



## Identification of Factors Affecting Creative Destruction in Economic Enterprises

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### Abstract

Creative destruction was first introduced by Schumpeter in 1942 in his book "Capitalism, Socialism and Democracy." Creative destruction describes a process in which new innovations replace existing ones, rendering them obsolete. Schumpeter characterized creative destruction as innovation in the production process that increases productivity, defining it as "an industrial leap process that continuously transforms the economic structure from within, relentlessly destroying the old structure and creating a new one." Given the importance of the creative destruction process in the economic development of the business ecosystem, this article examines the factors influencing creative destruction in economic enterprises based on qualitative content analysis. The research findings indicate that the main factors affecting the creative destruction process in an economic enterprise include: the degree of alignment of the enterprise with technology, investment in research and development, the number of competitors, government support, the size of the enterprise, and the entry and exit of competing enterprises from the market.

**Keywords:** Creativity, Innovation, Creative Destruction, Economic Enterprise

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### <sup>1</sup> المؤلف المراسل

### معلومات البحث

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### تحديد العوامل المؤثرة على التدمير الإبداعي في المؤسسات الاقتصادية

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### المستخلص

تم تقديم مفهوم "التدمير الخلاق" لأول مرة بواسطة شومبيتر عام 1942 في كتابه "الرأسمالية، الاشتراكية والديمقراطية". يشير التدمير الخلاق إلى عملية يتم فيها استبدال الابتكارات الجديدة بالابتكارات القائمة، مما يجعلها متقدمة. وصف شومبيتر التدمير الخلاق بأنه عملية ابتكار في الإنتاج تزيد من الإنتاجية، حيث عرفه على أنه "عملية قفز صناعية تحول باستمرار الهيكل الاقتصادي من الداخل، وتدمر بلا هوادة الهيكل القديم وتخلق هيكلًا جديدًا".

نظراً لأهمية عملية التدمير الخلاق في التنمية الاقتصادية لنظام الأعمال، فإن هذه المقالة تبحث في العوامل المؤثرة على التدمير الخلاق في الشركات الاقتصادية باستخدام تحليل محتوى نوعي. تشير نتائج البحث إلى أن العوامل الرئيسية التي تؤثر على عملية التدمير الخلاق في الشركة الاقتصادية تشمل: درجة توافق الشركة مع التكنولوجيا، الاستثمار في البحث والتطوير، عدد المنافسين، الدعم الحكومي، حجم الشركة، ودخول وخروج الشركات المنافسة من السوق.

**الكلمات المفتاحية:** الإبداع، الابتكار، التدمير الخلاق، الشركة الاقتصادية

### Introduction

A sector, whether manufacturing or service-oriented, consists of a group of competitors who directly compete with each other by producing products or providing services. A specific strategic industry includes products that share similar

sources of competitive advantages [1]. Among the various factors that contribute to the survival of a firm in an industry is the establishment of a competitive advantage by the firm in the products or services offered. This advantage can be

achieved through innovation in the production of new products. On the other hand, the competitive drive to offer creativity and innovation is one of the fundamental principles of a free market economy. The logic is that economic actors are compelled to innovate in order to compete and create competitive advantages. Product innovation creates value that contributes to the well-being of individuals or leads to better utilization of resources [2]. Innovation manifests itself in the introduction of new products, new methods of production, opening new markets, discovering new sources of raw materials or intermediate goods, and reorganizing the production process [3]. The most distinctive technological causes that lead to shifts in competitive advantage include: innovation in new technologies, new or changing buyer needs, the emergence of a new sector in the industry, and changes in government regulations [1].

Sohn and Jung, through structural equation modeling, argue that creativity leads to innovation and effectiveness [4]. If creativity is considered one of the main elements of innovation, it can be said that creativity somewhat leads to the emergence of creative products. In the scientific literature, there is still no consensus on what constitutes a creative product. However, it can generally be stated that if a product possesses characteristics of novelty and originality, creates value, and is practical, it is considered a creative product [5]. It is worth noting that many creative products are of the service type, and many technical goods are utilized in the service sector [6].

After the introduction of a creative product, four stages of the product life cycle emerge: 1- **Introduction stage:** This is the most expensive stage for the firm, as the product's market share is

small and sales volume is very low. The firm incurs costs such as research and development, advertising, and more. 2- **Growth stage:** The firm experiences growth in product sales and profitability, but still incurs advertising costs to boost sales further. 3- **Maturity stage:** At this stage, the firm's profits reach their maximum, and the sole objective of the business is to maintain its market share. 4- **Decline stage:** The product's market share and sales decrease. This reduction in share is due to market saturation, meaning that either the product has already been purchased by consumers or consumers have turned to a different type of product. In this stage, the firm may seek to achieve lower profits through cheaper production methods. If the firm innovates during the product's decline phase, it can maintain its position in the industry by introducing a new creative product.

If we consider technological change as an action to create competitive advantage and foster innovation, with the emergence of new technologies, previous innovation methods and processes become obsolete, and new methods replace them. It can be said that competitiveness and, consequently, new technological innovations lead to creative destruction. For technological change to result in creative destruction, the created technology must possess three characteristics: 1- The created technology should provide a competitive advantage and serve as an incentive for investment. 2- Considering the firm's infrastructure, there should be the capability to replace old technologies with new ones within the firm. 3- The new product should create new value for the customer. In this case, it can be said that the new technology has shaped the process of creative destruction [7].

Now, in an era where economic development is contingent upon creative competitiveness,

identifying the factors influencing the cycle of creativity, innovation, and creative destruction is of great importance. Therefore, the aim of this research is to identify the factors affecting creative destruction in economic firms, and for this purpose, a qualitative content analysis method has been employed.

### Theoretical foundations

Schumpeter [8] writes in his book "Capitalism, Socialism and Democracy": Competition inherently possesses a driving force and a promoter known as innovation and creativity. Firms can control costs through innovation and creativity, achieve better quality, increase their profits, and ensure their survival in the market. In the discussion of competition, the issue arises that economic resources should be optimally allocated over time, and in fact, to judge the competitiveness of a market, we should not expect resources to be allocated optimally in that market at every moment in time and rapidly. Therefore, it is observed that in the process-oriented view of competition, competition occurs through innovation and change over time, and it was on this basis that Schumpeter attributed the term "creative destruction" to describe competition. Thus, from the perspective of economists like Schumpeter, the capitalist system and competition are processes in which, due to the firms' need for innovation and creativity, the economy is constantly undergoing transformation and change [9].

When a new product is introduced to the market, we assume five stages in the evolution of the market concerning the number of producers in it. These five stages represent the initial model of the market life cycle from its inception to that time,

but do not include the period of decline or final contraction in the absolute size of the market.

The first stage begins with the commercial introduction of a new product by its first producer [although in rare instances, there is a concurrent introduction of the product by more than one producers] and ends with a sharp increase in the entry rate of new competitors into that industry. The length of this stage is related to the ease of copying the initial innovator[s], the size of the market for the new product soon after it is first introduced, and the number of potential entrants into the market. In addition, the speed with which technological information is communicated in the economy is an important factor affecting the length of Stage 1. We speculate that there has been a historical increase in the rate of diffusion of technological information and that this has contributed to a decrease in the length of first stage over time.

The second stage is a period of Sharp increase in the number of producers. The existence of this stage cannot be doubted; in virtually all new product markets there is a period of rapid growth in the number of producers.

The third stage is the period in which the number of entrants is roughly balanced by the number of exiting firms, leaving net entry approximately zero. Zero net entry does not, however, reflect an equilibrium but rather is associated with structural changes in the market [discussed later] which, when they mature, precipitate the ensuing Stage IV. The sharp decline in the gross entry rate in Stage III [to a point where gross entry roughly equals gross exit] arises from forces that have their origin in Stage II. In a sense, therefore, Stage III

could be viewed, alternatively, as the final segment of Stage II.

The fourth stage is the period of negative net entry. It represents a culmination of the structural changes under way in the third stage. The conclusion of the period of negative net entry brings the beginning of Stage V - a second period of approximately zero net entry. The approximate absence of net entry or exit does not result, however, from equality of the number of producers with a unique equilibrium level defined by market size and economies of scale. Stage V continues until the eventual shrinkage of the market, induced by obsolescence of the product, or until fundamental changes in technology launch a new product cycle. [10].

### **Creative Destruction**

Schumpeter first introduced the term "creative destruction" and stated that "the opening of new domestic and foreign markets and organizational development is indicative of an industrial leap process that constantly transforms the economic structure from within, destroys the old structure, and creates a new one" [11]. Creative destruction is a process in which emerging technologies eliminate old technologies. Notably, with the emergence of technology, the fundamental way of doing work and creating economic value has changed. This wave of structural change is the very creative destruction that eliminates the production structures of unproductive sectors. Technology enhances processes and the output mix, adjusting to the evolving regulatory and environmental contexts [12]. By "creative destruction," he meant the replacement of old capital—both physical and human—with new

capital and old companies with new ones [13]. Schumpeter believed that the driving force behind these waves of creative destruction is technological change.

The term creative destruction was originally coined by Schumpeter and later accepted by Harvey in the context of his accumulation theory. According to Harvey, the search for surplus value or profit is the driving force of capitalism [14]. To achieve profit, capitalists engage in the production cycle, where investment is made in factors of production [such as labor], a commodity is produced, sold, and generates profit. This surplus value is then reinvested in the purchase of new inputs, thus restarting the accumulation cycle [15].

The concepts of creation and destruction are implicit components of the product production cycle. According to Harvey [16], logical landscapes, meaning places that act as centers of accumulation and products, are created and ultimately destroyed. Their final destruction occurs when new technological advancements in communications and transportation render traditional production centers obsolete. New logical landscapes are discovered, and this cycle continues. Therefore, the dual forces of creation and destruction work hand in hand [14]; as destruction brings forth a creation that leads to further destruction [17].

Creative destruction refers to the dissemination of knowledge resulting from execution, which ultimately leads to advancements that reduce the tenure of a successful entrepreneur. By anticipating this, entrepreneurs first optimize time to ensure that their profits do not fall into a recession during their operational period and maximize the duration of their activities. These

effects lead to classification in entrepreneurial execution and consequently result in an overall boom. If an entrepreneur undertakes work before a boom, they have, in a way, revealed information about their productivity improvements to potential competitors who may use this information in designing their own productivity enhancements. By delaying execution until success, they postpone profitability but maximize their intended duration [18].

### **Schumpeter's Theory of Innovation and Business Cycles**

To explain creative destruction, Schumpeter describes his model of the business cycle in two stages. The first stage pertains to the initial impact of innovation that entrepreneurs unveil in their production processes, while the second stage involves competitors' reactions to this initial impact. Schumpeter begins his analysis by assuming a state of equilibrium in the economic system where all factors of production operate at full capacity. Each firm produces efficiently at an average cost equal to the price. The prices of products are equal to both average and marginal costs, and profits are zero. There are no net savings or net investments. Schumpeter refers to this equilibrium state of the economy as "a circular flow" of economic activity that repeats periodically, similar to blood circulation in a living organism. When an entrepreneur successfully implements an innovation, the flow of economic activity is transformed. According to Schumpeter, the primary function of an entrepreneur is the activity of innovation, which brings real profit. By innovation, he means changes in the production of goods that cannot be achieved through marginal changes [19].

Innovation was a key term in Schumpeter's theories, and he believed that it is innovation that leads to economic changes. Joseph Schumpeter considered business cycles to be the result of the innovative activities of entrepreneurs in a competitive economy. Schumpeter develops his model of the business cycle in two stages. The first stage relates to the initial impact of innovation introduced by entrepreneurs in their production processes. The second stage follows as a result of competitors' reactions to the initial impact of innovation. With the innovation that has taken place, monetary income increases, prices rise, investment increases, and supply exceeds demand, disrupting the initial equilibrium and expanding economic activities [the first wave occurs, which Schumpeter calls innovation]. Other producers enter this industry, purchasing power increases, demand for the new product rises, and prices go up due to increased demand. Just when all new products replace old ones, demand for old products decreases, and their prices fall. The company producing the old product either adjusts or shifts towards producing the new product. As a result, the old firm is both shut down and experiences reduced profits due to repaying loans from previous innovations and falling prices. Here, the firm faces uncertainty and risk. It enters a recession period. The motivation for innovation decreases. Entrepreneurs are again in search of new innovations to turn this recession into a boom. Schumpeter refers to this phenomenon as the ebb or diffusion of wealth [3].

According to Schumpeter, business cycles are driven by the process of creative destruction, through which innovative and high-productivity companies eliminate relatively unproductive firms from the market. Some prominent macroeconomic

models predict that recessions may accelerate this process by cleansing unproductive firms and freeing up resources for more productive uses [20].

Schumpeter's theory of creative destruction includes both creation [the formation of new firms] and destruction [the exit of firms]. The exit of firms reflects the mechanism of selection, which is an important outcome of the competition process and one of the reasons for internal competitiveness [1].

### Literature vreview

Caballero and Hamour [12], in a study titled "Creative Destruction and Development: Institutions, Crises, and Restructuring," point out that empirical evidence indicates that creative destruction in new products and processes is a primary mechanism for development during economic downturns. They examine how underdeveloped institutions and persistent economic crises are significant barriers to creative destruction, leading to macroeconomic consequences, and conclude that the increase in liquidity during a crisis does not lead to economic restructuring; rather, evidence suggests that the existence of crises is an obstacle to restructuring, and underdeveloped institutions play a major role in slowing down the process of creation and the inappropriate allocation of resources.

Nair and Ahlstrom [21], in an article titled "The Delay in Creative Destruction and the Coexistence of Technologies," explore the issue of how complexities arising from technology, institutional dynamics, and ecological factors may allow for the coexistence of competitive technological systems [methods]. This article also demonstrates such coexistence by discussing the persistence of

various technologies in steel manufacturing and the treatment of kidney diseases. The research findings indicate that the process of creative destruction can be delayed in certain specific areas. - Maliranta [22], in an article titled "Research and Development, International Trade, and Creative Destruction: Empirical Findings from Finland's Manufacturing Industries," examines the determinants of micro-level structural change for increasing productivity empirically using panel data from twelve Finnish manufacturing industries, assuming that R&D leads to productivity diversity among industrial machinery, which in turn results in gradual changes in input shares in the presence of dynamic competitive pressure. The results show that research and development, with a several-year delay, leads to creative destruction, and imports serve as a restructuring stimulus for increasing productivity, especially when domestic R&D is low.

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Zhou and colleagues [23] in a paper titled "Is Creative Destruction Effective in China?" refer to creative destruction as the main driving force

behind industrial development and acknowledge that the continuity of the creative destruction process provides an incentive for the renewal of regional industries. The analytical framework of the paper emphasizes that the exit of firms creates an incentive for the entry of new firms, serving as a complement in the process of technological change and industrial renewal as articulated by Schumpeter. It addresses how newcomers engage in fundamental innovations and new products, reshaping the products of existing firms and obsolete technologies, thereby forcing them to exit or retreat. This paper, using firm-level data from Chinese industries between 1998 and 2008, seeks to argue the relationship between firm exit and entry continuously with a set of various factors, including firm characteristics, more significant industrial linkages, and national and regional institutional contexts, particularly in China, where a threefold process of decentralization, globalization, and privatization has led to significant spatial and temporal changes in the economic and institutional landscape.

Kulkarni [24], in a paper titled "Schumpeterian Creative Destruction and the Media Economy: A Case Study Approach in the Media Economy with Reference to Indian Media Conglomerates," examines whether the concept of Schumpeterian creative destruction can manifest in the emerging market media economies. In this study, innovation is considered a key element in market performance. The research measures the impact of vertical integration and its effect on creative destruction through a qualitative research approach. The theoretical concepts of industrial organization and contingency theory are used as a framework for this study. This research aims to explore the economy of media conglomerates in

India and creates a model of creative destruction and innovation for emerging economies.

Taneo and colleagues [25], in an article titled "Creative Destruction and Knowledge Creation as a Mediator between Innovation Speed and Competitiveness of food small and medium sized enterprises in Malang, Indonesia," examine the role of creative destruction and knowledge creation as a mediator between the speed of innovation and competition among small and medium-sized enterprises [SMEs] in the food sector. The research findings indicate that when the speed of innovation development is accompanied by creative destruction and knowledge creation, competition can be enhanced. Innovative ideas that are realized quickly and products that enter the market faster have greater opportunities to increase competition through profitability and efficiency. Additionally, the speed of innovation development increases the competition of food SMEs, and the government does not play a role in strengthening the relationship between the speed of innovation development and the competition of medium-sized food enterprises.

### **Research method**

The research method is considered qualitative based on its objective. Accordingly, data is collected from scientific documentary sources [articles and books] and analyzed using content analysis methods. Content analysis is defined as an analytical inductive analysis in which the researcher achieves an analytical typology through the classification of data and pattern recognition both within and outside the data [26]. The sample size in this method is not predetermined and continues until saturation is reached. Saturation in

qualitative research means that no new and significant concepts emerge for the development of categorical systems, and the findings tend to repeat previous concepts. Given the nature of qualitative research, the trustworthiness of the research results must be evaluated. The reliability of the findings is assessed based on criteria of credibility [persuasiveness], dependability [confidence in the accuracy of the data], conformability [derived from the data], and transferability [applicability of the findings in other studies]. The method for evaluating the trustworthiness of the findings is based on analytical triangulation. This type of triangulation involves the use of more than one researcher/analyst to review and revise the findings [26]. Therefore, the data, process, and

results of the research are evaluated in two stages by five experts in the fields of economics, business development, management, and industrial engineering, separate from the authors of the article, and the consensus of the feedback evaluations is taken into account in the research. The research process is defined in four stages:

- Examining the factors affecting creative destruction in documentary sources and categorizing the related concepts
- Thematic classification of categories in the literature
- Identifying relationships between themes and developing a conceptual model
- Evaluating the trustworthiness of the conceptual model

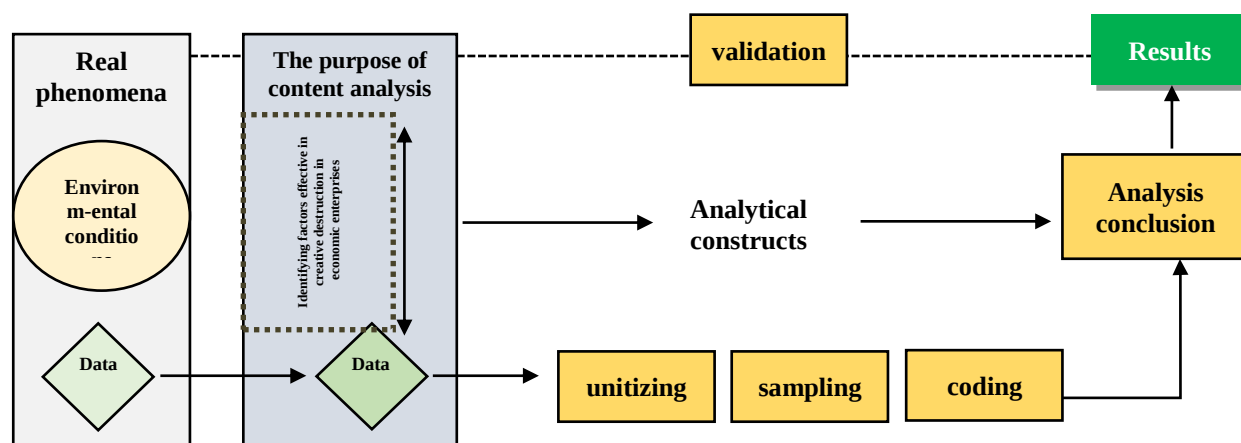


Figure (1): Content analysis research process

## Research Findings

Documents and scientific research related to the research topic were selected as sample units in the qualitative content analysis method. The selection of samples continued until reaching the point of

saturation, which is the time when no new concepts are added to the research. In this study, the sample size consisted of 32 documents and scientific studies. Table [1] presents a sample of the text units, subcategories, and main categories of the research.

**Table (1): Categorizing factors affecting the creative destruction of an economic enterprise**

| Main category               | Subcategory                        | A sample of text units                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Sample                                                                                                      | Sampling units                                                                        |
|-----------------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Company entry and exit      | Market Size Capability             | Demand and market size play a major role in motivating innovation, and it can be stated that innovative activities are controlled by the extent of the market. Innovation increases in larger markets, but it is not necessarily product innovation.                                                                                                                                                                                                                                                                                                                                        | Schmookler [27]<br>Schmookler [28]<br>Boone [29]<br>Raith [30]<br>Scherer [31]<br>Cohen [32]<br>Kremer [33] | Documents and research related to the topic of factors affecting creative destruction |
|                             | Product replacement                | Larger markets may accommodate fewer companies [and fewer varieties]. A larger market may intensify competition in research and development to such an extent that fewer companies can remain in the market [and cover their fixed costs]. Reducing entry barriers [by lowering input costs] actually encourages more companies [and varieties] to enter, but it diminishes each company's incentive to produce and invest in cost reduction. The result is that an increase in product substitutability leads to greater innovation, but it may reduce the number of varieties introduced. |                                                                                                             |                                                                                       |
| Firm size                   | Technological diversity            | Innovative activity increases in accordance with the size of the company, and larger companies have an advantage in innovation. It seems that both large and small companies differ not only in their investment in research and development but also in the management and productivity of innovative activities. While large companies are considered the main players in technological change and economic development processes, smaller companies are viewed as agents of change, creating jobs and technological diversity that stimulate the growth and evolution of the industry.   | Schumpeter [34]<br>Vermeulen [35]<br>McAdam [36]<br>Spencer [19]                                            |                                                                                       |
|                             | Industry Dynamics                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                             |                                                                                       |
| Technology compliance level | Technology obsolescence            | Creative destruction leads to the obsolescence of old technologies due to the accumulation of knowledge and processes resulting from industrial innovation. From a normative perspective, the obsolescence of old technology and adaptation to new technology results in greater innovations and further creative destruction.                                                                                                                                                                                                                                                              | Aghion [37]<br>Christensen [38]<br>Schumpeter [34]<br>Tushman [39]                                          |                                                                                       |
|                             | Access to the knowledge of the day | Countries gain access to foreign technologies through trade. Therefore, those economies that benefit from imports from countries with higher levels of technical knowledge will experience higher per capita income growth rates compared to countries whose trading partners have lower levels of technology.                                                                                                                                                                                                                                                                              | Coe [40]<br>Hoffmaister [41]<br>Freeman [42]<br>Arthur [43]                                                 |                                                                                       |
|                             | Interaction                        | According to the neo-Schumpeterian                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Hanusch [44]                                                                                                |                                                                                       |

| Main category                         | Subcategory                                                          | A sample of text units                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Sample                                                                                   | Sampling units |
|---------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------|
|                                       | of the network of socio-economic actors                              | approach, this dynamic of innovation arises from the actions of a multitude of social and economic actors: entrepreneurs, companies, and countless public and private institutions that interact with each other in an evolutionary dynamic.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                          |                |
|                                       | Company location                                                     | Advanced technology companies located in urban areas are significantly more innovative than those situated in peripheral regions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Hanusch [44]                                                                             |                |
| Competitiveness                       | Developing qualitative characteristics of social and economic growth | Technological progress is the main factor of growth and dynamism of modern economies. These dynamics are driven by innovative activities in all sectors and areas of the economy and society as the main driving force of change and development. Behind innovation, which is understood as a process of unpredictable and discontinuous influx of new products, production technologies and organizational solutions, we find the most important processes of knowledge production and diffusion. Consequently, when looking at the competitiveness of companies, regions, countries or even a union of countries, price competition no longer plays the main role, but competition for innovation is what really matters. From this perspective, the dynamics that are relevant and must be observed include not only the quantitative characteristics of economic growth, but also the qualitative characteristics of economic development and structural changes. It is obvious that the dynamic processes understood and analyzed in this context are fed by multiple sources that influence each other in a mutually evolutionary way. Among other things, these sources include, in addition to economic actors such as entrepreneurs, companies and families, as well as financial actors such as banks, venture capitalists and private equity firms, public actors and institutions such as governments, universities, schools, research institutes, patent offices and regulatory authorities, etc. | Hanusch [44]                                                                             |                |
| Investing in research and development | Research and development time                                        | Research and development efforts [or innovations] are the embodiment of purposeful efforts to create new technological knowledge. Since the creation and implementation of knowledge requires time, the R&D efforts carried out in the past are essential. To the extent that R&D stimulates technological progress that has been successfully implemented only in a fraction of the factories,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Llerena [45]<br>Maliranta [22]<br>Jones [46]<br>Shefer [47]<br>Hall [48]<br>Frenkel [47] |                |
|                                       | Exploitation in research and development                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                          |                |

| Main category         | Subcategory                          | A sample of text units                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Sample                                       | Sampling units |
|-----------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------|
|                       | Diversity of technological knowledge | it should be reflected in higher productivity dispersion. In a competitive environment, the diversity of technological knowledge and productivity levels within an industry is a source of selection, and this in turn is the engine of the evolution of industry productivity.                                                                                                                                                                                                                                                           |                                              |                |
|                       | Human capital                        | Few firms and institutions have sufficient innovation capability or absorptive capacity to keep up with technological progress. Therefore, continuous restructuring within the industry is needed to exploit the productivity potential generated by R&D. Job destruction, plant closures, and bankruptcies are inevitable by-products of this process                                                                                                                                                                                    | Maliranta [22]                               |                |
|                       | Firm size                            | Firm size has a positive effect on the level of R&D expenditure. That is, a firm's willingness to invest in R&D is positively related to its size. It is generally believed that a large portion of industrial R&D is carried out by large firms. R&D activities provide knowledge with different strategic values, and firm size affects such activities.                                                                                                                                                                                | Fisher [49]<br>Dosi [50]<br>Acs [51]         |                |
|                       | Firm size                            | Investment in R&D can be affected by firm size in several ways. Large firms are more likely to provide the funds needed for large-scale R&D. In general, large firms are older than smaller firms. However, it may be observed that in high-tech industrial sectors, one can find a large number of young and relatively small start-ups. These firms are heavily involved in R&D activities.                                                                                                                                             | Shefer [47]<br>Vives [52]                    |                |
| Number of competitors | Competitive pressure                 | Competitive pressure, by stimulating reallocation, constitutes another important part of creative destruction. These considerations encourage further investigation to determine how exposure to global competition through imports and exports, together with R&D efforts, is related to creative destruction in industries.                                                                                                                                                                                                             | Maliranta [22]<br>Geroski [53]<br>Gowdy [54] |                |
|                       | Product import and export            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                              |                |
| Government support    | Incentive support                    | The other side of the creative destruction process deserves government attention for many reasons. In a just society, the hardships of less fortunate citizens must be compensated in some way. As Arrow [1963] has pointed out, different social institutions may be needed to insure against various welfare-reducing uncertainties that markets fail to do. An adequate social security system may also make it easier for workers to accept painful measures such as low firing costs or deregulation of product markets, which would | Maliranta [22]                               |                |

| Main category                                      | Subcategory                                 | A sample of text units                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Sample                                    | Sampling units |
|----------------------------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------|
|                                                    |                                             | lead to a continuous renewal of micro-level production and long-term growth. All things considered, encouraging firms to innovate is not enough. These efforts must be accompanied by various complementary policy measures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                           |                |
|                                                    | Granting research and development subsidies | R&D subsidies may encourage investments aimed at expanding the frontier of technological knowledge [basic and applied research], and/or exploring deeper into the technological knowledge that companies already possess [technology development]. Governments can act in favor of innovation by establishing partnerships with higher education institutions, creating a more attractive tax system in favor of R&D, implementing specific incentives to encourage and support innovation among small and medium-sized enterprises [SMEs] and start-ups.                                                                                                                                                      | Herrera [55]<br>Brette [56]               |                |
| Entry and exit of a competing firm from the market | Competitive pressure                        | Decreasing the costs of entry into an industry leads to more entry into the industry, which reduces R&D costs per firm. Increasing the degree of product substitution increases R&D effort [and output per firm], provided that the total market does not shrink. Increased competitive pressure leaves less room for entrants. If this happens, it should be clear that efficiency and innovation should increase because of the increased price pressure with fewer entries. If the market expands with the degree of product substitution, then the direct effect on efficiency and innovation will each day outweigh any possible adverse consequences of the possible increase in the number of entrants. | Bertrand [57]<br>Ebell [58]<br>Vives [52] |                |

Based on the content analysis of the documentary studies presented in Table [1], six factors affect creative destruction in an economic enterprise; each factor is influenced by the others. **Adaptation to technology** is the first factor affecting creative destruction, which is itself influenced by factors such as technological obsolescence, access to current knowledge, interaction of the network of socio-economic actors, and the position of the enterprise.

Technology obsolescence is a major problem for product management, resulting from a mismatch between the life cycle of products and the technologies that underpin them. Technology obsolescence poses a serious challenge not only to product suppliers but also to consumers. Trends in the technology lifecycle are important for product managers, who must take a long-term view of their products, and for planners who determine the

product development process, where time to market is critical.

Obsolescence becomes a problem when it is forced upon an organization; in response, that organization must involuntarily make a change to the product that it manufactures, supports or uses. There are generally three types of involuntary obsolescence: 1. Logistical – Loss of the ability to procure the parts, materials, manufacturing or software necessary to manufacture and/or support a product. 2. Functional – The product or subsystem still operates as intended and can still be manufactured and supported, but the specific requirements for the product have changed, and as a result, have obsolete the product's current function, performance or reliability. For consumer products, functional obsolescence is the customer's problem; for more complex systems [e.g., avionics] it is both the manufacturer's and the customer's problem. For complex systems, functional obsolescence of a subsystem is often caused by changes made to other parts of the system. 3. Technological – More technologically advanced components have become available. This may mean that you still have or can get the older parts to use to manufacture and support the product, but it becomes a technological obsolescence problem when the supplier of those older parts no longer supports them. These three types of obsolescence are referred to as DMSMS [Diminishing Manufacturing Sources and Material Shortages]. Note, obsolescence of the kind discussed above can strike hardware, software, and intellectual property [59]. Therefore, it can be claimed that technological obsolescence is one of the factors that affects the adaptation factor to technology.

The second factor affecting creative destruction is **investment in research and development**. This factor is also influenced by factors such as research and development time, R&D utilization, knowledge diversity, human capital, and firm size.

Research and development is a time-consuming process. Relying on prior knowledge and awareness and using up-to-date studies in the field of technology can speed up the process of research and development and exploitation of existing knowledge.

Maintaining a diverse set of knowledge can create value for technology companies. Internal research and development clearly helps create knowledge because it is a planned and managed business function designed to systematically expand the company's specific knowledge base, and also creates the knowledge infrastructure needed to identify, absorb and exploit external knowledge.

The presence of specialized human resources in the research and development team, which is considered the human capital of any company, is essential for advancing the creative and technological goals of any company.

The **entry and exit of a competing firm from a market** is a factor that is affected by competitive pressure, reduced entry costs, firm size, and product substitutability. Competition is the amount of pressure an organization experiences from competitors. Competitive pressure exists when firms are restricted from entering the market. Product substitutability is a factor that affects competitive pressure and, consequently, the entry of a competing firm into the market

The fourth factor, competitiveness [number of competitors], also depends on the development of

qualitative and quantitative characteristics of economic and social growth and product imports and exports.

The fifth factor is **firm size**, which is determined by productivity management, technological diversity, and industry dynamics. While small firms enjoy the benefits of smaller, more flexible management and faster response times to market changes, larger firms can benefit from economies of scale, especially in some industries such as the automotive industry. Larger firms also have political clout and better access to credit, contracts, and government permits. This is especially true for developing countries. Even private financial institutions are likely to support larger firms for better liquidity and more sustainable operations.

The last factor of **government support**, including tax breaks and government loans to cover the costs of research and development and idea creation, market development, customs exemptions, insurance facilities and support, establishment, licenses and permits for exploitation, etc., is also important in the formation of creative destruction. Identifying the number of competitors at the beginning of entering the industry and maintaining the position should be considered, but the exit of competitors cannot be identified because many companies do not announce their inactivity.

### Technology Adaptation

The degree of adaptation to technology has a positive effect on the process of creative destruction. Awareness of existing and up-to-date technologies in the world and their use in the direction of the firm's strategies is of particular importance. Technology used through invention, reverse engineering, and purchasing technology

patents from the manufacturing company creates and creates a competitive advantage in the firm.

The degree of adaptation to technology is of particular importance because economic growth can be achieved by being aware of the existence of technology and its localization. Competitors can copy the creation of an idea or use the innovation with permission, which is considered selling technology.

### Investment in Research and Development

Investment in research and development seems to be a factor in the direction of creativity in industries. The amount of investment in research and development has a positive and significant effect on creative destruction. Naturally, investment in research and development reflects the culture of that organization to accept innovation and creativity; the more the organization is up to date with new technology and is striving to achieve it, the more creative spirit is breathed into it.

Research and development is done in-house in most companies. Because of the lack of intellectual property rights, if R&D is outsourced, there is a possibility of copying the idea and product or service before the production process. If the technology used is "high-tech", companies may conduct R&D externally.

### Number of competitors

The existence of domestic and foreign competitors is important due to the competitive pressure created in the market and has a positive effect on creative destruction. Competitors compete with each other to create a competitive advantage and innovation because they want to operate and

survive in a particular industry. Before firms enter the industry, new entrants identify their competitors and then create products and services that will be most profitable for them throughout the product's life cycle.

Other driving factors are competitors and their activities. Naturally, in passive and monopolistic markets where there is no atmosphere of competition, there is a tendency to remain in the status quo and stagnate, examples of which can be seen well in the country. Instead, competitive markets witness more innovative strategies and move towards the blue ocean.

Dynamism and creating positive changes along with conscious thinking are definitely one of the ways to survive in the target market. These changes are related to both internal and external factors of a company. Internal factors, such as the power to increase a company's knowledge with respect to human and financial resources, and external factors, such as behavioral analysis of competitors' businesses, are what can ensure the survival of a company.

### **Government Support**

The importance of government support in the economy is not hidden from anyone. Governments, through government support, help to rapidly promote innovation by providing loans with the lowest interest rates to knowledge-based companies to cover the costs of research and development and product manufacturing. Also, tax breaks for these companies can be an incentive to create ideas and innovate products and services. .

The impact of the country's economy on the demand and ultimately the supply of knowledge-based products or services is very important. And

until there is no demand from the market, no matter how much creativity or creative destruction takes place, it will not be effective due to financial incompetence. The presence of mafia in all trades is also another factor that makes these six factors ineffective or ineffective.

### **Firm size**

Firm size seems to have little effect on the process of creative destruction. Larger firms may have an advantage over smaller firms due to access to financial resources. However, it cannot be stated with certainty that larger firms are more successful in generating ideas, as many large firms were small when they first started..

### **Entry and exit of a rival firm from the market**

Because it is not possible to identify competitors when they enter and exit the market and cannot be identified, this factor may not have much impact on creative destruction. There may be companies that are classified as knowledge-based companies but do not operate in this field. However, the entry of new competitors into the market, if they enter with new ideas, is considered a threat to the companies in the industry. Therefore, it can be said that the entry of competitors into the market can have a negative impact on other firms but have a positive impact on the process of creative destruction.

### **Conclusions**

According to the findings of the research, the factors affecting creative destruction are: adaptation to technology, number of competitors, firm size, research and development, government support, and entry and exit of competing firms from the market [Figure 2]. The rate of adaptation to technology in developing countries may occur

late. However, for the formation of creative destruction, awareness and use of up-to-date technologies are important and have a positive effect on creative destruction. The entry and exit of competing firms from the market is less important in the process of creative destruction than other factors. Because competitors do not announce their inactivity. Therefore, competitors are unaware of their competitors' exit from the market after new innovations. The number of competitors at the beginning of entering an industry with new ideas is important. How long other competitors have been

operating and how successful they have been in this industry is an issue that should be considered. The size of the firm may be effective in accelerating the process of creative destruction. However, this factor is a bit ambiguous. Because large and small companies each have some kind of advantage in the formation of innovation. In order to advance the goals of the research and development team, establishing a company, offering a product, etc., government support is of particular importance in innovative activities.

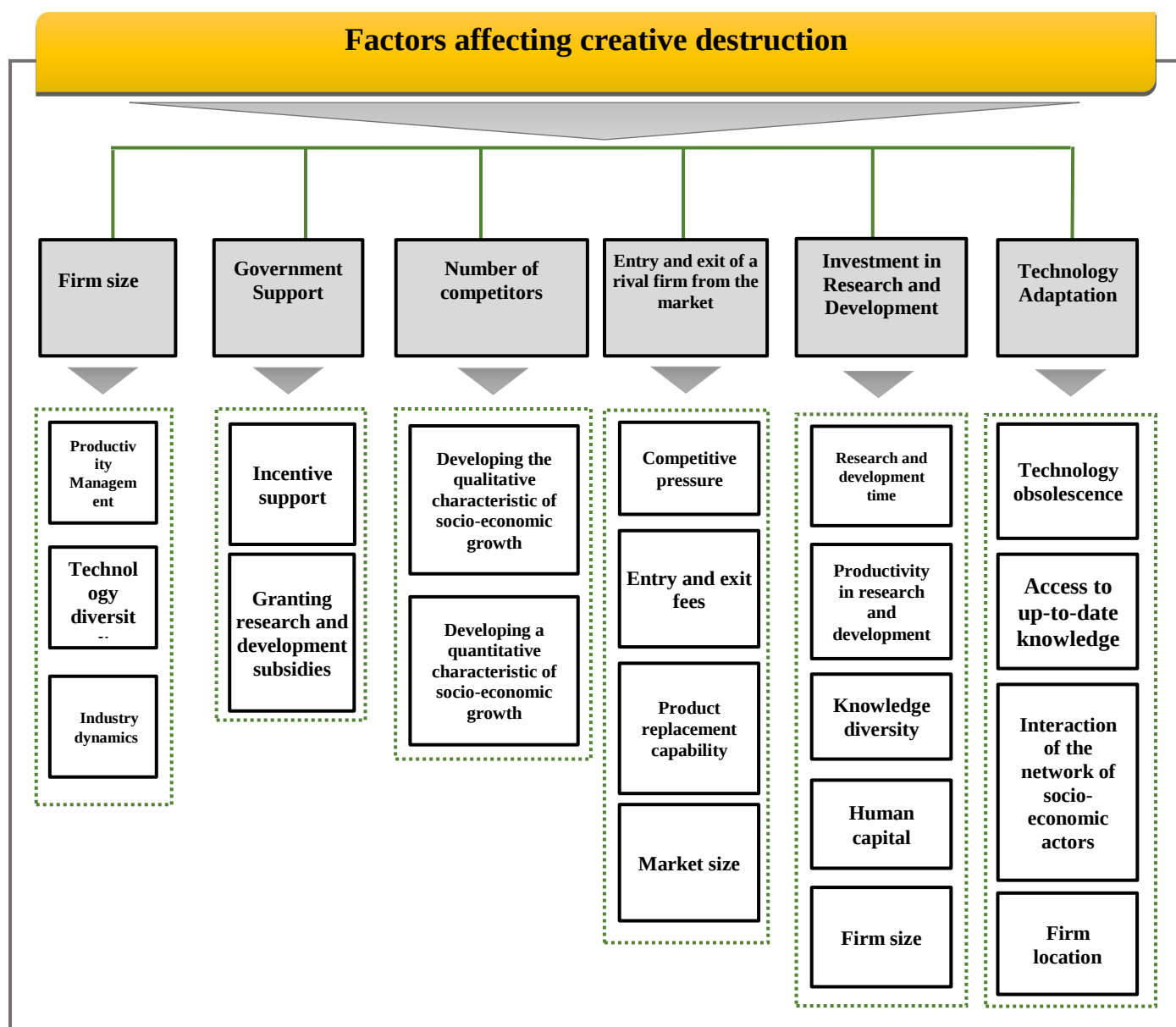


Figure (2): Factors affecting creative destruction in economic enterprises

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