

The Decision to Participate in Entrepreneurial Networks: The Case of Singapore

Teck-Meng Tan

Nanyang Technological University, Singapore

Wee-Liang Tan

Nanyang Technological University, Singapore

John E. Young

The Robert O. Anderson School

University of New Mexico

Albuquerque, NM 87131-1221

Phone: 505-277-6471 Fax: 505-277-7108

Abstract

This paper defines the concept of entrepreneurial infrastructure and describes the elements which comprise them. It then examines the proclivity for entrepreneurial participation within such infrastructure networks. Six variables are proposed as being critical for entrepreneurial interaction with infrastructures and a proposed model for participation is suggested. Twelve indepth interviews are conducted with entrepreneurs in the nation of Singapore and based upon data gathered, the proposed variables and model are revised. Based upon the revised variables and model, implications for public policy are developed.

Over the years, several studies have investigated differences in new venture creation among geographic areas in an attempt to identify factors contributing toward supportive environments for new business creation (Bull and Winter, 1993; Bearse, 1982; Pennings, 1982a, 1982b). One conceptual element that is considered a major factor in stimulating new business creation and small business growth and development in regional environments is the entrepreneurial infrastructure. This paper briefly develops the concept of entrepreneurial infrastructure and proposes six criteria that determine whether entrepreneurs will participate in these networks. Then it reports the results of exploratory, in-depth interviews among entrepreneurs in Singapore. A revised model is developed based on interview data.

Entrepreneurial Infrastructure

While industrial infrastructure represents the place-specific notion of the facilities and services underpinning all of the industry and populations residing within a given location (Vaughn, 1983; Porter, 1990), entrepreneurial infrastructure, as the term is used here, represents a sub-set of the more general industrial infrastructure concept. Hence, *entrepreneurial infrastructure* represents the

facilities and services present within a given geographic area which encourage the birth of new ventures and the growth and development of small and medium-sized businesses.

Although the importance of the entrepreneurial infrastructure concept seems readily apparent for promoting business creation and development, there has been a dearth of research and analysis regarding the topic. One significant exception to this lack of systematic analysis is the recent work of Van de Ven (1993). Van de Ven (1993) stipulated that while entrepreneurial infrastructures are indeed critically necessary, such mechanisms - once in place - are not sufficient conditions for fostering the development or commercialization of technological innovations. Nevertheless, Van de Ven (1993) concluded that entrepreneurial infrastructures include: (a) the development of resource endowments for basic knowledge, (b) financing mechanisms, (c) competent labor, and (d) an institutional governance structure which legitimizes, regulates, and standardizes the activities of industry members. Another explicit reference to the "new venture infrastructure" concept was made by McMullan and Long (1993). McMullan and Long (1993) considered the components of a "new venture infrastructure" to be entrepreneurship education, incubators, and venture capital. They considered these components of the infrastructure to be complementary and mutually supportive of each other.

Entrepreneurial infrastructures provide support to potential new business owners, owners of small growing businesses, and existing small and medium-sized businesses in the form of: (1) assistance with tasks which the business owner or small firm must accomplish, (2) resources - physical or monetary, (3) information, and (4) knowledge. Such infrastructures are important for community economic growth and development because communities can influence the level of entrepreneurship activity within their domains by influencing elements within the entrepreneurial infrastructure (Bull and Winter, 1991).

Assistance with Tasks

Conceptually, one can consider the tasks which the business owner performs within the operating domain of the business as internal tasks. Such internal tasks would include planning, directing, and organizing various functional activities of an enterprise. Likewise, one could consider tasks performed by others, in various functional areas, within the boundary of the enterprise as internal tasks. Using these perspectives pertaining to internal task processes, the decisions of individual entrepreneurs or representatives of businesses to seek assistance in performing their tasks, from entities outside the business, can be viewed as decisions to form boundaries with external individuals or organizations (Mackenzie, 1986).

Required Resources: physical or monetary

In order to function effectively, business owners and small firms require facilitative resources. For instance, with regard to business creation, potential business owners require adequate physical accommodations and capital. To the extent that physical facilities and installations exist and are able to accommodate aspiring business owners (e.g., incubators) and growth-oriented businesses (e.g.,

industrial parks) or, that capital sources are adequate (e.g., venture capital firms), the infrastructure support network is effective.

Required Information

Small business owners and small, growing businesses require information in order to effectively carry out their work. For instance, information is needed regarding the environment. Such helpful information, which can assist business owners in making effective decisions, would include economic, market, legal, technological data, and other environmentally related data. This information and data could be made available from facilities established within the entrepreneurial infrastructure.

Required Knowledge

Small business owners and their businesses will be ultimately successful only if the business owner or firm has attained a level of knowledge which is adequate for accomplishing the tasks with which they are faced. Such knowledge, which is stored in the business owner's long-term memory, can be acquired by experience through trial-and-error while operating the business (Reuber and Fischer, 1993). However, entrepreneurial knowledge can also be acquired through formal training in the concepts and skill areas which can be directly applied within the business venture (e.g., Barnes and Jones, 1995; Gosh and Block, 1993). When facilities exist to encourage the transfer of such knowledge, these facilitates are said to be components of the entrepreneurial infrastructure. Next, we will examine six critical factors which encourage or discourage the participation of potential business owners, practicing business owners, or small and medium-sized firms in infrastructure networks.

Decision to Participate in the Entrepreneurial Infrastructure

Participation in the network is influenced by several factors, which serve as independent variables in a proposed conceptual framework, (see Table 1).

Insert Table 1 about here

According to Table 1, six critical variables affect an individual's or firm's decision to participate in the infrastructure network. Variable X_1 reflects the potential user's realization that the individual or firm needs some form of assistance. This assistance could be for either new venture creation or for ongoing small or medium-sized businesses. X_2 examines whether the entrepreneur is aware that infrastructure support is available within the geographic area to provide what is needed. X_3 examines the capacity of the facility. Capacity encompasses issues such as: Is the facility large enough, in terms of physical capacity, electronic capacity, financial capacity, and so on? Is there enough capacity to meet the demands for the services?

X_4 examines the accessibility of infrastructure services and the facilities which provide them. For example, research laboratories may be present within a community, but may be inaccessible to a potential user due to user fees required, security clearances, location, or for other reasons.

Potential users of infrastructure networks may be prone to use such services if they are under severe pressure for doing so. For instance, financial pressure and time deadlines could represent two forms of pressure which may influence a potential user to be more likely to seek assistance within the support network. X_5 represents this variable.

If the potential users are to utilize the services provided within an entrepreneurial infrastructure, they must perceive that the services they receive are competent. For instance, are the personnel working within the facility perceived as competent to perform their jobs? Is the technology utilized at the facility adequate to meet the needs of potential users, and so forth? Answers to these questions are reflected in variable X_6 . In essence, these six variables represent independent variable which determine a potential user's inclination for participating within the infrastructure.

The Case of Singapore

The setting for the test of the framework was the nation of Singapore. Hence, the study represents a single case analysis or test of the model. Singapore received its independence from Britain in 1959. While the main island, located off the Malay Peninsula, covers only 225 square miles, it boasts a population of slightly over 3 million. In its early stages of industrialization, attracting investments from multinational companies was one of the country's primary development strategies.

However, since the recession of 1985-86, the importance of local companies to the economy has been increasingly recognized (Lee, et. al, 1994). Over the past several decades, the government of Singapore has promoted numerous such programs for enhancing the country's economic development.

Currently, Singapore's economic growth is targeted to propel the city-state from the status of a newly industrialized economy (NIE) to that of a developed economy by the year 2000 (Wu, 1991). The development of small and medium-sized businesses represents a major component in Singapore's Strategic Economic Plan (Chew and Goh, 1994). As recently as 1992, small and medium-sized businesses represented as much as 44% of the country's workforce (EDB Annual Report, 1992). It has been estimated that Singapore has over 60 government or quasi-government programs which are available for assisting the nation's entrepreneurs and SMEs (Teo and Lee, 1994).

Methodology

The Sample

The study was conducted by administering a series of semi-structured interviews with 12 entrepreneurs, presidents, or top executive officers. Effort was put forth to ensure that companies of

different ages and number of employees were included in the sample. Interviewees were queried only with regard to infrastructure facilities and services with which they had either personally interacted or had intended to utilize. For instance, the respondent may be asked whether he had sought or obtained any business assistance in the last two years. If the answer was "yes", follow-up questions were asked in order to assess the respondent's perceptions of adequacy, accessibility, competence, and the other variables with regard to facilities or services that they actually used or attempted to use (e.g., National Productivity Board Short Courses).

In-depth interviews were conducted with 12 small and medium-sized businesses. The sample can be considered a within-case, nested sample, the intent of which was to generate a better understanding of the local entrepreneurial network within the nation. Of the 12 companies interviewed, 3 were in design and manufacturing, 4 were engaged in trading and distribution, and 5 were in service or retail sectors. The majority of small and medium-sized businesses in Singapore fall within these three industry categories.

Procedure and Interviews

The procedure used in the study was to begin with a preconceived conceptual framework, interview a company to test the "fit" of the framework with the company's own experience. If the model fit the company's decision criteria, no revisions were made. Exceptions, and hence revisions, to the existing model were sought during each company interview.

Semi-structured interviews were conducted with 12 founding entrepreneurs or current chief executive officers. The general structure of the interviews was as follows:

- (1) Introduction and pleasantries,
- (2) Discussion of problems encountered and challenges currently facing the company [taping begins],
- (3) For each encounter with the infrastructure, or each problem faced, interviewers asked:
 - (a) Have you ever sought assistance from one of Singapore's public or government sponsored units or organizations? (If not, question 4 was asked).
 - (b) If yes, why did you seek such assistance?
 - (c) What was your experience?
 - (d) Was it easy or difficult?
 - (e) Were you successful? Did you obtain what you wanted?
 - (f) Were the resources adequate?
 - (g) How immediate was your need?
 - (h) How did you find out about the program/scheme/facility?
- (4) If no, why did you not use any public or government sponsored units?
Have you ever felt that you have missed an opportunity to use one of these facilities?
- (5) Before the close of the interview, entrepreneurs were asked if there was any need that they had which they hoped that a government agency would be able to fulfill. [Taping ends].
- (6) Closing statements and brief tour of the facilities.

Inter-coder Reliability

As a result of the interviews, 78 specific instances were mentioned in which entrepreneurs either actually received infrastructure assistance, explicitly considered interacting with components of the network, or in retrospect missed opportunities to receive assistance through interaction with infrastructure facilities. These actual, explicitly considered, or missed opportunities for infrastructure interaction generated 78 sets of data for content analysis. Each of these data sets was examined separately to determine its “fit” with the proposed conceptual model and its six suggested independent and four suggested dependent variables. This examination process resulted in the coding of a total of 546 data-points, or decision points, within the model, for the 78 sets of data. Of the total 546 data-points examined, 90 of these decision points represented disagreements between the two analysts after discussion. This resulted in an inter-coder reliability factor of $(546-90)/546$ or 83.52%.

Analysis

Of the 78 sets of data which were analyzed, 6 did not fit the proposed conceptual model. Seventy-two data sets conformed to the proposed framework. Figure 1 illustrates the distribution of data sets which were confirmed by the model. The figure indicates that each path was verified by at least one data set while some paths had significantly higher number of data sets than others. The number of data sets which “fit” each path are indicated.

Insert Figure 1 about here

The variable which accounted for the lack of fit with all 6 data points was variable X_5 , "Is the business need urgent?" In addition to the 6 non-confirming data sets, 1 data set fit the model, but was not adequately explained by the proposed framework.

Revising the Model

After several iterations through the data sets, seeking to match the data to the model, a final version of the model was derived. No new variables were discovered during the analysis which affect the entrepreneur's or company's participation in the infrastructure. However, the ordering of the variables was altered to reflect the increased importance of specific variables in the decision process. Also, one variable was refined in greater detail. The revised list of variables appears in Table 2.

Insert Table 2 about here

Table 2 indicates that variable X_3 has been changed. Decision question, "Is the business need urgent?" has now been moved to an earlier decision point in the mapping function to reflect its increased importance as discovered in the data.

Impact of Urgency of the Need on Decision to Participate. The 6 data sets which did not fit the proposed model indicated that, if need for assistance or services offered by the infrastructure is intense, the competence of the facility or service is overlooked. The entrepreneur will seek to utilize the facility or interact with the infrastructure regardless of the facility's accessibility, adequacy, or perceived competence. On the other hand, when the business need is not urgent, there remains the possibility that the entrepreneur may choose not to interact with the infrastructure. In addition to the clear lack of fit of these six sets, 7 of the 12 companies verbally expressed support for the increased importance of the urgency variable.

Impact of Latent Demand on Decision to Participate. The seventh item which did not fully fit the participation model was revealed regarding the interaction of a company with the Skills Development Fund (SDF). This data set was coded as having positive responses for all variables, which was the case at the time of the interview.

This was a young company, specializing in the importation of automobile accessory items such as designer mirrors, brake lights, engine performance enhancing additions, car seats, and upholstery. The entrepreneur displayed an awareness of government schemes and other facilities in the infrastructure, which was below that of the other entrepreneurs in the study. During the interview, he revealed that he was initially unaware of the Skills Development Fund and how it could be applicable to his company. Then, he was introduced to the facility by his finance company. Once he was made aware of the resource, he immediately recognized the need for assistance and utilized the facility.

This pattern was also displayed by the entrepreneur during the interview itself. At the time of the interview, he was unaware that tax incentives were available for companies that participated in overseas trade shows and exhibitions. Upon discovering during the interview that such incentives were available, he instantly recognized the applicability of the tax incentives to his business, and indicated that he would immediately investigate how he might take advantage of such incentives. From these two interactions, it became apparent that recognition of an awareness of a facility or resource, and recognition of the need for assistance, could occur simultaneously.

Impact of Accessibility on the Decision to Participate. Due to difficulty encountered in coding variable X_4 , "Resources to assist potential users perceived to be accessible?", it became clear that more refined coding scores would be required. Therefore, three categories were created to record this variable. First, "inaccessible" was used to describe when the facility was unavailable due to factors such as regulation, or prohibitive costs associated with accessing the facility in the near-term (for instance within the next 2 years). Under these and similar conditions, it would not be possible for the business to interact with the facility under any circumstances in the near future.

On the other hand, if the facility was accessible, differences in the behaviors of the entrepreneurs were seen depending on whether the facility was either "difficult" to access or "easily

accessible." For instance, in the case of one company, the difficulty in obtaining a bank loan to finance the start-up drove the entrepreneur to seek all equity financing for his company. However, when the facilities were perceived to be easily accessible, the entrepreneurs were likely to use the facility depending on its competence, urgency of the business need, and perceived adequacy of the resources.

It was also discovered that speed of the response of the facility was one of the attributes which should be considered in the definition of accessibility. From the information provided by the respondents, it appears that the accessibility of a particular facility should include consideration of the speed with which the facility will be able to respond with its services.

The final revised conceptual framework is illustrated in Figure 2. This revised framework indicates the following: (1) A dotted line between variable X_1 and X_2 indicating the possibility that both conditions can become present simultaneously, or that X_2 may precede X_1 . (2) The decision question, "Is the business need urgent?", formerly associated with variable X_5 has now been moved forward in the mapping function to become variable X_3 . This change reflects the increased importance of this decision question in the mapping function. (3) Decision question, "Are the resources or facility perceived to be adequate in terms of capacity?" has now become variable X_5 . (4) Finally, variable X_4 , "Resources to assist potential users are perceived to be accessible" now has three possible values. This revised mapping function fits all of the 78 collected sets of data.

Insert Figure 2 about here

Implications

The analysis revealed a different ordering of the independent variables, reflecting a different weighting in the decision-making mapping function for predicting participation in the infrastructure. The new ordering, depicted in Table 2 and Figure 2, indicates that the most important variable is for the entrepreneur or the company to recognize that there is a legitimate need for business assistance. One way in which governments can facilitate this initial and most essential step, variable X_1 , is by publicizing standards similar to the Robert Morris Associates benchmarks published in the U.S. Such readily available performance standards could help in developing "typical" operational benchmarks for Singapore-based companies. These measures could then be used for assessing the operations of Singaporean firms. However, in developing such standards, care should be taken to distinguish typical operating standards for large, multinational corporations from those which reflect the "best practices" of small to medium-sized entrepreneurial enterprises (SMEs). Currently, databases chronicling best practices standards and metrics for growth-oriented SMEs are virtually non-existent world-wide¹. Databases, providing financial and nonfinancial benchmark information for Singaporean SMEs should be encouraged.

¹The significant exception to the lack of databases providing operating metrics for the "best practices" for growth-oriented, entrepreneurial firms is the newly established database at the Center for Entrepreneurial Leadership at the Ewing Marion Kauffman Foundation in Kansas City, Missouri, U.S.A.

Variable X_2 appears to offer the greatest potential for improving the current effectiveness of the Singaporean entrepreneurial infrastructure. Without investing in additional facilities, the effectiveness of schemes which are currently available could be significantly enhanced by informing greater numbers of SMEs and entrepreneurs of the availability of existing resources. This reality is also borne out by the creation of the dotted line in Figure 2 connecting variables X_1 and X_2 . The investigation determined that entrepreneurs and SMEs, upon learning of the availability of facilities, which could prove beneficial to their businesses, would immediately seek out such facilities. Hence, more companies should be made aware of the existence of the wide array of services which already exist.

The urgency of the need facing entrepreneurs and SMEs, variable X_3 , was discovered to be more important than originally predicted. Government can have no effect on the degree of urgency of specific challenges facing SMEs as they continually encounter operating and growth-related problems. However, X_3 , the degree of urgency of the problem, should be considered in relation to variable X_4 , the accessibility of the resources or facilities. When entrepreneurs urgently need specific resources, facilities providing such resources should be readily accessible. Regarding the accessibility variable, X_4 , entrepreneurs' perceptions were found to be more sophisticated than originally proposed, calling for greater refinement of the independent variable. For instance, when entrepreneurs urgently need financial assistance to fill orders-in-hand, the inaccessibility of government programs due to cumbersome and time consuming procedures will deter participation. Implications for policy in these instances could encompass the creation of "rapid response" procedures for pre-selected problems facing SMEs.

The study indicated that clients do in fact consider the capacity of infrastructure facilities, X_5 , before such facilities are approached. However, the capacity of the facility, which includes financial, physical, electronic, and manpower characteristics is not as important to the decision maker as originally proposed. Finally, entrepreneurs and SMEs are the least concerned with the competencies of infrastructure resources, X_6 , as they effect the likelihood for engaging such resources. This was clearly borne out when financial resources were approached. In the case of consultation, perhaps SMEs simply ignore what they consider to be "inappropriate" or "irrelevant" advice. In both cases, SMEs seem to be the least concerned with the perceived competence of the resource as it affects their own decision to seek or not seek assistance.

Limitations of the Study and Future Research

This attempt to develop a generalizable model for predicting the likelihood for participating in entrepreneurial infrastructures has several limitations which should be addressed in future studies on the topic. For instance, several services in entrepreneurial infrastructures as conceived in this study can be obtained in one of the other major infrastructure categories. A single university program, for example, can provide data, consultation, and even physical resources in the form of incubator space. Therefore, facilities classified in this study were categorized based upon the most predominant services rendered by the facility.

The model developed here is based upon in-depth interviews of 12 companies selected as representing typical SMEs in the Singaporean economy. The essence of the theory development process used was to look for exceptions to the proposed conceptual model, in an iterative fashion. Therefore, while all 12 cases fit the present revised model, it is likely that other exceptions to the framework currently exist within the nation. As a matter of public policy, such exceptions should be sought, as the government continues to attempt to promote the competitiveness of its SMEs on the stage of global commerce. The authors encourage others to replicate this particular study and to develop other models for examining the likelihood of participating in entrepreneurial infrastructures.

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Table 1
Proposed Variables Influencing the Decision to Participate
in Entrepreneurial Infrastructures

Variable	Decision Question	Values
X ₁	Company or individual recognizes a need for assistance?	X ₁ = Yes X ₁ = No
X ₂	Company or individual is aware of the existence of resource or facility?	X ₂ = Yes X ₂ = No
X ₃	Resource or facility perceived to be adequate in terms of capacity?	X ₃ = Yes X ₃ = No
X ₄	Resources to assist potential users are perceived to be easily accessible?	X ₄ = Yes X ₄ = No
X ₅	Is the business need urgent?	X ₅ = Yes X ₅ = No
X ₆	Are the resources perceived to be competent?	X ₆ = Yes X ₆ = No
R	Will participate. Possible participation. Participation not likely. Will not participate.	

Table 2
Revised Variables Influencing the Decision to Participate
in Singapore's Entrepreneurial Infrastructure

Variable	Decision Questions	Values
X ₁	Company or individual recognizes a need for assistance?	X ₁ = Yes X ₁ = No
X ₂	Company or individual is aware of the existence of resource or facility?	X ₂ = Yes X ₂ = No
X ₃	Is the business need urgent?	X ₃ = Yes X ₃ = No
X ₄	Resources to assist potential users are perceived to be accessible?	X ₄ = Inaccessible X ₄ = Difficult X ₄ = Easy
X ₅	Resource or facility perceived to be adequate in terms of capacity?	X ₅ = Yes X ₅ = No
X ₆	Are the resources perceived to be competent?	X ₆ = Yes X ₆ = No
R	Will participate Participation likely Participation unlikely Will not participate	

Figure 1
Distribution of Responses Fitting Paths of the
Proposed Model

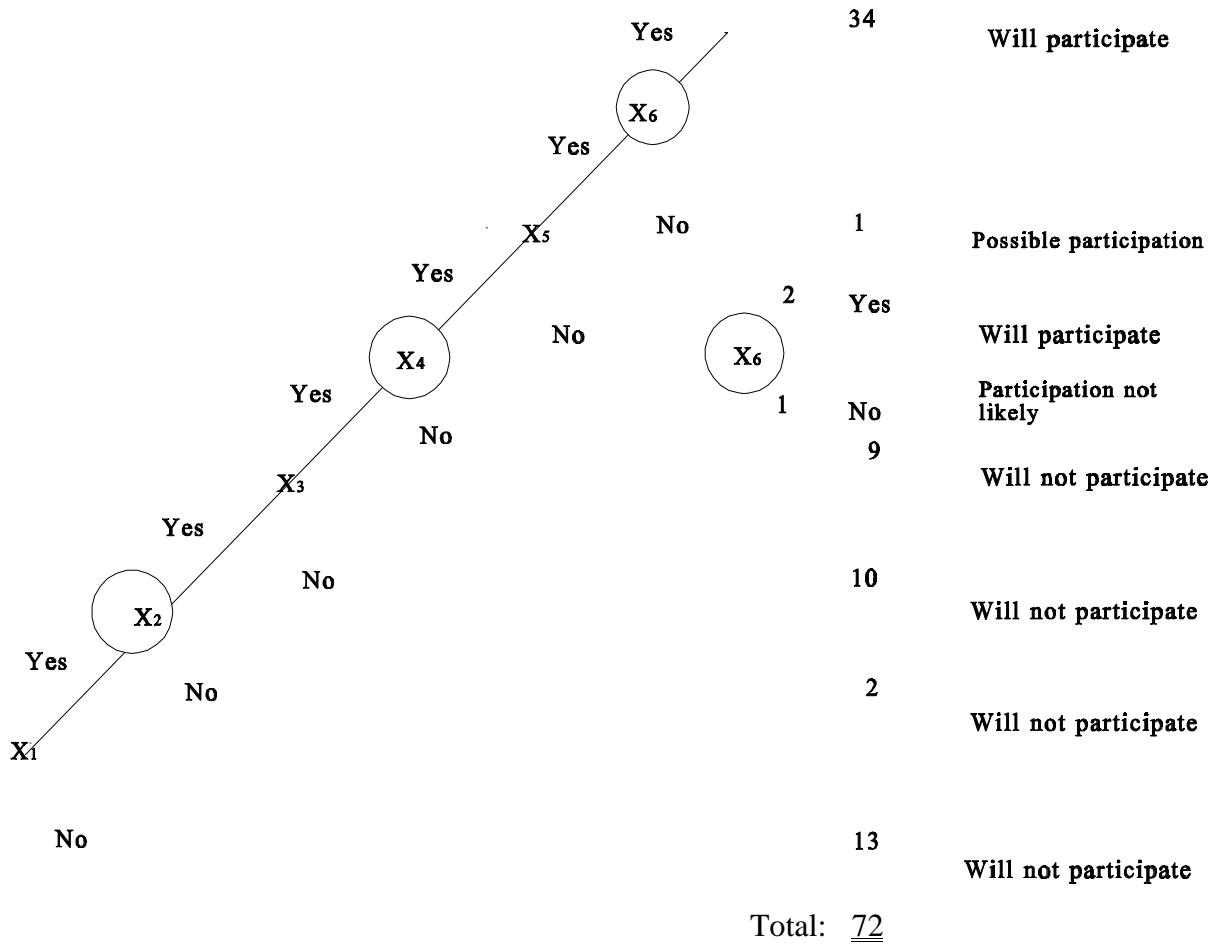


Figure 2
Revised Mapping Function for Participating
in Entrepreneurial Infrastructures

