

Innovation Adoption And Diffusion in the Industrial Markets: An Empirical Research on the Small and Medium Size Enterprises in Ankara - Ostim

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Abstract

The scope of the study is to examine the variables affecting the potential purchasers in the industrial markets for diffusion and adoption of the innovations. On the basis of the Frambach research model (1998), a model has been developed and the questionnaire has been applied to machinery manufacturing industry to test hypotheses. According to the findings obtained, it is found out that the firms are considering the characteristics of the innovation, the competition, the environment with which it is in touch and from which it gets information and the marketing strategy related to the innovation, rather than the characteristics of their own company. On the other hand, the adopted innovation is developed and launched to the market by the firms considering the needs of the other firms. In this stage, they seek to announce and diffused the innovation with various marketing strategies (positioning, market support and risk reduction).

Key Words: innovation, industrial market, supplier, adopter, adoption and diffusion of innovation.

1. Introduction

Innovation ensures firms to extend their markets and to enter easily into the new market divisions. Therefore, innovation, in enhancing the efficiency and profitability of the firms, becomes as an important competitive tool today. Innovation is defined as the adoption of an internally generated or purchased device, system, policy, program, process, product, or service that is new to the adopting organization (Damanpour, 1991). Carroll (Pierce & Delbecq, 1977) defines innovation as a social process of organizational adoption in contrast to a scientific discovery. In this view organizational innovation represents a major change in the structure and\ or procedures (behavior) of an operating system. Thompson (Pierce & Delbecq, 1977) defines innovation as the generation, acceptance and implementation of new processes, products, or services for the first time within an organization setting. In a broad way, innovation defined as the creation or adoption of new ideas (Damanpour & Schneider, 2006). The concept of innovation is a complex process through which new ideas objects and practices are created developed or reinvented and that are new and novel to the unit of adoption (Walker, 2006).

The industrial market is composed of all organizations selling or buying goods and services for the purposes of using in the activities, reselling to the others or using as raw material and material in its own production process. As the consumer oriented firms, the industrial firms need to make innovation in all working areas. Especially for the firms that are carrying out their activities under constantly changing economical conditions and intensive competition, innovation and development of new products have become one of the basic conditions for getting the competitive advantage to survive.

Adoption of the innovation is the all activities for diffusing the new product, idea or technology from the origin where it was created or discovered all the way to the end user or the innovation adopter.

The firms that are not adopting the innovation process and are not directing their findings towards to the needs of human beings lose their power to survive and develop. In this scope, it is a necessity that the innovation should be adopted and applied by the firms. Innovation adoption is a tool for an industrial organization to adapt itself to the industrial environment, or to preempt a change in this environment, in order to increase or sustain its effectiveness and competitiveness in the industrial markets (Damanpour, 1987). Rogers defines the adoption process as “the process through which an individual or other decision making unit passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and confirmation of this decision” (Frambach & Schillewaert, 1999). Diffusion means the spread of an innovation through the set of potential adopters (Drury & Farhoomand, 1999).

It is found out that the innovation adoption and diffusion concerns in industrial markets are not considered adequately in the marketing literature, and that a great part of the theories developed on innovation and the marketing concerns discussed are focused on end consumer and consumption market. Therefore, the main objective of this paper is to examine the variables affecting the innovation adoption level of the potential buyers and the marketing strategies applied by the innovation developer firm so as to have the buyers adopt such innovation. In the framework of this main objective, a research model will be developed for determining the variables for adoption and diffusion of innovation in industrial markets and for investigating the validity of such variables, and a field research will be conducted within the framework of the model developed.

2. Adoption and Diffusion of the New Industrial Products: A Conceptual Model

A first *theory of innovation diffusion* was formalized by Everett Rogers. The Bass diffusion model was developed by Frank Bass and describes the process how new products get adopted as an interaction between users and potential users. Bass contributed some mathematical ideas to the concept (Bass, 1969). Recently, most significant research is made by Frambach et al., 1998 and Frambach & Schillewaert, 1999. In this paper, a research model has been developed for determining the *adoption and diffusion of the innovation in industrial markets*, benefiting from the research of Frambach et al. (1998) on the effect of the factors of the firms providing and adopting the innovation on its application in the service sector. In the research model, first the factors of firms that have adopted the innovation had been considered, which are the characteristics of the innovation and adopter, network participation, competitive environment and information. In the second part of the model, the approaches taken by the innovation supplier firm for influencing the innovation acceptance decision of the potential buyers are introduced. Furthermore, unlike with Frambach’s model, “the factors of the innovation adopter-then-supplier firms (marketing strategies and the innovation development)” have been added to the model. Thus the research model depicted in Figure 1 is obtained (see Appendix).

2.1. The Variables of the Model for Adoption and Diffusion of Innovation in Industrial Markets

Having examining the literature on adoption and diffusion of innovation, the researches considering the variables of the innovation adopter and supplier firms are shown in Table 1. This table is designed on the basis of the Frambach’s study (1998), then the relevant variables are explained respectively.

Table 1. Adopter and Supply Side Variables

	ADOPTER SIDE					SUPPLY SIDE	
	Perceived Innovation Characteristics	Adopter Characteristics	Network Participation	Competitive Environment	Information	Innovation Development	Marketing Strategy
Bhaskaran, 2006		✓					
Blau & McKinley, 1979		✓					
Damanpour, 1987		✓					
Damanpour, 1991		✓	✓		✓		
Damanpour, 1992		✓					
Damanpour & Schneider, 2006		✓	✓				
Dewar & Dutton, 1986		✓			✓		
Drury & Farhoomand, 1999		✓					
Ettlie & Rubenstein, 1987		✓					
Evan & Black, 1962		✓	✓	✓			
Frambach, 1995	✓	✓	✓	✓	✓	✓	✓
Frambach et al. 1998	✓	✓	✓	✓	✓	✓	✓
Frambach & Schillewaert, 1999	✓	✓	✓	✓		✓	✓
Gatignon & Robertson, 1989		✓	✓	✓			✓
Gauvin & Sinha, 1993		✓					
He et al. 2006	✓						
Kim, 1980		✓					
Miller & Friesen, 1982		✓			✓		
O'Neal et al. 1973	✓	✓		✓	✓		
Peansupap & Walker, 2005	✓						
Pierce, & Delbecq, 1977		✓					
Tornatzky & Klein, 1982.	✓						
Tzokas & Saren, 1997							✓
Waarts et al. 2000	✓	✓	✓	✓			✓
Yang & Liu, 2006				✓			
Zmud, 1982		✓					

2.1.1. Adopter Side Variables

There are several variables affecting the adoption of new products by potential target audience. According to the Frambach (1998) model, the variables for the innovation adopter side are the characteristics of the innovation and adopters, network participation, competitive environment and information.

2.1.1.1. Perceived Innovation Characteristics

A review of the innovation literature shows that perceived innovation characteristics are discussed in different ways. Frambach (1995), in his study, determined the perceived innovation characteristics as relative characteristics, compatibility, complexity, trialability, observability, uncertainty, expectations technology. The variable of the expectations technology, however, has not been used in the studies of Frambach et al. (1998) and Frambach & Schillewaert (1999). Furthermore, He et al. (2006), have considered the variables in this study, except uncertainty, as perceived innovation characteristics.

While O'Neal et al. (1973), considered the relative advantage as compatibility in their study, Peansupa & Walker (2005) added complexity and provide sufficient resources to these variables. Tornatzky & Klein (1982), in their studies, have determined compatibility, relative advantage, complexity, cost, communicability, divisibility, profitability, social approval, trialability and observability as perceived innovation characteristics and increased the variable number. Waarts et al. (2000), in their studies, took the disadvantages variable as an addition to the compatibility variable.

This paper is based on the Frambach's (1998) study and aims at explaining the perceived innovation characteristics with the following variables.

Relative Advantage is the perception of the new product as more superior in comparison to the previous similar goods or services. The higher the relative advantage of the new product, the easier and faster it is adopted (Kotler & Armstrong, 2006: 161-162). *Compatibility* is the level of compatibility between the innovation and the needs, value judgments, expectations and the experiences of the potential adopter. Generally, the compatibility of the innovation has a positive effect on its adoption (Kotler & Armstrong, 2006: 161-162). *Complexity* is the perception of grasping or using the innovation as difficult. Complexity arises in different forms such as limited application of the innovation, difficulties in understanding the innovation and the complexity of the first confrontation with it. Complexity has a negative effect on the possibility and speed of the adoption of the innovation (Frambach & Schillewaert, 1999). *Trialability* is the limited or restricted level of trial of the innovation before adoption. The researches showed that the trialability of the innovation was important in terms of innovators and early adopters. For the late majority learn the effectiveness of the innovation from the early adopters and face with less uncertainty. Trialability may have a positive effect on the possibility of adoption (Tornatzky & Klein, 1982). *Observability* is the extent of communicating, explicating and relating the results of the innovation.

In other words, it is the visibility of the easy adoption and application of the innovation to the eyes of the potential buyers. The clear observability of the results of the innovation facilitates the faster diffusion of the innovation in the relevant environment and the social system (Tornatzky & Klein, 1982). *Uncertainty* is the degree of the risk as perceived by the potential buyers during the innovation adoption decision making process because the information on the innovation is not sufficient. Uncertainty has technological, financial and social sorts. Technological uncertainty is the difficulty experienced by the potential adopters in perceiving the extent to which innovation will be functional and how far they should trust in the innovation. Furthermore, the potential adopter might think that a better innovation may be presented and considered as technological uncertainty. Financial uncertainty is the difficulty experienced by the potential adopters in perceiving whether the innovation is financially satisfactory, e.g. arise of unexpected costs. Social uncertainty is the possibility that the potential adopter might have a disagreement with his/her environment in accepting the purchase and application of the innovation (Frambach & Schillewaert, 1999).

2.1.1.2. Adopter Characteristics

The characteristics of the potential adopter individuals and organizations may affect the innovation adoption decisions. In this paper, "size, age, structure and receptiveness" in the Frambach's (1998) study are taken as four major characteristics of the adopter affecting the innovation adoption decisions of the organizations and that have been tested in the model.

The relationship between the size variable among the adopter characteristics and the adoption decision has been investigated by several authors (Bhaskaran, 2006; Blau & McKinley, 1979; Damanpour, 1987, 1992; Damanpour & Schneider, 2006; Drury & Farhoomand, 1999; Ettlie, & Rubenstein, 1987; Evan & Black, 1962; Frambach, 1995; Frambach & Schillewaer, 1999; Gauvin & Sinha, 1993; O'Neal et al., 1973; Pierce & Delbecq, 1977; Waarts et al., 2000). Generally, there is a positive relationship between size of the organization and the adoption of the innovation. In comparison with the smaller ones, the larger organizations may need more to adopt the innovation with the purpose of supporting and developing their efficiencies (Damanpour, 1992; Damanpour & Schneider, 2006; Pierce & Delbecq, 1977). In turn, it is discussed that the smaller organizations might be more innovative and more flexible, and that their such characteristics enhance their possibility of adopting the new products (Frambach & Schillewaert, 1999).

Age may affect the firm's level of accepting the new ideas and products. In review of the relevant literature, it is seen that the relationship between the age variable and adoption decision has been investigated by Bhaskaran (2006), Damanpour (1991), Damanpour & Schneider (2006), Frambach (1995), Frambach & Schillewaer, (1999) and Pierce & Delbecq (1977).

Structure may facilitate or hinder the adoption of the innovation. (Blau & McKinley, 1979; Damanpour, 1987, 1991; Damanpour & Schneider, 2006; Dewar & Dutton, 1986; Drury & Farhoomand, 1999; Evan & Black, 1962; Frambach, 1995; Frambach & Schillewaer, 1999; Gatignon & Robertson, 1989; Kim, 1980; Miller & Friesen, 1982; Pierce & Delbecq, 1977; Zmud, 1982). *Centralization* is the concentration of power and control of the organizational system in the hands of several individuals (Frambach, 1995: 253). The larger firms, due to their centralized structure, response late to the adoption of the innovation, although they are likely to have the equipment for the better implementation of the innovation.

The new product or idea *receptiveness* of the enterprises may affect their adoption trends and periods for the new products. Even this respect, the innovation tendency of the organization may be considered as significant. For this reason, some researchers have investigated the effect of this variable on the innovation adoption decision (Damanpour, 1987; 1991; Evan & Black, 1962; Frambach, 1995; Frambach & Schillewaer, 1999; Waarts et al., 2000). As a result, it is emphasized that the receptiveness, size, age and centralization level of the organization increase or decrease the innovation adoption possibility.

2.1.1.3. Network Participation

Network is defined as the respective interaction between the members in a social environment. The interaction of the members participating in such communication system has an active role in enhancing the amount and speed of the innovation adoption and diffusion process. The participation of the organization members in the communication systems via official and, especially, unofficial ways has a positive effect on the organization's innovation adoption possibility facilitating the dissemination of the information on the innovation (Frambach, 1995). Organizations may adopt the innovations being influenced from the other organizations (competitors, suppliers and agents), which already adopted the innovation. In this context, the information exchange to be carried out with these organizations on new product, idea or technology has an effect on the adoption of the innovation. In addition, especially unofficial communication between the staff of a firm with that of the other may be more effective in comparison with the official communication. In this context, the increase in the information sharing process will facilitate the organization to be more open to the new idea and products (Frambach & Schillewaert, 1999).

A review of the relevant literature showed that the relationship between network participation and innovation have been investigated by several authors. According to Frambach (1995) and Frambach et al. (1998) the network participation on innovations such as new products, ideas or technologies may take place with the other firms active within the industry (competitors, suppliers and agents) and the firms outside the industry. Frambach & Schillewaert (1999), in their study, considered the network participation under the title of social network. Evan and Black (1962), in their study, dealt with the network participation as communication between line and staff. Damanpour (1991) discussed it in two sections – external and internal communication. Damanpour & Schneider (2006), in their study, dealt with the external communication along with trade unions. Gatignon & Robertson (1989) took up network participation as communication openness and Waarts et al. (2002) in connection with a parent company.

On the basis of all this literature, it can be said that the intra-organizational and extra-organizational networks and the density of the mutual relationship among the members in this system have an effect in the adoption of the innovation.

2.1.1.4. Competitive Environment

In the markets where the *competition and innovation* is intensive, firms are likely to need to adopt the innovation so as to protect their competitive advantage and positions. Therefore, it is seen that there is a direct relation between the diffusion of the innovation through the market and the competition therein (Frambach & Schillewaert, 1999). That is to say, the competition and the competitor organizations may affect the diffusion of the innovation.

A high level of a competition among the firms in a certain industry likely enhances the innovation adoption rate and speed creating a pressure on the firms for adopting the innovation. The firms choosing not to adopt the innovation are likely to lose their competitive advantage before those adopted it. In this terms, both the innovation supplier and adopter firms should take into consideration the effect of competition in the diffusion of the innovation (Frambach, 1995: 254).

A review of the relevant literature showed that the researchers have dealt with competitive environment from different points of view.

Blau & McKinley (1979) have determined the environment as non-private clients, joint ventures and consultant use; Damanpour & Schneider (2006) as economic health, urbanization and unemployment rate, community wealth and population growth. In a different way, in Miller & Friesen's (1982) study the environment is considered as dynamism, heterogeneity, and hostility, and in Peansupap & Walker's (2005) study, as the personal commitment, organizational commitment, open discussion, personal anxiety and frustration. Pierce & Delbecq (1977) took the environment variable as environmental uncertainty. All the aforementioned studies, however, ignored the competition in the framework of the enterprise.

On the other hand there are studies which took up environment as competition. O'Neal et al. (1973) sought to explain competitive environment as intensity of competition; Frambach (1995) as competitiveness industry; and Frambach et al. (1998) by considering both of them. Frambach & Schillewaert (1999) stated it as network externalities and competitive pressures. Yang & Liu (2006), in addition to competitive intensity, include technological turbulence and aggressive tech posture into their study as competitive environment. Gatignon & Robertson (1989) determined the concentration ratio of an industry, price intensity and demand uncertainty as competitive environment. Waarts et al. (2000) dealt with environment in two sections, namely internal and external and determined that IT intensity and IT integrity as internal environment and industry competitiveness and supplier competition as external environment. Evan and Black (1962) took up organizational competitive position as competitive environment.

It can be said that, the more the competition and innovative activities intensify, the more improves the innovation adoption level of the organizations in the industry.

2.1.1.5 Information

Intensive *information* process activities affect the innovation adoption. The adoption process develops depending on the information obtaining level of the adopter firm on the innovation (Frambach, 1995: 253). Decision makers' information levels, information obtaining desires and the process of being informed contributes to discriminate the innovation adopters and non-adopters Frambach, 1995: 253). The more the potential adopter desires to get information about the innovation, the more its innovation adoption possibility increases.

In the related literature, the relationship between information and innovation has been considered by some authors. Frambach (1995) and Frambach et al. (1998) have suggested that the information level of the potential adopters had a positive effect on the innovation adoption decision. Miller & Friesen (1982) took up information processing variable as scanning and controls. O'Neal et al. (1973), investigated the relationship between the amount of positive information and the innovation adoption decision. Gatignon & Robertson (1989) took up information variable as personal and impersonal information. While Dewar and Dutton (1986), in their study, investigated the relationship between information variable and the innovation adoption decision and took up the information variable as depth of knowledge and external exposure, Damanpour (1991) took it only as technical knowledge resources.

Generally, the more the amount of the information reached at the potential adopter, the more the innovation adoption possibility is.

2.1.2. Supply Side Variables

In the model as developed by Frambach et al. (1998) and considered in this paper, it is being defended that the marketing strategies affected by the innovation supplier firms and the innovation development processes were effective in the adoption of the innovation.

2.1.2.1. Innovation Development

The innovation adoption possibility in the market depends on the success of the supplier firm in the innovation development process. The researches conducted in innovation management explain that many factors affecting the innovation development process in the pre-expansion period accelerated or hindered the innovation diffusion process (Frambach et al. 1998). In this respect, the uniqueness of the innovation, its level of satisfying the potential adopters' needs and its compatibility level are important. In case that the potential adopter is persuaded that the innovation is compatible with the specific needs of the organization, which case is called as the perceived customization of the innovation, the innovation adoption possibility is likely to be affected and to increase (Frambach et al. 1998).

2.1.2.2. Marketing Strategy

The innovation supplier companies, with marketing strategy, usually aim at enhancing the innovation adoption and diffusion, and further more they have financial aims such as price, income and profit. In this context, the marketing activities of the innovation supplier firm have an immediate effect on the adoption of the innovation by the organization (Frambach, 1998). Especially the presentation strategy and tactics of the supplier firms assume a major role. Despite that there are many marketing variables facilitating the adoption, the factors considered in the paper are positioning the innovation, the activities of the innovation supplier firm towards reducing the risks of adoption for the potential adopter and winning the market support.

Positioning the innovation in the market and choosing the potential adopters with a careful and rigorous positioning strategy may facilitate the market accepting level for the innovation. The lead adopters may affect the decision of the other adopters in the market. In this context, to define the potential lead adopters in the market and to focus on such groups may accelerate the initiation of the adoption of the innovation (Frambach & Schillewaert, 1999).

Risk reduction, the second marketing strategy, is to decrease the risk related to the early adoption. The innovation supplier firms aim at reducing early adoption related risks such as innovation implementation risk, financial and functional risk (Frambach & Schillewaert, 1999).

Winning the *market support* is another marketing strategy. The innovation supplier firm may win the market support with various ways such as getting the support of opinion leaders, drawing a successful image and legalizing the product (Frambach, 1995: 259).

A review of the literature in this scope revealed that the supply side variables have been considered by authors in different ways. While Frambach (1995), in his study, took up the cooperation with other suppliers, positioning the innovation in the market, reducing the risk of adoption and winning market support as supply side variables, Frambach et al., in 1998, took it as positioning, risk reduction, market support and innovation development, and Frambach & Schillewaert, (1999) in their study, as targeting, communication and risk reduction. In the other studies in the literature, the role of supply side variables in innovation adoption has been investigated even more. While Gatignon & Robertson (1989) took the vertical coordination between suppliers and customers, and the supplier incentives, Tzokas & Saren (1997) took the mode of exploitation, marketing proficiency and the identification of lead users. Waarts et al. (2000) dealt with the quality and intensity of the supply side marketing activities.

Based on from this literature, it can be said that the marketing strategies and innovation development process positively affect the adoption of the innovation.

2.1.3. Adopter-Then-Supply Side

In the industrial markets, the firms take the innovation from foreign markets and transfer it to the other firms in the industry with or without modification. They seek to use the innovation and then they adopted in compliance with the innovation development process and the marketing strategies.

Research Hypothesis

According to the theoretical framework the research hypotheses that will be tested are presented as follows:

H1: There is a significant relation between the characteristics of the innovation and the innovation adoption decision.

H2: There is a significant relation between the characteristics of the adopter firms and the innovation adoption decision.

H3: There is a significant relation between the network participation and the innovation adoption decisions.

H4: There is a significant relation between the competitive environment and the innovation adoption decision.

H5: There is a significant relation between considering the information, research and suggestions on the information and the innovation adoption decision.

H6: There is a significant relation between the supply side marketing strategies and the innovation adoption decision.

H7: There is a significant relation between the innovation development process and the innovation adoption decision.

H8: There is a significant relation between the innovation adoption decision of the adopter-then-supplier firms and the marketing strategies.

H9: There is a significant relation between the innovation adoption decision of the adopter-then-supplier firms and their development of innovation.

2.1.4. Research Methodology

2.1.4.1. Questionnaires

A self-reporting questionnaire in three parts was developed. The first part of the questionnaire was composed of nine questions about participant's demographic information and about the firm for which the participants work (number of employees, number of years in business and yearly sales).

The next part of the questionnaire was composed of 15 questions directed to the innovation adopter firms. These questions are measured by 5 point Likert Scales (1=strongly disagree, 5= strongly agree). All of the determinants of perceived innovation characteristics were selected from the articles of Tornatzky and Klein (1982) but uncertainty was chosen from Frambach and Schilewaert's (1999) study. Age and size of the firms were used in past studies on innovation by Frambach et al. (1998); structure (centralization) is selected from Robertson and Wind's article (1980). To measure network participation level of firms within industry or outside industry, Frambach ve Schilewaert's (1999) studies were used. Intensity of the innovation and the competition, and the uncertainty of the demand, which are among the variables related to the competitive environment, have been formed based on Gatignon and Robertson (1989). Questions about information processing activities are being composed from Frambach and et al. (1998). Adoption decision as the dependent variable is measured by a binary measurement. Respondents were supposed to answer "yes" or "no" to identify their status.

The final section of the questionnaire is composed of 20 questions to measure additional factors which are different from the model of Frambach et al. (1998). These questions were also measured by 5 point Likert Scales (1=strongly disagree, 5=strongly agree). The first 10 of 20 questions were about the marketing strategies (positioning, risk reduction and market support) of the supplier firm and its innovation development process. Additional factors differing from Frambach are composed of marketing strategies and innovation development process of innovation adopter firms in order to expand the adoption of the innovation (final 10 questions). Using these 10 questions, key informant surveys are completed to identify adoption and diffusion of innovation by machinery firms.

2.1.4.2. Sample and Data Collection

The context of this study is to determine the adoption of the innovations in industrial markets and to determine the variables related to this adoption as well as to examine the validity of these variables that were determined. Thus a model has been developed and the questionnaire designed related to this model has been applied to the enterprises in Ankara OSTİM (Middle East Trade and Industry Center) functioning in machinery manufacturing industry. A total of 117 usable questionnaires were collected, resulting in an effective response rate of 78.5 %. Moreover 23.1% of the respondents were female and 76.9 % were male.

A review of the distribution of the participants over the divisions they work in the company, it was seen that 30,8% were working in top level management, 22.2% in accountancy and finance, 18.8% in sales and marketing, 17.9% in manufacturing, %2.6 in control and 7.7% in Research & Development. It was seen that, a 36. 8% of the companies employed 1 to 9, 28.2% 10 to 49 and 35% 50 to 99 employees. According to the survey findings, 16.2% of the companies were active for last 4 to 9 years. It is seen that the most of the companies, namely 83.8%, were active for last 10 or more years.

3. Result

For the purpose of determining the reliability of the questionnaire applied, the Cronbach Alpha values were calculated for three groups as “innovation adopter”, “innovation supplier” and “innovation adopter and then supplier” companies. Cronbach Alpha value was calculated 0.8414 for the innovation adopter companies (16 questions), 0.7681 for the innovation supplier companies (10 questions) and 0.8738 for the innovation adopter and then supplier companies.

For the purpose of measuring the effect of supply-side and adopter-side variables (Figure 1) on the adoption, the relationship between such variables and innovation adoption decision was investigated. Finally, the marketing strategies applied by the innovation adopter firms for marketing it to the other firms and their innovation development processes were investigated. To investigate such relationships, the factors determined by Frambach et al. (1998) were taken as a basis. However, to use the mentioned factors in this study, firstly their Cronbach Alpha values were investigated. The values in question (perceived innovation characteristics (6 items) $\alpha=0.698$; network participation (3 items), $\alpha=0.533$; competitive environment (4 items), $\alpha=0.672$; the supply side marketing strategy (9 items), $\alpha=0.772$) were found reliable. Since that the information variable is measured with only 1 item, its Cronbach alpha value is not investigated. Whether all those variables have a relationship with the adoption decision was investigated with Pearson correlation coefficient. The results are given in Table 2.

Table 2. Correlation between factors and adoption decision

	Variables	Pearson Corelation	Significance
Adopter Side	Perceived innovation characteristics	0. 803*	0.000
	Adopter characteristics (centralization and receptiveness)	-0. 168	0.069
	Network participation	0.773*	0.000
	Competitive environment	0.730*	0.000
	Information	0. 737*	0.000
Supply Side	Innovation development	0.151	0.103
	Marketing strategy	0.820*	0.000
Adopter-then-Supply Side	Innovation development	0.798*	0.000
	Marketing strategy	0.851*	0.000

3.1. Analyses and Findings on Innovation Adopter Firm Variables

As it may be seen in Table 2, a meaningful positive linear relationship was found between the innovation adoption decision and the adopter side factors (except the adopter characteristics). Therefore, the characteristics of the innovation, network participation, competitive environment and information may change the innovation adoption decision.

Furthermore, the relationship between the dimension and age (activity year) variables among the adopter firm factors and the innovation adoption level needs to be investigated. Since size and age variables were asked with open ended questions, the relationship between such variables and the innovation adoption decision cannot be measured. Therefore whether there is a differentiation between size and activity years was investigated with One Way Analysis of Variance (ANOVA).

If the adoption decision varies with size and age of the firm, such variables may be considered significant in the adoption of innovation. To do such analysis, first the firm dimensions (e.g. small, large etc.) and age was grouped.

To find out whether the innovation adoption decision varies with firm size, ANOVA test was used. As a result of the test no meaningful difference was found [$F(1.115)=1.581$; $P>0.05$].

To find out whether there is a difference in innovation adoption decision according to age of the companies, ANOVA test was used. As a result of the test no meaningful difference was found [$F(2.114)= 1.150$; $P>0.05$].

Based on the analyses conducted and findings achieved as mentioned above, it is seen that the innovation adoption decision of the firms does not change with the age and size of the adopter firm.

3.2. Analyses and Findings on Innovation Supplier Firms

As it may be seen in Table 2, there is a 99% level of strong and linear relationship between the innovation adoption decision and the marketing strategies of the innovation supplier firm. No meaningful relationship is found, however, between the innovation adoption decision and innovation development process. Thus, the lack of a relationship between the realization of the innovation by the innovation supplier firms taking into consideration the needs of the other companies and the innovation adoption decision may be interpreted in various ways. The innovation supplier firm, instead of realizing the innovation by taking into consideration the needs of the adopter firm, simply explores and sends the innovation to the market. And this may show that the adopter firm adopts the innovation based on other factors (the characteristics of the adopter firm and the factors related to its environment). Another interpretation may be delivered by taking the characteristics of the sample into consideration. The firms in the sample are generally small and medium sized firms. In this respect, it may be said that such firms receive the innovation directly from the outside, and some others copied it with partial changes. Besides, considering that a large part of the firms in the sample are small and medium sized firms active in machinery manufacture industry, it may be seen normal that they have the tendency of imitating the innovation instead of buying it.

3.3. Analyses and Findings on Adopter-then-Supplier Firms

Different from Frambach's (1998) model, the marketing strategies and innovation development processes of the firms in their attempts for getting the innovation adopted by other firms were investigated. As it is presented in Table 2, the adopter firms both apply marketing strategies so as to get the innovation adopted and realize the innovation taking into consideration the needs of the client. In other words, the adopter firms adapt and develop the innovation they have adopted, when marketing it they use marketing strategies. As a result of the above calculations and findings (for testing the model) H1, H3, H4, H5, H6, H8 and H9 were accepted while H2 and H7 were rejected.

Conclusion

According to the findings obtained, it is found out that the firms are considering the characteristics of the innovation, the competition, the environment with which it is in touch and from which it gets information and the marketing strategy related to the innovation, rather than the characteristics of their own company. On the other hand, the adopted innovation is developed and sent to the market by the firms considering the needs of the other firms. In this stage, they seek to announce and sell the innovation with various marketing strategies (positioning, market support and risk reduction). Furthermore, the firms in the sample are generally small and medium size ones, and this may prevent the firms to make major technological innovations. Since the larger firms, which develop the innovation, do not do this by considering the needs of small and medium size firms, the smaller firms get the innovation, adapt it to their needs and to the needs of similar size firms and then launch it again.

This study is limited to machinery sector, therefore conducted within the framework of a relatively small sample size. For the purpose of illuminating the studies to be conducted in the future, the same study may be conducted for the other sectors and the sample number may be increased. On the other hand, it may be researched whether the activities of the SMEs in adopting an innovation and launching it after making partly modifications are stemming from the particular characteristics of such firms (financing problems, capacity, lack of employing expert personnel, lack of adequate resource allocation for the marketing activities, production according to the needs of the client, not to work in an international scale, mostly local standards such as product quality and sizes).

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Appendixes

Figure 1. The Research Model for the Adoption and Diffusion of Innovation in Industrial Markets.

