INNOVATION IN SME

ACCESS TO STRATEGIC RESOURCES THROUGH THE RELATIONAL NETWORK OF THE CONTRACTOR AND INNOVATION OF TUNISIAN SMEs

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ABSTRACT: Our paper is devoted to analyze the mediating effects of the access to strategic resources between the relational network of contractors and innovation in the specific case of Tunisian SMEs. The originality of this approach lies in the effort to show that the detention of a relational network is not synonymous with real access to strategic resources and the realization of benefits in terms of innovation. This finding is particularly important for SMEs which lack the means to profit from their own relational fabrics.

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Introduction

The resources are assimilated as the cornerstones of the existence and growth of a business (George, 2005 and Penrose, 1959). For Denieuil (1993), SMEs have a social value that results from the variety of knowledge, support and personal relationships of the contractor. The success of the latter, therefore, depends on his capital relationships and ability to move within a relational network of customers, suppliers, administrative guarantees, etc.

In general, external resources are very useful for the development of new products to increase market share and improve business performance. Access to these resources is likely to facilitate the identification and exploitation of opportunities available in the production environment and the prediction of unexpected risks (Yli-Renko et al., 2001). These opportunities are particularly important for SMEs compared to large businesses due to its fragility and vulnerability and the lack of resources (financial, human, experience ...). Therefore, the primary concern which these SMEs face, is to get the resources needed to ensure their survival and to be more efficient.

Moreover, given the lack of resources to pursue their innovation, SMEs are required, actually more than another time, to benefit from their relational networks thanks to an effective access to the strategic resources.

Therefore, the objective of our paper is to analyze the mediating effects of the access to strategic resources between the relational network of contractors and their innovation in the specific case of Tunisian SMEs.
The effect of access to strategic resources on innovation

One feature that seems recurrent in studies on innovation in SME context is that their resources are usually limited (Keogh and Evans, 1998; Major and Cordey-Hayes, 2003; OECD, 2005; Rothwell and Zegveld, 1982). SMEs may be disadvantaged in their pursuit of innovation by the lack of resources (Julien and Carrier, 2002) and the optimizing of its use becomes a necessity (Wolff and Pett, 2006). This may explain why the efficiency of the R&D department of SME may be higher than for large firms (Acs and Audretsch, 1991; Vossen, 1998). However, their lack of resources can also lead them to limit their involvement in risky activities, such as R&D (Carmel and Nicholson, 2005, Hoffman et al., 1998.). Innovation systems, as Lundvall (1985) propose, are an essential attribute attention to interactive learning that is conditioned by non-price relationships, such as energy, confidence and loyalty. In addition, the effective transfer of knowledge requires mechanisms to coordinate the interaction of complementary pieces of knowledge.

In this regard, social relationships accelerate the pace of learning and are potential sources of innovation and dynamicity (Asheim et al., 2011; Iammarino and McCann, 2005; Malmberg and Maskell, 2006). In addition, the daily interaction between stakeholders can ensure a rich and diverse social networking. Indeed, the face-to-face ensures that both interaction partners put efforts in a common project and prevents them from engaging in free-riding behavior, which would undermine the incentive and interactive learning in the future (Storper and Venables, 2004). In this way, trust and engagement are gradually established in the process of social interaction and enhances the learning dynamics.

Therefore, the ability to innovate of the company is based on the exploitation of its innovative skills. The latter is leveraging a set of codified and institutionalized knowledge as well as a pool of experiences formalized to reach a sufficient level of knowledge in the judgment (decision) of innovation to produce (Dubuisson and Kabla, 1999). Innovative skills are deeply rooted and diffused in the organization, which makes them difficult to imitate. They offer more potential to be extensively exploited since they are at the level of the organization and not only at the level of individuals in the organization (Prahalad and Hamel, 1990).

Effect of access to strategic information on innovation

Many contributions have showed the positive effect of the use of these external sources of information. Julien et al. (2004) observe the beneficial effect on innovation of links to actors rather distanced from the everyday activity of SMEs (universities, government agencies, etc.) compared with those with whom it interacts more regularly (suppliers, customers, partners, etc.). From his side, Watson (2007) showed that the characteristics of the leader of the network had a positive impact on the survival and growth of the company.

In fact, innovation depends on the learning process, but also on the past decisions in the accumulation of knowledge (Cohendet, 2003). In this regard, the organization follows a specific technological trajectory. Indeed, the firm is restricted in its exploration by the limited rationality of the members of the organization. Unable to process all the information, they are forced to use routines and procedures to explore their environment (Cohendet, 1994). According to an evolutionary perspective, organizations first accumulate knowledge and experiences that promote the generation of innovations (Cohen and Levinthal, 1990). Then, they develop routines and structures that crystallize organizational knowledge that are advanced over time to better exploit the knowledge acquired. The routines and structures are difficult to modify. Faced with a changing environment, the slow adjustment routines and
structures becomes a source of organizational inertia and stiffness. Thus, organizations lose the ability to assimilate and exploit new knowledge pools. Technological exploration becomes more local and closer to what the organization already knows (Mitra, 2000). The organization pursues a technological trajectory which can increasingly narrow it away from the requirements of the environment. In this case, the organization gradually loses its competitive flexibility (Sorensen and Stuart, 2000). As innovation and routines that support it are based on knowledge, it becomes essential for the firm to focus on the creation and assimilation of knowledge. But, the process of creating knowledge must feed rich information to counter exploration which can make knowledge increasingly localized. In practice, the results of the survey conducted by Julien, Guihur and Morin (2003) on SMEs of the Quebec indicate that there are many limits to technical progress and access to qualified staff. These difficulties are mainly related to the need to use the rich information to innovate.

Daft and Lengel (1986) define wealth of information as its ability to change the understanding of state within a time interval. They consider that communication is rich when it allows, quickly, the clarification of ambiguous situations or spend beyond different perspectives. The information used is not as rich as it takes longer to reduce ambiguity or that it does not go over the differences of perspectives. The potential that it has to learn a communication gives it its wealth of information (Daft and Lengel, 1986). According to Julien (2005), rich information is a rich source of various signals used as raw material for new knowledge. The managerial problem is related to the process of innovation needs to be supplied with new knowledge and thus, to be supplied with rich information to continue contributing to the flexibility and competitive distinction of the organization.

However, Daft and Lengel (1986) believe that some media or communication channels are richer than others depending on their ability to convey the rich information able to reduce ambiguity in new knowledge. A rich medium facilitates immediate reactions and simultaneously maintains a large number of signals, uses many communication channels, allows a focus on the person (personalization) and retains language diversity (Daft and Wiginton, 1979). Moreover, cross study achieved by Carlson and Zmud (1994) reveals that the wealth of information of electronic medium as perceived by users is based on their experience with both the communication channel and the interlocutor, and experience to communicate in the involved organizational context. In addition, the wealth of information collected is comparatively less affected by the subject of communication and social influence felt by the interlocutor. As for the longitudinal study, the author emphasized that the wealth of information about the electronic medium as perceived by the user is positively articulated with the experience of the latter with the communication channel, experience with interlocutor and social influence.

Hence, the structural features facilitate the use of media usually considered rich, interactive reports, promoting, personal and often face-to-face to share subjective views towards a common interpretation. Such rich structural mechanisms include group meetings, liaison activities (boundary spanning) with individuals serving as information gateways between departments and finally, direct contact between members of the organization (Daft and Lengel, 1986). Some uses of electronic communication channels may also be assimilated as carriers of rich information (Carlson and Zmud, 1994). Besides the structural means, the organization can also access to rich information through training of members of the organization, recruiting members with increased expertise, complementary or new, or the acquisition of new resources (Wickert and Hershel, 2001; Julien and Carrier, 2002).

Thus, innovation is the fruit of a collective effort, which frequently goes beyond the simple framework of the organization (Amable, 2003). In fact, the synergy between the different stakeholders, organization of links established between them, and their
environments are critical to absorb information and turn it into a source of knowledge (Julien, 2005).

The innovation activity is also an often interactive and collective turbulent process of the dismantling, the construction and the association of ideas (Callon, 1995). Therefore, innovation is reduced to a recombination of knowledge and expertise to create new resources and skills used by individuals or organizations. Knowledge is the base and the starting point for innovation. But, knowledge is created and organized by the message flow, signals, from which we can draw meaning and learn something (Nonaka, 1994). The potential to learn in a communication gives the latter its wealth of information.

The wealth of information, as a rich source of various signals, used as raw material for new knowledge (Julien, 2005). On the basis of available knowledge pool, the creation of knowledge through learning and the accumulation of knowledge influences the organization's ability to innovate through the accumulation of knowledge and absorption of rich information.

**The effect of access to financial resources on innovation**

Access to financial resources is one of the first obstacles faced by contractors in the creation of their company. Given the efforts in research and development to generate significant profitability, innovative SMEs have, in fact, more often, serious funding problems than other "traditional businesses" (Albert, Fayolle, and Marion, 1994; Moreau, 2005). We note that the information asymmetry and the presence of intangible assets are, also, the two main causes of the problem of financing of the innovative company. This pushes financial institutions, including banks, to maintain a cautious position by rationing the volume of credit to small, innovative structures, or, by making it more expensive for them.

The financial dimension of export performance makes reference to both internal determinants, through financial and external determinants, because of external financial barriers hindering the export development. The export requires specific financial needs. Indeed, although some requirements are common to domestic activity and international activity, others are linked only to the international activity of the company. They create a need for additional funding. Another category of emerging financial needs of the export activity and its development consists of the costs they will generate, which increase the need for working capital and it must be minimized.

Venture-capital or, more generally, the capital investment is a financing method particularly well adapted to the emergence and development of innovative startups. As defined by the FPEA (the French Private Equity Association), the mission of the venture-capital is to take a stake in small and medium sized unlisted companies. This financing method, thus, appears as an essential lever for the revitalization of the business fabric of our economies (Glachant at al., 2008). Indeed, although it accounts for a paltry share of the total capital raised to finance innovation, venture-capital plays a crucial role in the economic sphere and can even present itself as a catalyst for innovation and particularly for radical innovation.

If the mechanism of financial funding promotes the launch of new innovative firms, especially its originality is that it is strongly attached to an objective of growth and enhancement of the financed company. Indeed, venture-capital companies mobilize their expertise (financial, managerial, technical, ...) in order to add value to their portfolio. Nevertheless, the ultimate goal of venture-capital companies is to pay via capital gains realized on the resale of their holdings in the company.
The effect of social support on innovation

Our fundamental theoretical hypothesis concerning the concept of innovative environment, namely the social and economic environment of a developed region during by following path dependence, is that all innovative environments are the product of interactions between companies, institutions and labor (different categories of proximity). Such interactions are exclusively the result of mutual synergies (networks, partnerships, etc.) between the various local actors (public or private) taking part in the economic and industrial development. As an illustration, we can refer to different types of cooperation between companies and research laboratories. To this end, the launch of new entrepreneurial activity is a priori moderated by socioeconomic context, industrial and scientific environment, and the genesis of innovations.

The effect of knowledge transfer on innovation

According to Tesfaye (1997) and Fayolle (1999), innovative contractors in the technological field target their investment projects in the sectors in which they have a thorough knowledge about the markets and technologies adopted and the industry in question (Tarek and Sami, 2014), the competence and the past experience with the product and the technology used.

Moreover, innovation capacity of the company is strongly determined by the ability of the contractor to operate his innovative skills. These latter, are developed, thanks to a set of codified and institutionalized knowledge, and a non-transferable basis of experience to acquire sufficient knowledge and thus, in order to decide the innovation to produce (Dubuisson and Kabla, 1999). Innovative skills are radically integrated and shared within the organization, which makes them difficult to imitate.

The analysis of innovation is not realized on the side of the resources involved or the results obtained. The problem is related to activities necessary for this innovation to succeed (what is now), especially in terms of knowledge, expertise, experience and skills to innovate (Cohendet and Munier 2009). Based on this idea, we can formulate the following hypothesis: The relational network of the contractor affects positively and significantly the innovation by facilitating access to strategic resources.

Hence, we try to test the mediation of the access to strategic resources in the relationship between relational network and innovation.

Methodology, results and discussion

Before presenting the results of the confirmatory analysis, we want to clarify the conditions for its implementation. The majority of variables cannot be considered normal or pseudo-normal. This is the reason that the use of Bootstrap procedure with 100 replications of the sampling and the method of Maximum Likelihood (ML) has been selected for the parameter estimates. We try in what follows to test the mediation of the variable related to the absorption capacity between relational network and entrepreneurial orientation. We expose below the necessary calculation steps in order to identify the mediating effect and the strength of this indirect effect will be tested through the complete model. The technique of structural equations, as recommended by Baron and Kenny (1986) were used among all possibilities of analysis of causal effects. Several indices will be mobilized to assess the validity, quality and relevance of a measurement model. The use of confirmatory factor
analysis with adjustment function (ML) is sensitive to the violation of the assumption of normality of the different multi-dimensional relational network.

However, we preferred to use a bootstrap procedure to ensure the validity of results. As for the validity of relations, two types of service must be assessed. Statistical significance is assessed through "t-student" tests on correlations. The practical significance is assessed by the value of R-square. Given this wealth of information, the use of indices to compare the suitability of several models between them (NFI NNFI, CAIC, GFI, AGFI) and an index associated with a confidence interval (RMSEA). In consequence, we retain the indicators according to their availability in STATISTICA 5.1.

All data collected by a questionnaire were subjected to a number of statistical analyzes with the aim to discover, describe and understand the process of access to external resources. However, the information provided by the questionnaire was not all directly usable as is. They were submitted to a preparatory work to make them operational for statistical processing. Preparing data includes a number of steps which are intended to transmit the questionnaires variable file on which will be considered complete statistical processing. Two main phases can then be distinguished: the verification of questionnaire and "codification of answers."

This systematic work has shown that the successful questionnaire is completed legibly. Only a very few cases involved minor anomalies. It was essentially a few unintentional oversights responses to an item, generating few missing values. Thus, there was no removal of relevant questionnaires.

The questions were related to innovation adopted by SMEs (including their industry, specializing in the IT sector, characteristics of the innovation model to follow, innovation typology and the minimum values of innovation);

To investigate the dimensionality of the variable related to innovation, a first factor analysis using SPSS 17 software, the varimax rotation method with Kaiser normalization was chosen because of various scales are not supposed to be independent. Before the analysis, we first checked whether the conditions for the factorization of the variables were observed. Measuring KMO is of the order of 0.617. This value is satisfactory for the exploratory phase. The statistical picture of the anti-correlation matrix is satisfactory.

<table>
<thead>
<tr>
<th>ITEMS</th>
<th>VARIABLE</th>
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<tbody>
<tr>
<td>Sector of company</td>
<td>Innovation</td>
</tr>
<tr>
<td>Specially in the IT sector</td>
<td></td>
</tr>
<tr>
<td>The Model to follow in the innovation system</td>
<td></td>
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<tr>
<td>Product type according to the degree of innovation</td>
<td></td>
</tr>
<tr>
<td>Conductor and project monitoring</td>
<td></td>
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<tr>
<td>The Minimum values of innovation</td>
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</table>

After filtering, our sample consists of 140 Tunisian SMEs. To study the dimensionality of the entrepreneurial orientation, a first factor analysis with SPSS 17 software, the varimax rotation method with Kaiser normalization were selected because of the various scales are not assumed to be independent. Before the analysis, we first checked whether the conditions for the factorization of the variables were observed. Measuring KMO is of the order of 0.617. This value is satisfactory for the exploratory phase. The statistical picture of the anti-correlation matrix is satisfactory. The Bartlett
sphericity test is also significant to the threshold of 0.001. This analysis has reduced the number of items from 34 to 28 (total outstanding items) which justify the use of a second factor analysis. The items related to innovation are exposed in the following table.

The first factor related to innovation is interested in different types of organizational innovation (product, process, and marketing) that can be implemented to develop the new production methods, a new idea, and thus, to give a dynamic and latent capacity in both forms: technological form and behavioral form. From 6 items we have valued, innovative capacity of the contractor based mainly on the exploitation of his innovative skills and his experiences with the product and technology used and therefore, to have a good knowledge of markets, technologies or industry.

Furthermore, in order to measure the relational network of the entrepreneur, we opted for five key variables, namely: The scale of the network, the density of the network, the structural holes, the nature of social ties, and attribute of alters.

In what follows, we want to explore the relative influence of all components of personal and relational network, on the access to strategic resources by referring to a structure analysis based on the ML function. The values shown in the tables below are those of the bootstrap (100 replications of the same sample size).

**TABLE 2. VALIDATION OF THE DETERMINANTS OF VARIABLE RELATED TO ACCESS TO STRATEGIC RESOURCES USING INDEXES**

<table>
<thead>
<tr>
<th>INDEX</th>
<th>VALUE (ML FUNCTION)</th>
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<tbody>
<tr>
<td>AGFI(^1)</td>
<td>0.994</td>
</tr>
<tr>
<td>GFI(^2)</td>
<td>0.649</td>
</tr>
<tr>
<td>RFI(^3)</td>
<td>0.774</td>
</tr>
<tr>
<td>TLI(^4)</td>
<td>0.654</td>
</tr>
<tr>
<td>CAIC(^5)</td>
<td>0.974</td>
</tr>
<tr>
<td>RMSEA(^6)</td>
<td>0.077 [0.067 0.087]</td>
</tr>
</tbody>
</table>

The results of the estimate indicate statistically significant and positive relationship between the different dimensions of relational network and access to strategic resource, except for the attribute of alters (a non-significant negative correlation between the two variables). The practical correlation between measurements obtained between relational network and access to resources is acceptable (R^2 = 0.49). The adjusted indexes are satisfactory or are close to the recommended standards.

The significant relationship between relational network and innovation suggests that the formation of entrepreneurial opportunities occurs by the wealth of information

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\(^1\) Adjusted GFI.
\(^2\) Goodness of-fit index.
\(^3\) Index related to the adequacy of Bollen.
\(^4\) Turker Lewis index.
\(^5\) CAIC of Bozdogan(1987).
\(^6\) RMSEA de Steiger and Lind (root-mean-square error of approximation, 1980).
acquired through social ties and new contacts. Another significant relationship between innovation and relational network reveals that the entrepreneurial opportunity is based on how learning and knowledge accumulation influence the innovative contractors to exploit its innovative skills.

The significance of this relationship suggests the existence of the mediating role of the variable access to strategic resources in the relationship between relational network and innovation. We will further explore this possibility.

Before commenting these results, we want to ensure that the relationship between the components of personal and relational network and innovation is mediated by the access to strategic resources. To do this, three values must be calculated successively to conclude that the access to strategic resource has a total mediation. We resumed below each of the three steps necessary to calculate and present the findings later to stretch. The table highlights the value and significance of correlations between measurements of the relational network (Xi) and the variable related to access to strategic resources (M), the correlation between Xi and innovation (Y) as well as correlations between X and Y when the mediation M is controlled.

The ML fitting feature was used later to use a bootstrap procedure has controlled the violation of the assumption of the normality of variables and the stability of the results.

| Table 3. Validation of the determinants of access to strategic resources |
|-----------------------------|-----------------------------|
| **Statistical significance** | **Practical significance**   |
| Scale of network → Access to strategic resources |  
Correlation: 0.233 (t=2.18)**
After Bootstrap: 0.228 (s=0.022) |
| Density of network → Access to strategic resources |  
Correlation: 0.63 (t=3.18)**
After Bootstrap: 0.61 (s=0.007) |
| Structural holes → Access to strategic resources |  
Correlation: 0.036 (t=5.18)**
After Bootstrap: 0.031 (s=0.034) |
| Nature of social ties → Access to strategic resources |  
Correlation: 0.014 (t=1.74)**
Après Bootstrap: 0.012 (s=0.054) |
| Attribute of alters → Access to strategic resources |  
Correlation: -0.44 (t=1.22)
After Bootstrap: 0.42 (s=0.032) |
| Note: *** (1%), ** (5%), no stars (not significant). |

Statistical significance was evaluated through tests "t" conducted on the correlations.

The practical significance appreciated by the value of $R^2$. 

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Regarding the mediating effect of the access to strategic resources, the results show that the relationship between measures of personal and relational network (Xi) and access to strategic resources (M) are significant, and that relations between X and Y are also significant at the threshold of 1% and 5%, respectively. The other relations between X and Y when M is controlled are not significant for the Xi formulated by the network density, scale of network and the nature of the Social ties. These results support those of Basanar et al. (2003) and confirm the existence of a local network and the importance of information and financial knowledge facing many blockages to develop a better understanding of future needs, and therefore, more innovative business opportunities. From the study of a sample of the contractors, Mina and Smith (1983) point out that the effect of these social ties on entrepreneurial opportunities should not overestimate this monotonic relationship if the information is vigilant, but rather the recognition of a market opportunity.

**Concluding remarks**

Based on our results of estimates, we highlight the importance to guide SMEs to the strategic resources, information sources and to be vigilant in this vocation. At this
level, appear as incentives, the fact to develop new contacts and it is very important that strategic resources play an intermediary role by collecting, filtering and analyzing rich information in order to make easy decisions taking related to innovation and therefore, to manage the competitive advantages.

Indeed, we conclude the evidence of a partial mediation in the relationship between personal and relational network and innovation by the variable access to the strategic resources. Therefore, this relational network of the contractor acts indirectly on innovation through its effect on access to strategic resources. This result confirms partly organizational modeling.

References


Bel Hadj Tarek, Aouadi Sami, 2014. "Effects of corporate economic intelligence on the international competitiveness of Tunisian firms", Knowledge Horizons - Economics, Faculty of Finance, Banking and Accountancy Bucharest, "Dimitrie Cantemir" Christian University Bucharest, Vol.6(1), pp.113-121


Hoffman K., Parejo M. et al., 1997. Small firms, RandD technology and innovation in the UK: A literature review, Technovation, 18, pp.39-55


OECD, 2005. Manuel d’OSLO, principes directeurs pour le recueil et l’interprétation des données sur l’innovation


Rothwell R., Zegveld W., 1982. Innovation and the small and medium sized firm, Londres, Frances Pinter


