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IMPACT OF INTER-ORGANIZATIONAL AND EXTRA-ORGANIZATIONAL FACTORS ON THE POLICIES OF SCIENCE AND TECHNOLOGY PARKS IN EMERGING ECONOMIES

IMPACTO DE FACTORES INTERORGANIZACIONALES Y EXTRAORGANIZACIONALES EN LAS POLÍTICAS DE PARQUES CIENTÍFICOS Y TECNOLÓGICOS EN ECONOMÍAS EMERGENTES

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ABSTRACT

This article aims to study policymaking resulting from the impact of intra- and extra-organizational factors of science and technology parks (S&T parks). This article is classified as applied in terms of objective and quantitative in terms of data gathering. The population comprises senior managers of companies established in the five selected S&T parks, totaling 493. Applying the stratified random sampling method and the Cochran formula, the sample size was determined at 216. The validity of the questionnaire's content was endorsed by professors, experts and pundits. The Cronbach's alpha of the questionnaire was extracted to be higher than endorsed levels in all dimensions, which shows the reliability of the research. Results show that intra-organizational factors (organizational, networking, legal and fiscal), with the intervention of extra-organizational factors (institutional, cultural and contextual, capital and location), lead to development of six S&T park policymaking categories (policymaking for culture and motivation, policymaking for creation of incentives, policymaking for development of capacity and capability, policymaking for infrastructure, policymaking for attracting investment, policymaking for creating business opportunities).

KEYWORDS

S&T parks policy, Intra-organizational factors, Extra-organizational factors.

RESUMEN

Este artículo tiene como objetivo estudiar la formulación de políticas resultante del impacto de factores intra y extraorganizacionales de los parques científicos y tecnológicos (parques C&T). Este artículo se clasifica como aplicado, en términos de objetivo, y cuantitativo, en términos de recopilación de datos. La población está compuesta por altos directivos de empresas establecidas en los cinco parques C&T seleccionados, alcanzando un total de 493. Aplicando el método de muestreo aleatorio estratificado y la fórmula de Cochran, el tamaño de la muestra se determinó en 216. La validez del contenido del cuestionario fue avalada por profesores, expertos y especialistas. Se extrajo el alfa de Cronbach del cuestionario para ser superior a los niveles avalados en todas las dimensiones, lo que demuestra la fiabilidad de la investigación. Los resultados muestran que los factores intraorganizacionales (organizacionales,

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en red, legales y fiscales) con la intervención de factores extraorganizacionales (institucionales, culturales y contextuales, de capital y ubicación) conducen al desarrollo de seis categorías de formulación de políticas de parques C&T (formulación de políticas: para la cultura y la motivación; para la creación de incentivos; para el desarrollo de capacidades y aptitudes; para la infraestructura; para atraer inversiones y para la creación de oportunidades de negocio).

PALABRAS CLAVE

Política de parques C&T, Factores intraorganizacionales, Factores extraorganizacionales.

1. INTRODUCTION

Over recent decades governments have increased their innovation efforts with a view to bringing about economic development and transformation. Governments have pursued different policies in encouraging innovation activities in a bid to realize national industry development. The significance of this issue may stem from: first, the 1970s oil crisis and the necessity of replacing non-oil energy resources (Rothwell, 1994); second, the competitive nature of innovation activities and attention to the hidden economic aspects of technological innovation (Smith & Larimer, 2017); and third, the governments' intention to industrialize their domain on the global scale at a time where economic globalization pushes governments to boost technology research costs (Su & Zarea, 2020). If nations and subsequently companies adopt better policies for knowledge-based companies through S&T parks and applying knowledge more effectively through these parks, they can largely improve their growth and welfare levels.

Globalization is a sign of stimulation of competition and access to new potential markets for nations. In order to win international recognition, public and private organizations and entities should focus on market-product innovations, increasing opportunities and equipping themselves with cutting edge technology. That is key to staying in global competition, which would require policymaking through development of S&T parks and knowledge-based companies (Cuentas et al., 2013).

Innovation issues have become more complicated than before and innovation policymakers are required to be capable enough to confront such complications and find an in-depth understanding of them. Therefore, S&T parks' policymaking has become more effective than before in exploiting knowledge-based and technology companies (Farsi et al., 2011a)

S&T parks keep knowledge and technology running at universities, R&D institutes, private companies and markets and manage the process, while facilitating the growth of innovation-based companies through incubators and spin-off processes. These centers are currently helping establish knowledge-based companies by providing financial, moral and legal support, supplying necessary equipment and facilities, counseling, and preparing necessary workspace. Therefore, S&T parks' policymaking can result in the growth of knowledge-based companies and technology cores (Petti & Zhang, 2013).

Finally, in the statement of problem for this research, it is important to note that the companies established at S&T parks are considered as effective factors in the

economy and social developments thanks to their skill in identifying opportunities and moving in the direction of development of these opportunities. Therefore, classifying development policies at these companies in terms of internal and external factors could be instrumental in economic development and growth. The main question in this research is focused on the impact of intra- and extra-organizational factors on Iranian S&T parks' policies.

2. THEORETICAL BACKGROUND

S&T policies may be formulated based on traditional objective-oriented criteria. However, what matters is that the more the number of actors and stakeholders in the process of policymaking, the higher the challenges lying ahead (Gomes et al., 2018; Hart & Kleiboer, 1995) The most important reason for the failure of technology policy has been insufficient information about decision-makers and the complexity of partnership between actors (Moreno, 2008; Schön., 1994). For Eriksson & Weber (2008) this process is more challenging for developing nations. The developing nations' understanding of advantages and disadvantages, costs, opportunities and risks of technological option is not sufficient. Meantime, protracted decision-making has not been a first-mover advantage for them (Lee et al., 2008). The existence of a systematic approach vis-à-vis the process of policymaking gives enough space to all actors to fulfill their roles (Conceicao et al., 2003).

S&T parks have emerged as a powerful source of entrepreneurship, talent acquisition and economic rivalry for regions, states and nations. They have been instrumental in infrastructure logistics and economic growth for knowledge-based companies. For the purpose of providing a venue for researchers and companies to be together, S&T parks create an environment encouraging cooperation and innovation, spreading, developing, disseminating and commercializing technology. Three major motives behind S&T parks are presented by (Petti & Zhang, 2013) as follows: reindustrialization, regional development and synergy. According to Soenarso et al. (2013), the S&T parks are designed to empower academics at local universities to commercialize their research ideas and prepare the ground for small businesses using sophisticated technologies.

2.1. S& T Policy Concept

Technology policy refers to policymaking in technology and related sectors, i.e. policymaking for knowledge-based technologies with economic growth core (Hackett et al., 2007). This concept points to policies that are concentrated on technologies and sectors and mainly correspond to the winners and losers' choice among technologies. The idea behind the introduction and application of technology policy, like science policy, is the issue of industrial development and its dependence on various branches of science and techniques. The elements involved in technology policy include universities, research institutes, technology organizations and R&D labs. These policies finally prepare the ground for the facilitation of commercialization (Fagerberg., 2005.). Science, technology and innovation policy

covers a group of policies aimed at upgrading activities and processes pertaining to science, technology and innovation to help realize economic and social development (UNCTAD, 2017). Some research conducted on S&T park policy is as follows:

Hove & Zinyama, (2012) conducted research titled “The Challenges of Zimbabwe S&T Policy Formulation from 1980 to 2002”. Their paper examines the challenges of S&T policy formulation in Zimbabwe. It divulges the rationale why it took a long period before an S&T policy was originated. The paper reveals that S&T policy development was complex. It was largely the lack of; strong policy, multi-stakeholder involvement, funding and commitment from government ministries mandated with policy formulation and implementation. One of the major institutional problems hindering and interrupting the formulation of the S&T was the disintegration of the policy formulating route. The data were gathered by questionnaires and oral interviews with key informants... The respondents and key-informants were chosen by means of purposive and snowball sampling methods. The study concludes that for S&T policy to be effectively devised and executed, there should be institutional capability amplification and budgetary allocation for the S&T cause.

Hall et al. (2006) conducted a research study on public policy and entrepreneurship. Entrepreneurship is a primary catalyst for economic growth and regional development. Recognizing its importance, state and local policymakers are now devoting considerable resources to fostering entrepreneurship. Their paper presents a framework for thinking about government's role in the entrepreneurial process. They examined the research on macro-level determinants of entrepreneurial activity and found that policies broadly consistent with economic freedom, such as secure property rights, low taxes, and low regulations lead to a robust entrepreneurial environment.

Abdullahi (2004) conducted research titled “an impact assessment of S&T policy on national development of Nigeria”. His study aimed to assess the impact of S&T policy on national development of Nigeria. The data generated from interviews and questionnaires were analyzed using quantitative and qualitative methods. The analysis confirmed all the hypotheses stated as well as the fact that S&T policy had not played a critical role in national development and that Nigerian society was not aware of and hardly contributed to formulation of S&T policy. Furthermore, the study revealed that development process in Nigeria failed to recognize the critical role of scientific and technological activities. The country lacked science culture and the existing institutional capacity for S&T development was very weak in terms of requisite personnel and facilities. The study concluded that a new policy shift was desirable which emphasized the promotion of S&T culture, its integration into the production system and the strengthening of institutional framework for policy formulation, implementation, monitoring and evaluation in addition to promotion of S&T literacy. Finally, pertinent recommendations were made which included among

others, the need for government to place greater emphasis on achieving value-for-money on its expenditure on research. This demands an increase in activities on R&D evaluation as well as strengthening of infrastructure for information and knowledge dissemination. The summarized results are given in Table 1.

Table 1: Research on S&T Parks Policy and Related Classification

Dimensions	Component	Research Cited
Polymaking for creating business opportunities	Obstacles to entry/deregulation, access to foreign markets, transfer of technology, private demand requirements, supply regulations	(Kostka, 2014; Mu & di Benedetto, 2011; Wasim, 2014)
Polymaking for attracting investment	Loans, tax on wealth and heritage, business angels, venture capital, tax on fortune, stock market and corporate buyout	(Bergek et al., 2015; Prodan, 2007; Saji & Mishra, 2013; Silva et al., 2020; UNCTAD, 2017)
Polymaking for developing capacity and capability	Traditional business training, entrepreneurship, restart	(Aarikka-Stenroos & Sandberg, 2012; Seyoum, 2004; Zaridis & Mousiolis, 2014)
Polymaking for infrastructure	Entrepreneurship infrastructure (public), entrepreneurship infrastructure (private)	(O'shea et al., 2004; Smith & Larimer, 2017; Teece, 2010)
Polymaking for creating incentives	Tax on private income, tax on businesses and fiscal incentives, social security, administrative responsibilities, labor market rules, bankruptcy rules	(Bali & Zarea, 2018; Padilla-Pérez & Gaudin, 2014; Shaw & Allen, 2018)
Polymaking for culture and otivation	Entrepreneurial motivation, special incentives, communication with legends	(Bergek et al., 2015; Gibb & Hannon, 2006; Jack et al., 2009; Machnik- Słomka & Kordel, 2016)

2.2. Intra-organizational factors and S&T park policy

Bigliardi et al. (2006) believe that science parks follow various objectives depending on the impact on the organization and the region. The objectives related to companies include facilitating transfer of technology, encouraging existing technologically-advanced companies, attracting companies engaged in state-of-the-art technologies

and developing strategic alliances/networks. The objectives related to regional impacts include development of region, creation of jobs and increasing credit allocation (Bigliardi et al., 2006). In the following research, the intra-organizational factors and policymaking at S&T parks are discussed.

Wasim (2014) conducted research on the factors involved in science park planning. His findings identified the factors effective in S&T park planning as follows: government (administration, stakeholders, target group, capital, technological concentration), growth (networks, business support, infrastructure, motivations, culture), external factors (R&D policy, financial policy, stock markets, unofficial economy, foreign investment).

Soenarso et al. (2013) conducted research about innovation-based development of S&T parks in Indonesia with a view to supporting local economy. Their research showed that such factors as stakeholders, systematic support by central and local governments, providing suitable infrastructure, encouraging research cooperation and increasing R&D budget were significant factors in the development of S&T parks. Finally, S&T parks provide a platform for the development of national and regional innovation systems.

Wonglimpiyarat (2013) conducted a research study titled “innovation financing policies for entrepreneurial development – Cases of Singapore and Taiwan as newly industrializing economies in Asia”. This paper is concerned with the innovation financing policies for entrepreneurial development of Singapore and Taiwan, the first-tier countries/newly industrialized economies in Asia. In particular, the study focuses on the venture capital and capital market funding policies. The study has shown that the government intervention model is successful in Singapore and Taiwan as a result of having clear-cut agencies responsible for carrying out policy implementation. Both countries also have stock markets for high-tech industries with flexible market-entry regulations to support technology development. The study offers empirical reasons on effective innovation financing policies to support the national economic development. The results are then summarized in Table 2.

Table 2: Research on intra-organizational factors and policies of S&T Parks

Dimensions	Component	Research Cited
Networking	Entrepreneurship networks, small social groups, lab and research networks, bank and nonbank financial institutions, technology diffusion investors, information providers, external intermediaries	(Gomes et al., 2018; Jack et al., 2009; Ye et al., 2012)
Organizational	Identification, exploration, creation and exploitation of opportunity, management of knowledge, capital budgeting, education changes management, capacity of absorbing specialized forces	(Allameh et al., 2011; Caruth & Handlogten, 1988; Hendricks, 2015)
Legal	R&D entities at private companies, research institutes supporting state-universities, institutions supporting intellectual property rights, industrial and academic facilitators, scientific research institutes, supporters of commercialization process, financial sponsors	(Guadix et al., 2016; Markman et al., 2008; Rust, 2015)
Fiscal	Innovative financial mechanisms, innovative marketing mechanisms, innovative rewarding mechanisms, government regulation policies, global concerns on environment; significance and necessity, knowledge-based industries and their growing role in economy	(Petti & Zhang, 2011, 2013; Saji & Mishra, 2013)

The research hypotheses are as follows:

Hypothesis 1: Intra-organizational factors affect policy designed by S&T parks in Iran.

Hypothesis 2: Intra-organizational factors affect extra-organizational factors at S&T parks in Iran.

2.3. Extra-organizational factors and S&T park policy

Borrás & Edquist (2013) have concluded that S&T parks are built mainly due to the necessity of reindustrialization of a region, necessity of establishing new high-tech companies, or with a view to boosting local companies through transfer of technology. Economic development may become more instrumental in the old process of production through applying new technologies (IT, new materials and biotechnology among others) In the following research, extra-organizational factors and policy of S&T parks have been examined.

Hall & Sobel (2006) conducted research on public policy and entrepreneurship. Entrepreneurship is the main catalyst for the growth and development of regional economy. They examined the research on macro-level determinants of entrepreneurial activity and found that policies broadly consistent with economic freedom, such as secure property rights, low taxes, and low regulations lead to a robust entrepreneurial environment.

Padilla-Pérez & Gaudin (2014) conducted research titled “science, technology and innovation policies in small and developing economies: The case of Central America”. The policy instruments identified in this research are as follows: institutional framework (national science, technology and innovation plan; assessment of science, technology and innovation policy; technology; intellectual property rights; administrative mechanisms; public education system; national strategy; standardization; qualitative policy; public procurement policy); financial (financial motivation, financing innovation. Planning to upgrade interaction between innovation system actors, private-public relationship organizations; promoting significance and functionality of science, technology and innovation; public organs).

Hove & Zinyama (2012) conducted research on challenges to formulation of S&T policy in Zimbabwe from 1980 to 2002. Their findings showed that one of the recent major institutional problems in the adoption and finalization of S&T policy stems from the process of S&T Park policy. The study found no organizational cohesion and consolidation. Also, it revealed that lack of institutional coordination between the minister of higher education and technology, the Institute of Development Studies and the Research Council of Zimbabwe hindered the development and formulation of S&T policy. Furthermore, the study emphasized that an effective implementation of S&T policy required upgrading institutional capabilities and allocation budget to S&T. The summarized results are given in Table 3.

Table 3: Research on extra-organizational factors and policy of S&T parks

Dimensions	Component	Research Cited
Institutional	Tax code, imports/exports law, market entry laws (licenses, etc.), regulatory agencies, bankruptcy rules, corporate registration rules, macro-objectives and policies, laws of activity, intellectual property laws, general policies tendency, immigration rules, labor law, legal system, anti-monopoly laws, industrial policies, industrial environment	(Guadix et al., 2016; Smith & Larimer, 2017; Xie et al., 2018)
Capital and location	Financing resources and approaches, investment banks, business angels, investors' tendency to financing small technological enterprises, capital market, financing through government centers, state partnership investments, foreign investors, credit scoring system, high-risk investors, rivalry between fiscal entities	(Cuentas et al., 2013; Gupta et al., n.d.; Talebi et al., 2010)
Cultural and Contextual	Successful individual models, open transnational society, cultural events of entrepreneurship, open forums, entrepreneurial campaigns, communications and branding, media coverage, tendency to entrepreneurship, risk exposure, accepting entrepreneurship, admission to failure, respecting failure, respecting investors, culture of accountability, culture of innovation and creativity, entrepreneurial vision, social capital	(Bigliardi et al., 2006; FARSI et al., 2011b; Siegel et al., 2007)

The research hypotheses are as follows:

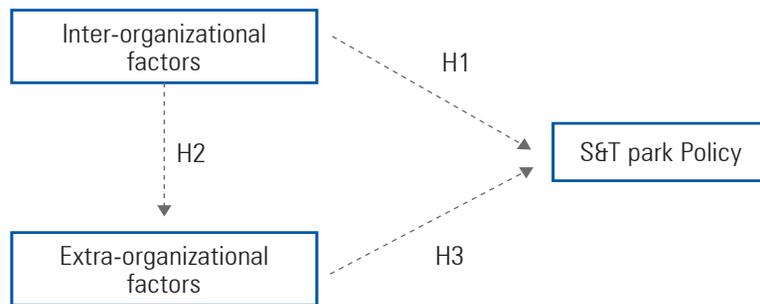
Hypothesis 1: Extra-organizational factors affect policy designed by S&T parks in Iran.

Hypothesis 2: Extra-organizational factors affect policy designed by S&T parks in Iran through intra-organizational factors.

2.4 Conceptual Model

Given the literature review, the conceptual model for this study is illustrated in Figure. 1.

Figure 1: conceptual model



3. RESEARCH METHODOLOGY

This research is classified as applied in terms of objective and quantitative in terms of data gathering. To realize the research objectives, library studies were conducted, the Internet was used and internationally recognized databases were consulted with the focus on the identification of dimensions. In the following step, based on the extracted dimensions, a questionnaire was designed and distributed among the sample subjects. Finally, the questionnaire's data was analyzed using LISREL software.

3.1. Population and Sample Space

The population comprises managers and senior experts of companies established at five top S&T parks, based on the classification of Ministry of Science, Research and Technology, in the provinces of Fars, Isfahan, Khorasan Razavi and Guilan as well as in Pardis. Using simple random stratified sampling in which all members have equal chance to win, the samples were selected. The Cochran formula was then used to determine the sample size at 216. Table 4 shows the number of samples for each stratum:

Table 4: Stratified Sampling of Parks and Companies

S&T Park name	Frequency of Stratum	Ratio of Frequency to Population	Number of Samples
Isfahan	92	0.19	42
Khorasan Razavi	137	0.27	59
Guilan	68	0.14	31
Pardis	101	0.21	43
Fars	95	0.19	41
Total	493	1	216

3.2. Data Gathering Methods

Questionnaire was chosen as a proper tool for data gathering. It comprised three sections as follows: Section 1 (Introduction) comprised a summary, objectives and necessity of research in addition to demanding that respondents answer questions; Section 2 comprises demographic questions including particulars like gender, last university degree, age and job experience and occupation; Section 3 comprises 95 specialized questions. Ordinal scale, more specifically five-point Likert scale, was used in designing the questionnaire.

3.3. Validity Assessment Method

The validity of the questionnaire was evaluated by advisors and supervisors, five faculty members and five directors of S&T parks.

3.4. Reliability Assessment Method

The Cronbach alpha method was used to evaluate the reliability of the test. The results are given the section 4-2-1.

4. ANALYSIS OF FINDINGS

4.1. Descriptive Statistic for Research Variables

With data gathered from the questionnaires, average statistics, standard deviation, skewness and kurtosis are extrapolated for the research variables which are as follows: 1. Factors affecting S&T Park policy (intra-organizational, extra-organizational); 2. Inter-organizational factors (organizational, networking, legal and fiscal); 3. Extra-organizational factor (institutional, cultural and contextual, capital and location). See Tables 5 and 6.

Table 5: Descriptive statistics for S&T Park policy variables, extra-organizational factor and related dimensions

	Networking	Intra-Organizational	Institutional	Extra-organizational	Governance	Financial	Cultural and Contextual	Policy making	Extra-organizational factor
Average	3.6978	3.7519	3.4489	3.4190	3.8628	3.7288	3.4877	3.5794	3.6931
Standard deviation	.74033	.73649	.70880	.73541	.56922	.69194	.64640	.63394	.53285
Skewness	-.597	-.431	-.137	-.111	-.115	-.497	-.128	-.373	-.035
Kurtosis	.893	.780	.571	.466	-.291	.953	.738	1.573	.465

Table6: Descriptive statistics for inter-organizational factor variables and related dimensions

	Business Opportunity	Investment attraction	Capacity Development	Infrastructure	Motivation and Incentive	Culture and Motivation	Inter-organizational factors
Average	3.6056	3.9429	4.0540	4.1921	4.3179	4.2932	4.0676
Standard deviation	.79086	.66518	.75785	.77991	.70803	.73764	.61271
Skewness	-.573	-.684	-.945	-1.557	-1.585	-1.539	-1.478
Kurtosis	.363	2.280	1.718	3.933	3.575	3.493	4.754

As the tables show the research variables lie within an acceptable range for skewness and kurtosis. The acceptable range for skewness and kurtosis varies between -3 and 3 and as long as a variable lies in this range it has normal distribution.

4.2. Modeling of Structural Equations and Smart PLS Software

4.2.1. Research Measurement Model Assessment

Results of assessing the measurement model based on the extracted values are provided in Table 4. As the results show, validity (convergent validity index or average variance extracted (AVE)) is assessed as appropriate in the model and the model has acceptable reliability (composite reliability and Cronbach's alpha). AVE with value of more than 0.5 for each variable indicates appropriate convergent validity (Ebrahimi & Mirbargkar, 2017). In the table7, convergent validity values are more than 0.5, thereby confirming the convergent validity of concepts.

Table 7: Composite Reliability, Cronbach's alpha, and AVE

Factors	Composite reliability	Cronbach's alpha	AVE
Intra-Organizational	0.838270	0.755144	0.515064
Extra-organizational	0.892897	0.856161	0.581668
S&T Park policy	0.943233	0.936888	0.502171

Based on different resources, for a tool to be deemed as reliable, the alpha coefficient and CR should be at least 0.7. (Khajeheian & Ebrahimi, 2020). Therefore, the reliability of the measurement tool is confirmed.

4.2.2. Model Fit

The variance index explained for the endogenous constructs of the model were examined to show to what extent the dependent variable predicted or explained the independent variable. With goodness of fit (GOF) equaling 0.620, a positive value, the entire model fit is described as positive. Since it is higher than 0.35, it is said to be an optimal value. Therefore, the model's fit is confirmed (Table 8).

Table 8: Table 5: GOF Reliability Index

Row	Factors	R2	COMMUNALITY	GOF
1	Intra-Organizational	0.734660	0.515064	$GOF = \sqrt{Communtality \times R^2}$ $= 0.620$
5	Extra-organizational	0.685748	0.581668	
10	S&T Park policy	Exogenous	0.402171	
Average		0.713	0.540	

4.2.3. Analysis of Paths Using Linear Structural Relationships

After determining measurement models, in order to assess the conceptual model of the research and ensure the existence or non-existence of a causal relationship between the research variables and examine the consistency of observed data with the conceptual model of the research, the paths were also tested using the structural equations model. The inter-organizational factor of the conceptual model, developed by the PLS software, is illustrated in Table 7.

4.2.3.1. Standard Coefficients

Based on the significance value of 0.05, the critical should be more than 1.96. Any value lower than that would not be considered as significant. Furthermore, p-values lower than 0.0 indicate significant difference in the values calculated for regression coefficients of zero for p-value = 0.95.

4.2.3.2. T-Value Coefficient

The diagram below illustrates the significance level for the variable items in the research. It has to be noted that a significance level above 1.96 and below -1.96 is acceptable. As the diagram shows, the factor loadings in the questionnaire have a good significance level as they are all above 1.96. Therefore, the validity of the items' construct and structure is confirmed. Furthermore, all paths between variables are significant because they are greater than 1.96.

4.2.4. Q2 Index, CV-Red, CV-Com

The models with acceptable structural fit should be able to predict indices related to the endogenous structures of the model. In other words, if in a model, the relationship between structures is defined correctly, they can sufficiently affect other indices to pave the way for the confirmation of hypotheses. Henseler et al. (2013) have determined the three values of 0.02, 0.15, and 0.35 for weak, average, and strong prediction, respectively in endogenous structures. If is equal to or less than zero for an endogenous structure, its relationship with other structures of the model has not been explained optimally. To calculate the value in the PLS software, the blindfolding technique is used. Therefore, the Cross-validated Redundancy (CV-Red) and Cross-validated Commuality (CV-Com) are calculated as shown in Table 9:

Table 9: CV-Red and CV-Com Values

Factors	CV-Red	CV-Com
Intra-Organizational	0.371	0.282
Extra-organizational	0.388	0.408
S&T Park policy	0.306	0.356

Positive values show the optimal quality for the model. As shown in the table, the values have been calculated as positive for all structures of the research. Furthermore, all variables are generally varying between 0.15 and 0.35 or are greater than 0.35. Therefore, the prediction power of the structures of the research is assessed as medium to strong.

5. CONCLUSION

In examining the model of S&T park policy with entrepreneurial approach we concluded that this S&T Park policy has organizational, institutional, networking and extra-organizational aspects affecting inter-organizational and extra-organizational factors. The inter-organizational factors include culture and motivation, creating business opportunity, attracting investment, developing capacity, creating motive and incentives and providing infrastructure. The results also indicated that the direct effect of S&T Park policy on the inter-organizational factors is weaker than its indirect impacts when extra-organizational factor mediators are concerned. The results are summarized in the table 10:

Table 10: Results Summary

Hypothesis	Independent Variable	Dependent Variable	Mediator	Coefficient	Significance Level	Results
1	S&T Park policy	Inter-organizational	-----	0.240	1.988	Approved
2	Extra-organizational factor	Inter-organizational factors	-----	0.975	4.6	Approved
3	S&T Park policy	Extra-organizational	-----	0.931	57.056	Approved
4	S&T Park policy	Inter-organizational factors	Extra-organizational factor	0.788	16.82	Approved

Hypothesis 1: There is a direct path between S&T Park policy and inter-organizational factors. This path is confirmed with a coefficient of 0.240 and a significance level of 1.988 which is greater than 1.96. Therefore, this hypothesis is confirmed.

Hypothesis 2: There is a direct path between extra-organizational factor and inter-organizational factors. This path is confirmed with a coefficient of 0.957 and a significance level of 4.600 which is greater than 1.96. Therefore, this hypothesis is confirmed.

Hypothesis 3: There is a direct path between S&T Park policy and extra-organizational factor. This path is confirmed with a coefficient of 0.932 and a significance level of 57.056 which is greater than 1.96. Therefore, this hypothesis is confirmed.

Hypothesis 4: There is an indirect path between S&T Park policy and inter-organizational factors, considering the extra-organizational factor mediator. Therefore, this hypothesis is confirmed. The general impact is calculated by dividing the indirect impact by total. The general impact equals 0.788 and since the Sobel Test has yielded 16.82 which is greater than 1.96 it may be concluded that the path based on the mediatory role of the extra-organizational factor variable is significant. Given the results of the model fit index and standard coefficients and significant values, it may be concluded that the research model has been confirmed.

The impact of external network on the model of S&T parks and knowledge-based companies' policy with entrepreneurial approach was confirmed. Jack et al. (2009) describe the real activity of networking as a system enabling the entrepreneurs to obtain resources which are not under their control. The social network of entrepreneur facilitates access to necessary and key resources for benefiting from opportunities and upgrading the entrepreneurial efficacy, particularly in environments with limited resources. Mediatory enterprises are organizations or organized groups making efforts to develop innovation in the business models of enterprises. Such efforts are made either directly through innovating enterprises and developing the innovative capacity of product and process in an enterprise or indirectly through upgrading innovation in national, regional or local systems of innovation (Ye et al., 2012).

The impact of organizational factors on the model of S&T parks and knowledge-based companies' policy with entrepreneurial approach was confirmed. Opportunity identification is one of the most important capabilities of successful entrepreneurs, thereby being a key factor examined in entrepreneurship research (Moreno, 2008). Identifying and choosing optimal opportunities for new businesses is among the most important capabilities of successful entrepreneurs. Therefore, describing the discovery and development of opportunities constitutes a key element in entrepreneurship research (Zarea et al., 2010). One objective of recruitment is to make sure that the organization would constantly have an acceptable number of high-quality staff to be employed at the right place and the right moment to secure a successful inter-organizational factor (Jimenez-Moreno et al., 2013; Talebi et al., 2010). Recruitment is instrumental in the short-term and long-term performance, growth, durability and success of contemporary organizations. In fact, it is only through effective recruitment and employment that every organization - regardless of its size, industry, scope or objectives - may prove efficient and durable (Caruth & Handlogten, 1988).

The impact of institutional factors on the model of S&T parks and knowledge-based companies' policy with entrepreneurial approach was confirmed. By preparing legal mechanisms and adopting necessary policies, universities can become stakeholders in academic corporates maturing in incubators to spend revenues

obtained in this way through a synergic process on research and development of knowhow (Su & Zarea, 2020; Teece, 2010). Universities are highly instrumental in accelerating the search for national objectives and changes towards a knowledge-based economy (Smith & Larimer, 2017) and are expected to play a more active role in national and local economic development. University professors and managers play a fundamental role in establishing the culture of commercialization (Wonglimpiyarat, 2013)

The impact of extra-organizational factors on the model of S&T parks and knowledge-based companies' policy with entrepreneurial approach was confirmed. This literally means the government can upgrade a cognitive environment and subsequently boost entrepreneurial capabilities through education programs or counseling services, and improve a normal environment for entrepreneurship by resorting to widespread publicity and spreading entrepreneurship in society with a view to creating a positive impression of entrepreneurs in order to increase the entrepreneurs' motive (Rust, 2015) With such corporates bringing together a variety of skills, capabilities and specialists, creativity and innovation hit maximum levels as a result, which would in turn play a fundamental role in technological development and economic prosperity (Borrás & Edquist, 2013)

6. SUGGESTIONS

6.1. S&T Park policy suggestions

1. For the first path, i.e. direct line between S&T Park policy and inter-organizational factors, in light of average S&T Park policy value of 3.7 and the average inter-organizational factor value of 4.06, it is recommended that entrepreneurship networks be established, small social groups be formed, lab and research networks be equipped, investors in technology and information procurement be engaged and cooperation with foreign mediators in networking in S&T Park policy be envisaged.
2. For the second path, i.e. direct line between extra-organizational factor and inter-organizational factors, in light of the average extra-organizational factor value of 3.69 and the average inter-organizational factor of 4.06, it is recommended that market rules and regulations be honored, macro-level objectives and policies be pursued, general policies be adopted, anti-monopoly regulations and industrial policy be applied, numerous sources and solutions be used for financing, investors brace for financing small-sized technological enterprises and government centers embrace extra-organizational factor through joint investments.
3. For the third path i.e. direct line between S&T Park policy and extra-organizational factor, in light of the average S&T Park policy value of 3.57 and the average extra-organizational factor value of 3.69, it is recommended that opportunities be identified, discovered, developed and put into practice,

knowledge be managed correctly, budgeting be arranged, and capacities of employing specialized workforce be enhanced to help upgrade organizational factors in S&T Park policy.

4. For the fourth path, i.e. indirect line between S&T Park policy and inter-organizational factors with the mediatory role of extra-organizational factor, it is recommended that R&D entities be established in private companies and institutions supporting intellectual property rights, supporters of commercialization process be hired, financing institutes be engaged, mechanisms of innovative marketing be applied, promotional innovative mechanisms be worked out, arrangement be made with the government-regulated policy, access to foreign markets be relaxed, venture capital be facilitated, traditional business and entrepreneurship be educated.

6.2. Future Research

The Researcher will finally present new visions that can lead other researchers who intend to conduct similar work. Therefore, the present research can serve as a practical basis for other research studies on modeling policy for S&T park and knowledge-based company with entrepreneurial approach. Any research, albeit considered as comprehensive, cannot take into account all aspects due to various restrictions pertaining to topic and time. The present research was no exception to this rule. Therefore, the following suggestions are made for future research on this topic:

1. Designing requirements and standards of implementation of S&T park development policy;
2. Outlining model of implementation of S&T park development policy;
3. Analyzing the topic of the present research in other similar organizations (small, medium and large-sized organizations) or various industries for comparison;
4. Looking at the structural aspects of S&T Park policy as a modifying actor in organizations;
5. Scrutinizing the impact of external changes on S&T Park policy in other companies;
6. Inspecting the relationship between S&T Park policy and entrepreneurial approach: How come when organizations embark on their organizational entrepreneurship efforts to change the results, senior managers finally expect such attempts to positively affect the financial situation of the organization.

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