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***Research Paper***

# Investigating the impact of it adoption on innovative performance in small and medium software manufacturing

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## Abstract

The purpose of this study was to investigate the effect of IT adoption on the innovative performance in small and medium software manufacturing companies. This research is an applied and correlational study. The statistical population in this study was 920 employees of small and medium software manufacturing companies and sampling method was simple random sampling method that the sample size for this study was 270 people using Morgan table. In this research, two researcher-made questionnaires were used to collect information. To measure reliability, the Cronbach Alpha Measurement Instrument has been used. About the information technology questionnaire is equal to 0.78 and for the innovative performance questionnaire is equal to 0.78 and since these values are larger than 0.7 which demonstrates the high reliability of the questionnaires. The validity of the questionnaires was verified by the professors. Statistical research methods include structural equations using AMOS software and the results of the research showed that adoption of IT technology has an impact on the innovative performance in small and medium software manufacturing companies in.

***Keywords***: *Information Technology; Innovative Performance; Product Performance; Market Performance.*

## 1. Introduction

New technologies, especially information and communication technology, have greatly affected the different areas of human life. Increasing the efficiency of systems, the use of multimedia systems, the possibility of communication, always and everywhere using the Internet and networks, is one of the reasons for ICT. In education, researches also show that the use of this technology will enhance the level of effective management of educational systems and will accelerate and facilitate education [1]. The development of information technology has revolutionized all aspects of human life. Organizations and the impact of information and communication technology (ICT) in organizations as an integral part of human society have been no different from this rule, and this has led different countries to consider the adoption and expansion of information technology in agencies and organizations. As IT is used in many of the daily business processes, such as e-banking, e-commerce, e-mail, e-government, and so on. Industries also use the information technology to compete with competitors in the field of markets and products to increase innovation and innovative performance [2]. Therefore, the need for research on the factors affecting the adoption and application of information technology in them in recent years has been completely felt. Individual factors such as employee perceptions and attitudes towards information technology and their demographic characteristics are among the factors that influence the level of acceptance and use of this technology by employees [3]. Based on the studies, various models and methods have been used globally to examine the factors affecting the adoption of information technology and one of the most prestigious ones is the IT adoption model that deals with factors at the individual level [4]. This model has been used in many researches in different countries and its applicability has been investigated. This model has been introduced by [5] in the doctoral dissertation. As can be seen, the basis of this model is two factors: "perception of usefulness" and "perception of ease of use". These two factors influence the attitude of individuals towards the use of technology, making it possible to decide on the use of that technology [5]. Regarding these two factors, which have been done in most researches and their results test is directly related to technology acceptance, the researcher is looking to investigate the relationship between these two factors with innovation in the performance of the small and medium software manufacturing companies. So, to measure the relationship between the two factors of "perception of usefulness" and "perception of ease of use" with innovative performance, Deivis's shortened model has been used. In general, in the 1990s, a very significant transformation, called the "Information and Communication Technology Revolution", occurred in the economic scene [6]. The rapid decline in the prices of commodities that benefited from "information and communication technology" led to an enormous investment in these commodities and led to a deepening of capital and a shift in the organization of production of other goods in the economy. It is clear that the lowering prices of information and communication technology led to Is to increase the incentive for organizations to substitute information and communication technology for labor and other forms of capital, such as factories, machinery or equipment. Therefore, the use of new information technology in organizations is usually seen as a positive step towards organizational activity. The successful use of information technology in organizations depends on the adoption of that technology by employees, managers and customers. Software manufacturing

companies, with a committed management, a staffing manpower and a strong R & D force for survival in the competitive market, need to accept new technologies, innovation in terms of performance, product and new ways of attracting customers to today's complex market. So companies need to ensure that information technology is accepted among employees, and then uses the benefits of information technology to improve their product and market performance. Computer software companies have made relatively large investments in information technology such as hardware and software equipment, the implementation of the office automation system, the establishment of a learning management system (LMS), the creation of local networks, and so on. But despite these investments, human resource productivity is still not at the optimal level and it is not clear exactly which IT components have a more significant impact on human resource productivity. There are also vague points about the effectiveness of the content management system, and it seems to be possible to improve its effectiveness by making modifications to this content. In this research, various components of manpower productivity, and optimal use of time, are considered to be the optimal use of financial resources, motivation and skills as components that IT can affect them.

## 2. Research literature

Acceptance of technology has been one of the key elements of research related to information systems in recent decades. There are a variety of perspectives on understanding the factors influencing user decision making in relation to IT adoption. [7]. In the information society, organizations and government centers need to develop competitive advantages based on the proper and focused use of information and communication technologies, which is critical to the success of today's market and the first step of measuring the electronic preparedness of these centers for accepting these new technologies [3]. In 1999, in the definition of technology acceptance, Kotler states that when a product or service is provided by a company, it is necessary for the customer to be convinced of the purchase of that new product or service, and that the incitement of customers is done by the manufacturers or by providing Service providers, by the complicated process that is part of it, are based on customer characteristics and behaviors. It is a mental flow in relation to a person that is called the admission process from the earliest individual hearing of an innovation to the final acceptance of that innovation by a person. Kotler introduced a new definition in 2003 that acceptance is a unique decision taken by a regular consumer in relation to the use of the product [2]. Acceptance of technology is generally considered as a methodology for assessing the attitude towards the use of technology by users in a multiple domain [8]. Innovation is widely seen as one of the essential components of competition that is institutionalized in the organizational structure, processes, products and services of a company. Innovation is one of the basic guidelines, growth strategies to enter new markets, increase market share and compete with other companies [9]. Today, scientific and industrial societies have come to the conclusion that organizations can maintain their long-term advantages in competitive areas by relying on innovation, the promotion and promotion of innovative activities within themselves. The acceleration of technological change and shortening the product cycle have forced many companies to create and commercialize knowledge in a more efficient way. Therefore, companies have been busy identifying and developing their own innovation capabilities that are vital to their survival and long-term growth [10]. Companies try to adopt and implement the many strategic initiatives and initiatives that consolidate their success in improving their competitive advantage, innovative capabilities and business performance. Innovation has been considered as a vital weapon for sustainable competitive advantage [11]. Innovative performance as the last remaining frontier in the modern business world helps companies reduce costs, improve performance, and market new products and services [12].

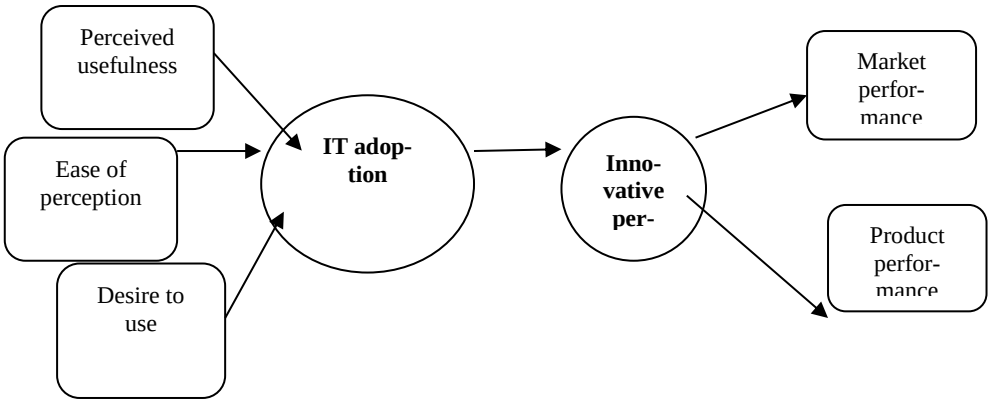


**Fig. 1:** Conceptual Model of Research.

## 3. Research methodology

This research is an applied and correlational study. The statistical population of this research includes 920 employees of small and medium software manufacturing companies and a sampling method was used for this research. A simple random sampling method was used to collect the statistical sample for this study using Morgan table equal to 270 people. In this research, two researcher-made questionnaires were used to collect information. The first questionnaire related to IT adoption of [2] and the second questionnaire related to the innovative performance of [3]. Cronbach's alpha has been used to measure the reliability of the instrument. The information technology questionnaire is equal to 0.78 and for the innovative performance questionnaire is equal to 0.78 and since these values are larger than 0.7, which indicates the high reliability of the questionnaires, the validity of the questionnaires is confirmed in content and form by professors. Statistical research methods include structural equations using AMOS software.

## 4. Research findings

Research hypothesis: IT adoption (perceived usefulness, perceived ease and willingness to use) has an impact on the innovative performance of small and medium software manufacturing companies. In order to study the first hypothesis of the research, structural equation modeling was used. To this end, a model for the relationship between "IT adoption" and "innovative performance" was first developed and then, using the software, the designed model was tested. The statistical test of the test is as follows:
H0: IT adoption has no impact on innovative performance.
H1: IT adoption has an impact on innovative performance.
The final model of the structural equations for the first hypothesis is shown in Fig. 1, which shows the high impact coefficient in the relationship between the variables "IT adoption" and "innovative

performance". Also, the factor loads for each component of the test variables are shown in Fig. 1.

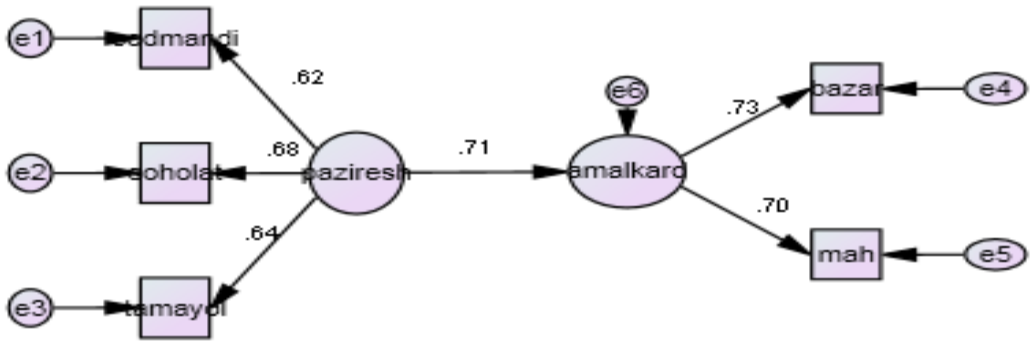


**Fig. 1:** Factor Loads for Each Component of the Test Variables.

**Table 1:** Fitment Indicators of Structural Equation Modeling of Research Hypothesis

| Structure / Index | $\chi^2$/df | P | RMSEA | CFI | CMIN | RMR | GFI |
|---|---|---|---|---|---|---|---|
| Acceptable amount | 3> | 0.05> | 0.07> | 0.9 | --- | 0.05> | >0.9 |
| Main hypothesis | 2.088 | 0.000 | 0.031 | 0.965 | 2348.67 | 0.016 | 0.948 |

**Table 2:** Coefficients, Critical Ratios and Significance Level Related to the Research Hypothesis

| Hypothesis | Standard coefficient | Significance level | Critical amount | Standard error |
|---|---|---|---|---|
| "IT adoption" and "innovative performance" | 0.71 | 0.000 | 7.08 | 0.260 |

In the following, considering that the structural equation model of the main hypothesis has been verified, it considered the research hypothesis using standard coefficients, critical values, and significance level. The findings in Table 2 on the main hypothesis in the relationship between "IT adoption" and "innovative performance" show that with regard to the direct impact coefficient of 0.71 in the relationship between variables and the significant level of 0.000, which is less than 0.05 and also the critical amount is obtained at 7.08 and more than 1.96, therefore, the zero assumption in this relation is rejected, and the assumption is accepted with a confidence of 95%. Therefore, it can be stated that IT adoption has a direct and significant direct effect on the "innovative performance" studied.

## 5. Results

The performance of an organization and its people depends on many factors such as organizational learning, innovation and information technology. These factors have been linked with each other, which is directly or indirectly effective on the performance of an organization. The research was also conducted with the aim Effect of IT adoption on innovative performance, product performance and market performance in small and medium software manufacturing companies. To this end, three dimensions of IT adoption include perceived usefulness, perceived ease of use, and willingness to use based on previous studies and the impact of these dimensions on the innovative performance, market performance and market performance were assessed using structural equation test. The results of the research showed that IT adoption (perceived usefulness, perceived ease and willingness to use) has an impact on innovative performance, market performance and product performance. This result is consistent with the results of the research carried out by [2-4], [6], [9]. On the other hand, the result of this study contradicts the results of research conducted by [13]. Information and communication technologies have been introduced as the dominant technology in the new millennium. These technologies have become tools for increasing productivity, efficiency and growth in all areas of human activity by accelerating the process of information exchange and reducing transaction costs. The potential benefits of these technologies can be achieved when developed and expanded among all sectors of society. Innovative activities provide an endless source for competitive advantage. Nowadays innovation is one of the factors affecting the success and survival of knowledge-based organizations. Many scholars have introduced innovation and the creation of distinction as an undeniable necessity. Innovative performance is largely based on the effective management of innovation processes, and managers must identify, develop, support and allocate resources and capabilities consistently in order to achieve sustainable competitive advantage. The incentive for innovation in the organization is created so that decision makers take into account functional gaps or find that the organization's current status is not satisfactory. As noted, IT adoption should be considered as an appropriate setting in order to motivate innovation and thus improve the innovative performance. It is therefore recommended. The companies studied will be aware of this. On the other hand, survival in the current business environment requires an understanding of its complexity. Because nothing is absolutely predictable and this has created major challenges for managers. Preserving the survival of organizations in the competitive environment of today's world does not leave them an alternative to gaining competitive advantage. One of the key sources of competitive advantage is innovation; because the ability to innovate deeply rooted in the human mind and cannot be produced with the help of technology, it can be easily mimicked or opened. Innovative activities provide an inexhaustible source for competitive advantage. Organizations are relying on innovation to increase productivity and improve their economies. Understanding the effective factors in the implementation of innovative performance and development is of strategic importance. Innovative performance is achieved by creating the knowledge needed to develop the product and the new production processes, or to improve existing processes.

According to the results, the following suggestions are presented:

1) One of the biggest problems of organizations in the field of using information technology is lack of a stable strategy in the use of information technology, so that many senior executives in the country still do not see the correct use of information technology. Therefore, teaching and inducing the use of information technology and creating a consistent strategy in organizations for the use of information technology is a key step for the development of different dimensions in the country. Therefore, the studied industries should be aware of this.
2) The studied industries, by investing in the areas of research and development, knowledge management and information technology, should provide a platform for increasing the number of innovations that are created using creativity and power of thought.

3) Attention to innovation in mission statement and vision, the creation of structures and responsibilities around the axis of innovative performance, the allocation of resources and channels through the use of new technologies, for the production and use of ideas and the creation of a culture of change, should be considered for managers of small and medium software manufacturing companies.
4) The management team of small and medium software manufacturing companies encourages staff members to pay more attention to the use of information technology by encouraging target groups and try to create suitable platforms for conducting appropriate training courses, about the use of new technologies and the benefits of using them.
5) Managers of small and medium software manufacturing companies can take steps to enhance the acceptance of information technology by strengthening the organizational and cultural atmosphere that encourages the change and adoption of new technology, along with the support and commitment of senior management of the organization.
6) The small and medium-sized software manufacturing companies try to produce and deliver newly introduced products and services using up-to-date technologies to provide high-quality products and services.
7) The small and medium-sized software manufacturing companies, using new marketing methods such as mixed marketing and customer relationship management, and, on the other hand, design and produce products and services in the same way which can provide customer loyalty.
8) The small and medium-sized software manufacturing companies, with the help of new technologies and methods, are seeking to update their administrative system, equipment, machinery and processes of production.

## References


[1] Nelson, F. F. (2016). An analysis of information technology factors that influence the lack of adoption of Agile Scrum methodology: A qualitative study (Doctoral dissertation, CAPELLA UNIVERSITY).
[2] Hadi Moghaddam, Arash and Ali Aghaei Far, 2016, The relationship between IT adoption and innovative performance Case study: One of the defense industries of the country, the second international conference on management and information technology, Tehran, Khadamat Bartar Co.
[3] Seyed Sajjadi, Mohammad Mehdi, (2016), investigating the effect of IT adoption on innovative performance, product market performance at Akhgar Steel Co., Global Management Conference, Accounting Economics and Humanities at the Beginning of the Third Millennium, Shiraz, Research of Green Industry Market Idea Company.
[4] Ko, C. H., Pei, L., & Tsai, Y. H. (2016). A Study of Employees' perception of Information Technology Adoption In Hotels. International Journal of Organizational Innovation (Online), 8(3), 231.
[5] Zain, Mohamad, Raduan Che Rose, Iskandar Abdullah, Maslin Masrom, (2005)
[6] Alexander, G. L., Madsen, R. W., Miller, E., & Wise, K. (2016). A National Report of Nursing Home Information Technology Adoption and Quality Measures. Journal of nursing care quality, 31(3), 201-206. https://doi.org/10.1097/NCQ.0000000000000187.
[7] Lee, S. Xiang, J. Y. Kim, J. K. (2011). Information technology and productivity: Empirical evidence from the Chinese electronics industry, Information & Management. 48, 79-87. https://doi.org/10.1016/j.im.2011.01.003.
[8] Hashemian, Razieh, Alireza Assareh, Effat Piri (2013), Investigating the Factors Affecting the Use of Educational Technologies Based on the Technology Acceptance Model (TAM), with emphasis on the role of multiple and creative thinking in this process, Proceedings of the 2nd Inter-Conference Management, Entrepreneurship and Economic Development, Qom, 2013.
[9] Mehdi Salehifar, Emrah Akyol, Kumar Viswanatha, and Kenneth Rose, On Optimal Coding of Hidden Markov Sources, 2014 Data Compression Conference, IEEE, 233-242. https://doi.org/10.1109/DCC.2014.71.
[10] Mehdi Salehifar, Tejaswi Nanjundaswamy, and Kenneth Rose, On Scalable Coding of Hidden Markov Sources, 978-1-4799-9988-0/16/$31.00, IEEE ICASSP, 2016, 4024-4028.
[11] Yusra, Maha., Othman, Abdul Rahim., Mokhtar, Sany Sanuri Mohd(2012), Assessing the relationship among Six Sigma, Absorptive Capacity and Innovation Performance, Social and Behavioral Sciences, 65, pp.570–578 https://doi.org/10.1016/j.sbspro.2012.11.167.
[12] Taghizadeh Jourshari, Mohammad Reza, Mehdi Ebrahimnezhad Moghaddam, Mohammad Taakhireh (2013), Impact of Total Quality Management on Bank Performance: Mediating Function of Innovation and Quality Performance (Case Study: Tejarat Bank of Guilan Province), Management Conference, Challenges and Solutions , Shiraz, December 2013.
[13] Mansouri Haji Khajehloo, Behzad (2013), Investigating the Effect of Information and Communication Technology Utilization on Customs Manpower Productivity of Bileh Savar, Master's Thesis, Executive Management, Ardabil Azad University.