

SOUTH ASIAN JOURNAL OF MANAGEMENT RESEARCH

(SAJMR)

Volume 1 Number 2

July 2009

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**Chh. Shahu Institute of Business
Education and Research (SIBER)**

(An Autonomous Institute)

Kolhapur - 416 004, Maharashtra State, INDIA

SOUTH ASIAN JOURNAL OF MANAGEMENT RESEARCH (SAJMR)

ISSN 0974-763X



Published by
Chh. Shahu Institute of Business Education & Research (SIBER)
University Road, Kolhapur - 416 004, Maharashtra, India

Contact: 91-231-2535706 / 07 Fax: 91-231-2535708 Website: www.siberindia.co.in, Email: sajmr@siberindia.co.in

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The first issue of the first volume of SAJMR received good response from the readers. The feedback received from the readers made us to improve the present issue.

The present issue has broader scope than the earlier, yet we have kept the true spirit of the journal. In this issue we have included articles from the Computer Studies and Environmental Management field as well. As we have stated earlier, the objective of the journal is to provide a common platform for the practicing managers and academicians to share their research knowledge through this journal.

In future, we also welcome articles related to different pedagogical approach in management teaching. Many courses including management discipline everywhere use more of a traditional approach of lecturing to share the knowledge. Lecturing method is more passive in nature. Case study comes next to lecturing method in imparting knowledge. But not much has been done in developing experiential approach as a pedagogy of teaching in management field, particularly in India.

Experiential learning is more active rather than passive. The readers can contribute case studies and teaching material in experiential learning approach in different management fields such as marketing, human resources, organization behaviour, organizational change and development, strategic management, etc.

I am grateful to all the authors, reviewers and editorial members of the journal for their contribution and support in bringing out the second issue of first volume of the journal successfully.

Dr. Babu Thomas
Editor

Contribution of Location Theories for Regional Development: Why some Technology-Based Firms Choose to be Rural?

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Abstract

This research aims to identify the factors which influence the location of technology-based firms. Accordingly, we propose a conceptual research model on the location of firms, based on the neoclassical, behavioural and institutional views. In order to reach the objectives of our research, an empirical study was developed based on a questionnaire filled by 203 technology-based firms located in the Beira Interior region (Portugal). The resulting data was subject to two types of statistical analyses: bivariate and multivariate. It was possible to identify crucial factors that mostly influence the location of these firms. These factors were: (i) founder's wish to live in a particular locality, (ii) employees' wish to live in that particular locality; (iii) proximity to the residence of the founder; (iv) birthplace of the founder and (v) the level of economic activity in the region.

Keywords: Location Issues, Regional Development, Technology-Based Firms

1. Introduction

Entrepreneurship, as well as the factors behind its existence and their influence on regional economic development, has been studied by several authors (Birley, 1985; Kirchoff and Phillips, 1988; Storey, 1994). The question of regional development has interested a range of both national and international researchers (Cooke, 2002; Lopes, 1998; Rego, 2003; Santos, 2002). On a national level, the importance of the topic lies mostly in the existence of national asymmetries, while, on an international perspective, interest is correlated to all events affecting Europe and, more precisely, the European Union. Entrepreneurship is thus presented as something that contributes to regional development (Raposo *et al.* 2004). Accordingly, the White Paper (2001) produced by the NCOE (National Commission on Entrepreneurship) stresses that its major contribution, on a local level, is innovation. Questions on location theories are inevitably linked to the question of entrepreneurship and its relevance to regional development. That is to say, what makes entrepreneurs, who are

responsible for the entrepreneurial activity; choose a particular location to set up their business?

Regional development, particularly in (more) peripheral regions, is normally associated to major capital investment, to the application of technical and scientific resources in the productive systems and to profound economic change. Rural areas are still lagging behind their urban counterparts, particularly regarding technology-based firm formation (Roper and Love, 2006). Given the importance of regional development and location theories, we shall aim to identify, in the present research, the reasons which lead technology-based firms to set up in a particular region, with particular emphasis on the factors which influenced the decision to locate technology-based firms in the Beira Interior Region (Portugal).

2. Contributions for regional development

According to Alberto (2008), the concept of regional development is a result of the integration of the variable space in the topic of

development, which thus appears linked to a concrete spatial reference – the region. Territorial development achieved a level of importance in the 1990s that only finds parallel in the post-war issues around growth. The importance of this topic is clearly perceptible on two levels: international and national. In what concerns the international level, the development of Eastern Europe into new political and administrative models. The unification of Germany, the European monetary union and the multiplication of international organizations with a significant degree of economic and political integration are a good example of this. On a national level, the presence of profound local asymmetries, the economic protection of Portuguese borders, the concern with the efficacy of financial efforts to promote a balanced development, the need to clarify and evaluate the role of political and administrative decentralised structures in the promotion of development, make the issue of territorial development very much a current one, of unprecedented relevance (Lopes, 1998).

Rego (2003) proposed a new concept of regional development, that of 'learning region'. Qualifying a region as a 'learning region' means that the players in the system are involved in learning processes that allow the development of knowledge, know-how and other competencies, which are necessary for innovation and sustained competitiveness. In order to be efficient in a borderless world economy, regions must present the same characteristics as firms with a strong knowledge-based component: permanent improvement, new ideas, knowledge creation and ongoing learning. The key to the existence of 'learning region' lies in the presence of human infrastructures and institutional mechanisms that foster interactive learning. Thus, the capacity to encourage the return to universities throughout people's active lives is vital to ensuring knowledge update and maintenance of the capacity to innovate.

Intelligent regions are territories which are specially oriented and prepared to offer a series of conditions which favour the recreation of a relationship culture and collective learning dynamics, with the strategic purpose of producing knowledge and innovation. For this reason, and thanks to these specific factors, they are no different from the more developed

concept of innovative environment. Amongst other characteristics, intelligent regions have a series of specific assets which distinguish them from the competition, and allow them to be better positioned, in terms of coherence and strength, to face multinational productive capital (Santos, 2002). This idea is associated to the concept of 'knowledge economies' (Cooke, 2002). According to this author, these 'knowledge economies' face three clear challenges: to fight regional imbalances; the fact that the activities of modern economies are increasingly knowledge-based; the concentration of knowledge-based economic activities in clusters. In this context, entrepreneurship, innovation, knowledge spillovers and KIBS (Knowledge Intensive Business Services) contribute to regional development and location theories.

3. Theoretical views on firms' location

According to Silva (2005), the spatial distribution of economic activities results from opportunities and location strategies devised in accordance with particular objectives. However, decision-making processes are complex and involve an important economic component, since a large part of human activities require the use and sharing of limited resources. In the opinion of Capello (2007) there are two groups of theories (which he refers to as "regional economics") that look into the issue of economic logic, which intends to explain the location of firms or, in other words, the existence of areas that are more developed than others: (i) Location theories: economic mechanisms that cause the distribution of activities in space; (ii) Growth and regional development theories: they focus on spatial aspects of economic growth and on territorial distribution of income. Location of economic activity can be analysed through three distinct views (Hayter, 1997): (i) the neoclassical, which focuses mostly on the location theory and centres its analysis on profit maximization strategies and minimization of costs (ex. transportation costs, human resources costs and external economies; (ii) institutional, which states that it is important to consider not just the firm's search for an appropriate location but also the institutional milieu it is part of (clients, suppliers, commercial associations, regional systems, the government and other

firms); and (iii) behavioural, which focuses on situations of uncertainty and lack of information.

Of all the literature on location factors of technology-based firms that was reviewed, we chose to follow the theoretical classification advanced by Hayter (1997). According to Hayter, these three views have the purpose of demonstrating how complex the reasons that motivate the location of a particular economic activity are, and they allow us to analyse factors of location at a more 'micro' level. Hayter (1997) defined the frontiers between these views in a more comprehensible manner. In his opinion, these are unclear in the literature that has been produced. Thus, we shall now provide a brief characterization of these views.

3.1. Neoclassical view

Several research studies, as will be shown, centre on the location factors of technology-based firms. However, few of these insights reflect on the motives which led firms to set up in rural areas. The reason behind this lack of information lies, probably, in the small number of firms located in rural areas. Nevertheless, and thanks to the development of information technologies, particularly the Internet, Grimes (2000) identified an increase in the number of firms which set up in those areas. According to Ouwersloot and Rietveld (2000), one of the key factors for economic development is technological innovation: the introduction of new production techniques, products or services. However, the emergence of these new factors is usually preceded by an intensive R&D process. Thus, and in the view of these researchers, the location of R&D activities is influenced by several factors. They have then identified four factors that are external to firms and which may influence location decisions: (i) labour offer; (ii) knowledge infrastructures; (iii) physical infrastructures; and (iv) agglomeration effects. These researchers concluded that the factors that make firms decide to set up in a particular region depend on the type of firm. In other words, for traditional transformation firms, the industrial composition of the place where they will be based is a key factor. If the firms are service-based, what influences them most in their choice of location is physical infrastructures and knowledge.

Holl (2004) focused his research on the impacts that the new transport infrastructures had on emergence of new manufacturing firms. Contrary to many previous studies, this work based its analysis at a micro level basis, in order to assess the variations on location at a detailed geographical scale. Through empirical results, the author concluded that in a country such as Spain, where the highway road system was developed recently (1980-1994) and where intra and inter-regional differences are clearly visible, access to road infrastructures makes all the difference when it comes to deciding where to set up a new firm. Costa *et al.* (2004) analysed the mechanisms behind the location of new technology based firms and proposed that it was linked to the type of industry and the product life-cycle on which the firm based its activity. Therefore, when the entrepreneur finds a place to set up his firm, he should evaluate if the environment is the most favourable to carry out his production process. This environment may be more or less populated and it may contain a greater or smaller variety of productive activities.

Nonetheless, through their empirical study, they came to the conclusion that the most populated and developed cities have lost their attractive edge, regarding the location of firms, to their smaller and more rural counterparts. Yet, when they looked at new science-based firms, they realised they prefer to locate and be part of the large cities. Thus, the location of firms is as near or remote from major urban centres depending on the type of firm and the activity it pursues. Focusing now on Hayter's perspective, it can be said that, according to the neoclassical view, the location of firms lies essentially on the power of economic forces. The truth is that, in practice, and depending on the profile of the entrepreneur, he may well ignore the power of these forces. According to Hayter, this situation often has a perverse influence in the location theories when researchers strictly defend the neoclassical view, given that, through common sense, as well as a result of economic advantages. When entrepreneur choosing the location for his firm, takes into account all types of costs, thus deciding where to set up where costs are lower. It is precisely because of these issues, and because, in Hayter's view, this factor does not explain, in itself, the location of firms.

He developed two theories that are henceforth presented: the institutional and the behavioural. In sum, in this type of view, the authors argue that the factors which enable the emergence of firms are road infrastructures, more or less populated places and the type of industry to be set up.

3.2. Behavioural view

Galbraith (1985) studied 98 entrepreneurs of high technology firms with an average of 670 employees each in Orange County, California (USA). He concluded that high-technology firms, in their location decision process, operate within a framework of factors that are different from those observed in traditional industries. The author identified three factors that determine the location of this type of firms: evaluation of individual and professional character; culture and way of living; and the wish of the founder of the firm to leave in that locality. These conclusions are equally shared by Arauzo and Viladecans (2006) in their study on the level of spatial concentration of new firms (in the period 1992-1996) in the municipalities of Spanish urban areas. Those authors believe that the process of sub-urbanism is particularly important to high-technology based firms. These firms move from big cities in large urban areas (their traditional location) to smaller cities. This, as a result, end up improving their accessibility, thanks to investments in road infrastructures. In fact, smaller cities appear to be preferred for the location of technology-based firms. Because they offer a quieter environment, better quality of life and become highly advantaged by the presence of qualified individuals working in these industries.

Felsenstein (1996) argues that urban areas enjoy a physical network of infrastructures that is better than in non-urban areas (ex. telecommunications), this being a sufficient condition for entrepreneurs to prefer them as locations for their firms. Nevertheless, and based on a study on a sample of 160 firms, both in urban and non-urban areas in Tel Aviv (Israel), he analyzed the trend of high-technology firms to choose urban areas as a location. The author concluded that the location of firms does not follow a strategy or a calculation. It appears to be particularly the case of small new firms which emerge within a locality, without a defined

background strategy. Yet, he noted and concluded that one of the characteristics of the network of new firms lies precisely in the fact that they are not located in urban areas. According to Hayter (1997), the location of many firms is explained by this view, since many entrepreneurs, when deciding on where to set up their firms, end up choosing the places where they were born, pushing neoclassical factors aside. For him, this perspective goes against economic principles, since only behavioural factors are subject to assessment. Nevertheless, this view accounts for the appearance of the majority of small and medium-sized firms. In sum, the researchers argued that the location of firms lies mostly in the quality of life and personal characteristics of entrepreneurs.

3.3. Institutional view

A different perspective to the study on the location of technology-based firms, the institutional view, is the one offered by Elgen *et al.* (2004). Their research aims to analyse the role that public research institutes play in capturing/attracting new technology-based firms. For that purpose, they selected to 20,000 new German firms specifically on the basis of their deep knowledge of research institutions. The results demonstrated that these start-up high-technology firms tend to trust science with a high degree of intensity, which made them set up near research institutions. Nevertheless, new service-based firms tend to move away from the very same institutions. Thus, it can be said that, depending on the degree of technology that is necessary to the activity of a particular firm, it will be located nearer or further away from research institutions. Meyer (2003) further developed the research that was previously carried out by other authors, as, for him another key fact that influences the location of firms is the presence, at a given locality, of a business incubator, because this type of institution is of extreme importance when it comes to deciding where to locate a firm in a particular place. In a similar study, with technology-based firms as a basis for analysis, Audrestch *et al.* (2005) stressed the importance of access to knowledge spillovers when new technology-based firms decide on their location. In this model, the authors include: distance, in kilometres, from firms to the universities, the number of scientific

articles published by the universities, the number of students studying exact and social sciences, the number of inhabitants, the price of an overnight stay at the most expensive hotel in town and the firms' average age. Their results revealed that new high-technology firms are influenced by factors other than regional traditional characteristics, such as the opportunity to access knowledge generated by universities. Autant-Bernard *et al.* (2006) analyzed the determining factors in the creation of new biotechnology firms in France over the last decade (1993-1999), in order to understand the role of the environment in the commercialization of scientific results. They based their research on three key determining features: proximity to knowledge resources, surrounding milieu and industry's surrounding milieu. Their results demonstrated the need for the existence of a large and diversified scientific basis inside a region to enable these firms, after they were set up, to continue their activity for many years. Looking at the example provided by another country (Spain), Alonso (1999) and

Trullén (2001) argued that the major technology-based firms tend to group together in the periphery of large urban areas; particularly when these newly set up firms have over 100 employees. Therefore that they can benefit from the technology created by other agents, at lower costs. According to Hayter (1997), there are also entrepreneurs who prefer to set up business near universities, research centres and governmental bodies, in order to provide more adequate support to the activities they intend to develop within their firms.

In sum, the authors we have referred to believe that the factors that decide the location of firms are determined by the presence of a business incubator, proximity or distance from public research institutes and from more or less populated cities. Given the systematization that has been presented, and considering the three views to the location of technology-based firms, we present, in Figure 1, our own research model. The model intends to highlight the main factors that influence location decisions by technology-based firms.

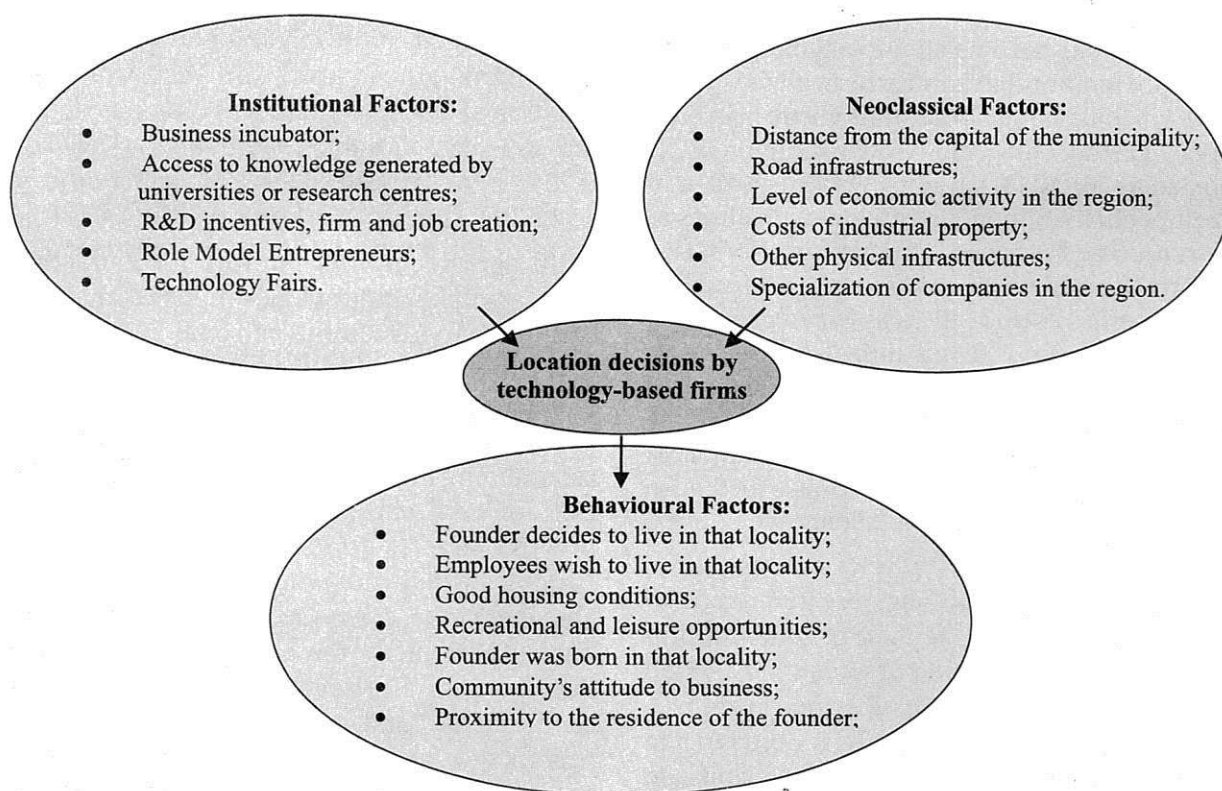


Figure 1: Proposed research model

Given the conceptual model, research hypotheses regarding each of the location factors shown in the model have been formulated (Table 1)

4. Methodological and statistical procedures

The classification of technology-based industries includes the OECD (2003) classification for R&D intensive manufacturing industries, given the major contribution that these firms may give to the country in terms of R&D production, wealth and added value. Four key categories have been identified: (i) high-technology industries; (ii) medium-technology industries; (iii) medium-low- technology industries; and (iv) low-technology industries. Our database was built from the database supplied by the support of regional centre (NERGA for the district of Guarda), and by using of the telephone directory (yellow pages for the district of Castelo Branco), since we were not able to obtain the necessary information from the institutions. Our database includes 550 firms, of which 60% are high-technology, 14% are medium-technology and 26% are low-technology firms. We obtained 203 answers, representing a response rate of 36.9%. The questionnaire is formed by closed questions, using a likert scale. The respondents were the entrepreneurs – firm's owners.

OECD has been using population density to measure rurality, that is, all areas with fewer than 150 inhabitants per square kilometre are rural areas (1996). In regional terms, the OECD considers all NUT III areas with over 50% of their population living in rural municipalities to be rural. The European Commission (1997) also resorts to population density to measure rurality, and classifies as rural all areas with a population density below 100 inhabitants per square kilometre. Based on these criteria, our unit of analysis (Beira Interior region) is rural in all the localities that it comprises, as we shall next demonstrate. We used the face-to-face method in our research, in order to obtain the highest possible number of responses.

The objectives of our research were to analyse and identify the factors which inform decisions on the location of technology-based firms in the Beira Interior Region (Portugal). We aim to: (i) empirically validate the proposed conceptual model on decisions on the location of technology-based firms in Beira Interior; (ii) identify which factors influence the location of technology-based firms in Beira Interior; and (iii) characterize

firms according to distinct technology levels and detect eventual differences between levels. In order to identify the location factors of high, medium and low-technology firms in Beira Interior, we carried out a factor analysis on 19 items of the questionnaire, with the SPSS 15. The objective for using the factor analysis technique was to obtain a reduced number of factors which allowed us to identify the structural relations amongst the nineteen variables which measure the importance of factors in the location of firms.

The extraction method of the factors to be used was the main components method, using the varimax method, with the purpose of obtaining a factorial structure in which one, and only one of the original variables, is strongly associated to just one factor, and weakly associated to the other factors. The Bartlett method (minimum mean square method) was used to determine the factor scores. The factor analysis of the main components for the nineteen variables that we studied included 196 firms. All the variables that saturated more than one factor were discarded (the saturation criteria was coefficient 0.40). No item was eliminated, and the nineteen variables were kept (KMO = 0.759 and Bartlett's test of sphericity = 1347.702; significance level: 0.000).

In agreement with the rule for extracting factors with singular values higher than 1, we extracted five factors (personal motivation; innovation and incentives to firm formation; characteristics of the locality; economic expansion in the region; and conditions of the surrounding milieu) which account for around 62% of total variability. The factor analysis process was started by eliminating the variables with factor weights of less than 0.40, absolute value, from the components' matrix. Table 2 depicts the group of 19 items distributed by 5 factors, the singular values for each factor and the explained variance percentage, and the internal consistence of each factor, using Cronbach's alpha coefficient.

The analysis of the internal consistence of each factor yielded alpha acceptable values

Table 1: Research hypotheses

Size	Research hypotheses	Studies
Behavioural factors H1: Behavioural factors influence the location of high, medium and low-technology companies, in Beira Interior	H1a: The founder's wish to live in this locality influences the location of high, medium and low-technology companies	Elgen <i>et al</i> (2004) Mayer (2003) Audrestch <i>et al</i> (2005) Autant-Bernard <i>et al</i> (2006) Alonso and Trullén (2001) Hayter (1997)
	H1b: The employees' wish to live in this locality influences the location of high, medium and low-technology companies	
	H1c: Proximity to the founder's residence influences the location of high, medium and low-technology companies	
	H1d: Access to good housing conditions influences the location of high, medium and low-technology companies	
	H1e: The founder's birthplace influences the location of high, medium and low-technology companies	
	H1f: Recreational and leisure opportunities influence the location of high, medium and low-technology companies	
	H1g: The climate in the region influences the location of these companies	
	H1h: The community's attitude to business influences the location of high, medium and low-technology companies	
Neoclassical factors H2: Neoclassical factors determine the location of high, medium and low-technology companies, in Beira Interior	H2a: Distance from the capital of the municipality influences the location of high, medium and low-technology companies H2d: The cost of real estate influences the location of high, medium and low-technology companies	Grimes (2000) Ouwensloot and Rietveld (2000) Holl (2004) Costa <i>et al</i> (2004) Hayter (1997)
	H2b: Road infrastructures influence the location of high, medium and low-technology companies	
	H2c: Other physical infrastructures influence the location of high, medium and low-technology companies	
	H2e: The level of economic activity of the municipality/region influences the location of high, medium and low technology companies	
	H2f: The level of specialisation of companies in the region influences the location of high, medium and low technology companies	
Institutional factors H3: Institutional factors determine the location of high, medium and low-technology companies, in Beira Interior	H3a: The existence of a business incubator in the region influences the location of high, medium and low technology companies	Galbraith (1985) Arauzo and Viladecans (2006) Felsenstein (1996) Hayter (1997)
	H3b: Access to knowledge generated by universities, technology parks or research centres influences the location of high, medium and low-technology companies	
	H3c: R&D, company or job creation incentives in order to locate business in this region influence the location of high, medium and low-technology companies	
	H3d: Technology fairs organised regularly in the region influence the location of high, medium and low-technology companies	
	H3e: The "role models" in the region influence the location of high, medium and low-technology companies	

for all factors except factor 5, which presented an alpha value lower than 0.5. Accordingly, analysing the grouping of the variables in factors, the interpretation for the factors encountered is as follows: factor 1 is related to the firm founder's personal motivations (option of housing for employees and founders, residence near the location of the firm and birth place). Factor 2 is related to the level of innovation (business incubator, proximity to universities, technology fairs, the presence of role model entrepreneurs in the region and incentives to firm formation. The third factor refers to characteristics of the locality (attitude of the community to new entrepreneurs, and the level of infrastructures). The fourth factor refers to the possibility for economic expansion that the region can provide (road infrastructures, cost of land and level of economic activity). The fifth factor has to do with conditions of the surrounding milieu (good housing conditions, leisure opportunities, climate, and specialization of firms in the region). The factor analysis reveals that the proposed conceptual model has a slightly different application when applied to Beira Interior Region, in what concerns the aggregation of factors. Thus, our empirical model is as follows (Figure 2).

5. Location factors of technology-based firms

In order to extend our knowledge of the differences regarding the level of agreement regarding the location factors of our study, we used the Kruskal-Wallis test again. Which is not an alternative to the parametric test, but as a test that is appropriate to this measurement scale (1 - not important to 5 - very important), in other words, an ordinal scale. The test statistics allow us to conclude that factors Employees wish to live in the locality and Climate in the area led to a different level of agreement in the three types of technology, to significance level of 5%. In the 10% level, it was noted that factors Founder's wish to live in the locality, Proximity to founder's residence, Founder's birthplace in the locality, Recreational and leisure opportunities, Distance from the capital of the municipality, and Level of economic activity in the municipality/region present differences in the three technology types. Other factors did not reveal significant statistical differences.

In order to identify which were the decisive factors for the location of firms in the region of Beira Interior according to technological classification (low, medium and high), three variables designated by neo, inst and behv were created to quantify the importance given to location factors defined as neoclassical, institutional, and behavioural. In the research model the questions associated to each of these new variables can be seen. Given that the premises regarding the normality of the dependent variable and homogeneity of variances did not occur the Kruskal-Wallis test was used to test if there were differences regarding the importance of firm location factors, or, otherwise, if there are differences in the level of factor agreement regarding the type of technology. The hypotheses under study can be formally described as follows:

$$H_0: \theta_1 = \theta_2 = \theta_3 \quad \text{vs} \quad H_1: \exists i, j: \theta_i \neq \theta_j (i \neq j; i, j = 1, 2, 3).$$

On Table 4 of the test statistics, the significance probability calculated asymptotically can be seen ($p=0.003$) for which reason we reject hypothesis H_0 . Regarding the variable which quantifies the importance of behavioural factors, we concluded that there is at least one type of technology with distinct agreement regarding location factors.

In what concerns the variables associated to Neoclassical and Institutional location factors, we do not reject the hypothesis of their influence being identical for the distinct types of technology, because $p=0.450$ and $p=0.872$ respectively. The analysis of Table 5 demonstrates that factors associated to the neoclassical and institutional views are correlated even if that correlation may be weak. Factors associated to the behavioural view are not correlated to the others.

6. Final considerations

In the present research we aimed to focus on two theoretical topics which, given their complex nature, have been playing an increasing important role. Initially we concentrated on regional development and on the various contributions to the topic. Then referred to the firm location theories, and here we focused

Table 2: Technology-based firms location decision factors: factor analysis of the main components, following varimax rotation

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
	Personal Motivation	Innovation and Incentives to firm formation	Characteristics of the locality	Economic expansion in the region	Conditions of the Milieu
Founder's wish to live in the locality	0.861				
Employees' wish to live in the locality	0.731				
Proximity to founder's residence	0.852				
Founder born in the locality	0.811				
Business incubator in the region		0.787			
Access to knowledge generated by universities, technology parks or research centres		0.732			
R&D incentives, creation of firms or of jobs to locate business in this area		0.774			
Regular technology fairs in the area		0.685			
'Role models' in the area		0.635			
Attitude of the community to business			0.523		
Distance from the capital of the municipality			0.784 0.650		
Other physical infrastructures					
Road infrastructures				0.722	
Cost of real estate				0.639	
Level of economic activity in the region				0.669	
Access to good housing conditions					0.568
Recreational and leisure opportunities					0.482
Climate in the area					0.648
Specialization of firms in the area					0.473
Explained Variance (%)	22.45	16.77	8.57	7.13	6.77
Consistency α Cronbach	0.859	0.768	0.575	0.582	0.386

KMO = 0.759 and Bartlett's sphericity test = 1347.702 (significance: 0.000)

particularly on three location theory perspectives: the neoclassical, the behavioural, and the institutional. It was precisely at this point that we formulated our research question, to which we now provide the answer: what are the reasons that make technology-based firms set up in a particular region? And particularly, which were the location factors in the case of technology-based firms in Beira Interior?

According to the results obtained it was possible to identify the following factors which influence the location of technology-based firms in the Region of Beira Interior:

- (i) the founder's wish to live in the locality;
- (ii) the employees' wish to live in the locality;
- (iii) proximity to the founder's residence;
- (iv) the founder's birthplace;
- (v) the level of economic activity in the region (this factor only influences high and medium-technology firms).

We noted that the first four factors fell within the behavioural view, and only the fifth, and last, can be included in the neoclassical view. We can thus conclude that entrepreneurs with firms in Beira Interior were led by personal reasons when deciding on the location of their firms. In other words, they were primordially influenced by behavioural factors. This means that neoclassical factors had little weight in the

decision on location, and institutional factors did not influence such decisions. Therefore, we are in a position to argue that besides personal reasons being pivotal to decisions on the location of firms in Beira Interior. The fact that the region is rural in all of its municipalities and not near to major urban centres probably is not, in itself, an obstacle to the creation of firms in the region.

As part of our research question, we stipulated three specific objectives: (i) to empirically validated the proposed research model on the decisions on location of technology-based firms in Beira Interior; (ii) to identify which factors influence the location of technology-based firms in Beira Interior; (iii) to characterize firms according to their distinct levels of technology and to detect eventual differences between levels. According to the findings, it has been possible to verify that high-technology firms are located in less rural areas than their medium and low-technology counterparts. Regarding the characterization of high, medium and low-technology firms, the fact that the factors are identical for the three types of technology must be stressed, because entrepreneurs, in what concerns their social and demographic characteristics, do not have a defined pattern for each type of firm, not in terms of age nor qualifications which explains why the importance attributed to factors is the same. It

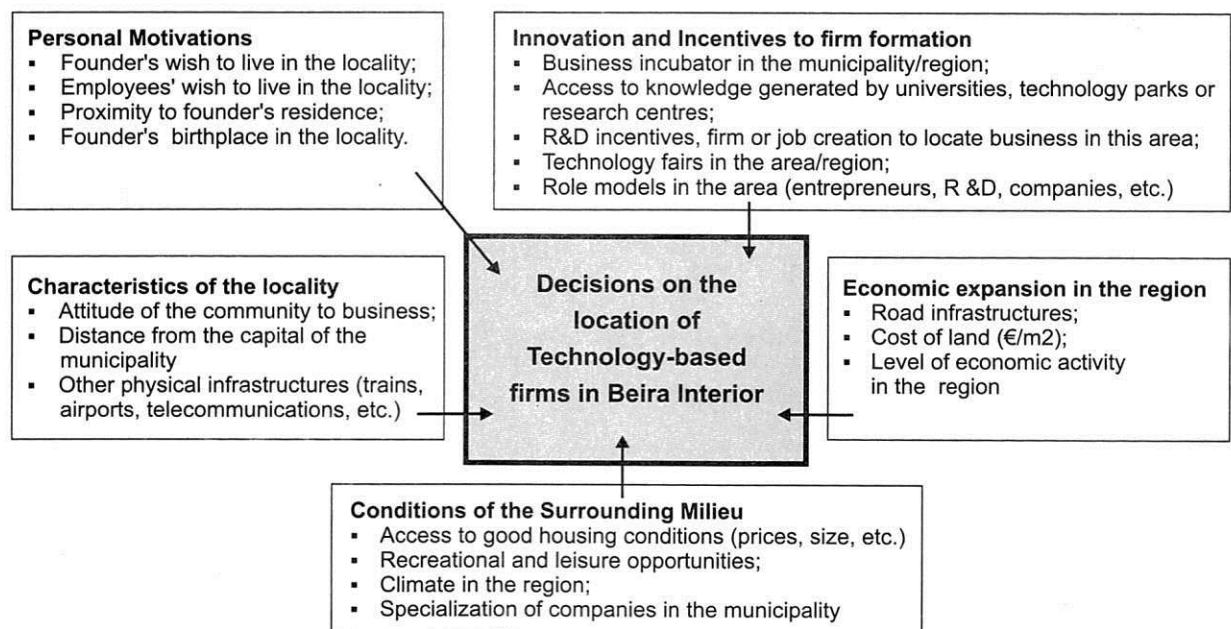


Figure 2: Empirical Model

Table 3: Kruskal-Wallis' Test applied to the nineteen Location Factors

Location Factors	Chi-square	d.f.	Asympt Sig.
Founder's wish to live in the locality	5.02	2	0.08**
Employees' wish to live in the locality	10.71	2	0.00*
Proximity to founder's residence	5.20	2	0.07**
Access to good housing conditions	0.26	2	0.88
Founder born in the locality	5.05	2	0.08**
Recreational and leisure opportunities	5.73	2	0.06**
Climate in the region	10.75	2	0.00*
Attitude of the community to business	1.56	2	0.46
Distance from the capital of the municipality	5.06	2	0.08**
Road infrastructures	0.80	2	0.67
Other physical infrastructures	1.85	2	0.40
Cost of land	3.27	2	0.20
Level of economic activity in the region	5.74	2	0.06**
Specialization of firms in the region	0.34	2	0.85
Business incubator in the region	0.14	2	0.93
Access to knowledge generated by universities. technology parks or research centres	0.87	2	0.65
R&D incentives. creation of firms or of jobs to set up business in this area	1.63	2	0.44
Regular technology fairs in the area	0.76	2	0.68
'Role models' in the area	1.67	2	0.43

* = $p < 0.05$; ** = $p < 0.10$.

has equally been possible to empirically validate the conceptual model presented despite the fact that it has undergone changes regarding the location factors of firms in the region of our study. This fact suggests that future research, applied to different regions, is required, so as to ascertain which factors carry more weight in the decision on location.

The findings of the study have important implications for both academics and policy-makers. Contrary to present literature, this study indicates that the location decision of technology-based firms in rural areas is not a fruit of calculative and rational economic thinking nor is it apparently swayed by the

potential benefits that may come from institutional spillovers or from public incentives. Rather, the conclusions coming from the sampled entrepreneurs point towards a differential decision making process for rural technology-based firms that are more emotional revolving around the entrepreneurs' desire to establish residence or remain part of the rural community where they located their businesses. Some academics have tended to associate location decision of higher knowledge-based firms with greater economic rationality and strategic thinking. What this study has found is that in the case of the surveyed knowledge-based firms of Beira Interior, the search for a specific

Table 4: Kruskal-Wallis Test Statistics - Test Statistics (a.b)

Tests applied	Neo Stand	Ins Stand	Behv Stand
Chi-square	1.598	0.275	12.578
Degrees of freedom	2	2	2
Asymptotic significance	0.450	0.872	0.002

a Kruskal Wallis Test; b Grouping Variable: Type of Technology

Table 5: Correlation of Factors by type of view

		Neo Stand	Ins Stand	Behv Stand
Neo Stand	Pearson Correlation	1	.334	.122
	Sig (2-tailed)		.000	.092
	N	195	195	.193
Ins Stand	Pearson Correlation	.334	1	.001
	Sig (2-tailed)	.000		.991
	N	195	201	198
Behv Stand	Pearson Correlation	.122	.001	1
	Sig (2-tailed)	.092	.991	
	N	193	198	198

life-style and quality of life dominated the business location decision making process. This means that policy makers could help sway a greater number of knowledge-based firms to

locate in rural areas by making their localities more socially attractive and welcoming to technology entrepreneurs improve living conditions and quality of life.

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