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Regional competitiveness, economic growth and stages of development*

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Abstract

This paper positions the concept of regional competitiveness within theories concerning regional economic growth and stages of economic development. It examines the sources of regional competitiveness encompassing an analysis based on the particular stage of economic development that the nations within which regions are situated have reached. As a means to achieve this, the paper undertakes an empirical analysis of data stemming from the World Competitiveness Index of Regions, and identifies regional competitiveness as a dual concept that explains relative differences in rates of economic development across regions, as well as an understanding of the future economic growth trajectories of regions at a similar stage of economic development. As with endogenous growth and development theory, the notion of regional competitiveness presented here places knowledge, innovation and entrepreneurship at the forefront of conceptualisations of regional economic differentiation.

Key words: *regional competitiveness, economic growth, stages of development, innovation, knowledge*

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1. Introduction

The notion of the competitiveness of regions remains an area of contested theoretical debate, with some arguing that firms, and not places, compete for resources and markets. Nevertheless, a significant forum of scholarly and practitioner-based research has developed in recent years with the aim of theorising upon and empirically measuring the competitiveness of regions. However, the somewhat disparate and fragmented nature of this work has led to the lack of a substantive theoretical foundation underpinning the various analyses and measurement methodologies employed.

The competitiveness of regions generally refers to the presence of conditions that both enable firms to compete in their chosen markets and for the value these firms generate to be captured within a particular region (Begg, 1999; Huggins, 2003). Regional competitiveness, therefore, is considered to consist of the capability of a particular region to attract and maintain firms with stable or rising market shares in an activity, while maintaining stable or increasing standards of living for those who participate in it (Storper, 1997). Given this, competitiveness may vary across geographic space, as regions develop at different rates depending on the drivers of growth (Audretsch and Keilbach, 2004).

While the competitiveness of regions is intrinsically bound to their economic performance, there exists a growing consensus that competitiveness is best measured in terms of the assets of the regional business environment (Malecki, 2004, 2007). These include the level of human capital, the degree of innovative capacity, and the quality of the local infrastructure – all of which affect the propensity to achieve competitive advantage in leading-edge and growing sectors of activity. The influence these assets and other externalities can have on firm competitiveness, such as the ability of regions to attract creative and innovative people or provide high-quality cultural facilities, are all important features of regional competitive advantage (Kitson et al., 2004). In other words, competitiveness is increasingly concerned with creativity, knowledge, and environmental conditions, rather than being purely based on accumulated wealth (Huggins, 2003).

This paper seeks to place the regional competitiveness discourse within the context of theories concerning regional economic growth and stages of economic development. It positions the concept of regional competitiveness, and models related to its measurement, within those theories that attempt to understand and determine the means through which economic development occurs across regions. To achieve this, it contains a critique of a range of literature from both a theoretical and methodological perspective, allowing a more concrete conceptualisation of regional competitiveness to be framed.

The structural features of regional economies and their societies, especially those features that determine the competitiveness of a region, will evolve through time and are likely to display a degree of path dependence (Martin and Sunley, 2006; Boschma and Frenken, 2006). Given the quite different development histories of European and North American economies, particularly compared with, for example, BRIC (Brazil, Russia, India and China) nations and Middle Eastern economies where growth rates have been much more rapid in recent years, it is logical to expect that regions within these broad groupings will differ substantially in the sources of their competitiveness. Given this, the paper examines the sources of competitiveness, encompassing an analysis based on the particular stage of economic development that nations have reached. This facilitates an analysis of the different drivers of regional competitiveness across the globe. As means to achieve this, the paper undertakes an empirical analysis of data stemming from the World Competitiveness Index of Regions (WCIR) (Huggins et al., 2014). The aim of the WCIR is to provide a tool for analysing the development of a wide variety of regional economies based within differing national economies. The WCIR enables an illustration of the changing patterns of competitiveness across the globe to be generated, as well as exemplifying the outcomes suggested by the latest theories on regional development. The methodology underpinning the WCIR is outlined in section 3. Prior to this, section 2 critiques the key literature relating to the concept of regional competitiveness.

2. Literature overview on issues of regional competitiveness

As Martin (2005) outlines, concern with competitiveness has filtered down to the regional, urban, and local levels, particularly the role of regionally based policy interventions in helping to improve the competitiveness of regions and city-regions. In many advanced nations, these interventions form part of a strategic framework to improve productive and innovative performance. From this policy perspective, the key drivers of regional competitiveness are usually considered to consist of the enhancement of knowledge and creativity through clusters (Porter, 1998) or networks (Huggins and Izushi, 2007) of firms and complementary organisations. This perspective resembles the views of the endogenous school of regional development, which argues that regions themselves act as an organisational form of coordination facilitating sustainable competitive advantage (Courlet and Soulage, 1995; Garofoli, 2002; Lawson and Lorenz, 1999; Maillat, 1998a).

Despite these developments, both the concept and the measurement of competitiveness at a regional level remain contested areas of analysis, with some suggesting that "competitiveness league tables are inevitably seductive for regional development agencies and the media keen to absorb 'quick and dirty' comparative measures of regional economic performance" (Bristow, 2005: 294).

When conceptualising regional competitiveness, it is crucial to distinguish it from the concept of competition. Certainly, by writing in terms of competitiveness, one inevitably invites the reader to think of head-to-head conflict. Yet, the concept of competitiveness at the national or regional level is only competitive in the sense that it refers to the presence of conditions that will enable firms to compete in local, national, and international markets. Regions 'compete' in trying to provide the best platform for operating at high levels of productivity, but this is very different from the kind of direct competition undertaken by firms. It is the zero-sum conceptualisation of regional competitiveness which often leads to the premise that there must inevitably be both winners and losers (Bristow, 2005).

Malecki (2004) usefully distinguishes between low road and high road competition. As he points out, regions may compete on the basis of low wages, docile labour, and low taxes, but such low road competition will simply perpetuate an inability to upgrade to an economic base with higher skill and wages. Conversely, competition on the high road involving, for example, knowledge policies aimed at promoting entrepreneurship and knowledge-based economic development, can lead to positive-sum outcomes that bring benefits to all regional economic and social activities (Leborgne and Lipietz, 1988; Malecki, 2004). For regions, therefore, it is important that competitiveness not only leads to increasing market shares in a particular industry but also raises, or at least maintains, the standard of living, as this should be the end goal of competitive activity (Aiginger, 2006; Storper, 1997). In general, regional development concerns the upgrading of the economic, institutional, and social base, with entrepreneurship that is able to unlock wealth being a prime source of development (Amin, 1999). Consequently, entrepreneurship is central to regional economic growth and competitiveness (Audretsch and Keilbach, 2004; Malecki, 2007).

Spatial economics which does not incorporate entrepreneurship factors may fail to understand and identify key sources of regional development (Andersson, 2005), with regions that are open and creative often able to attract human capital and enjoy more dynamic entrepreneurship (Benneworth, 2004; Lee et al., 2004). In a competitive environment, entrepreneurs will be alert to opportunities and contribute to regional economic growth (Audretsch and Keilbach, 2004). However, changes in levels of entrepreneurship and contributions to regional economic development will take time to emerge, and as such, any effects are only likely to be seen in the long term (Huggins and Johnston, 2009; Huggins and Williams, 2009). Alternatively, regions can be uncompetitive and lack entrepreneurial dynamism because they lack the key strengths which make leading regions prosper and develop (Benneworth and Charles, 2005; Chaston, 2009; Huggins, 1997; Huggins and Johnston, 2009; Huggins and Williams, 2011; Lagendijk and Lorentzen, 2007; North and Smallbone, 2000; Virkkala, 2007).

As already indicated, regional competitiveness remains a contested concept. However, Paul Krugman, a renowned sceptic of the national competitiveness concept (e.g., Krugman, 1994), suggests that the competitiveness of a region is based on its ability to provide sufficiently attractive wages and/or employment prospects and a return on capital (Krugman, 2003). This proposition, along with others, has led to competitiveness becoming a more generally accepted concept when discussing uneven development across regions. Camagni (2002) further argues that the concept of regional competitiveness is theoretically sound, due to the role territories play in providing competitive environmental tools to firms and in processes of knowledge accumulation.

Regional competitiveness and growth

Some commentators have suggested that although policymakers everywhere are appropriating the term regional competitiveness, it remains "complex and contentious" and "we are far from a consensus on what is meant by the term" (Kitson et al., 2004: 992). Nevertheless, the regional entrepreneurial, knowledge, and innovation capacity of regions are generally considered to be key factors underpinning the future economic development and growth trajectory of regions. It is this link, therefore, between the knowledge, entrepreneurial, and innovation bases of regions and their growth capacity and capability which is at the heart of the concept of competitiveness. In this respect, regional competitiveness concepts are strongly tied to the lineage of Schumpeterian theory (Schumpeter, 1934) – or 'Schumpeter's competitiveness', as it has been termed (Beugelsdijk and Maseland, 2011) – as well as more contemporary theories relating to the endogenous nature of economic growth.

Both competitiveness and endogenous growth theory are rooted in the notion that the sources of high rates of economic performance and subsequent growth stem from the role that the production, distribution, and use of knowledge play within and across economies (Antonelli et al., 2011; Grossman and Helpman, 1994; Harris, 2001; Ibert, 2007; Vaz and Nijkamp, 2009; Zucker et al., 2007). The knowledge-based economy is generally considered to consist of the sphere and nexus of activities and resources centred on, and geared toward, innovation (Romer, 2007). The innovation systems literature, in particular, pinpoints the flow of knowledge across organisations as a crucial factor for effective innovation (Andersson and Karlsson, 2007; Cooke, 2004; Cooke et al., 2011; Freeman, 1987, 1994; Harris, 2011; Lundvall, 2010).

Early models of economic growth are rooted in the work of Solow (1956, 1957) and Swan (1956), which focused on physical capital and the supply of labour as the key sources of growth (Andersson and Karlsson, 2007). In contrast with these earlier models and echoing the key tenets of regional competitiveness,

endogenous growth theory stresses that knowledge is a key driver of productivity and economic growth, which departs from the traditional emphasis on the accumulation of physical capital (Aghion and Howitt, 1998; Lucas, 1988; Romer, 1986, 1990). Theorists of economic development have increasingly drawn upon models of endogenous growth to better understand the factors underpinning such development. Endogenous growth theory generally assumes that economic growth is at least partly a function of stocks of knowledge in the form of human capital or the outcomes of research and development (R&D) activities. The use of the term endogenous is recognition that economic growth is influenced by the use of investment resources generated by economies themselves, rather than the exogenous factors associated with traditional growth models.

At the regional level, it is generally recognised that there is a need to better understand the mechanisms underlying regional growth patterns (Andersson and Karlsson, 2007; Capello and Nijkamp, 2009; Stimson et al., 2011). As indicated above, economic growth rates are increasingly considered to be dependent on endogenous factors with most treatments commonly assuming that economic growth is partly a function of either stocks of human capital, as proposed by Lucas (1988), or R&D, as proposed in Romer's (1986) model. Romer (1986), for instance, specified a model of long-run growth in which knowledge is assumed to be an input into production that has increasing marginal productivity. Adapting Romer's (1986) model to the regional context, it can be proposed that the output of a region (*r*) is a function not only of physical capital and labour, but also the stock of results from expenditure on R&D:

$$Y_r = A(R)F(K_r, R_r, L_r)$$

where Y = economic output; A= current global state of knowledge; K= physical capital; R= stock of results from expenditure on R&D; L = supply of labor.

In the Lucas (1988) model, it is investment in human capital (*H)* that largely determines the output of a region (*r*):

$$Y_r = A(H)F(K_r, H_r)$$

These models make clear that endogenous growth is considered to be driven by technological change arising from intentional investment decisions made by profit-maximizing agents, with the stock of human and research capital – and investments in such capital – determining the rate of growth (Ha and Howitt, 2007; Romer, 1990). In this respect, regional competitiveness models possess many similarities, with the key difference being that output measures are transferred to the right-hand side of the equation – see, for example, the equations developed by Aiginger (2006) outlined in the measurement and methodologies section below – with the left-hand side being a measure of overall competitiveness. This makes logical sense as endogenous growth models are seeking to explain the factors underlying past

output growth. Competitiveness models, on the other hand, are seeking to measure the capacity and capability for future output growth, with the factors used to explain this encompassing the explanatory factors adopted by growth theorists as well as current rates of output and productivity.

For Porter (1998), the localised productivity advantages of agglomeration, such as access to specialised inputs, employees, information, and institutions, will encourage firms to cluster, and reinforce clusters over time, as new firms become attracted by the same advantages of concentration. Many of the factors that increase current productivity will also encourage innovation within the cluster and, therefore, increase the productivity growth of firms. For example, access to specialised information via personal relationships will, over time, provide localised advantages for firms in perceiving new technological opportunities and new buyer needs. Therefore, as traditional forms of advantage become nullified, competitive advantages lying outside of firms – i.e. in the business environment in which they are located – increase in importance.

With advances in telecommunications and information technologies allowing the instantaneous transfer of information, regardless of location, it might appear logical to consider that geography would become increasingly less important in economic analysis. In fact, in a number of ways, the reverse is true (Porter, 1990). Although it has become possible for firms and individuals to source work far more widely, the geographic concentration of related resources and industries, in particular knowledge-intensive activities, remains one of the most striking features of any nation or region, especially in the most advanced economies. Furthermore, although the historic factors influencing location, such as proximity to inputs and markets, are being undercut, the ability to source from anywhere is, paradoxically, increasing the importance of local competitive advantage; in many respects, globalisation is reinforcing localisation.

Despite contemporary theoretical developments in the field of economic growth, Aghion and Howitt (1998) suggest that there is a need to further widen our conception of the investment resources underpinning economic growth. At the regional level, it is similarly recognised that there is a need to better understand the mechanisms underlying regional growth patterns (Andersson and Karlsson, 2007; Capello and Nijkamp, 2009; Stimson et al., 2011). Indeed, it is suggested that perhaps the most interesting implications of endogenous growth theory relate to the impact of the spatial organisation of regions on flows of knowledge. In particular, it is considered that differences in regional growth can potentially be explained by differences in the conditions for creating, accumulating and – crucially – transmitting knowledge (Roberts and Setterfield, 2010). For instance, it is argued that increasing returns are realised through both the geographic and organisational processes resulting from localisation, and in time the spatial and economic diffusion of knowledge (Pred and Hagerstrand, 1967; Storper, 2009).

Fundamentally, a key driver of regional growth consists of the capability of organisations in a region to access and subsequently utilise appropriate economically beneficial knowledge. According to Storper (1997: 44), "the status of the region is now not merely as a locus of true externalities, but – for the lucky regions – as a site of important stocks of relational assets". These relational assets in the form of the network capital of firms and other organisations (Huggins, 2010; Huggins and Johnston, 2010; Huggins et al., 2012; Huggins and Thompson, 2014) and the social capital of individuals (Cantner et al., 2009; Hauser et al., 2007; Lorenzen, 2007; Tappeiner et al., 2008; Tura and Harmaakorpi, 2005; Walter et al., 2007) distinguish Storper's (1997) 'lucky' from 'unlucky' regions, as well as forming part of the territorial capital of regions, which includes not only relational assets but the wider set of natural, human, and organisational assets underpinning regional competitiveness (Camagni and Capello, 2010, 2013; Capello et al., 2011).

Endogenous Regional Economic Development

In general, it is widely observed that the location where innovation occurs is evolving, with the stock of knowledge and other knowledge-based resources constantly shifting, reflecting ever-changing contexts for new and more advanced knowledge requirements (Dicken, 2007). Furthermore, the sources of regional productivity and growth are increasingly based on the role that knowledge plays within and across regional economies (Capello and Nijkamp, 2009). As a result, the concept of the knowledge-based economy has emerged to aid a better understanding of how the effective production, distribution and use of knowledge underpin innovative and competitive modern economies (Huggins and Izushi, 2007). The concept of 'regional innovation systems', for instance, is recognition of the role of knowledge for growth through innovation (Cooke, 2004). Innovation systems theory views an economy as an interlinked systemic network of components facilitating innovation (Freeman, 1987; Lundvall, 1992).

In an evolutionary context, the knowledge-based development of a regional economy involves multiple threads of relationships among its actors and resources at both a firm and spatial level, which interact in a complex manner (Maskell and Malmberg, 2007). For instance, under growing competitiveness pressures in virtually all sectors, firms are increasingly focusing on their core activities and searching external knowledge sources as part of their innovation management strategies. These firm-level strategies may facilitate knowledge-based investment and stimulate the growth of related resources and capabilities within their region, resulting in productivity improvement at both firm and regional level. Yet, there are growing concerns that such knowledge-based development may not necessarily contribute to employment growth at the regional level and may in fact lead to 'jobless growth' (Vivarelli and Pianta, 2000; Döpke, 2001).

As indicated above, endogenous growth theory has placed knowledge at the centre of economic development (Romer, 1986, 1990), but whilst endogenous growth can be considered the desired outcome of knowledge-based development and innovation, it is the process of endogenous development which underpins the growth trajectories of economies (Vázquez-Barquero, 2007). In particular, regions are increasingly considered to be key territorial units within which endogenous forms of development flourish through their innovative milieu – or what some have referred to as 'technopoles' (Castells and Hall, 1994), 'industrial districts' (Capello, 1999) or 'clusters' (Porter, 1998; Cooke and Huggins, 2001) – facilitating knowledge flow and new knowledge creation. Implicit is the contention that regional development and growth is best promoted through bottom-up activity focused on the enhancement of local production systems, rather than top-down processes of exogenous development focused on seeking to redistribute resources from elsewhere (Maillat, 1998a, 1998b; Garofoli, 2002).

Cooke (2004) suggests that regional innovation systems are a vital component for regional economic development, while others have focused on the notion of clusters as the key focus of regional economic theory and policy, with the underlying argument being that competitiveness is determined by the strength of key concentrations of specific industries (Porter, 1998; Huggins and Izushi, 2011). The innovative milieu of urban settings, in particular metropolitan regions, means that they are often singled out by scholars such as Maillat (1998b), Fischer et al. (2001), Revilla Diez (2002) and Vázquez-Barquero (2007) as being key territorial units within which endogenous forms of development flourish.

The principles of the endogenous development school of regions are rooted in the role that factors such as collective learning and cooperative behaviour play in the establishment of an innovative milieu. As Garofoli (2002) states, endogenous development primarily concerns the capacity to innovate and produce 'collective intelligence' in a localised environment, which explicitly recognises the relevance of the spillover, diffusing, accumulating, creating and internalising of knowledge. The centrality of knowledge spillovers within processes of endogenous development is evident in the way through which, for example, cluster boundaries are defined (Porter, 1998). As Porter argues, 'drawing cluster boundaries is often a matter of degree, and involves a creative process informed by understanding the most important linkages and complementarities across industries and institutions to competition. The strength of these 'spillovers' and their importance to productivity and innovation determine the ultimate boundaries' (Porter, 1998: 202). Although it could be argued that agglomeration forces beyond technological development will also play a significant role in delineating cluster boundaries, it is clear that the extent of knowledge spillovers is also of significance in shaping these boundaries, as well as forming the basis of a region's overall innovativeness (Huggins and Izushi, 2011).

3. Methodology: World competitiveness index of regions

In this section the rationale and method underlying the World Competitiveness Index of Regions (WCIR) is discussed and presented. The WCIR represents an integrated and overall benchmark of the knowledge capacity, capability, and sustainability of each region, and the extent to which this knowledge is translated into economic value and transferred into the wealth of the citizens of each region. Therefore, the WCIR is explicitly tied to the theoretical discourse stemming from endogenous growth theory, with knowledge and human capital at the centre of its analysis.

Overall, the WCIR framework employs a set of 19 indicators. In the input domain of new knowledge production, the number of employees in five high-tech sectors are used as proxies for the human capital devoted to innovation. Other technology-input measures include R&D expenditures performed by the business and government sectors. Another technology measure used is the number of patents granted, with private equity investment capital used as a proxy of the availability of funds for knowledge-based, start-up firms. For indicators of the long-term competitiveness sustainability, public expenditures on primary and secondary education and higher education are included. Three indicators of internet-based infrastructure are employed: numbers of internet hosts, secure servers, and broadband access - as measures of knowledge competitiveness sustainability. Other measures included are the regional unemployment rate and economic activity rate (defined by the ratio of the labour force to the working-age population). Also included are the proportion of workers employed in a managerial capacity, which is used as a proxy of human capital.

To remove effects of the size of each region analysed, per capita figures are taken for the following variables: R&D expenditures performed by the business sector and government sector; patents granted; private equity investment capital; internet hosts; secure servers; broadband access; and public expenditures on primary and secondary education, and higher education. Employment in the five high- or medium-high-tech industries and the number of managers are based on a per total regional employment basis. To avoid individual indicators having an excessive influence on the composite WCIR index, the individual indicators are standardised after appropriate scaling.

The WCIR covers 546 regions globally. In the European Union (EU) member states, a total of 137 regions are benchmarked. This not only gives a wide perspective across EU regions, but provides insights into the regional disparities that are so important to the EU's economic convergence goals (Keating and Loughlin, 1997). Due to the rapid development in the performance of the BRIC nations (Brazil, Russia, India, China), the WCIR gives the regions of these nations prominent coverage. Under the European continental bloc, 56 Russian regions are included,

bringing the total of European regions to 196. Russia, being a transcontinental country, posed a separate challenge, with a number of the more eastern regions classified within the Asian continental bloc.

In North America 90 US regions are benchmarked along with 12 Canadian regions (based on their defined provincial units). The US regions are based on the Metropolitan Statistical Areas (MSAs) as defined by the US Census Bureau. In the case of Asia and Pacific regions, 164 regions are included from Australia, Japan, South Korea, China, India, Kazakhstan, Taiwan, Singapore, New Zealand, and 'Asian Russia'. The Asian and Pacific regions are defined by city or provincial/ prefecture boundaries for most nations (for example, provinces for China). In the Middle East, 35 regions covering Israel, Qatar, and Kuwait (each as region-states), and also 13 Saudi Arabian, 7 United Arab Emirates, and 12 Turkish regions are benchmarked. Finally, the WCIR covers regions from two South America nations: Brazil (27 regions) and Colombia (22 regions).

In order to establish the composite WCIR measure four components are first calculated, then a mean average of the value of the components is taken to give a raw WCIR score. In order to calculate the final index, the raw scores are first transformed so that their average becomes 100. Then a geometric mean of the variances of the converted variables is taken, which is termed (variance)original. Finally, the scores for all regions are standardised, multiplied by the square root of (variance)original.

4. WCIR analysis by stage of economic development

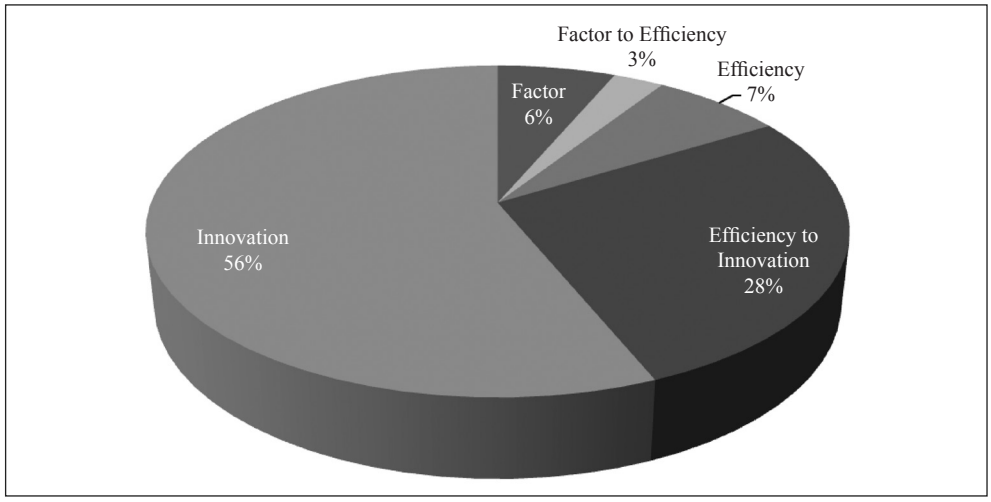
Drawing on the WCIR data, this section of the paper considers the extent to which regions can be grouped by their national stage of development, drawing on the WCIR data. Initially, regional competitiveness is analysed based on the stage of economic development of the nation in which they are located. The stage of development used here is the World Economic Forum's typology presented in its *Global Competitiveness Report* (World Economic Forum, 2012), which is based on Michael Porter's (1990) original conception. This approach places nations into three main stages of development, along with two intermediate transition stages between these main stages. The three main stages of development are: *Factor*; *Efficiency*; and *Innovation* driven economies. Factor driven economies compete on the basis of their factor endowments, such as their natural resources and plentiful supplies of cheap labour. Firm production relies on low prices to make sales, based on low costs. In the efficiency driven stage wage costs are likely to rise, with the main route to achieving competitiveness being increases in efficiency, particularly within the labour force and through the use of established technology. In the final innovation stage of development wage levels increase further, with competitiveness

primarily resulting from the benefits of creating new products and production processes.

The World Economic Forum (World Economic Forum, 2012) uses two variables to determine the stage of national development. The most influential of these is GDP per capita, with nations allocated to a particular stage of development based on the GDP per capita group they fall into. However, as a further determinant of whether a nation is at the factor driven stage of development, the percentage of exports (goods and services) associated with mineral goods is explored. Those nations in which mineral exports account for 70 per cent or more of total exports using a five year average are classed as factor driven economies regardless of their GDP per capita level.

Table 1 presents the GDP per capita ranges used by World Economic Forum (2012) and the stage of economic development for nations in which WCIR ranked regions are located. The WCIR regions are largely in nations in the innovation driven stage of development. However, it is apparent that the WCIR has regions representing all stages of national development, with there being a considerable number of regions located within economies that are in the transition phase between efficiency and innovation driven states, as shown by Figure 1. In total, slightly more than a quarter of regions are found in the group representing the transition between efficiency and innovation driven economies, with Russian and Brazilian regions falling into this group. Those regions not having reached the point of starting the transition to becoming an innovation driven economy make up the remainder and are, therefore, dealt with as one group.

Figure 1: Distribution of regions by national stage of development



Source: Authors

Table 1: Nations included in the WCIR by stage of development

Stage of Development	Factor Driven	Transition from Factor to Efficiency Driven	Efficiency Driven	Transition from Efficiency to Innovation Driven	Innovation Driven
GDP per capita range (US$)	< 2,000	2,000 – 2,999	3,000 – 8,999	9,000 – 17,000	> 17,000
Number of nations	1	3	4	9	34
Number of Regions	35	15	39	150	307
	India	Kuwait	Bulgaria	Brazil	Australia
		Qatar	China	Estonia	Austria
		Saudi Arabia	Colombia	Hungary	Belgium
			Romania	Kazakhstan	Canada
				Latvia	Cyprus
				Lithuania	Czech Republic
				Poland	Denmark
				Russia	Finland
				Turkey	France
					Germany
					Greece
					Hong Kong
					Iceland
					Ireland
					Israel
					Italy
					Japan
					Korea
					Luxembourg
					Malta
					Netherlands
					New Zealand
					Norway
					Portugal
					Singapore
					Slovakia
					Slovenia
					Spain
					Sweden
					Switzerland
					Taiwan
					UAE
					UK
					US

Source: Based on World Economic Forum (2012)

Table 2 indicates that the average competitiveness of regions is higher for those regions located in nations classed as more developed, which is the case regardless of whether the mean or median average is examined. It is logical that regions within the transition phase of development display a lower standard deviation for their competitiveness scores, as this group is captured by a smaller GDP per capita range than the innovation driven countries. The least developed group of nations consisting of those that have not yet entered into the transition phase to become innovation driven, display a higher variation in regional competitiveness than those in transition phase, reflecting the fact that whilst some of these are now efficiency driven, others are still - at least in part - factor oriented economies.

Overall, there is a strikingly large range in competitiveness scores found for regions within a particular stage of development group. In all three stages of development the range of regional competitiveness scores is in excess of 250, and although the minimum and maximum values increase with stage of development, there is little difference in the least competitive region within the group of transition nations (the Chechen Republic in Russia, WCIR -9.79) and that in the innovation driven nations (Canarias in Spain, WCIR -8.72).

Table 2: Regional competitiveness by national stage of development

	Not in Transition to Innovation Driven	In Transition to Innovation Driven	Innovation Driven
Mean Average	11.9	48.1	150.9
Median	-1.8	43.4	147.3
Standard Deviation	51.4	32.8	61.1
Maximum	216.5	250.9	360.0
Minimum	-50.3	-9.8	-8.7
Range	266.8	260.7	368.7
Upper Quartile	24.5	62.1	182.9
Lower Quartile	-22.2	24.8	115.8
Inter Quartile Range	46.7	37.3	67.1
Skewness	2.0	2.1	0.2
Kurtosis	4.7	9.7	0.6

Source: Authors

As previously indicated, the most competitive regions of the world are drawn from an increasingly wider variety of nations, and Figure 2 emphasises this by highlighting the extent to which there is overlap between the three stages of development. The large ranges in regional competitiveness across the three groups

mean that there are regions from nations that are yet to make it to the transition phase, as well as those in the transition phase, that are more competitive than the lowest ranked regions within the innovation driven economies. For example, Shanghai and Beijing, with WCIR scores of 216.5 and 214.2, rank above all regions in transition phase with the exception of Nenets Autonomous Okrug in Russia. This shows that although nations such as China as a whole may be rated as only moderately successful in terms of their competitiveness (29th out of 144) by studies such as the World Economic Forum's Global Competitiveness Index (World Economic Forum, 2012), or even uncompetitive in the case of Russia (67th), individual regions within these nations perform much more strongly. At the same time, some nations with low national competitiveness rankings according to the Global Competitiveness Report, such as Brazil (48th), may lack a leading region; for example Distito Federal in Brazil achieves a WCIR score of 111.13 ranking it only 250th.

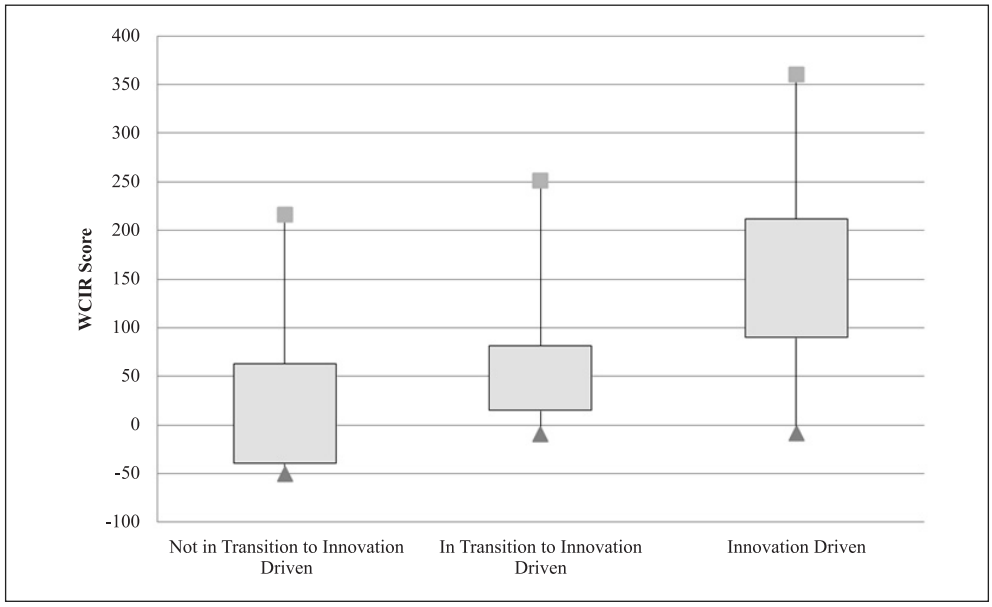
Reflecting the rapid growth of Asian hotpots, the Xinhua-Dow Jones International Financial Centers Development Index in 2011 (CFC Holding Company and CME Group, 2011) ranks Shanghai within the top ten financial centres for four of its five measures: financial markets; growth and development; industrial support; and services. Only in terms of the broader general environment measure, which includes elements concerning the economic environment, political environment and openness, does Shanghai fall outside the top ten, although it is still ranked 19th of the 45 financial centres covered. It is this 'economic environment' measure that perhaps best accounts for broader competitiveness beyond the financial industry and is therefore more reflective of the WCIR measures. Figure 2 does indicate, however, that in those nations that are either pre-transition or undergoing the transition phase, more competitive regions are the exceptions to the rule. This is confirmed by the positive skewness statistics presented in Table 2, although it does not detract from the fact that there is considerable overlap in the competitiveness of regions within nations at all three stages of development.

These patterns are consistent with studies that find functional networks based around specific technologies to be international in nature (Foray, 2004), and which do not necessarily require innovative firms to be located in regions with strong national economies (Jaffe and Trajtenberg, 2002). Even where production requires greater spatial proximity of specialised labour forces and suppliers, production may not require a significantly high level of national development, given that the geographical proximity required is on a much smaller scale, as identified by the literature on agglomeration economies (van Oort, 2004) and clusters (Porter, 2000). Regions can increasingly attract skilled labour internationally, providing they are open and integrate foreign workers (Florida, 2002; Raunio, 2007).

If regions in less developed nations continue to become more open economies, there is no reason to consider that they cannot continue to improve their competitiveness.

Once a region begins to develop successful innovative firms this process becomes reinforcing, with the prospect of agglomeration economies in the form of knowledge spillovers encouraging other knowledge-based enterprises to locate in the same location, further enhancing the knowledge spillovers present (Koo, 2005). This confirms the suggestion that in the modern globalised world, where global knowledge pipelines are of equal importance as local sources (de Bruijn and van Oort, 2007), the national stage of development may become less relevant in defining the economic trajectory of regions. Instead, what may play a pivotal role is the extent to which international linkages with the world's most competitive regions are formalised (Saxenian, 2002; Huggins and Thompson, 2014).

Figure 2: Distribution of regional competitiveness by national stage of development



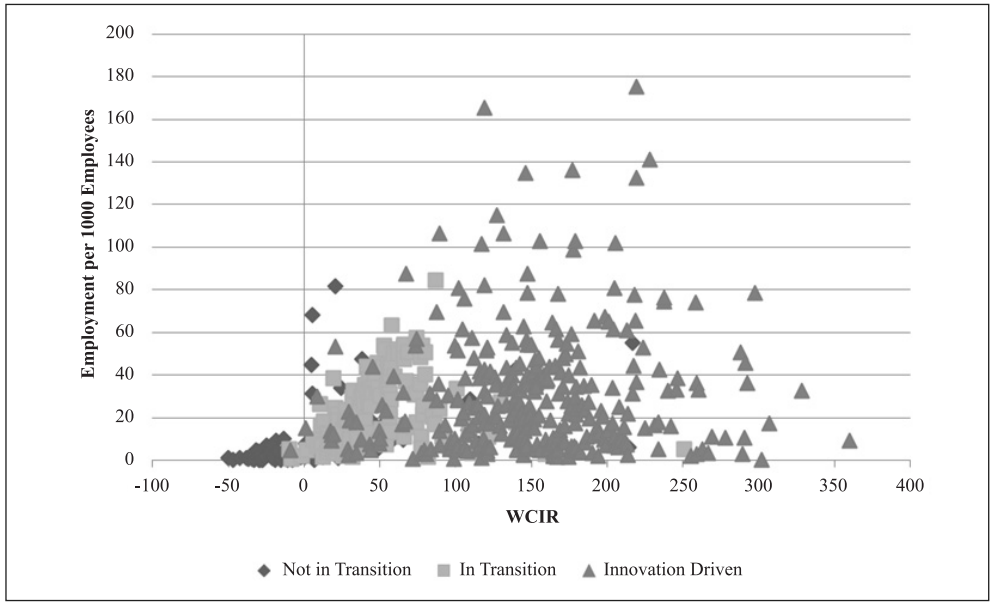
Notes: The bar represents the range of WCIR scores found in each group of nations, the shaded box represents the competitiveness scores contained within 1 standard deviation of the average WCIR score (shaded boxes represent those WCIR scores within 1 standard deviation of the mean).

Source: Authors

Figure 3 shows that for those regions in nations which have started the transition to becoming innovation driven there is a strong link between employment in industries associated with knowledge capital such as mechanical engineering, and the automotive industry and the overall WCIR score. No such pattern is obvious for those regions in innovation driven economies where there is less reliance on this capital for competitiveness. This understandable given that in many emerging

economies these industries have become important for stimulating economic growth, particularly as these activities have migrated away from more advanced economic centres (Huggins and Izushi, 2007).

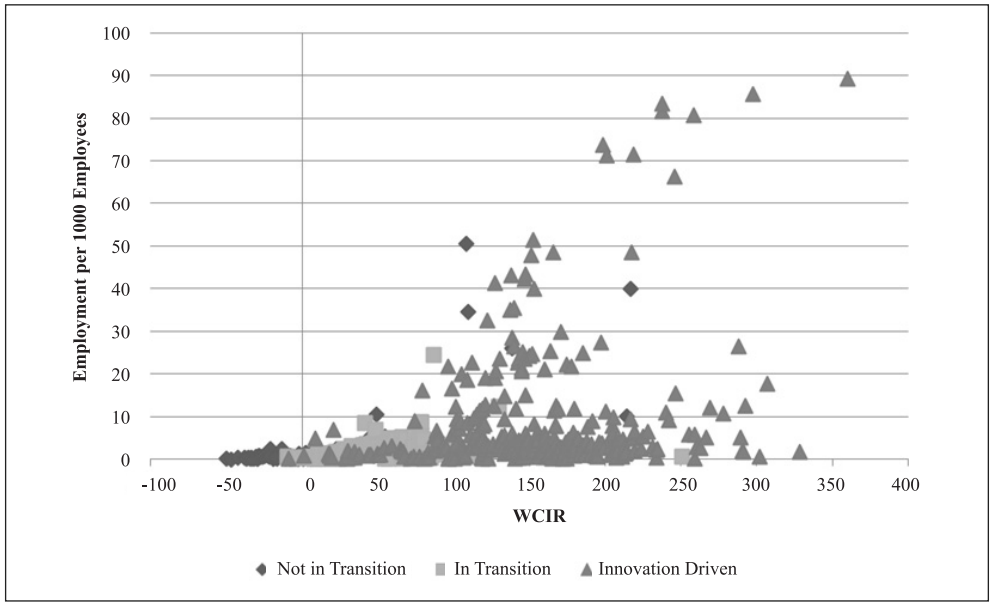
Figure 3: Employment in mechanical engineering and automotive industries per 1000 employees by stage of development and WCIR



Source: Authors

Similarly, when considering industries such as the IT and computer manufacturing sectors, the link between employment in these sectors and overall competitiveness is again present for those regions in transition nations (Figure 4). Accessing knowledge through these sources, especially through the utilisation of mechanisms such as FDI, is likely to allow regions in less developed countries to catch-up considerably (Temple, 1999). However, as scholars such as Cohen and Levinthal (1990) and Lemoine and Ünal-Kesenci (2004) have outlined, this will have limited potential without sufficient absorptive capacity.

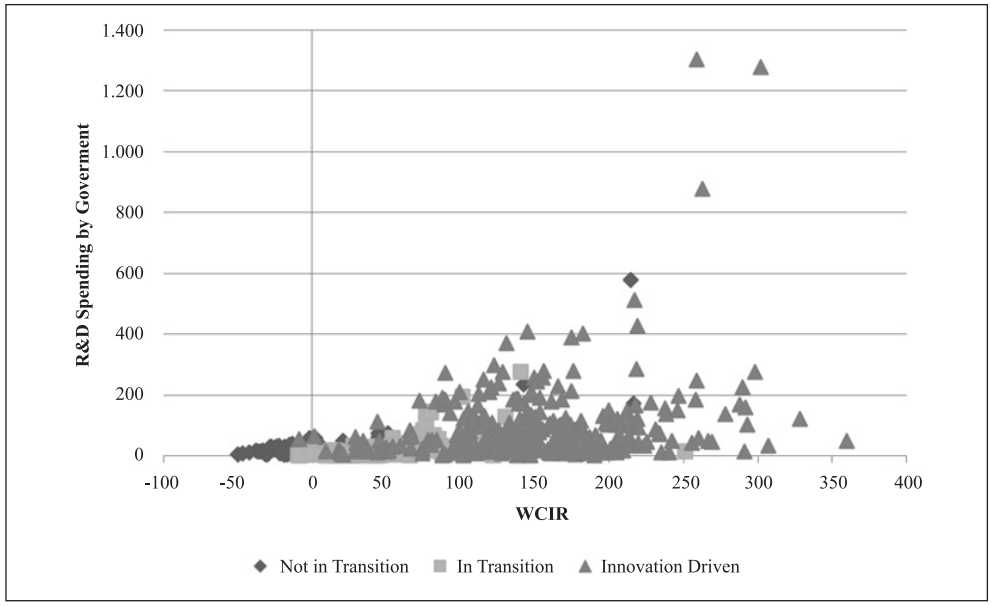
Figure 4: Employment in IT and computer manufacturing per 1000 employees by stage of development and WCIR



Source: Authors

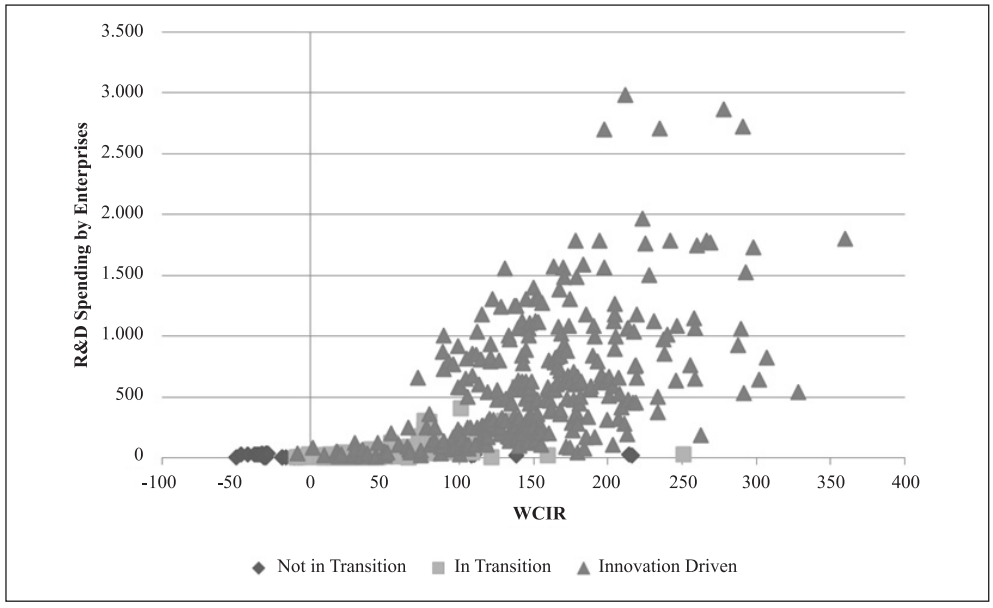
Figure 5 shows that whilst there is some evidence of government spending on R&D rising with the level of national economic development, there are still many regions in innovation driven nations with lower R&D spending per capita than those regions in transition nations. Many regions have either chosen or not been able to increase R&D expenditure to the levels seen in innovation driven economies. One explanation proposed for R&D activity being lower in lagging or less developed economies is the 'regional innovation paradox' (Oughton et al., 2002). This paradox suggests that whilst lagging regions require more spending to promote innovation, such as government R&D spending, firms and other actors in these regions are weaker at absorbing these funds effectively, in part due to other industrial policies that direct funds to more successful regions. This means that regional policymakers in lagging regions may not be able to pursue this pattern of encouraging R&D expenditure to achieve growth (Lewison, 1991). When considering private sector R&D spending (Figure 6) a clear link between such spending and competitiveness is found for regions in innovation driven economies, which is likely to result in higher levels of regional GDP per capita (Howells, 2005).

Figure 5: Government R&D spending per capita by stage of development and WCIR



Source: Authors

Figure 6: Private Sector R&D spending per capita by stage of development and WCIR



Source: Authors

Table 3: Correlation between knowledge capital indicators and WCIR

Regions	Employment in Automotive and Mechanical Engineering per 1,000 employees	Employment in IT and Computer Manufacturing per 1000 employees	Per Capita Expenditures on R&D performed by Government	Per Capita Expenditures on R&D performed by Business
All (N = 546)	0.517	0.789	0.375	0.542
	(0.000)	(0.000)	(0.000)	(0.000)
Not in Transition (N = 89)	0.190	0.554	0.671	0.576
	(0.074)	(0.000)	(0.000)	(0.000)
In Transition (N = 150)	0.564	0.560	0.446	0.530
	(0.000)	(0.000)	(0.000)	(0.000)
Innovation Driven (N = 307)	0.167	0.582	0.121	0.229
	(0.003)	(0.000)	(0.033)	(0.000)

Notes: p-values in parenthesis

Source: Authors

Finally, Table 3 presents the Spearman rank correlation coefficients for the four indicators discussed above with the overall WCIR score for the regions grouped by their nation's level of development. It is clear that with the exception of employment in IT and computer manufacturing, the knowledge capital indicators show a much greater link with competitiveness for those regional groups not belonging to innovation driven economies. It is also noticeable that there is a strong link between competitiveness and R&D expenditure per capita across regions in non-innovation driven nations.

5. Conclusion

This paper has sought to identify regional competitiveness as a dual concept that explains relative differences in rates of economic development across regions, as well as an understanding of the future economic growth trajectories of regions at a similar stage of economic development. As with endogenous growth and development theory, the notion of regional competitiveness presented here has placed knowledge and innovation at the forefront of our understanding of regional economic differentiation. It has further been suggested that such differentiation needs to be increasingly understood from an international perspective, with the WCIR presenting a means for undertaking such an analysis.

In a globalised economic environment, regional competitiveness differences are not always related to national or geospatial characteristics, with regions undertaking economic change and evolution that is more related to their position within a global network of regions. Technological progress has clearly impacted on this network development with improvements in ICT facilitating new modes of knowledge exchange, heightening the propensity to penetrate international markets. Indeed, the apparent limits of globalisation (Storper, 1992) are being stretched by new spaces of knowledge flow and the emergence of new regional centres. These knowledge bases are the primary spatial architecture underlying systems of innovation, and the interesting issue is that this architecture is subject to evolutionary forces, with new key regional knowledge bases emerging around the globe as other more mature bases move into a period of decline.

More generally, locational competition has shifted to the international stage, with regions being key geographical units for understanding changing patterns of global economic development. The notion of regional competitiveness is a means of understanding differences in rates of economic development across regions, as well as their future economic growth prospects. Initiatives such as the World Competitiveness Index of Regions (WCIR) seek to provide a more spatially nuanced understanding of global competitiveness than national measures of international competitiveness, with regional competitiveness focused explicitly on the microeconomic determinants of regional development and growth. Economic development, especially at the regional level, remains a relatively fuzzy concept with no standard or accepted means of conceptualising or measuring it. The concept of regional competitiveness provides a means for both conceptualisation and measurement based on the understood key levers and drivers of growth within a 21st century global economy.

As well as empirically framing the underlying tenets of regional competitiveness, it has been argued that regional competitiveness is both allied to, and an extension of, regional growth theories, with a key factor in achieving such growth likely to be the possession of a critical stock of firms that are able to generate knowledge, entrepreneurs, and innovations in developing sectors and markets, and ultimately new jobs. Regional competitiveness, therefore, is predicated on the presence of conditions that enable firms to compete in their chosen markets, and on the value that these firms generate being captured by the respective region. This view is consistent with endogenous approaches to regional development that are focused on factors such as human capital, education, and innovation systems, with regional competitiveness occurring only when sustainable growth is achieved at labour (wage) rates that enhance overall standards of living. Although some commentators have criticised the regional competitiveness discourse because of the connotations of head-to-head winner-takes-all battles, the concept is far more closely related to a notion of regions comparing and contrasting themselves as a means of improving.

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Regionalna konkurentnost, gospodarski rast i faze razvoja

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Sažetak

U radu se postavlja koncept regionalne konkurentnosti unutar teorija o regionalnom gospodarskom rastu i fazama gospodarskog razvoja. Istražuju se izvori regionalne konkurentnosti obuhvaćajući analizu koja se temelji na određenom stupnju ekonomskog razvoja koji su narodi unutar pojedinih regija postigli. Da bi se to postiglo provodi se empirijska analiza podataka koji proizlaze iz Indeksa svjetske konkurentnosti regija i identificira se regionalna konkurentnost kao dualni koncept koji objašnjava relativne razlike u stopama gospodarskog razvoja diljem regija, kao i razumijevanje budućih putanja ekonomskog rasta regija koje su na sličnom stupnju ekonomskog razvoja. Kao i kod endogenog rasta i teorije razvoja, i u ovom radu prezentirani pojam regionalne konkurentnosti stavlja znanje, inovacije i poduzetništvo na čelo konceptualizacija regionalne ekonomske diferencijacije.

Ključne riječi*: regionalna konkurentnost, gospodarski rast, faze razvoja, inovacija, znanje*

JEL klasifikacija: *O18, O38, P51, R58*

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