p.27.	Chapter 1., Section 1.1., Page 11.

Paul t'Hart has provided a contemporary definition of crisis, describing it as an "unpleasant event that represents a challenge for decision-makers, tempts them to act under conditions of imperilment, time constraint and unpreparedness". A crisis is a "serious threat to the basic structures or fundamental values and norms of a social system, which, under conditions of time pressure and very uncertain circumstances, demands the bringing of critical decisions."

Paul t'Hart's states that the elements of a crisis which indicate that it exists are as follows: the origin of the decision-making difficulties of the top managers in the commercialisation of new projects at Polaroid, the risk competitiveness of the project, the limited time or delay in the implementation, and the lack of decisions to act in the conditions of unpreparedness for competition. Ignoring small problems can lead to a huge crisis in the beginning and a situation of uncertainty in the workplace.

2) The risk management cycle.

Theory and the name of paper (name, year)	My research paper
Pearson, C. M. and Clair, J. A., "Reframing crisis management", *Academy of Management Review* 23.1 (1998), pp.59-76.	Chapter 1. Section 1.1., Page 11.

According to Pearson and Clair, a crisis is an "event of small probability and great consequences, which imperils the life of an organisation, being characterised by unclear causes, effects, and means of solution, as well as a conviction that decisions must be made quickly".

In my view, all the elements of Pearson and Clare's description of the crisis are the same as the elements of Polaroid's bankruptcy, because, at Polaroid, the beginning of the crisis was caused by small mistakes, money spent on inconclusive scientific research, and management processes that denied connections between staff members, thus leading to bankruptcy.

3) Identifying potential risks

Theory and the name of paper (name, year)	My research paper
Pauchant, T.C. and Mitroff, I.I., "Crisis management: managing paradox in a chaotic world", *Technological Forecasting and Social Change* 38.2 (1990), pp.117-134. Fearn-Banks, K. and Hooper, P., "Introduction: crisis communications and crisis management". *Journal of Promotion Management* 12.3-4 (2006), pp.3-5.	Chapter 1., Section 1.1., Page 11.

Pauchant and Mitroff see it as a "disruption that physically affects the system as a whole and imperils its fundamental premises, its autonomy, and essence".

Elements described by Pauchant and Mitroff were observed at Polaroid. Polaroid's disappearance from the photography market was largely influenced by the decision of management groups to sell Polaroid's real estate in parts, as well as the reduction of factories and laboratory buildings, because Polaroid was considered risky amongst investors, and the divestment affected the entire company.

Kathleen Fearn-Banks defines crisis as a "larger event with potentially negative consequences affecting an organisation, company or industry, as well as its target public, products, services or good name".

John Von Eiken's description of a crisis explains that any negative event which affects an organisation's financial position or reputation leads to a crisis, which suggests that Polaroid's lawsuits with Kodak were also a factor. As can be seen from the above, although the definitions of crisis are different, their essence is united by a single idea. This idea is based on the decisions of the top managers who played a key role in the Polaroid company's management system.

Polaroid's three aspects (product development, financial performance, and management changes) illustrate the importance and necessity of crisis prevention management capabilities presented in Chapters 1 and 2. Before the crisis, the Polaroid company used measures such as production of new products based on the demand and wishes of consumers, and management based on the analysis of financial results. In general, Polaroid's top managers also used many methods to ensure the stability of the company. On this basis, top managers took into account their options when making decisions. It can be seen that the discussion part of the scientific research work is inextricably linked with the theoretical part.

4) The Comprehensive Business risk

Theory and the name of paper (name, year)	My research paper
Whelan, T., and Fink, C., "The comprehensive business case for sustainability". *Harvard Business Review*, *21*(2016).	Chapter 1., Section 1.1. Page 13.

Fink argues that any event which could cause media and government attention to interfere with normal business operations and negatively affect a company's image and profits would lead to bankruptcy. The consequences of hindering business activity and negatively affecting the reputation of the company are analysed. Polaroid had the following negative effects. For example, in 1990, Polaroid was awarded $909 million as a result of the Kodak lawsuit – short of the $5.7 billion Polaroid had cited in lost profit and interest in 1988.

Total debt (long and short-term) in the year 1995 stood at $726.8 million, which was more than the optimal debt (measured) amount of $625.9432 million, due to a reduction in the number of workers and employee stock ownership plan (ESOP) system. An ESOP is an employee benefit plan that gives workers ownership interest in the company in the form of shares of stock. In 1997, Polaroid cut its additional workforce by 15%, or about 1,500 jobs.

5) Diversification strategy and systematic risk

Theory and the name of paper (name, year)	My research paper
Barton, S. L., "Diversification strategy and systematic risk: another look", *Academy of Management Journal*, *31*(1) (1988), pp.166-175.	Chapter 1. Section 1.1., Page 13.

Barton sees a crisis as "a larger and more unpredictable event with potentially negative consequences". This incident and its consequences could seriously harm the company, its employees, products, services, financial condition and reputation".[191]

In general, economic crises occur not only at the national level, but also at the micro level, and corporate crises are explained as management problems, errors, and shortcomings. In the Polaroid company, if the situation were evaluated from this viewpoint, then the reason why the Polaroid managers could not follow the warnings of the crisis management

[191] Barton, L., Crisis in Organizations: Managing and Communicating in the Heat of Chaos, South-Western Publishing Company: Cincinnati, OH, 1993, p.2

theories was that, during the development of the crisis, the strategy of the company's management was unpredictable and impossible. The concept of crisis is inextricably linked with the concept of risk, and it has a multi-faceted impact on management decision-making methods.

In the Polaroid company, within the framework of diversification strategy and systematic risks, technological and employee departure from the company were considered important factors in causing the crisis. A sudden and unexpected event that causes great confusion among people in the workplace is termed an organisational crisis. In other words, a crisis is defined as an emergency situation that disturbs the employees and also leads to instability in the organisation. A crisis affects an individual, group, organisation, or society as a whole.[192]

Technological failures and machine breakdowns also lead to crises. A crisis occurs when employees disagree and fight amongst themselves. Ignoring small problems can lead to a big crisis in the beginning and a situation of uncertainty in the workplace. Management should have full control over their employees and should not be haphazard about work. These features were available at Polaroid. For example, the Polavision, Helios, «PIF" (PRINT IN THE FIELD), one-hour lab, and PDC-2000 innovative technologies were unsuccessful. In addition, there were cases of disagreement between the top managers and the new team that DiCamillo formed. Polaroid conducted a great deal of scientific research without results (developing a product that would be accepted by the market). Polaroid's failure to pay attention to poor results or unfavourable market changes led the company to bankruptcy.

Polaroid's decades of digital ventures seemed to lose the company investment in the business. Disappointments and failures in digital technologies were the result of mistakes in the decisions of the new top management team. As a result, by 1998, Polaroid's previous strength in digital imaging technologies had significantly diminished. In 1992, Polaroid had approximately 300 engineers and scientists conducting research on digital technology, and by 1998 around 50 engineer employees were working on digital imaging research. Corresponding with this decline, confidence in the value of large-scale inventions disappeared.

This research paper demonstrates the impact of risk management in Polaroid's case study by analysing the theoretical factors listed above. It was also described that Polaroid has elements of risk management theories.

The following conclusions can be drawn from this. Polaroid's failure analysis, risk assessment and risk management have been established as a scientific field, and, in practice, supporting decision-making in the

[192] National Encyclopedia of Uzbekistan. Volume 4. Zebuniso-Konigil. Editorial Board: M. Aminov, T. Daminov T.: - National Encyclopedia of Uzbekistan. State Scientific Publishing House, 2002. - 704 p.

activities of the top management group is an important contribution to the field of risk management. Basic principles, theories and methods exist and are still evolving. This scholarly research review focuses on recent work and advances involving the fundamental ideas and thinking underlying the risk domain. After analysing many articles in this field, the following main conclusions are drawn:

1. The scientific basis of risk assessment and risk management is still theoretical work and, in practice, top managers can make serious mistakes when it comes to decision-making; additionally, from this perspective, there are some shortcomings or insecurities in the sense that management relies on principles.

2. There has been, and will continue to be, much research on risk assessment and management. Therefore, in a broader history of risk assessment and management, there should be more analysis of companies that failed to assess risks correctly. Through drawing conclusions from these analyses, it is necessary to gain knowledge in applying such situations in future companies. Therefore, it is necessary to develop the field of risk management and have a strong unifying scientific platform for this field. The factors that developed the risks at Polaroid must scientifically justify the necessary experience in order to not be repeated in the future.

3. In the example of the Polaroid company, there are signs of interest in the main issues of risk assessment and management. The study of this area of risk is necessary to solve the social problems faced at the moment and the risks that arise in the era of complex technological changes. Every scientific researcher needs to take the field of risk assessment and management to the next level.

5.5. This thesis in comparison with the prior works on the Polaroid case study

In comparison with the prior works on the Polaroid case study, the following points are unique to my study.

1) Scope of the case study (method of study)
2) Analysis of three aspects (method of study)
3) Three factors of failure (discussion)
4) Implications of risk management studies (discussion)

1. Scope of the case study

Based on the above research concerning previous studies, the following research methods (data collection and analysis) are important for my research.

(1) The scope of the study should be from the establishment of the company to bankruptcy, because the reasons for failure can be based not

only on the period of stagnation, but also on the growing period of the company.

Polaroid was the first manufacturer of instant cameras and film. However, the company rose from an industrial giant to bankruptcy, but then went out of business. Polaroid was founded in 1937 to produce polarised sunglasses. Taking advantage of this polarisation in cameras, it became a huge company. After this, Polaroid's development process took place in three stages.

In the first phase, Edwin Land's company dealt with the problem of producing a fast camera. From 1948 to 1978, the company achieved economic growth by using a razor-edge business model (Teece, 2010) in the instant camera (Model 95, Model Swinger, Model SX-70, Pronto, and OneStep series).

In the second phase, the Polaroid team solved the problem of introducing a film system to create instant moving pictures. In 1977, Polaroid launched the Polavision film system. The project became a financial disaster and was cancelled a year after launch. The first failure was launching Polavision.

In the third phase, the Polaroid company dealt with the problems of digital technology production. In the 1960s, at the dawn of the digital age, Polaroid was engaged in scientific research on digitisation in its respective business areas, and the first signs of digital technology began to appear. During this period, digital technologies took over the market; global demand for photography and colour film declined. The second failure occurred when Polaroid decided to commercialise new digital technology projects through an old business model without studying the market environment. Following this, the Polaroid company began to lose its competitiveness in the photographic business market.

Overall, in the Polaroid study, risky decisions from inception to bankruptcy led to poor results, because the reasons for the failure of Polaroid can be traced not only to the decisions made by the top management team during the company's growth period, but also during the recession. Throughout Polaroid's economically successful period, some factors created the risk of a crisis. These factors gradually increased and caused the Polaroid crisis.

The first factor. Failure of strategic planning. The company's strategy was not to plan the future photography market, but to improve its innovative techniques. This lack of strategic planning, amongst other factors, contributed greatly to its downfall.

The second factor. Failure of cooperation. No company can implement its strategic plans for the future alone. To this end, Polaroid offered other photography companies opportunities to trade and collaborate in their dominant field, the instant photography market. As a result of

successful cooperation, risk factors were developed in the photography market. The risk of this partnership led to the commercialisation of new Polaroid projects by Kodak.

The third factor. Disagreement and inability to adapt. The most important element in the implementation of a strategic plan is decision-making. Bad decision-making, infighting, and an inability to adapt to changing times amongst Polaroid's top management team led to the company's bankruptcy.

The above factors are the reasons for the failure of Polaroid, not only the factors that remain in the period of failure, but also the factors that begin to grow in the period of success.

2. Analysis in relation to three aspects

(2) The case is analysed not in relation to a single aspect, but in relation multiple aspects, specifically three aspects (finance, product R&D and marketing, and management changes).

1) Product R&D analysis.

It failed due to improper systematisation of scientific research. From the beginning, the Polaroid company devoted all of its energy to scientific research. In 1948, it launched the Model 95 camera. The company introduced the first colour film in the Colourpack camera in 1963 and the Swinger camera in 1965, the latter of which was also cheaper than other models. Polaroid cameras were very popular in the 1970s. The consequences of the crisis, which began with the failure of the Polavision project in 1977, were severe.

The 1980s saw significant investment in R&D and digital imaging technology. In 1981, the Electronic Imaging Group was established to start R&D production. The group was tasked with developing the areas of micro-electronics, IC design, advanced optical design, image processing, software design, PC board design, surface assembly, CAD/CAM/FEA design, and fibre optic technology. In 1989, almost 42% of Polaroid's R&D expenditures were directed towards digital imaging. However, scientific research such as Polavision, «PIF" (PRINT IN THE FIELD), PDC-2000, Helios and Captiva ended in failure.

2) Finance analysis.

After a long and unsuccessful effort to find a new way of selling that would allow Polaroid to recapture the success of the early 1970s, the company was on the brink of bankruptcy in the mid-1990s, as there was huge financial debt.

Polavision project failure. According to estimates, Polavision was a hugely damaging project for Polaroid. Polavision, which had been in

operation since 1977, abandoned its Instant Movie development programme, resulting in a loss of $500 million. In 1979, the business was sold at a loss of $68.5 million.

Financial loss of Polaroid and Eastman Kodak patent litigation. Polaroid sued Eastman Kodak for infringing on 14 fundamental technology patents. Financial losses from the countersuit cost Polaroid an estimated $6.1 million.

Failures in attracting capital. In 1985, Polaroid had $225 million in debt due to the main factors that exacerbated the crisis during the economic recession. As such, the Polaroid company felt the need for financial investment. As a result, Shamrock Holdings, led by Roy Disney and Stanley Gold, attempted a hostile takeover of Polaroid in 1988 under the guise of investment. The move was halted by Polaroid's share buyback. The stock cost Polaroid $450 million. As a result, the company took on a debt of $830 million.

The failure of Project Captiva. In 1994, the Captiva project was commercialised, but was cancelled the same year with a loss of $300 million.

The failure of Project Helios. The Helios project led to losses of $180 million in 1994 and $190 million in 1995. Therefore, in 1996, most of Helios was sold to Sterling Diagnostic Imaging Inc. In total, the Helios project cost Polaroid $600 million.

Stocks crash. In 2001, a poor earnings report and a heavy $935 million debt led to mass layoffs and a collapse of Polaroid's stock price.

3) Marketing, and management changes analysis.

Changes in the management system at Polaroid may also have been a factor in the crisis, since Polaroid was not managed successfully by company presidents after Edwin Land.

William McCune founded the Electronic Imaging Group in 1981. Additionally, in 1982, the Polaroid company lost its marketing advantage. In 1984, the MEL was established to compete in the emerging digital technology market with state-of-the-art imaging, coating and micro-electronics. In Polaroid's customer-orientated management system, the three divisions (consumer, commercial, new business) had difficulties with making decisions and implementing long-term plans, as well as with the senior management team's performance.

In 1990, MacAllister Both established three market-orientated divisions - Consumer, Business, Scientific/Technical Imaging – in addition to a fourth: The Electronic Imaging Division. In the 1990s, Polaroid's delays in bringing new projects to market and commercial failure meant that the marketing process was flawed. As a result, there were cases of customer distrust and alienation of Polaroid. The loss of marketing

advantage caused the top management team to lose confidence in Polaroid's further development.

As such, Gary DiCamillo emphasised the marketing direction of the company. From a marketing point of view, Polaroid's resurgence in the digital technology market, product uniqueness, and changes in the company's capital structure made every effort to preserve its core strengths. Polaroid's failure to restructure the business into a new environment with the strong influence of digital imaging was due to a lack of marketing excellence and an inability to fully respond to changes in the digital imaging market.

3. Analysis of the reasons for failure

(3) By using three aspects (finance, product R&D and marketing, and management changes), this study is able to cover several reasons why the company failed.

By using the aspects of finance, product R&D and marketing, and management changes to analyse the causes of failure, the study covers several reasons why companies fail.

In order for Polaroid to be successful in the photography market, the company continually improved its processes to meet ever-changing needs. However, the decisions and projects that took into account the changing needs of the market did not justify themselves. In a competitive and financially cost-driven competition for Polaroid, it exited the market with too much debt.

There was a failure due to the fact that scientific research work was not properly organized, whilst Polaroid's investments in R&D did not pay off. Since the reasons for bringing the results to the market were the lack of confidence in the perfection of scientific research projects and the speed of time, Polaroid's top management team decided to delay the commercialisation of projects. This decision shows that the operating and transaction costs affecting Polaroid's economic growth and the competitive conditions in the photography market at the time were not properly taken into account.

The change of directors and the loss of marketing dominance at Polaroid can be attributed to the lack of trust and indifference of the top management team to the company's goals, the distrust and alienation of customers, and delays in monitoring results in the optimization of digital technology projects.

4. Implications for risk management studies

This section briefly summarizes the implications of risk management in the Polaroid case study and examines the theoretical and managerial implications. In addition, the research paper discusses the management

issues of Polaroid's top managers and their ineffective management. Subsequently, the results of the decisions made in the emergency system of the Polaroid company are analysed through a detailed assessment of the situation.

Additionally, as markets and technologies change rapidly, the ability to change and make sound decisions has become even more important. It appears that Polaroid did not achieve excellence in risk management despite implementing risk assessment and control processes at some points during its operational management. Polaroid did its best to achieve the goal by distributing its resources. However, limited resources, such as business volume, uninformed management and unsystematic strategies against risks; combined with many external factors and the poor risk management performance of Polaroid's top management team, led to serious failure. Based on the research data and findings, the conclusions and suggestions regarding the effect of Polaroid's projects on effective risk management are as follows.

1) The impact of the decisions made by the top managers on the goals and objectives of the Polaroid company.

The need to systematically describe or explain the company's vision and goals to Polaroid employees during the commercialisation of any new projects was not highly organised. Indeed, clarifying the company's goals is an important part of achieving efficiency not only in risk management, but also in long-term operations. At Polaroid, risk management was to be a central part of company management. Conferences, seminars or meetings focused on the value of the company and the existing risks in relation to these values provided an understanding of situations and conditions of risk management; the entire business pointed to the employees and improvements on specific projects were rarely discussed by the top management team. In addition, although the decisions developed as a result of a systematic analysis of the photography market were in line with the company's goals and objectives, the impact on risk management was poor.

2) Implications of prioritizing excellence in risk management.

Polaroid's critical mistake was missing the opportunity to deliver its new digital technologies on time and quickly to meet consumer demand as the digital imaging market grew. Polaroid did enough to create the digital photography market, but it took a long time to define the market and perfect digital photography, leaving the door open for other competing companies.

3) *The impact of financial resources spent on R&D on the company's income*.

Whilst Polaroid indeed devoted considerable resources to digital photography, this was simply due to a lack of understanding of the digital market or an unwillingness to listen to consumers. Polaroid followed the path of many companies. The company protected its technology and its

biggest market. Polaroid directed financial resources to scientific research works to the extent that this had a greater impact on its income. The commercialisation of the results of scientific research work was not put into one system. It was the decisions of the top management team that caused Polaroid to fail. Polaroid's actions highlight the importance of marketing and market creation when dealing with digital technology. Polaroid was far behind its competitors in the digital technology market.

4) Risk management practices of the company's top management team.

Effective management of any projects and risks within projects depends largely on the management experience of the project managers or top management team. The Polaroid company tried to implement diversification projects using all of its capabilities (financial resources, R&D, marketing, management system). These projects could reach wider areas. However, top-managers were required to have more powers than possible, and, as a result, the decisions they made with physical effort reduced the scope of influence in risk management.

5) Approach to risk management.

Polaroid's business had a tendency to ignore the evidence of failure every time and take risks without exploring the existing market as an opportunity for growth. In the digital technology market, Polaroid took risks in the hopes of further economic development, considering that Polaroid projects would suffer huge losses even if they failed. The company's top management team had to carefully consider its approach to decision-making and risk-taking. It is dangerous for top managers to over-rely on their abilities. When one project fails, it can affect the team's attitude towards another project, and at worst, lead to another failure. Top managers must judge overconfidence and not allow risk-taking to jeopardise the possibility of success.

6) Impact of risk prioritisation

Looking at the Polaroid case, a group of top managers treated new promising projects equally to simplify management and workflow. However, this did not yield the best results. Polaroid projects were more promising than those of competitors. However, as a result of disagreements, indecision and delays in the top management team, the projects became riskier for the Polaroid company. At Polaroid, failure to implement projects on time and quickly resulted in risk being a criterion for prioritising risks. The impact of Polaroid's risk prioritisation criteria increased the likelihood of risks occurring and led to bankruptcy.

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Appendix

Appendix 1.

Year	Sales ($ million)	Earnings/Share ($)	Average Annual Stock Price ($)
1950	6	0.18	2
1951	9	0.12	2
1952	13	0.15	3
1953	26	0.37	4
1954	24	0.3	7
1955	26	0.64	10
1956	35	0.98	19
1957	48	0.18	5
1958	65	0.23	9
1959	90	0.34	18
1960	99	0.28	26
1961	102	0.26	25
1962	104	0.32	19
1963	124	0.36	21
1964	139	0.58	20
1965	204	0.93	43
1966	322	1.52	71
1967	374	1.81	102
1968	402	1.86	110
1969	466	1.92	124
1970	444	1.86	91
1971	526	1.86	97
1972	559	1.3	118
1973	686	1.58	104
1974	757	0.86	51
1975	813	1.91	29
1976	950	2.43	38
1977	1062	2.81	32
1978	1377	3.6	42
1979	1362	1.1	39
1980	1451	2.6	26
1981	1420	0.95	27

1982	1290	0.73	23
1983	1254	1.61	31
1984	1272	0.83	30
1985	1295	0.6	17
1986	1629	1.67	29
1987	1764	1.88	29
1988	1863	0.34	33
1989	1905	1.96	43
1990	1972	2.2	34
1991	2071	2.54	25
1992	2153	2.06	30
1993	2245	1.45	32
1994	2312	2.49	33
1995	2237	0.309	39
1996	2275	0.32	44
1997	2146	0.281	48
1998	1846	0.115	34
1999	1979	0.2	24
2000	1856	0.84	16
2001	1400	0.255	0

Source. https://negocios.udd.cl/files/2012/09/POLAROID-COMPLETE.pdf

Appendix 2.

SX-70 Cameras[193]

	Types	Produced	Explanation
1	Encore!	1977	Similar to Pronto!
2	OneStep	1977	Single-element 103mm f/14.6 plastic lens. Fixed focus. White-and-black plastic body.
3	OneStep Plus	1977	Appears to be a Special Markets version of the Time-Zero OneStep. Similar to OneStep except for some cosmetic restyling.
4	Presto!	1978	Similar to OneStep, except: Gold-coloured plastic body. Also, in black

[193] https://www.instantoptions.com/landlist/cameras/sx70/rigid.php#presto

			with rainbow stripe and a combo of both styles.
5	Pronto!	1976-1977	3-element 116mm f/9.4 plastic lens. Lens on late-production models was colour-coated. Minimum focus 3 ft. Front-cell focusing with focus scale on lens ring. Black plastic body.
6	Pronto! B	1977	Similar to Pronto! except: Silver-and-black plastic body. Lens ring has different style. Plastic lens is colour-coated.
7	Pronto! Extra	1977-1978	Similar to Pronto! except: Supplied with self-timer and tripod mount.
8	Pronto! Plus	1976-1977	Similar to Pronto! except: Originally supplied with carrying case, photo album, film, and Flash bar.
9	Pronto! RF	1977	Similar to Pronto! except: Has a single-window superimposed-image rangefinder.
10	Pronto! S	1976-1977	Similar to Pronto!
11	Pronto! SM	1976-1977	Similar to Pronto!
12	Pronto! Sonar OneStep	1976-1977	Similar to Pronto! except: Autofocus; used Polaroid Sonar AF system. Full manual focus was also possible. Low-light warning in viewfinder. Has a tripod socket and a cable-release socket Has an extra set of flash contacts behind the Flashbar socket; This extra socket did mate with a special electronic flash designed specifically for this camera, but I didn't know what extra functionality these extra flash contacts might have provided (the flash otherwise seems similar to those sold for other Polaroid camera models).
13	Super Clincher	1980	Similar to Pronto! except: Two-tone brown/tan-coloured plastic body.
14	The Button	1981	Similar to OneStep except: The lettering “The Button” could be left or right

			aligned. No idea which was more common.
15	TimeZero OneStep	1981	Similar to Pronto! Sonar OneStep, aside from a few cosmetic stylings changed.
16	TimeZero Pronto AF	1981	Similar to Pronto! Sonar OneStep