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# Impact of stakeholder groups on development of a regional entrepreneurial ecosystem

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## ABSTRACT

This paper discusses the relationship between the entrepreneurial ecosystem and stakeholder groups involved in sustainable development of regions. Findings from empirical research of Latvian regions brought researchers towards improvement of the entrepreneurial ecosystem model. This paper develops an ecosystem model that assists in the planning and designing of regional sustainable development. Findings from empirical research might help us to identify additional contributions of stakeholder groups for sustainable development of regional entrepreneurial ecosystems. The paper is aimed at improving understanding of entrepreneurial ecosystem structure and suggesting ways for individual companies to exploit the components of entrepreneurial ecosystems. By summarizing the research results, the impact of stakeholder groups involved in the sustainable development of a regional entrepreneurial ecosystem is explained.

## KEYWORDS

Entrepreneurial ecosystem;  
stakeholder groups;  
sustainable development;  
regional development

## 1. Introduction

Ecosystem principles are broadly discussed in the scientific literature. The entrepreneurial ecosystem is a dynamic economic model that can be used for strategic planning processes, providing the framework for mutual relationships among stakeholders involved in it, and for defining customer the needs, which in future can ensure an increase in the value proposition.

In his research, Moore (1996) understood a biological ecosystem to comprise ecological elements, which cooperate with each other, while an entrepreneurial ecosystem comprised all stakeholders related to entrepreneurship. Therefore, the following questions represent our specific interests in this study: What are the important determinants of a regional entrepreneurial ecosystem from the perspective of stakeholder groups?

At the regional level, factors associated with regional variation in new company formation have been explored through studies of structural differences in geographical, industrial and organizational variables (Armington & Acs, 2002; Audretsch & Lehmann, 2005; Brixy & Grotz, 2007; Kirchoff, Newbert, Hasan, & Armington, 2007; Wang, 2006; Woodward, Figueiredo, & Guimaraes, 2006).

Many scientific studies tried to attempt defining entrepreneurship and identifying factors affecting regional-level relationships. Entrepreneurship has attracted many

researchers because on provide more direct empirical evidence into regional and national levels by identifying key factors in promoting entrepreneurial activities and increasing performance. Regional-level studies are also important to researchers since entrepreneurial activity has been recognized as one of the most important drivers of regional economic growth (Acs & Armington, 2004; Audretsch & Keilbach, 2004). Furthermore, regional clustering theory raises the importance of geographically localized networks for entrepreneurial activities found to be empirically significant (Sorenson & Audia, 2000), reinforcing the value of regional-level entrepreneurship research.

Moreover, the selection of factors that affect regional entrepreneurial activities is associated with the co-creation relationship that supports ecosystem principles. Ecosystem principles suggest that entrepreneurial entities and environments coexist and reciprocally co-evolve together, not that the companies simply adapt to their environments, as suggested by the Structure–Conduct–Performance paradigm (Lewin & Volberda, 1999; Porter, 2006; Tsai, Hsieh, Fang, & Lin, 2009).

Among many interpretations of regional factors, ‘triple helix’, or university–industry–government relationship, have been increasingly recognized as a major source of regional growth. Relationships drive the transformation of scientific and technological contributions towards economic outcomes (commercialization). Scientific studies underline how considerable innovation is created through interaction among the elements of the triple helix model, supporting a structuralized regional approach and economy transformation into a knowledge-based economy (Etzkowitz, 2003; Etzkowitz & Zhou, 2007; Leydesdorff, Dolfsma, & Panne, 2006).

The triple helix model and co-evolutionary theory have been widely recognized for studying the complex dynamics of ecosystem networks and interactions among ecosystem components, although empirical studies examining the interaction among three components but its contributions to regional growth are still narrow. Most empirical studies of triple helix have studied the relationship interactions between university and industry, but less often government due to methodological limitations such as reliance on relationship evaluations method. Accordingly, few only few empirical studies have attempted to investigate the essence of university–industry–government relationship outcomes on a regional level.

## **2. University–industry–government relationship outcomes and stakeholder value allocation**

By explaining the essence of university–industry–government relationship outcomes at regional level, we should determine the ‘outcome’. It brings us to the well-known neoclassical model, where the economic value generated is the sum of the consumer surplus and the producer surplus. The question of value maximization is focused on the consumer surplus and the producer surplus or residual value, attributed to the owner. This is not denying the fact that other stakeholders do not also receive a surplus, merely that the task of determining the amount of the surplus and distributing it is transferred to the resource markets (labour, finance, commodities, etc.). In the neoclassical model, unfortunately, the problem of value creation is separate from that of value distribution. If the stated conditions are met, consumers receive their surplus, the providers of resources receive their opportunity cost and the company’s owners appropriate the producer

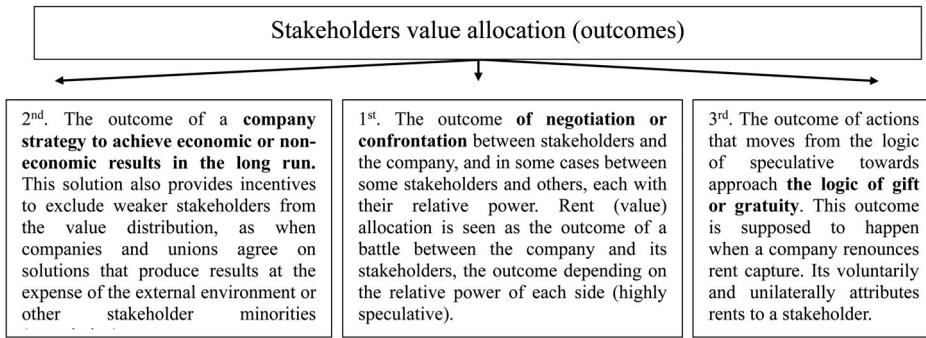
surplus or profit, which is an incentive for them to make decisions that maximize profit and, also therefore, present and future efficiency. As a consequence of all the above, an economic optimum (outcome) is in terms of the maximization of ‘social value’ (Jensen, 2001) for the economy as a whole. If consumers maximize their utility and companies maximize profit for their owners (i.e. the expected present value of the shares, assuming a long-term, stochastic view) (Mossin, 1977), the social (economic) value created will be maximal (Renzetti, 1992). For that to happen, however, certain conditions must be met: perfect competition (or sufficient competition (Stigler, 1957) in all markets; markets for all goods and services, present and future, i.e. there can be no goods without a price); free entry to and exit from all markets; availability, to all concerned, of sufficient information on the prices, characteristics and availability of the goods and services for all to be able to make optimal decisions; non-existence of public goods; absence of positive or negative externalities (i.e. nobody bears the costs, risks or benefits of actions performed by other agents with which he does not have a market relationship) and so on.

All of the above mentioned shows that ‘creating value for consumers’ covers a wide range of possible situations and ‘outcomes’ inadequately. Everything creating value for consumers will also apply to other stakeholders. For instance, a company may provide incentives for its employees to acquire specific human capital, which will increase the employees’ productivity and create value for the company as a whole. The result, however, may be higher pay for the employees, or a reduction of their opportunities and an increase in the cost of switching to a different employer. The same may occur with specific physical or organizational capital; this is not a problem where the capital goods are owned by the company, but it may be a problem if they are owned by the company’s suppliers. Similarly, the company may transfer certain more or less explicit risks or costs to other stakeholders. Unions may put pressure on the company in an attempt to capture part of the owners’ extraordinary profit; or management may distribute part of the surplus among the employees in order to ensure peaceful industrial relations or obtain other benefits (e.g. having an alliance with employees tends to enhance management’s bargaining power vis-à-vis the company’s owners), or simply as a means of transferring value from shareholders to employees. This brings us towards generally accepted rules of justice that regulate the distribution of stakeholder value allocation (Agle & Mitchell, 2007).

As Priem (2007) points out, the primary value allocation is in a demand-side process. If consumers are unwilling to pay the price, the supposed value creation and allocation disappears: the product does not have a built-in value that is waiting to be identified by a customer who will pay for it. If a product is able to satisfy customers’ present needs better without losing any of its capacity to satisfy future needs, then more value will be created because buyers will be willing to pay a higher price for the product. If a producer uses better technology (innovations), combines resources more efficiently or pays lower prices for them, again more economic value will be created. We would like to summarize debates on university–industry–government relationship outcomes by presenting stakeholder value allocation framework (Figure 1).

Stakeholder value allocation explanation:

(1) The outcome ‘of negotiation or confrontation’ between stakeholders and the company. The distribution of value is the result of confrontation between relative bargaining powers, and the attitudes of stakeholders may range from



**Figure 1.** Stakeholder value allocation (outcomes). Source: the authors created based on Agle and Mitchell (2007), Jensen (2001), Priem (2007) and etc.

- (i) more or less resigned acceptance of the current state of affairs, where no rents are being created or can be created in the near future;
- (ii) maintenance of the status quo, so as to be able to continue to appropriate the rents that are already being appropriated;
- (iii) confrontation, so as to create and capture rents that cannot currently be appropriated, or so as to prevent other stakeholders from appropriating such rents.

These three identified dynamics are likely to be present in relations between many companies and their stakeholders, and will make it impossible to go beyond purely economic value creation.

(2) The outcome of a 'company strategy to achieve economic or non-economic results in the long run'. The second way out of the conflict over the distribution of rents is the cooperative solution, which leads us to the second way of approaching the problem of value distribution, as the result of a strategy to maximize profit – or achieve other results – in the long run. The main point here is to recognize stakeholder management as the key to achieving competitive advantages that will enable sustained growth of economic value through, for instance, cost and risk reduction, employee or customer loyalty building, more favourable treatment from regulators or public opinion, the acquisition of reputation and legitimacy in the eyes of the financial markets, synergistic value creation or business opportunity creation (Kurucz, Colbert, & Wheeler, 2008).

This approach adds an optimistic note to the confrontation over rent capture: it does not eliminate the conflict, but it does soften it by offering the expectation, at least in the long run, of a more or less continuous increase in value-generating capacity, so that stakeholders can reasonably expect the situation to improve for everybody. Another difficulty is that the conflict will reappear as soon as these expectations are frustrated, or as soon as a particular stakeholder group is adversely affected by trends in technology, demand, competition, regulation or other factors: so long as stakeholder relations are governed by the struggle over rents, any balance will be precarious. In any case, this approach – which is very widespread in the literature and in business practice – fails to go beyond purely economic value creation. In all these cases, the company 'overinvests' in its stakeholders (Freeman, Harrison, & Wicks, 2007).

(3) The outcome of actions that depart from the logic of power and approach ‘the logic of gift or gratuity’. This approach may be a more ‘human’ form of the same economic value maximization model – a way, perhaps, of avoiding any conflict over value distribution by offering additional economic compensation to win over the firm’s employees, customers or investors. This may occur as part of a ‘relational’ approach to human action in companies, or as a means of building better relations with employees or in a company’s value chain. On the other hand, the company may be trying to achieve something more than economic results, as human relations have value in themselves (Bruni, 2004; Donati, 2010). The logic of gift or sharing, where a person gives more than he receives, without expecting anything in return – or better still, seeking reciprocity from the other, not in order to recover the surplus given but in order to develop the other’s capacity to give, i.e. to generate in the other a value that is not simply economic (Argandoña, 2011; Sacco & Vanin, 2006). In other words, these are actions that create (and use) trust and that seek to elicit cooperation, beyond any consideration of whether or not they generate an economic return.

### 3. Stakeholder management model

Moore (1993) stresses that the business ecosystem is based on three platforms: Core Business, Extended Business and Business Ecosystem. Each of the three platforms specified by Moore (1993) also includes the stakeholders. In a stakeholder model, therefore, the theory of value creation implies that

- (1) all those who create or capture value, or who in their relationship with the company assume risks, either inside the firm (owners, managers and employees) or outside the firm (consumers and suppliers), or who suffer the impact of the firm’s externalities or misinformation (local community, environment, future generations and society at large), must be considered stakeholders – at least for the purpose of value distribution, which is what concerns us here;
- (2) maximizing value for consumers and resource providers is not enough to guarantee a social optimum, as there are other relevant stakeholders to be considered and
- (3) in relations between stakeholders and the company, there are other variables to be taken into account besides the exchange of goods or services for a price. Such as whether there are alternatives (alternatives that limit market power), whether information is provided (including the means to process it and use it rationally), whether protection is available against negative externalities (whether those affected have the means to defend themselves against externalities) and so on.

Even so, maximizing economic value for all stakeholders does not guarantee maximum value for each individual stakeholder; it does not even guarantee an efficient and fair distribution of value. We therefore need to consider how value is shared, distributed, appropriated or captured (see Table 1).

Some values are cumulative, sometimes with limits (operational and evaluative knowledge does not have diminishing returns, unlike the satisfaction derived from extrinsic value and psychological intrinsic value).

**Table 1.** Stakeholder values.

Values	Description
Economic extrinsic value (economic value)	This is created through collaboration among employees and may be appropriated by either side, as we explained earlier
Intangible extrinsic value	which is provided by the company, for example, recognition, some kinds of training. This is not part of the economic value created by a company, although it may be a form of participation in intangible value (e.g. the personal status that comes from working for a highly regarded company). Intangible extrinsic value may be complementary to economic value (besides salary, employees will also expect the company to give them recognition), or a substitute for it (an honorary distinction may be a form of remuneration, in place of a salary increase), although the latter probably only to a limited extent (recognition cannot completely take the place of remuneration)
Psychological intrinsic value	such as satisfaction with the work done. This is generated in the agent himself. It is not part of the economic rent creation process and cannot be appropriated by the company or other stakeholders, although they may help to create or destroy it. In an employee, it may be a (partial) substitute for extrinsic value (besides the satisfaction of working for the company, employees will need a minimum of remuneration). An employee may be seeking an 'extrinsic' result, which the company will provide as a consequence of the relationship and which may be an economic good or service, or something non-economic. He may be seeking remuneration, or he may be seeking intangible results, such as career promotion (which will also have economic consequences) and recognition (Frey & Neckermann, 2009)
Intrinsic value that takes the form of operational learning (acquisition of knowledge and capabilities)	This is created in the agent, not in the company, but probably with the cooperation of other stakeholders. It is not part of the economic value created by the company, although it may contribute to the creation of economic value in the future. It may also be a (partial) substitute for economic value
Transcendent value, which consists of evaluative learning	(acquisition of virtues or vices). This is generated in the agent himself as a consequence of his own decisions. It alters the agent's ability to assess the consequences of those decisions for himself and for other agents. It is not part of the economic value created by the firm; it cannot be appropriated by the company; and employees create it in themselves, even if they do not seek or expect it. It affects an agent's ability to make decisions in the future that are capable of generating all the types of value mentioned here; that is to say, it affects the consistency of an action (Argandoña, 2008). Transcendent value is necessary, therefore, for relations between the company and its employees to develop in such a way that everybody's needs continue to be met in the future. In this sense, it cannot be replaced by any other type of value. Transcendent value belongs to the sphere of ethics
Value that consists of positive or negative externalities	That is, value that is felt by agents other than those with whom the relationship or transaction is conducted. For example, relations between employees and the company may result in harm to the environment; or they may generate knowledge that spills over to other people; or they may motivate others to engage in corrupt acts (bad example), etc. This type of value (or disvalue) does not appear directly in the relationship between a company and its employees; yet it affects them throughout the resulting evaluative learning process – which is a way of internalizing the effects of this value

Source: The authors created schema based on Argandoña (2011) and Frey and Neckermann (2009).

Values may be positive or negative (the economic value may be less than the opportunity cost; evaluative learning may be negative and destroy people's ability to make consistent decisions in the future). And may generate more or less value – including economic value – in the long run, because operational and evaluative learning improve the ability of the company and of individuals to generate more extrinsic value. The stakeholder theories based on the common good are precisely a means of explaining how that non-economic value is created to which all contribute and of which all also receive, though without any claim to equivalence (Argandoña, 2011).

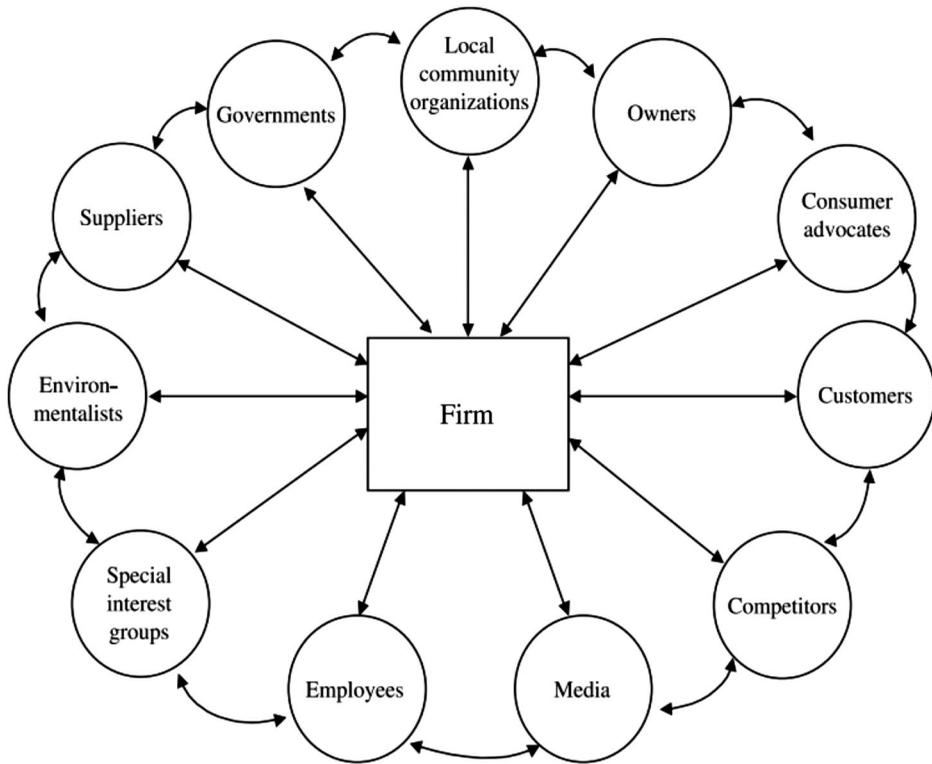
If we broaden the concept of value, the notion of 'creating value for all stakeholders' takes on a new meaning – one that goes beyond economic extrinsic value to include other types of value which stakeholders need, even if they do not know it, in different proportions and for different 'uses'. Now, therefore, we can talk about the different processes by which different types of value are created. And these different types of value are related to one another in different ways: some are substitutes, others are complements and all are necessary (including economic value, especially in an economic organization), but in different senses (Kurucz et al., 2008). It is a matter of broadening the concept of value, so as to give access to other dimensions. Without a willingness to give disinterestedly, some types of value simply cannot be created.

Finally, 'managing the company to serve all stakeholders' is now possible because the challenge is not to share a value but to generate non-exclusive value which everybody needs. And that is a challenge which, though entrusted to managers, must be addressed by all. So long as the focus remains on economic value, however, any solutions adopted will be insufficient, because the processes of capturing that value will always be liable to conflicts of all kinds (discussed previously). If the value created in companies is not just of one type, but of several, it is possible to find better ways of creating economic and non-economic value in a sustained way, so that all the stakeholders (see Figure 2), who help to create that value, also share in its enjoyment, albeit in different and changing ways over time, so that the economic optimum (efficiency criterion) is guaranteed and management is improved.

Finally, as our findings connect value creation with entrepreneurial ecosystem, the system coexist and life cycle. As regards the concept of time, while Morris (2013) expands his research 'in time' into managerial activities towards the front end of the system lifecycle, i.e. the project phase, our study pushed the focus of research towards back-end operations where the use value of project outcomes is realized. As regards research on stakeholders, analysing value creation within an ecosystem (Winch, 2014; Winch & Bonke, 2002) and the dynamism of stakeholder networks over time (Aaltonen & Kujala, 2010; Olander & Landin, 2005) be used in further research to broaden the project stakeholder view within ecosystem. Finally, our findings are allowing us to continue research on regional entrepreneurial ecosystem.

#### 4. Entrepreneurial ecosystem model

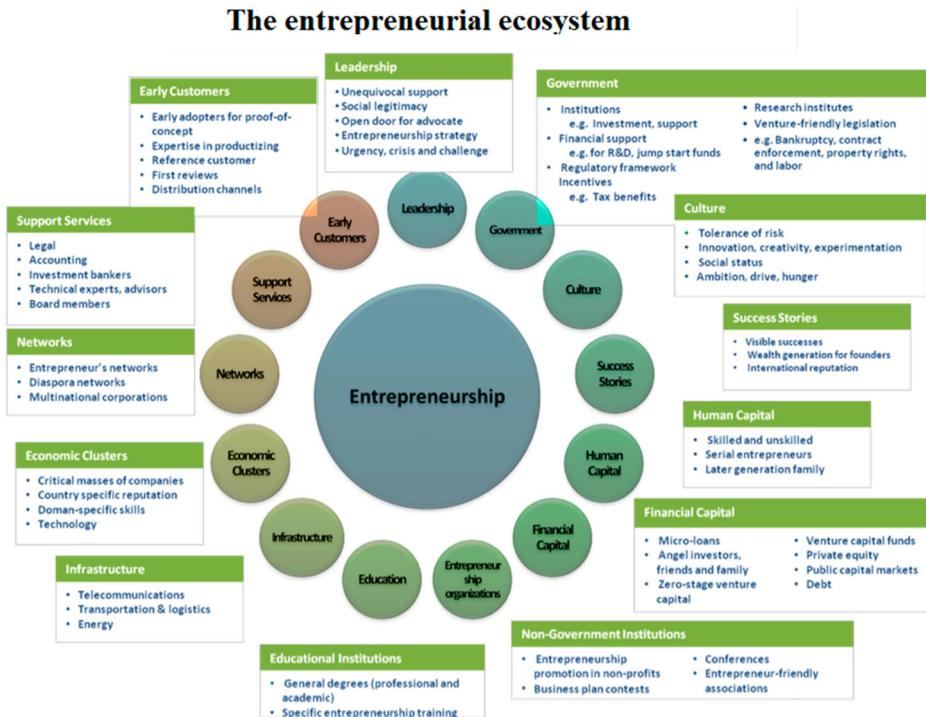
According to Isenberg (2011), an entrepreneurial ecosystem (see Figure 3) consists of elements that can be grouped into six domains: a conducive culture (e.g. tolerance of risk and mistakes and positive social status of entrepreneur); facilitating policies and leadership (e.g. regulatory framework incentives and existence of public research institutes);



**Figure 2.** Stakeholder Map. Source: Freeman (1984).

availability of dedicated finance (e.g. business angels, venture capital and micro loans); relevant human capital (e.g. skilled and unskilled labour, serial entrepreneurs and entrepreneurship training programmes); venture-friendly markets for products (e.g. early adopters for prototypes and reference customers) and a wide set of institutional and infrastructural supports (e.g. legal and accounting advisers, telecommunications and transportation infrastructure and entrepreneurship promoting company networks).

The definition of stakeholders is 'those groups without whose support the organization would cease to exist'. The theory was later developed by Freeman (1984) providing a necessary framework for entrepreneurial ecosystem model development, aligning priorities, building new institutional capabilities and fostering synergies between different stakeholders (Rodríguez-Pose, 2013; Warwick, 2013). According to Freeman (1984), a stakeholder may be any individual or group of individuals either impacted upon by the company or able to impact on the achievement of its objectives. Over the years scientists (e.g. Iansiti & Levien, 2004) have discovered that within the biological ecosystem there exist a substantial number of stakeholders, which are mutually dependent. While Power and Jerjian (2001) consider that the entire ecosystem should be managed rather than just the business, they also consider that an ecosystem can be integrated an electronic transaction. Power and Jerjian (2001) discovered that within an entrepreneurial ecosystem there are just four groups involved – shareholders, employees, a business and customers. The concept of entrepreneurial ecosystem is based on the way customers' value is created, as well as mutual relationships among stakeholders.



**Figure 3.** An entrepreneurial ecosystem. Source: Isenberg (2011).

The development of stakeholder theory has centred upon two related streams: firstly, defining the stakeholder concept and secondly, classifying stakeholders into categories that provide an understanding of individual stakeholder relationships (Rowley, 1997). Stakeholder analysis can be used to generate knowledge about relevant actors so as to understand their behaviour, intentions, interrelations, agendas, interests and the influence or resources they have (Brugha, 2000; Phan et al., 2005). Our paper supports Isenberg's (2011) view of entrepreneurial ecosystems. As a conclusion, the entrepreneurial ecosystem approach is based on clustering of economic activity (with an emphasis on local and regional environments and interactions between framework conditions; Isenberg, 2011). Stakeholder groups are embedded in a regional ecosystem composed of key stakeholders such as companies, industrial clusters, universities, colleges and government. This conclusion brings our research towards the triple helix model discussion.

## 5. Triple helix approach

The triple helix model of university–industry–government relationships developed to study the knowledge infrastructure in networks of bonds among the institutional constituents of a regional innovation system (Etzkowitz & Leydesdorff, 2000; Leydesdorff et al., 2006). This model provides potential for understanding in the context of the relationships among university–industry–government elements, notably regional economic growth. The role of the triple helix in regional entrepreneurial activities is confirmed (Campbell & Guttel, 2005). The 'triple helix' approach was initially designed by Etzkowitz and

Leydesdorff (Etzkowitz & Leydesdorff, 2000; Leydesdorff & Etzkowitz, 1997) in order to illustrate how innovation in modern societies needs a close adjustment of the government at different levels (local, regional, national or supra-national) with academia (universities and other public research organizations) and industry. The conceptual framework was developed in order to represent the increasingly strategic importance of links between academia, industry and government, leading to new types of 'knowledge infrastructure in terms of overlapping institutional spheres, with each taking the role of the other and with hybrid organizations emerging at the interfaces' (Etzkowitz & Leydesdorff, 2000). Etzkowitz and Leydesdorff (2000) further elaborated the triple helix of university–industry–government relations into a model for studying knowledge-based economies. In various countries, the triple helix concept has also been used as an operational strategy for regional development and to further the knowledge-based economy. At the centre of these developments is the evolutionary triple helix model which supports strategic interactions and collaboration between universities, industry and government (Etzkowitz & Leydesdorff, 2000). The triple helix concept comprises an evolutionary model for collaborative relationships between the traditional three institutional spheres that comprise universities, industry and government in which innovation is an outcome of the interaction. The triple helix model incorporates three distinct typologies of innovation systems. Industry is regarded as the leader of innovation, while the university's role is reduced mainly to teaching and academic research (Etzkowitz & Leydesdorff, 2000). Under this model, the potential to exploit knowledge generated by universities is limited as university teaching and research tend to be far removed from industry needs and universities themselves have little or no incentive to engage in the commercialization of their research (Bercovitz & Feldmann, 2006; Leydesdorff & Meyer, 2013).

One of the important aspects of the triple helix model is that it emphasizes the interrelations among the three spheres influencing a regional innovation system. Sysko-Romanczuk and Lozano Platonoff (2005) explained conceptually that the close cooperation of the research and business communities, based on an effective transfer of knowledge, might unlock the hidden entrepreneurial potential of regions, and an efficient local government might stimulate development of that potential. In addition, universities make many efforts to commercialize and license their research outputs through their own technology licensing offices or university incubation centres, which collaborate closely with industry partners (Gregorio & Shane, 2003; Landry, Amara, & Rherrad, 2006; Wright, Birley, & Mosey, 2004).

## 6. Third Generation University

According to Duke (2009), the modern university has five primary functions: research, education, commercialization of know-how, acquisition of research projects and recruitment of students. Duke characterizes Third Generation Universities (3GUs) as network universities at the centre of an international know-how-hub defined as 'a group of institutions, in and around the university, and preferably on the university's premises that collaborate with the university, its academics and research teams, and each other'. According to Duke (2009), the main differences between the first (medieval), the second (Humboldt model) and the third (current and coming) university systems are the underlying objectives. In medieval times, the focus was on education and the memorization of material.

Gradually, a focus on research emerged, and in today's world universities will not survive without the commercialization of research as a third objective. Wissema describes modern research as tech-business: technology as a tool for realizing profit, because research is business. Duke (2009) names the concept of open innovation and external developments as important steps for creating know-how and encourages the establishment of new companies as tools for its exploitation. Duke (2009) argues that there is no chance of survival for the old system, as outlined in his book, which is essentially a manual for understanding and managing the transition from the current form of university to what Wissema calls the 3GU. Nowadays, many successful examples prove that universities have a significant role in the enhancement of different regions. The competitiveness of regions is affected and altered by globalization and other background processes that serve as arrangers of regional structure and for this reason they deserve attention. The modern economic development demands that due to the increased engagement towards the society and economy. Beyond the well-known typology of the first, second and third generation of universities that universities emerged in international literature that depicts interesting facts that are worth considering regarding the economic development activities of universities.

## 7. Research results

The population for the questionnaire survey was manufacturing industry enterprises where industrial manufacturing has been carried out and which were represented by specialists working in these enterprises. The sampling of the survey was entire population – 8981 enterprises. All 8981 enterprises are regarded as the main population. The number of respondents surveyed (368 surveyed) compared to the number of companies reflected in the database made up 5.00% (5.00 confidence interval). Respondent selection was obtained using randomization. In order to reduce heterogeneous effect in our empirical analysis, we divided surveyed five major geographical regions (Figure 4).



**Figure 4.** Major Latvia economy regions. Source: Latvian Academy of Sciences (2011).

**Table 2.** Regional activity, company concentration and triple helix stakeholders' group impact evaluation.

Regions	Stakeholders' group impact evaluation distribution for triple helix, %	Value added mln Eur 2013	Value added, % 2013	Employment in manufacturing industry, 2013
Latvia	100	2541.05	100	7464
Kurzeme Region	8.3	287.34	11.3	912
Latgales Region	8.5	229.57	9.0	767
Riga Region	66.8	967.21	38.1	4436
Vidzeme Region	7.1	232.17	9.1	702
Zemgale Region	9.3	318.87	12.5	647

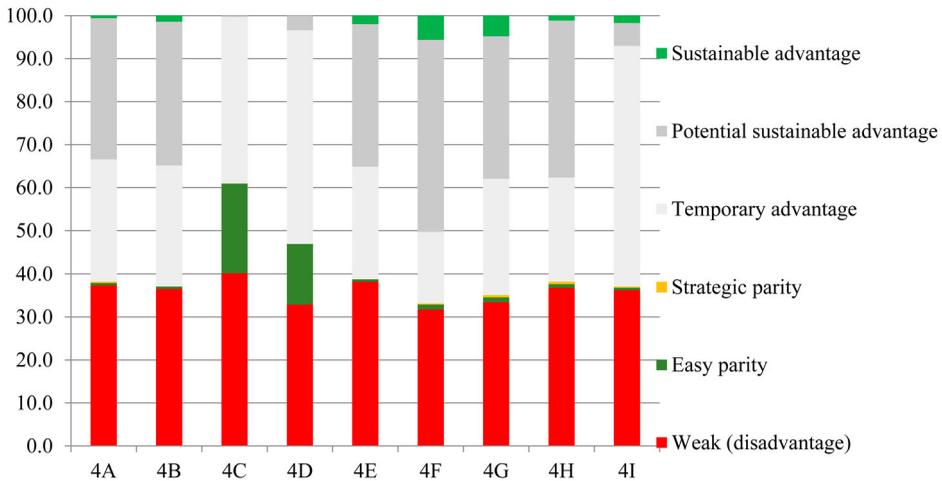
Source: Central Statistical Bureau (2013) and research results.

In order to examine the effects of triple helix, we conducted empirical research with factor analysis. First, we calculated descriptive statistics and compared with research results. We examined and evaluated regional factors that affect entrepreneurial activity (i.e. triple helix factors with impact on company value added) within the entrepreneurial ecosystem. As shown in Table 2, regional activity, company concentration and stakeholder evaluation (total variable evaluation) for triple helix relationship have some peculiarities.

In the case of the university, the one variable's decent – 3GU presence, which represents the evaluation of university network in a region. In the case of government, we use government institution support for entrepreneurial activity. Here, government institution supporting R&D is the measure of the relationships' impact on value added for company. In each sphere – university, industry and government – we also consider company R&D activity variable (is the company active in innovations). Regarding triple helix, Riga region has the highest level of university network, by proportion. In addition, the Riga region has better company networks and government institution support (incubators, infrastructure, concentration, etc.). We examined the importance of supportive relationships among the university–industry–government components of the triple helix. The result of the correlation analysis among the constructs is presented in Figure 5.

As soon as empirical research had many questions and were devoted to different areas, we are showing only questions (4th Block of research) dedicated to triple helix relationships.

Components of triple helix relationship regarding R&D capabilities through the university networks and government institutions (4A) have 33% of potential sustainable advantage and 28% of temporary advantage conjointly evaluated as an excellent advantage (strong impact). Contradictorily 37% of the respondents evaluated it as a disadvantage. Question 4B concerning suppliers and transport transaction cost reduction (reducing the cost of using resources and logistics through the University networks and government institutions) has 34% of potential sustainable advantage and 28% of temporary advantage is evaluated as an excellent advantage, contradictorily 36% of respondents evaluated it as a disadvantage. In comparison, common infrastructure availability through the university networks and government institutions (4E) has 33% of the potential sustainable advantage and 26% of temporary advantage, resulting in being evaluated as an excellent advantage. Contradictorily 38% of respondents evaluate it as a



**Figure 5.** Triple helix component impact on entrepreneurial activity. Source: survey data analysis.

disadvantage. Equivalently, special financial instruments through the university networks and government institutions (4F) have 45% of the potential sustainable advantage and 17% of the temporary advantage, being evaluated as an excellent advantage, while 32% of the respondents evaluated it as a disadvantage. Proportionally, additional export capabilities through the university networks and government institutions (4G) have 45% of potential sustainable advantage and 17% of temporary advantage, ultimately evaluated as an excellent advantage; 32% of respondents evaluate it as disadvantage. Identically, question 4H concerning advanced technology availability through the university networks and government institutions has 37% of potential sustainable advantage and 24% of temporary advantage and is evaluated as an excellent advantage, while 37% of respondents evaluate it as a disadvantage.

In the same manner, use of information networks through the university networks and government institutions (4C) has 39% of temporary advantage. Contradictorily, respondents' evaluation was low – 21% easy parity and 40% of disadvantage. Likewise, question 4D concerning institutional relations through the university networks and government institutions has 50% of temporary advantage while having low evaluation – 14% easy parity and 33% of disadvantage. Equally, availability of skilled workforce through the university networks and government institutions (4I) has 56% of temporary advantage – evaluated as a strong advantage. In contrast, 38% of respondents have evaluated it as disadvantage.

The authors would like to highlight triple helix advantages (components 4A, 4B, 4C, 4D; 4E, 4F, 4G, 4H, 4I, 4J). Survey results show that average evaluation of cluster advantages is less in regions with weak networks and higher in advanced regions. These results are interesting because the authors concluded that the reason for moderate evaluation was university network activity. As a conclusion, manufacturing companies could not take full advantages of triple helix relationships in regions with weak network structure. Exploiting economies of scale and transactional cost factors from triple helix relationships will significantly reduce operation cost and increase profit margin. In case of triple helix

relationships, company university networks and government institutions could provide necessary transactional cost reduction.

## 8. Conclusions

In this paper, we examined the impact of the triple helix of university–industry–government relationships on the regional level. We selected triple helix variables based on Isenberg's (2011) entrepreneurial ecosystem components (R&D-related factors such as university incubators, government institutions and industrial knowledge networks). We also considered regional (geographical) peculiarities, representing major geographical regions.

The major role of the triple helix in regional entrepreneurial activities is also confirmed in our empirical research. Therefore, it is helpful to use the triple helix approach for regional development. The role of a university in entrepreneurial development is especially important, as we could identify relationship impact in the triplex helix system and could create better value. Our study also contributes to the entrepreneurial ecosystem value identification emphasizing the co-creation how relationship among university, industry government.

As a conclusion, in most advanced regions, considering total value-added share and its employment by statistical region, we see high triple helix relationship evaluation (better stakeholders' value). Historically, in these regions triple helix networks have better infrastructure (more 3GUs and company networks). The Riga region has the highest level of university network, by proportion. In addition, the Riga region has better company networks and government institution support (incubators, infrastructure, concentration, etc.).

We found a positive impact for interaction between company–university–government, the impact effect is greater for high university network regions than for the less. These results suggest that in regions with advanced 3GU development, triple helix relationships have a greater impact and play an important role as a cluster. It means that better clustering provides better support for entrepreneurial activity, creating high value-added and competitive advantages from triple helix relationships. Development of 3GUs will foster cluster structure and relationship quality

The results suggest that we can use branch approaches to promote and accelerate university regional entrepreneurial development. By developing branches of 3GUs triple helix networks will boost venture capital investment and increase quality of competitive advantages for more effective entrepreneurial activity (value creation). In addition, university R&D expenditure will play an important role for innovations and will enhance collaboration between all spheres of the helix relationship. In low regions, low triple helix relationship supportive functions of university–industry–government components will have less impact on entrepreneurial activity and we expect no synergistic effects.

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