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Article

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Journal of Global Entrepreneurship Research

Provided in Cooperation with:

Springer Nature

Suggested Citation: Bhushan, Bharat; Pandey, Sharadindu (2015) : Exploring the dynamics of network characteristics for Indian high technology entrepreneurial firms, Journal of Global Entrepreneurship Research, ISSN 2251-7316, Springer, Heidelberg, Vol. 5, Iss. 12, pp. 1-20, <https://doi.org/10.1186/s40497-015-0029-4>

This Version is available at:

<https://hdl.handle.net/10419/161771>

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CASE STUDY

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Exploring the dynamics of network characteristics for Indian high technology entrepreneurial firms

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Abstract

Recent research acknowledges that networking constitutes an important aspect of entrepreneurial efforts for any organization. This aspect takes up an even bigger role in case of high technology firms that are in their growth phases. This exploratory study is an attempt to understand as to how various network characteristics evolve and contribute to the growth and success of any entrepreneurial firm in the Indian socio-cultural context. Specific focus was on exploring four important characteristics of firm network: Network Diversity, Network Inertia, Network Endorsement and Network Relational Mix.

Entrepreneurs of ten Indian high-technology firms from National Capital region (NCR) were involved by explaining them the context of this study through intensive face to face discussions and asked to share their experiences using a descriptive questionnaire. The questions were framed around four network variables to be studied. Qualitative responses were received from seven of the ten entrepreneurs within the defined time frame. The inputs from these seven respondents were analysed using explanation building approach for case study analysis.

Some of the findings of the study go well with the extant literature, thereby contributing to theory validation for Indian socio-cultural context. However, several new aspects came up whereby the findings don't seem to go well with the existing theories thereby leading to potential areas to be explored further. Such variations are discussed in the conclusion section and summarized point by point with respect to existing models. These could be potential areas of further study in the current context.

Keywords: Entrepreneurship; Networks; Network characteristics; Organization growth; Co-evolution; Diversity; Inertia; Endorsement; Relational mix

Background

As a venture progresses through the various successive life cycle stages of growth, the resource needs keep on changing. By their very nature, entrepreneurial firms have a lack of internal resources and other related start-up handicaps and the same have been highlighted in the theoretical constructs of liability of newness (Stinchcombe 1965) and liability of smallness (Baum, 1996). The more innovative it is, the greater is its need to organize institutional support and legitimacy (Baum et al. 2000). This dynamic nature of firm resource needs suggests that a more dynamic approach to understanding the firm's network is required (e.g., Larson and Starr 1993; Reese and Aldrich 1995; Salancik 1995). A general understanding has emerged among both strategy and entrepreneurship researchers in relation

to the importance of the role that networks play in successful emergence and growth of entrepreneurial firms (e.g., Birley 1985; Larson and Starr 1993; Reese and Aldrich 1995; Hansen 1995; Stuart et al. 1999; Hite 2000). A broad agreement exists that networks play a critical role in the success of new and emerging firms because networks provide a means to satisfy the various types of resource needs of the evolving firm, which the firm by itself may not be able to meet by its own internal resources. The evolving resource needs lead to a shift in networks as a firm progresses through various life cycle phases.

The changes to the networks could be in the form of their relational mix and various characteristics related to structure, content and governance. Hite and Hesterly (2001) have explored the evolution of networks for firms from an emergence to early growth stage. Though, networks being a critical aspect for success, as pointed out by Stuart and Sorenson (2007), very little is known as of now in terms of network emergence and evolution. A recent publication by Slotte-Kock and Coviello (2010) tries to develop a theoretical model and emphasizes the proposition that organization and networks co-evolve. This study leaves several pointers for research in the direction of network and venture co-development through various stages. Emerging firms tend to leverage upon personal connections and ties with entrepreneurial family members and friends to gain access to some of the key resources for initiating a venture (Larson and Starr 1993).

The evolution and nature of young firms has also been researched by Schutjens and Stam (2003). They consider the changes experienced by a network in terms of by four main characteristics: type, number, source, and location. They take a specific period of first 3 years and research as to how the network changes with respect to the above four characteristics. They conclude that “the shift from social to business contacts over time, as hypothesized in the literature, only holds for outsourcing, supplier, and cooperative relationships. This means that upstream contacts become increasingly commercial over time. In contrast, downstream contacts (sales relationships) become increasingly social in source”.

Lechner et al. (2006) have also explored the aspect of evolution of network with the firm evolution. The perspective taken by these researchers is in terms of a specific aspect of networking, that is the relational mix concept where they argue that the overall network of an organization is made up of different types of networks, called the relational mix, and how the relative importance of each type of network varies with respect to the various growth stages of the firm. They conclude that the relational mix is a better way of associating network change with firm evolution as compared to the network size and it hence reinforce the importance of different networks in different situations as proposed by Gulati and Higgins (2003).

Most of the network research has examined the firm's networks at a single, static point of time. However, a firm is an ever evolving dynamic entity and as it progresses it requires new and additional resources to support its continuous growth and these may lead to variations to the network composition. Though there are several types and characteristics of networks, this study focuses on four characteristics – Network Diversity, Network Inertia, Network Endorsement and Network Relational Mix.

Network diversity

Diversity of network ties refers to the range or variety of different sources, industries, geographical locations, and functions represented among the network ties. As stated by

Larson and Starr (1993) emerging firms tend to leverage upon personal connections and ties with entrepreneurial family members and friends to gain access to some of the key resources for initiating a venture. It appears that as inter-organizational networks become more diverse their organizational structures become more difficult to integrate (Goerzen 2005). Based on this argument, one can assume that the network becomes more diverse with the evolution of the firm to meet its increased requirements in terms of diverse resources.

Network inertia

Network inertia refers to the persistent organizational resistance to changing inter-organizational network ties or difficulties that an organization faces when it attempts to dissolve old relationships and form new network ties (Kim et al. 2006). The dimensions of measuring inertia are in terms of resistance to change in terms of networks attributes like age, size and number of ties. The extant network literature is of the view that greater the number of ties, the more the network inertia.

Network endorsement

Inter-organizational exchange relationships can act as endorsements that influence perceptions of the quality of young organizations when unambiguous measures of quality do not exist or cannot be observed (Stuart et al. 1999); Stuart (2000) argued that endorsements of entrepreneurial ventures by high-status exchange partners reduce the uncertainty surrounding these ventures future prospects, and thereby facilitate the process of mobilizing resources and, ultimately, the success of these firms. Endorsement also leads to gaining the needed legitimacy (Elfring and Hulsink 2003). Thus it leads to a belief that endorsements by actors play vital role which may be changed in terms of numbers and status of exchange partners during the growth phases of a firm.

Network relational mix

Relational mix (Lechner and Dowling 2003) refers to the characteristic whereby that firms use different types of networks in different development phases. The relational mix consists of value-added networks that go beyond exclusively economic relationships (Lechner et al. 2006). Lechner and Dowling (2003) proposed a network development model based on varying network types and based on qualitative research, identified that firms use relationships for a variety of purposes and that every firm has an individual relational mix.

Technology as a term has a very wide usage. As defined by Barley (1986), technology has been used by researchers to indicate machines and related devices, techniques and behaviors or the systematic arrangement of people and tasks. High technology ventures are associated with employment of technologically qualified people and the change in technology being substantial over a period of time. Stearns and Allen (2001) characterize high technology firms in terms of industries that have heavily science dependent innovation, have disproportionately high expenditures on research and development activities and have high proportion of employees who are scientists and engineers as compared to other firms. High technology entrepreneurship is a very

important segment of entrepreneurship because it occurs at the core of the economy and yields relatively higher returns.

India has been witnessing a substantial increase in the growth of entrepreneurial ventures in the recent past. The gross domestic product (GDP) is growing at an average rate of 8.5 % every year and is counted as one of the best amongst the emerging economies. Most of this growth could be attributed to the high technology sectors like Information technology and Biotechnology. According to Indian Brand Equity Foundation (IBEF), report on IT for 2015, “India is the world’s largest sourcing destination for the information technology (IT) industry, accounting for approximately 52 % of the US\$ 124–130 billion market. The industry employs about 10 million Indians and continues to contribute significantly to the social and economic transformation in the country. India, the fourth largest base for young businesses in the world and home to 3000 tech start-ups, is set to increase its base to 11,500 tech start-ups by 2020, as per a report by Nasscom and Zinnov Management Consulting Pvt Ltd. India also saw a ten-fold increase in the venture funding that went into internet companies in 2014 as compared to 2013. More than 800 internet start-ups got funding in 2014 as compared to 200 in 2012.”

Looking at the great potential that India offers in high technology areas like IT along with the premises that networks play a strong role in the firms’ growth, it leads to an interesting topic to be explored further.

By above discussion, the following research objectives emerge:

1. How the network parameters of the high technology firms change while transitioning from preliminary stage to the advance stage?
2. What networking challenges or priorities a high technology firm come across during the evolution of the business

In order to get a deeper insight into the above questions with respect to Indian context, this study explores four important network characteristics for high technology entrepreneurial ventures using qualitative approach by getting detailed inputs from seven firms.

Case description and methodology

In order to study the four network characteristics that define the scope of this case, a detailed semi-structured questionnaire was formulated. This exploratory study uses the qualitative multiple case study approach and an open ended descriptive questionnaire was designed to elicit responses. The questionnaire had questions related to the measurement of network diversity, network inertia, network endorsement and network relational mix and represent the operational definitions of these parameters with respect to this study. Each parameter consisted of four to six questions and jointly aggregated to give an overall meaning for that parameter. Each respondent was met in person and was explained the context of the study. Further they were requested to give their responses in the most descriptive way as they could for each of these questions.

Purposeful sampling method was used for selection of the firms. This method is usually recommended for qualitative studies, and enables the researchers to use their judgement to select respondents and cases that are particularly informative (Neuman 1991) and

which would help to achieve the objectives of the research (Saunders et al. 1997). The selection of the firms was with a view to have a representation of various stages of growth as defined by Churchill and Lewis (1983) in the case. Though the final categorization into a specific stage for analysis was based on founders' judgement, but several externally visible factors and publically available data was used to make an informed guess as to what stages the firms would most probably be belonging to.

The analysis of the responses was done using Explanation-Building approach. This is one of the standard approached for case analysis (Yin, 1994). As per Yin "The procedure is mainly relevant to explanatory case studies. Here the goal is to analyze the case study data by building an explanation about the case and could lead to major contribution in theory building" Robert K. (1994).

A consolidated summary of the overall research methodology used is provided in Table 1 below.

The different phases of growth have been chosen based on the framework defined by Churchill and Lewis (1983). This framework defines five stages for small business growth. Table 2 summarizes various stages as per this framework.

The above definitions were explained as a part of initial discussion sessions with the respondent firms and were asked to classify their firm in one of the above category to get precise information. It is assumed that the respondents being founders/co-founders have a strong sense of their firm and will be choosing one of the stages based on their knowledge and experience. Once this precise data was obtained, we classified into two categories.

This was done to ease the analysis as well as draw conclusions. This is accordance to Miles and Huberman (1994) whereby they state "Data reduction is a form of analysis that sharpens, sorts, focuses, discards, and organizes data in such a way that "final" conclusions can be drawn and verified". The two broad categories defined were Preliminary and Advanced and the five states defined by Churchill and Lewis (1983) were coded defined in Table 3.

Table 1 Research methodology summary

Methodological Parameter	Approach	Reason
Study Approach	Qualitative Case based approach	Being an exploratory study
Sample Selection	Purposeful Sampling	Most applicable for qualitative exploratory studies
High Technology Area	IT and related areas	IT in Indian socio-economic context is a very high growth and technology intensive area
Selecting appropriate geographical	Geographical Area – National Capital Region (NCR), India	NCR is one of the fastest growing cluster for IT and related firms in India
Number of Firms Approached	Ten (10)	Purposefully selected to cover different stages of growth.
Credibility of data	Early Familiarization (Prolonged Engagement)	Lead to adequate understanding and establish a relationship of trust with founder/owners
Data Collection Method	Descriptive questionnaire	To give adequate opportunity to founder/owners for thinking and replying to the best of their capabilities
Number of Firms Responded	Seven (7)	Three firms did not respond within the defined timeframe
Data Analysis	Explanation Building	Most relevant analysis approach for qualitative data from exploratory studies

Table 2 Five stages of growth

Stage	Defining characteristics
Existence	Initial formative stage, not too sure of customers, products, services etc.
Survival	Establishes as a workable business entity, having few customers and keeping them satisfied with its products/services
Success	Grown large enough, requires functional groups to be run efficiently, sufficient cash etc.
Growth / Take-off	Looking towards rapid growth and how to finance it.
Maturity	Consolidating and controlling gains from rapid growth. Detailed strategic and operational planning formalized and well developed systems.

Table 4 provides the summary of seven out of the ten firms that responded as a follow up to the personal meeting with their founders and thoroughly explaining them the objectives of the study and getting an assurance that they themselves will be filling up the answers because they know their organization the best and have nurtured it right from a though process to where it is as of today. Specific emphasis was given to explain the defining characteristics of various stages as defined by Churchill and Lewis (1983) so that the respondents understands this well and can make a right choice. Names of the firms have been codified from A to G for the sake of anonymity.

This study does not tend to generalize the findings but endeavours to get a better insight into the network characteristics of high technology entrepreneurial firms operating at various levels of maturity stages with respect to Indian context in the National Capital Region (NCR) which is one of the fast growing regions for high technology sectors.

Discussion and evaluation

Based on the responses to the various descriptive questions provided by the seven organizations on the four network characteristics, the following sections provide the analysis based on the explanation building approach to qualitative data analysis. As explained in the case description and methodology section, the discussions are based on two broad categories, preliminary and advanced. Preliminary consists of existence and survival stages and Advanced consist of success, growth and maturity stages as defined in the framework by Churchill and Lewis (1983).

Network diversity

(a) Preliminary stage

Firms at the preliminary stage indicated that network evolves with each interaction. And in this process each actor of the network plays the role in increasing the size and diversity. This means that over the passage of the time, diversity naturally increases. Though it is expected that the friends and relatives should have bigger role at the

Table 3 Coding of stages

Coded stages	Stages included from Churchill and Lewis framework
Preliminary	Existence, Survival
Advanced	Success, Growth, Maturity

Table 4 Details of respondent firms

Organization	A	B	C	D	E	F	G
Respondent	Owner and Founder	Owner Director	Managing Director	Founder Director	Founder CEO	Director	Managing Director
Organization Started	2008	2002	2007	2009	2010	1998	2013
Organization Joined	2008	2002	2007	2009	2010	2003	2013
Number of employees	8	10	240	5	70+	80	6
External Funding	No	No	Yes	No	No	Yes	No
Number of customers	6	25	50	9	12	700	500
Sector/Industry	IT and Innovation Consulting	IT Technology Solution Trading	IT Telecommunication	IT Consulting	IT Professional Services	Telecommunication	Online Commerce
Stage of Organization	Survival	Success	Growth	Survival	Survival	Maturity	Existence

preliminary stage, yet some firms indicated that they started from professional network rather than personal network. As one of the respondent state

"It is more focused with past professional relations and friends and not relatives."

High technology being a non-traditional context most of the entrepreneurship comes from the personal background rather than family background, this makes the importance of friends and relatives lesser. There were some firms which indicated that friends and relatives cannot be equated. In their context, relatives have a lesser role than friends.

A respondent from the preliminary stage firm pointed out that in the initial stage of the high technology firm, large amount of creativity and innovation is required. These are presumed to be more of individual centric concepts but a right kind of group enhances the creativity. To a question related to associating with professionals apart from relatives and friends, this respondent said

"Yes. The nature of our business requires an active engagement with variety of people. As we define innovation to be successful creation of change through ideas. We actively work towards getting variety of skills and professionals to contribute to the evolving innovation landscape".

Another respondent described that at preliminary stage, one needs to seek the partnership i.e. deep ties. Though the ties with the kins have deep relationship, yet they may lack the right kind of skills which is required from partnership essential to sustain the creativity and innovation from the point of view of technological competence. However, some firms which did not deny the role of kins in the initial stages might be pointing out more from the financial aspects.

The fact related to less network diversity at the initial stages gets validation when one respondent indicates that his attempt to tie up with government and industry did not get much fruit to his business. For example, the comment from one of the respondent was

"Yes. We participated in some of the government and industry supporting institutions. These experiences have not been of substantial value so far in our journey".

At the preliminary stages when a business has to prove itself in the market place, it has to maintain high focus, which probably disallows her to mingle with other firms/government organization with separate focus. This raises some doubts that when Government is ready to support new technology ventures so why these ventures are not getting much in networking with the government. In India, the Government has created an ecosystem which can play a facilitator's role from outside but probably not touching the core of the firm's business.

Network diversity increases with the spread of the locations. Each location yield separate partner network for the firm, which may not get directly associated with their business network. These are the local networks affecting the local operations of the firm. Most of the firms pointed out that the diversity of the business functions increased with the passage of the time. Some firms indicated that functions remain same but the hiring pattern gets focussed towards hiring dedicated people for specific functions. As an example, one of the responded commented that

“However, we are hiring dedicated people for those functions”.

The biggest value of the dedicated people is to stay in the business, hold and grow the network and to work as a bridge to provide the network value to the founder.

(b) Advanced stages

A respondent firm which targeted defence sector ab-initio did not start from the kins network. This confirms the belief that in the high technology sector network diversity increases but may not begin with personal network due to highly specialized nature of work. The main challenge a company faces during transition of the business stage is to have relationship with professionals and convert some of them or take their help in roping in right kind of technical talent for their organization. As per this respondent

“We have been successful in this endeavour to the extent of drawing recognized industry players into the organization”.

So one of the aim of network diversity is to explore various talents and to get them persuaded to work for the organization. At the advance stage itself, the respondents did not sustain external networks through institutions and government personally. They maintained it through their organisation. This explains that even at the advance stage the mechanism of network building is not one on one. It is routed through the organization. Function to function or department to department external networking is possible once the nature of collaboration is technical. But when the nature of collaboration is of business or strategic then it is routed through the entity. Advance stage companies depicted the transition in the nature of their businesses and accordingly the network diversity increased. The requirement of the diversified network grew as the business was no more confined as the specialized entity.

Another respondent from the advanced stages emphasized the need of restructuring their business as a part of their growth. Regarding adding new functions to the business, this respondent said that

“There has been a continuous reengineering leading to restructuring and in the course of the refinement, there have been few new business functions added accordingly”.

This is typical of a high technological context whereby such efforts are required to come up with new marketable ideas and products which can add to the commercial success of the firm apart from filling their urge for continuous experimentation for exploration and exploitation. As per the comments, their journey from preliminary to advanced stages saw several forms of refinements in their portfolio along with related spin-offs and these lead to adding of new business functions to effectively manage and grow the organization thereby leading to an increased diversity of their network.

Network inertia

(a) Preliminary Stages

As a part of the growth and maturity, firms are always on a watch out to establish relationships with other firms which could be helpful in any form to them. These relationships could be in the form of suppliers, consumers, technical partners or any other format. Apart from forming new relations, firms also come across situations where they might want to continue some existing relations or freezing some of the relationships if they are not adding any value whatsoever to the business but are more of an overhead to carry along. Because of the high technology context, it seems reasonable and appropriate that firms at the preliminary stages might be quite active in forming and freezing such relationships to get to a good set of firms that could be of long term mutual benefit.

Most of the respondents from the firms at the preliminary stages have a strong opinion on this aspect that they don't face any apprehensions to freeze relationships if they don't seem to be of much value mutually. However one of the respondents from one such firm did mention that this is not that easy for them and they do face some level of difficulty in freezing such relationships. This could be related to the high technology context because at times, there are major dependencies from a technical stand point that shivering of relationships could amount to huge losses for both the entities and firms at their preliminary stages may not be in a position to handle such setbacks.

Another respondent from the survival stage pointed out that irrespective of their success in terms of inter-organizational ties with some firms, they are constantly looking for opportunities to not only keep such ties intact but to strengthen them further as they look around for more such ties with new firms. As this respondent commented

"We are continuously looking for new opportunities, keeping old ties intact and in fact enriching them as much as we can".

This correlates well with the network diversity aspect as well as the understanding of having lesser inertia at the initial stages of the firm. Another organization had a very similar view but with an additional dimension related to their value system. The response provided was

"We are hungry for growth but value our eco system and balancing acts. We are focused in Relation Management but at same time we are constantly looking for new ones as well".

This response clearly emphasized the need of growth with the help of inter-organizational collaboration but all such relations have to be well within the value system of the organization. This could be because of the fact that value systems play a crucial role in defining the organizational fabric and any relations made with like-minded firms will yield long term and enduring relationships and any violation to these with a quick short term benefit might not be of strategic value. This response also emphasized the need for a proper relationship management focus to achieve long term benefits.

Most of the respondents shared a common view and opined that on one hand they are looking for new relations and on the other hand they also work towards enriching

the ties with existing partner firms and strengthen their inter-organizational relations. One very remarkable statement came from one of the respondents that if everything is established once for all and they are not making any new relations, they are not growing. The response stated

“Anything established means we are not growing”.

This is a very strong opinion with respect to a direct relationship between network growth and organizational growth, especially when the firms are in their evolving stages. This direct relationship also points to the coevolution of the two entities – firm and network, and that both have a direct and proportional impact on each other.

The presumption that network inertia is less at the preliminary stages gets supported by one of the respondent who emphasized that relationship building is lot more required and has to be essentially organic in nature. The response also pointed towards active and passive relations and that at any required point of time based on needs, passive relations get ignited and quickly transform into active relations for business benefits. As per this response,

“These are organic relationships and forever changing. When the need is dire (from any one side), that is when the relationship is re-ignited and discussed in the context of that need”.

This characteristic is expected lot more at the preliminary stages because at the point the organizations are in existence or survival stages and would not like to lose any related or un-related opportunity for them. This might not be the case in advanced stages whereby the firms start working in a more institutionalized manner. However, one of the responses from a firm in preliminary stages gave a different perspective in terms of their being very selective and choosy about selecting their partners and doing lot of due-diligence before getting into any relationships. The explanation from this respondent was

“Most of our relationships tend to be long lasting. This is mainly because we take time to determine who to invest our energies with. Typically, our bets on our partners are good ones and they lead to long lasting healthy relationships”.

By this approach, they might go slow initially but ensure that whatever they do has a very high probability of being right and they can enjoy long term healthy relationships and a strong network. This factor could be directly influenced from several aspects and one important one being how deep pockets they have and can sustain even if they go slow.

(b) Advanced Stages

A respondent firm working on latest innovative technologies and at advanced stages emphasized the fact that freezing any old relationships and making new ones could be at times a difficult proposition. This confirms the belief that as firms move to advanced

stages of growth, inertia also increases. Another important aspect to this with respect to latest technology based innovative work is the strong interdependence at times between partner organizations. At times, huge investments are required and design and development in several related areas is required to get to a marketable idea/product and all these diverse efforts might not be feasible to be undertaken by one entrepreneur and hence hands have to be joined between firms resulting into strong ties that are difficult to do away with.

Most respondents in this category were of the view of having long lasting relationships in contrast to the views of preliminary stage organizations where the responses showed more dynamism. This again supports our belief of increasing inertia with growing stages for a firm. One of the responses pointed towards the trust and faith factors also and that with passage of time, firms start becoming more and more opportunity dependent among themselves with a motive to get to a mutually beneficial journey in the long run. As per this respondent,

“An element of trust and faith adds on to give and take in a relationship and that balances the equation in the long run and nurtures the relationship”.

Here the focus becomes more of an opportunity based give and take because there might not be any pressing urgent needs from a survival perspective.

Network endorsement

(a) Preliminary Stages

As the network grows in size and diversity, it plays a bigger and bigger role in achieving the business objectives as well as endorsing the firm from various aspects. Several respondents agreed to the above. Firms at the preliminary stages have to spend lot more time and energy in building their network so that the network can help them identify business as well as be a spokesperson for their work, ethics, competence and credibility. Multiple respondents mentioned about active participation in social media, business conferences and other public forums in a big way so as to identify business opportunities. As one of the respondent pointed out

“Not Necessarily. We actively pursue leads through participation in speaking at public conferences, academic symposiums, social media, and our web presence leads”.

This is evident of the fact that at early stages, network is not that strong so as to be a dominant source of seeking business opportunities. On the contrary, one respondent said that they initially survived through network only. This could be attributed to the owners' characteristics as he has been in this IT industry for almost three decades and this is his third venture and so he already had a strong network that could help him.

Most of the organizations replied positively towards seeking active affiliations with prestigious business affiliates for supporting their business. As per one of the respondent, this is one of their preferred routes to get international and helps their high technology ventures to get beyond Indian geographies though their prime focus is still towards aggressively making a mark in the Indian market. Again on the contrary, one

respondent strongly commented that they never had any beneficial gains from their affiliations with prestigious affiliates. As expressed by this respondent

"No, never had any really beneficial experience with them".

The nature of this firm is too innovative and creative and hence could be the reason that they are not able to find some affiliates with the same focus and intensity that could help them further in growing their business. This same respondent, in contrast to other respondents, had a negative outlook towards memberships of industry boards and professional councils. The reason cited being that all such boards and councils are too politicized and of not much value to what they focus for in the area of innovation, intellectual property and patents. As per his comments,

"Never had any really beneficial experience from them. Back of my mind, I think these are too politicized to be of much value for us".

It gives a new dimension of interpretation in terms of the effectiveness of such boards and councils, but may be getting deeper into this dimension is not the scope of this study. Another respondent, whose nature of business is in the form of high end consulting, set-up and integration of complex enterprise level software applications find lot of value with all such associations to network, popularize their business and look for new business opportunities. Thus, it seems logical to interpret that lot of endorsement needs from a firm's network are highly dependent on the nature of its operations and relative complexity and technology even though all these fall under the broader category of high technology enterprises.

A major portion of the respondents did not find academic institutes as a vehicle to leverage academic capabilities for helping out in their high technology pursuits. As per one of the comments

"We tried a bit but that does not help. In India Specially Universities are not investing anything on innovation and incubation of ideas".

This is unlike global markets where most of the entrepreneurial break through is a result of industry-academia synergy. This seems to be an important contextual aspect and a potential area to be pursued further by researchers because quite a few breakthroughs of niche innovations especially in IT in the global scenario seem to be coming from academic projects.

(b) Advanced Stages

Networks being more elaborate and diverse at the advanced stages, they play a much bigger and important role in terms of creating credibility for firms along with offering new business opportunities.

One of the respondents clearly stated the above fact and between the two states, preliminary and advanced, the preliminary stage was mostly focused on forming of

network and now at advanced, they are able to identify business opportunities through the network. As pointed out by this respondent,

“Now a days yes, but when we have started we had to built our own network”.

As per another respondent, identifying opportunities through network is not only there preferred way, but also speeds up the whole process of opportunity identification and exploiting it. As per this respondent,

“Most of the time it helps and is a better approach to improve the speed to market”.

This is in direct support of the notion that endorsement network size increases and plays a more dominant role for firms at advanced stages of their life cycle.

All the respondent firms were of the opinion that they actively look forward to associations with prestigious business affiliates. One of the respondents very clearly linked this aspect to credibility, which is closely linked to endorsement from industry. As stated by this respondent,

“Yes. Credibility is a major consideration and recognition is the key parameter for decision makers to favour with business”.

They were of the opinion that all such associations are a great vehicle and some of the key parameters that decision makers take into consideration while awarding business to any organization. Such associations act as high-status actors for the firm's network and offer their associated benefits. This is again a very clear indicator that network endorsements are much more needed at advanced levels as compared to preliminary levels.

As compared to the mixed responses related to memberships of industry boards and professional councils for firms at preliminary stages, there is a clear consensus from all the respondents that such memberships are a must for them and add lot of value to their business. As expressed by one of the respondent

“Yes. These platforms always throw insights as to the developments just not on refinement of technologies across the industry but do educate the pros and cons of the regulatory frame work and bring a great opportunity of networking with the ecosystem involved”.

This emphasises that such boards and councils are almost mandatory for them because these are the forums where lot of regulations and compliances are discussed, analysed and framed and these have a direct impact on the projects and products being worked upon by their organization. This is quite typical of high technology areas whereby standards keep evolving and being an active participant in all such forums and discussions, firms can play a critical role not only in understanding of these standards but also putting across their point of view and influencing these to their business benefits.

With respect to academia as a source of endorsement, the responses were similar to the ones obtained from firms in the preliminary stages. At both the stages, high

technology entrepreneurial ventures do not see much value of any such associations. Though one respondent did mention that they initiated some efforts in this direction, but are yet to see any tangible benefits. This could be a strong reflection on the capabilities of academic institutes, especially in the high technology context and a bigger strategic problem to be looked into.

Network relational mix

(a) Preliminary Stages

Firms at the preliminary stages indicated that the network relational mix evolves more as a continuous process. Though expected that the friends and relatives might be playing a dominant role in constituting the relational mix of the network of the firm at the preliminary stage, yet the responses to this effect were not that strong and partially true. The respondents did indicate that the mix was not much dominated by friends and relatives. The reason for this could be well attributed to the high technology context and the reason that friends and relatives do not give much leverage to the business. To get more mileage from the network, the entrepreneur will have to depend more on professionals having skills in the high tech areas which might not be a part of the friend or family network.

The responses from respondent firms show a clear change in their network as constitution with passage of time. One of the respondents very clearly spelled out that the “business orientation” of the network has been increasing over time as compares to “friendly orientation” that used to be at the start of the venture. As per this respondent,

“Only good thing today is same has grown much wider and horizon of thinking has changed. Network relation today is more business oriented; while earlier it was friendlier”.

Another respondent had a very similar view and also extended the response by emphasizing that the formalization of the network has been a big help in terms of finding the right kind of people for their business and future growth. In the words of this respondent,

“Yes, my network organization is more formalized to make it easier for me to find the relevant people for my future new tasks at hand”.

Thus formalization of the network is more effective in connecting a firm with the right partners and customers. These responses help to strengthen the thought that networks become more and more formalized with the passage of time and as the firm moves through its journey from one stage to the other. One respondent did point out that their network is growing at a very fast pace but more in an informal manner. This remark points out to another dimension of network composition and growth that whether the growth is more formal or informal in nature, though the nature of the network gets more formalized and could be another area of exploration.

Network and formal relations with related firms are a big source of help during the existence and survival stages for an organization and help get initial business. Almost

all of the respondents had similar views on this aspect and that all such relations played an extremely important role to get the initial work orders for the business. One such response stated that

“Yes, our original relationships helped a lot to break the initial ice with the first few major customers”.

This is a clear indication that formalization of the network is a must and helps organizations in a big way during the initial stages. Friends, family and other social relations might be helpful to do the setup, but it is these business networks that help acquire and grow the business. Hence it seems imperative that firms should consciously focus on evolving formal relations and start transforming their network relational mix from an informal to a formal nature.

As described above, though the relations with related firms help initial breakthrough, they do not much help in providing leads about overall market information and opportunities external to them. As per respondents, they mostly depend on additional resources like councils, industry association etc. to explore such opportunities. Some respondents also mentioned that they utilize their own opportunity mapping and market research efforts to explore such opportunities. This indicates that the relational mix of organizations needs to have some element of industry relations also to keep abreast with the latest opportunities across their sectors of interest. This again reinforces a mix of several elements to make a successful and beneficial network that can help the firm grow. This also points to the fact that the share of business networks needs to grow as the firm moves from stage to stage in its lifecycle.

Except a few respondents, many of the examined firms do not actively look at making relationships with their competitor firms. This trend, known as “Co-optition” is a recent trend whereby firms look forward to making relations with their competitors with a view to control the market. However, this is more prevalent in commodity markets where the products are not much unique from each other and almost everyone is producing similar stuff. However, in the context of high technology firms, this might not work because every firm has some unique offerings or capabilities or intellectual property that they would like to leverage to the maximum until the technology matures to a level that it becomes a commodity. One of the respondents did say that they look forward to such relations but with a view to understand competitor products and their strategy. In this case, the motive behind the relations is quite different and not inline to the type of relationship exploration that this research is looking for. Another respondent did talk about co-optition and that they do look forward to associating with their competitors. This can be attributed to the nature of the firm as this firm is in the area of high end consultancy and innovation and the work for each client is different from the other. They work with various client organizations to offer their services and hence do not have any product of their own that could be easily imitated by competitors. Hence they are not averse to making relations with competitors.

(b) Advanced Stages

The relational mix of firms at advanced stages have a more dominant share of formal and business networks as compared to informal and social networks. Almost all the

respondents validated this point and hence give a strong support to the presumption. Respondents have commented that there is a vast difference in their current network composition and what it used to be in the early stages. One of the respondent commented that they have undergone through lot of permutations and combinations while their network evolved with the evolving organization. As per this respondent,

“Lot of permutations and combinations have evolved though the basic DNA exists with slight iterations here and there”.

At advanced stages, a firm becomes quite mature and stable and hence the corresponding network composition also becomes similar. The adhoc nature component becomes meagre whereas the formal component becomes more dominant as the firm establishes itself in the industry.

At this stage, the network is a great source for getting information related to new opportunities, markets and clients. This is in contrast to the responses for these parameters from firms who were at the preliminary stages. As expressed in one of the responses,

“Primarily yes with regard to market intelligence while the innovation is based out of domain expertise to customize to a business requirement”.

The reasoning behind this is quite clear that at advanced stages, the relational mix of the network is lot more formal and business oriented and hence serves the purpose of opportunity identification lot more effective as compared to preliminary stages where informal and social orientation is lot more. Thus the network is a great provider of business intelligence at advanced stages. All the respondents had a similar view on this parameter and gives a strong support to the notion that at advanced stages, business networks are a dominant part of overall firm network and a great source of opportunity identification.

Firms at this stage also don't seem to be too much inclined to the idea of making relationships with their competitors. One of the respondent very precisely stated that

“Head on encounters do happen at various forums including for rate negotiations but an analysis & paralysis of the approach and product line is ascertained to counter to have a better edge”.

As stated in the previous section also for firms in preliminary stages, this could be attributed to the nature of business of high technology firms whereby there is lot of differentiation in the products and services being offered and this is quite different to a stable commodity market where several manufacturers are producing almost similar products and instead of fighting with each other and getting to a loose-loose situation, they start joining hands with competitors to fight back the market forces.

Another major difference with the firms at advanced stages is that they look forward to entering into some sort of agreements with similar firms to jointly develop technology and solutions. A large part of the respondents at preliminary stages had opposite views to this aspect. As a firm matures and moves to advanced stages, its overall

network also matures and formalizes and hence the firm is in a position to enter into formal agreements with similar firms to jointly work and grow. They can have strong safeguards and agreements to protect their rights and share of the intellectual property or product profits whereas the firms at initial stages may not be that strong and formalized to have proper process and procedures in place to handle all such complexity and legal matters and hence don't want to get into such joint agreements and are more comfortable working on their own.

Conclusion

The respondents of the present study emphasized that they will focus on professional network rather personal in the initial stages of their business. This seems to contradict with Larson and Starr (1993) who established that emerging firms tend to leverage upon personal connections and ties with entrepreneurial family members and friends to gain access to some of the key resources for initiating a venture. In the preliminary stages, economic performance is more vital than organizational performance. Focussed professional network at the preliminary stages would minimize the higher turn-over rate which is the by-product of heterogeneous groups (O'Reilly, Cald, 1989). Similarity or focus is positively associated with Inter-firm learning (Darr and Kurtzberg, 1993). This similarity may be lacking in personal network but traceable in professional network. Time cost and commitment cost may hinders the firms at the initial stages to attain diversity by the means of institutional network.

Kim et al. (2006) concluded that an organization faces difficulty and challenges when it attempts to change the network ties. Our research has got mix result. At one side, some respondents indicated that organization has to make 'Balancing act' to retain the network. That highlights the difficulty of continuous alignment of two different systems. On the other hand, some respondents saw the old network of the

Table 5 Summary of Variations in Indian socio-economic context

Theory	Data contrary to or potential area for extending the theory
Upstream contacts become increasingly commercial over time; Schutjens and Stam (2003)	Some are long lasting while others tend to be transaction oriented
Less knowledge on network emergence; Stuart and Sorenson (2007)	Niche Skill helps in partnering with larger firms
Organization faces difficulty and challenges when it attempts to change the network ties; Kim et al. (2006)	These are organic relationships and forever changing. When the need is dire (from any one side), that is when the relationship is re-ignited and discussed in the context of that need.
Emerging firms tend to leverage upon personal connections and ties with entrepreneurial family members and friends to gain access to some of the key resources for initiating a venture; Larson and Starr (1993)	It is more focused with past professional relations and not relatives.
Entrepreneurs tried to increase sales substantially by developing marketing networks, and to leverage their technological base by co-opetition networks; Lechner and Dowling (2003)	No, not much. Everyone is comfortable in their own zone.
The more innovative it is, the greater is its need to organize institutional support and legitimacy; (Baum et al. 2000).	Not Exactly, The Industry boards is platform to meet, greet and know each other. It cannot replace the overall effort of organization to acquire customers and business.

organization as organically grown. This reflects that organizations use different network partners as different channels in their business pursuits. These channels may be active or dormant but they have role to perform and they are opportunity driven and both the partners understand this and sustain the partnership. This indicates the relative ease in maintaining network. This is somewhat contrary to the finding of Kim et al. (2006).

Inter-organizational exchange relationships can act as endorsements that influence perceptions of the quality of young organizations when unambiguous measures of quality do not exist or cannot be observed (Stuart et al. 1999). Stuart (2000) argued that endorsements of entrepreneurial ventures by high-status exchange partners reduce the uncertainty surrounding these ventures future prospects, and thereby facilitate the process of mobilizing resources and, ultimately, the success of these firms. Endorsement also leads to gaining the needed legitimacy (Elfring and Hulsink 2003). The findings of our study are in congruence to the work from earlier researchers. Firms look forward to get associated with prestigious business affiliates for raising their credibility quotient that further helps in business opportunity acquisition. One additional aspect that did come out in the Indian context is that affiliation with academia does not seem to benefit the organizations much in the high technology areas. Another additional finding that comes up is that at initial stages, though affiliate organizations are of great help, but memberships with councils are not of much value. This however, becomes quite important for organizations at advanced stages.

Lechner et al. (2006) concluded that over-reliance on social networks over time may in fact constitute a growth problem, since it may indicate that firms are not capable of developing other important ties. This study also concludes that friends and relatives might play a supporting role initially. Entrepreneurs depend more on professionals having skills in the high tech areas which might not be a part of the friend or family network. Another important finding by Lechner et al. (2006) was that networking should be a proactive task of entrepreneurs and that strategic network building over time is an important factor for the development of the entrepreneurial firm. Findings from this study are also in congruence to the earlier findings by Lechner, et al. Respondents have reported vast difference in their network relational mix from in terms of where they started and where it stands now and as an evolving firm, entrepreneurs have been looking for exploring and leveraging all such relations to enable firm growth and gain business benefits.

Table 5 summarizes data contradictions whereby the findings don't seem to go well with the existing theories thereby leading to potential areas for theory extension either globally or more from an Indian socio-economic context, thereby leading to enrichment of this important area.

Competing interests

The authors declare that they have no competing interests.

Authors' contribution

BB carried out this study as a part of his research. He worked on designing the questionnaires, contacting several entrepreneurial organizations and interacting with their owners/senior management to make them understand the rationale of the study and have their views on various aspects of network characteristics that are a part of this study. He worked on analyzing the responses using the explanation building approach and drafted this paper. SP helped come up with the overall approach and design for this study and has been providing his expert opinion and guidance at every stage of this study. He reviewed the analysis, refined and enriched it and helped finalize the overall paper. He read and approved the final manuscript.

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Received: 22 November 2014 Accepted: 15 June 2015

Published online: 22 July 2015

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