

MEASURING INNOVATION POWER OF BUSINESSES: A REGIONAL RESEARCH IN FOOD AND AGRICULTURAL INDUSTRY

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ABSTRACT

In today's terms economic growth and competitiveness are based on innovation increasingly. Innovation is considered as a fundamental component of the entrepreneurship and sustainable development. Countries need innovative enterprises and also pioneer companies in this field for being included to international race and attaining competitive advantage. These companies have to apply right measurements and incentives, and have to generate right attitude with right strategies both inside and outside the company to make innovation is managed. For a healthy process of innovation management, it is very important to perform a serious planning and implementation, to create awareness of innovation inside the company, to bring innovation into the corporate culture and to measure the power of innovation at regular intervals in this process. In the principle of 'You cannot manage what you cannot measure', with the data and feedback that obtain through measurements, enterprises can determine their strengths and weaknesses in this field and they can provide continuity a successful innovation process. In this study; innovation concept and its importance for enterprises and companies, some of the innovation measurement models have been emphasized, and Arthur D. Little's innovation measurement models have been analyzed, and one of them has been practiced in the agriculture and food sectors in Salihli province. The findings have shown that, innovation power of a company or enterprise is not influenced by the size of company, the age of company, the field of activity or the company's annual turnover. As highlighted in the literature of the study, innovation is possible for every business and enterprise with applying the right processes.

Keywords: *Innovation management, Research-Development, Competition, Strategy*

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ÖZET

Ekonomik büyüme ve rekabet edebilirlik günümüz şartlarında giderek inovasyona dayanmaktadır. Uluslararası yarışa dahil olabilmek ve rekabet gücünü elinde bulunduran bir düzeye ulaşabilmek için ülkelerin hem inovatif girişimlere hem de bu konuda öncü şirketlere gereksinimi vardır. Bu şirketler inovasyonu yönetilir kılabilmek için, doğru ölçümleri ve teşvikleri uygulamak, hem içeride hem de dışarıda doğru stratejilerle doğru davranışı üretebilmek, ve bu süreç için etkili bir metodoloji geliştirmek zorundadırlar. Sağlıklı bir inovasyon yönetim süreci için, işletmelerin ciddi bir planlama ve uygulama gerçekleştirmeleri, işletme içerisinde inovasyon farkındalığı yaratıp, inovasyonu kurum kültürü haline getirebilmeleri ve bu süreçte inovasyon güçlerini düzenli aralıklarla ölçmeleri oldukça önemlidir. “Ölçemediğiniz şeyi yönetemezsiniz, geliştiremezsiniz” ilkesi doğrultusunda, yapılan bu ölçümler sayesinde elde edilecek veriler ve geri bildirimlerle, işletmeler bu alandaki zayıf ve güçlü yönlerini tespit edebilir, başarılı bir inovasyon sürecinin sürekliliğini sağlayabilirler. İşletmelerde inovasyon gücünün ölçümlemesinin amaçlandığı bu çalışmanın ilk bölümünde; inovasyon kavramı, özellikleri, çeşitleri ile bağlantılı olduğu kavram ve konuları; ikinci bölümünde dünyada geliştirilmiş olan inovasyon ölçümüne yönelik yapılan çalışmalardan bazıları; üçüncü bölümde ise dünyanın ilk yönetim danışmanlığı şirketi olan Arthur D.Little 'ın inovasyon Üstünlüğü ölçüm modeli ile incelenmiştir. En son bölümde ise, Arthur D.Little 'ın modeli Salihli ilçesinde tarım & gıda sektöründe üretim faaliyetinde bulunan işletmelere uygulanmış, elde edilen veriler analiz edilmiş, yorumlanmış ve önerilerde bulunulmuştur.

Anahtar Kelimeler: İnovasyon, İnovasyon Yönetimi, Strateji, Rekabet, Teknoloji.

Introduction

Today's global competitive landscape is becoming even more challenging. Innovation provides a company the opportunities to grow faster and better than their competitors. Courses in our age, all initiatives need to have continuous renovation to make a difference, to gain competitive advantage in international markets, and to increase quality of social life of the countries. The key factor here is to create economic value through innovation and renovation, a vital factor that should not be ignored. For companies, innovation that converges with science and technology is one of the basic requirements for survival and healthy growth. In order to minimize the risk

of failure, it is very important for companies to encourage investments and activities related to innovation and to blend innovation into corporate culture for a successful management process. For an efficient innovation management process, companies should be able to build up a common vision that overlaps with the personal vision and an effective innovation strategy that integrates with the corporate strategy. A combination of the above factors should be provided by one or more individual leaders. Apart from these, emphasizing “creating business value”, being aware of the fact that the basic unit of innovation is the communication network that includes both business and non-business people (employees, customers, suppliers, etc.) and information; considering the time and resources, which are allocated to developing new ideas and improvement, as an investment not a cost; designing reward systems that support new ideas instead of repeated business performance; and incorporating everyone into the learning cycle are important steps for the innovation process.

Innovation

An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations (Oslo Manual, 2005: 46). Innovation by definition is the name of innovations which will bring commercial improvements. That is, to do something not previously found or not been done and to do so to ensure revenue and profit growth. Innovation is about to think that others did not and to present innovations to the market that will bring turnover and profit increase; and accordingly even the smallest discoveries, that can bring this result, enter into the scope of innovation (Kırım, 2005: 49-50). The purpose of innovation is to launch newness into the economic area. Innovation is not just about brand new products. Creating new products is only one of ten types of innovation. Others are product innovation, service innovation, process innovation, marketing innovation, organizational innovation, societal innovation, business model innovation, radical and incremental innovation, experience innovation, eco-innovation. In the world of business, innovation is a key to success. Rapid changes and advances characterize today’s business environment, and in order to remain competitive in the global

marketplace, companies must develop and implement new ideas. Business organizations, more than ever before, recognize that they need employees who think creatively in order to maintain their competitive edge (Clapham, 2003: 366). Innovation is essentially about learning and change and is often disruptive, risky and costly (Tidd, Bessant & Pavitt, 1997: 305). For firms, innovations can be expensive to develop and they risk being prey to imitators who copy (and improve) their innovations, whilst not risking the development costs (Osborn & Brown, 2005: 128).

For a business, innovation means;

- increased sales and market share with developing and improving delivery performance and increasing new products/services in the portfolio
- increased income with increasing productivity, launch of new products to market and shortening time of services offered
- reduction in costs with using resources and time better.

Consequently, innovation is the most important part of corporate strategy, and also a continuous line of activities (Elçi, 2006: 152). According to Davila et al (2006), the seven innovation rules provide the basis for effective execution:

1. *Exert strong leadership on the innovation strategy and portfolio decisions.* Clear direction from the top of the organization permeates throughout the organization to motivate, support, and reward the activities that encourage innovation as well as the innovations themselves.

2. *Integrate innovation into the company's basic business mentality.* Innovation is not a rabbit you pull from a hat on special occasions; it must be an integral part of the way a company operates every day.

3. *Align the amount and type of innovation to the company's business.* Innovation may or may not be the key to success for your overall business strategy; you have to determine the types and amounts of innovation needed to support the business strategy-and more is not necessarily better.

4. *Manage the natural tension between creativity and value capture.* A

company needs strength in both. Creativity without the ability to translate it into profits (for example, execution and value capture) can be fun but it is unsustainable; profits without creativity is rewarding but only works in the short-term.

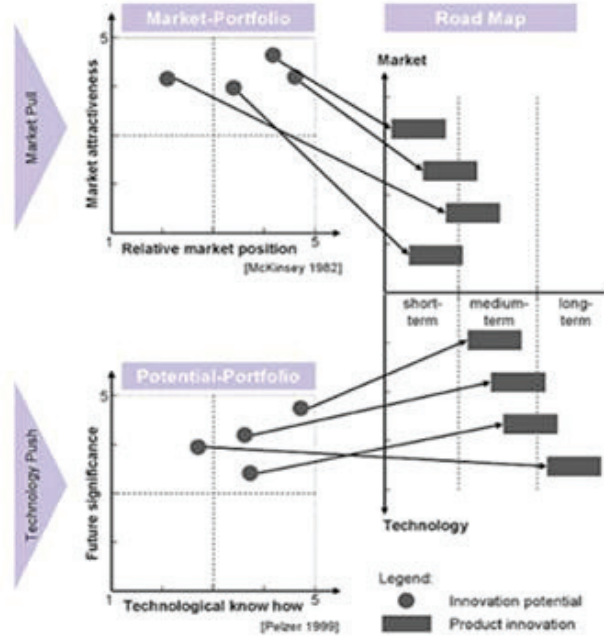
5. *Neutralize organizational antibodies.* Innovation necessitates change, and change stimulates explicit routines and cultural norms that act to block or negate change.

6. *Recognize that the basic unit (or fundamental building block) of innovation is a network that includes people and knowledge both inside and outside the organization.* A successful organization excels at fusing its internal resources with selected portions of the vast resources of the world's capitalist economy.

7. *Create the right metrics and rewards for innovations.* People react to positive and negative stimuli, and your company's innovation is no exception. You will never achieve the level of innovation that you need if people do not have the proper rewards (Davila, Epstein & Shelton, 2006: 11-12).

According to Aachen Strategy Model, that has been developed by the Fraunhofer IPT in cooperation with the WLZ of the RWTH Aachen, if a company dominantly implements market-oriented strategies in order to search and select new product ideas, this generally creates short-term innovation potentials. If a company has technological potentials, capabilities or know-how (e.g. patents/licenses), a technology push can be achieved if these potentials can be translated into product ideas. This strategy creates mostly medium-to long-term innovation potentials (see figure below) (Eversheim, 2009: 23).

Figure 1: Product Innovation and Innovation Potential



Innovation is the specific tool of entrepreneurship by which entrepreneurs exploit change as an opportunity for a different business or service. There is a considerable overlap between entrepreneurship and innovation. Moreover, innovation should address market needs, and requires entrepreneurship to achieve commercial success (Hasan and Harris, 2009: 93). There is no greater resource in an economy than purchasing power. But purchasing power is the creation of the innovating entrepreneur (Drucker, 1985: 27). The content of innovation itself may necessitate changes in skill levels, and need to accommodate existing industrial relations structures. The process of innovation needs to take account of social organization, including work groups and union organizations as well as the physical form of the production process. Finally, the outcome of innovation is substantially affected by industrial relations, at both the individual and collective level (Martin, 1994: 338). Innovation in firms and other organizations depends on effective interconnection between many groups of people, both within the organization and externally. The highest priority for these connections varies with the type of innovation being pursued. For instance, incremental process innovation requires the closest possible links between people in production and research, while architectural product innovation needs similarly close links between researchers, marketers and customers (Fairthlough, 1994: 333-334).

Common problems associated with partial views of innovation (Tidd, Bessant et al., 2001):

Table 1: Common problems associated with partial views of innovation

If innovation is only seen as...	The result can be...
Strong R&D capability	Technology which fails to meet user needs and may not be accepted
The province of specialists in white coats in the R&D laboratory	Lack of involvement of others, and a lack of key knowledge and experience input from other perspectives.
Meeting customer needs	Lack of technical progression, leading to inability to gain competitive edge.
Technology advances	Producing products which the market does not want or designing processes which do not meet the needs of the user and which are opposed.
The province only of large firms	Weak small firms with too high a dependence on large customers.
Only about 'breakthrough' changes	Neglect of the potential of incremental innovation. Also an inability to secure and reinforce the gains from radical change because the incremental performance ratchet is not working well.
Only associated with key individuals	Failure to utilize the creativity of the remainder of employees, and to secure their inputs and perspectives to improve innovation.
Only internally generated	The 'not invented here' effect where good ideas from outside are resisted or rejected.
Only externally generated	Innovation becomes simply a matter of filling a shopping list of needs from outside and there is little internal learning or development of technological competence.

Source: The International Handbook on Innovation, 2003: 764, Editor L. V. Shavinina

Collaboration can provide possibilities not only of learning about new technologies, but learning about methods of creating future technologies and of the ways those technologies might affect the existing business. It can

teach companies new ways of doing things not only technologically, but organizationally and managerially, and can conceivably alter the nature of the business (Dodgson, 1994: 290). A culture that fosters innovation embraces communication not only within the members of the organization, but also with external constituencies. Customers have proven to be a valuable source of insight, but so have suppliers, universities, competitors, or companies in other industries (Davila, Epstein and Shelton, 2006: 23).

A company's innovation strategy needs adjustment over time. A number of internal and external factors affect the selection of the best innovation strategy (see table below). These affect the choice of the innovation strategy and the shape of the portfolio (Davila, Epstein and Shelton, 2006: 75).

Table 2: Factors to consider in choosing an innovation strategy

Internal Factors	External Factors
Technical capabilities	Capabilities in the external network
Organizational capabilities	Industry structure
Success of the current business model	Competition
Funding	Rate of technological change
Top Management vision	

Innovation measurement is the most critical element to enhancing the management success. Innovation measurement systems fill three roles, as follows:

- **Plan:** Define and communicate strategy. Make assumptions about the sources of value explicit and clear, select the intended strategy, and clarify expectations about strategy throughout the organization.
- **Monitor:** Track the execution of innovation efforts to assess changes in the environment, intervene only if necessary, and evaluate performance.
- **Learn:** Identify new opportunities. Learn about new solutions to achieve performance goals, new business, or technology opportunities (Davila et al., 2006: 146).

For a high level competitiveness power and continuity of it; it is very important for businesses to track their innovation performance over time, to define with figures of effects created and to achieve control. Different innovation processes and different organizational levels need different measurement systems, and these can vary over time (see table below) (Davila et al., 2006: 177).

Table 3: Examples of Measurements

Objective	Measures
<i>Outputs</i>	
Long-term corporate profitability	Stock price Projected sales growth Projected residual income
Short-term corporate profitability	Residual income growth Sales growth Return on equity Percentage of sales from new products
<i>Outcomes</i>	
Customer acquisition	New customers gained through innovation Number of customers through existing products/ services who buy new products/services Number of new customers of new products/ services who go on to buy existing products/services Market share
Customer loyalty	Frequency of repeat customers Average annual sales per customer Customer satisfaction with innovation activities Percentage of customer attrition Ratio of new visitors to repeat visitors
Value capture	Margin of product and services offered to customers Average of prices paid by customers Number of new product and service lines introduced Profitability of innovation operations Revenues generated through innovation efforts (total revenue, innovation revenue, revenue per innovation customer) Customer profitability
<i>Process</i>	

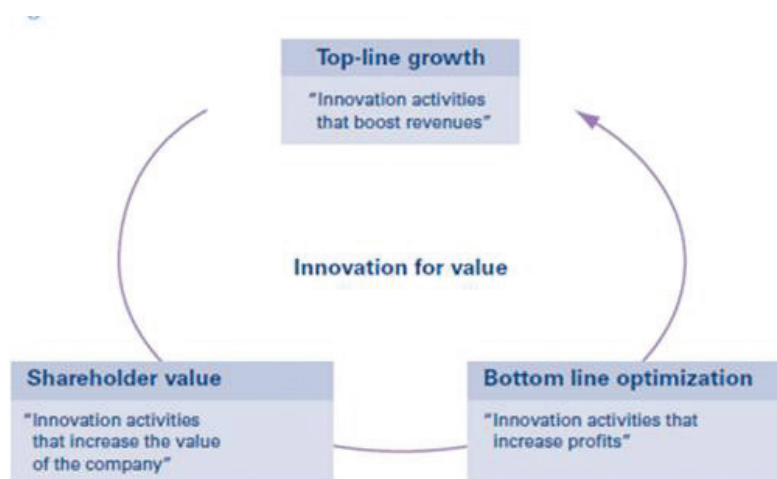
Portfolio	Percentage of innovation efforts devoted to radical, semi-radical, and incremental innovation
Execution	Portfolio balanced over time, returns, risks, and technologies Alignment between innovation strategy and resource allocation Product platform effectiveness Reduction in new product/process development time/cost Within target sales/profits Projected within time, budget, product performance targets R&D productivity Number of new patents granted each year Number of gateway returns Rate and quality of experimentation Cost, development time, delivery time, quantity, and price of products and services offered
<i>Inputs</i>	
Commitment and focus on innovation	Time dedicated to innovation Budget percent allocated to innovation efforts Performance-based compensation linked to innovation success Success of ideas passing through selection and execution processes Investment in training Level of innovation integration across business units and functions Mix of innovation sources Percentage of innovation projects outsourced
Balanced innovation of networks inside and outside of organization	Number of strategic alliances Number of experienced innovation team members Assessment of supplier capabilities Number, cost, price, and perception of new products offered from innovation projects Number, cost, price, and perception of new services offered from innovation projects Perception of brand Profitability of innovation operations
Coherent and aligned innovation strategy	Objectives for innovation efforts clearly communicated to senior managers and employees Competitive position within industry Number, complexity and size of competitors, customers, partners and suppliers Percentage of performance measures and rewards aligned and linked to innovation activities Quality of IT infrastructure Quality of information for innovation Market and technology research resources Amount and quality of customer data acquired related to innovation
Appropriate management infrastructure for effective innovation implementation	Dollars of resources available for innovation Free time allowances for R&D employees Geographical diversity of production and sales Level of empowerment to Strategic Business Unit and functional managers Cross-functional initiatives

Source: Davila et al., 2006: 172-173

The literature review showed that there is not a broad consensus over the parameters to be used in innovation measurement. Different business-level measurement models such as Agamus Consult model (Eckelmann, 2002), Heinz-Kurt Wahren model (Wahren, 2004), Innovationlabs LLC model (Morris, 2008) and Arthur D. Little model employ various measures.

Arthur D. Little is a global management consultancy firm with over 31 offices in over 20 countries, and it is the world's first management consultancy firm. For over 120 years, the Arthur D. Little name has been synonymous with technological ingenuity and innovative thinking. According to Arthur D. Little successful innovation is not about how much you spend, but why and how you spend it – in other words knowing what kind of value your business is aiming to create, be it Top-line growth, Bottom-line optimization or Shareholder value. “Innovation for Value” (Little, 2008: 1)

Figure 2: Innovation For Value



Research and Methodology

This study employs Arthur D. Little's 'Innovation Management Health Check' model. The required data was collected through survey method and interviews. A questionnaire was developed to be self-administered by

the top managers working at various companies in agriculture and food industry. The survey questionnaire consists of two parts. The first part of the questionnaire comprises innovation measurement table, prepared by Arthur D. Little and European Business School. This first part aims to investigate the strength of innovation management of the companies in the sample. Under the Innovation Vision & Strategy, Resources, Organization Structure, and Innovation Processes sections 8 statements and under the Culture and Climate section 10 statements are addressed in the questionnaire. These sections aim to provide an innovation measurement through 'Innovation Scorecard' which was developed by Arthur D. Little and European Business School. The second part of the questionnaire intends to gather information on company and manager demographics. Afterwards the collected data was analyzed using statistical methods, tools and software.

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Companies, engaged in production activity in agriculture and food industry in Salihli, Manisa, were selected as the research sample. The aim of choosing Salihli province and the companies here was the emerging nature of industry and fertile agricultural lands. 15 companies out of 16 in the Salihli Organized Industrial Zone participated in the research study as a result of a seven-week effort. The sampling unit consists of experts,

intermediate and upper level managers in the companies. In addition to face-to-face interviews, the self-administered questionnaires were returned via e-mail. The participants were asked to choose best suitable answer to their opinions to the 42 statements in total on a scale where 'no = 0, partly = 0,5, yes = 1' according to the measurement table that had been developed by Arthur D. Little and European Business School. In the analysis the scores were assessed as such; 0-2 point range was considered as 'low'; 2-4 point range as 'medium'; 4-6 point range as 'good'; and 6-8 point range as 'very good' scores. Hypotheses of the research are as follows:

H_1 : Companies' score of innovation power is good.

H_2 : There is no relation between innovation power and total turnover growth of companies.

H_3 : There is a significant relation between innovation power and growth of business activity fields (local, national, international)

H_4 : There is a significant relation between innovation power and number of years in the industry.

H_5 : There is a significant relation between innovation power and number of employees.

H_6 : There is a significant relation between innovation power and management of professional managers.

H_7 : There is no relation between innovation power and gender of managers.

H_8 : There is no relation between innovation power and age of managers.

H_9 : There is no relation between innovation power and education levels of managers.

H_{10} : There is no relation between innovation power and years that managers worked in the company.

The distribution of company activity field showed that %33.3 of the participating 15 companies are operating on local level, %20 on national level, and %46.7 on international level. Total Average Innovation Score of

the participating companies is 4.824 and according to the evaluation criteria these companies could be considered to have a ‘good’ innovation score. This score has been calculated by taking %20 of the each section score and by adding up all of the weighted section scores. The calculated score showed that companies in Salihli province need to improve their innovation management to reach the level of ‘very good’ in innovation scorecard and to develop a successful innovation implementation.

Total average innovation power of companies according to their field of activity

	Local	National	International
Innovation score	4,0	5,0	5,3

Total innovation power of companies according to their legal structures

Innovation score	Indivi-dual	Limi-ted	Incor-porated	Ordinary Partner-ship	Collective Partner-ship
	-	4,8	4,8	-	-

Total innovation power of companies according to their annual turnovers (Thousand TL)

Innovation score	Less than 250 TL	251-500, TL	501-750, TL	751-1000 TL	Over 1000 TL
	4,9	4,7	-	6,0	4,6

Total innovation power of companies according to their operating years

Innovation score	Less than 1 year	1-4 years	5-8 years	9-12 years	Over 12 years
	-	5,4	6,3	3,7	3,7

Total innovation power of companies according to their number of employees

Innovation score	1-10 people	11-20 people	21-30 people	31-40 people	More than 40 people
	2,5	6,0	2,7	5,3	5,0

Total innovation power of companies according to business managers' ages

Innovation score	Under the age 30	31-40	41-50	Over the age 50
	-	5,3	5,0	4,0

Total innovation power of companies according to business managers' education levels

Innovation score	Primary education	High school	College after high school	Undergraduate	MA	Postgraduate
	3,6	-	4,9	4,2	5,2	6,6

Total innovation power of companies according to business managers' working years

Innovation score	Less than 1 year	1-5 year	6-10 year	11-15 year	More than 16 years
	5,9	4,9	5,3	5,3	3,6

In the study, according to the findings of hypothesis testing;

- Innovation power score of companies is good. Thus, H_1 is accepted.
- The analysis showed that there is no relationship between innovation power and total turnover. Consequently H_2 is accepted.
- Findings revealed that there is no relation between innovation power and growth of business activity field. So, H_3 is rejected.
- Analysis revealed that there is no relation between innovation power and operating years of the companies. Thus, H_4 is rejected.
- The results of the analysis showed that there is no relation between innovation power and the number of employees. So, H_5 is rejected. The analysis revealed that there is no relation between innovation power and the management of professional managers. Thus, H_6 is rejected.
- The findings revealed that there is a relation between innovation power

and age of managers. Consequently, H_8 is accepted.

- Analysis showed that there is no relation between innovation power and education level of managers. So, H_9 is accepted.
- Findings revealed that there is no relation between innovation power and the years that managers worked in the company. Thus, H_{10} is accepted.

The finding of the study showed that innovation power of a company is not affected by company's size, age, activity field or annual turnover. Innovation, as emphasized above, is possible for every company if applied with the right process. Although great importance is given to the creation of new services, there is not a particular methodology for planning, developing or carrying on the innovation process. Likewise, a significant deficiency observed in companies in not employing a serious methodology for adopting innovative ideas. This situation leads to overthrow of many good ideas and activities. Companies are not yet very successful in converting their innovative practices into operational outcomes. Managers should provide the basis for continual improvement and help integrating innovation strategies into business strategies in companies. This could be achieved through proper incentives and reward systems, which would actually support new ideas, not reward repeated work performances. Every business has a business model, whether they articulate it or not. For that reason every business must determine their own innovation performance criteria and must follow them regularly. In addition, businesses may try to take steps in that direction, for adopting the novelties, which are created by universities and research institutions, according to the needs of the industry; and for organizing the production of industry according to market demands. In this way, the innovation activities of companies would enhance on one hand and on the other hand competitive power would increase and region's economic development would accelerate.

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