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Analyzing the Impact of External Variables of Information Communication and Technology on Organizational Agility in Khuzestan University of Agricultural Sciences and Natural Resources

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Abstract

The complexities and continuous changes of life in today's era have made it necessary to have the ability and benefit from ICT knowledge and the optimal use of this technology. Many countries of the world consider the development of information and communication technology as one of the most important development infrastructures, including the impact on organizational agility through information collection and management. In this research, the aim is to analyze the impact of external variables of information communication and technology on organizational agility in Khuzestan University of Agricultural Sciences and Natural Resources. The research was applied in terms of type and purpose and descriptive-correlational in terms of obtaining data. The statistical population consisted of 100 faculty members of Khuzestan University of Agricultural Sciences and Natural Resources. With the help of Krejcie and Morgan table and simple random sampling method, a sample of 80 people was determined. To achieve the results, data were collected using a researcher-made questionnaire (ICT Questionnaire and Organizational Agility Questionnaire). The validity of the questionnaire was done using the opinions of university faculty members outside the target community and the reliability of the questionnaire was confirmed using Cronbach's alpha coefficients ($\alpha = 0.96$), which was distributed among the sample and the results were analyzed. Data were analyzed using SPSS and LISREL software. According to the research findings, the effect of management variables, rules and regulations and software technology is equal to 3.76, 2.71 and 5.63, respectively. The results showed that among the effective variables, management variables, rules and regulations and software technology have a greater impact on organizational agility in the university.

Keywords: Organizational Agility, Information and Communication Technology, Khuzestan University of Agricultural Sciences and Natural Resources, Flexibility

1. Introduction

In today's variable world, the only thing that doesn't change is change. Organizations are increasingly under-effected by the three words customer, competition and change, and are always looking for ways to overcome these problems. Organizations must seek an organizational agility paradigm to maintain their competitive ability and to cope with change. In government organizations, agility is very important because the results and successes of these types of organizations are interesting and admirable. It is vital to understand the nature of change and the importance of future development for organizations, communities and even individuals planning for their future (Kavosi et al, 2021). Rapid and continuous changes are one of the fundamental challenges of today's organizations. Organizations usually have common goals such as high work quality, effective performance and providing appropriate services to customers and operate in a very dynamic and changing environment. Such conditions require them to have adaptive strategies. Organizational agility is one of the most important solutions and strategies of the organization to operate in a dynamic and unpredictable environment (Ravichandran, 2018). Over the years, the higher education sector has faced a barrage of disruptions and reforms as a result of government reform, market demand and volatility, economic pressures and technological innovation. Recent innovations to open up education, including Massive Open Online Courses (MOOCs), blended learning, collaborative models and free education with elite universities, have changed the

landscape of the education sector. Agility is an increasingly crucial factor for survival in this new throwaway paradigm of innovation upon innovation (Mukerjee, 2014). The higher education system is one of the main and basic institutions of any society that its performance is important on all aspects of the society's people life because it depicts the political, economic, social and cultural situation of that society. Organizational agility is as one of the ways to respond to the factors of change and transformation and also to solve problems in universities and in fact is the paradigm of an engineering organization for universities. Studies which are surveying the challenges of universities and higher education institutions in terms of agility have observed research including administrative, educational, entrepreneurial, and high-level academic practices (Ghane ebadi et al, 2019). The educational system is one of the systems that has a fundamental need for transformation in the field of organizational agility (Rashidi et al, 2018). The university is a dynamic institution created to respond to the professional and scientific needs of society and its survival depends on constructive and effective interaction with the environment, but this interaction lasts when the quality of the university is maintained and it has the necessary flexibility in responding to the needs of the society (Ghane ebadi et al, 2019). Agility is defined as the ability to overcome unexpected challenges to face unprecedented workplace threats and get benefit from changes as an opportunity for advancement (Chegini, 2021). Organizational agility as a management concept was first formed in a production platform and especially flexible production systems and later spread to other business areas and was presented as one of the organizational characteristics (Camacho et al, 2022). Agile organizations need a lot of distinct capabilities to handle change, uncertainty, and unpredictability in their work environment. These capabilities are as the basis for maintaining and developing agility, including responsiveness which refers to the ability to detect changes, and respond quickly and take advantage of them; Competence that indicates the ability to achieve the goals and objectives of the organization; Flexibility and adaptability that are the ability to flow different processes and achieve different goals using the same facilities; And speed of action which is the ability to perform activities in the shortest possible time.(Khosravipour, 2021).

Improving and optimizing management, achieving integration, automation and management agility and reducing costs are of the key factors for competition. Agility emphasizes increasing adaptability and flexibility and has the ability to respond quickly and effectively to market changes. Agility in general can reduce production costs and therefore the pressure to reduce costs is one of the benefits and reasons for using an agile system. Agile organizations seek to eliminate overhead costs (Jamali & Fallah, 2017). Organizations must effectively overcome ongoing and unexpected changes as well as new customer challenges at low cost; In fact, agility is essential to survive against competitors, under changing environments to face the challenges of fast delivery of products and services, quality and customer satisfaction (Bavarsad & Darabian, 2016). "If an organization can agilely create a mechanism for change, it no longer has to worry about an unpredictable future," says Bill Gates, a Microsoft investor and manager. In other words, organizations must change their processes, prices, products and services sooner than competitors (Fendereski et al,2014). The role of information technology in enhancing the organization's ability to detect and respond to environmental changes has also become important (Javanmardi et al, 2012). Information technology in organizations affects the indicators that are all prerequisites for the success of organizations. One of the areas that can be greatly influenced by technology is organizational agility (Darvishsefat & Kholosi, 2013). The first impact of information technology on organizational agility is the organization's ability to collect and manage information. Information technology can increase the organization's ability to collect, store and share information, and this is considered the most important factor of organizational agility (Li & Wang, 2021). Information or knowledge is power. The more one knows, the more one will be able to control events (Nyamba et al, 2020). In the studies of many researchers, information technology is considered as an important enabler and facilitator of agility and is considered as a major force for business agility and at the same time an important capability that can prevent or activate the level of agility (Sayadi toranlo et al,2017). Technology is how to use knowledge, resources, tools and skills to design and apply products. The development of human abilities corresponds to the development of the individual and his environment. In fact, technology includes new capabilities that lead to tangible changes in organizational change. Information technology is applicable to any activity imaginable. From taxation to current banks, from oil exploitation to energy efficient systems, from document management to complex scientific and academic issues and technical training needs, from print publishing to transportation, from business to environmental management, and finally from a variety of hobbies to close and distant relationships (Torkian et al, 2014). Technology is one of the factors of globalization and causes its expansion. Organizations move towards specialization and continue their activities in close competition (Chehrazad, 2021). Agarwal and Sambamurthy (2002) state that information technology will play an important role in helping organizational agility (Agrawal & Sambamurthy, 2002).

Higher education, as the hub of knowledge creation, must continually strive to promote culture that creates opportunities for continuous learning on a daily basis at the organizational level, promotes questioning and debating, and facilitates participatory and collective thinking. Technology in higher education facilitates communication with

stakeholders for continuous feedback and facilitates timely response to environmental changes. The IT infrastructure has led to the automation of office work, facilitates the sharing, dissemination and storage of academic research, and can be an effective support tool to support and facilitate the teaching-learning process. In addition to training new capabilities, organizations need to build an innovative reward system, workplace independence, and employee participation in the decision-making process to build trust and commitment between them. Vasyakin et al. (2016) call educational institutions self-organizing systems that, in addition to being centers of knowledge and learning, are also known for maintaining relationships with internal and external stakeholders (Menon & Suresh, 2020). Due to the digital power and the spread of information, higher education has undergone a huge revolution and the production of knowledge in the information age is not possible without the use of new technologies (Naghavi et al, 2015). Universities can no longer face the growing needs of students and different segments of society by using traditional tactics and strategies, The strategies used in higher education over the past decades are not sufficient to face the economic, scientific, political and social expectations of society and audiences (Khavari et al, 2017; Richter and Godbey, 2009). In this regard, it is necessary for higher education to integrate new technologies, including information technology, with its programs, elements and components, while reducing hierarchical control, to be able to respond to the changing needs and wants of customers in an ever-changing and unpredictable environment and take advantage of new approaches to move towards innovation and value creation and ultimately increase agility. Therefore, in expressing the necessity of conducting research in organizations and especially higher education centers and universities, the importance of the impact of agility capabilities in achieving academic agility and having people with useful response, faster response, flexibility, and adaptability and also in today's competitive world, the ability to improve and automate management and consequently reduce costs can be mentioned. Due to the specialization of organizations, it has been proven that information and communication technology, including network technology, software technology, etc., can lead to the improvement and strengthening of organizational agility capabilities in today's changing and full of immediate developments world. The entry of government organizations and higher education centers and universities into cyber space and fierce competition in technology development is one of the most important challenges of this century. In many studies, the impact of this concept and its various influencing variables, which sometimes have an external and sometimes an internal impact on organizational agility, have been discussed in public and private organizations. However, no serious and official research has been done about its role and impact on the agility of higher education centers and universities, especially from the perspective of university faculty members. The role and importance of higher education centers and universities in educating, nurturing and empowering people with higher education in today's communities is significant and needs attention and prioritization. Administrative, support, research, libraries and various departments of the university need the necessary technical infrastructure to speed up the work and satisfy the clients, employees and students.

In a research, Bagheri Kerachi and Abbas Pour (2013) identified organizational agility components as an innovative approach in university management and studied the application of these components in universities. Qualitative findings indicate that the components of organizational agility in universities include: agility drivers, agility capabilities, agility facilitators, agility barriers, agility consequences. Also, the quantitative findings show that the mean score of the respondents regarding the application of all components in the current situation is lower than the average and there is a significant difference in all components.

The study of Abbaspour, Aghazadeh and Bagheri Kerachi (2013) includes the drivers of agility in the university environment, including technological changes and transformations, continuous change in customer expectations and preferences, continuous change in student expectations, the need for high quality and innovative workforce, financial limitations, competition, change and complexity of the environment and knowledge economy.

In a research, Farsijani (2012) while examining the influencing components of the organizational agility system, has emphasized the influencing role of components such as the use of appropriate technologies regarding the effective use of resources to achieve organizational agility. In the discussion of evaluating the level of importance of organizational agility components at the university level, it is also necessary to mention that components such as new rules and regulations, elimination of traditional methods, resistance to using up-to-date technologies (contextual factors), improvement of Human resources skills (input), identification of resources needed by educational institutions, the comprehensive plan of educational and research programs (corrective measures) and finally factors such as reducing parallel work and efficient access to libraries and information sources have lower importance than other factors.

Naqavi, Azar and Asaadi (2015) in a research prioritized organizational agility enabling factors in universities and higher education centers in Yazd. The results showed that agile workforce, information technology and organizational structure are among the key factors that enable organizational agility in universities.

Rashidi et al., (2018) in a research identified and prioritized the effective factors on the development of organizational agility in North Khorasan Education Organization and identified organizational factors, strategic factors, human factors and technological factors as influential factors in this research. The results showed that the mean of organizational agility variables is above average and the mean of technology factors is average. The prioritization of factors affecting organizational agility is such that organizational factors, strategic factors, human factors, and technological factors have the priority of influencing organizational agility, respectively.

Pourjavid, Khosravipour and Ali Beigi (2018), in a qualitative research through in-depth and semi-structured interviews with experts in Iran's agricultural higher education. The use of information technology by the university was identified as one of the determinants of academic agility in Iran's higher agricultural education in the dimension of agility facilitators.

Keykha et al., (2020) showed in a research that information technology, accountability, competence, integrity, teamwork, speed of action and knowledge management play a role in the organizational agility of employees, among which the variables of information technology, responsiveness, speed of action and teamwork play the most important role in the organizational agility of employees.

The findings of Shahidipourakbari and Shokoh's research (2021) entitled "Investigating the relationship between the use of information technology and organizational agility in Qavamin Bank branches in Kerman province" showed that there is a positive and meaningful relationship between the use of ICT and organizational agility in all its dimensions, i.e. technology, human resources, information resources, and organizational resources.

Pourjavid, Khosravipour and Ali Beigi (2021) have conducted a qualitative research with the aim of designing an organizational agility model in higher agricultural education with Grand Theory Approach in Iran. In the selective coding, six categories of causal, interfering, background, core, strategies and consequences of organizational agility in agricultural higher education, With subcategories of intelligence and mastery of change, speed and flexibility in the face of change, accountability, knowledge base and innovation of the university (core category), changes in customer and government expectations, technological changes and competitiveness of universities (causal conditions), obstacles inside and outside the organization agility (background conditions), flexible structure, agile workforce, continuous improvement, culture of change, information and communication technology, effective university with environment (interfering conditions), using the capacities and potentials of universities and empowering universities to promote academic agility (strategy), and production of capable and qualified graduates with the knowledge and services required by society (consequences) were achieved and finally, the research conceptual model was offered.

Sirat, Soleymani damaneh & Dehghani soltani (2023) showed in a research that information technology governance mechanisms have a significant positive effect on organizational agility.

Korani (2023) in his research entitled "The Role of Organizational Agility in the Relationship of Information and Communication Technology with the Job Performance of Teachers in Conservatories and Agricultural Education Centers in Kermanshah"showed that there is a positive and significant relationship between the development of information and communication technology and organizational agility. And the use of ICT has increased organizational agility.

Moosaei & Afshari (2023) in their research entitled "Investigating the Role of Personalized Digital Extension Services on Agricultural Performance (A Case Study of Farmers in Fars Province)" showed that personalized digital extension services have a positive and significant effect on agricultural performance, agricultural income, variety of product production, intensity of input consumption, product productivity, willingness to use technology and product commercialization of farmers in Fars province.

Sina (2022) in his research entitled "The relationship between ICT and job performance with the mediating role of organizational agility" showed that there is a positive and significant relationship between ICT and job work with the mediation of organizational agility. In other words, ICT has a positive effect on job performance and organizational agility.

Ranjan (2008) stated in his article that the view based on information technology will enable scientific and academic institutions to quickly respond to goals and objectives and even respond to the demands and needs of faculty members and staff. It also emphasizes the development of information technology in scientific and educational centers in order to make the organization more efficient and effective.

Al-Zabi et al., (2011) in their article examined the necessary mechanisms for agility, and based on the findings, there is a positive relationship between organizational agility variables such as employee empowerment, customer-oriented culture, information technology, organic structure, and learning organization with product improvement in the organization. Huang et al. (2012) in their article, emphasized the effect of information technology in improving the organization's ability to process information and the effectiveness and efficiency of the organization. Results of Bagheri Kerachi et al., (2013) research showed that the level of application of organizational agility components in

the public universities of Fars province is lower than the average. The results of Darvish Mola's research (2016) showed that the quality of the information management system and its components, including the quality of establishment, performance, and credibility, have an effect on the organizational agility of metal industry companies in Kaveh Industrial City. Menan and Suresh (2020) conducted a study with the aim of evaluating organizational agility for a higher education institution. The total organizational agility index showed that the institution is agile, but still there is more capacity for improvement. The research findings of Gao et al. (2020) showed that the flexibility and integration of information technology have a positive relationship with organizational agility, while the flexibility of information technology has a high impact on organizational agility. Arianfar and Rajabi Farjad (2021) showed in their research that the exploration and exploitation of information technology affects the agility of Tadbir Holding. The study of Tomomits & Moraes (2021) states that in the United States, a lot of research has been done in this field, and in general the most recent publications have been published in management system and information management journals. The identified studies mainly focus on the causal relationship between information technology and organizational agility from three perspectives: (1) the direct effect of information technology capabilities on agility, (2) the moderating effect of information technology capabilities on the relationship between other organizational capabilities and agility organizational, and (3) the indirect effect of information technology on organizational agility through other organizational capabilities. Lai et al.'s (2021) study also provides a new comprehensive model and showed that IT competencies link individuals with perceived task structure and employee agility. According to the findings, IT competence has a positive relationship with interdependence and autonomy. Task autonomy also has a significant impact on employee agility. Ahmadi and Ershadi (2021) have investigated the role of social network technology as an important collaboration tool for organizational agility. The structures of their model include service quality, service types, service costs and speed as independent variables, as well as agile management as a dependent variable. The results show that the types of services as the main factor of social network technology have the greatest impact on the agility of a company. Then service speed, service quality and costs were ranked second to fourth respectively. Providing an understanding of IT services, promoting a service environment and fully identifying IT requirements are the most critical success factors for maintaining the strong impact of social networking technology on organizational agility.

According to the mentioned contents and reviewing the backgrounds, it can be seen that the role and influence of the effective factors of information and communication technology is undeniable and also agility capabilities play a significant role in the success of organizations in general and higher education centers in particular in today's competitive and turbulent environment, and this depends to a great extent on the knowledge and optimal use of information technology. Based on existing researches, effective external factors include rules and regulations, software technologies, customer influence, management in the organization and network technology. The main variables studied in agility include flexibility, speed of action, competence, cost, quality, automation and responsiveness related to university agility.

In order to achieve the goal of the research, the following hypotheses are pursued:

Main hypothesis: external factors (customers, management, software technology, network technology and rules and regulations) of information and communication technology have a positive and significant effect on organizational agility in Khuzestan University of Agricultural Sciences and Natural Resources.

Sub-hypotheses:

1- The customer variable as one of the external factors of information and communication technology has a positive and significant effect on organizational agility in Khuzestan University of Agricultural Sciences and Natural Resources.

2- Management variable as one of the external factors of information and communication technology has a positive and significant effect on organizational agility in Khuzestan University of Agricultural Sciences and Natural Resources.

3- Software technology variable as one of the external factors of information and communication technology has a positive and significant effect on organizational agility in Khuzestan University of Agricultural Sciences and Natural Resources.

4- Network technology variable as one of the external factors of information and communication technology has a positive and significant effect on organizational agility in Khuzestan University of Agricultural Sciences and Natural Resources.

5- The variable of rules and regulations as one of the external factors of information and communication technology has a positive and significant effect on organizational agility in Khuzestan University of Agricultural Sciences and Natural Resources.

2. Materials and Methods

The research was applied in terms of type and purpose, and descriptive-correlation in terms of how to obtain data. The statistical population of this research includes faculty members of Khuzestan University of Agricultural Sciences and Natural Resources. The statistical population consisted of 100 faculty members of Khuzestan University of Agricultural Sciences and Natural Resources, and a sample of 80 people was determined with the help of Karjesi and Morgan table and simple random sampling method. The data collection tool was a researcher-made questionnaire and the required information was collected through sampling from the community. The questionnaire includes two parts, the first part (information and communication technology questionnaire including 26 questions and 5 components of software technology, network technology, customer, management and rules and regulations) and the second part (organizational agility questionnaire including 42 questions and 7 components) Responsiveness, competence, flexibility, automation, quality, cost and speed of action). Table 1, shows the value of Cronbach's alpha coefficient for two categories of variables under investigation. To determine the reliability of the questionnaire, Cronbach's alpha coefficient has been calculated. The number of 30 questionnaires was experimentally distributed among academic staff members, and then its reliability was determined with the help of SPSS software using Cronbach's alpha test for 2 categories of items including external variables and agility, with values of 0.94 and 96, respectively was obtained, which indicated the desired reliability of the research questionnaire. Also, the validity of this research has been confirmed by the collective opinion of experts and professors of the university.

Table 1. The value of Cronbach's alpha coefficient

Variables	Cronbach's alpha coefficient
External variables	0.94
Agility	0.96

3. Results and Discussion

To check the data of the research questionnaire, two categories of descriptive and inferential statistics methods have been used to analyze the data and test the hypotheses. According to the findings, the majority of respondents are men (67.5%). 26.3% of the studied people are in the age range of 36 to 40 years with the highest frequency. Also, the educational level of the majority of them is PhD (71.3 percent). Table (2) shows the statistical description of the faculty members of Khuzestan University of Agricultural sciences and Natural Resources. In the present research, the test result was calculated based on two groups of men and women, and according to the results of the table below, since the value of sig is more than 05.0%, the claim of the normal distribution is accepted (Table 3).

Table 2. Descriptive Statistics of the faculty members of Khuzestan University of Agricultural sciences and Natural Resources

Variables		Frequency
Gender	Female	32.5
	Male	67.5
Educational level	M.A	28.7
	Ph.D	71.3
Age	30<	23.3
	31<X<35	25.7
	36<X<40	26.3
	>40	24.7

Table 3. Kolmogorov–Smirnov test

Test	Organizational agility	External variables
Z	0.876	0.733
Sig	0.417	0.641

Considering the normality of the data distribution, tests such as Spearman's correlation test and multiple regression test are used to check the research hypotheses. Spearman's rank correlation coefficient was used to perform the correlation test for research variables. Based on table (4), it can be concluded that the correlation coefficient between external variables and organizational agility is significant with a confidence level of 99%. In other words, as the amount of external variables increases, the organizational agility of the university will also increase. Therefore, it can be concluded that the main hypothesis is confirmed and there is a positive and significant relationship between the external variables of information technology and organizational agility.

Multiple regression test:

In order to predict changes in the dependent variable with the help of independent variables, multiple regression method has been used. In this test, the organizational agility variable has been analyzed as a dependent variable and external variables as an independent variable (Table 5). According to table (6), the regression analysis has progressed to three steps. According to this article, table (6) shows that the value of multiple correlation coefficient for external variables is significant at the level of 99% (sig=0.000). The value of the adjusted coefficient of determination (taking into account the number of degrees of freedom) shows the optimal value of 0.439 for the rules and regulation variable, the optimal value of 0.592 for the management variable, and the optimal value of 0.626 for the software technology variable. Based on the beta value, the real contribution of the rules and regulations variable in explaining organizational agility is 0.481, which means that for one unit change in the standard deviation of the rules and regulations, there is a change of 0.481 in the standard deviation of the organizational agility variable. In general, according to the findings, the positive and significant effect of external variables on organizational agility and the main hypothesis are confirmed. But among the external variables, the variables of rules and regulations, management and software technology have a greater impact on organizational agility. Therefore, among the sub-hypotheses, sub-hypotheses 2, 3 and 5 are confirmed. For more detailed analysis of the data, the structural equation model is used to test the hypotheses with the help of the structural equation model and LISREL software, which is considered a comprehensive cognitive methodology and with the help of which complex relationships between variables are displayed in path analysis. The structural model shows the relationship between the hidden variables of the research and examines the role of these variables. In the implementation of the structural equation model to test the main hypothesis of the research, according to the values of the following indicators, the output of the software shows the appropriateness of the fitted structural model. The chi value divided by the degree of freedom is equal to 1.67 and smaller than 3. Also, the value of the RMSEA has an acceptable value. Also, the fit indices according to table (7) show excellent fit and are confirmed.

Table 4. Correlation test for research variables

Variable	Sig	Correlation coefficient
External variables	0.000	0.687

Table 5. Multiple regression test for effective external variables with organizational agility

Variable	B	beta	Adjusted coefficient of determination	R2	R
External variables	1.286	0.745	0.550	0.556	745.0

Table 6. Steps of multiple regression test for effective external variables with organizational agility

Variable	B	Beta	Adjusted coefficient of determination	R2	R
Rules and regulation	2.082	0.481	0.439	0.446	0.668
Management	2.537	0.345	0.592	0.603	0.776
Software technology	1.539	0.218	0.626	0.641	0.800

Table 7. Indicators of suitability of the structural model of research

Fit index	RMSEA	GFI	AGFI	CFI	NFI	NNFI	χ^2/df
Reported value	0.09	0.85	0.76	0.97	0.92	0.95	1.67

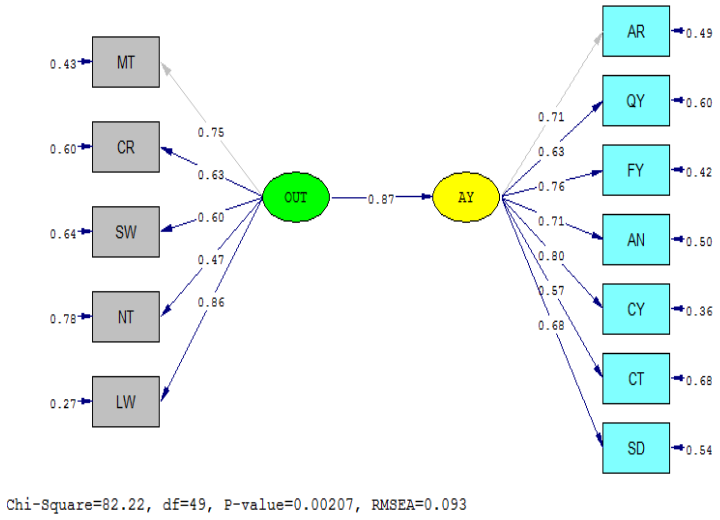

Figure1. Structural model of research in standard estimation mode

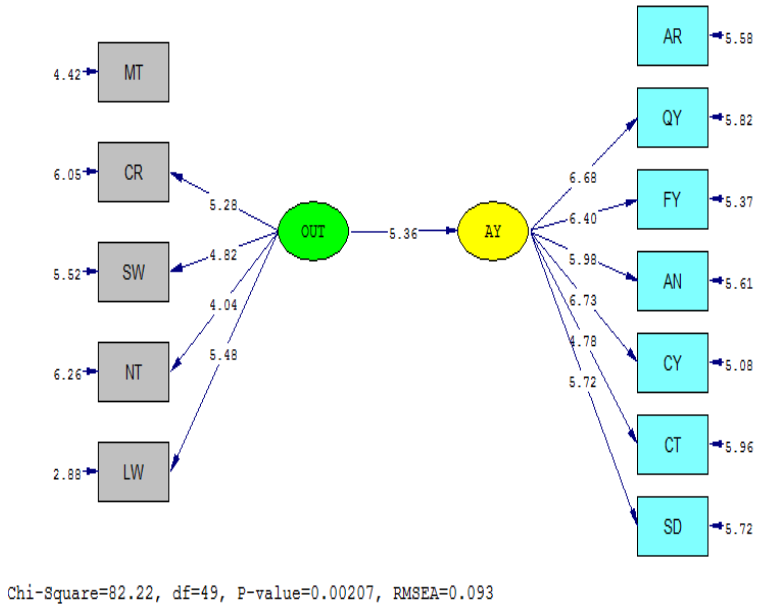

Figure2. The structural model of research in meaningful mode

In Figure (1, 2), the significance of the coefficients and parameters obtained from the structural model of the research is shown. The results of the structural equation model show that there is a positive relationship between external variables related to information and communication technology and organizational agility (β=0.87; t=5.36). Considering that in the model of significant numbers for the analysis of research hypotheses, the number obtained for the relationships of the variables is greater than 1.96, it can be concluded that these relationships are significant at the confidence level of 95% and the external variables of information and communication technology are effective on organizational agility. Therefore, the main hypothesis of the research is confirmed. In the implementation of the structural equation model to test the sub-hypotheses of the research, according to the value of the indicators, the output of the software shows the appropriateness of the fitted structural model. Other index values according to diagram (4) also have favorable values. In other words, the observed data is consistent with the conceptual model of the research to a large extent (Table 8).

Table 8. Indicators of suitability of the structural model of research

Fit index	RMSEA	GFI	AGFI	CFI	NFI	NNFI	χ^2/df
Reported value	0.09	0.87	0.76	0.97	0.93	0.95	1.68

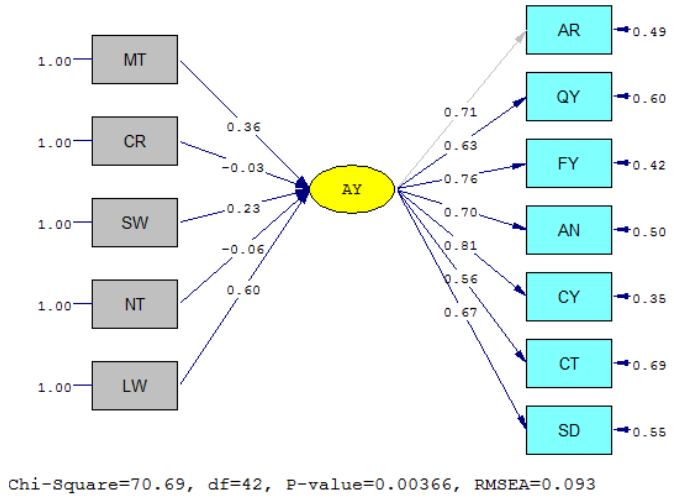

Figure3. Structural model of research in standard estimation mode

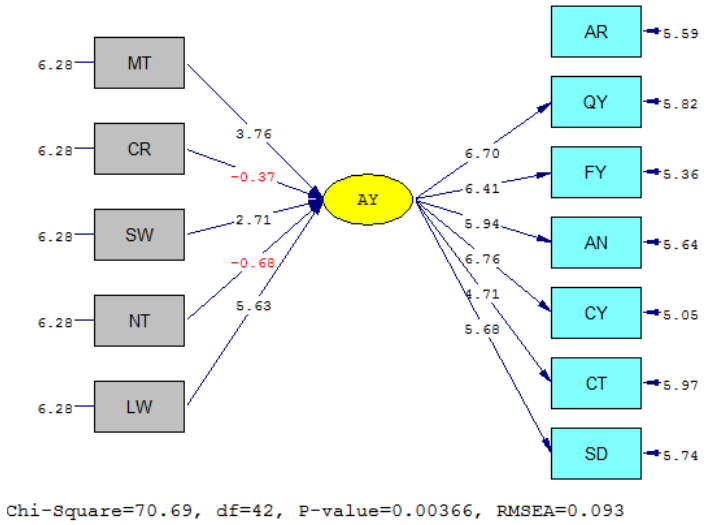

Figure4. The structural model of research in meaningful mode

In Figure (4), the significance of coefficients and parameters obtained from the structural model of the research is shown. The results of the structural equation model show that the three components of management, software technology, and rules and regulations are among the external variables affecting information and communication technology and have a positive effect on organizational agility in the university.

Considering that according to Figure (4), the calculated significant number for the impact of management variables, rules and regulations and software technology is equal to 3.76, 2.71 and 5.63 respectively, indicating the direct and positive impact of these three variables on organizational agility. Therefore, among the sub-hypotheses, sub-hypotheses 2, 3 and 5 are confirmed. But sub-hypotheses 1 and 4 regarding the influence of customer variables and network technology have not been confirmed. What can be seen in the Figure (3) shows the relationship pattern of external variables of information and communication technology with organizational agility in the standard mode.

In the standard estimation mode, the amount of path coefficients between measures is determined. This means the amount of change in the dependent variable (organizational agility) per unit of change in the independent variable. In this way, the impact of management variables, software technology and rules and regulations on organizational agility is equal to 0.36, 0.23 and 0.60 respectively.

4. Conclusion and Recommendation

Considering the importance of agility in universities and the lack of research in this field, it was necessary to conduct this research. Organizational agility is considered as one of the ways to respond to the factors of change and transformation and to solve the current problems of universities. Agility capabilities include responsiveness, competence, flexibility and adaptability, as well as speed of action. By reviewing the backgrounds, factors such as quality, cost and automation are among the important factors in achieving agility. The higher education system is one of the main and fundamental institutions of any society, whose performance has a significant impact on all aspects of the lives of people in that society. Agility is considered as a new paradigm for organizational engineering of universities and even other competitive enterprises. By reviewing the background of the research, it is clear that one of the effective factors on organizational agility is information and communication technology, which includes external factors such as customers, management, software technology, network technology, and rules and regulations. The research was conducted with the aim of investigating the impact of external variables of information and communication technology on organizational agility in Khuzestan University of Agricultural Sciences and Natural Resources from the perspective of faculty members.

Based on the findings, the impact of management variables, software technology, and rules and regulations on organizational agility is 0.36, 0.23, and 0.60, respectively. Therefore, among the sub-hypotheses, sub-hypotheses 2, 3 and 5 are confirmed. The obtained results are somewhat consistent with the research results of Keykhah et al. (2020), Pourjavid et al(2021) and Lai et al(2021). Lai et al.'s study (2021) emphasizes the direct effect of information technology capabilities on agility. In the research of Keykhah et al. (2020), information technology has been effective on organizational agility, and in the research of Pourjavid et al. (2021), information technology has been considered in the design of organizational agility model. In fact, with the increase and improvement of the mentioned effective variables, the level of organizational agility will increase. Considering that it was found that management, software technology and rules and regulations have a greater impact on organizational agility, it can be concluded that without proper management, the presence of necessary technology and consideration of appropriate rules, organizational agility cannot be expected in universities. Therefore, it is suggested to consider the correct management of changes, formulation of mission and vision and strategies according to the needs and expectations of customers and beneficiaries of higher education. Attention should be paid to the adequate training of the personnel and employees of the supervisory and maintenance department of the information technology system. The use of specialized multi-functional teams should be taken into account in order to train and empower employees and re-engineer university processes. Considering the changing effect of rules and regulations, encourage and strengthen systems in order to motivate employees and faculty members to use information technology more effectively in order to make the university more agile. Necessary actions and support should be taken regarding the improvement of technical infrastructure, increase of network power and capacity, reduction of inflexible rules and regulations, and increase of flexibility in planning and implementation in the university. This finding is somewhat consistent with the findings of Abbaspour et al. (2013), Farsijani (2012) and alzoubi et al. (2011). Of course, in the research of Abbaspour et al. (2013) in the discussion of evaluating the level of importance of organizational agility components at the university level, new rules and regulations are of lower importance, but in general, the drivers of agility in the university environment include changes and transformations. In a research, Farsijani (2012) has emphasized the effective role of using appropriate technologies regarding the effective use of resources to achieve organizational agility. The present study did not indicate the impact of customer variables and network technology on organizational agility, which is not in line with the study of Ahmadi and Ershadi (2021) because the study of Ahmadi and Ershadi (2021) focused on the impact of social network technology as an important tool of cooperation for organizational agility, and determined understanding information technology services and fully identifying information technology requirements as the most important success factors for maintaining the strong impact of social networking technology on organizational agility.

Recommendation for future research:

- Investigate variables and mechanisms affecting organizational agility in universities and other higher education centers, whether governmental or non-profit.
- Considering the global developments, this issue should be studied continuously in public and private organizations.

- In the study of other higher education centers (whether comprehensive or specialized), other factors involved in organizational agility should also be studied.

- It is recommended to study about the design of a model for organizational agility in the country's higher education system (comprehensive or specialized).

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