



## THE MANAGEMENT OF INNOVATION IN SUPPLY CHAIN

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### ABSTRACT

Innovation is well known as one of the most important issues until the end of life for each industry, particularly in emergent markets such as in Turkey. Innovation is essential for succeeding. The main problem in emergent markets is the low level of political and economic environment, human resource, infrastructure, market development, and business development. Over the last decades, innovation has become a key element for further improvement, especially against foreign competitors. Global competition process pushes companies to restructure themselves with new trends, higher quality, and lower prices. As for supply chain management, a company as located in a country like Turkey who has a higher inflation rate should be innovative, otherwise it somehow always ends to bankruptcy. The aim of this paper is to emphasize the importance of the innovation management concerning supply chain in Turkey. It is well-known that innovation is associated with the supply chain. Therefore; competitiveness, organizational structures, processes, products, and service will be considered to determine the success of innovative supply chains in Turkish companies. Hereby, companies who succeed in implementing innovation will be determined as keys. When it comes to implementing the innovative small companies have more advantage to adapt their business models than big companies. Companies need to get the innovation as a management discipline. The corporate executives or owners have significant importance to run the innovation on their firms. Finally, the results will be a guideline for the top managers to make decisions for the future of their business intelligence.

**Keywords:** Innovation Management; Supply Chain; Competitiveness.

**JEL-Classificattions:** O31, O32, O33

### Tedarik Zinciri Yönetiminde Yenilik Yönetimi

#### ÖZET

Yenilik, hiç şüphesiz her endüstri, özellikle Türkiye gibi gelişmekte olan bir ülke için ömür her zaman en önemli koldan biri olmuştur. Yenilik başarı için esastır. Gelişmekte olan piyasar



için en önemli sorunlar, düşük profilli politik ve ekonomik şartlar, insan kaynakları, altyapı ve iş geliştirme süreçleridir. Son yıllarda, özellikle yabancı rekabetçiler için yenilikçilik, gelişme için anahtar bir rol üstlenmiştir. Küresel rekabet şirketleri yeni eğilimlere, daha yüksek kaliteye ve düşük fiyatlara itmeye başlamıştır. Tedarik zincirine bakıldığında ise, özellikle yüksek enflasyon oranına sahip Türkiye gibi ülkelerde firmalar yenilikçi olmadıkları takdirde iflas etmeye mahkumdurlar. Bu çalışmanın amacı, Türkiye’de tedarik zincirindeki yenilikçiliğin önemini vurgulamaktır. Hiç şüphe yoktur ki tedarik zinciri yenilikçilikle iç içedir. Organizasyonel yapı, rekabetçilik gibi faktörler Türkiye’de yenilikçiliğin başarısını tayin eden hususlardır. Uygulama aşamasına gelindiğinde yenilikçiliğin, büyük firmalara kıyasla, küçük firmalarda daha kolay olduğu anlaşılmaktadır. Yenilikçiliği şirketler bir yönetim tarsi olarak ele almak zorundadır. Şirket sahipleri bu oyunda başrolü oynamaktadırlar. Sonuç olarak bu çalışma, şirketlerin gelecekte iş zekası geliştirmelerine katkıda bulunabilecektir.

**Anahtar Kelimeler:** Yenilik yönetimi, Tedarik Zinciri, Rekabetçilik

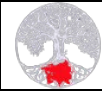
## 1. Introduction

Innovation is frequently related to the application of better solutions that meet new requirements, unarticulated needs, or existing market needs. This accomplished through more effective products, processes, services, technologies, or business models that are readily available to markets, governments, and society. The term "innovation" can be defined as something original, more effective and, as a consequence, new, that "breaks into" the market or society. (Mejabi, 2017)

Joseph Schumpeter identified innovation as the critical dimension of economic change. He argued that economic change revolves around innovation, entrepreneurial activities, and market power. He sought to prove that innovation-originated market power can provide better results than the invisible hand and price competition. He argues that technological innovation often creates temporary monopolies, allowing abnormal profits that would soon be competed away by rivals and imitators. These temporary monopolies were necessary to provide the incentive for firms to develop new products and processes. (Kurz, 2007)

According to Peter Drucker, the general sources of innovations are different changes in industry structure, in market structure, in local and global demographics, in human perception, mood, and meaning, in the amount of already available scientific knowledge, etc. (Mejabi, 2017: 12)

Innovation management is the discipline of managing processes in innovation. It can be used to develop both product and organizational innovation. Innovation management includes a set of tools that allow managers and engineers to cooperate with a common understanding of goals and processes. The focus of innovation management is to allow the organization to respond to an external (customers, suppliers, etc.) or internal (technical divisions, marketing, and sales) use its creative efforts to introduce new ideas, processes or products (Kelly and Kranzburg, 1978).



Innovation management includes a set of tools that allows managers and engineers to cooperate with a common understanding of processes and goals. Innovation management allows the organization to respond to external or internal opportunities, and use its creativity to introduce new ideas, processes or products.

Supply chain management is achieved by an organization proactively adopting initiatives to move suppliers and customers into collaborative relationships for mutual gain. Business professionals who want to make a significant impact on the efficiency, effectiveness or profitability of their organizations should consider learning more about supply chain management and its value for companies operating in a competitive global marketplace. (Bisk 2018)

Firms can no longer effectively compete in isolation of their suppliers and other entities in the supply chain. Interest in the concept of supply chain management has steadily increased since the 1980s when companies saw the benefits of collaborative relationships within and beyond their own organization. (Lummus, Vokurka, 1999)

To define a firm that aims to have a longer lifecycle, all the paths will cross in the supply chain through a sustainable relation of innovation. Innovation is not something to catch but chase and run with it as a management discipline.

In order to create innovation, along with the presence of innovation-oriented employees, corporate organizational structures, environments that are designed for creating innovation and the strong will to force through reform are required. In short, corporate executives' proactive commitment is necessary.

## **2. Turkey's global position on Innovation**

**Global Innovation Index (GII)**, a collaboration between INSEAD, Cornell University and the World Intellectual Property Organization (WIPO), provide insights into the recipes that the leaders in global innovation use to promote sustainable growth. The leading countries don't make it easy for technology to just proliferate. They actively foster innovative ecosystems that allow it to flourish.

The GII measures a country's innovation performance based on both on its innovation inputs (such as regulatory environment, education, R&D and infrastructure) and its innovation outputs (such as patents filed and knowledge diffusion).



| Country                  | Score (GII) | Rank ((GII) | Rank (GDP) | Score (GDP) |
|--------------------------|-------------|-------------|------------|-------------|
| Switzerland              | 68.40       | 1           | 20         | 679         |
| Netherlands              | 63.30       | 2           | 18         | 826         |
| Sweden                   | 63.10       | 3           | 23         | 539         |
| United Kingdom           | 60.10       | 4           | 5          | 2625        |
| Singapore                | 59.80       | 5           | 37         | 324         |
| United States of America | 59.80       | 6           | 1          | 19391       |
| Finland                  | 59.60       | 7           | 44         | 253         |
| Denmark                  | 58.40       | 8           | 36         | 324         |
| Germany                  | 58.00       | 9           | 4          | 3685        |
| Ireland                  | 57.20       | 10          | 35         | 334         |
| Israel                   | 56.80       | 11          | 32         | 351         |
| Korea, Republic of       | 56.60       | 12          | 11         | 1538        |
| Japan                    | 55.00       | 13          | 3          | 4872        |
| Hong Kong (China)        | 54.60       | 14          | 34         | 324         |
| Luxembourg               | 54.50       | 15          | 53         | 64          |
| France                   | 54.40       | 16          | 7          | 2854        |
| China                    | 53.10       | 17          | 2          | 12015       |
| Canada                   | 53.00       | 18          | 10         | 1652        |
| Norway                   | 52.60       | 19          | 29         | 396         |
| Australia                | 52.00       | 20          | 13         | 1380        |
| Turkey                   | 37.40       | 50          | 17         | 849         |

Table 1 Global Innovation index (GII) 2018, Gross domestic product (GDP) ranking by country 2017 (GDP Scores based on incurrent prices Billion USD)

Source: <https://www.globalinnovationindex.org/analysis-indicator>

<https://www.imf.org/external/datamapper/NGDPD@WEO/OEMDC/ADVEC/WEOWORLD>

Table 1 provide an overview of the global innovation index of 2018. Switzerland for example leads because it performs in all pillars of the GII model, especially in terms of business environment and ability to transform available resources into innovative outputs. Switzerland leads the rankings for the seventh consecutive year, (2010-2018) followed by Sweden and the Netherlands. In the top 25, China (which entered that group last year) moves up another three places, becoming the 22nd most innovative economy in the world. Recently, China has shown the strongest improvements in patent applications, university rankings and gross R&D expenditure. It also scores strongly in companies doing R&D and research talent. (Lanvin,2017)

Turkey was at the 58<sup>th</sup> position in the Global Innovation Index in 2015; it went up 16 steps with 39.03 points to the rank of 42<sup>nd</sup> in 2016; it stayed a close rank with 38.90 points to the rank of 43<sup>nd</sup> in 2017; finally with 37.40 points to the rank of 50<sup>nd</sup> in 2018. The key indicators of Turkey are:



- Population (millions): 79.6
- GDP (US\$ billions): 735.7
- GDP per capita, PPP(\$): 20,437.8
- Income group: Upper-middle income
- Region: Northern Africa and Western Asia

| YEAR 2017   | Score 0–100 or value (hard data) | Rank      |
|---|----------------------------------|-----------|
| <b>Global Innovation Index (out of 127)</b>         | 38.9                             | <b>43</b> |
| <b>Innovation Output Sub-Index.</b>                 | 35.5                             | 36        |
| <b>Innovation Input Sub-Index</b>                   | 42.3                             | 68        |
| <b>Innovation Efficiency Ratio</b>                  | 0.8                              | 91        |
| <b>Global Innovation Index 2016 (out of 128)</b>    | 39.0                             | <b>42</b> |
| <b>1 Institutions</b>                               | 50.6                             | <b>95</b> |
| 1.1 Political environment.                          | 40.5                             | 95        |
| 1.2 Regulatory environment                          | 50.5                             | 97        |
| 1.3 Business environment                            | 60.9                             | 95        |
| <b>2 Human capital &amp; research</b>               | 38.1                             | <b>43</b> |
| 2.1 Education                                       | 45.5                             | 72        |
| 2.2 Tertiary education                              | 39.8                             | 48        |
| 2.3 Research & development (R&D)                    | 29.0                             | 38        |
| <b>3 Infrastructure</b>                             | 45.7                             | <b>68</b> |
| 3.1 Information & communication technologies (ICTs) | 56.7                             | 67        |
| 3.2 General infrastructure                          | 34.6                             | 76        |
| 3.3 Ecological sustainability                       | 45.7                             | 59        |
| <b>4 Market sophistication</b>                      | 47.8                             | <b>57</b> |
| 4.1 Credit  | 27.2                             | 89        |
| 4.2 Investment.                                     | 38.5                             | 72        |
| 4.3 Trade, competition, & market scale.             | 77.9                             | 141       |
| <b>5 Business sophistication</b>                    | 29.3                             | <b>75</b> |
| 5.1 Knowledge workers                               | 34.1                             | 77        |
| 5.2 Innovation linkages                             | 21.2                             | 96        |
| 5.3 Knowledge absorption                            | 32.7                             | 65        |
| <b>6 Knowledge &amp; technology outputs</b>         | 27.6                             | <b>46</b> |
| 6.2 Knowledge impact                                | 34.6                             | 47        |
| 6.3 Knowledge diffusion                             | 19.2                             | 85        |
| <b>7 Creative outputs</b>                           | 43.4                             | <b>31</b> |
| 7.1 Intangible assets                               | 64.7                             | 61        |
| 7.2 Creative goods & services                       | 20.7                             | 56        |
| 7.3 Online creativity                               | 23.5                             | 53        |

Table 2 Global Innovation Index 2017 based on Turkey data

Source: <https://www.globalinnovationindex.org/gii-2017-report#>



Turkey's best performance is in the Creative outputs criterion as shown in table 2. There have been improvements from previous years in the macroeconomic environment, infrastructure and higher education and training criteria. However, the financial market development, institutions, innovation, health and primary education, and goods market efficiency criteria have all recorded with lower scores.

According to the World Economic Forum (WEF), the most problematic area for doing business in Turkey is the inadequately educated workforce. In addition, financing, inefficient government bureaucracy, policy instability, tax rates, inflation and tax regulations brings unstably.

However, even though Turkey was placed 43<sup>nd</sup> among 128 countries in the general ranking, it was at 88<sup>th</sup> position in "political environment" indicator and 96<sup>th</sup> position in "regulatory environment" indicator. Those two factors has a significant importance to keep Turkey to have lower ranking in comparison to higher ranked countries.

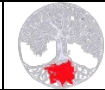
### **3. Competitiveness as a Core**

Customers have multiple sources from which to choose to satisfy demand; locating product throughout the distribution channel for maximum customer accessibility at a minimum cost becomes crucial. Previously, companies looked at solving the distribution problem through maintaining inventory at various locations throughout the chain. However, the dynamic nature of the marketplace makes holding inventory a risky and potentially unprofitable business. Customers' buying habits are constantly changing, and competitors are continually adding and deleting products. Demand changes make it almost a sure bet that the company will have the wrong inventory. The cost of holding any inventory also means most companies cannot provide a low-cost product when funds are tied up in inventory. (Lummus, Vokurka, 1999)

There are several important implements that companies need to focus on. Such as; finding a niche, starting from small, chasing for global market and creating models or products for global. This will be illustrated with some case studies: case of Rubicon, BASF, Ekol 4.0 and Tal Apparel Limited.

#### **- Case of Rubicon**

Rubicon Global is a technology company that provides waste, recycling, and smart city solutions to businesses and governments worldwide. Company's rise from a startup to a global force in the digital content industry was achieved through its founder vision and perseverance, but also because the Company focused on the development of a strong business plan that focused on niche verticals with the digital content industry. Rubicon also recruited and retained a high-quality workforce, empowering them with the latest technology and creating an environment where ideas are highly valued. As a small company in many countries not known for innovation, (Jordan) Rubicon created momentum in the market by taking on small projects, building a portfolio and eventually using this experience to land large contracts.



- Case of BASF

That company is BASF. BASF, the world's largest chemical company, has a cleverly constructed supply chain where the byproducts of one operation get converted into starting materials of another operation. BASF, a company headquartered in Germany with 2017 revenues of \$65 billion, calls this "Verbund." In English this means to "combine" or to "cooperate." Verbund saves the company money. The company believes they save over one billion euros annually through this concept. .But Verbund is also a sustainability play. BASF saves on raw materials and energy, lowers emissions and cuts logistics costs because the synergistic production operations are near each other. In logistics, having plants near each other allows for 280,000 fewer truckloads per year. (BASF, 2018)

- Case of Ekol 4.0

Ekol, creating inspirational and sustainable value with its customers, is ready to introduce a new perspective to the industry. Ekol will revolutionize the traditional business model with Logistics 4.0 to offer solutions that are even more integrated, interconnected, and innovative to its customers who deserve the best. Ekol is advancing with a focus on continuous and dynamic transformation and continues to grow through original and innovative ideas which provide novel opportunities for customers as well as competitive advantage. (EKOL, 2017)

- Case of Tal Apparel Limited

Tal Apparel Limited, has used IT (Information Technology) strategically to gain competitive advantage in cutthroat global apparel industry. The Hong Kong based company has developed a sophisticated information management system to manage the supply chain of its major retailer customers while at the same time providing backward integration into its own production and material sourcing networks. Company has created product and service differentiation unique as its. Tal has succeed to adopting a managed growth strategy offers an excellent model for companies contemplating the growth opportunities afforded by their IT initiatives. (Lee, H., Farhoomand, A., Ho, P., (2004)

#### **4. Role of top managers**

Innovation management is to manage the innovative activities in order to ensure the realization of the goal and the optimal efficiency. Creating a prosperous environment for innovations will be a significant step.

Managers are responsible to create an environment encouraging innovation. They need to understand the overall encompassing role of innovation. Adopting innovation appears to be a focal point for the foreseeable future providing the largest marginal contribution to the manufacturing industries in general, especially for Turkey. (Ulusoy, 2003)





Existing business is not the only task of top managers. A sustainable business model requires a long run with many transform and development processes. It's a value of management perspective to convey it to the company ethics.

How did some companies succeed when others did not? Arguably, it was because their leaders rejected conventional notions that would focus on quick wins without providing sustainable and prosperous growth. (McCord, 2011)

## 5. Material and Methods

This study is a literature review based on quantitative material and therefore secondary sources. This includes scientific articles, case studies, and other related literature. To find out the importance of innovation management in Supply Chain.

Table 2 shows the top 20 countries rankings of GII and those 20 countries GPP. As a quantitative methodology, the Spearman rank correlation coefficient has been calculated. The aim of comparing GII and GDP is to emphasize the correlation between them. According to quantitative analyze, there is a result of -0,08 rank correlation coefficient. It is very engrossing detection that correlation coefficient negatively associated with GII rank and GDP rank. That means, there is an inverse correlation between GII and GDP. As a Matter of fact, finding the rank correlation coefficient close to zero terms can be called a non-significant result.

|      | <i>Rank</i> | <i>Rank</i> |
|------|-------------|-------------|
| Rank | 1           |             |
|      | -           |             |
| Rank | 0,08607     | 1           |

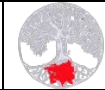
The Spearman's Rank Correlation Coefficient is used to discover the strength of a link between two sets of data. This example looks at the strength of the link between the GII and GDP rankings using the Spearman rank correlation coefficient formula below.

$$r_s = 1 - \frac{6 \sum D^2}{n(n^2 - 1)}$$

## 6. Conclusion

The estimates of GII rankings and GDP rankings, there is no significant relationship between a GII rankings and GDP rankings. The fact two variables correlate cannot prove anything - This





paper can be further optimized with quantitative data supported by new parameters that effects on Innovation.

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