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Standing on the Shoulders of Giants: Entrepreneurship and Path Dependency in a Regional Context

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Abstract In this conceptual paper, the concept of path dependency is used as an interpretive lens to examine the relation between entrepreneurship and regional development. A critical review of the path dependency literature showed that the concept needs to be complemented first to fit the purpose of this paper. Three suggestions have been made. By using path dependency as an interpretive lens, five interrelated propositions could be made addressing the suggested complements. First, discussing entrepreneurship in a regional context, three different dimensions of path dependency should be taken into consideration: the technological, cognitive and social dimension. So far the cognitive and social dimension of path dependency has been neglected. Second, entrepreneurial activities form a regional path which is linked to the industries within the region. Third, there are two different types of entrepreneurship, namely radical and related entrepreneurship. Fourth, the same types of entrepreneurship will trigger different regional development processes depending on the specific situation of the region. Fifth, entrepreneurs which possess new information from outside the region will more likely alter the path of the region.

Key words: Path Dependency, Entrepreneurship, Regional Development, Innovation

"Bernard of Chartres used to say that we are like dwarfs on the shoulders of giants, so that we can see more than they, and things at a greater distance, not by virtue of any sharpness of sight on our part, or any physical distinction, but because we are carried high and raised up by their giant size."

(John of Salisbury 1159)

Introduction

Studying regional development, two general types of explanation can be identified for why regions develop as they do. The first explanation relates to the emergence of innovative activities carried out by radical entrepreneurs that may transform the society and economy. In

regional development literature, this is referred to as impressive stories of renewal and change, where regions have changed from old and heavily industrialized regions to modern high tech poles, examples being Teesside in Northeast of England (Hodson 2008), the Öresund Region in Denmark and Sweden (Lundquist and Winther 2006) and the Rhine-Ruhr area in Germany (Knapp 1998).

The other type of explanation is related to path dependency, where present developments build on past decisions and activities (Hudson 2004, Berndt 1998, Krugman 1992). In apparent contrast to the first explanation, path dependency is often seen as negative constraints for future development where some regions continue to develop along established regional trajectories and ultimately result in lock-ins. In this perspective, regions may be caught in destructive path dependency processes and only by breaking free from their constraining past they can change their declining path. This type of regional development process is characterized by a lack of radical entrepreneurs.

This paper challenges the general way of dichotomizing between entrepreneurship and path dependency as two opposing concepts in regional development. Rather, the author posits that these concepts are related to each other and it will be argued that such a view can provide a better understanding of regional development processes. An important building block for the theoretical discussion is the idea that even such disruptive activities as revolutions are never really discontinuous as informal constraints are imbedded in societies (North 1990). Thus, entrepreneurs, may it be single persons or in teams, can create new regional paths, but they are also to some extent related to existing patterns and behavior in the region.

This paper contributes to literature and research on entrepreneurship and regional development in the following way. The paper builds a conceptual framework for a more actor-centered view of regional development. The concept of path dependency will be used as a means to link entrepreneurship and regional development. As a starting point, a critical review of the concept of path dependency needs to be conducted to address the following questions: how is the concept understood so far and how does the concept need to be developed further to create a better understanding of the relation between entrepreneurship and regional development for the purpose of this paper? After that, the concept can be used to emphasize the link between entrepreneurship and regional development. First, entrepreneurship should be understood as an evolutionary process stressing the importance to include context, process and outcome. Second, there are two different types of entrepreneurship which need to be discussed in a regional context: radical entrepreneurship initiates new regional development trajectories, while related entrepreneurship follows the

established trajectories. Third, it will be discussed how entrepreneurship is embedded in existing regional knowledge structures. The importance of prior knowledge for the initiation of new development trajectories is emphasized. In this paper entrepreneurship should be understood as the identification of new business opportunities and the development of new products or services to commercialize such opportunities (Shane 2003). Following this definition, the aspect of new firm creation is no requirement. This definition was chosen precisely because of the importance of inter-corporate networks for the innovation process. Furthermore, a certain kind of entrepreneur is in the center of attention, namely technological entrepreneurs because their activities represent one important way to create new regional development trajectories.

The rest of the paper is structured as follows. Section 2 present the general assumptions on path dependency in the literature and make a short discussion on three potential extensions of the concept in alignment with the purpose of this paper. In section 3, five propositions are put forward. The first two propositions address the potential extensions of the path dependency concept with entrepreneurship in the focus. The other three propositions focus on the relation of entrepreneurship and regional development. The last section discusses some implications and concludes with a short discussion.

Critical review of the path dependency concept

Path dependency is a recognized concept in many disciplines and is thus used in many different contexts (see Martin and Sunley 2006 for an in-depth overview). Within social science, the work of David (1985), Arthur (1989, 1994) and North (1990) are the most prominent references. The concept was introduced in economics to explain technology adaption processes and industry evolution (David 1985, Arthur 1989). A critical literature review was conducted. After an extensive review, several regional development papers dealing with path dependency were selected for a further review. The selection criteria were the focus on the economic development of a region and the number of citations. The review suggests that the concept needs to be complemented for the purpose of this paper. Three suggestions have been made.

First, table 1 shows several more or less precise descriptions of path dependency within regional development papers. The concept is often understood as *'future development is reflected by history'*. It should be noted that beside these rather vague descriptions, no further conceptualization is offered in most of the papers. Often path dependency is mentioned in the title as a catch phrase, but not further explicitly addressed in the paper (e.g. Shapira and

Youtie 2008). There is no consistent way of defining the concept which might limit the knowledge accumulation about the concept as the definitions do not relate to each other. It is often not perfectly clear what the actual path is, why some historical events are more important than others and to what extent they can influence present decisions. For their research questions this approach might be perfectly adequate, but for the purpose of this paper the actual path needs to be identified. Therefore:

Possible complement 1: The context of path dependency should be clearly conceptualized in the context of regional development

Table 1: Definition of path dependency in selected regional development papers

	<i>Dimension</i>	<i>Description of the concept</i>	<i>Type of paper</i>
Shapira and Youtie (2008)	Technology	Regions maintain technological leadership through early entry and positional lock-in. p191	Industry case study
Schienstock (2007)	Technology	Technological choices made in the past influence subsequent choices. p93	National case study
Martin and Sunley (2006)	Technology	Inability to shake free of the own history. p399	Conceptualization
Hassink (2005)	Comprehensive	The importance of history and institutional context for regional development explaining the decline of industrial areas. p522	Regional case studies
Essletzbichler and Winther (1999)	Technology	The dependence of technology on past and existing knowledge tends to move firms, regions and countries along relatively well-defined technological trajectories. p179	Industry case study
Kenney and Burg (1999)	Technology	Small events or historical accidents can be critical triggers that enable one region to become the center of a particular type of economic activity. p70	Regional cluster study
Meyer-Stamer (1998)	Technology	It is an attempt to explain the rationality of behavior that at first sight might appear irrational if one assumes utility maximizing behavior. p1496	Regional cluster study

Second, within regional development literature, most of the articles dealing with path dependency are limited to technological development of a single product or industry either within a specific region or across several regions (Martin and Sunley 2006). Thus, as suggested in table 1, most regional development papers dealing with path dependency address the technological dimension and focus on the development trajectories of technologies. They are process rather than actor-centered oriented meaning that the evolutionary path of the technology is described while the actors, such as entrepreneurs, are often not included. Hassink (2005) takes a more comprehensive approach by addressing also the institutional context, but also this paper is process oriented. If entrepreneurial activities are discussed

within the framework of path dependency, such a single, technological dimension is too limited. Entrepreneurs are embedded in culture which is broader than the technological view. Furthermore, entrepreneurs are often biased by experiences and prior knowledge (Shane 2000) which are not expressed in a technological dimension alone. Therefore:

Possible complement 2: The technological dimension of path dependency needs to be extended

Third, in path dependency literature, the concept is often described as one explanation for technological lock-ins eventually resulting in stagnation and decline. In order to be innovative, the path needs to be broken. How path dependency is perceived depends very much on the perspective of the entrepreneur. For example, within industries, path dependency is one pre-requisite for the accumulation of relevant knowledge and experience, while people from outside this industry might perceive the development along the same technological trajectories as very restricted. Evidence has been presented suggesting that prior related knowledge increases the likelihood to initiate successful economic activities (Boschma and Iammarino 2009, Frenken, van Oort and Verburg 2007). It should be avoided to classify path dependency right at the beginning as either positive or negative. It depends very much upon the observer and the specific situation. Therefore:

Possible complement 3: Path dependency should be perceived as a neutral process which is open to different perceptions

Several propositions will be put forward in the following chapter exploring the link between entrepreneurial activities and regional development through the interpretive lens of path dependency. These propositions are connected to the possible complements which have been presented above.

Entrepreneurship as a regional process

Entrepreneurs are economic actors who are an important source for job creation and economic growth (Audretsch and Keilbach 2004, Birch 1979). As agents of change, entrepreneurs may stir up the obsolete economical and institutional structure with their actions. This 'big man theory' does not seem to correspond with the recent discussions about innovation processes (Schiestock 2007). Most innovations are a process involving a wide network of different actors (Freeman 2001, Johannisson 1998). Knowledge and experience from different fields need to be combined into one innovation, making it difficult for one individual entrepreneur to initiate a new development path alone.

When illustrating path dependency, the path is often described as a linear trajectory with certain alterations (Martin and Sunley 2006). One has to keep in mind that the path is identified in retrospective by the researcher. Looking back in time, researchers rationalize and include only those events which they think have formed and altered the path. Thus, the included events are occurring in a certain sequence and are in linear relation to each other as shown in figure 1(a). The time horizon plays an important role when identifying the path in retrospective. There is a time delay between the entrepreneurial activity and the alteration of the regional path. It might be difficult to identify this particular, path-altering event for several reasons: the activity might be hidden by the process and/or the path alternation needs to be attributed to several activities. This ties in to the understanding that entrepreneurship is a collective phenomenon.

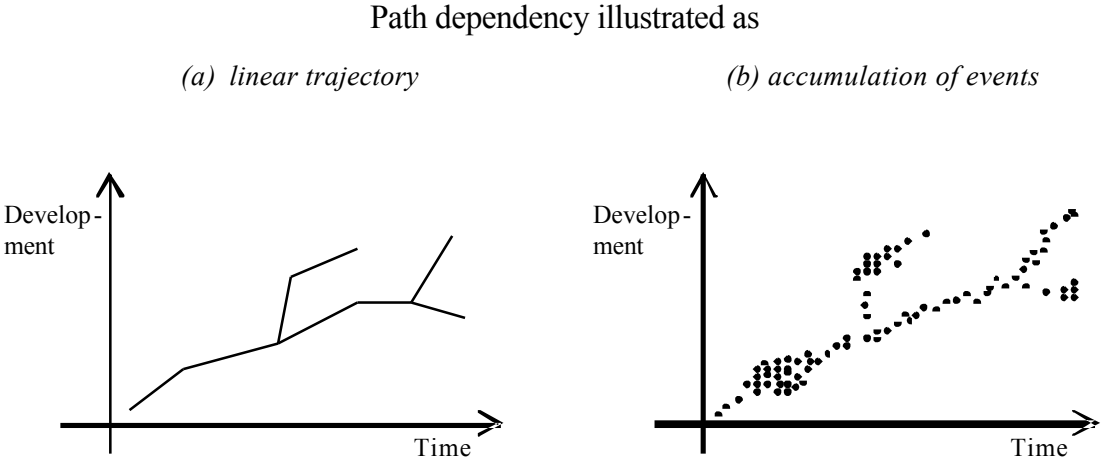


Figure 1: Altered illustration of a technological path

For the purpose of this paper however, a path should rather be perceived as an accumulation of different events which form along certain directions as shown in figure 2(b). This means that there is not only the focus on some events, which the researcher thinks are the most important ones. All events need to be considered as their interactions lead to the importance of some events. Events are hereby understood as entrepreneurial activities such as the commercialization of new business opportunities. Each entrepreneurial activity has the potential to open up new directions and opportunities.

Entrepreneurial activities play an important role for the regional development. A solely technological discussion is too limited, if the regional development path in relation to

entrepreneurship should be discussed. Regions house more than just technological trajectories.

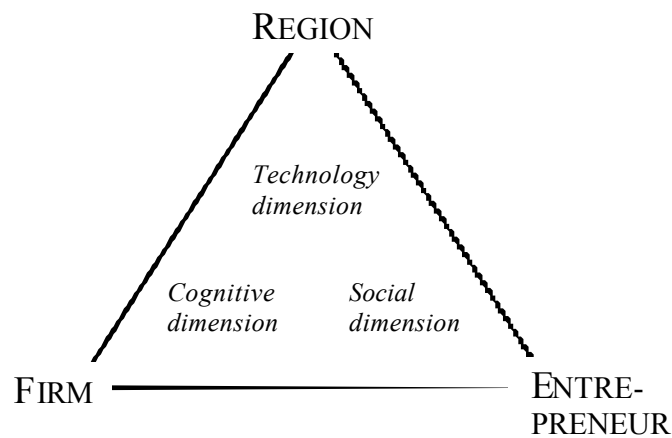


Figure 2: Different dimensions of path dependency

Figure 2 illustrates why it is important to include different dimensions of path dependency. Including entrepreneurship, the technological dimension alone is not sufficient to explain regional development. It is important to understand that each entrepreneur is embedded in culture and is biased in order to cope with uncertainties when commercializing a new business opportunity; meaning that the entrepreneurs rely on experiences and prior knowledge. Thus, three interrelated dimensions of path dependency need to be identified. First, there is the technological path dependency which is closely linked to the development of a technology. As seen in table 1, most research has been focused solely on this dimension. Second, there is the cognitive path dependency about how we know the world. This refers to the mental models rooted in the person's experiences and behavior. Such cognitive path dependency can be seen in the development of the disk drive industry (Christensen 1997). Christensen concludes that the large disk drive companies failed not because of the lack of knowledge to produce smaller disk drive units, but because they did not see the use of producing smaller units. The third dimension is the social path dependency. This dimension refers to the culture of a region. Differences in business cultures were described in the comparative analysis of Silicon Valley and Route 128 (Saxenian 1996). While risk-taking was glorified and business failure socially accepted by the entrepreneurs in Silicon Valley, stability and company loyalty were valued by the entrepreneurs at Route 128. These two regions had totally different attitudes towards entrepreneurship. Such cognitive and social differences suggest that path

dependency should not just be limited to a technological dimension when discussing entrepreneurship in a regional context. Therefore:

Proposition 1: In studies of entrepreneurship in a regional context, technological, social and cognitive dimensions of path dependency should be taken into consideration

Past activities should be discussed in relation to the three dimensions of regional path dependency. The regional path is one possible manifestation of the combination of the three dimensions. But how can a regional path be defined? The region itself is no actor and can not initiate actions. But a region consists of many actors such as entrepreneurs, politicians and organizations; all of which can initiate actions. For the purpose of this paper, the regional path is closely connected to the economic activities within the region. The simplest case to analyze would be a region which has only one single industry. The path of this industry would then be considered to be equivalent to the regional path. A region however houses multiple industries which may or may not be related. To simplify this complex situation, the path of the most dominant industry could be identified suppressing less dominant business activities. Such an approach would neglect an important aspect of path dependency: *small* events can alter the path development. Thus, all the business activities within a region should be taken into consideration when identifying the path of the region. The question remains: how can a regional path be defined, if the region houses multiple, related and unrelated industries with different development paths? One possibility is to deviate from the idea that there is only one regional path. Each industry can have technologies which are completely unrelated with technologies of the other industries in the region. It seems impossible to unite them into one regional path. But this approach would not serve the purpose of this paper as it would not be possible to alter the path of the region but more paths would be added.

A second option is suggested: to deviate from the narrow understanding to link the regional path to the technology trajectories of the regional industries. The regional development path depends not only on the paths of the different industries but also on the interactions between them and the regional actors. All this needs to be discussed in relation to the proposed three dimensions of regional path dependency. Some activities are of larger importance than others and it can be assumed that some activities are more related to the regional path than others. The introduction of a new technology can lead to new industry emergence in the region and is therefore less related to the current regional economic profile, while entrepreneurs imitating successful entrepreneurial activities of other regional

entrepreneurs are closely related. Path dependency can be seen as a selection process in the sense of specialization. Smaller regions are usually more specialized than larger ones. In this light, the path of the region is highly influenced by the economical specialization of the regional industries. Therefore:

Proposition 2: Entrepreneurial activities form a regional path which is linked to the industries within the region

As stated above, the focus in this paper lies on ‘technological’ entrepreneurs. With the regional development in the center of attention, innovation in this paper means new to the region. A product, service or technology can be new to the region although it has already been introduced in the global market quite a while ago. According to this understanding, entrepreneurs can have two different roles: their activities can either be of radical or of related nature; always in relation to the regional path. Radical activities should be understood as activities initiated outside established regional trajectories. Such activities would be initiated by the Schumpeterian entrepreneur. Related activities on the other hand follow established regional trajectories and are initiated by the Kirznerian entrepreneur. Schumpeterian entrepreneurs are ‘*innovative and break away from existing knowledge*’, while the Kirznerian entrepreneurs are ‘*not very innovative and replicate existing knowledge*’ (Shane 2003, p.21). Conclusively, it is not enough to set off just any innovative activities to alter the path; the activities also need to lie outside established trajectories. Therefore:

Proposition 3: There are different types of entrepreneurship: Related entrepreneurship will be along established trajectories, while radical entrepreneurship will alter the path

Precisely because there are different types of entrepreneurship in relation to the regional path, the concept of path dependency should be perceived in general as neutral. If path dependency can initiate new regional development trajectories or leads to a decline of the regional economy depends very much on the type of entrepreneurship and the specific regional situation. Furthermore, different stakeholders do not perceive the same processes in the same way, but they relate differently to the path dependency process. The pre-determined negative perception of path dependency in the literature is therefore unsuitable.

Table 2: Different types of entrepreneurship and regional process

<i>Type of entrepreneurship</i>	<i>Regional process</i>	
	<i>Declining industry</i>	<i>Emerging industry</i>
Related entrepreneurship	Stagnation/Decline	Support
Radical entrepreneurship	Renewal	Disturbance

Table 2 shows how the same type of entrepreneurship can lead to quite different regional development processes depending on the specific situation of the region. If the region houses predominantly declining matured industries, related entrepreneurship will not alter the path and the regional economy will stagnate or decline. Path dependency is generally linked to such a lock-ins. Under the same circumstances, radical entrepreneurial activities on the other hand will generate new ideas and initiate new development trajectories. This will lead eventually to a renewal of the regional economy. If the region however houses emerging industries, related entrepreneurial activities are needed to support the new industry genesis. Under these circumstances, related entrepreneurship will support the development of a dominant design and enable the commercialization of inventions. Under the same circumstances, radical entrepreneurship can be of some disturbance for the development of the new industry as it can hinder the development of a dominant design. Aldrich and Fiol (1994) suggested for example that emerging industries should avoid competing designs and by that eliminate confusion and uncertainty for potential stakeholders. It is important to be aware of the specific situation of the region and the different types of entrepreneurship. Therefore:

Proposition 4: Different types of entrepreneurship have different effects on regional development

The question which appears in this context is under which circumstances the different types of entrepreneurship emerge. The different types could be linked to new knowledge entering the region. As new knowledge should be understood any experience and any knowledge, may it be tacit or explicit. This new knowledge can enter the region in three different ways: through the migration of entrepreneurs and employees, through information exchange of global networks or through research activities within the region. Migrating entrepreneurs or employees should be understood as persons moving between different

regions of the same or different countries. In entrepreneurship literature, it is suggested that the social networks of entrepreneurs are mainly of local nature (Hess 2004, Sorenson 2003) and that knowledge spillovers are geographically bounded (Audretsch and Feldman 1996). Despite this geographical limitation of knowledge, entrepreneurs are considered to be highly mobile individuals (Godley 2007) and recent research suggests that knowledge can overcome long geographical distances (Saxenian 2006). Migrating entrepreneurs come from different institutional backgrounds and possess different knowledge. Thus, entrepreneurs will introduce new knowledge to the region they are moving to. For two reasons it is more likely that the migrants rather than local entrepreneurs will initiate radical entrepreneurial activities. First, the migrants are not aware of the technological, cognitive and social path of the region. Second, they possess more likely knowledge which is new to the region. But also global networks are a source of new knowledge. Companies, especially high-tech companies, are often involved in such global networks (Cooke 2004). While the local entrepreneurs can perceive new knowledge through such global networks, they might be more restricted as they are embedded in regional practices, institutions and culture. Nonetheless, new introduced knowledge will potentially stir up the regional practices. Therefore:

Proposition 5: Entrepreneurs which possess new knowledge from outside the region will be more likely to alter the path of the region

Implication and discussion

The concept of path dependency was used as an interpretive lens to exploring the link between entrepreneurial activities and regional development. Path dependency contributed in three ways to such a study of entrepreneurship. First, the evolutionary aspect of entrepreneurship was emphasized moving away from the big man theory to a perspective where entrepreneurial activities are seen as an accumulation of events including cooperation, context and outcome. It is therefore important to consider different, interrelated dimensions of path dependency. Second, different kinds of entrepreneurship were proposed. Related entrepreneurship will be in line with path dependency, while radical entrepreneurship will alter the path. It is therefore important not only to distinguish between non-innovative entrepreneurial activities and innovative entrepreneurial activities, but also to distinguish two different types of innovative entrepreneurial activities. What type of entrepreneurship triggers which regional process is very much depending on the regional characteristics. It can be stated that both types are needed for the regional development. Third, it was discussed how

entrepreneurship is embedded in the existing knowledge structures of the region. On one side, entrepreneurs rely on prior knowledge. On the other side, new knowledge might enable the entrepreneurs to use their prior knowledge in new business opportunities.

Entrepreneurs are of course not thinking in terms of related or radical entrepreneurship. Activities are initiated where business opportunities are identified. They are generally not concerned which regional development processes are triggered through their own actions. Nonetheless, the activities of each have some impact on others. Identifying relevant activities in retrospective might cause some difficulties for the researcher. It needs to be decided which activities were of importance and which activities were of higher importance than others. There might be such a large number of activities going on that it is difficult, if not impossible, to identify the important ones. Especially when a company fails, it is difficult to see their importance of their former activities. Shockley Semiconductor for example failed soon after its establishment, but was still very important for the future development of the semiconductor industry in Silicon Valley (Holbrook et al 2000). In present it is impossible to predict which current activity is of most significance for the future regional development. It can however help to understand the different processes occurring within a region.

Each region has a unique development and houses unique pre-requisites for the future development. Furthermore, each entrepreneurs relies on prior knowledge and experience for future decisions. Their actions depend to different degrees on the regional composition of knowledge and the industrial structure. This makes it very difficult, if not impossible to imitate the same processes somewhere else. One might say that the region has special competitive advantages, if this prior knowledge and the unique regional composition can be used to initiate new trajectories.

This is what the title suggests; that entrepreneurs can ‘stand on the shoulders of giants’ by using prior information and knowledge embedded in the regional infrastructure to identify new business opportunities which can be outside of the established regional trajectories. The challenge for the entrepreneur is not to seek for ‘complete’ novelties. New, innovative paths can rather be found through a creative combination of resources that already exist in the region.

The aim of this paper was a conceptual one. Through the path dependency perspective, entrepreneurship was discussed in a regional context and several propositions were presented. Future research will address the propositions through a set of in-depth-case studies, which will contribute to a better understanding of regional development processes.

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