A CRITICAL EVALUATION OF INNOVATION AND IMITATION PROCESSES: A CONCEPTUAL APPROACH

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In this paper are analysed the innovation and imitation processes, and how a company can improve its innovation potential. Relevant literature is synthesized to provide a picture of innovation and imitation processes by using multiple data collection methods including document analysis, Web research, and observation. Because companies today operate in increasingly turbulent and complex environments, they need to be more proactive and innovative. The main contribution of this paper is that it explores and builds a conceptual model to improve innovation potential of company. The findings of this study show how the conceptual model of innovation may be used to guide the managers to sustain innovation or imitation process.

Keywords: innovation, imitation, capabilities, absorption capacity

1. Introduction

Knowledge is considered to be an economic driver in today’s economy. In many cases we can see that the knowledge economy is rapidly being transformed into the creative economy. More companies from developed countries generate economic value from creativity, imagination, and innovation. Introducing new products, services, and technologies is a vital area for innovation [9]. The company’s resources and its products become obsolete more quickly, changing the economic realities that surround decisions regarding which resources to employ, which products to develop, and which markets to enter.

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We can use R&D expenditures, patents and new products as a measure of innovative effort. In high-tech industries, the impact of innovation efforts on the technological and innovative performance of firms is especially strong. R&D expenditure has grown in the last time. For example, Romania has only 0.65% GDP, Japan 3.4%, Israel 4.7%, US 2.7%, and China 1.5%.

Romanian companies have problems to manage and replace on large scale outdated equipment and machinery in their facilities, improve the infrastructure, adopt new technologies, and integrate processes and sustain the economic convergence towards the EU.

A company can invest substantially in R&D and aims to be the first to bring the innovative product to market. Being a pioneer also can earn a firm advantage because it can pre-empt its rivals in the acquisition of scarce resources. Furthermore, innovating firms can gain advantage through sustained technology leadership. Innovation is not the only choice for a new product introduction. Imitation can take different degrees, from clones, to creative imitation [2].

The main objective of this paper is to develop an explicit framework based on a conceptual model which can be used as a tool for managing the processes of innovation and imitation.

In the following sections, the literature related to this research is reviewed. The research question and methodology are then defined and clarified, followed by the development of a simple model to help explain differences among process innovations in the rate of imitation. The paper then analyses the impact of this model on the company development an initial framework for the innovation and imitation processes and further research activity is proposed. Finally, results of research are analysed before the concluding section of the paper.

2. Key concepts and literature review

Traditionally, competitive advantage was achieved by having lower costs than the competition, achieving higher quality or product performance, adding a new product feature, offering more selection or delivering better customer service. Unfortunately, this game can no longer produce sustainable advantage. Today, to be successful in any industry, companies must continuously reduce costs, improve quality, enhance customer service, and so forth. The main advantage drivers are the following: adaptability, flexibility, speed, aggressiveness, and innovativeness.

For example, the laser was invented over 30 years ago and has led to many new applications. Laser technology has been adapted to navigation, precision measurement, music recording, and fibre optics. This technology is more able to adapt and improve for many applications and, in doing so, it opens up a potentially attractive market [1].
Technological knowledge has led to technological advancement that in many ways has created new markets rather than generating a technology to satisfy an unmet market need. Often these technologies were created by people wanting to advance knowledge, without concern for commercial applicability.

*The capability of the company to be aware of the new threatening, identify and take effective advantage of externally developed technology is the key.* Most technology-based innovations involve a combination of several different technologies. For example, Sony and Ericsson have formed a joint venture to work on the development of cell phone handsets.

This joint venture in mobile phones combines Sony’s consumer products expertise with Ericsson’s extensive knowledge of cell phone networks. Ericsson is the world’s leading maker of wireless networks. It gives Ericsson access to Sony’s multimedia technology, branding expertise and knowledge acquired from Japan’s early start in third-generation cell phone technology.

*Technological knowledge is not enough for company, it need to have a very good absorption capacity.* Absorptive capacity describes how acquired knowledge is transformed into new sources of competitive advantage. The concept of absorptive capacity has been defined as an ability to recognize the value of new external knowledge, assimilate it and use it for commercial purpose.

New technologies and a very good absorption capacity need to operate in turbulence environments. Fortunately, the turbulence means opportunity. That is, changes in markets, technologies, regulation, and other areas close some doors while opening others. Market fragmentation also means new market segments are appearing new technologies create new company capabilities, and so on. For example, Jong-Yong Yun, vice chairman and CEO at Samsung, said “*the race for survival in this world is not to the strongest, but to the most adaptive*” [5].

**Invention** is the creation of something new, and innovation is the process of putting it into practice. Research confirms that successful new ideas are generally those that are backed by someone (idea champion) who believes in the idea and is determined to convince others of its value.

Patented inventions do not result in an innovation. In fact, many inventions which result in innovations are not patented. A *patent reflects new technical knowledge*, but it does not indicate whether this knowledge has a positive economic value. An innovation is a result of a process that begins with an invention, proceeds with the development of the invention, and results in the introduction of a new process, product or service to the market place [4].

**Innovation** is driven by the ability to see connections to spot opportunities and to take advantage of them. For example, new drugs based on genetic manipulation have opened a major new front in the war against disease. Mobile phone, PDAs and other devices have revolutionized where and when we communicate.
Schumpeter argued that the competition posed by new products was far more important than marginal changes in the prices of existing products. Companies manage their resources over time and develop capabilities that influence their innovation performance. In Fig. 1, an overview of the innovation process is illustrated [15].

![Fig. 1 Overview of the innovation process](image)

We can see in this overview that the innovation process includes an economic perspective which attempts to look at the internal activities. It also recognises that firms build relationships with other entities to obtain new knowledge.

The consumers have a significant role in the design of “experience innovation”. The importance of customizing and tailoring the experience via forms of co-creation is critical, for example, in service sector.

Each company has a unique architecture represents the way it has constructed itself over time. This comprises its internal design, including its functions and the relationships it has built up with customers, suppliers, competitors, and so on. This framework has a considerable impact on a company’s innovative performance [7].

Continuous innovation and an ability to continually redefine the competitive playing field are among the skills that define corporate performance in the global economy. For example, Nokia is still the world’s largest maker of cell phone handsets, but it lost its leading position in the United States by failing to match popular products like the Motorola Razr and Apple iPhone [3].

The disruptive emergence of Apple’s iPhone and Google’s Android revealed the magnitude of this case. The iPhone’s global share now approaches 16%, Android’s global smart phone share has shot from 4% in 2009 to almost 23% in 2010. Nokia’s new deal with Microsoft may or may not be the beginning of an essential turnaround.
Certainly companies that have established themselves as technical and market leaders have shown an ability to develop successful new product and service. The world’s most innovative companies are developing impressive growth and/or return to their shareholders (see Table 1).

Table 1

<table>
<thead>
<tr>
<th>Industry</th>
<th>Market leaders</th>
<th>Innovative new products and services</th>
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<tbody>
<tr>
<td>Internet-related industries</td>
<td>eBay; Google</td>
<td>New services</td>
</tr>
<tr>
<td>Cell phones</td>
<td>Nokia</td>
<td>Design and new features</td>
</tr>
<tr>
<td>Motor cars</td>
<td>Toyota; BMW</td>
<td>Car design and associated product development</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>Pfizer, GlaxoSmithKline</td>
<td>Ulcer treatment drugs</td>
</tr>
<tr>
<td>Computers and software development</td>
<td>Intel; IBM and Microsoft; SAP</td>
<td>Computer chip technology, computer hardware improvements and software development</td>
</tr>
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</table>


The ability to recognize new opportunities in the external environment, evaluate and prioritize these opportunities, and then translate these opportunities into viable business concepts lie at the heart of the entrepreneurial process. For example, the lower capital costs often mean that the opportunities for new entrants and radical change are greatest in the service sector.

As resources become increasingly specialized and resource needs become less predictable, companies tend to make shorter-term commitments to a given resource, and to rely more heavily on the outsourcing, leasing, and leveraging of resources. Practically, the dramatic pace of technological change combined with the fragmentation of markets forces companies to develop more new products and to do it so much faster [18].

*Open innovation* means extending the search and commercialization of new ideas beyond the boundaries of the organization and even beyond the boundaries of the industry. Research confirms that collaboration with customers and suppliers has a huge impact on product development [15].

Open innovation can play an important part in the development of a company. By breaking down traditional corporate boundaries, open innovation allows intellectual property, ideas, and people to flow freely both into and out of an organization.

Today there are a lot of companies who failed or suffered substantial loss due to innovation failure. An alternative to the development of innovation is to imitate other successful businesses.
Imitation is not to be confused with copyright infringed. Imitation takes advantage of the research and development carried out by the pioneering businesses to enter markets, gain market share and obtain an advantage competitive.

In software development, the market leader, Microsoft, has often been accused of benefiting economically from inventions made by others. For example, Windows was based on Apple’s Macintosh operating system and MS-DOS itself was acquired from another company.

By copying innovators, a business can generate significant profits and minimise the costs and risks, usually associated with being the first business to try a new product or service.

Creative imitation is not “innovation” in the sense in which the term is understood. The creative imitators look at products or services from the viewpoint of the customer. Creative imitation satisfies a demand that already exists rather than creating one [11].

For example, a classic case of the reflection of the unexpected success is used of the transistor. This electronic component has been invented by Bell Labs in USA but American companies in that time ignored it. Japanese companies bought the transistor invention for a ridiculous sum of $25,000. Two years later, Sony brought out the first portable transistor radio. Three years later, Sony had the market for cheap radios in the United States, and five years later, the Japanese had captured the radio market over the world. The Americans rejected the transistor because it was not invented by the electrical and electronic leaders, RCA and GE.

Japanese repeated this strategy again and again. They repeated it with television sets and digital watches and hand-held calculators and copiers (Xerox Company).

Creative imitation is likely to work most effectively in high-tech areas for one simple reason: high-tech innovators are least likely to be market-focused and most likely to be technology and product-focused [13].

The elements of imitation:

- **Counterfeits or product pirates.** On the streets of Bucharest we can find Cartier watches, Gucci handbags, and Nintendo video games. Counterfeits are copies that carry the same brand name or trademark as the original. They are strictly illegal. Counterfeits are usually low-quality, shoddy goods, sold under the guise of a premium-priced seller’s respected brand name. They typically carry a much lower price than the original. Counterfeits are the least creative attempt at imitation.

- **Knockoffs or clones.** Clones are often legal products in their own right. The absence or expiration of patents, copyrights, and trademarks makes many of them legal. Typically, clones sell the same basic product as the innovator but at a lower price and without the prestigious brand name.
When the IBM personal computer was introduced in 1988, it became an immediate success. That success, and the open architecture of the PC, created a secondary market for IBM-PC clones. Knockoffs are legal copies of a competitor’s product.

- **Design copies** trade on the style, design, or fashion of a competitor’s popular product. Design copies mimic clones. But in instances where design plays a lesser role, design copies combine aspects of innovation and imitation. For example, the Japanese auto sellers moved up-market to challenge the German luxury auto makers Mercedes and BMW with prestige models of their own: Lexus (Toyota), Infiniti (Nissan), and Acura (Honda). They emulate the innovator and sell at a lower price.

- **Creative adaptations** are the most innovative kind of copy. Creative adaptations often take the form of either copying and then making incremental improvements on existing product or adapting existing products to new situations.

The most successful imitators tend to be importers in open markets and exporters in grey markets. They sell the lower – quality product at lower price. The Pentium series would be replaced by AMD processors; fewer supported built-in features and sold at much lower prices. The best imitators are always innovators [8].

In an industry in which technology undergoes rapid changes, the next-generation technologies enable imitators to neutralize the advantage enjoyed by innovators. This leads to the following hypothesis:

**H1: The benefit of innovation over imitation becomes weaker when the company operates in a turbulent environment**

Some organizations build formal strategic partnerships such as alliances and joint ventures to improve innovation success. An important part of company open innovation process is networking with external scientists in totally new areas that could lead to totally new businesses. For example, Procter & Gamble has on the marketplace the Crest Spin Brush. The technology for this product was invented by a small entrepreneurial firm in Cleveland [9].

Whenever BMW Group begins developing a new car, the project’s team members – from engineering, design, production, marketing, purchasing, and finance – are relocated to a separate Research and Innovation Centre, where they work collaboratively to speed the new product to market. This teams typically are small, loosely structured, and flexible, reflecting the characteristics of creative organizations.
Innovative activity is costly due to high failure rates, due to its complexity and non-linearity, and due to the often significant, knowledge-intensive investments required to realistically pursue it. For example, in pharmaceuticals industry, also in other high tech industries, we can compare the costs of innovation that are very high while the costs of imitation are relatively low [14].

In industries with low entry barriers for example, in services, there is little incentive to innovate, since the entry subsequent to innovation would quickly erode any economic rents. At the same time, in industries where entry barriers are relatively high, the absence of potential entry may reduce the incentives to innovate [6].

Even though successful innovation can increase profit margins, global competitiveness and enable a business to experience high growth, the risks and costs involved in developing innovative products or services can be a too high price to pay for some business owners.

In a competitive market, imitation enables firms to reduce the high cost of product innovation and thus achieve better performance. Thus,

**H2: When competition market intensifies innovation it becomes weaker than imitation**

Innovation is at the top of everyone’s priority list today, but managing innovation and change has always been an important management capability. For example, Samsung Electronics was becoming a brand associated with cheap, low-quality knockoffs until managers implemented new processes that transformed it into an innovative company.

To gain or keep a competitive edge, managers have renewed their emphasis on innovation, shifting away from a relentless focus on controlling costs toward investing in the future. Innovations in products, services, management systems, production processes, and corporate values are what keep companies growing, changing, and thriving. Without innovation, no company can survive over the long run [6].

For example, telephone companies are investing in technology to push deeper into the television and broadband markets. Computer companies are also developing computers that are smart enough to configure themselves, balance huge workloads, and know how to anticipate and fix problems before they happen.

Creative organizations are loosely structured. They have an internal culture of challenge, freedom, and playfulness. Information technology is helping managers provide needed organizational control without strict top-down constraints. Middle managers play a crucial role in driving innovation and enabling organizations to respond to rapid shifts in the environment.
Many small and medium-sized enterprises (SMEs) fail because they don’t see or recognize the need for change. Small firms have a strong incentive to introduce new products into the market in order to create a niche market, in which they have to change in order to survive competition with current firm. On the other hand, large firms have an incentive to invest in both process (economies of scale) and product innovation (economies of scope) in order to maintain their market position [9].

Small enterprises are engine of innovative activity in certain industries, despite an obvious lack of formal R&D activities, raises the question about the source of knowledge inputs for small enterprises. The answer is emerging from other (third-party) firms or research institutions, such as universities. Economic knowledge may spillover from these units creating it for application by other firms. Recent studies evidence that new economic knowledge may spill over but the geographic extent of such knowledge spillovers is limited [12].

For example, in computers and process control equipments small firms contributed the bulk of the innovations. By contrast in the pharmaceutical preparation and aircraft industries the large firms are much more innovative. Practically, in industries that are highly innovative and composed predominantly of large firms, the relative innovative advantage is held by small enterprises

Innovation is all about developing knowledge. Therefore, firms that are actively seeking opportunities to exploit knowledge spillovers will have a competitive advantage, assuming those firms have enough absorptive capacity to make effective use of knowledge [14].

Therefore, innovation strategy seems to contribution more significantly to new product or service than an imitation strategy. This leads to the following hypothesis:

**H3**: Innovation has a stronger impact on new product or service performance than imitation

We can see how as more high-level knowledge work is outsourced to less-developed countries, and companies from developed countries are evolving to the next level to generate economic value from creativity, imagination, and innovation. Firms that relay on information from suppliers and customers as sources of innovation have a better opportunity to appropriate the rents of innovation and to spend less on introducing new product.

Finally, imitation is approached as a strategy that not only is consistent with innovation but also is essential to the focused and effective use of innovative capabilities. The true imitators don’t just copy superficial elements. They unravel the cause-effect patterns in the original, often more insightfully than the original, and rebuild.
3. Factors which determine the innovation or imitation process

In this section the factors which determine the innovation and imitation processes are analysed. In the first place, a simple model is developed to explain the innovation process and how a company can improve its innovation potential. Practically, the model developed explicitly accounts for both advantages and disadvantages of imitation and innovation processes. To set the context for the theoretical model developed in this section, it is useful to identify the innovation potential of companies and the possibilities to use the imitation process.

The present research analysis is based on document analysis, Web research, survey, and observation. Multiple-case study research was selected as the methodological approach for evaluation of innovation and imitation processes. The data gathering and analysis process were based mostly of the suggestions made by engineers, researchers, academic staff and managers. In 2010, we examined four firms in IT sector located in Bucharest.

The major hypothesis around which the model is built is the following: the innovation strategy seems to contribute more significantly to new product or service than an imitation strategy (H3). Innovation is a process that begins with an invention, proceeds with the development of the invention, and results in the introduction of a new process, product or service to the marketplace.

The model of innovation illustrated in Figure 2 emphasises that innovations occur as the result of the interaction of the marketplace, the science base and the organization’s capabilities. It can be regarded as a logically sequential, though not necessarily continuous process that can be divided into a series of functionally distinct but interacting and interdependent stages. Practically, the overall innovation process can be thought of as a complex set of communication paths over which knowledge is transferred. Companies that are able to manage this process effectively will be successful at innovation [16].

The generation of ideas is shown to be dependent on inputs from three basic components: organization capabilities, the needs of the marketplace, and the science and technology base. Ideas for new products or services come from several sources, including consumers, employers, R&D projects, competitors, and so on. Companies often analyze consumer complaints to discover new product opportunities.

Employees may be encouraged to suggest new product or service ideas. For example, Bausch & Lomb, a pioneer in contact lenses, uses brainstorming sessions as one approach to develop new products. Another source of new product, process or service ideas is from the company’s basic research, but the costs are great. Ideas can come from unexpected places. For example, detailed analysis of a competitor’s product innovations enables a firm to avoid the bad ones and exploit the good ones [13].
The next stage is screening and evaluation. That is a quick analysis to eliminate ideas that do not warrant further effort. Companies often use an internal and external approach to screening. The development of innovation capabilities is based on the ability to combine and effectively use different kinds of knowledge. For example, we can use the analytical-based knowledge, creativity-based knowledge and entrepreneurial-based knowledge [10].

A key characteristic of technology progressive companies was their high quality of incoming information and also the need for high-quality external linkages in successful innovation.

Inward technology transfer involves more than identifying interesting technology. It is necessary to match technology with a market need in order to produce a potential opportunity for the business. The final stage in the inward technology transfer process is the application of the business opportunity for competitive advantage.

We can see in the first stage of the model that an idea needs to transform into concept of product or service. The process of converting intellectual thoughts into a new product, process or service is an invention. This is where science and
technology usually play a significant role. At this stage, inventions need to be combined with hard work by many different people to convert them into products or service that will improve company performance. The later stage represent exploitation, it is the complete process that represents innovation.

Often imitation costs are much lower than innovation costs because an imitator, for example, does not need to spend as many resources on research. Imitators have opportunity to identify a strategic approach to improve products or services better than an innovator.

If customer demand is highly unstable and fast changing, identifying changing needs becomes much more difficult. In this case, an imitation strategy seems more effective. A high rate of technological change offers imitators a variety of ways to copy existing products and make improvements to them. Table 2 shows the key factors which determine when a company can develop an innovation or imitation process to gain advantage competitive on the market.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Innovation process</th>
<th>Imitation process</th>
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<tbody>
<tr>
<td>The degree of capital intensity</td>
<td>High intensity</td>
<td>Low intensity</td>
</tr>
<tr>
<td>The extent to which an industry is concentrated</td>
<td>Highly concentrated</td>
<td>Highly fragmented</td>
</tr>
<tr>
<td>The total innovative intensity</td>
<td>High potential of innovation</td>
<td>Low or moderate innovative intensity</td>
</tr>
<tr>
<td>The extent to which an industry is comprised of small firms</td>
<td>Many small firms</td>
<td>Some small firms</td>
</tr>
<tr>
<td>The company size</td>
<td>Small firms</td>
<td>Large firms</td>
</tr>
<tr>
<td>Rate of technological change</td>
<td>Low rate</td>
<td>High rate</td>
</tr>
<tr>
<td>Customer demand</td>
<td>Low changing needs</td>
<td>High changing needs</td>
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</tbody>
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Unlike imitators, innovators have the potential to create markets, shape consumer preferences, and even change behaviour of consumers. Innovators tend to make sizable investments in production capacity and therefore are more likely to achieve superior performance through production and market scale economics. An innovation strategy has a stronger positive impact on new product performance. Innovators may be able to identify next-generation technology from what happens in developed markets [17].

Practically, in industries that are highly innovative and composed predominantly of large firms, the relative innovative advantage is held by small enterprises. In addition, sometimes innovation involves different combinations of elements in a new frame – an alternative architecture. For example, the low cost airline was not about new aircraft or airports but rather about focusing on an
underserved market and developing a new configuration around that. A new model of business emerged with very different characteristics.

Since the marginal cost of production of the MNC (multinational companies) is higher than that of the imitator firm, the optimal pricing of the successful imitating firm depends on the operational costs. If this gap is high enough, then the imitating firm can charge the profit maximising. However, if gap is narrow, then the imitating firm charges an equilibrium price equal to the rival’s marginal cost of production [18].

Big companies are much better at incremental innovation than they are at radical innovation. Some researchers found that although companies pay lip service to innovation, most fail to provide the formal structure and support that programs need to succeed, such as an autonomous organization, processes tailored for highly uncertain work, and well-designed metrics.

4. Discussion and conclusions

In business environment when change is more incremental, imitation can defense rivalry and reduce risk for any given firm. In the extreme, such imitation can be anticompetitive. When a firm has adequate time and resources to extensively explore its environment, experimental learning will be preferred. In highly uncertain environments when quick action is necessary, to imitate others becomes an attractive decision rule.

The imitators might be able to see the opportunities and invest in other market segments, because they have more freedom of movement by entering the market later.

Fourthly, imitators can learn from the mistakes of the innovators. They can see clearer picture and the situation before entering into the market. In addition, they can avoid or reduce the costs on research and development. The imitator can put more attention and spend more resources on the development of the technological process to improve the production efficiency and the quality of the product or service. As a result, imitation could be an essential part of innovation when reverse engineering, in particular, often led to significant advances in technology.

Many studies conclude that innovation is the least likely in the most and and the least competitive industries. Where competition is acute, companies refuse to spend money on innovation for fear that they will not be able to profit from their ideas. And where companies have lots of market power, they become lazy and do not bother to innovate.

Our study has some limitations that further research should overcome. First, the relative effectiveness of innovation and imitation is contingent on various other factors, such as organizational resources, culture, and structures.
Second, our study is based solely on literature and observation. These differences may limit generalizing of the findings.

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