VRIJE UNIVERSITEIT

THE NEW URBAN WORLD

ASSESSMENT OF CREATIVITY, DIVERSITY AND ATTRACTIVITY OF CITIES

ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad Doctor aan
de Vrije Universiteit Amsterdam,
op gezag van de rector magnificus prof.dr. F.A. van der Duyn Schouten
in het openbaar te verdedigen
ten overstaan van de promotiecommissie
van de Faculteit der Economische Wetenschappen en Bedrijfskunde
op woensdag 29 mei 2013 om 9.45 uur
in de aula van de universiteit,
De Boelelaan 1105

door

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geboren te Beni Chicar, Marokko

PREFACE

On the road towards the completion of this dissertation I was not travelling alone. I was accompanied by my family, relatives, friends, colleagues and many others. I wish to thank them all – and many others – by positioning them in the urban piazza model which forms the centerpiece of my work. An alphabetical list of people depicted in this piazza puzzle is found overleaf.

Sadly, my father's picture is missing in this piazza model. But I am grateful to him for what he has given to me, and I am proud to be his daughter. I dedicate this work to him.

Amsterdam, May 29, 2013   Karima Kourtit

Hicham	Afanoua-Kourtit	Ahmed	Kourtit
Abdeslam	Argam	Rachid	Kourtit
Thebhred	Argam	Abdelkadir	Kourtit
Daniel	Arribas-Bel	Said	Kourtit
Sabah & Cherihane	Azahaf	Karima	Kourtit-Banani
Bart & Klaar		Jamina	Kourtit-El Bardai
Amit	Batabyal	Fadma	Kourtit-El Filali
Peter	Batey	Hajet	Kourtit-Ibrahimi
Marlon	Boarnet	Paul	Krugman
Elfie	Bonke	Pia	Laurila
Larry	Brown	Ada	Leene
Frank	Bruinsma	Patrizia	Lombardi
Milan	Bucek	Tomaz	Dentinho
Roberto	Camagni	Edward	Malecki
Roberta	Capello	Enno	Masurel
Andrea	Caragliu	Miruna	Mazurencu
Jamila	Cortet	Jan	Möhlmann
Michael	Carroll	Tawfik	Mouline
Caroline	Crevels	Peter	Nijkamp
Maurice	De Kleijn	Mark	Partridge
Andre	De Waal	Giovanni	Peri
Mark	Deakin	Jacques	Poot
Chiara	Del Bo	Neil	Reid
Sasa	Dobricic	Piet	Rietveld
Patricia	Ellman	Andres	Rodriguez-Pose
Najima	El Qoulfat	Joao	Romao
Ewald	Engelen	Adam	Rose
Barbara	Fess	Ingolf	Schädler
Manfred	Fischer	Henk	Scholten
Rachel	Franklin	Bob	Stimson
Luigi	Fusco Girard	Roger	Stough
Arthur	Getis	Soushi	Suzuki
Eduardo	Haddad	Claude	Thill
Wim	Hafkamp	Emmanouil	Tranos
Geoffrey	Hewings	Hadewijch	Van Delft
Yoshiro	Higano	Mariska	Van den Berg
Charlie	Karlsson	Rick	Van der Ploeg
Abdellatif	Khattabi	Renee	Van Kessel
Robert	Kloosterman	Nicoline	Van Os
Janet	Kohlhase	Eveline	Van Leeuwen
Rem	Koolhaas	Eric	Vaz
Radoua	Kourtit	Harmen	Verbruggen
Nouri	Kourtit	Hengwei	Wang
Ayoub	Kourtit	Yuyuan	Wen
Yassine	Kourtit	Hans	Westlund
Amina	Kourtit	Jenny	Wiersema
Mohamed	Kourtit	Ellen	Woudstra
Noua	Kourtit	Shaker	Zahra
Majda	Kourtit	Klaus	Zimmermann
Ilham	Kourtit		

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EXECUTIVE SUMMARY

This study focuses on the 'New Urban World'. The 'New Urban World' refers to the persistent rise in the share of the world population that lives in urban areas, be it in a geographically concentrated form (e.g. cities) or a deconcentrated but functionally connected form (e.g. metropolitan areas, polynuclear spatial patterns). The 'New Urban World' does not display a homogeneous and stable settlement pattern, but rather a spiky landscape. This megatrend offers various great opportunities for urban development, but at the same time puts enormous pressure on our urban areas by also inducing negative externalities, such as pollution, congestion, security issues and social degradation.

The general aim of our study is: *Assessment of the (internal and external) characteristics and drivers of urban actors and/or cities in a competitive spatial-economic environment, with a view to a comparative analysis of their innovative and creative performance.* This formulation means that our research is instrumental in nature. It serves to develop or apply appropriate – novel and existing – quantitative research tools for evaluating the behaviour of urban actors or urban systems in the 'New Urban World', on the basis of well-defined performance criteria. A series of applied modelling studies on the 'New Urban World' is presented in this study, analysed by several quantitative research tools, in order to provide an operational basis for the assessment aim of our study. Different methods are used in different cases. All these tools – and their combinations – are essential in identifying, measuring, explaining and comparing (input and output) performance indicators describing the actors' economic achievement.

The methodological framework of our research on the 'New Urban World' is formed by the 'urban piazza' architecture (see Figure 1). The 'urban piazza' architecture acts as the main navigation tool for assessing urban performance criteria under varying conditions, ranging from the micro-level (firms or cities) to the macro-level (global cities). The piazza is decomposed into four segments and two layers, which form the four major foci of our research. This leads essentially to a complex multilevel conceptual model for action (see Figure 1), starting from **A** and then moving through **B** and **C** to **D**. The findings in each part of our study offer the ingredients for answering the question of whether our research aim has been achieved.

Part A offers new conceptual and empirical insights into the relationships between the actors' location behaviour and performance and the drivers of urban development in Dutch urban areas. The performance of the business actors appears to depend, *inter alia*, on the economic context in which these firms operate. In combination with the use of advanced management techniques (viz. strategic performance management technique (SPM)), the type and quality of capital resources included in the firms' production function crucially affect the firms' competitiveness in both local and international markets. For the analytical part, the SPM concept is used (extended with detailed spatial meso-attributes regarding the location characteristics of these firms) as the main methodology to evaluate their performance and complemented with other analytical approaches, such as geoscience-based tools, SOM, (super-)DEA, PCA, SEM and spatial data analysis.
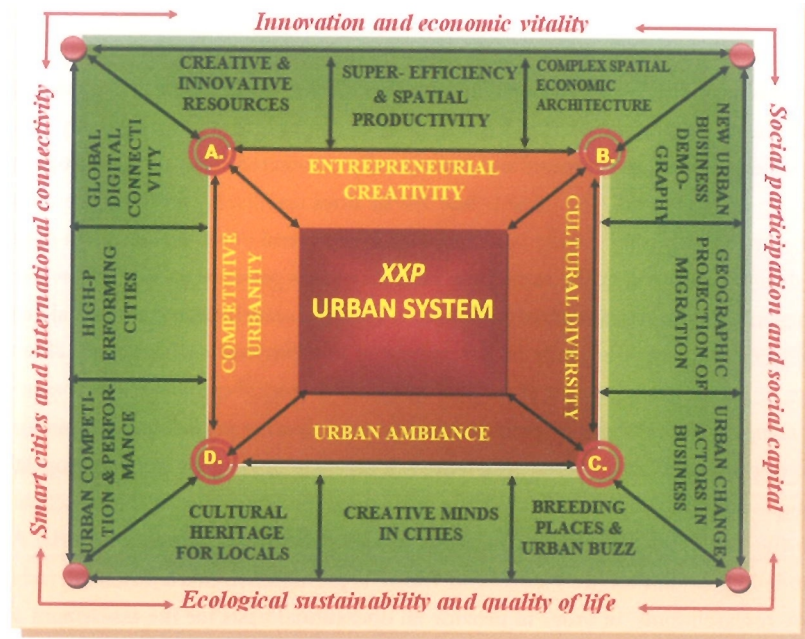
Figure 1. Knowledge arena of the '*urban piazza*' in the '*New Urban World*'

The empirical findings show significant differences in the spatial and functional profiles of firms with different size categories that have adopted advanced management techniques (with a focus on strategic approach, customer approach, leadership approach, business process approach, etc.), while their geographical position, across distinct geographical areas in the country, also plays a significant role. The various contextual factors (input) appear to influence business performance (output) linked to specific geographical or urbanized areas. It is plausible that low-performance firms profit from localization economies and urbanization economies in the Dutch areas. For these business actors, a broadly composed capital base (including human and social capital and local or urban resources) turns out to contribute to their business operations and performance in a dynamic and challenging business environment.

The general *message* in **Part A** can be summarized in the following way. In assessing the characteristics and drivers of urban actors and/or cities, 'location matters' (for example in relation to geographical and location-specific facilities, innovative and creative resources, accessibility), but more so for some businesses than for others. Space is an essential component of everyday business life, in which distance matters more for some businesses than for others at different stages and levels of the business actors' growth approach in relation to benchmarking. Thus, it turns out that there are significant differences in the spatial and functional profiles of firms across distinct geographical areas in the country. An integrated mix of management technique measures at both the micro firm level and the level of supporting regional moderator variables appears to be critical

for firms' performance. In conclusion, one may argue that a closer connection between industrial organization research and locational behaviour research may be fruitful for gaining advanced insights into regional dynamics and creativeness.

Part B provides new insights from an impact assessment of the 'urban diaspora', seen from an international perspective. Much attention is given, at the micro-level, to the business achievements and growth and risk strategies of migrant entrepreneurs by assessing the measurable impact of personal and contextual factors on the business performance of migrant firms in large cities, with a particular focus on the Netherlands. The influx of various migrant groups, such as highly skilled and talented workers and entrepreneurs, is likely to have a considerable welfare-enhancing impact on a city, in particular by contributing to innovation and local growth, creating new jobs for less favoured population groups, advancing the benefits from cultural diversity and reinforcing the economic opportunities related to international connectivity. In the analytical part, we used a combination of techniques from our toolbox, such as SCM, (super-)DEA, SOM and regression analysis. Our analytical findings bring to light that in our modern and globalizing urban world, migration flows tend to lead to the emergence of new 'diasporas'. Such concentrations of migrant groups in distinct urban districts prompt the rise of various seedbed conditions for self-employment and entrepreneurship. The empirical findings show that migrant entrepreneurs – especially second-generation migrants – make up a significant share of the urban business economy and contribute considerably to urban vitality. They are a solid and, in the meantime, established part of the normal urban economic business sector, and as such are indispensable. They offer many job opportunities in a modern city, and often 'jump' towards higher market segmentation. This holds for both first- and second-generation entrepreneurs, although the second generation clearly demonstrates a more knowledge-oriented business attitude. There is rising business performance of second-generation migrant entrepreneurs in mainstream segments of modern urban economies.

In Part B, the general *message* from the assessment exercise in our study is that the variety of migrants and their different motives, attitudes and achievements (e.g. regarding migrant entrepreneurship) lead to great cultural diversity, mainly in urban agglomerations, and high performance. It is plausible that the variety – more than the sheer absolute numbers – generates many benefits. In particular, self-employment opportunities, SMEs and the globalization of the city may play a central role in creating new (urban) economic vitality.

Part C presents an analytical framework that links the opportunities provided by the urban ambiance in the Dutch urban system to the level of attractiveness of these areas, i.e. a favourable and inspiring concentration in geographical space (clusters) for various (potential) stakeholders (e.g. residents, businesses and visitors). We find that multiple components and drivers, effective support and the use of ICT tools nurture the cultural heritage attractivity and richness of cultural diversity in many urban systems for various users. In the empirical part, different analytical approaches were adopted (e.g. SOM, MSM, the econometric (ordered logit) modelling approach, etc.), because of the different levels of stakeholder involvement and the multiplicity of issues related to urban ambiance. Our empirical findings show that modern cities with a relative abundance of cultural heritage and urban ambiance tend to enhance the quality or attractiveness of a place to various stakeholders (e.g. visitors, residents, professions, migrants, firms). In particular, actors who

are part of the creative core appear to be attracted to – and hence over-represented in – urbanized areas, with their relatively high presence of culture, nature, ethnic diversity and short distances to markets with job opportunities.

This brings us to the general *message* from **Part C**: urban buzz offers wealth-creating potential for cities, as a result of density, connectivity and proximity advantages among the creative minds – including distinct migrant groups – that reside in modern cities. Creativity and diversity appear to be key factors in the dynamic performance conditions of such areas.

Finally, **part D** focuses in particular on assessing the comparative performance and success factors of these cities. It is certainly recognized that urban performance does not only depend on the city's endowment with hard infrastructure (such as transport facilities, ICT infrastructure, public amenities), but also on the availability and quality of knowledge and creativity infrastructure. We observe that modern cities tend to become engines (or even power plants) of knowledge, innovation and technology in a global context. We employ various assessment tools from our toolbox (e.g. super-DEA, MCA/MAMCA, multiple regressions, CAN) to arrive at a relative performance ranking of these cities. In the empirical part, the various case studies identify important and smart key performance indicators that are instrumental in maximizing the cities' competitive advantages and connectivity. We find that urbanity becomes the dominant model of conducting business, living and working in our society. At the same time, we live in the age of connectivity, in which networks of all kinds and all scale levels become the dominant organizational focus of the socio-economic activities on our planet. Our empirical findings show that compared with standard ranking and benchmarking procedures, significant performance differences may emerge. In particular, the new methods to achieve unambiguous DEA ranking results provide interesting findings on the relative position of cities, if we standardize the population size. Our results allow us to explore the perception and experiences of various stakeholders and actors and to clarify the dependencies between the different assessment criteria and the criteria that really make the difference to the socio-economic performance of global cities. This will allow cities to identify the criteria to work on and, by doing so, to find out how to increase their attractiveness.

The general *message* of **Part D** is that modern cities in an open and globalizing economy are becoming powerhouses of creative ideas, innovative technologies, sustainable development and socio-economic wealth. This is due to a strong worldwide urbanization trend that emphasizes the need for a repositioning of cities, a process in which they are increasingly involved due to competition on their integral performance. In addition to persistent urbanization trends, the urbanized world will also be a virtually connected world, in which next to the physical infrastructure the digital infrastructure (in particular, the Internet) will also play a central role.

The wealth of research findings brings to light that the urban space economy is a multidimensional dynamic phenomenon with many characteristics of a complex economic, social and cultural nature. Cities are evolving systems driven by a multiplicity of actors and stakeholders. It goes without saying that cities have many 'faces'; they are not uniform or identical. Hence, there is no one single unambiguous assessment tool. Our study focuses on assessment methods for urban systems, against the background of the Dutch reality. Although the Netherlands obviously has its

own peculiarities, it seems plausible that the urban dynamics in the Netherlands does not follow a unique pathway, but shows many similarities to the development of urban systems elsewhere, certainly in OECD countries. It is, therefore, not too daring to say that many findings and conclusions also have validity for other countries. The aim of our study is achieved by introducing on a fit-for-purpose basis various advanced assessment tools and combinations thereof. Assessment is apparently not a single instrumental approach, but needs tools that are tailor-made for specific cases.

From the variety of studies, it is evident that the current urbanization is an irreversible megatrend, with unprecedented research and policy challenges. Issues of place and space will become increasingly interwoven, not only in the developed world, but also – and even more so – in developing and emerging economies. Our viewpoints and findings on the assessment aim of our study can be summarized in five general observations:

- Cities are *powerful economic vehicles* to ensure continued economic growth, especially in a period of economic recession;
- *Population dynamics and migration* do not necessarily affect the economic growth potential of cities, but offer a great opportunity for the future;
- *Creative classes* in cities may be an important condition for innovative development, but there are more important elements (such as the educational suprastructure, connectivity infrastructure, cultural heritage);
- The *monitoring* of urban development – through systematically collected databases and benchmarking systems – is a critical vehicle for strategic urban policy in a competitive global urban environment;
- *Flexible governance and focused amenity and land use policy* are necessary to keep cities – or more generally, metropolitan areas – alive as engines of economic growth.

Our research on the '*New Urban World*' has clearly demonstrated that agglomeration benefits are partly economic in nature, but also partly social, cultural or technological. To exploit such benefits, innovative urban strategies are necessary to lay the future foundations for modern cities that are sustainable, inclusive and competitive. This new perspective on the future of our planet clearly originates from the cornerstones of the '*New Urban World*'. The policy and research challenges for modern cities are vast, but proactive policy may find support in the following quotation: '*The city is not only the place where growth occurs, but also the engine of growth itself*' (Duranton 2000, p.291-292). With more people on our planet living in cities, there is a need to look at the economic geography of our world from a broad urban systems angle. The '*New Urban World*' needs to develop a world perspective and to transcend a local basis.

Reference

Duranton, G. (2000). Urbanization, Urban Structure and Growth. In: J.M. Huriot, and J.F. Thisse (eds.) (2000), *Economics of cities: theoretical perspectives*, Cambridge: University Press, pp.290-317.

1 THE 'NEW URBAN WORLD' – OPPORTUNITY MEETS CHALLENGE*

1.1 A 'New Urban World' Scene

> "The 19th century was a century of empires, the 20th century was a century of nation states, and the 21st century will be a century of cities".
>
> (Wellington Webb, Mayor (1991–2003), City of Denver, Colorado, USA
> *Urban Times*, 1 November 2011)

In the '*century of cities*', our planet is moving towards a '*New Urban World*', as more people move from rural areas towards an 'urban way of life' characterized by a specific and local identity, to seek promising socio-economic opportunities (United Nations 2007; OECD 2009; Birch and Wachter 2011; World Urbanization Prospects 2011). The level of urbanization is expected to increase in all the major regions of our world, with Africa and Asia urbanizing more rapidly than the rest of the world (World Urbanization Prospects 2011). Currently, over 50 per cent of the world's population lives in cities, and an increase to over 80 per cent is predicted by 2050 (see Figure 1; for details, see e.g. World Urbanization Prospects 2011). This will make our earth an increasingly urbanized planet. In various policy-making bodies nowadays (for instance, the United Nations), the twenty-first century is even called 'the urban century' (see Nijkamp and Kourtit 2012).
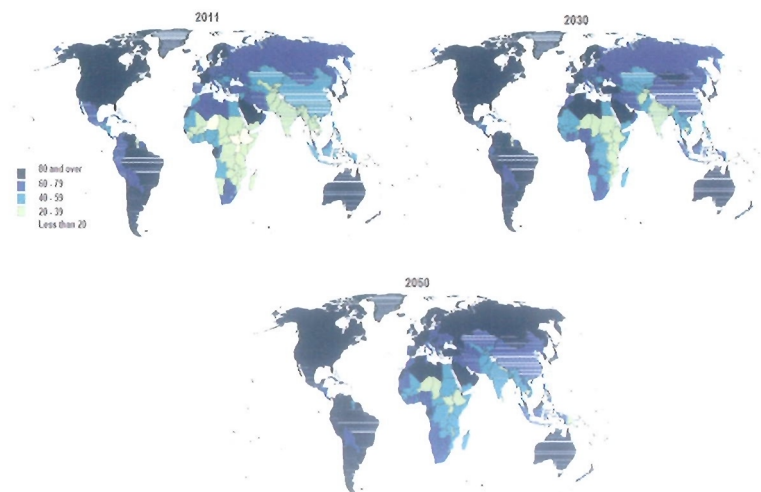
Figure 1. Percentage of the population in urban areas, 2011, 2030 and 2050
Source: United Nations, Department of Economic and Social Affairs, Population Division: World Population Prospects DEMOBASE extract, 2012

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* This chapter was inspired by several studies that have been produced in the context of the Joint Programming Initiative 'Urban Europe'.

The current urbanization rates in both OECD and NON-OECD countries – despite ageing and demographic decline – show a gradual structural rise, and there is no reason to assume a general standstill or decline in the decades to come. In the context of our study, the term 'city' will often be used with the more general meaning of 'urban area' or 'urban agglomeration', so as to capture functional labour and housing markets as well, whenever appropriate[1].

The long-term megatrend in population movement towards the city is leading to large-scale urbanization and mirrors both the natural population increase and the large migration movements in various parts of the world. Consequently, urban challenges may become the most complex and critical factors for sustainable development in the future (see Beall and Fox 2009; Lombardi et al. 2012). This megatrend offers various great opportunities for urban development, but at the same time puts enormous pressure on our urban areas (giving way to negative externalities such as pollution, congestion, security issues and social degradation). The structural urbanization trend is not always greeted with enormous enthusiasm, as evidenced by a quotation of Steve McQueen:

> *"Cities have always been the fireplace of civilisation, where light and heat radiated out into the dark".*
>
> (O'Sullivan 2000)

However, such negative perceptions of urban life are contradicted by alternative views, for instance by Theodore Parker (2000), who claims:

> *"I'd rather wake up in the middle of nowhere than in any city on earth".*
>
> (O'Sullivan 2000)

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[1] In a standard textbook on urban economics by Mills and Hamilton (1984), the authors raise the question: 'What are urban areas?'. They argue that there are many urban concepts: town, city, urban area, metropolitan area, and the like. Some of these concepts are based on legal definitions, and hence these definitions vary across nations. Others are based on population figures and reflect the fact that in urban areas the average population density is higher than elsewhere. The authors provide the following basic description: 'Thus the fundamental and generic definition of an *urban area*, or *metropolitan area*, is a place with a much higher population density than elsewhere' (p. 3). It is thus clear that the concept 'urban' is not a clearly operational term. In our study, we use this term as a general description of a place or area with a relatively high concentration of people in a demarcated built environment. To be slightly more precise, in the present study, we adopt the following nomenclature (see the *Dictionary of Human Geography*, edited by Gregory et al. 2009):

- *urbanization*: has often been understood as a process of human distancing from first nature. In cities, nature became a residual or artificial category limited to parks, zoos and urban – mostly ornamental – gardens.
- *city*: today, a more generic usage of this term refers to an urban demographic, economic and above all political and jurisdictional unit, usually bigger than a town.
- *agglomeration*: the association of productive activities in close proximity to one another. It typically gives rise to external economies associated with the collective use of the infrastructure of transportation, communication facilities and other services. Agglomeration also facilitates the rapid circulation of capital, commodities and labour.
- *urban areas*: may be cities or towns and are characterized by a higher population density in comparison with the areas surrounding them.

The question of whether positive or negative externalities will take the lead depends on a mix of many forces, the joint outcome of which is determined by the so-called XXQ principle. This is the overarching objective of an urban system to optimize all the forces in a balanced way, leading to maximum urban attractivity, i.e. the highest possible quality of welfare, living and working in urban areas (see Nijkamp 2008). In vinological terms, the XXQ principle stipulates that the city should strive to become a '*premier grand cru classé*'. Is our urban world able to meet such ambitions faced with the wide variety of issues and challenges of the twenty-first century, e.g. in terms of ageing, (international) migration, sustainability, economic vitality, international competition, poverty gaps, climate change or modern technology (see Marcotullio and McGranahan 2007)? The above-mentioned structural urbanization, with more spatially concentrated settlement patterns, will no doubt create great, but also unforeseen challenges, not only for individuals and organizations, but also for governments.

The economies of spatial proximity (or agglomeration) appear to outweigh the negative aspects of large-scale urban agglomerations (see Glaeser 1998). They are, in general, able to offer and generate a variety in working and living conditions (economy, ecology, energy provision, collective transport, facilities supply, etc.) in a much more efficient way than any other settlement pattern. Clearly, at various stages of urban evolution, other or complementary spatial complex configurations have emerged, such as the suburbanization and urban sprawl phenomena (see Tellier 2009). While Alonso (1964) raised the intricate questions of 'How big is big enough?' and 'How big is too big?' almost half a century ago, the general development towards further urbanization worldwide has continued.

Andersson et al. (2001) show that each new urban epoch finds its roots in many logistical revolutions in our world, with drastic implications for the transport systems, accessibility and connectivity of city systems. The latter tendency is empirically confirmed in more recent work by Bettencourt et al. (2007) and in a later interview by West in the *New York Times* (2010), which demonstrates the validity of the urban scaling hypothesis: he is able to show – on the basis of a very large database containing all kinds of relevant urban variables for many cities in the world – that urban efficiency and performance (both economic and ecological) rise with city size. He finds that, on average, cities benefit from a 15 per cent rise in productivity for each doubling of city size. Especially in the current globalization age, cities act as international power stations, with a rich pluriformity of – both centripetal and centrifugal – economic, political and technological forces. Such cities have a strong global control and command impact, not only because of their sheer size, but more so because of their innovative and creative potential (Sassen 1991; Shefer and Frenkel 1998; Glaeser and Kerr 2009). In this context, the local R&D, knowledge and learning base also plays an important role (Acs et al. 2002; Kourtit et al. 2011; van Geenhuizen and Nijkamp 2011).

The above-mentioned persistent trend towards an urban world is called by Kourtit and Nijkamp (2013a,b,c) the '*New Urban World*'. This concept refers to the persistent rise in the share of the world population that lives in urban areas, be it in a geographically concentrated form (e.g. cities) or in a deconcentrated but functionally connected form (e.g. metropolitan areas, polynuclear

spatial patterns). Clearly, the increasing urbanization is not a uniform rectilinear trend. The current megatrend also shows much variation in time and space. We even observe shrinking cities, like Leipzig or Detroit. However, even in countries with shrinking cities, the overall urbanization rate at the national level is still increasing. It is thus likely that the global *New Urban World*'s development path will be uneven, with tremendous heterogeneity across the world.

Even cyclical movements may occur, as demonstrated in the earlier urban life cycle model developed by van den Berg et al. (1987). This once more confirms that the '*New Urban World*' does not display a homogeneous and stable settlement pattern, but rather a spiky landscape (Rodriguez-Pose and Crescenzi 2008). It is characterized by great diversity in living and working patterns, in urban land use and architecture, in urban management and governing institutions and in sustainable competitiveness on both local and international markets, in a dynamic urban century. There is an abundance of literature that traces the roots of rising urbanization. These are mainly found in the presence of spatial externalities (often in the form of so-called MAR – Marshall–Arrow–Romer – externalities dealing with various economies of scale in urban areas) and social capital benefits (often referred to as 'melting pot' advantages in the spirit of Jane Jacobs (1961), the 'creative class' concept of Florida (2002) and Landry (2000) or the 'islands of innovation' concept of Cooke (1998) and Kourtit et al. (2011). Complementary treatments of these issues can also be found in Nijkamp (2008) and van der Ploeg and Poelhekke (2008). Clearly, cities are faced with both negative and positive developmental attributes; the net balance of these forces determines the final attractivity profile of a city.

> *"Cities are the abyss of the human species".*
>
> (Jean Jacques Rousseau, Emile, Book 1, 1762, p. 59)

Despite (sometimes) negative perceptions of cities, it should be noted that in general cities are meant to be the 'home of man' (Ward 1976). Nevertheless, they will have to meet strict sustainability conditions in a dynamic environment. It is widely accepted that cities are able to create many positive external benefits, so that from an economic perspective there will be a structural tendency for an increasing influx of people into urban areas (see also Owen 2009; Glaeser 2011). Socio-demographic changes (e.g. ageing), migration and mobility, entrepreneurial dynamics, sustainability and efficiency of transport and energy systems, ICT (and other advanced technologies) and increasing returns to scale in urban agglomerations are the driving forces behind new settlement patterns in our modern society.

Many cities have turned into powerful forcefields with a rich pluriformity of centripetal and centrifugal movements in an open world, an observation already made a few decades ago by Dematteis (1988). This is in agreement with the so-called '*urban piazza* model', which will be presented in Chapter 2. Clearly, there is a rising wave of literature that argues that in the future cities will become arenas for social action, knowledge sharing, economic vitality and ecological

sustainability (Sassen 1991; Shefer and Frenkel 1998; Acs et al. 2002; Glaeser and Kerr 2009; Kourtit et al. 2011; van Geenhuizen and Nijkamp 2011). Despite the plausibility of these arguments, these propositions have to be supported by empirical facts. Consequently, our study will offer a range of applied studies on the performance of cities and their actors.

In the 'New Urban World', increasing urbanization is likely to continue as a robust trend, to the extent that many modern cities and urban agglomerations will become nodes of a global network (Taylor 2001, 2004, Taylor et al. 2002; Burger et al. 2009) in which regional and national borders will play a less important role (see also Vaz et al. 2006). Cities will certainly play a pivotal role in the future of our space economy, but they are also confronted with grand challenges. They are subject to a very complex and diverse set of socio-economic forces that are closely interwoven with far-reaching demographic transformations, sociocultural, political, economic and technological drivers and challenges at all geographic scales (from local to global) that may influence the vitality and attractiveness of urban areas. Clearly, such areas do not only show a quantitative size increase, but also a qualitative composition change. These large-scale concentrations of people tend to become more 'colourful' as a result of international migration, with the consequence that most cities in the developed world are becoming melting pots of ethnic diversity, language differences, religious denominations, cultural expressions and socio-economic disparities. Large cities tend to be 'homes of migrants' and therefore exhibit a wealth of cultural heterogeneity (see Nijkamp et al. 2012). Clearly, with the rise of second- and third-generation migrants, the share of sociocultural differences tends to decline; nevertheless, a qualitative shift in the cultural face of cities is manifest (see also Crul and Mollenkopf 2012).

The above-mentioned challenges for urban environments may be turned into new opportunities, particularly in such domains as advanced environmental and business facilities, advanced infrastructures and logistic systems, environmental and climate-neutral urban facilities or creative and knowledge-intensive strategies for socio-economic prosperity and well-being in a dynamic and sometimes irreversible way (see e.g. Pumain and Moriconi-Ebrard 1997; Black and Henderson 2003; Duranton 2007). In particular, the transition towards knowledge cities – sometimes also called e-cities, innovative cities, creative cities, smart cities and the like – may create many new possibilities for efficient and well-functioning urban areas in the future (see also Kourtit et al. 2011). Modern cities – and in particular metropolitan areas – may thus act as spearheads of sustainable economic growth. However, is this 'New Urban World' a true golden age of urban vitality and attractiveness (such as socio-economic opportunities), or are there trade-offs, whereby the urbanization will be accompanied by negative attributes (such as pollution, criminality, low security)? Such questions are equally relevant in the context of our study.

1.2 A New Generation of Cities: High-Performance Cities

In the 'New Urban World', modern cities are increasingly functioning as seedbeds for creativeness, innovation, entrepreneurship and spatial competitiveness. Such cities are becoming functional areas in which a balance between agglomeration forces and urban quality of life is sought.

They compete in terms of quality and attractiveness, are characterized by product heterogeneity and behave according to the laws of monopolistic competition in economics (see Frenken et al. 2007). Cities – often in the form of metropolitan areas – have increasingly entered a global race, in which monopolistic competition and product variety play a central role (see e.g. Abdel-Rahman and Fujita 1990; Glaeser et al. 1992; Quigley 1998; Becker and Henderson 2000; Duranton and Puga 2000). These agglomerations often act as economic growth engines and reflect the fact that, in an open global space economy, scale advantages are essential, an observation also made by the new economic geography movement (Krugman 1990).

The question is now: which agglomeration has the highest socio-economic performance, and why? The 'performance' concept already has a long history in industrial management and business economics. In general terms, this concept can be defined as: 'a person's achievement under test conditions' (*Oxford Encyclopaedic English Dictionary*). However, in productivity and efficiency studies, this concept is defined much more broadly and refers to a systematic operational measurement – often in comparison with relevant actors – of the economic achievement position of an actor or corporate organization. The latter meaning will also be adopted in our study on urban actors and/or cities.

There are nowadays numerous attempts to rank the relative performance of cities in our world. This leads to a new 'urban imperative': urban areas must attract, retain and even nurture highly mobile and creative and innovative firms and talent (the 'pluriformity' approach), as their aggregate efforts will become the primary drivers that deeply affect the foundations for securing the socio-economic development and competitive advantage of modern cities and urban areas. Cities are subject to a 'rat race' (see Kourtit et al. 2012).

> "*Every morning in Africa, a gazelle wakes up.*
> *It knows it must run faster than the fastest lion or it will be killed.*
> *Every morning a lion wakes up.*
> *It knows it must outrun the slowest gazelle or it will starve to death.*
> *It doesn't matter whether you are a lion or a gazelle.*
> *When the sun comes up, you better start running*".
>
> (Th. L. Friedman, 2007, p. 137)

This means that the traditional roles of cities are constantly being redefined in a global competitive system, as demands for high-quality amenities and public services are subject to permanent change. The challenges are: to improve the competitive high performance of cities; to strengthen and establish their regional and local base; to turn urban areas into attractive and sustainable high-quality places to live and work; and to incorporate innovation and technology into the overall developmental strategies. All these are critical conditions for a promising living, working and business environment.

Modern cities form the heart of a dynamic society (viz. a new cultural civilization of a complex society) and a breeding place for creativeness, innovativeness, entrepreneurial spirit, socio-economic progress and ecologically sustainable transformation (see e.g. Glaeser 2011; van Geenhuizen and Nijkamp 2012; Kourtit and Nijkamp 2013a,b,c). In this way, these powerhouses can act as the engines of the world's economic growth and vitality, for instance in the form of the 'urban buzz piazzas' (see Arribas-Del et al. 2013). In other words, cities seek to provide the highest possible quality in order to attract and retain creative and talented actors (employees, self-employed people or entrepreneurs, but also residents and visitors) in order to generate positive externalities. It is noteworthy that the presence and experience (individual visions, preferences and values) of creative minds can create critical conditions for enhancing the level of attractiveness of cities, leading to a concentration of innovative potential in geographical space.

The value, for instance, that firms attach to the geographic space regarding location decisions based on their preference intensities and criteria for visual assets may positively influence these firms' (business) performance and strategic choices. This, in turn, may bring about positive socio-economic achievements that may enhance the attractiveness of modern cities and urban agglomerations and ultimately achieve a high degree of sustainability and competitive advantage (Martin et al. 2008). In this context, regions and cities have to respect the wishes of various stakeholders and offer unique geographical and location conditions and facilities – beyond other competitive assets – in order to attract talent and firms to generate positive externalities to improve their economic performance. Therefore, a prominent focus on urban areas' performance from a global perspective is needed to stay competitive and profitable when facing long-run 'grand challenges', taking into account a wide range of strategic priorities and creative and innovative response strategies regarding important issues at the local and national levels (Zeng and Zhao 2005).

Furthermore, the growing importance of external and environmental changes has further intensified and supported the need for a proactive and open-minded urban governance system, paying due attention to the important and talented actors (e.g. creative and innovative people and firms, governments, cities, tourists, residents, etc.) involved (comparable to the wealth of new civilization à la Toynbee 1947). Such a governance system may be instrumental in maximizing the socio-economic and ecological performance of cities and in coping with negative externalities and historically grown path dependencies, so the (international) competitive position of cities in terms of their attractiveness is strengthened. To assess the 'competitive advantage' of new urban governance systems (see Porter 1990), it is necessary to design and map out, in a quantitative sense, the relevant indicators that shape the multilevel creative resources of cities and urban agglomerations. This is a necessary step for any benchmark study or strategic performance analysis of the success conditions and failures of urban governance systems. Such cultural, creative and innovative resource indicators should be transparent, manageable, testable, comparable, representative and policy-relevant, while remaining manageable in size and scope.

A well-informed urban policy system creates unforeseen possibilities and new opportunities for the entrance of new cultural and innovative urban perspectives, such as the aforementioned 'urban buzz piazzas', vibrant places with a sense of innovative freedom from the perspective of new paradigms, based, for example, on 'creative minds' principles (see Kourtit et al. 2013). All this requires novel scientific insights and policy strategies in order to make the urban future 'a place 4 all'. Such policy initiatives would need to be supported by solid, multi-disciplinary and evidence-based research on the challenges and opportunities of urban systems worldwide. This policy challenge forms the background of the present study.

1.3 Research Aims and Scope

The '*New Urban World*' will be a complex constellation seen through the lens of modern civilization. Particularly in Europe, cities are diverse and distinctive in their history and cultural heritage, as well as in their ways of dealing with economic, social and environmental challenges. For example, a focus on social participation is key when facing urban challenges. It is, therefore, crucial not only to understand the challenges and responses of urban systems, but also to help shape them on the basis of evidence-based research on the important drivers that have an impact on the performance of urban governance systems.

The multifaceted diversity of urban challenges and the innovative responses of urban governance systems also call for a coherent approach by means of which anchor points for effective actions and resources can be identified and used in a benchmark analysis. Furthermore, to offer a systematic comparative overview of the performance of actors in an urban system, it is important to seek a balance between: (i) growth-inducing and growth-hampering factors; (ii) multiple (from micro- to macro-) layers of actors and structures in a city; and (iii) intra-urban and extra-urban forcefields and networks. After a careful screening and filtering of various megatrends and challenges (for details, see Nijkamp and Kourtit 2011, 2012; Nijkamp and Kourtit 2012), four important dominant classes of challenges and critical conditions in the '*New Urban World*' have been identified. They have been organized around four interconnected pillars that form the anchor points for multilevel spatial capital resources and policy measures relating to the performance of urban systems, viz.:

- *Economy and innovation*: creative economic and entrepreneurial capital;
- *Mobility*: infrastructural, logistic, connectivity and communication capital;
- *Society*: social and cultural capital;
- *Ecology*: environmental and ambiance capital.

This multidimensional set of strategic performance measures, resources and perspectives, which are interconnected with and balanced against each other, will provide an integrative view of the health of urban systems' performance in the '*New Urban World*'. This is essentially a combination of traditional and innovative performance measures organized according to a systematic and

balanced four-pillar strategic framework. These four pillars are each of critical importance for the new urban governance system of a spatially interconnected and networked world. A focus on the interfaces of these four distinct cornerstones is a *conditio sine qua non*. These pillars may be used as overarching research vehicles in our study, in particular for identifying a set of internal characteristics along with contextual conditions, at both the sectoral and the spatial level.

It is apparently a great challenge to monitor an urban governance system and to trace whether the actors involved are still on course. In general, two elements are clearly missing in this context: (i) a rational and transparent evaluation system for judging the broad economic, social, cultural, technological and ecological performance of a city; and (ii) an advanced strategic performance management system in order to provide operational guidelines for managerial or strategic improvements for the actors in the urban system. In our study, the focus will be especially on the design of appropriate evaluation systems as an analytical tool for judging the (past or anticipated) achievements of the urban (governance) system, from a district level to a supra-urban level. Our study has a general scope, but addresses in particular urban actors and systems in the Netherlands. This densely populated country has a rich variety of urban appearances, ranging from concentrated cities to polynuclear forms. Other countries may display a different spatial organization, but in all cases the question of the relative efficiency – or, more generally, the highest performance – of cities is pertinent.

From the perspective of comparing the competitiveness and attractiveness of urban systems, various empirical and comparative studies have in the past mapped out the relative performance profile of global cities (see Friedman 1986; Sassen 1991; Grosveld 2002; Taylor 2004; GaWC 2008; Institute for Urban Strategies 2010; Caragliu et al. 2011; McKinsey Global Institute 2011; Taylor et al. 2011; Kourtit et al. 2013). These studies do not only address the internal and external context, the strategies, the priorities and the economic performance of particular actors in the urban system over time; they also attempt to design a ranking system that gives a broader comparative insight into the economic performance of these cities in order to provide a systematic performance assessment basis – or benchmark basis – for cities. These systems contain 'focused handles' (evidence-based information) on how to improve their relative position on the basis of their contribution to economic progress or better performance (see also Cerreta et al. 2010). This approach is normally an exploratory comparative benchmarking analysis of the differences in performance in the course of a search for high-performing actors, i.e. cities or firms, from among functionally specialized and heterogeneous cities or firms in different parts of the world. Thus, there is a need for a systematic analysis and monitoring of the drivers and impacts of both micro- and macro-structural trends regarding urban dynamics in a globalized competitive world.

The presence of and access to solid applied research findings are pertinent to continuously anticipating changing circumstances. This will encourage the actors and institutions in the urban system to improve the performance of the urban system in order to keep pace with rapidly changing urban dynamics elsewhere. All this is needed in order to realize the concept of a sustainable city in

a globalized world. Against the background of the above-mentioned observations, the general aim of our study is:

An assessment of the (internal and external) characteristics and drivers of urban actors and/or cities in a competitive spatial-economic environment, with a view to a comparative analysis of their innovative and creative performance.

This aim will be achieved by presenting and analysing a series of urban studies, each employing a set of appropriate assessment tools that are fit for purpose in a given urban case study context. The final result will be presented in a systematic survey table at the end of our study. Given the variety of urban actors and/or cities in a multilayered spatial system, our case studies will have different foci on the performance of these actors/cities. Our findings will be provided in a systematic, quantitative form. The research challenge in designing and applying a set of analytical toolboxes lies in the following needs: to merge distinct disciplinary perspectives; to address multi-actor and multitasking issues in urban systems; to pay attention to multilayer analytical perspectives (from the district level to the supra-urban level); to come to grips with the evolutionary complexity of actors and/or cities; and to design appropriate databases and information systems that lend themselves to quantitative analysis.

In the light of the above-formulated central aim of our study, our prominent research question will zoom in on the performance of urban actors and/or cities. From a methodological perspective, the scope of our study is to develop various multifaceted building blocks and perspectives on urban development that are interconnected and balanced against each other and that might create and exploit new synergies regarding dynamic urban systems, with a view to producing a liveable, sustainable and economically viable urban environment for multiple (from micro- to macro-) layers of actors, cities and structures in order to strengthen the global position of actors in the urban governance system. This will help to develop further innovative approaches for addressing adequately the above-mentioned challenges that create and improve urban places characterized by vitality, liveability and accessibility. Because of the different contributions of distinct forms of capital to various urban performance measures, a new conceptual model is designed in our study, based on a multilevel statistical-econometric framework for employing and analysing appropriate performance measures, which we call the 'urban piazza' model. This will be further highlighted in Section 2.

1.4 Methodological Framework

Our study employs a variety of recently developed, statistical–econometric tools and methods at different geographical scales. Our empirical work also focuses on different groups of stakeholders, included in an interconnected multifaceted spiral framework: namely, by starting from local actors and moving up to global actors. In this way, the above-mentioned 'urban piazza' model provides a framework for different empirical models, related to different actors' and/or cities' performance indicators (see Chapter 2). To the best of our knowledge, this is a rather novel

approach in regional economic and industrial organization research. To cope with a variety of empirical research issues, a broadly composed and innovative analytical toolbox is employed in our study. Figure 2 addresses more explicitly the empirical and methodological framework of our research, in which a subdivision is made into exploratory analysis, explanatory analysis and decision support tools.
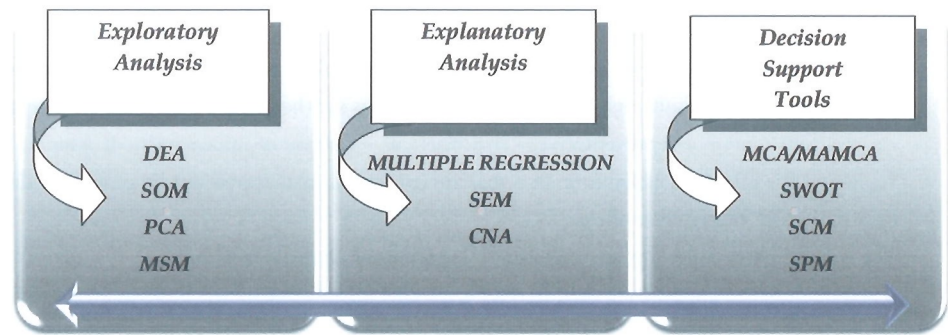
Figure 2. An overview of the statistical-econometric tools and methods used in our research

Legend: DEA = data envelopment analysis   SWOT = strengths–weaknesses–opportunities–threats
         SOM = self-organizing mapping   MAMCA = multi-actor, multi-criteria analysis
         PCA = principal component analysis   SCM = strategic choice matrix
         MSM = micro-simulation   SPM = strategic performance management
         SEM = structural equations model
         CNA = complex network analysis
         MCA = multi-criteria analysis

Figure 2 presents the toolbox employed in our applied research. These tools are used in different stages of our empirical analysis and call for a concise description. More details can be found in the successive case studies in our work.

Our *exploratory* analysis comprises, in particular, the following research techniques:

• *Data envelopment analysis* (DEA) – and its recent extension to super-efficient DEA – for mapping out the achievements of both cities and firms in a comparative way, in order to identify high-performing cities and/or actors that have an extraordinary performance in terms of urban (or resource) input and output indicators and outputs regarding their economic achievement. This new productivity-based approach is complemented with two new directions in DEA research, viz. a distance friction method and a context-dependent method for calculating and identifying super-efficient actors (in this case, firms and cities).

• *Self-organizing mapping* (SOM), a recent multivariate learning tool for analysing complex systems and networks, is applied to identify and explain, in virtual topological space, the

relative differences between actors (e.g. firms, cities) and their performance in various sectors or cities. This complex systems approach allows us to assess systematically the regional patterns of spatial activities and to integrate and provide relevant information with a geographic component in order to enhance our insight into critical strategic planning decisions for both localization and business performance.

- *Principal component analysis* (PCA) is a classical multivariate technique for systematizing and summarizing a long list of both input and output (performance) variables into more manageable and independent indicators.
- *Micro-simulation models* (MSM), e.g. in the context of ordered choice modelling, are essentially a type of multi-agent analysis that generates synthetic data by tracing the impact of interventions on a representative – hypothetical – sample of micro-units. It does so by replacing the effects of behaviour in a real environment, as mapped out by empirical data or empirically validated models.

The second part of our toolbox consists of *explanatory* analysis methods:

- *Multiple regression analysis* is used to offer a testable framework on the basis of an extensive micro- and meso-data set on the internal and external performance of firms and regional covariates. An explanatory econometric model is a confirmatory approach adopting a causal regression framework that is designed and estimated to assess the importance of various behavioural variables and control factors to the performance of the actors concerned.
- The design and estimation of a *structural equations model* (SEM) are pursued to assess the performance of the firms or actors concerned (using what is called the 'flying disc' model) in order to provide a comprehensive econometric estimation of the complex business champions–regions nexus.
- Finally, a *complex network analysis* (CNA) is used to map out connectivity patterns in the topological configuration of a country, region or urban digital infrastructure.
- The final part of our analytical toolbox is composed of various *decision support techniques*:
- *Multi-criteria analysis* (MCA) is used to evaluate various choice alternatives, e.g. among actors or cities. In particular, *multi-actor, multi-criteria analysis* (MAMCA) identifies the potentially most powerful actor (e.g. a city), measured in terms of various main criteria and a vast set of sub-criteria. A novel element here is the explicit consideration of the perceptions and priorities of various distinct classes of stakeholders.
- *Strengths–weaknesses–opportunities–threats* (SWOT) analysis gives a systematic overview of the various effects of policy actors in a broader strategic context of socio-economic benefits.
- The *strategic choice matrix* (SCM) provides a systematic framework for analysing the socio-economic importance of major societal or spatial developments for society, either nationally or locally. It is a new vehicle for assessing and supporting appropriate policies for cities or firms.

- The *internal strategic performance management* (SPM) tool addresses the firm's position in the external (e.g. regional or urban) world, which in the present study is extended with spatial meso- attributes related to the location of the firm. SPM aims to improve the firm's competitive performance through the application of strict internal management principles. Specifically, firms use SPM to create a consistent understanding of the business strategy by translating this strategy into a set of performance measures (Brewer and Speh 2000) in the form of critical success factors (CSFs) and key performance indicators (KPIs). These CSFs and KPIs provide qualitative and quantitative descriptions of important elements of the business strategies in which firms have to excel in order to be successful (Melkers and Willoughby 2005).

The various methods are used at different spatial scale levels, for which in various empirical studies geoscience-based tools are also used as an integrating mechanism. All these tools will be used in our study on a fit-for-purpose basis. Whenever appropriate, given the context, the research issue or the available data, they will be employed. A retrospective overview of the use of the various tools – after the presentation of our twelve applied case studies – can be found in Tables 1 and 2 in Chapter 15. We now move on to the analytical framework of our study.

1.5   Organization of the Study

Our study is based on a set of interconnected applied studies in a complex forcefield of urban dynamics that may enhance knowledge potential, encourage innovation and efficiency among firms, knowledge workers, and cities or regions and favour a sustainable urban quality of life. These scientific parts of our study have been published (or will soon be published) in the international refereed literature. The architecture of our approach – and its underlying conceptual framing – will be described in greater detail in Chapter 2. The main constituents of the present study can be summarized as follows:

- **Part A: ENTREPRENEURIAL CREATIVITY**
  Creative and innovative resources
  Super-efficiency and spatial productivity
  Complex spatial-economic architecture

- **Part B: CULTURAL DIVERSITY**
  New urban business demography
  Geographic projection of migration
  Urban change actors in business

- **Part C: URBAN AMBIANCE**
  Cultural heritage for locals
  Creative minds in cities
  Breeding places and urban buzz

- **Part D: COMPETITIVE URBANITY**
  Urban competition and performance
  High-performing cities
  Global digital connectivity

Each of these parts contains three distinct chapters that address more specific and focused questions related to the particular part concerned. Each chapter separately highlights a new perspective on urban dynamics and the socio-economic performance of urban systems, their actors and their (strategic) directions in Europe and elsewhere. Next, each chapter also shows a considerable amount of variation in terms of the aim and scope of the empirical study concerned, the nature of the comparative data, the architecture of the data, the scale of the analysis and the composition or size of the sample, methodologies, tools and techniques used (see Tables 1 and 2 in Chapter 15 for a retrospective summary). Furthermore, each chapter is built around the interconnected pillars (cornerstones) that lead to a focal point for specific research challenges on creativity, innovation and attractiveness. Consequently, a series of mutually complementary and interlinked research questions emerges, each using its own frame of reference, database, methodology or application field to be tested throughout the empirical work. The logical structure of the connection between the various parts A–D in this present study is illustrated by a schematic representation of the structure of the empirical work in Figure 3. This figure constitutes the 'red thread' of the research to be undertaken in subsequent chapters of this study.

The logic of our study is based on Figure 3, and in subsequent chapters, we will offer on a case-by-case basis an applied modelling study that is systematically organized around the conceptual framework of the '*urban piazza*' (to be presented in Chapter 2).
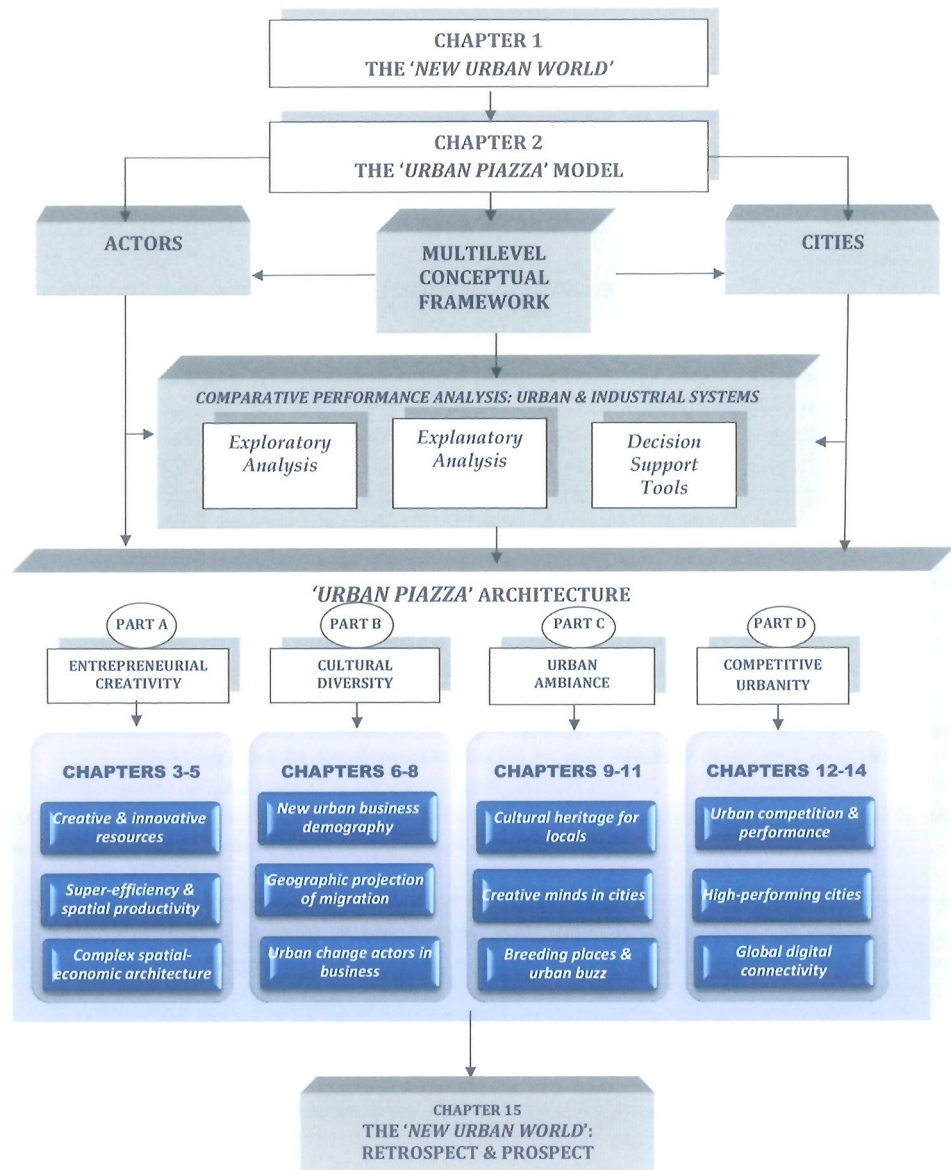
Figure 3. Organisation of the 'New Urban World' study

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2 THE ARCHITECTURE OF THE STUDY: THE 'URBAN PIAZZA' MODEL

2.1   The 'Urban Piazza': An Ideal-Typical Design

The complex urban dynamics in the competitive environment of the 'New Urban World', as well as the architecture of our study, can be described in metaphorical terms by means of what we call the 'urban piazza' model, which offers a systematic framework for a comparative analysis of urban systems' performance (see Figure 1). The 'urban piazza' framework addresses the dynamic forcefields that are critical to the performance of various actors and/or cities that seek to optimize sustainable outcomes for communities in terms of competitive economic and sustainable development. This leads essentially to a complex multilevel conceptual model (see Figure 1), starting from **A** and then moving through **B** and **C** to **D**.
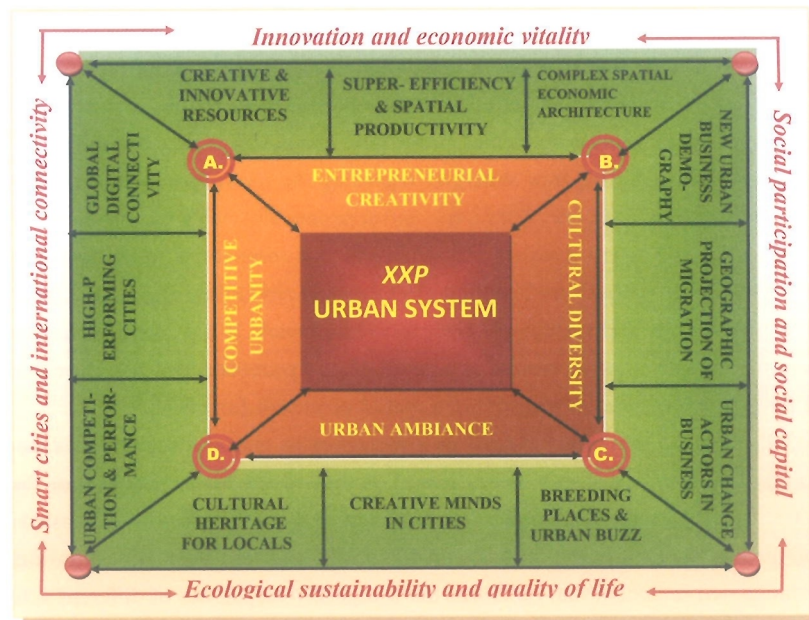
Figure 1. Knowledge arena of the 'urban piazza' in the 'New Urban World'

In the ancient world, the piazza was a vital part of the city's global culture. It was originally seen as a gathering spot and a market for commerce, as well as an architectural and historical area. Over the centuries, the piazza has been further utilized as a multifunctional and energetic creative urban artifact that emphasizes the city's rich complexity, which has actively and passively

contributed to cohesion and progress and heralded the birth of different initiatives, resources and perspectives for urban development. Even in modern Italian cities, the piazza is still a landmark in the city. The piazza is not only the geographically central place in the city; it is much more the 'fireplace' of the city, which radiates heat and energy out into the whole city and its surroundings. It presents a general public centre with a high level of social life, superior to the chaotic traffic-dogged narrow streets leading to tiny squares, and with a colourful character, where the city's main urban life and activities take place and shape the highly vibrant atmosphere, creating and improving the 'XXP' (the maximum contribution to productivity, quality and profitability in the urban or spatial system) (similar to the above-mentioned XXQ concept; see Nijkamp 2008). XXP is thus a measure of urban performance in which efforts (investments, creativity, other inputs, etc.) are linked to achievements (e.g. profitability, vitality, position in rank order lists of cities, etc.).

Urban vitality is needed for the piazza to become a new part of a future productive urban landscape (Fishman 1977; Hall 1988). It is a visible place where people gather, meet and interact and where the 'social and cultural capital' of a city is concentrated. It is also a place to relax and enjoy the architectural and historical quality of the city, with a wealth of 'environmental and ambiance capital'. Furthermore, the piazza is a place to conduct business (banks, shops, etc.) and to create urban wealth, so that it is also a geographic concentration of 'entrepreneurial capital'. Finally, it is a place at the crossroads of many street and transport routes, so it may also be seen as 'connectivity and communication capital' in the city. The piazza is thus becoming a promising basis for creating and exploiting new synergies regarding the multilayer dynamic urban system, with a view to establishing a liveable, sustainable and economically viable environment for multiple (from micro- to macro-) layers of actors and structures in a competitive urban world. Therefore, the piazza is a historically important breeding place for new civilization and wealth, and serves as an attractive, high-quality and sustainable place to live and work. It is a core place for sustainable development for the entire urban system as a result of its dynamism, and has, over the decades, reinforced the position of cities as magnets in a spatial-economic forcefield.

We will now use the '*urban piazza*' as a metaphor to map out the complex interactions in modern city life. The idea of this '*urban piazza*' is that all the forces that induce the creative use of smart – physical and immaterial – infrastructure come together in a consistent way – from different directions and orientations – in the piazza and find their concentration point in a spatially integrated forcefield that enhances the competitive capacities of different actors in the urban system. In the recent literature on regional growth, various contributions can be found that support the above ideas. Examples are the FIRES-Qware model developed by Nijkamp (2007), the Pentagon model of XXQ forces by Nijkamp (2008), the leadership and organizing capacity approach developed by Stough (2005) and the smart infrastructure model developed by Smilor and Wakelin (1990). This concept leads essentially to a multilevel conceptual framework for action. This complex system of interconnecting functions of basic systems may sometimes create an (internal and external) unstable equilibrium in a balance between multiple (from micro- to macro-) layers of actors and multiple structures in a city. This may even lead to multiple equilibria, as has also been suggested in a new economic geography context (e.g. Krugman 1991).

The '*urban piazza*' represents the set of relevant factors that stimulates the creation of new opportunities and/or innovations in urban areas at the interface of the urban governance system, the business sector and the research and education sector (the triple helix). This can support the development of urban areas as attractive, high-quality and sustainable places to live and work and set these areas apart as global front runners in imaginative urban development. It becomes a culture-based creativity and social innovation urban area with a great diversity of extraordinary facilities. The above-mentioned forms of capital highlight four policy foci for modern city life, which need to be taken into consideration in order to achieve the highest possible quality of urban life, viz.:

A. Entrepreneurial creativity;
B. Cultural diversity;
C. Urban ambiance;
D. Competitive urbanity.

If we confront these four components of the '*urban piazza*' architecture with the four pillars ('four classes of challenges') mentioned in Chapter 1, it should be noted that each of these four major challenges determines to varying degrees the four elements that altogether make up the '*urban piazza*' architecture. Urban planning and governance presuppose not only appropriate attention to each of these four components, but also a balanced focus on the interfaces between these four components. We will now first zoom in on the four policy foci individually, by decomposing each of these four items into three elements, and we will address the interwoven nature of these four concerns in Sections 2.2 to 2.5.

2.2   Part A: Entrepreneurial Creativity

This part of our study refers to the economic foundation that is necessary for the efficient operation of a sustainable urban area. In particular, three forces are relevant here – creative and innovative resources; complex spatial-economic architecture; and super-efficiency and spatial productivity – which are all primarily responsible for urban innovations, sustainable socio-economic growth and the transformation of regions and cities.

2.2.1   *Creative and innovative resources*

Many cities house a wealth of creative industries, but the spatial dispersion of these industries over distinct types of cities varies significantly (Kourtit et al. 2013). This applies even more to the high-technology industry, in particular high-tech SMEs, which are usually characterized by an extremely volatile, dynamic and uncertain business climate (Sureshchandar and Leisten 2005). The creative sector nowadays is often seen as one of the most proliferate economic branches in innovative industry, as it combines cognitive talents with spiritual and managerial originality.

The spatial concentration of activities, involving spatial and social proximity, increases the opportunities for interaction and knowledge transfer, while the resulting spillover effects reduce the cost of obtaining and processing knowledge. In addition, knowledge workers preferably

interact with each other in agglomerated environments to reduce the interaction costs, and they are more productive in such environments (Florida 2002). Following this argumentation, cities are the cradle of new and innovative industries. Companies in the early stages of the product and company life cycle, when dealing with manifold uncertainty, prefer locations where new and specialized knowledge is abundantly available at low costs (see e.g. Audretsch 1998; Camagni 1991; Cohen and Paul 2005). In this context, cities also offer enormously rich potential for a wide array of innovative business opportunities. In this way, these firms in these industries can achieve more sustainable business success in a dynamic and competitive environment, as compared with other industries (see e.g. Beise and Stahl 1999). This emerging 'new economy' is characterized not only by new types of industry, but also by the fact that these emerging industries can make a significantly higher contribution to growth and innovation within the broader knowledge-based society (Lee et al. 2004; McGranahan and Timothy 2007). Policy makers often view these industries as key contributors to industrial creativity and innovation performance, technological change, social development and (building and sustaining) economic growth and progress (Bommer and Jalajas 2002; Etzkowitz and Klofsten 2005).

A major issue to be addressed in this study is the geography of the creative sector: in other words, *where are creative industries located in space, and why*? This main research issue will be addressed in Chapter 3 from both a conceptual and an empirical perspective. That chapter will offer a new, comprehensive spatial model (the 'flying disc' model) that tries to map out and estimate all the relevant factors (spatial and functional) that are decisive for the presence of the creative sector in a certain place or district. This analysis uses SPM as a strategic assessment tool for comparing the performance of actors. This main research issue will be addressed here from both a conceptual and an empirical perspective, with an extensive econometric analysis of the Dutch situation.

2.2.2 Super-efficiency and spatial productivity

The space economy – with its myriad of actors, regions and interwoven networks – exhibits a dynamic constellation that is both volatile and resilient. It comprises complex feedback systems that may break or reinforce spatial equilibrium forces (Reggiani and Nijkamp 2009). Regions and firms appear to form a complex spatial-economic architecture that may be characterized by dynamic evolution and resilience. In today's open world driven by global competitiveness, many regions and cities are being challenged to form a 'creative geographic space' by novel governance models and to develop new ideas to implement an effective strategy for public interventions at the local level by encouraging the development of creative industries and the consequent economic growth (Tornqvist 1983; Andersson 1985; Landry 2000; Bommer and Jalajas 2002; Florida 2002; Kourtit et al. 2011c; Mitra 2012).

This new paradigm has given rise to a certain hype around the concept of a creative, open and globalizing world with social, cultural and creative urban environmental factors and mechanisms that are diverse and dynamic (Florida 2003; Peck 2005; Forte et al. 2006; Matheson 2006; Olfert and Partridge 2011). The spatial-temporal complexity leads to a new 'spatial imperative': modern

regions and cities must attract, retain and even nurture highly mobile and (global) creative and innovative firms and talents (the 'pluriformity' approach), as their aggregate efforts become the primary drivers that will deeply affect the ground rules for securing economic development and the competitive advantage of modern regions and cities and their networks (Sonis and Hewings 1998; Glaeser 2004; Shea 2004; Peck 2005; Nijkamp 2008; Muñiz et al. 2010). To manage their regional or urban economies and strengthen their international position, many regions and cities have to compete in fiercely contested arenas for 'creatives' – individuals, firms and organizations – as a new and increasingly pervasive (business) development policy strategy in order to attract or generate highly specialized creative and knowledge sectors (see Bayliss 2007).

Regional governments, decision-making bodies at local levels and leading firms in the area concerned are thus changing their existing economic and productive positions (Porter 1990; van den Berg 2001) by providing the most promising and profitable business environment (Porter 2002). They may ensure an efficient design and use of smart spatial amenities, such as the local infrastructure, urban quality of life in the region concerned and availability of various capital resources (e.g. qualified labour) used in the production of innovative products and/or services.

The above-mentioned observations clearly prompt a question concerning the relationship between the spatial dimension (geographic attributes) and regional factors, on the one hand, and the business performance (viz. super-efficiency and productivity) of individual entrepreneurs, on the other. In recent years, we have witnessed a reorientation of the research and policy interest of international institutions (e.g. the World Bank) towards the interaction between business activities and localization. Although there is common agreement on the interdependence between local and regional environmental factors and the business performance of firms and their economic activity (e.g. formation, survival, functioning and growth), many studies that pay attention to this issue are based mainly on anecdotal evidence and offer mainly case study observations or in-depth interviews with a few key players.

Consequently, many research questions still remain a puzzle, both theoretically and empirically. This suggests that more solid research on this topic is definitely needed in order to gain a better understanding of the interplay between the firm's performance and its geographic environment. This issue will be highlighted in the next contribution. Chapter 4 will provide a frame-work for addressing the mutual interplay between the business performance of creative, high-tech firms in the Netherlands and geographical amenities, which serves to identify the spatially discriminating factors that determine the location of urban creative activities, in particular the presence of spatially discriminating effects at local and regional scales that are a moderating factor in economic development.

2.2.3 *Complex spatial-economic architecture*
Spatial dynamics is the outcome of a complex socio-economic and technological forcefield, with a complex ramification of micro-based motives (e.g. entrepreneurial performance strategies) and macro-oriented (or meso-oriented) contextual drivers. The performance of firms depends,

inter alia, on the economic context in which these firms operate. One of the founding fathers of modern economics, Alfred Marshall, laid the basis for efficiency analysis, and hence for the competitive behaviour of firms. In his *Principles of Economics* (1920), he introduced the marginality principle as a rational economic guideline for agents (e.g. marginal cost, marginal utility). Marshall paid attention to firm behaviour and drew a distinction between internal and external economies. Clearly, a high quality of local and regional environmental resources may influence the strategies and processes and the choice of location and spatial patterns of these firms (Pfirrmann1994; Porter 2000; Lagendijk 2001; Oughton et al. 2002), create new entrepreneurial, employment and market potential (Bergmann et al. 2002) and offer novel opportunities that can help to make better use of firms' business activities. In combination with the use of advanced management techniques (Hronec 1993; Lynch and Cross 1995; Kaplan and Norton 1996; Lingle and Schiemann 1996, 1999; Rheem 1996; Atkinson et al. 1997; Armstrong and Baron 1998; Ahn 2001; Sandt et al. 2001; Ittner et al. 2003; Lawson et al. 2003, 2004, 2005; Said et al. 2003; Thorpe and Beasley 2004; Waal 2007; Waal and Coevert 2007; Chau 2008; Holloway 2009; Pinheiro de Lima et al. 2009; Bourne et al. 2010; Franco-Santos et al. 2012), the type and quality of the capital resources included in the firms' production function, therefore, crucially affects their competitiveness on both local and international markets (Azofraa et al. 2003; Evans 2004; Waal et al. 2009). Thus, there is a need for an evidence-based analysis of the various capital assets – in particular, local conditions – that have an impact on the performance of firms and their competitive advantages. The business performance of firms shows great variation related to their geographical location decision (Kourtit and Nijkamp 2013).

The growing importance of external and environmental changes places a great deal of emphasis on entrepreneurship (information- and knowledge-based activities), and has further intensified and supported the need for efficient and effective spatial capital resources, such as human capital, social capital, knowledge capital and innovation capital (see, among many others, Becker 1964; Mincer 1974; Bourdieu 1983; Putnam et al. 1993; Fukuyama 1995; Putnam 2000; Bowles and Gintis 2002; Wößmann 2003; Vandenbussche et al. 2006; Crook et al. 2011; Caragliu et al. 2012), which all encourage businesses to meet challenges and stay relevant and competitive.

Firms' performance, in a broad sense, is a multifaceted concept, and is influenced by conditions both internal and external to the firm. Thus, these firms have to embrace these spatial capital resources in their business strategies; their strategic goals have to be growth-oriented and designed to search for and develop new (long- and short-term) opportunities in order to enhance their entrepreneurial learning strategies and business performance. In this way, they can remain viable and realize sustainable competitive advantages associated with their human capital. In an increasingly globalized and interlinked economy, firms, especially those with several plants, operate in complex environments, and this should be reflected in any model that attempts to unveil the determinants of performance (Pavitt 1984; Miles et al. 1995). A firm's success or failure is also related to the external environment in which it operates, as this reflects the set of institutional and social norms governing its operations and determines the potential quality of the workforce.

This means that the environment in which firms perform their activities matters in their location decision.

To provide a better insight into the differences in business performance among regional patterns of spatial business activities, and to understand entrepreneurial learning strategies, Chapter 5 will examine the relationship between the geographic location and industrial characteristics and the business objectives and performance of individual firms. In particular, this study will address the importance of different capital assets in the multilevel spatial systems of the Netherlands.

2.3   Part B: Cultural Diversity

Diversity in cities is a fashionable concept that refers in particular to soft factors, such as the new urban business demography, the socio-geographic projection of migration and urban change actors in business, as these may improve the quality of society's collective welfare and translate its human capital into greater socio-economic prosperity, which facilitates spillovers and the rise in knowledge necessary for productivity, innovation and sustainability. This may then lead to a new focus on the role of learning and skills in the local innovation economy. However, sustainability is not only related to environmental quality conditions (such as air or water quality), but also concerns the general quality-of-life conditions in cities, such as social participation, cultural ambiance or socio-economic health (see also the well-known Brundtland Report 1987). A focus on social participation is key when facing urban challenges.

2.3.1   New urban business demography

In our modern and globalizing urban world, migration flows tend to lead to the emergence of new 'diasporas' (Eurostat 2004; OECD 2009). This 'diaspora economy' exhibits not only a 'colourful' ethnic composition in each individual country or city, but leads to worldwide linkages and communications – often even strong international networks – between people in the sending countries and people in the host countries (Zimmerman 2005). Such international connections may enhance welfare on both sides, through trade, tourism or FDI.

Fortunately, numerous studies exist on the advantages and disadvantages of immigration – and of cultural diversity in a more general sense – all of which point out the major differences among and within various migrant groups (Greenwood et al. 1996; Tani 2003; Longhi et al. 2005a, 2005b, 2008; Okkerse 2008; Longhi et al. 2010; Nijkamp et al. 2012). An important fact is that migrants are not uniformly dispersed in their host country, but have a strong urban orientation (see Body-Gendrot and Martiniello 2000; Sahin 2012). Such concentrations of migrant groups in distinct urban districts give rise to various seedbed conditions for self-employment and entrepreneurship. This phenomenon has, in recent years, received much research and policy attention, and is known as 'migrant entrepreneurship', new entrepreneurship, colourful entrepreneurship, minority entrepreneurship or 'ethnic entrepreneurship' (for an overview, see Dana 2007 and Sahin 2012).

Ethnic (or migrant) entrepreneurship has become a characteristic feature of the economic ramification of modern cities in the developed world (see e.g. Hardin 1974a,b; Ward and Jenkins

1984; Min 1987; Waldinger et al. 1990; Choenni 1997; Delft et al. 2000; Masurel et al. 2002, 2003; Kloosterman and Rath 2003; Rusinovic 2006; Sahin et al. 2007; Kourtit and Nijkamp 2012). This phenomenon refers to the business activities undertaken by migrants of a specific sociocultural and ethnic background or country of origin. Immigrants have been responsible for a high degree of new business formation – and hence economic growth – in many cities of the world. They usually appear to be a highly creative and qualified entrepreneurial group (Kloosterman and Rath 2003; Masurel et al. 2003; Rusinovic 2006; Sahin et al. 2007; Kourtit and Nijkamp 2012). Migrant entrepreneurs make up a significant share of the urban business economy, and they contribute considerably to urban vitality in modern cities. Migrant entrepreneurship is also generally regarded as an important self-organizing principle, by means of which migrant minorities are able to improve their weak socio-economic position and contribute to the integration and social bonding of migrants (Choenni 1997; Dagevos and Gesthuizen 2005; Sahin et al. 2007). Migrant entrepreneurship is thus a multifaceted phenomenon that reflects the great socio-economic diversity in business life in modern cities.

New trends in migrant entrepreneurship and its growth strategies (see Ansoff's (1957) business growth theory) in the Netherlands tend to show a rise in second-generation migrant entrepreneurs in the creative sector leading towards an external market orientation ('break-out strategies'; see also Engelen 2001), instead of focusing on the traditional sectors, in which the first generation operates. They want to expand their market domain by means of 'break-out strategies' by offering high-quality and innovative products and services to a broader group of clients and markets outside their own ethnic group. Young people of ethnic origin are progressing further than ever before in education and the workforce (see Cormack and Niessen 2002). Many successful self-employed migrants or minority business firms contribute to improved social and economic integration in the host society. They are a solid and, now, established part of the normal urban economic business sector, and as such are indispensable, but it remains to be seen whether they deserve to be called 'entrepreneurial heroes'.

Despite many studies, the data and information on migrant entrepreneurship are far from being satisfactory or comparable. Most studies address a specific migrant group in a city with a small sample, and there is a huge gap in the evaluation of migrant entrepreneurship in different geographical settings. Furthermore, various studies on ethnic entrepreneurs still mainly focus on the first generation, which is more concentrated in the traditional sectors (e.g. the clothing, repair, retail, hospitality and cleaning sectors). A limited number of studies focus on the non-traditional sectors – in particular the creative industries – of ethnic entrepreneurship, which are attracting increasing interest from second-generation entrepreneurs (also called the 'new generation').

To achieve a better understanding of the important entrepreneurial behaviour and activity of second-generation ethnic entrepreneurs, Chapter 6 will explore and trace the opportunities and barriers of these ethnic entrepreneurs and the critical success conditions of the highest-performing ethnic firms ('entrepreneurial heroes') in the innovative and creative sector. The aim is to identify the drivers of break-out strategies for new markets, while making a distinction between the high and the low performance of these ethnic firms in Dutch cities at a micro-business level.

2.3.2 Geographical projection of migration

In an open and global world characterized by increasing urbanization, modern cities function as the habitat of international migrants and magnets of economic growth (Nijkamp 2008). Cities have traditionally always been on the edge of social change. Today, the most pressing challenges are related to new migration patterns (see e.g. Gorter et al. 1998). In an open world, migration is a 'natural' phenomenon. Several academics speak nowadays of the 'age of migration', and this suggests that mankind is structurally 'on the move'. The age of migration has led to a different population composition of cities in the developed world. The foreign migration rate has shown an unprecedented and steady rise in recent decades and, given the rising globalization and increasing mobility, there is no reason to assume that this demographic trend will grind to a halt (UNHCR 2003; Eurostat 2004; OECD 2009).

Consequently, many countries, especially in the developed part of the world, host a great diversity of foreign migrants originating from many sending countries all over the world (United Nations Department of Economic and Social Affairs 2011). Continuous migration plays a major role with respect to diversity, social and cultural equality, increased rural thinning, etc. Most foreign migrants have tended to settle down in urban areas – often in the form of ethnic or language clusters – and have created multicultural diversity in many European countries. Many cities in Europe have over the past decades seen the influx of large flows of migrants, both from within Europe and from outside, and this has induced a dramatic change in both the population composition and the sociocultural behaviour of distinct population groups in large agglomerations (Zimmermann 2005).

The worldwide political and economic turbulence has prompted the emergence of massive population flows moving to other countries, with many positive but also negative consequences (see Bommes and Morawska 2005; Marcura et al. 2005; Partridge et al. 2008). The migration flows are quite diverse in terms of heterogeneity with respect to skills, education, age, gender, welfare position, cultural background, ethnicity and motivation. Therefore, it is no wonder that we observe not only spatially diverse patterns of migrant departure and settlement, but also large differences in the socio-economic impacts of foreign migrants. This variety in migrants leads to great cultural diversity, mainly in urban agglomerations.

The 'new geography of migration' offers ample evidence that it is not possible to give an unambiguous and general answer to the question of whether or not international migration is beneficial for host and/or sending regions. A burgeoning literature in many countries has emerged over the last two decades to assess the socio-economic impacts of international immigration on host countries (see e.g. Greenwood et al. 1996; Longhi et al. 2005a, 2005b, 2008; Okkerse 2008; Longhi et al. 2010). This 'new geography of migration' thus far does not have a uniform analytical framework, but rather a somewhat fragmented approach, although the preliminary results are promising and fascinating. In this context, there is an increasing need also to address the broader and local dimensions of immigration empirically and systematically, in order to trace, monitor and assess the wider economic and societal impacts of immigration on the host country, region or city.

The main aim of migration impact assessment is *not* to monetize the economic value of migrants. Chapter 7 offers an overview of recent studies that seek to address the socio-economic impacts of immigration on host countries, regions or cities on the basis of a systematic migration impact assessment, either nationally or locally. A useful tool to organize a systematic estimation of various immigration effects is a SWOT analysis, whereby these effects are assessed in a strategic choice matrix in order to determine the existing fit of migration in its environment and to devise effective strategies in response to issues in the socio-economic environment; in brief, the matrix indicates which options suit the key issues.

2.3.3   Urban change actors in business

Entrepreneurship has emerged as a significant organizational form and one of the most important and dynamic forces shaping the changes in the global economic and social landscape throughout the world (Pavitt 1990; Berry and Taggart 1998; Jones-Evans and Klofsten 1997; Bommer and Jalajas 2002; Wennekers 2005; Oakey 2007; Cooper and Park 2008). Entrepreneurship is often found in the SME sector, and therefore also offers new opportunities for immigrants with a business-oriented attitude. As mentioned above, they are known as 'ethnic' or 'migrant' entrepreneurs, hence the term 'new entrepreneurship'. This has become a popular broader concept in a modernizing multicultural society and open economy (van Light and Bonacich 1988; Waldinger et al. 1990; EIM 2006).

New entrepreneurship forms a significant part of the SME sector in our modern cities and has become a source of new economic opportunities for regions and cities. It also contributes to the development of integration and the great diversity in entrepreneurship in our modern social economy. It reflects different cultures and open-ended capacities for economic growth creation in cities, and leads to economic diversity. Migrant entrepreneurs are often seen as the new 'entrepreneurial heroes' who turn dreams into reality under harsh initial development conditions, especially in the SME sector (see also Waldinger et al. 1990; Kloosterman and Rath 2003; Masurel and Nijkamp 2003; Dana 2007; Sahin 2012). In the Anglo-Saxon literature of the past decade, much attention has been paid to the economic importance of migrant entrepreneurship. This type of self-employment appears to provide a vital and creative contribution to the urban economy, in particular with regard to urban economic vitality. The increase in and importance of ethnic entrepreneurship has recently attracted policy and research interest regarding migrant business in Europe.

This new phenomenon is also increasingly being recognized in the Netherlands as an interesting focus for a city's SME policy. Migrant entrepreneurs operate in interesting niches and form a positive stimulus for creative business making in modern cities. Previous research relevant to ethnic minorities' economy and entrepreneurship can be traced back to much of the earlier classic works of Sombart (1914) and Weber (1930). The birth of their concept of 'the stranger as trader', combined with the social structure (work, family, social life), nationality, mobility and religion, has influenced subsequent empirical (case) studies and writings on ethnic entrepreneurs.

Various empirical studies and new trends in migrant entrepreneurship and their business growth strategies in the Netherlands tend to show a rise in second-generation migrant entrepreneurs in new high-level market segments of business activities, such as business and professional services, information and communication technologies (ICT) and the creative industries, instead of focusing on traditional sectors, in which the first generation operates (Cohen and Fields 1999; Ram and Smallbone 2001; Saxenian 2002; Art 2005; Smallbone et al. 2005; Evans 2006; Rusinovic 2006; GLA 2007; Evans 2009; Kourtit and Nijkamp 2011; Sahin 2012). They are also progressing further than ever before in education and in the workforce (Cormack and Niessen 2002). This is often called a 'break-out' strategy, as such migrant entrepreneurs – often second-generation entrepreneurs – employ their resources (human capital, social networks, financial capital) to enter more promising – though also more risky – markets. They want to expand their market domain through break-out strategies, by offering high-quality products and services to a broader group of clients and markets, outside their own indigenous ethnic group. They become change agents who invent, introduce and commercially exploit new products or production processes in a competitive and risky economic environment.

The above exposition suggests a clear hypothesis on the motivation and behaviour of second-generation migrant entrepreneurs: namely, that they tend to be more inclined towards making risky economic investments (see Ansoff 1957; Brockhaus 1980) and in favour of more advanced (and competitive) market segments, for which innovation and skills (education) are a necessary condition (see Waldinger 1986; Engelen 2001; Cormack and Niessen 2002). Chapter 8 serves to test this hypothesis by focusing in particular on the transition strategies of second-generation migrant entrepreneurs, as their 'break-out' strategies may lead to a convergence of migrant entrepreneurship towards mainstream entrepreneurship.

2.4   Part C: Urban Ambiance

'*Urban ambiance*' is a driving force that refers in particular to the broader social and environmental constituency that is a prerequisite for business vitality and sustainable attractivity. Three elements are particularly important in this context: cultural heritage for locals, creative minds in cities and breeding places and urban buzz, which represent the drivers (potential human assets that form the foundation of innovative ideas) that create a socially sustainable society. Furthermore, these factors ensure that the regional or urban economy benefits from the related knowledge spillovers together with sharing and developing new knowledge and improving or promoting innovations in regions that generate economic wealth and achieve competitive advantage.

2.4.1   Cultural heritage for locals

Cultural heritage is not just a 'soft' historical asset or petrified resource from the past; it plays an active role in a modern, open-space economy. It refers to historic–cultural capital that is seen as an important and visibly recognized landmark from the past and is one of the identity factors of a tourist or creative place. The modern tourist sector – in relation to cultural heritage planning

– offers a very interesting but complex scene, in which sociocultural forces (e.g. changing tastes and lifestyles) and geographical factors (e.g. spatial images and perceptions, including marketing strategies) are all important components of tourism policy (see also Coccossis and Nijkamp 1995).

Many cities and regions now host a wealth of cultural attractions and have to compete for the favours of potential visitors and residents, both domestic and international (Bruinsma et al. 2010). Cultural heritage is increasingly recognized as making an important contribution to the destination image generation of cities, which originates from the attractiveness of cultural heritage. It acts as an attraction force for people from different places of origin, while it stimulates local socio-economic development and reinforces a sense of local identity and pride (a strategic development tool for urban tourist and resident policies). This means that cultural heritage is not only a source of historical information or place identity affecting the image of the attraction itself, but also influences the broader destination image of the city, with far-reaching implications for the modern quality of life in a broad sense (see the above-mentioned 'XXQ' concept; see Nijkamp 2008).

Cities have to use their indigenous resources, e.g. arts, music, culture and heritage, to identify and transform 'places' that affect residents' and tourists' experience, and it is particularly the location quality of cities that attracts resident and tourists. Therefore, such cultural activities form part of the positioning and marketing strategies of cities and regions, especially in the context of sustainable development, in which information and communication technology (ICT) tools may play an increasingly significant role. One such tool is ICT devices that offer 'e-services'. Not only does ICT allow firms to market their services, but also cultural heritage attractions may benefit from the new options given. These options are related to the increased access to and preservation of cultural heritage. Both are major contributors to the enhanced knowledge and appreciation of customs, artefacts, folklore, etc.

Consequently, the information provided to (potential) visitors (e.g. residents and tourists) has an impact on their perception of the quality or attractiveness of a place and hence on their choice behaviour. This is a major challenge to policy-making bodies, especially in the context of sustainable local development. The supply of e-services in the modern ICT world may be regarded as a strategic vehicle to enhance the public's familiarity with urban cultural heritage through innovative marketing channels and to increase user satisfaction through advanced choice aid facilities and by making less well-known areas accessible. It is important to invite visitors as well as residents to less well-known and often hidden areas that are related to cultural heritage. The interest in cultural heritage comes not only from domestic and international tourists who want to experience and appreciate it, but also from local residents. An important aspect in terms of both the physical and the cultural characteristics of destination areas is the behavioural or attitudinal characteristics of the residents who live in tourist centres.

The awareness of the value and increased interest in cultural heritage plays a central role in creating new urban vitality, focusing on improvements to new lifestyles and cultural developments in our modern society. Through access to various ICT tools, many places become more accessible.

The increased use of ICT has thus resulted in a significant change in the structure of the cultural industry, not only for Dutch and international tourists but also for local residents. The tourism volume and composition in a destination area have of course spatial and socio-economic consequences for residents, who usually also have a high degree of taste variety for the type of tourists attracted to their place. However, in many cases, the appreciation of residents for visitors is part of a much broader set of choice and preference attributes of their local environment, such as noise, crowding effects, politico-cultural heritage, local entertainment, etc. (see also Neuts et al. 2012).

It is, therefore, important to investigate the perceptions and preferences of residents in a tourist place from a much broader perspective that is geared toward their total complex view of their living environment. Hence, the focus of our research will be on the preferences, attitudes and appreciations of locals in a major tourist place, namely Amsterdam.[1] Therefore, Chapter 9 will address in particular the cultural heritage attractiveness of the city, in terms of the perceptions and preferences of the residents of Amsterdam regarding the importance of cultural amenities and the information provided by e-services on these amenities.

2.4.2 Creative minds in cities

Our world houses a wealth of *cultural heritage*, interpreted here as a collection of physical and tangible artifacts that have an explicit and recognized association with the past of a place or area, and may be seen as a self-identifying landmark for that place (see Throsby 1999; Snowball 2008; Riganti and Nijkamp 2009; Nijkamp 2012). The maintenance and expansion of this form of cultural capital is seen as a major challenge for urban development policy, not only from a preservation perspective, but also from a revenue-generating perspective (e.g. cultural tourism, attractiveness to the creative classes) (see e.g. Bruinsma et al. 2010; Fusco Girard and Nijkamp. 2009; Kourtit et al. 2011). Many large cities are characterized by the abundant presence of a great diversity of cultural heritage, which may be one of the reasons why people and firms move to these cities (Landry 2000; IJdens et al. 2006).

The abundant presence of urban cultural heritage – for instance, in the form of a monumental historical inner city or an attractive cultural urban 'ambiance' – contributes to an innovative urban climate that favours creative minds. Firms are supposed to develop innovative ideas, to design new forms of technology or architecture, to experiment with new business models, to suggest new paths to sustainable development and to stimulate many young people who are seeking original concepts in a globalizing world. Their presence may need the availability of – and access to – both production facilities and consumer amenities. Urban agglomerations offer a great diversity of seedbed conditions for a flourishing creative industry. There is convincing evidence in the literature

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[1] It should be noted that a parallel research trajectory has been undertaken on the appreciation and views of visitors and tourists in Amsterdam. The findings are described by van Leeuwen and Nijkamp (2010).

that cultural and creative sectors[2] often need the seedbed advantages of agglomerations (see Pratt 1997; Turok 2003; Power and Scott 2004; van Oort 2004). The urban creative economy needs an incubator and seedbed for unconventional pathways and roads less travelled in order to create new competitive opportunities for innovations or new value-generating activities.

Various seminal studies have been published in the past decade on creativeness concepts, for instance by Howkins (2001), Florida (2002, 2003), Scott (2006) and Landry (2007). Broader reviews of creative places and creative people are contained in, amongst others, Camagni (2011), Fusco Girard et al. (2011) and Kourtit et al. (2011). Creative minds may become innovation engines, as they are able to combine the three forces of Confucian wisdom acquisition: pedagogic knowledge transfer from others; learning-by-doing mechanisms; and auto-cognitive mental development. From this perspective, creative minds have exceptional innovation potential in terms of both ideas and practices. Therefore, they may act as effective growth engines in modern cities (Coulson and Leichenko 2004; Gilderbloom et al. 2009). They can be seen as new catalysts for urban development (Throsby 2001). It is taken for granted that the overwhelming presence of the creative classes in many modern cities is the offspring not only of educational capital in urban areas, but also of social capital ('communication as the source of creativeness') and cultural capital.

Cultural capital – including cultural heritage – is often argued to offer an innovative and open ambiance that stimulates creative thinking. Cultural capital refers to non-financial social assets linked to the arts and culture in a way that combines a wide range of amenities, such as public provision for the arts and culture, cultural and creative activities, cultural participation, the number of visits to cultural and recreation services (museums, art galleries, theatres, cinemas, sports events) or cultural support systems (see the 'flying disc model' developed by Kourtit and Nijkamp 2013). It should be noted that the interaction between the creative sector and the cultural capital in cities is a multifaceted and complex phenomenon that does not have a linear or unilateral relationship (see Wenting et al. 2010).

Cities have a wealth of cultural facilities that may attract creative people, but at the same time the presence of a large creative class will also favour cultural performances and services in the city. It is clear that the city may act as a *creative–cultural complex* that integrates artistic capital, knowledge capital, social capital, entertainment capital and economic capital (see also Glaeser 2011). An important – though often neglected – constituent of long-standing urban development is formed by urban cultural heritage. The presence of cultural heritage may sometimes hamper a flexible adjustment to new urban challenges, and sometimes its sustainability and continuity may be endangered by rapid uncontrolled urban dynamics (see de Noronha Vaz et al. 2011). However, it may also offer the basis for solid long-term urban stability, particularly in the case of cultural tourism (see Fusco Girard and Nijkamp 2009). In addition, it may create interesting 'image' externalities that may have a positive effect on the value of urban real estate (see Nijkamp 2012) or on the attractiveness of the city to innovative or creative minds. Especially the latter phenomenon,

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[2] In general, the term 'creative industries' usually refers to those economic activities that generate both tangible and intangible innovative or knowledge-oriented goods and services, which have an income-generating capacity, while the term 'cultural industries' refers to those activities that have an artistic, historic–social or entertaining connotation (Kourtit et al. 2013).

viz. the interface between the creative industry and the cultural heritage in the city, deserves more empirical investigation.

Clearly, the cultural–economic significance of cities is determined not only by cultural goods in a strict sense, but also – and sometimes even more so – by various spillovers to other sectors (e.g. retail development, hospitality sector revenues, real estate values), so that the economic implications of cultural heritage may have a long-range value chain pattern in a broader area. Especially in the case of clusters of cultural amenities (e.g. in old city centres), the agglomeration advantages of a cultural complex may emerge as contributors to urban growth. It is noteworthy that there are a number of different views on the intricate relationship between cultural heritage and creative industries:

- Innovative or novel ideas may flourish best in an appropriate urban climate with a sense of historical authenticity, in particular cultural heritage. Jane Jacobs (1961) even argues that new ideas are born in old buildings. Consequently, industrial heritage (such as brownfields in the city) may attract creative talent. This proposition may seem plausible if empty – and hence cheap – buildings in culturally attractive areas act as incubators for creativeness, but such amenities are not sufficient. This is illustrated by the case of Detroit, where empty factories have not induced an influx of creative minds. Clearly, a culturally rich city may attract creative and social capital, which may lead to more new firm formation.
- The abundant presence of urban cultural heritage – for instance, in the form of a monumental historical inner city or an attractive cultural urban 'ambiance' – contributes to an innovative urban climate that favours creative minds. These creative minds may be employees, self-employed or entrepreneurs, but they may also comprise visitors. Their presence may need the availability of – and access to – both production facilities and consumer amenities.

The latter phenomenon, viz. the interface between the creative industry and the cultural heritage in the city, deserves more empirical investigation. Therefore, Chapter 10 explores the relationship between the urban cultural capital and the level and growth of various creative professions in the creative sector, with particular reference to urban agglomerations in the Netherlands.

2.4.3   *Breeding places and urban buzz*

Cities have become playgrounds for competitive behaviour and rapid economic dynamics at local and global scales. However, in many cities (or urban agglomerations), economic growth is mainly manifested in specific geographic areas, where creative people and innovative entrepreneurs are located. Modern cities are the seedbeds for creativeness, innovation and spatial competitiveness. They are characterized by product heterogeneity, with a surprising innovative, creative and cultural diversity and new and diverse urban design and lifestyles, and behave as macro-units according to the laws of monopolistic competition in economics (see Frenken et al. 2007). Modern cities try to offer the highest possible quality or image in terms of culture, cultural diversity, arts, sports,

innovativeness, use of tacit knowledge, entrepreneurship, financial markets, an open and attractive urban 'milieu' or atmosphere, urban embeddedness of new business initiatives, access to social capital and networks, integrated sustainability, etc. Density and proximity are the key features of modern cities (or, in general, urban agglomerations).

The advantages of urban areas can be summarized in terms of three driving forces: economies of *density*, or colocation of people and activities (Glaeser et al. 1992; Nijkamp 2008); economies of *proximity*, which relate to the benefits of physical or socio-psychological access (see e.g. Boschma 2005; Torre and Gilly 2005; Tranos et al. 2013); and economies of *connectivity* (related to social capital or network linkages; see Tranos et al. 2013). These classes of external economies explain the booming character of modern cities. The high degree of urbanization presents the grand challenges with which modern cities are confronted. However, it contributes simultaneously to their scale and scope by generating a wealth of unrivalled centripetal and centrifugal forces and associated benefits. One of the resulting dynamic urban constellations that is frequently mentioned in the current literature on urbanization advantages is 'urban buzz', the potential to generate creative, innovative and unconventional initiatives or activities in cities or in specific urban districts. These spatial urban constellations have been studied in the urban science literature from a variety of different analytical perspectives (for a review, see Nijkamp 2010).

From this perspective, urban agglomerations are not necessarily a source of problems, but offer the integrative geographic action platform for creative solutions and new opportunities. Owing to the seminal work of Jane Jacobs (1961), we know that social capital (e.g. in the form of networking) and human capital (e.g. in the form of creative entrepreneurship) are essential for smart and booming urban economies. To meet a wide array of future challenges, urban agglomerations have to be smart and resilient. Urban buzz has received considerable attention in the recent urban literature from different perspectives. Buzz areas – be they cities as a whole or urban districts – are powerhouses of innovation, creativity and unconventional lifestyles. Storper and Venables (2003), for instance, refer in particular to the ease of communication and information exchange between different actors as a key characteristic.

However, a recent study by Rodriguez-Pose and Fitjar (2012) highlights the need for a broader interpretation of urban buzz: this concept is a container for local entrepreneurial dynamism (Acs et al. 2008), innovation access and intensity (Duranton and Puga 2001), knowledge generation and diffusion (Puga 2010), competitive cluster formation (Porter 1990), industrial districts (Pyke and Sengenberger 1992), learning areas (Morgan 1997) or spatial systems of innovation (Cooke et al. 1998). More detailed analyses of buzz phenomena can be found, *inter alia*, in Amin and Thrift (1994), Gertler (1995), Bathelt et al. (2004), McCann (2008) and Polèse (2009). This phenomenon may relate to socio-economic factors, such as economies of cultural and social diversity in urban areas (Jacobs 1961, 1969; Waldinger et al. 1990; Choenni 1997; Perdikogianni and Penn 2005; Sahin et al. 2007; Longhi et al. 2010; Kahanec and Zimmermann 2011; Kourtit and Nijkamp 2012), and productivity-enhancing factors that focus on business sector advantages. However, urban buzz is not uniformly spread over all the population groups or areas in a city. There is a clear spiky

pattern governing its distribution that has to do with many socio-economic factors as well as the nature of the built environment. This action place of urban buzz resembles the *piazza* of the old Italian cities, where in the past all the activities and communications in the city were concentrated. Essentially, the *piazza* is the spatial bundling of urban buzz.

Many of these contributions point out important elements of dynamic urban developments, but in most cases a solid evidence-based econometric test of the underlying hypotheses is missing. To gain a better integrated understanding of the highly complex urban buzz, Chapter 11 investigates how buzz patterns can be explained and in particular how cultural diversity affects this phenomenon in the city of Amsterdam in the Netherlands. It focuses on the spatial expression and geographic projection of urban buzz, and in particular concentrates its efforts on the economic functioning and outreach of such *piazza*s in modern cities.

2.5   Part D: Competitive Urbanity

The notion of 'competitive urbanity' addresses in particular the network character of cities (both physical and non-physical). It is particularly concerned with urban competition and performance, high-performing cities and global digital connectivity, which demonstrate how the interdependent aspects of various (formal and informal) networks that comprise various regional attraction resources result in the emergent socio-economic performance patterns of regions and cities. This increasingly means access to global relationships, (informal and formal) networks or connected cities, as they highlight economies of scale.

2.5.1   *Urban competition and performance*

Cities in the developed world are powerhouses of creative thinking, the development of new technologies, entrepreneurial spirit, socio-economic progress and ecologically sustainable transformation. In this way, these powerhouses can act as the engines of the world's economic growth and vitality. A wealth of challenges and opportunities is found in urban environments, not only in the urban production and consumption domain, but also in the resource and infrastructure potential of these cities (see e.g. Pumain and Moriconi-Ebrard 1997; Black and Henderson 2003; Duranton 2007). Modern cities are diverse and distinctive in their history and cultural heritage as well as in their ways of coping with economic, social and environmental challenges in a globally networked economy. A focus on the high potential of urban areas from a global perspective is necessary when facing long-run 'grand challenges'.

The implementation of effective strategies and actions in an urban setting will ensure that these cities are not only aware of their own strengths and weaknesses, but are also fit and able to adapt and prosper in a competitive global setting. Therefore, over the years, modern global cities have dramatically changed the way of managing dynamics in urban development in order to become and remain an attractive environment for various stakeholders, for example by attracting and retaining firms or tourists and by recruiting talented people in a vibrant urban environment. Clearly, global competition among cities or urban agglomerations is not a goal in itself, but mainly the outcome of a self-organizing process induced by the openness and interdependence of our

world. They may wish to enhance their international image, their socio-economic or cultural profile or their share in international resources or revenues in order to reinforce their relative position.

The repositioning of modern global cities calls for a solid evidence-based benchmarking analysis. This issue has prompted much empirical research on the ranking of cities, such as that of the Economist Intelligence Unit, which addresses the liveability of cities. Obvious caveats in comparing the performance of different cities are the differences in city size, the number of and type of indicators used, the sample of cities chosen, the goal of the interurban comparison, etc. Chapter 12 offers a comparative benchmark assessment of 40 world cities by investigating their detailed performance indicators on the basis of a recently developed multi-criteria model called MAMCA. A novel element here is the explicit consideration of the perceptions and priorities of various distinct classes of stakeholders.

2.5.2 High-performing cities

Cities have turned into forcefields with both centripetal and centrifugal movements in an open world, an observation already made more than two decades ago by Dematteis (1988). Especially the seminal work of Friedman (1986) on world city developments – leading to an urban system as an interconnected global system with a specific hierarchical functional structure – has inspired a considerable amount of research on globalization and urban development (see also Beaverstock et al. 1999; Knox and McCarthy 2005; Sassen 2006; McCann 2008; Kourtit et al. 2011). It is noteworthy that there is increasing interest in the performance of cities from a global perspective. Cities – and, increasingly, metropolitan areas – are indeed operating more and more on a world scale, in which monopolistic competition and product variety play a central role (see e.g. Abdel-Rahman and Fujita 1990; Glaeser et al. 1992; Quigley 1998; Becker and Henderson 2000; Duranton and Puga 2000). These agglomerations often act as economic growth engines, and mirror the fact that, in an open, global space economy, scale advantages are essential, an observation also made in the new economic geography. A prominent question is now: which agglomeration has the highest socio-economic performance? It has become fashionable to design rankings of cities, often from a number of different angles (e.g. accessibility, wealth, business climate, etc.).

Despite many future uncertainties, these global cities are likely to be able to develop creative and future-oriented strategies, initiatives and instruments that can be successfully implemented. Therefore, the filtering of challenges through a balanced vector of six original and promising success conditions – which are generally recognized as critical global factors – may prompt effective actions and policy improvements in order to exploit new urban strategies for overcoming the cities' weaknesses. There have been numerous attempts in recent years to rank the relative performance of cities in our world. Various attempts have been made to develop a classification or ranking of world cities based on their actual performance or their perceived success (see e.g. Grosveld 2002; Taylor et al. 2009; Arribas-Bel et al. 2011; Suzuki et al. 2011; Kourtit et al. 2012). Especially the seminal work of Taylor and associates has gained worldwide recognition.

The main challenge in empirical research is the development of a consistent, quantitative database that is appropriate for a comparative, strategic benchmark analysis. However, a pure ranking of world cities on the basis of their weighted achievement scores does not tell us very much about their economic efficiency, which in the long run will be decisive for their prosperity and sustainability. Therefore, Chapter 13 provides a more critical analysis of the performance of global cities by using data envelopment analysis (DEA) to position these cities on the basis of their relative performance in order to identify unambiguously the high performers ('exceptional places'), i.e. by relating their output to their input. This ratio is much more informative about the actual economic profile of the city concerned, seen from a global perspective.

2.5.3   Global digital connectivity

In the present era, cities are increasingly becoming complex connected networks ('network cities in city networks') and accommodating a rising share of the socio-economic activities of a nation as a result of proximity and density externalities. These spatial urban constellations have been studied in the urban science literature from a variety of different analytical perspectives (for a review, see Nijkamp 2008). Everywhere, cities and metropolitan areas are to some extent operating like business firms in an open globalizing world. Traditionally, infrastructure has acted essentially as the backbone of an interconnected economy, with a fractal representation at various geographical scale levels (see e.g. Batty and Longley 1994). The views on the position of global, international and connected (or network) cities have significantly changed over the years. Cities increasingly act in a system of connected networks that serve as strategic alliances for the development of our world (for an extensive urban network analysis, see Neal 2012). The majority of cities are now not only connected through conventional physical infrastructure, but also through modern digital infrastructure and virtual connectivity, viz. the transition to a 'digital economy', thanks to the introduction and large-scale penetration of information and communication technologies (ICT) in all sectors of the economy (see, *inter alia*, Cohen et al. 2002; Cohen and Nijkamp 2006).

In a more challenging way, the above-mentioned debate can be summarized under the heading of the validity of the 'death of distance' hypothesis (see Cairncross 2001). Despite the enormous amount of attention paid to this hypothesis, it has also been increasingly questioned (see Wang et al. 2003). A test of this hypothesis calls for solid empirical research (see also Gorman and Malecki 2002). Knowledge networks, the exchange of data and information and new forms of virtual communication create economic externalities that are beneficial to all the network agents and participants involved. A good example of modern virtual strategic networks among urban areas is found in brain circulation networks based on ICT advances in a modern knowledge economy. In the context of, for example, future Internet (Internet of Things), e-mobility and new energy and building concepts, several cities have already started demonstration activities and positioned themselves as innovative test beds. Modern ICT has led to shrinkage of our world, where in a few seconds we may in principle be connected with any other individual in any other place on the planet. Accessibility and connectivity are clearly of critical importance for urban

vitality in an open economy (see also Wegener and Fürst 1999; Bertolini 2006). In addition to the strategic reprofiling of urban areas into integrated network cities (including polycentric patterns), we also observe a new gradual transformation of urban agglomerations into (regional, national or even global) spatial-economic networks. Worldwide, urban areas are becoming centripetal and centrifugal nodes in complex multilayered networks (Taylor 2001, 2004; Taylor et al. 2002; Burger et al. 2009), in which regional and national borders will play a less important role. This may lead to the emergence of, for example, hierarchical networks or interconnected global networks of urban agglomerations. Clearly, this will prompt new research endeavours on complex network analysis. City global networks are definitely becoming a source of creative and strategic research on the future of metropolitan areas. However, the debate on the impacts of ICT on cities already has a respectable history (Castells 1996; Cohen et al. 2002). Furthermore, a limited number of studies regarding the impact of traditional and digital infrastructure in emerging economies – in particular China – can also be recorded (Démurger 2001; Ding and Haynes 2006).

Advanced infrastructure appears to be critical in many cases. An under-investigated issue, however, is the question of how cities and urban networks are related to digital spatial connectivity. Chapter 14 investigates whether in a spatial interaction model, in which the spatial interaction refers to the digital infrastructural capacity between global cities, with a particular focus on China, the standard Newtonian gravity model that is so often applied in physical flow models will still hold in a virtually connected world.

Parts A–D, described in a succinct way in the various sections of this chapter, make up the overall architecture of the present study. The multilayered constellation of interconnected parts and chapters together forms the '*urban piazza*', which provides the guiding principle for the structure of the present study. Each individual chapter (3–14) will now be presented at length in the remaining part of the study.

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PART A:

ENTREPRENEURIAL CREATIVITY

Creative and innovative resources

Super-efficiency and spatial productivity

Complex spatial-economic architecture

3 IN SEARCH OF CREATIVE CHAMPIONS IN HIGH-TECH SPACES – A SPATIAL APPLICATION OF STRATEGIC PERFORMANCE MANAGEMENT*

Abstract

The business performance of firms in the creative high-tech sector shows much variation. This paper examines whether the geographical location of such business firms influences the performance of these firms. The overarching analysis framework of this paper emerges from the recently developed Strategic Performance Management (SPM) concept for individual firms, which in the present study is extended with spatial meso-attributes related to the location of these firms. SPM aims to improve the firms' competitive performance through the application of strict internal management principles. Our study thus adopts a micro-business perspective on the organizational determinants of a firm's economic performance and its links with distinct spatial entrepreneurship conditions and general economic moderator variables. The present study focuses on both large and small and medium-sized (SME) firms, mainly operating in the creative high-tech sector in the Netherlands. The research methodology uses stepwise the following analytical tools: multivariate analysis of an extensive micro- and meso-data set on the internal performance of firms and regional covariates; Data Envelopment Analysis (DEA) and its recent extension to super-efficient DEA for mapping out in a comparative way the achievements of both regions and firms; a GIS-oriented statistical analysis to identify geographically-discriminating factors in the firms' performance; and the design and estimation of a Structural Equations Model (SEM) for assessing the performance of the firms concerned (using what is called the '*flying disc*' model). Our results show significant differences in the performance of large vis-à-vis SME firms that have adopted SPM, while their geographical position in the country, in general, also plays a significant role.

Keywords: creative industries, high-tech sector, Data Envelopment Analysis (DEA), super-efficient DEA, principal component analysis, Structural Equations Model, flying disc model

3.1   Aims and Scope

Modern regional development policy finds its origin in both micro-based location theory and meso- or macro-oriented economic growth theory (see, e.g., Capello and Nijkamp, 2009; Kourtit et al., 2011a; Stimson et al., 2011). In recent years, a wealth of new contributions to a better understanding of spatial dynamics has been published. In particular, *regional innovation theory* – in association with spatial endogenous growth theory – and *modern agglomeration theory* – in association with the New Economic Geography – have acquired a prominent place in regional growth analysis (see, e.g., Acs and Armington, 2006; Acs and Varga, 2002; Brakman et al., 2001, Crescenzi and Rodriguez-Pose, 2011; Fujita and Thisse, 2003; Karlsson et al., 2009; Redding, 2010). These frameworks form important conceptual cornerstones of the present study.

Despite many advances in the above mentioned frameworks, it is surprising that recent approaches in the management sciences and business administration literature have hardly been applied in contemporary economic growth research. In particular, business performance analysis – as a solid framework for understanding entrepreneurial learning strategies and developing comparative benchmarking principles – is an underdeveloped part of current regional growth studies. The present paper seeks to fill this gap by offering a coherent blend of three strands of the literature: (i) *neo-innovation theory,* in which economic growth is connected with creative entrepreneurship, in the vein of endogenous growth theory (see, e.g., Acs, 2002; Boschma and Fritsch, 2007; Stough, 1998); (ii) *new spatial-economic network theory,* in which industrial district concepts (à la Marshall) are connected with industrial network and 'filières' concepts, often under the umbrella of New Economic Geography principles (see Capello, 2008; Karlsson et al., 2010; Martin and Ottaviano, 1999); (iii) *extended strategic performance analysis* from the business and management literature, in which internal micro-economic efficiency analysis at the firm level – called Strategic Performance Management (SPM) – is connected with spatial-economic covariates by, inter alia, designing and applying quantitative benchmark analyses that use new variants of comparative Data Envelopment Analysis (DEA) (see Kourtit et al., 2011b).

The primary aim of our study is now to trace *where* (i.e. in which type of region, such as urban, semi-urban, or rural areas) the highest performing firms (known as '*creative champions*') (notably with a high knowledge intensity) in the innovative and creative sector can be found, and why. In our research, a distinction is made between adoption and non-adoption of SPM, in both large firms and small and medium-sized enterprises (SMEs). The empirical work focuses on firms and regions in the Netherlands. Our analysis framework comprises: (i) a super-efficient Data Envelopment Analysis (DEA) of individual firms, so as to identify '*exceptional firms*' that have an extraordinary business performance; (ii) a GIS-oriented analysis of the spatial-economic profile of the regions where these firms are located, using a multivariate analysis of the spatial moderator variables; (iii) the design and estimation of a Structural Equations Model (SEM) in order to provide a comprehensive econometric estimation of the complex champions-regions nexus.

This paper is organized as follows. Section 2 is devoted to a concise and selective overview of the innovation and creative business literature. Next, Section 3 addresses the geography of the

competitive performance of firms (including an outline of SPM), and leads to the design and presentation of a conceptual *'flying disc'* model. Then, in Section 4, the database employed and the architecture of our exploratory data analysis are described. Section 5 provides a concise introduction to super-efficient DEA for discriminating between the performances of *'creative champions'*, while the empirical results are provided in Section 6, leading to the identification of *'exceptional firms'*. This information is then further used in Section 7, which presents the results of our operational *'flying disc'* model linking micro- and meso-data, including an interpretation of our findings on firms and regions in the Netherlands. Section 8 contains the description, estimation, and interpretation of the causal effect (or path) model for our spatial SPM analysis, using an integrated SEM. Finally, Section 9 makes some retrospective and prospective observations on our research.

3.2   Creative Firms in Creative Spaces

The geographical location and spatial clustering of industries – including the spatial distribution of firms over urban, urbanized and rural areas – has received intense attention in recent years. This issue has repeatedly been addressed in the past literature on economic and geographical networks, economic development policy, and business strategies. Dating back to Marshall's concept of industrial districts (Marshall, 1920), agglomeration economies related to market-pull effects and interactive network externalities – as sources of higher and sustained economic growth – have in recent decades been analysed, both conceptually and empirically, by various authors (see, for instance, Capello, 2008; Malmberg and Maskell, 1997; Porter, 1990). A renewed interest has emerged because of the far-reaching influence that localized concentrations of creative economic activity may have on regional and national economies, in particular through creating new businesses and job opportunities, or through an increase in advanced competitiveness, e.g. caused by regional and economic specialization. Such a new geographical force field may induce the development of creative clusters and hubs. Clearly, the current geographical dynamics of industry in a global context means that competition between regions, cities and firms is tending to intensify. The rise in creativity, productivity, R&D intensity, entrepreneurship and sustainability is an important characteristic of an innovative spatial system (*'creative spaces'*). Firms operating in an environment of heterogeneous market development – for instance, through monopolistic competition – aim to outperform others in a diversified spatial product or service system, which prompts the development of such *'creative spaces'* (cities or regions), the achievement of competitive knowledge-driven local or regional economies, and an increase in trade competitiveness, both regionally and globally (see, e.g., Fujita and Thisse, 2002; McCann, 2007, Czarnitzki and Hottenrott, 2008).

It should be added that innovation and entrepreneurship benefits are also related to the level and type of – as well as access to – market information and knowledge exchange within a broader spatial-economic network system. These conditions are often met in the creative sectors and industries, such as high-tech industries, business and financial services sectors operating in

knowledge-intensive market segments with high-skilled (high-wage) workers, and specialized cultural industries. The 'new paradigm' of creativity, innovation and entrepreneurship – and the upsurge of scientific research in this domain – is often ascribed to the emerging dominance and perceived international success of the creative sector[1], in connection with successful and promising industrial locations of this business. This new interest originates mainly from Florida's (2002, 2003) and Scott's (2000) seminal work on the economic importance of the Creative Industries (CIs) in modern cities. Its importance is also illustrated in a study on European countries which shows that, between 1999 and 2003, the growth in value added in the EU GDP from the creative sector was 6.5 per cent for the EU-25 (KEA, 2006). Over the same period, this sector developed at a considerably faster pace than the average growth rate for the European economy as a whole. CIs – and in particular the creative branches with a high knowledge intensity – are increasingly regarded as strategic vehicles to introduce new technological innovations, or as new tools for delivering more innovative products and services. These branches normally reflect a high degree of professional specificity to generate significant added value for the stakeholders and their firms, both economically and spiritually. They are often characterized by rapidly changing design specifications in order to serve increasingly individualistic lifestyles (Scott, 2006). Usually, they also have a high potential to unlock and serve new markets with high levels of macroeconomic uncertainty and a dynamic spatial-economic and flexible business climate. And, finally, they are often found in geographical clusters as part of their new positioning and marketing strategies, while they frequently use a common and fashionable marketing language to reach customers across many borders, especially in the context of creativity, innovation, and sustainable development (see Ioannides, 2010). Admittedly, their business model already dates back to Porter's *Five Forces Model* (1979) and Ansoff's (1957) *Business Growth Theory*.

Especially from a dynamic competence point of view, the local and regional determinants, capabilities and resources – along with advanced infrastructure and other geographical or cluster facilities – are decisive for the relatively strong competitive position of high-tech firms. Meeting these conditions ensures and fosters long-term viability for a creative and innovative business process, including financial-economic viability or survival potential. CIs tend to prefer places that are diverse, tolerant and open to new ideas, and in which regional economic growth is induced, driven by successful geographical or locational choices of others (Grimes and White, 2005).

In conclusion, a wealth of literature suggests that geographical and location-specific facilities, smart resources and market accessibility, tolerance and creativeness, knowledge production and commercialization, and the adoption of a modern business lifestyle (see, e.g., Bögenhold et al., 2001; Romein and Albu, 2002; Yamoto and Hirose, 2007; Winters, 2011;

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[1] Source: Kourtit, K. and Nijkamp, P. (2013), In search of creative champions in high-tech spaces: A spatial application of strategic performance management, *Journal of Regional Science* (accepted for publication).

It should be noted that the creative sector may have two components: a) specific industrial branches, in particular the arts sector, the media and communication sector, advertising and publishing, architecture, fashion and design, performing arts and the cultural sector; and b) specific parts of all other economic sectors that specialize in the creation of new ideas, concepts or inventions (e.g. dedicated consultancy services, think tanks or R&D divisions of corporate organizations, etc.).

Glaeser et al., 2010) are important drivers of the performance levels of CIs. This holds in particular for the availability of information and communication technologies and modern and sustainable transport and logistic systems, especially for attracting and retaining these firms and for recruiting talented people in vibrant environments in modern and networked agglomerations.

This summary of the characteristics of the CIs will now be used as a selection mechanism for identifying creative firms in our fieldwork. Rather than mechanically using secondary data provided by statistical offices, we aim to identify – on the basis of primary data on intrinsic firm characteristics – a set of firms in the creative high-tech sector that may qualify as '*creative champions*'. This selection is then further tested through in-depth field interviews. A novel feature of our research is that – as well as an analysis of generally accepted drivers of the locational behaviour of CI firms – the focus is specifically on the use – and the maturity of acceptance – of SPM. This integrative perspective will be further outlined in Section 3.

3.3   The Geography of Strategic Performance Analysis: the '*Flying Disc*' Model

A strategic performance analysis serves to induce a flexible business response in a rapidly changing, globally competitive economy. Firms have to identify their competitors, and then to develop business and marketing strategies in order to gain competitive advantage, to create unique selling propositions, to react appropriately to competitors, to prevent costly competition, to gain brand loyalty, and to actively market to targeted customer groups. Creative firms in particular must be able to design attractive strategies, and continually provide high-quality innovative goods and services to reach business markets in novel ways and stay ahead of fierce – often global – competition.

The growing importance of geographical markets and external changes in the high-tech industries puts great emphasis on creative entrepreneurship (information and knowledge-based economic activities), and on locational decision making and spatial strategies, for example, moving away from mass production to flexible innovation and specialization ('learning curve effects') (Scott, 1988). This has further intensified and supported the need for efficient and effective management techniques for executing innovative business strategies and enhanced performance (Millett, 1998; Haas and Kleingeld, 1999; Norreklit, 2000; Zeng and Zhao, 2005; Teece et al., 1997). This new management literature has also emphasized the geographical aspects of segmented industrial markets or '*meso-segments*' (an important element of spatial market planning), which encourages businesses to stay competitive and profitable. The currently most popular management tool in modern business practice is Strategic Performance Management (SPM) (Davis and Albright, 2004).

SPM can be understood as a "business supporting process where steering of the organization takes place through the systematic definition of mission, strategy and objectives of the organization, making these measurable through critical success factors and key performance indicators, in order to be able to take corrective actions to keep the organization on track" (de Waal, 2007). SPM is thus a tool for assessing business creativity, in order to: address continuously changing business

environments; develop systematic strategic tools that improve the organization's capability to cope with continuous competitiveness; and ensure a permanent innovative business attitude among managers. SPM requires firms to understand not only the '*what*' and '*how*' issues, but also the '*where*' question, in order to advance strategy, policy formation, business execution and, in turn, accountability. The locational and spatial market dimension is of critical importance in any business process and decision making. It provides spatial information and knowledge from outside the firm about (scarce) capital resources and trends in a changing spatial business environment (Covey, 2003; Kourtit et al., 2011b). It is a process that starts with understanding where business performance is today (positioning), which direction it should take (strategic planning), what targets should be set, and how (internal and external) resources should be allocated to achieve relevant business targets. SPM can help firms to channel and mobilize geographical resources towards their most important strategic objectives, in order to achieve the desired goals related to their strategic vision, and, in addition, it may encourage businesses to stay competitive and profitable.

From the rich SPM literature, it appears that this concept offers useful opportunities not only for managing human capital but also for acquiring a sustainable competitive advantage by creating an environment that fosters entrepreneurship. This, coupled with the adoption of the geographical concentration of relevant economic activities or business operations, provides a new key way to boost growth, and strengthen the competitive position of firms, or, if necessary, to cooperate. This is empirically confirmed in a recent study by de Waal et al. (2009), who find that firms that have a completely implemented an SPM system[2] (also referred to as '*creative champions*') are becoming more competitive than firms that are still in the process of considering such a system. Furthermore, firms that have not yet – but almost – completed the implementation of an SPM system are also gaining qualitative benefits, but lower financial revenues.

An important question is now: How does the SPM framework – addressing the internal management strategies of the firm – relate to the region concerned? The spatial analysis of business location is traditionally analysed within a regional-economic framework, which emphasizes the role of specific competitive advantages that a certain geographical location may offer to a wide variety of industries. Classical studies of Ross (1896), Marshall (1920) and Weber (1929) (based on neoclassical location-production models) have laid the foundations for evaluating the competitive advantage of firms or even entire industries by identifying and developing a set of critical location factors (e.g. labour, suppliers, transport), based upon least cost solutions. More recently, the work of Porter (1998a,b), which builds essentially on Ricardo's theory of comparative cost advantage, provides a practical, strategic framework by highlighting patterns of business location attractiveness and the values of an industry structure or economic activity that yield additional benefits to maximize productivity and profitability. Against this background, SPM is a strategic internal tool to reinforce the firm's position in the external (e.g. regional) world.

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[2] A 'completely implemented' SPM means that there is a fully operational system in place that contains critical success factor and key performance indicator data of the firm, which is used on a regular basis to monitor, discuss, and manage business performance related issues (de Waal et al., 2009), at a detailed spatial level. In this context, maturity is defined as a measure of the level of strategic performance development (or sophistication) of a strategic business process.

The previous analysis suggests clearly that a geographical concentration or agglomeration of firms engaged in similar or related activities tends to enhance competitiveness. This has prompted the development of various business advantages (external economies), such as a large pool of specialized workers; suppliers of materials and specialized services; easy access to suppliers of specialized inputs and services; the quick dissemination and building of a multifaceted community by sharing new resources, knowledge, and experience; and the ability to harness local intelligence to meet many challenges (see also Arikan and Schilling, 2011; Karaev et al., 2007; de Leeuw and van den Berg, 2010; McCann and Folta, 2011; van Oort, 2004).

There is an extensive recent literature on the critical importance of various types of capital for regional growth and efficiency, sometimes combined in the umbrella notion of 'territorial capital' (see Capello et al., 2011)

An integrative synthesis of the literature review in Sections 2 and 3 allows us to highlight in a comprehensive way the particular importance of three distinct classes of external (regional) critical success factors ('drivers') for a competitive spatial performance of CI firms, viz.:

- *Regional Growth Resources,* which comprise, inter alia, talents, skills and innovative entrepreneurial attitudes.
- *Regional Community Resources,* which refer mainly to mutual trust in society and 'smart citizenship'.
- *Regional Attraction Resources,* which concern pull factors such as infrastructure, suprastructure and cultural amenities.

The above three drivers are essentially latent constructs that cannot be directly measured in quantitative terms. They may be further subdivided into distinct categories of explanatory production factors that may be appropriate for empirical measurement in the applied part of our research (for a similar type of approach, see Jones and Romer, 2010). This hierarchical decomposition is based on the three above-mentioned classes of resources derived from the previous literature overview, and uses the following systematic typology of regional input or capital factors for each of the three resources concerned:

- *Regional Growth Resources (**Reg Growth Res**)* contains three capital factors, namely:
  - *Creative Capital (**Crea Cap**):* consists of measurable variables such as numbers of creative professionals and talents in creative sectors, meeting points for professionals, innovative entrepreneurial climate, or multicultural neighbourhoods, which are primarily responsible for urban innovations, sustainable socio-economic growth, and the transformation of regions and cities.
  - *Human Capital (**Hum Cap**):* contains competences, social and personality attributes such as the economically active population, skilled labour force, per capita GDP, rise in knowledge intensity, share of higher wages, or level of educational attainment. All these may be considered as important inputs that facilitate spillovers and the rise in

knowledge necessary for productivity, innovation and economic growth, and may lead to a new focus on the role of learning and skills in the local innovation economy.

- *Economic Capital (**Econ Cap**)*: consists of standard capital variables that include financial credit markets and support businesses, domestic price indices, unemployment rates, foreign direct investments, innovative entrepreneurial business climate, or R&D expenditures (both private and public); these variables are typically instrumental for a higher level of sustainability and innovation that creates local wealth and generate economic prosperity.

- *Regional Community Resources (**Reg Comm Res**)* refers to two capital factors, namely:
  - *Social Capital (**Soc Cap**)*: contains social network conditions such as social and informal linkages (e.g. participation in – and membership of – business or sport clubs, etc.), civil engagement, enforceability of societal contracts, quality and quantity of social interactions within communities, participation in policymaking, religiosity, presence of health centres, and quality-of-life neighbourhoods; these may improve the quality of society's collective welfare and transfer its human capital into greater socio-economic prosperity which facilitates sustainability.

  - *Knowledge Capital (**Know Cap**)*: includes valuable resources such as higher education institutions, share of knowledge workers in the total working population, rise in scientific and artistic activity, knowledge creation in terms of patent applications, or R&D expenditures in higher education; all these ensure that the regional economy benefits from the related knowledge spillovers together with sharing and developing new knowledge, and improving or promoting innovations in regions which generate economic wealth and achieve competitive advantages.

- *Regional Attraction Resources (**Reg Attrac Res**)* is composed of three factors, namely:
  - *Connectivity Capital (**Conn Cap**)*: is composed of variables such as mass transit facilities, airports, highways, ports, mobility of population and workforce, length of roads, motorways and rail tracks, number of telephone mainlines, or electricity generation capacity; such infrastructural provisions have positive effects on the production and consumption side of the economy. This factor demonstrates how the interdependent aspects of various (formal and informal) networks that comprise various regional attraction resources result in the emergent socio-economic performance patterns of regions and cities.

  - *Technological Capital (**Tech Cap**)*: contains ICT resources such as telecommunications access and use of digital government sources; this increasingly means access to global relationships and (informal and formal) networks, as they highlight economies of scale.

  - *Cultural Capital (**Cult Cap**)*: refers to non-financial social assets linked to the arts and culture in a way that combines a wide range of amenities, such as public provision for the arts and culture, cultural and creative activities, cultural participation, number of visits to cultural and recreation services (museums, art galleries, theatres, cinemas, sports events), or cultural support systems.

These eight types of capital resources – decomposed from the three original classes of resources – call for their more evidence-based empirical measurement on the basis of an extensive data base. The empirical assessment of the impact of these input or capital resources on the performance of the business sector (*BPF*) will be discussed in Section 4 of the present paper.

As well as the external forces, the business performance and the rise of firms' productivity in the CI sectors are also determined by internal SPM strategies aimed at enhancing in particular three business output objectives: (i) the profitability goals of firms (*Prof*); (ii) the quality of products or services offered (*Qual*); and (iii) the commitment of firms in realizing their business objectives (*Busc*). Thus, *BPF* can be decomposed into *Prof, Qual,* and *Busc*. The specific choice and definition of these three output-oriented categories emerges from a multivariate analysis of a set of relevant variables representing the most relevant components of SPM strategies of the sample of individual firms investigated in our study, and will be further justified in Section 4 as well.

The integration of the external regional drivers of the business performance of individual firms with the internal SPM strategy indicators leads essentially to a complex multilevel conceptual model. The merger of the internal-external force field (input and outputs) of the CI firms' performance levels can now systematically be incorporated in a stylized dynamic cause-effect framework, which we call the '*flying disc*' model (see Figure 1).
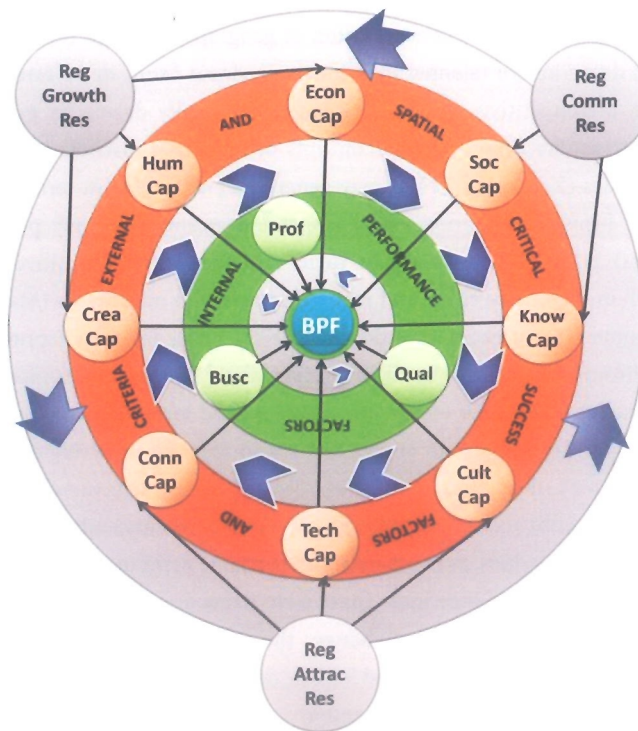

Figure 1. Architecture of the '*flying disc*' model of firms' business performance in geographical space

This 'flying disc' model connects micro-data on firms with meso-data on regional covariates and clearly has a multilevel structure. Multilevel models are based on a hierarchical organization in which units at one level are grouped within units at the next higher level (Gelman and Hill, 2007; Goldstein, 1987, 2003). Such a hierarchical decomposition offers an appropriate model design in multidimensional social science research, and has found extensive applications in many domains (see e.g., Bliese, 2009; Corrado and Fingleton, 2012; Islam et al., 2006; Klein and Kozlouski, 2000; Snijders and Bosker, 1999).

The 'flying disc' model serves as a strategic navigation instrument that maps out main directions in a comprehensive micro-meso framework, which includes an integrated set of essential locational factors (inputs) in core geographical zones, as well as linkages that determine a firm's micro-business performance (outputs). This framework is a tool to evaluate and rank the comprehensive performance of firms in the creative sector, provided that detailed assessments of geographical and urban determinants are available. These determinants are at the core of the 'flying disc' model that encompasses prominent input factors which are of decisive importance for the firm's performance (output).

The 'flying disc' framework raises intriguing issues concerning the role of contextual factors, the urban and regional climate, and the cultural 'milieu', as referred to by Florida and others (see also Landry, 2000; Roberts, 2006). Their presence may create critical conditions for the attractiveness of a city, a favourable concentration of geographical space (clusters), and a sound basis for locational decisions (of talented individuals, business firms, or investors), as well as for business success in a competitive economic system traditionally driven by profit motives. The concept of spatial proximity (based on the concepts of industrial districts à la Marshall (1920) and external economies (Krugman, 1991)) may generate new benefits in terms of efficiency and competitiveness for firms. Furthermore, such a spatial concentration may positively influence the firm's (business) performance which, in turn, may bring about positive socio-economic achievements which may enhance cities' and regions' competitive advantages (Martin et al., 2008). In other words, agglomeration economies do not directly foster regional economic growth, but do so indirectly, through their effect on firm performance. In this way, regions and cities use their indigenous resources and offer unique geographical and locational conditions and facilities – beyond other competitive assets – to attract talent and firms to relatively deprived regions in order to generate positive externalities. In other words, agglomeration economies may lift a firm to achieve an exceptional performance by facilitating it with competitive advantages to outperform other firms in competitive markets, as compared with the same firms or sectors in different regions (Passemard and Kleiner, 2000). Since most innovative firms are operating under conditions of complexity, acceleration, and continuous change, the implementation of promising strategic decisions and the integration of locational and logistic decisions into their daily corporate strategy are extremely important for their strategic planning.

The *'flying disc'* picture shows how macro- and meso-determinants (regional, general) have an impact on the individual firm's performance. This calls for extensive data at both firm and regional levels. Before focusing on the statistical-econometric aspects of the *'flying disc'* model, we first pay attention to the database used in our study, as well as to a novel framework for assessing business performance based on super-efficient Data Envelopment Analysis (DEA), with which we are able to determine the relative achievement of the business firms under investigation.

3.4 Database on Regions and Firms

Our empirical research seeks to explore in particular to what extent a firm's location (including both the spatial profile of its business activity and more general entrepreneurship conditions and economic moderator variables) influences the firm's performance (see our *'flying disc'* framework). Thus, the performance of a firm is determined not only by its internal decisions, but also by the geographical and local business environment of that firm.

In our empirical application, we make use of a large, original macro/meso- and micro-scale data set in the Netherlands. The macro-meso-set contains approx. 400 different spatial socio-economic data collected at the level of Dutch municipalities and regions. These data are quantitative measurements of the relevant aspects of the eight regional capital categories described in Figure 1. Each of these eight categories thus comprises various relevant data related to each of the categories (see Section 3). These variables – individually and in combination – are assumed to act as drivers of the business performance of firms in the municipality or region concerned. Not all data, however, were available at the same geographical level in the Netherlands, so that we were forced to aggregate consistently all available data from different geographical scales into what is called the COROP level (which contains 40 Dutch regions) by using GIS interface methods. These COROP regions cover the entire country and correspond to the standard EU NUTS-3 level (for details, see the map presented in Figure 2). The meso-spatial data (both municipal and regional) used in our study were provided, inter alia, by Statistics Netherlands (CBS). Our final database contained detailed information about geographical and regional socio-economic indicators regarding the location characteristics and meso-environmental factors of the 40 Dutch COROP regions (2008).

The system of COROP regions can be used for different spatial zoning analyses in the country depending on the classification concerned (for an illustration, see also Figure 10). A first classification of these regions is according to their degree of *centrality*: the *Randstad Core Region* (the highly-connected and densely-populated Western part of the Netherlands); the *Intermediate Zone* (a semi-circle of semi-urban areas); and the *Periphery* (a set of less connected, more low-density and isolated areas). Another classification – consistent with the previous one – is into *urbanization* levels, with a distinction of the COROP regions into 5 grades of urbanization (ranging from very urbanized regions – with more than 2,500 addresses per square kilometre – to non-urbanized areas – with less than 500 addresses per square kilometre). Both spatial demarcations will be used in our case study.

Figure 2: Map of the 40 COROP regions in the Netherlands
Source: http://en.wikipedia.org/wiki/COROP

    Besides the spatial data at a regional scale, we also obtained detailed micro-information about a multiplicity of relevant business characteristics – based on the SPM methodology – of a large set of individual firms in the creative high-tech sector in the Netherlands, in all of which SPM played a role. The choice of these firms deserves some clarification. The first selection mechanism for these firms was partly based on information from Dutch industrial branch organizations on the management profile of high-tech and knowledge intensive firms, and partly on previous expert contacts established with them, so that easy access was facilitated. In the selection of firms, we aimed for a reasonable degree of representativeness of firms over various regions. The final set of participating companies, all from the private sector, was next selected on the basis of two distinct criteria: namely, whether they operated in the creative industry[3], and were familiar with, or had implemented and used, SPM measurement systems. The individual firm data are related to both output and input (quantitative and qualitative) performance characteristics, as well as to the motivational and driving forces that are decisive for turning the firm into a high-performance firm, a *'creative champion'*, in each part of its business operation. In order to identify the opportunities

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[3] Creative industries in our study refer to a range of selected economic activities in the sectors of advertising, architecture, arts, culture tourism services, design, fashion, film, R&D, high-tech, games, and media.

and barriers associated with the business performance of these firms in the Netherlands, extensive personal interviews were organized (typically conducted face-to-face) with important executives and firm officials (e.g. chairman of the board, HRM director, region manager, cluster manager, division COO, CFO, operations manager, network senior vice-president, research vice-president). On average, four such key officers in each firm were interviewed. For practical reasons it was rather hard to conduct full-scale interviews with more than 240 persons. But the wealth of in-depth insights from such interviews appeared to be far higher than could be obtained with the use of secondary data. Thus, our data set is based on an in-depth survey questionnaire in our search for such *'creative champions'*.

In the interview rounds, a systematic format was followed. As a prior broad literature search did not create a solid basis for a satisfactory and validated questionnaire which would enable us to obtain verified and systematically-structured information from the managers in these firms on their critical success factors, a self-composed 'statement questionnaire' was used[4]. First, very detailed performance statements in the questionnaire were identified from the broad literature available (indicators were converted into statements and presented to the interviewees), and these were then formulated so that the interviewees could give them a rating on a 5-point Likert scale, varying from '1= *not at all*' (i.e. 'we did not experience any SPM (quantitative and qualitative) advantage at all') to '5 = *very strong*' (i.e. 'we experienced the SPM (quantitative and qualitative) advantage very strongly'). The interviewees were also asked if they had experienced other clear disadvantages from the implementation and use of the SPM measurement system in their organization (for details, see also Kourtit and Nijkamp et al., 2011b).

It should be noted that this type of research – which is rather common in business administration and industrial organization, but less in regional science – is based much more on in-depth case study investigations from which categorical information has to be translated into standardized data, for instance, a Likert scale. It should be noted that the number of firms that have introduced a mature SPM system is not excessively large, and hence the sample is by definition limited in size. Clearly, the collection of 240 information files was a major effort requiring many person-months of skilled work. As a consequence, in this type of face-to-face research the number of interviewees can never be very large, for obvious reasons. This may, of course, prompt a discussion on the representativeness of the findings. But it should be noted that in advanced case study research a good stopping rule is reached when the marginal new information content of any additional interviewer is rapidly declining (see Yin, 2003). And this also formed the basis for deciding on the size of the sample. Ultimately, a sample size of 240 interviews on 60 firms turned out to be satisfactory.

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[4] The questionnaire was first tested at a company level, after which some adjustments were made in the formulation of several questions. As mentioned, a total of 240 representative people (organizational staff members, key functionaries) of 60 creative business firms (19 large firms and 41 SMEs) were interviewed. The interview reports were sent to the interviewees for confirmation of their responses. After the interviewees had approved the interview reports, the answers given were averaged for each company so as to obtain a representative robust picture.

The precise geographical coordinates of these firms were, of course, known. And therefore, it was possible to assign the location of each individual firm unambiguously to the local or regional level employed in our study. Next, a spatial GIS-oriented statistical analysis was applied to integrate the variety of original micro- and meso-scale data formats to uncover geographically-discriminating factors in the firms' performance. In order to avoid the collection and use of an overwhelming amount of unstructured micro- and meso-scale data, and to obtain a better insight into the achievements of the Dutch firms in the period considered, as well as to get a systematic idea about the most crucial characteristics of the different regions and firms in our subsequent statistical analysis, the long list of indicators was systematized and summarized by means of a Principal Component Analysis (PCA). This was done in two steps, namely for both the input and the output (performance) variables.

The first step was based on a multivariate analysis of the wealth of regional meso-input indicators and variables that altogether made up the eight classes of capital mentioned in Section 3 (see the 'flying disc' model). Each type of capital was described by a collection of relevant indicators (ranging typically from 20 to 40 in number). Next, a PCA was applied to each of these eight multivariate constructs so as to identify the most characteristic orthogonal components for each of these eight input categories. Typically, for each of these eight capital classes, we extracted the two most important components from the PCA, so that altogether our multiregional data set on the regional input indicators for the SPM of individual firms was reduced to 16 independent indicators.

The next step was to collect and digest the detailed SPM micro-information on performance data obtained from the interviews with all firms under consideration. Altogether, for each firm 26 appropriate covariates were selected and used that may be seen as representative indicators which map out the constituents of the firm's business performance (*BPF*). In this case, again a PCA was applied. An analysis of these results led – as already mentioned in Section 3 – to the identification of three prominent factors, called Profitability Goals (*Prof*), Quality Orientation (*Qual*), and Business Commitment (*Busc*).

The integration of the transformed spatial meso-data and the transformed micro-data led to a new structured analysis framework, which was next used for two subsequent stages of the research: (i) an exploratory comparative DEA benchmark analysis of the differences in business performance of firms (in search of 'creative champions'); and (ii) an explanatory analysis based on Structural Equations Modelling in order to trace the regional drivers in the performance analysis of individual firms. The multilevel operational structure of the resulting measurement model is presented in Figure 3. As explained earlier, the foundation of this figure is formed by the conceptual 'flying disc' model (Figure 1). Figure 3 offers more detail on the methodology employed in our research. This figure combines the input variables (comprising the determining socio-economic and contextual covariates) with the output variables (comprising the business performance results). It thus forms an operational analytical framework for the assessment of the

firms' performance using DEA, while correcting for the impact of regional moderator variables. Clearly, Figure 3 contains our *'flying disc'* model as a basic subsystem.
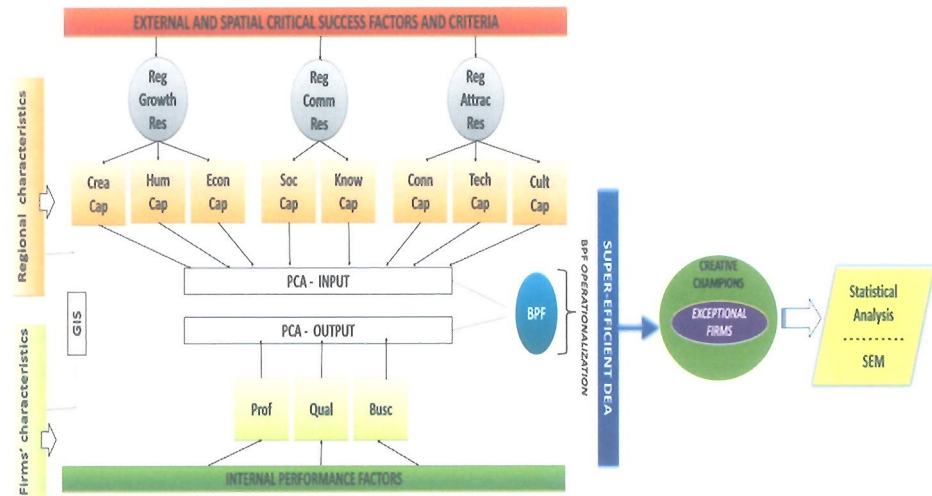

Figure 3. Architecture of the measurement model on 'exceptional firms'

3.5 DEA Benchmark Analysis of Creative Champions[5]

We now analyse the business performance of our sample of Dutch firms. As mentioned, we employ DEA to judge the efficiency (or relative performance levels) of the firms concerned, in our search of *'creative champions'*. This comparative analysis of the efficiency of organizations ('benchmarking') takes place through a study of inputs (including geographical and locational variables) in relation to outputs (including business performance results).

DEA has become an important analytical tool for the quantitative assessment of the performance or efficiency of organizations, and has had many applications in both the private and the public sector. The applications serve mainly to enable a comparative investigation of the efficiency – in terms of the ratio of output to input – of decision-making units (DMUs). DEA has quite a long history, mainly dating back to the seminal article of Charnes, Cooper and Rhodes (1978), and is therefore often referred to as a CCR analysis. The main idea is to determine the quantitative distance between the input position of a given DMU and the production possibility frontier (i.e. the efficiency frontier) formed by the input profiles of all DMUs under consideration. If the DMU concerned is located on this frontier, its efficiency is 1; otherwise, it falls in between 0 and 1. This standard DEA approach, based on input efficiency, is usually called the CCR-I model.

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[5] The authors wish to thank Soushi Suzuki for his great help in carrying out the various DEA calculations.

Clearly, one may also analyse the output efficiency, which is just a complementary operation. In the CCR-I model, a DMU may become more efficient by reducing its inputs for a given output vector (or, alternatively, by increasing its outputs for a given input vector). It is clear that DEA has a close resemblance to multi-objective programming (see Golany, 1988). How this improvement of efficiency may be achieved depends on the distance function between the input profile of a given DMU and the efficiency frontier. In addition to a standard radial distance function in the CCR-I model, alternative distance functions have also been proposed in the literature, viz. a context-dependent (or stepwise improvement) distance model (see Seiford and Zhu, 2003), a distance friction minimization model (see Suzuki et al., 2010, 2011), or a mix of both approaches (see Suzuki and Nijkamp, 2011).

DEA has seen a great diversity of applications to the performance assessment of both private and public organizations. A review of DEA applications by Seiford in 2005 already mentions more than 2800 applications. In addition to determenatic also stochastic DEA models have been developed. DEA has also been applied several times in regional performance studies (see, e.g., Afonso and Fernandez, 2006; Athanassopoulos and Karkazis, 1997; Halkos and Tzeremes, 2010; Kourtit et al., 2011c; Macmillan, 1986; Maudos et al., 2000; Suzuki et al., 2010, 2011; Zhu, 2001). For a more recent interesting contribution on a joint use of DEA and an SPM approach we refer to Medina-Borja et al. (2007). In our study on the relative business performance of firms in the Netherlands, we extend the conventional DEA approach to create a new version, which is briefly explained here. In standard DEA models, high performers all have a unit efficiency-score, so that it is hard to discriminate between them. Nicole et al. (2002) have provided an overview of various ranking methods for identifying unambiguously high performers (i.e. to identify '*exceptional firms*', viz. super-efficiency analysis, benchmarking, multivariate statistical analysis, proportional measurement of inefficiency, preference elicitation, and cross-efficiency analysis). In our approach, we use a super-efficient DEA, as this method involves a minimum of additional assumptions to generate unambiguous results. A super-efficient DEA uses the multi-objective linear programming nature of DEA. It is based on the elimination of a given DMU from a dual linear programming system and a subsequent assessment of its consequences in the efficiency set.

Super-efficiency aims to address the limitation that in most DEAs a set of multiple, equally high-ranking efficient DMUs is found (each with an efficiency score of 1). And this prompts the question whether it is possible to identify among this class of high-performing DMUs (i.e. '*creative champions*') the most successful DMUs, known as 'super-efficient DMUs', or, in our case, the '*exceptional firms*'. Hence, there is a need for a more sophisticated analysis based on the concept of super-efficiency. The super-efficiency notion seeks to arrive at a complete ranking in terms of amended efficiency rates for all firms (meaning a differentiation among efficient firms with an initial score of 1). It successively eliminates (one by one) each firm from the efficiency frontier, and then measures the new distance from that firm to the adjusted production possibility frontier. If the distance is small, then the super-efficiency is also small, and vice versa. A good exposition on super-efficiency can be found in Anderson and Petersen (1993), who have laid the basis for

super-efficiency analysis in order to get a complete ranking of all efficient DMUs. This approach was subsequently remodelled by Tore (2000, 2002) into a slacks-based model. The efficiency scores from their super-efficiency model are then obtained by successively eliminating the data on the DMU to be evaluated from the solution set. For the input model this can result in efficiency scores which may be interpreted – according to the DMU position – as a numerical rating of super-efficient DMUs. Such values are then used to rank all efficient DMUs; this operation may then lead to efficiency scores above 1. The super-efficiency model is therefore suitable to find unambiguously the highest performing DMUs, i.e. those having a score above 1. In the remaining part of our study, these firms are called 'exceptional firms'. These are the targets of our empirical analysis.

3.6   DEA Results on Creative Champions
3.6.1   Results from a standard DEA model

In this section we present the results from the DEA analysis applied to the data set with the above mentioned eight inputs of both a regional and firm-intrinsic nature (*Crea Cap, Hum Cap, Econ Cap, Soc Cap, Know Cap, Conn Cap, Tech Cap, and Cult Cap*) and three outputs (*Prof, Qual, and Busc*) for the DMUs under consideration. The DEA thus provides a measure of the relative performance of each DMU, using the highest performing DMU as a benchmark. By employing the 2008 Dutch CBS input database and individual performance information on firms as output variables, our DEA approach is able to classify efficient and inefficient firms (by identifying the maximum business performance (output) using a minimum input), followed by a sensitivity analysis to rank firms according to the robustness of the efficiency classifications. The efficiency evaluation results from our sample of Dutch firms – large and SMEs – based on the standard CCR-I model are given in Figures 4 and 5, respectively.

Figures 4 and 5 show a stability in the relative efficiency levels and scores of the business performance of both large and SME firms in 2008. A closer geographical analysis of the first group of '*large firms*' (see Figure 4) brings to light that the efficient DMUs (with a score of 1), i.e. the '*creative champions*' among large Dutch firms, are mainly located in the Western part of the Netherlands, namely, the Randstad. A further examination of these '*creative champions*' shows that most of them have a complete and mature SPM system. They use a relatively small amount of inputs (i.e. the resources *Crea Cap, Hum Cap, Econ Cap, Soc Cap, Know Cap, Conn Cap, Tech Cap,* and *Cult Cap*); nonetheless, these firms appear to provide a relatively large amount of outputs (i.e. quantitative and qualitative benefits *Prof, Qual,* and *Busc*) compared with firms that have a low (inefficiency) score, which are more often located in the Intermediate Zone of the country.

For the second group of firms, the SMEs, the results also show that the majority may be seen as '*creative champions*' among Dutch SMEs, as they achieved many efficiency scores of 1. Furthermore, these efficient firms have largely introduced and adopted a complete SPM system. These firms appear to be in particular located in the Intermediate Zone of the Netherlands.

In general, we can conclude that the overall efficiency level of large and SME firms shows a stable pattern. There is apparently little variation in the efficiency performance of Dutch firms

according to the CCR-I model. Clearly, the majority of these firms can be identified as *creative champions*, with most of them having a relatively complete SPM system (see also Table 1).
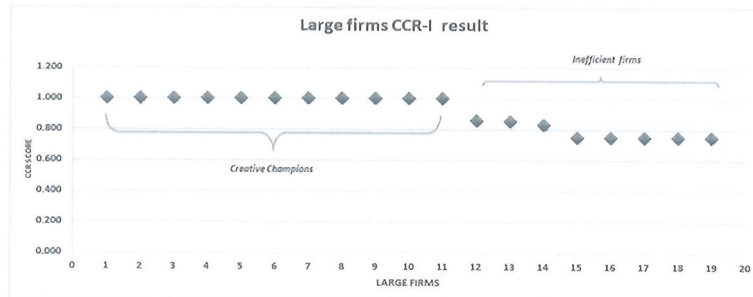

Figure 4. Standard DEA (CCR-I) score of large firms (2008)
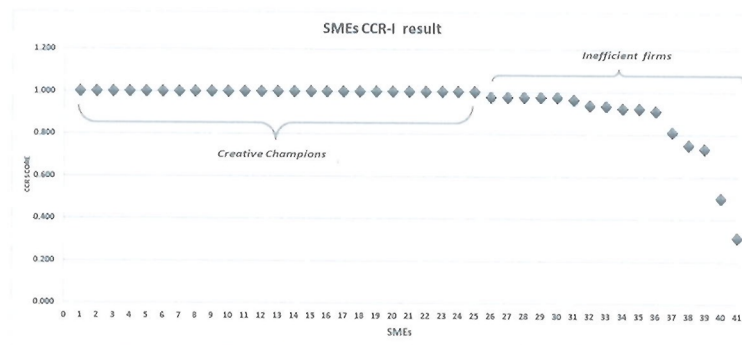
Figure 5. Standard DEA (CCR-I) score of SMEs (2008)

3.6.2 Super-efficient DEA results: identification of 'exceptional firms'

An intriguing question in DEA is: Are all firms equal when their efficiency rate equals 1? Therefore, we now present the super-efficient DEA results obtained by a ranking of efficient DMUs, so that we are able to identify from the class of efficient DMUs firms (i.e. *creative champions*) a subset of firms that have a super-efficient score higher than 1 (i.e. *exceptional firms*).

Consistent with the ranking of the super-efficiency values, Figure 6 shows that a significant share of the class of *creative champions* have a super-efficiency score above 1, mostly with a complete SPM system. This super-efficient class contains the business firms which we call *exceptional firms*.

Figure 6. Super-efficiency score of large firms (2008)

The ranking of the super-efficiency values for SMEs in Figure 7 shows that a considerable proportion of the *'creative champions'* among S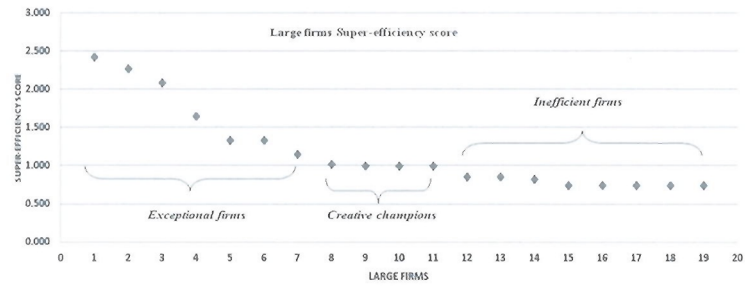MEs may be identified as *'exceptional firms'*, as they have a super-efficiency score higher than 1, with a complete SPM system.
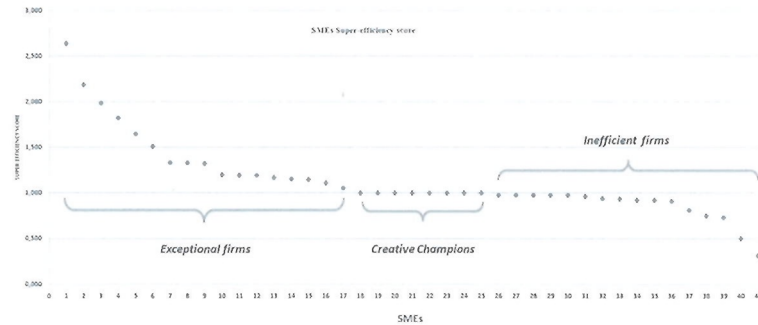
Figure 7. Super-efficiency score of SMEs (2008)

Finally, it is now an important question whether the above DEA results can be linked to the stage of SPM introduction in each individual firm, as well as to the geographical environment of these firms. This will be further investigated in the next section.

3.7 Geographical Location of Creative Champions

The spatial and logistic components of the strategy formation of firms are increasingly receiving serious attention (Glaeser et al., 1992; Henderson et al., 1995). In our exploration of how a firm's geographical location influences the firm's performance, we differentiated the firm's location according to its degree of centrality and urbanization. Accordingly, two types of classification were used, namely: (i) the Randstad Core Region, Intermediate Zone, and Periphery; and (ii) degrees of regional urbanization, on a scale from 1 to 5. In addition, we used dummies for the completeness (maturity) of the implementation of an SPM system in firms. The combined results are included in a comprehensive way in Tables 1 and 2, for both large and SME firms, respectively. The frequency

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of firms located in the various regions in relation to their performance profile (viz. exceptional firms, creative champions, and inefficient firms) is given in the right-hand side of these tables. The left-hand side of Table 1 contains information on the degree of maturity of SPM implementation in large firms, subdivided into three classes: full implementation (maturity); almost finished implementation (semi-maturity); and early-stage implementation (introduction). The left-hand side of Table 2 contains information on the degree of completion of SPM implementation in SME firms, subdivided into two classes: completion; and start-up of SPM. In practice, according to the completion and start-up stages of SPM, the score for the benefits per level of completeness category may vary, with possible responses from 1= *not at all* to 5 = *very strong*.

Tables 1 and 2 show that the more complete the SPM system implementation is, the higher the number of large firms and SMEs with a super-efficient score higher than 1 (i.e. the '*exceptional firms*') which had experienced benefits, in particular, qualitative advantages (i.e. **Qual** and **Busc**). Concerning their performance profile, our results show less difference in these firms' locations according to centrality and urbanization. Large '*exceptional firms*', with a completed SPM system, tend to be located in both the Randstad Core Region and the intermediate zone, with a small difference in relation to urbanization, compared with creative champions and inefficient firms, with a semi-finished implementation and early-stage implementation (introduction) of SPM. These latter firms are mainly found in fairly and strongly urbanized areas in the country. Small '*exceptional firms*' with a completed SPM system appear to be found in many regions, but with a concentration in low and strongly urbanized areas. This means that SPM may generate additional benefits in terms of efficiency and competitiveness for firms, and that geographical centrality is not necessarily an essential component of their prevailing business.

From a GIS perspective, our study is able to explore how creative firms are strategically located in the country. This approach creates a statistical space in which the firms' locations in the Netherlands are mapped according to their geographical coordinates, so as to visualize and to identify geographically-discriminating factors in the firms' performance. In Annex A, Figure A1 shows the firms' locational patterns according to their degree of centrality, defined by the area types Randstad Core Region, Intermediate Zone, and Periphery.

Tables 1 and 2 show that, in general, the creative champions and inefficient firms are overrepresented in the central and semi-central areas (i.e. Randstad Core Region and Intermediate Zone), in contrast to exceptional firms. They are more likely to move to dense economic regions in terms of easy access to, and high availability of, a local specialized labour pool, the existence of local inputs, infrastructure, financial institutions, buyer and supplier networks, and knowledge spillovers (in the spirit of 'industrial districts' advocated by Marshall, 1920). This suggests that access to alternative goods, such as a prestigious business climate, clients and markets, dominates the reasons why firms are located in these central areas (see also the early seminal work of Levitt, 1965; Vernon, 1966; Utterback and Abernathy, 1975). Thus, local economies and conditions appear to play an important role in firm location; in the early-stage implementation of SPM, these firms are as yet insufficiently knowledgeable and sophisticated about applying this knowledge to the day-to-day management of the firm.

Table 1. *'Flying disc'* frequency results in relation to the degree of completeness of SPM implementation for large firms

Class: degree of completeness of SPM implementation	Average score for benefits per level of completeness[6]		Super-efficient DEA score (X)	Geographical space							
				Centrality			Urbanization				
	Prof benefits	Qual and Busc benefits		Randstad Core Region	Intermediate Zone	Periphery	Non-urbanized	Low urbanized	Fairly urbanized	Strong urbanized	Very urbanized
SPM Maturity	3.39	3.40	X> 1.000: Exceptional firms	2	2	0	0	1	1	2	0
			X= 1.000: Creative champions	0	0	0	0	0	0	0	0
			X< 1.000: Inefficient firms	1	2	0	0	0	0	1	2
SPM Semi-maturity	3.26	3.51	X> 1.000: Exceptional firms	1	0	1	0	0	1	1	0
			X= 1.000: Creative champions	2	0	0	0	0	1	0	1
			X< 1.000: Inefficient firms	2	1	1	0	0	1	2	1
SPM Introduction	3.11	3.37	X> 1.000: Exceptional firms	0	2	1	0	0	1	2	0
			X= 1.000: Creative champions	0	0	0	0	0	0	0	0
			X< 1.000: Inefficient firms	1	0	0	0	0	0	0	1
Total Large firms				9	7	3	0	1	5	8	5

[6] For each class (degree of completeness of SPM implementation), the scores for *Prof* (the score of increased revenue, increased profit, reduced costs) and *Qual* and Busc (the score of higher efficiency, higher pro-activity, better result achievement, better strategic alignment, better goal achievement, higher quality) for all firms in the group were averaged, using a scale of 1 to 5. The higher the score in Tables 1 and 2, the more strongly the firms experienced the benefits.

Table 2. *'Flying disc'* frequency results in relation to degree of completeness of SPM implementation for SMEs

Class: degree of completeness of SPM implementation	Average score for benefits per level of completeness category		Super-efficient DEA score (X)	Geographical space							
				Centrality			Urbanization				
	Prof benefits	Qual and Busc benefits		Randstad Core Region	Intermediate Zone	Periphery	Non-urbanized	Low urbanized	Fairly urbanized	Strong urbanized	Very urbanized
SPM Completion	3.16	3.56	X> 1.000: Exceptional firms	4	3	5	1	5	1	4	1
			X= 1.000: Creative champions	4	2	1	0	1	1	2	2
			X< 1.000: Inefficient firms	2	7	1	0	5	0	4	1
SPM Start-up	3.03	3.21	X> 1.000: Exceptional firms	3	2	0	0	2	0	3	1
			X= 1.000: Creative champions	1	0	0	0	0	0	0	1
			X< 1.000: Inefficient firms	2	3	1	0	0	0	5	1
Total SMEs firms				16	17	8	1	13	2	18	7

The Randstad area, where various forms of capital (e.g. creative, human, infrastructure, financial, institutions, knowledge) are more abundant, are more likely in their early stages to host more firms which exploit these attributes for not only their current organizational performance but also their future performance and (strategic) directions. This can also further be explained in terms of the exploratory stage of these firms' performance (related to their positioning strategy) and the low maturity level of SPM. At this stage, regional contextual factors, such as technological possibilities and the preferences of various stakeholders in the market and external resources, are less well perceived by these firms. However, the differences in the location of large exceptional firms across the metropolitan core and the Intermediate Zone, as well as in the Periphery, are rather small. Where there is a progressive fully implemented SPM system, this improves the firms' competitive advantages by better anticipating and managing the rapidly changing circumstances within the industry through creative and innovative responses. This marks the transition from the exploratory stage to the mature stage in their business performance life cycles (i.e. the implementation of the SPM process), and their informal and formal business networks. This suggests that access to agglomeration and regional economies does not dominate in a firm's location in the later stage of the SPM implementation process.

On the other hand, *urbanization level economies* reflect external economies passed on to firms as a result of the returns from the large-scale operation of agglomerations as a whole. Tables 1 and 2 also show, however, that, while creative champions are more overrepresented in the metropolitan areas, the difference in the level of urbanization is rather small, in particular, for large creative champions and exceptional firms. In contrast, inefficient firms are more overrepresented in strongly or even very urbanized levels of the central areas. In Annex A, Figure A2 shows the firms' locational patterns according to degree of urbanization, divided into five grades ranging from non-urbanized areas to very urbanized areas.

The previous results demonstrate clearly that particular types of regions (based on, for example, centrality or urbanization) – in combination with a high availability of external regional resources – can play both a strong discriminating role for specific firms and a weak role for others, a finding also obtained by Duranton and Puga (2000). Table 3 presents in a nutshell an overview of the most important results of our analysis.

Table 3. An overview of the firms' location patterns in relation to centrality and urbanization

Firms	Business Performance	Centrality	Urbanization
Total firms	Inefficient firms	Intermediate Zone	Strongly urbanized zone
	Champion firms	Randstad Core Region	Very and strongly urbanized zones
	Exceptional firms	Randstad Core Region, Intermediate Zone and Periphery	Strongly and low urbanized zones
Large firms	Inefficient firms	Randstad Core Region	Very urbanized zone
	Champion firms	Randstad Core Region	Fairly, strongly, and very urbanized zones
	Exceptional firms	Randstad and Intermediate Zone	Strongly urbanized zone
Small firms	Inefficient firms	Intermediate Zone	Strongly urbanized zone
	Champion firms	Randstad Core Region	Very strongly and low urbanized zones
	Exceptional firms	Randstad Core Region, Intermediate Zone and Periphery	Strongly and low urbanized zones

3.8 Spatial Data Analysis: A Structural Equations Model[7]

The previous analyses were partly exploratory, partly explanatory in nature. We will now present a full explanatory model for the performance of individual firms in relation to contextual moderator variables, where we use a Structural Equations Model (SEM) for an integrated cause-effect system in order to identify the best-fitting structural path model between different contextual variables and super-efficient DEA results for the firms under consideration. On the basis of the previous results, three main hypotheses will be envisaged and tested, which centre on the question whether the achievement of a super-efficient score by firms is – as in the case of spatial-contextual variables – co-determined by the level of completeness of SPM implementation. To the best of our knowledge, our study is the first to test this proposition. Thus, our final aim is to test the SPM impact assumption empirically, on the basis of the following three hypotheses:

Hypothesis 1: *The super-efficient class of creative firms is positively related to the level of completeness of their SPM implementation.*

Clearly, we also have to consider the regional impact mechanism, and therefore the SPM concept for individual firms has to be extended with spatial attributes related to the geographical location of these firms. It seems now plausible to assume that a super-efficient score of both large firms and SMEs is also influenced by geographical space in terms of centrality and urbanisation. This leads to the following hypothesis:

Hypothesis 2: *The super-efficient class of creative firms is positively influenced by region-specific resources, and partly by centrality and/or urbanisation.*

Next, it is plausible that an *'exceptional firm'* is endowed with a mature SPM system which improves and increases the ability to understand how to steer a business in a challenging and turbulent business environment. This may at a certain stage lead to a higher business performance in terms of growth, operational efficiency, and value of capital assets. And it is therefore, likely that large firms have an advantage in having a speedy introduction of SPM. This leads to the following hypothesis:

Hypothesis 3: *The super-efficient class of creative firms is positively influenced by firm size.*

In order to test the relations between business super-efficiency performance, SPM acceptance, and critical resources in geographical space, we use a Structural Equations Model (SEM) that is capable of combining a confirmatory factor analysis with a regression path model. Furthermore, the large range of model fit indices is instrumental in identifying the best-fitting model that links the empirical data to the assumptions made (Byrne, 2010; Hooper et al., 2008; Mulaik and Millsap, 2000; Neuts et al., 2012). The SEM used in our study is of course inspired by the *'flying disc'* model and has the following constituents: super-efficient DEA scores of the firms concerned (*SEC*), in relation to centrality in geographical space (*CGS*) (viz. Randstad Core Region, Intermediate Zone, and Periphery – and/or urbanization levels (*UBL*) – complemented with firm size (*FS*) and the implementation stage of the SPM system (*SPM*). In this way, we are able to produce a comprehensive econometric estimation of the champions-regions nexus described extensively above. Thus, our model is constructed to identify and estimate the following structural relationships between these factors:

$$SEC = f (CGS, UBL, FS, SPM), \qquad\qquad (1)$$

with: *SEC* = Super-efficiency DEA score;

CGS = Centrality in Geographical Space;

UBL = Urbanization levels;

FS = Firm size;

SPM = Maturity of SPM system.

A clear assumption in model (1) is that the firms' super-efficiency performance depends on the geographical areas *(CGS* and or *UBL)* where they are located, so that they can benefit from these external (geographic, locational and urbanization) economies, and from the available and supporting regional resources. Therefore, it is important to test whether a firm's geographical location influences its performance and its operational efficiency. The degree of success of SPM implementation might presumably also depend on firm size *(FS)*. The structural model estimated

in a first round addresses SPM and is based on the conceptual model of Figure 3 including PCA-Input indicators and PCA-Output indicators, which are both used in the calculation of the super-efficiency indicators. Such a multifactorial SEM structure might, in principle, be modelled in a structural equations analysis, but the statistical possibilities are limited by the sample size (n = 60), compared to the amount of free parameters that would need to be estimated in a multifactorial design. Therefore, a composite formation of different items was used in order to decrease the number of necessary parameter estimates (Hoe, 2008; Landis et al., 2000). More specifically, the eight above mentioned capital categories distinguished above were combined into the three regional resource classes mentioned before. Figure 8 offers the SEM results[8]. It shows that the structural model provides a significant relationship between the maturity of the SPM system and super-efficiency values (.281; p-value < .001), and between Centrality and Super-efficiency values (-.386; p-value < .001). Urbanity was found to be significant at an α-level of 0.1 (-.051; p-value = .087), while Firm size was not found to be significant. The results suggest that firms with a more mature SPM system generate higher super-efficiency values, while firms located in the Intermediate zones or the Periphery are also more likely to have a higher efficiency score.
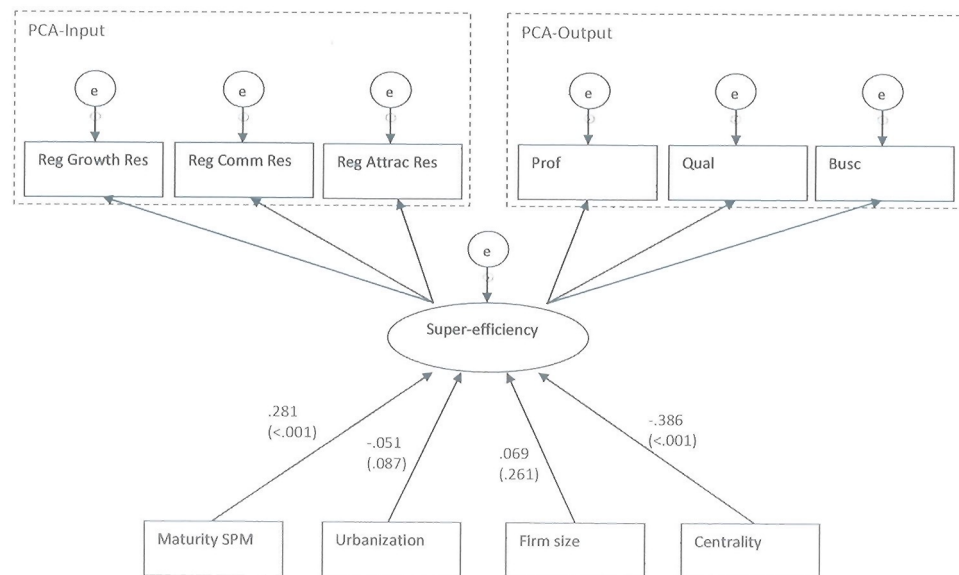

Figure 8. Structural equations model of the relationships between the maturity of the SPM-system, centrality or urbanization, and super-efficiency

Legend: The p-value is a test-statistic representing the significance level of the corresponding coefficient in this path model; if p<0.01, the relationship is significant at the 99% confidence level; if p < 0.10, the relationship is significant at the 90% confidence level.

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[8] The software package used for estimating this SEM is AMOS.

The Bollen-Stine bootstrapped chi-square test appears to accept our model with a p-value of .133. Other model fit indices include the σ^2/Df (= 1.613), CFI (= .978), RMSEA (=.102) and PNFI (= .190) (for an overview of model fit indices and threshold values, we refer to Barrett, 2007; Hooper et al., 2008). The findings of our SEM analysis indicate clearly a significant effect of the maturity of the SPM system, urbanization and/or centrality on the performance of creative firms. However, the significance of the ordinal scores may disguise differences in significance between levels of a variable. In order to identify the possible significance of each level of the regional contextual variables, a further complementary SEM analysis with dummy-coded indicators was used. These results are mapped out in Figure 9.

The final findings of the SEM in Figure 9 show that the Randstad area (centrality) and a high degree of urbanization (density) have a limited statistically significant impact (mostly with a p-value>.10) on the efficiency or success of the business strategy of firms in general. However, firms with a completed implementation of SPM experience a higher statistically significant impact (p < .01) on their performance than firms that are still in the process of implementing or introducing such a system. The first mentioned class of firms are more footloose and less dependent on place and distance; they have – even when located in the Periphery – apparently easier access to metropolitan areas, and also to available resources, knowledge and financial institutions, trade associations, and the like. Consequently, Hypotheses 1 and 2 receive conditional support from our empirical findings, while Hypothesis 3 cannot be shown to have a demonstrable effect.
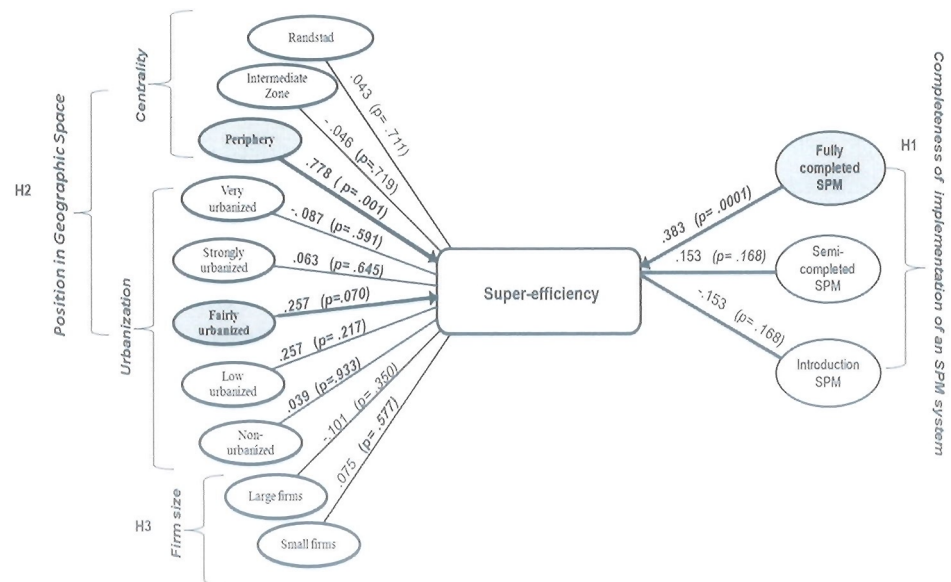

Figure 9. A structural equations model for super-efficient creative firms using SPM in high-tech spaces
Legend: *The light grey colour of the ellipses denotes a significantly positive effect with a 99% confidence interval, while the dark grey colour of the ellipses denotes a significantly positive effect with a 90% confidence interval.*

3.9   Concluding Remarks

The creative business and the region are closely intertwined phenomena. A rapidly growing number of cities and regions regard creativity, innovation, and learning as the centrepiece of novel development strategies. Our research has addressed in particular the combined importance of management strategies and spatial positions for the performance of innovative firms. In our study we have focussed attention on the performance and spatial position of creative high-tech firms in the Netherlands. The over-arching and central research question in our study was whether such firms – subdivided into large and small firms – perform better if they adopt a professional SPM system. And therefore, our study has tried to link elements from the SPM literature to both location theory and cultural organization theory. In this way, the process through which business firms realize their mission, strategy and objectives (measured by means of critical success factors and key performance indicators) is associated with the geographical profile of the place where the firm concerned is located, as well as with the cultural complex values and attributes of this firm (in particular, the 'creative mind' of the firm). In this context, several measurable performance indicators (e.g. turnover, profit, cost), as well as relevant background variables (both internal, such as managerial quality, or employee satisfaction, and external, such as innovative milieu, industrial networks, spatial accessibility), were all taken into consideration.

The analysis framework – succinctly presented in the '*flying disc*' model – was able to include the impact of both the geographical location and the industrial profile of business firms (both SMEs and large firms) on their market achievements. Our research has brought to light various new and relevant findings, in particular:

- SPM implementation is critical in distinguishing between high and low performance;
- Firms with a fully implemented SPM system are gaining more financial and non-financial benefits than firms that are still implementing such a system;
- High-performance versus low-performance firms can be identified in terms of their focus on internal and external strategy, markets and customers, leadership and management,;
- Various spatial factors ('input') that influence business performance ('output') are linked with particular geographical areas;
- Low-performance firms are likely to be able to profit more from localization and density economies in the Randstad Core Region and the Intermediate Zone;
- Location does matter, but not to the same extent for all firms;
- Distance matters more for some businesses than for others.

A trend seems to emerge that firms move to core areas as they mature, so that this phenomenon supports the hypothesis that the specific conditions of cities generate creativity. However, it may be the case that creativity does not need cities in the first instance, but tends to flow to cities in order to access alternative goods, such as prestigious locations, clients, and markets (a sorting effect). Hence the city would not necessarily generate more creativity than elsewhere, but

it would fundamentally benefit from the economic consequences of creativity more than anywhere else.

Finally, the super-efficient class of '*exceptional firms*' appears to achieve better (quantitative and qualitative) results; it needs only a relatively smaller amount of inputs (resources), in providing a relatively larger amount of outputs (production). Clearly, SPM helps to lift a firm to an exceptional performance by facilitating the firm with competitive advantages to outperform current or potential firms (see for similar findings, Passemard and Kleiner, 2000), especially in competitive markets or in an appropriate region, as compared with the same industry in a different region. We may therefore conclude that an integrated analysis mix of both SPM measures at the micro firm level and supporting regional moderator variables are critical for the firm's performance. In a more general perspective, one may argue that a closer connection between industrial organization research and locational behaviour research may be fruitful for advanced insights into regional dynamics and creativeness.

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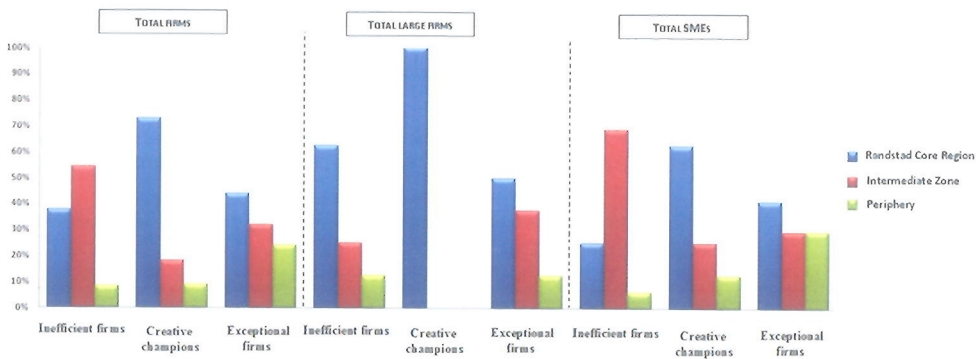## ANNEX A: Geographical Location of Firms

Figure A1. Geographical location of firms according to centrality, differentiated by size
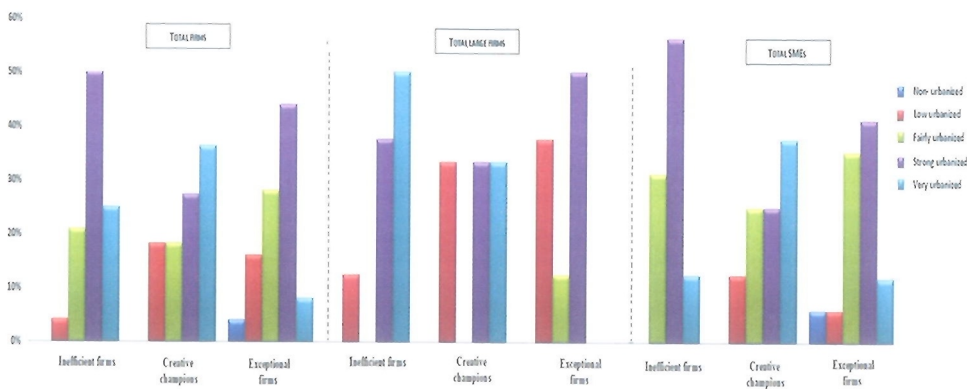

Figure A2. Geographical location of firms according to urbanization, differentiated by size