

# Identifying and Prioritizing Policy Tools to Support New Technology-Based Firms' Cooperation With Public Industries in Iran, a Futures Studies Approach

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## Abstract

*This paper tries to investigate the policy tools supporting New Technology-Based Firms (NTBFs). Given this aim, after reviewing background research regarding policy tools in Iran and other countries, the policy tools applied in other countries are compared with those applied in Iran and the gap between probable and preferred future situations was investigated in the framework of financial, administrative, information and regulatory policy tools by using paired T-Test and descriptive survey. The components of preferred policy tools are ranked by Freedman test. Research findings indicate that the widest and the narrowest gaps are in financial and information policy tools. The most preferred policy tools include joint ventures, joint R&D, issuing or buying stocks, companies' guarantees to receive aids, networking, grants, loans, incubators' development, creating a proper legal environment, training (managerial/technical) for companies, HR development, awards and bonuses, tax incentives, tax exemptions and consultancy service provision for the companies.*

**Keywords:** Policy, Policy Tools, Probable, Preferred, New Technology-Based Firms, Public Industries.

## Introduction

Because of the conditions caused by international sanctions against Iran and its economic capabilities, Policy tools supporting new technology-based firms are shaped alongside the historical and contextual evolutions of the Iranian nation. There are four general categories of policy tools used by public authorities .there, those being: administrative, information, financial and regulatory. Based on the situation, each of these four categories can be restrictive, voluntary or mixed (Moldavian Government, 2009, p.27). However, it is worthwhile to know if these tools are compatible with political, economic and social transformations such as resilience economy in Iranian policy making context. To put it more simply, are the actions by the Ministry of Industry, Mines and Commerce, as the government's representative in this field, intelligent? As a management thinker, Tom Veltri states "They look at your actions rather than your words." (Hopson, 2002, p.4). Policymaking is defined as "A certain method of shaping the action which is an informed rather than irregular and random effort (Kole Beach, 2003). Thomas Day (1999, p.2) declares that policy is about what governments do and why and what their outcomes are. Anderson (1997, p.5) believes that policy is a set of purposeful actions done by a player or a group of players to solve a problem. Finally, in one of the shortest definitions, Muller (1998, p.3) asserts that policy is equal to the government's science in action (Malek, 2006, p.178). Policy or government recognitions and the probable future of their interactions is a dynamic and complicated process especially in New Technology-Based Firms (NTBFs). Public policymakers need more future-oriented evaluations of their target population's attitudes and satisfaction after initiating acts.

The question is what public policy tools are available inside and outside of the country? Is there any difference between probable and preferred tools of the target population? What are the priorities of preferred public policy tools for those New Technology-Based Firms (NTBFs) cooperating with public industries? Probable policy tools are policy tools that are likely to be more widely used in the future due to institutional contexts and policy habits.

## Research Importance

### Main goal

The main aim of this research is to measure the gap between probable and preferred public policy tools used by public industrial organizations supporting NTBFs.

### Objectives

In line with the main goal, the below objectives are provided:

- Measuring up the gap between probable and preferred public policy tools in all four policy tools.
- Prioritizing these four categories of policy tools by the differences between probable and preferred policy tools.
- Prioritizing preferred public policy tools in the view of NTBFs in cooperation with public industries.

By this research, policymakers and executors acquire information about probable and preferred public policy tools so they can enhance their interaction with NTBFs as well as supporting them. Additionally, by prioritizing these policy tools, we can help policymakers and executors to focus on prioritized policy tools.

## Literature Review and Research Background

### Types of policy tools

There are four public policy tools used by public authorities including regulatory (legal/judicial), fiscal, informational and administrative tools which can be restrictive, voluntary or mixed depending on situations:

1. Regulatory tools which include adopting traditional prescriptive legislation and parliamentary directives, mechanisms of rules on the basis of legal precedent;
  - Restricting: rules, interdictions and dispositions
  - Supporting voluntary: codes of ethics and conduct;
  - Mixed: Secondary legislation (decisions), methodological directional lines and internal rules.
2. Fiscal tools including grants, subventions, guarantees, taxes and budgetary allocations
  - Restricting: Control of price, quantity, production, business joining and leaving, taxes and deductions
  - Mixed: Grants, guarantee certificates, subventions, loans, credits, assuring loyal and competition.
3. Information tools including informational and educational campaigns
  - Restricting: assuring customer protection by informing population on damages caused by the product
  - Voluntary: quality quotations, competitions
  - Mixed: information supply, mediation campaigns participation and consultation.
4. Administrative tools including direct intervention by the state, or memoranda of understanding (MIUs) external contraction, implications of family and community and voluntary bodies
  - Restricting: direct provision of services, infrastructures, capacity increase and development
  - Voluntary: implications of nongovernmental organizations, families and community
  - Mixed: indirect provision of services (contracting external sources).

Even if the major part of decisions made by decision-making bodies require the issue of a legal act, not all these acts contain a reglementation. In this context the administrative tools should not be confused with, for example, regulatory tools. The administrative tools, although are materialized similarly to those of regulation – by a legal act, do not contain any rules or regulations which are contained in regulatory tools. Thus, the Government decision to authorize a non-governmental organization to manage a project (administrative tool) is not the same thing as the Government decision to modify the regulations in the field of concurrency protection (regulatory tool) even though both are approved by legal acts. (Moldavian Government, 2009, p.27).

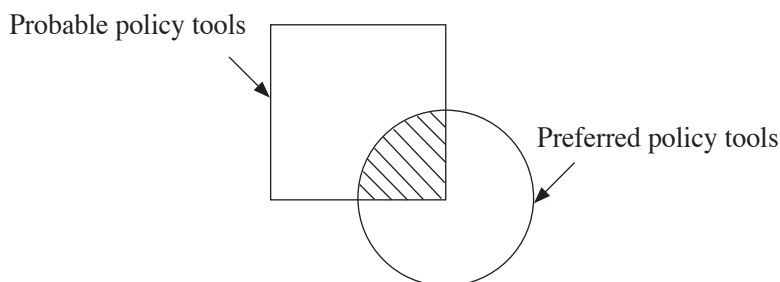


Figure 1. Research conceptual mode

## Supportive Policy Tools

Many people believe that the government itself is a problem rather than a solution for improving innovative capabilities of a country (Ahmadi & Ghazi Noory, 2008, p.74; Fulhaber, 2000). Since the time Sputnik Satellite was sent to space by Russia in 1957, US federal administration has played a vital role in supporting startups especially in high-tech industries. In recent years, European and Asian countries as well as the USA have conducted similar initiatives (Ahmadi Ghazi Noory, 2008, p.74; Learner, 1999). In this field, government's plans are divided into two categories: policies related to direct activities, initiatives and efforts by governments and indirect supports. In recent decades, New Technology-Based Firms are particularly being in the center of attention by researchers and policymakers (Ahmadi & Ghazi Noory, 2008, p.74; Licht & Linger, 1999) and different public policy tools are used inside and outside the country to support New Technology-Based Firms. These tools are listed and explained below.

## Reviewing External Policy Tools

Different countries use different public policy tools based on their contexts, capabilities and policies. Storey and Tether (1998) reviewed the public policy measures applied in the EU countries to support New Technology-Based Firms (NTBFs) during the 1980s and 1990s. They identified five policy areas, including: science parks, the supply of PhDs in science and technology, the relationships between NTBFs and universities/research institutions, direct financial support, and the impact of technological advisory services (Hsu et al, 2005, p.283). Also, some research is conducted in several European countries such as Finland (2012), a well – known country in this field, with different supportive public policy tools in both public sector including loans, allowances, subsidies, joint ventures tax incentives, companies' guarantees, grants, selling stocks, and nongovernmental supportive tools such as business angels and commercial contracts with big companies (Millennium, 2012).

Studies by Ferguson (1999) in Sweden regarding the growth of New Technology-Based Firms (NTBFs) indicate firms located in technology parks are more profitable than firms outside them. Likewise, the drawn image of New Technology-Based Firms (NTBFs) is especially valuable since such startups use modern technologies due to their attendance in technology parks (Ferguson, 1999, p.14).

The findings on science parks' performance in Sweden suggest that these parks' milieu appear to have a positive impact on their firms' growth as measured in terms of sales and jobs. However, there was no evidence of a direct relationship between science park location and profitability (Lofsten and Lindelof, 2001, p.309).

The most important supporting tools in the USA (2013) are divided into two groups: governmental supports (joint ventures, loans, buying the stocks of new technology-based firms, leading R&D budgets of some governmental entities toward new technology-based firms and joint R&D with research entities and nongovernmental supports including joint ventures (Millennium, 2013). Some researchers concluded that in the USA some factors such as locating a park near certain urban features, good transportation linkages, a high-quality residential environment, a university, and a pleasant working environment positively impact the success of New Technology-Based Firms (NTBFs) (Akbarzadeh and Shafizadeh, 2012, p.49; Amirahmadi and Saff, 1993, p.107).

For Mexico, as a country in North America, such supports include joint ventures, loans, creating proper legal environment, training New Technology-Based Firms (NTBFs), guarantees, joint R&D, providing financial advisory services and networking New Technology-Based Firms (NTBFs) (OECD, 2009, p.88).

In Asia, research investigated the contribution of policy tool toward the formation of Taiwanese biotechnology firm (Hsu et al, 2005). These policy tools were applied to practical research plans, auxiliary and educational plans, employing experts out of Iran, the development of research institutes, apprenticeship system, incubator plans and incentives (Hsu et al, 2005).

The effect of technological policy for the formation of new biotechnology firms (NBFs) is complicated because biotechnology is new, and its development raises issues due to a great deal of uncertainty. The results of this evaluation revealed that, first, policy tools relating to technology and human capital are currently the main focus in Taiwan. This focus is consistent with the perception of venture capitalists. However, from the perspective of bio firms, there are mismatches. Second, policy tools contribute to the formation of NBFs in different ways. Some contribute more widely across the criteria, while some are more specific. Third, the ranking of eight policy tools indicates that the role of public research institutes in economic development has become more sophisticated. Not only are they the sources of initial capabilities for emerging firms, but they are also important actors in industrial innovation, especially for a knowledge-intensive, industries like biotechnology. (Hsu et al, 2005, p.281)

Gorman and McCarty (2006)'s empirical study investigated the demand-side perspectives and experiences of entrepreneurs in a region in Canada to determine the types and sources of support used at various stages of business development in addition to identifying the potential support gaps. Findings indicate support used by Knowledge-Based Businesses (KBBs) differs from more traditional firms and that support needs change as firms move through the life cycle. There appears to be a low level of awareness among firms about available support services supporting beyond the start-up stage (Gorman & McCarty, 2006, p.131). These findings have important outcomes for both public and private sectors interested in supporting local economic development through creating and developing joint ventures.

Felstensein (1994) studied the role of technology parks as a location of new technology-based firms' growth in Occupied Palestinian Territory. His findings indicated that services by science and technology parks lead to the growth of new technology-based firms in such parks (Felstensein, 1994, p.93).

In South America and Brazil, supporting policy tools include joint ventures, loans, exchange, issuing stocks, establishing advisory centers, establishing training centers, academic allowances in universities, grants, guarantees, developing incubators and nongovernmental supports such as joint ventures, cooperation with big and mature firms, personal capitals and funds and business angels (OECD, 2009, p.32).

Walsh et al (1995) compared the pattern of emergence, survival and growth of small biotechnology firms in France, Britain and Canada by using surveys in these three countries and concluded that desired policy tools in these countries include the elimination of entrepreneurship barriers, promoting relations between public and private sectors, supplying governmental guarantee letters, networks, alliances and tax incentive plans. In the table below, the summary of policy tools in different countries is outlined:

Table 1. *Prescriptions Conclusion of Policy Tools in Studied Regions and Countries*

Continent		Asian			European				North America			South America	Total
Type of policy tools	Specific tools	Hsu et al (2005)	Felsen stein (2005)	Gorman and McCarty (2006)	EU (1998)	Ferguson (2006)	Lofstein (2001)	Inland (2012)	USA (2013)	Amirah madi and Saff (1993)	Mexico (2009)	Brazil (2009)	
Financial	Loan	*		*	*			*	*		*	*	7
	Aid guarantees	*		*	*			*			*	*	7
	Grants	*		*	*			*	*			*	6
	Awards and bonuses	*		*	*			*	*			*	6
	Issuing or buying stocks	*		*	*			*	*			*	6
	Tax incentives and exemptions	*		*	*			*					4
	Subsidy	*			*			*					3
	Joint ventures	*			*			*	*		*	*	6
Administrative	Joint R&D	*							*		*		3
	Incubators development	*	*		*	*	*			*		*	7
	HR				*							*	2
	Networking			*							*		2
Informational	Providing advisory services			*	*						*	*	4
	Training (managerial/ technical)	*		*	*						*	*	3
Regulatory	Creating proper legal environment							*	*		*	*	4

## Reviewing Internal Policy Tools

Governments play a vital and strategic role in devising policymaking systems. Needed technical, social and cultural grounds to produce, use and disseminate knowledge and shaping innovation waves for contribution in knowledge – based economy are manuals to be considered by policymakers in the 21<sup>st</sup> century (Akbarzadeh & Shafizadeh, 2012, p.47; Monavarian Asgary, 2004). Domestic research attempts to identify and prioritize key initiatives by governments to help the improvement of the procedure causing the creation and development of knowledge – based businesses (Akbarzadeh & Shafizadeh, 2012, p.45). In Iran, several studies are conducted to support new technology-based firms. These studies try to promote knowledge – based economy, resistance economy and policy tools proposed to the government. According to Mahdavi et al (2011), the tasks of new technology-based firms are usually in the framework of technology growth and development since major R&D activities seek technology growth. Technology growth at the level of firms is mainly achieved by economic motivations, adopting regulations and providing facilities through structures such as science and technology parks and national programs act as supporting agents (Mahdavi et al, 2011, p.55).

Stiri and Moshiri (2009) expressed some affecting factors on knowledge – based economy development as below:

- **Internet** as a factor of global knowledge synergy and knowledge development tool;
- **E-government and e-commerce** which expound the main aspects of knowledge – based economy;
- **The development of ITC** would lead to knowledge growth and economic development;

- **Educated, skillful, creative and innovative** manpower which plays a vital role in knowledge – based economy;
- **Governmental policies** such as commerce supportive atmosphere, legal system, tax system and proper regulated policies;
- **Infrastructures** such as telecommunications, ITC and scientific networks;
- **Financial resources** including risk-taking investors, foreign investors and governmental budgets providing proper tools for joint ventures.

Shafiei (2007) divided critical factors for the success of science and technology firms to expand knowledge – based businesses into four main categories: spatial, supportive (governmental factors, managerial and socio-cultural factors with their own subsets. According to Samadi et al (2008), governments can play a role in the success or failure of technological firms in the following ways:

- Knowledge – based economy development
- Strong emphasis on innovation and removing the barriers against it
- Acting as a catalyst for change;
- Facilities (government is a strong agent to change research into action and can gather varied beneficiaries and stakeholders);
- Investments;
- Identifying progress bottlenecks
- SMEs and applying guidelines to make technology transfer and commercialization;
- Supplying required physical infrastructures;
- Legislating facilitating laws and regulations as well as providing needed legal supports for the running of technological firms (Samadi et al, 2008, p.34).

In a study on strategies and plans to create and develop new technology-based firms, Technology and Applied Research Office of Tarbiat Modares University provided strategies below for the rapid promotion of this university in national level in terms of new technology-based firms' development:

- Pursuing the establishment of New Technology-Based Firms (NTBFs) by Tarbiat Modares University to conduct special missions or legal partnership with other new technology-based firms in accordance with the policies of the university;
- Approving a rule to grant incentives and bonuses to these firms under the brand of new technology-based firms affiliating to university;
- Passing a statute to bring financial and moral support to establish new technology-based firms based on definite business plans;
- Helping to form technology cores to establish incubators and technology parks at Tarbiat Modares University to commercialize and establish technology-based firms;
- Setting up joint venture funds at university to establish new technology-based firms especially through partnership with financial organizations and banks;
- Holding short term MBA or other strategic training courses for new technology-based firms through collaboration with University's entrepreneurship center or other centers; and
- Establishing consultancy centers or providing service to set up new technology-based firms.

Deylam Salehi (2009) asserts that the most important concern for startups is lack of financial resources and the government has the most important role in supplying them (Deylam Salehi, 2009, p.11). Sultani (2005) believes that providing governmental facilities is a determining factor in the

success of new technology-based firms in science-and-technology parks Sultani, 2005, p.17). By minor changes in the categorization done by Story and Teder (1998), Ahmadi & Ghazi Noory (2008) believe that new technology-based firms can receive support through science parks, human resource development, the supply of PhDs in science and technology, direct financial support to NTBFs by national governments and the impact of technological advisory services on NTBFs.

The most prominent finding of this study is the direct financial support to NTBFs by national governments which is divided in terms of importance into JV development, loan and share guarantees, Low Doc loans, low interest loans and small loans. The second priority is developing human resource development including entrepreneurial and managerial training for science and technology students, educating management practitioners in business management and similar fields, providing subsidies and tax incentives to use employees in R&D and educating science and technology doctorate. The third priority in technological advisory services includes JV development, monitoring the quality of services, notifying the existing services and providing subsidies while the fourth priority in science parks consists of specialized incubators, increasing the share of income for located firms in the budget of incubators, locating incubators in science and technology parks, locating incubators in distinguished areas (close to commercial centers and universities), increasing the quantity and capacity of governmental and non-governmental incubators. (Ahmadi & Ghazi Noory, 2008, pp.81-86)

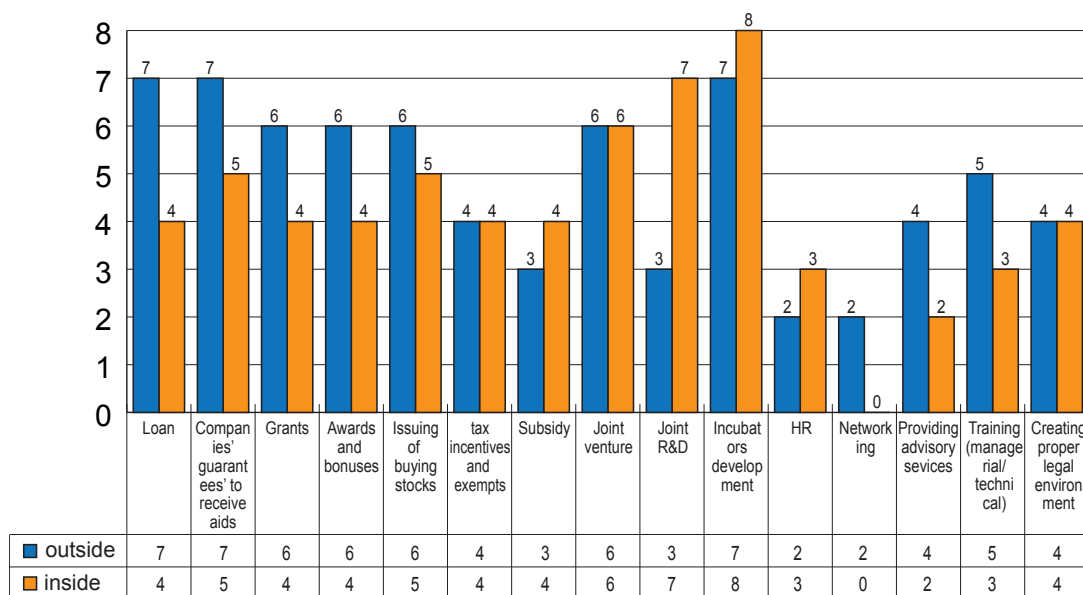
Akbarzadeh and Shafizadeh (2012) identified and prioritized key implementable activities by government to help the improvement of creating and developing these businesses. The results of the research suggest that this can be implemented by 8 indices ranked by importance: financial support by government, special structure for laws and regulations (tax exemptions, tolls, customs duties, commercial interest, importation duties), infrastructures (telecommunications, ITC and scientific sciences), government's supportive policies (commerce supportive atmosphere), investment funds (e.g. innovation and blossom funds), entrepreneurship promotion and efforts to create a proper context, governmental incubators and human force development.

Table 2. *Conclusion of Policy Tools in Iranian Studies*

Type of policy tools	Specific tools	Ryahi (2003)	Sultani (2005)	Shafei (2007)	Ahmadi & Ghazi Noory (2008)	Stiri & Moshiri (2009)	Salehi (2009)	PARliament / support law (2010)	Mahdavi et al (2011)	Tarbit Modares University (2012)	Akbarzadeh & Shafizadeh (2013)	Total
Financial	Loan					*	*	*			*	4
	Companies' guarantees' to receive aids				*	*	*	*			*	5
	Grants					*	*	*			*	4
	Awards and bonuses					*	*	*			*	4
	Issuing or buying stocks				*	*	*	*			*	5
	Tax incentives and exemptions					*	*	*			*	4
	Subsidy					*	*	*			*	4
Joint ventures	*				*	*	*	*	*	*	6	
Administrative	Joint R&D					*	*	*				7
	Incubators development	*	*	*	*	*		*	*		*	8
	HR				*	*					*	3
	Networking											0



Informational	Providing advisory services				*				*		2
	Training (managerial/technical)				*				*	*	3
Regulatory	Creating proper legal environment	*				*		*	*		4



Graph 1. Comparing Policy Tools to Support New Technology-Based Firms Inside and Outside Iran

## Methodology

Forecasting is one of the most important activities performed by professionals in support of public policymaking. In a world dominated by utilitarian thinking, policymakers regularly seek forecasts of the costs and consequences of alternative courses of action from planners, engineers, economists, and others. Forecasts are presented to the public as the results of unbiased scientific procedures. According to law, and in the eyes of the public, their forecasts are expected to provide analyses aimed at clarifying choices among courses of action (Wachs, 1990, p.141). Categories of forecasting methods include quantitative and judgmental Methods (Armstrong, 2001, p.9).

### Quantitative Methods

When you have enough appropriate data to use quantitative methods, you may or may not have good prior knowledge about future relationships. When you do not, the selection of an approach depends on whether you have cross-sectional or time-series data. (Armstrong, 2001, p.11).

### Judgmental Methods

Judgmental forecasting methods incorporate intuitive judgment, opinions and subjective probability estimates. Judgmental forecasting is used in cases where there is lack of historical data or during completely new and unique conditions (Lawrence et al, 2006). The selection of judgmental procedures depends on whether substantial deviations from a simple historical projection are

expected over the forecast horizon (Armstrong, 2001, p.9).

Judgmental methods include composite forecasts, cooke's method, Delphi method, forecast by analogy, scenario building, statistical surveys and forecasting. Statistical survey method was used in this research.

In terms of methodology and data collection tools, this applied research is a descriptive survey. It is descriptive due to the image it provides on future position and it is a survey because the data were gathered through sampling. Documents and questionnaires are used to collect data through library studies, reviewing relevant literature and extracting policy tools through a questionnaire. In this research, paired t – test is used to test the significance of the gap between probable and preferred future situation and Freedman test is used to prioritize preferred policy tools to analyze data acquired from the answers to 16 questions. In this questionnaire, each item has two ranges:

(1) Probable policy tools

(2) Preferred policy tools for new technology-based firms

Policy research with the approach of future studies, only forecast future events, and if possible, they are not limited to making preferred future. But also to prepare policy makers to deal with real future events by exploring a range of alternative futures.

### *Population and sample*

Research participants are managers and experts of new technology-based firms collaborating with public industries. 23 companies were selected and 45 questionnaires were distributed among 21 active and accessible new technology-based firms. The questionnaires were sent for all new technology-based firms by census technique and finally 39 questionnaires were received.

Table 3. *Frequency of participants' distribution by education*

Education	Frequency		%
	Manager	Expert	
Doctoral	6	0	15%
Postgraduate	11	9	51%
Graduate	9	4	34%

### **Validity and Reliability**

In this study, data collection is structured and after exploring and extracting theoretical texts, different books, articles, dissertations and reviewing domestic/foreign research reports, policy tools were listed in tables 1 and 2. Then, for each policy tool one question was proposed and shared with elites. After some modifications based on their feedbacks, the questionnaire was finalized. Reliability ratio of the questionnaire was pretested by SPSS software package and the value was 0.81.

## Findings

### *Gap analysis of probable and preferred situations (t-test)*

In table 4, the results from each four major hypotheses are summarized indicating an inductive analysis of testing paired samples.

Hypothesis 1: the preference for new technology-based firms to use financial tools in future is more than probable situation.

Hypothesis 2: The preference for new technology-based firms to use administrative tools in future is more than probable situation.

Hypothesis 3: The preference for new technology-based firms to use information tools in future is more than probable situation.

Hypothesis 4: The preference for new technology-based firms to regulatory tools in future is more than probable situation.

In all cases, research hypotheses are divided into H0 and H1. For instance, H0 and H1 for hypothesis 1 are as follows:

H0: The average preference for new technology-based firms to use financial tools in future is not more than theirs in a probable situation.

H1: The average preference for new technology-based firms to use financial tools in future is more than theirs in a probable situation.

As seen in table 4, all hypotheses except H3 were supported. In other words, since t-value of paired sample in hypothesis three is greater than t-value of the table (2) with the freedom degree of 38 and alpha ratio of 0.05; therefore, H0 is supported. It means that the average of the preference for new technology-based firms to use information tools in future is not more than that for a probable situation. However, there is a gap between preferred situation of financial, administrative and regulatory policy tools and probable situation in the future.

Table 4. Results from Paired t-test of Hypotheses

Hypotheses	Paired differences			confidence level of 95% for average		t statistic	Freedom degree	significance level
	average	standard deviation	average error standard deviation	Lower level	Higher level			
Financial	1.76	0.42	0.041	1.68	1.84	41.27	38	0.000
Administrative	0.91	0.58	0.045	0.80	1.01	27.17	38	0.000
Informational	0.5	0.35	0.039	0.4	0.6	32.68	38	0.226
Regulatory	0.58	0.32	0.033	0.49	0.68	31.52	38	0.000

As seen in table 5, the widest gap is 1.76 in financial policy tools and narrowest gap is 0.5 in information policy tools. The table above shows that administrative and regulatory policy tools have lower ranks and should be developed by considering preferred.

The components of this variable are:

- Loans
- Companies' guarantees to receive aids

- Grants
- Benefits and bonuses
- Subsidy
- Issuing or buying shares
- Tax incentives and exemptions
- Joint ventures

Table 5. Testing Paired Samples (Conclusion of t-test Results)

Policy tool (hypotheses)	Expect	Current	different gap
Financial (H1)	3.83	2.07	1.76
Administrative (H2)	3.09	2.18	0.91
Informational (H3)	2.51	2.01	0.5
Regulatory (H4)	2.79	2.21	0.58

### Prioritizing Preferred Policy Tools

Freedman test is used to study steady prioritization (rating) some dependent variables. However, one should note that, in statistics, there is no special method to determine the rate of variables. Freedman test can only study whether the ranks are equal or not (Momeni & Ghayumi, 2006). The results from this test are shown in two tables. In the first table, statistical characteristics and Chi<sup>2</sup> statistic are shown and in the second table, the average rate for each variable is provided.

Table 6. Results from Freedman Test for Preferred Policy Tools

Statistical indicators	Figures
Computed Chi <sup>2</sup>	51.419
Freedom degree	38
Computed significance level	0.03

In the confidence level of 95%, one can say that since computed significance level is less than the plausible error level (0.05), the average rates of preferred policy tools are not the same (Table 6). In other words, at least there is a significant difference between the averages of pairs in preferred policy tools. The average rates for each preferred policy tools supporting new technology-based firms are seen in table 7.

Noteworthy, higher average rates attribute more importance to that policy tool. As seen, the highest rate is for “joint venture” while the lowest one is for “providing advisory services”.

Table 7. Average Rates in Freedman Test for Preferred Policy Tools

Policy tools type	Preferred policy tools	Average rates	Priority
Financial	Loans	16.62	8
	Companies' guarantees to receive aids	18.46	4
	Grants	17.06	7
	Awards and bonuses	15.64	13
	Subsidy	17.32	6
	Issuing or buying shares	19.20	3
	Tax incentive and exempts	15.35	14
	Joint Ventures	20.01	1
Administrative	Networking	17.68	5
	Joint R&D	19.39	2
	Incubators Development	16.41	9
Informational	Human force development	15.70	12
	Providing companies with advisory services	13.23	15
Regulatory	Technical and managerial training	15.87	11
	Creating a proper legal environment	16.07	10

## Conclusion

The findings showed that domestic/foreign policy tools supporting new technology-based firms are 15 which are categorized into 4 groups. These groups are financial, administrative, informational and regulatory types which contain 8, 4, 2 and 1 tools, respectively. As shown in graph 1, the emphasis on financial tools both internally and externally is more than that on other policy tools. As mentioned in the research by Abbassnia and Abdi (2013), this is due to the demand for new technology-based firms in Iran. In foreign studies, the most emphasized and used tools are given loans by government and banks; supporting new technology-based firms to receive aids; and incubators development. In Iran, the highest emphasis and used tools include incubators development (8), joint R&D with governmental entities and institutes (7) and joint ventures (6). Concerning incubators, as suggested by Ahmadi and Ghazi

Noory (2008), general incubators should be converted into specialized new technology-based firms. Joint venture was the first priority in the study by Ahmadi and Ghazi Noory (2008) while it had the 7<sup>th</sup> rank in the study done by Akbarzadeh and Shafizadeh(2012). Likewise, networking policy tool has not been regarded by Iranian policymakers and authors.

Stiri and Moshiri (2009) further emphasized identifying financial tools in Iran even though this field may need more supports than financial ones due to the importance given by different people to national development, production and profitability of high – tech projects. Abbassnia and Abdi (2013) emphasize that in Iran, from the early stage of an idea to making the first sample, a mechanisms are needed to finance and procure required resources for growth by a law, plan, incubator, science and research towns, technology parks or support funds which have shown success in recent years (Abbassnia & Abdi, 2013, p.2).

However, the widest gap still exists between probable and preferred situations in the financial policy tools as the most important requirement of startups. The rank of organizational support, comprising of legal and structural support by tax incentives and exemptions, is 14. It indicates that there is a great deal of concern about preferred future and adopting tax incentive and exemption based on the sixth development program. However, this study shows there is the widest gap between probable and preferred situation of financial policy tools.

This study shows that as the basis of future studies, strategic intelligence and information of policy makers are promoted by futurists. therefore, can be used by those policymaking and executing entities using policy tools. Therefore, it is hoped that this research can pave the way for the better usage of such tools. Thus, it provides policymakers with fruitful and potential information to diagnose priorities, preferences and expressed needs for policy tools. Likewise, using the experience of other countries and “best practices” in the field of supportive policy tools and interacting with new technology-based firms can lend support for the acquiring of “policy learning”.

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