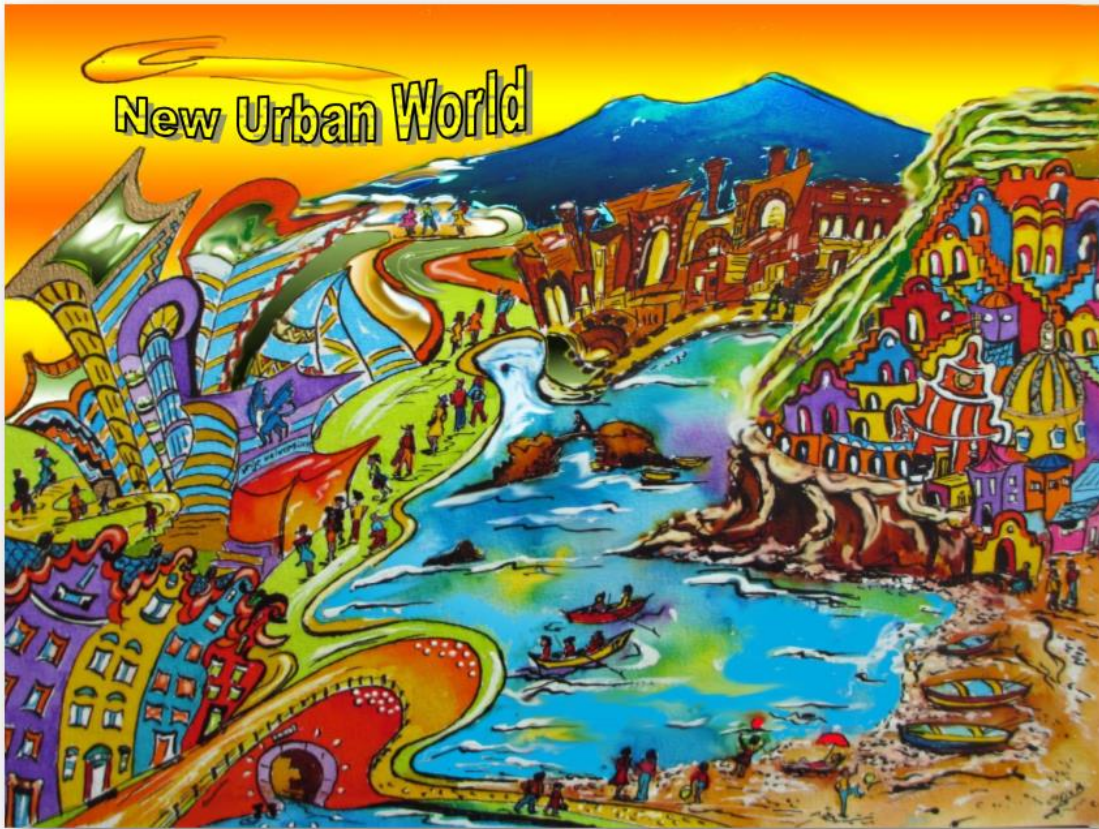


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THE NEW URBAN WORLD

Economic-Geographical Studies on the Performance of Urban Systems



Ph.D. Dissertation
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Economic-Geographical Studies on the Performance of Urban Systems

ACADEMIC THESIS

by

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Born in Beni Chicar, Marocco

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EXECUTIVE SUMMARY

“We will neglect our cities to our peril, for in neglecting them we neglect the nation.”

- John F. Kennedy (Statement to Congress, January 30, 1962)

The relevance of my study can be illustrated by the above statement of J.F. Kennedy. This statement centers on the importance of cities for a modern society. It therefore, calls for research and action on cities and its actors, in order to anticipate ‘grand challenges’. In our ‘*century of cities*’, our planet is gradually moving towards a ‘*New Urban World*’: more and more people will move towards cities or urban agglomerations, so that urban areas become the ‘new home of humankind’.

The ‘*New Urban World*’ is a recent phenomenon in the rich history of cities. At present, not only does more than 50 per cent of the world population live in cities, but also urbanization is still persistently and rapidly increasing, in particular in the developing world. Consequently, modern cities tend to become magnets of economic, cultural, political and technological power. This phenomenon is often referred to as the ‘*New Urban World*’. This ‘*New Urban World*’ marks a new stage in the urban landscape of our planet, that is characterized by a rapid and structural transformation of settlement patterns of people, firms and activities into urbanized patterns of living and working as the new dominant locational map of our world.

The agglomeration advantages of the ‘*New Urban World*’ originate from economies of density, proximity, accessibility and connectivity. In other words, urbanized areas are able to generate increasing returns to scale and hence, are generating self-propelling growth. Urban agglomerations will most likely also become the socio-economic powerhouses of the future and exhibit a fast dynamics in the decades to come. Cities are certainly not crafted in stone, but are a ‘*process*’, always ‘*on the move*’, in order to create favourable (XXQ) conditions for economic agents. The

'New Urban World' tends to turn into a complex and critical evolutionary organism for spatial development in the future.

Cities are also becoming strategic information systems driven by a multiplicity of interests of actors and stakeholders; they have many appearances ('faces') and are by no means uniform or identical. The management and governance of such modern, complex and ever-rising urban agglomerations calls for an effective and focused explanation and comparison of the driving forces of current city dynamics, including the impact of urban attractiveness on urban achievement levels and the implementation of appropriate urban governance measures from the overall perspective of long-range '*grand challenges*'. Cities are facing various great challenges and opportunities, but also negative externalities of density. So, there is a need for a drastic re-orientation of the socio-economic fabric and a re-positioning of modern cities (the '*urban century*').

Our research concentrates on a selected set of research opportunities and challenges related to the '*urban century*'. The general aim of this dissertation is:

Identification of the critical success factors for the competitive performance of urban actors and/or cities in the 'New Urban World', through the application of quantitative evaluation tools.

This study sets out to develop or apply suitable – novel and existing – quantitative research tools and methods for the identification of the critical success factors for the competitive performance of urban actors and/or cities in the '*New Urban World*', on the basis of measurable key performance criteria. From a methodological perspective, the above-mentioned research focus calls for a thorough investigation of the following hypothesis: '*World-wide, cities tend to become engines (or even power plants) of knowledge, innovation and technology, with a multiplicity of far-reaching socio-economic impacts in a global context*'.

A test of this hypothesis calls for solid empirical research. A series of applied modelling studies on the ‘*New Urban World*’ is presented in this study, by using several statistical and econometric tools, in order to provide an operational basis for the assessment aim of our research. The structure and focus of the various research contributions are given in the following Table of Contents, comprising 15 chapters (including 12 empirical research chapters).

PART	CHAPT	The ‘ <i>New Urban World</i> ’ CHAPTERS 1–15
	1	<i>The ‘New Urban World’ – Aims and Scope</i>
	2	<i>The ‘Urban Piazza’ Model as an Integrated Analysis Framework</i>
A Dynamic Cities	3	<i>In Praise of Megacities in a Global World</i>
	4	<i>Exceptional Places: The Rat Race Between World Cities</i>
	5	<i>Multi-Actor Analysis of Metropolitan Performance Indicators</i>
B Innovative Sectors	6	<i>Impacts of Multi-Level Spatial Capital Resources on Business Performance</i>
	7	<i>Creativity and Diversity: Strategic Performance Management of High-Tech SMEs in Dutch Urban Areas</i>
	8	<i>The Relationship between the Level Completeness of a Strategic Performance Management System and Perceived Advantages and Disadvantages.</i>
C Creative Districts	9	<i>The Use of Visual Decision Support Tools in an Interactive Stakeholder Analysis – Old Ports as New Magnets for Creative Urban Development</i>
	10	<i>Planning for Urban Historical-Cultural Heritage: A Geo-Imaging Multicriteria Approach</i>
	11	<i>Creative Buzz Districts in Smart Cities: Urban Retro-Fitting and Urban Forward-Fitting Plans</i>
D New Entrepreneurs	12	<i>Strangers on the Move: Ethnic Entrepreneurs as Urban Change Actors</i>
	13	<i>New Urban Economic Agents: A Comparative Analysis of High Performance New Entrepreneurs</i>
	14	<i>The Creative Urban Diaspora Economy: A Disparity Analysis among Migrant Entrepreneurs</i>
	15	<i>The ‘New Urban World’: Retrospect and Prospect</i>

This collection of 12 (= 4x3) analytical and quantitative studies – subdivided over four parts of the dissertation – contributes to a deeper understanding of the forces at work. These 12 chapters have all been published in (or accepted by) internationally refereed journals or publication channels. My study seeks to employ an integrative research constellation by designing and employing the metaphor of the ‘*urban piazza*’ as a frame of reference for a comparative analysis of urban systems’ performance (see Figure 1).

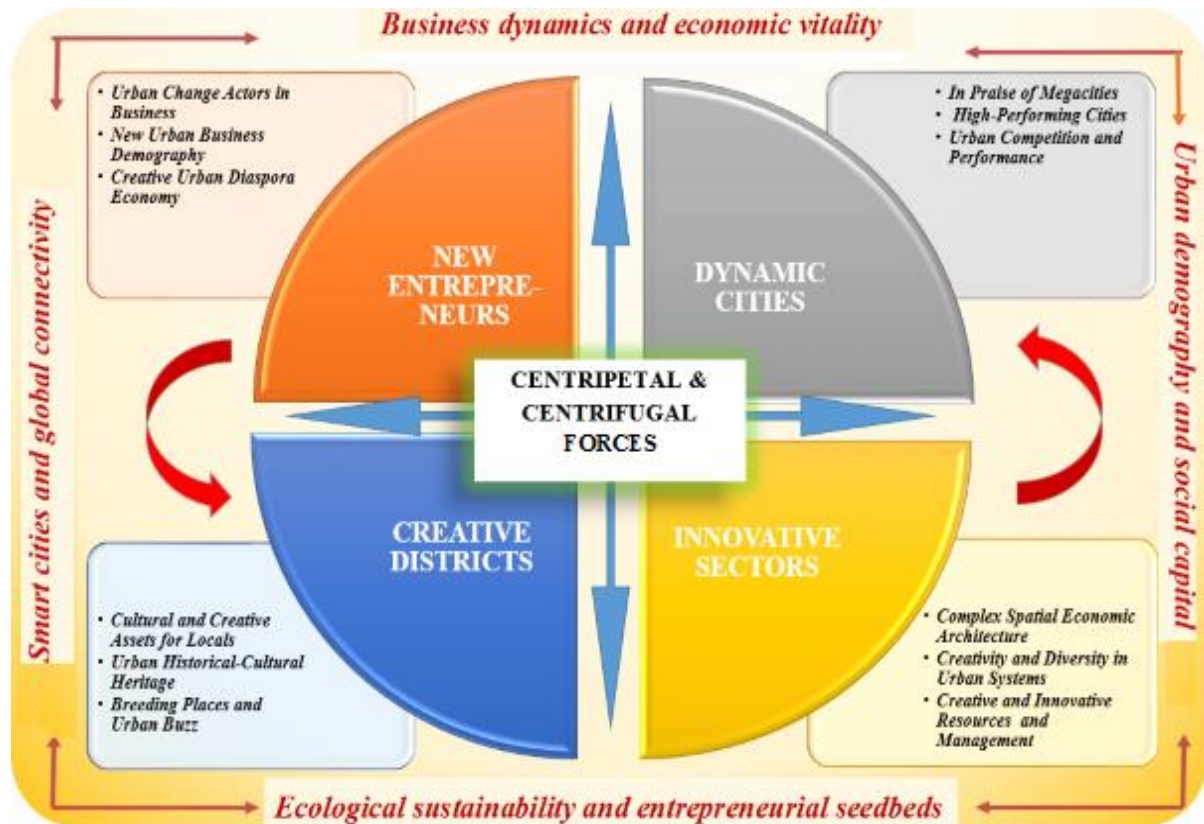


Figure 1. Knowledge arena of the ‘urban piazza’ in the ‘New Urban World’

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 centripetal and centrifugal centre, with a high level of social capital, 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 a highly vibrant atmosphere, creating and improving the ‘XXP’ (the maximum contribution to productivity, quality and profitability in the urban or spatial system). 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.).

The ‘urban piazza’ framework, addresses the dynamic force fields that act as critical success factors for the performance of various actors and/or cities that seek to achieve sustainable outcomes for urban actors in terms of competitive economic and sustainable development. Within this analytical framework four domains of urban activity — ranging from local to global — are

systematically addressed, viz. *dynamic cities*, *innovative sectors*, *creative districts* and *new entrepreneurs*. Thereby, this study aims to assess the (internal and external) characteristics and drivers of urban actors and/or cities in a competitive urban environment, with a view to a comparative analysis of their innovative and creative performance. A wealth of empirical applications – ranging from migration to entrepreneurship and from cultural heritage to global cities – is provided in this study, in order to illustrate the relevance of a solid research methodology for assessing the performance of modern cities.

An integrative synthesis of this study in the concluding chapter, both in general terms and thematically, does highlight in a comprehensive way the various findings and offers a succinct overview through a scoping of the findings of each individual chapter of our research. This final chapter reflects the particular importance of a diversity of messages, methods, observations and empirical findings. The added value of this study is the rigorous assessment of city performance, not only from an economic perspective but also from a multi-dimensional, partly non-economic, valuation perspective, in order to identify and to suggest strategic policy directions for cities to act at a competitive edge in a global spatial network economy. Despite their pluriformity, our 12 research chapters all confirm the proposition that cities are economic agents whose performance is enhanced by the presence of various types of urban externalities. Given the strategic importance of cities for the sustainable future of our world, a balanced and alert urban governance is needed. The creation of attractive cities – from both a socio-economic and a cultural perspective – will, therefore, be one of the most important challenges for urban policy in the future.

Our research on the ‘*New Urban World*’ has demonstrated that agglomeration benefits are partly economic in nature, but also partly social, architectural and cognitive. 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*’.

A general strategic caveat may be relevant here. Cities of the future will be confronted with many policy issues from local to global long-term megatrends as well as transitions in socio-economic parameters that may have long-term effects. Furthermore, a strategic governance of such systems will be important in tackling these long-term issues. This would mean that the challenge is not to stop urbanization or demographic shifts, but to manage and govern them. This needs to be done

by continuously anticipating changing circumstances and by translating and transforming threats into opportunities.

Managing and governing the fast urban development at a global scale in the ‘*New Urban World*’ will clearly be one of the biggest challenges in the twenty-first century. Issues like housing policy, infrastructure and logistics, environmental sustainability, urban land use, smart energy use, ageing, human health, social segregation, negative urban externalities and international migration will all require novel insights and policy strategies in order to make the future city ‘*a place 4 all*’. Indeed, the achievement of high urban productivity – measured in appropriate performance dimensions as developed in our study – is key to urban success. In a policy context, this calls for clear comparative and quantitative benchmark principles for urban systems in the competitive world of the ‘*urban century*’.

“When a man rides a long time through wild regions he feels the desire for a city”
(Italo Calvino, *Invisible Cities*, Random House, London, 1974)

1. THE ‘*NEW URBAN WORLD*’: AIMS AND SCOPE ¹

1.1 The Dynamics of Modern Cities

“We will neglect our cities to our peril, for in neglecting them we neglect the nation.”
- John F. Kennedy
(Statement to Congress, January 30, 1962)

The modern city is a cognitive, social, economic and technological engine in the economic geography of our world. It provides services and hospitality to citizens, businessmen and visitors, based on a wide array of agglomeration advantages. The accompanying externalities have been the source of the current world-wide urbanisation wave, which has turned our globe into an ‘*urban world*’, in which the present share of people living in cities exceeds already 50 percent. Consequently, modern cities have become magnets of economic, cultural, political and technological power. This is often referred to as the ‘*New Urban World*’. This ‘*New Urban World*’ marks a new stage in the urban landscape of our planet, that is characterized by a rapid and structural transformation of settlement patterns of people, firms and activities into urbanized patterns of living and working as the dominant locational map of our world. The agglomeration advantages of the ‘*New Urban World*’ originate from economies of density, proximity, accessibility and connectivity. In other words, urbanized areas are able to generate increasing returns to scale and are generating self-propelling growth.

This sketch of modern cities is however, not yet complete. Cities – both in the developing world and in developed countries – are not crafted in stone. They are in a permanent flux: cities are a ‘*process*’. They are in a continuous transition, and re-invent themselves in the course of time. In addition to internal dynamic forces (e.g., demographic change, social tension, environmental decay), the dynamics of cities is often caused by the turbulent external environment in which they operate. Especially in an open globalizing economy, cities have to compete for the most favourable position compared to others. This performance drive calls for permanent change. Even though in many cases the built environment and material urban infrastructures remain intact and stable over

¹ Source: This chapter was inspired by several studies that have been produced in the context of the Joint Programming Initiative ‘*Urban Europe*’ (see in particular Nijkamp and Kourtit 2011, 2012, 2013; Kourtit and Nijkamp 2013a,b,c; Kourtit et al. 2013a,b,c,d) and other related documents produced in this context by the author (see in particular Caragliu et al. 2012; Kourtit 2014a,b; Kourtit, et al. 2014; Kourtit and Nijkamp 2014).

several centuries, their socio-economic functionality tends to change dramatically over the years. For example, churches may be turned into exhibition halls or theatres; warehouses may be turned into modernized apartment buildings; or old factories into restaurants or hotels. Clearly, the city is always ‘*on the move*’ and is never completed.

In the ‘*New Urban World*’, more people than ever before are living in urban areas: in the year 2007, for the first time in the history of mankind, the urbanisation rate (the share of the people living in urban areas as compared to the total) exceeded 50 per cent (Caragliu et al. 2012, pp. 129-131). And most likely this trend will continue. Not only are large cities turning into mega-cities, but also is a rapidly increasing number of medium-sized cities moving into the class of large multi-million cities (see Nijkamp 2010). This radical transformation in the settlement pattern of people exhibits a variety of characteristics and challenges that are unprecedented. This urbanisation revolution does not only mirror a dramatic change in the way people live, but has also immense consequences for the social, demographic and environmental systems of our world (see Marcotullio and McGranahan 2007).

The population movement from rural areas to villages, from villages to towns, from towns to cities, from cities to mega-cities (including metropolitan areas, edge cities, urban sprawl areas), and from mega-cities to global city networks marks a new structural trend in the settlement pattern of our world (see e.g. Tisdale 1942, Sassen 1994, Taylor 2004). Rising urbanisation rates have been accompanied by a rising world population (with an average of 1.2 per cent growth per annum over the last half a century). The ongoing rise in urban population shares – at present exceeding 50 per cent on a global basis – may lead to a world-wide urbanisation rate that is expected to exceed 65 per cent by the year 2050. This trend will be influenced by both natural population increase and large migration movements in various parts of the world. Consequently, urban challenges may become the most complex and critical factors of sustainable development in the future (see Lombardi et al. 2011; Beall and Fox 2009; Caragliu et al. 2012, pp. 129-131; Kourtit 2014a,b).

Actually, the year 2007 marked an important milestone in the long history of urbanization in the ‘*New Urban World*’: for the first time in human history, the city took over the ‘power’ from its hinterland, since as of that year more than half percent of the world population (3.3 billion people) appears to be living in urban areas and cities; this figure is expected to grow to 5 billion

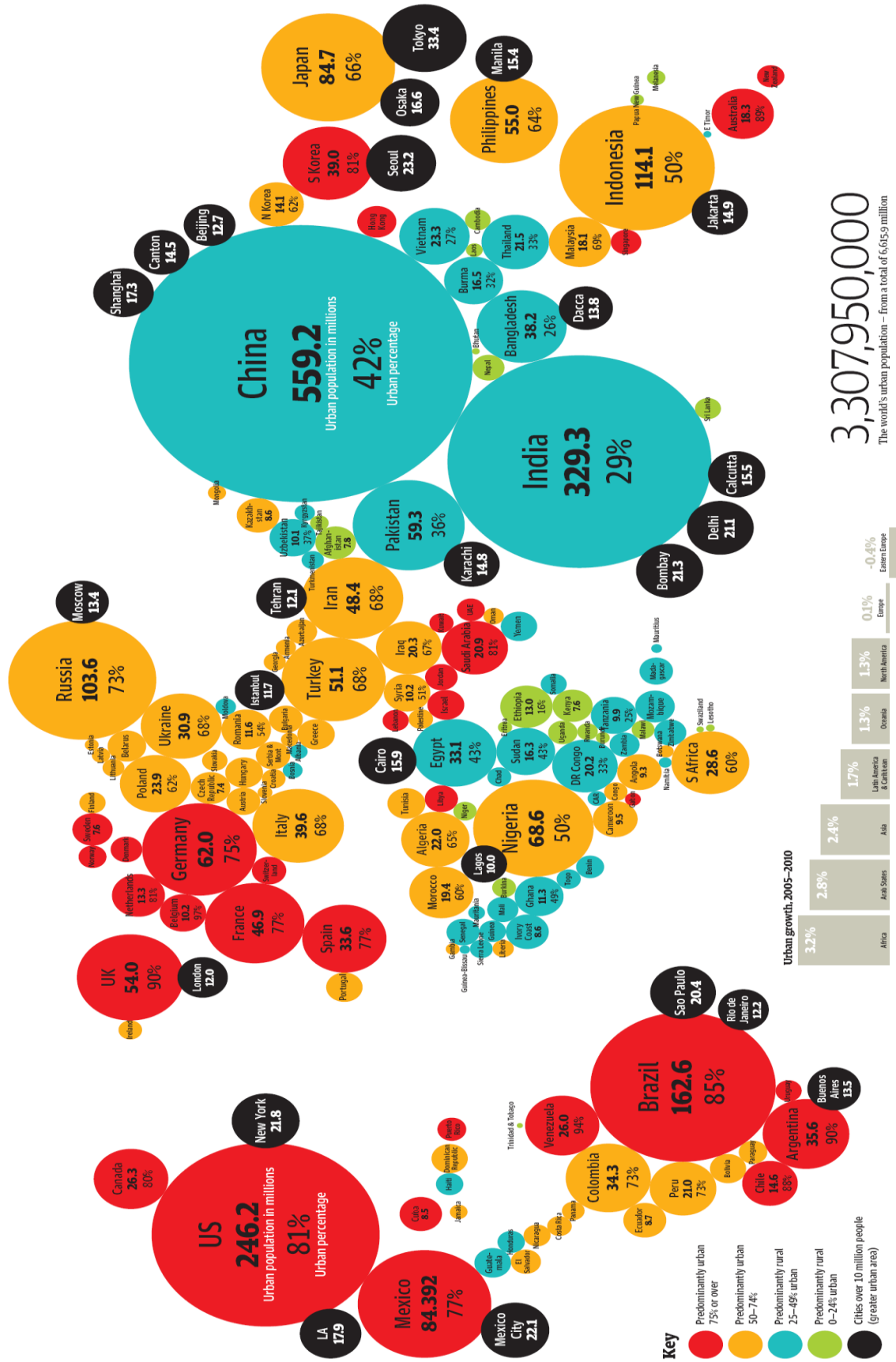
by 2030. Figure 1 shows an interesting map of the world (UNFPA, 2010), offering a visualization of the distribution of urban dwellers. The 21st century is by some people nowadays even called ‘*the urban century*’ (see Nijkamp and Kourtit 2011; Kourtit 2014a,b). Surprisingly, only a few centuries ago, 20 percent of global population lived in cities, while at the beginning of the 20th century the world's urban population was only 220 million, mainly located in the west (UNFPA, 2010; Caragliu et al. 2012, pp. 129-131).

A major complication in studying cities and urbanisation rates is always found by measurement issues, e.g. administrative demarcations (e.g. communes), statistical observation units (e.g. standard metropolitan areas), or functional socio-economic criteria (e.g. functional urban regions) (see e.g. Begg 1999, Berry 1973, Pacione 2001; Caragliu et al. 2012, pp. 129-131; Kourtit 2014a,b). There is no unambiguous and measurable description of a large city or a metropolitan region and, consequently, one has to accept second-best assessments, often based on current practice and available databases. Clearly, new GIS inspired information technology (e.g., based on satellite imagery analysis) may become helpful in the future (see Wolman 2004), but for the time being, we will have to resort to pragmatic solutions. It should be added that an additional complexity is emerging, namely the rise of connected city systems, either in polycentric form, or in the form of an interconnected network of cities, which renders the identification of a specific city and its boundaries, particularly from the perspective of its socioeconomic spatial profile, even more difficult. But the emerging need for benchmarking studies on urban performance¹ in a competitive environment nowadays forces us to accept sub-optimal definitions of cities).

The structural urban development is still continuing, with urbanization rates exceeding 70 percent in various European countries (see for details e.g., Mega 2010). This long term megatrend in population movement towards the city is the result of two underlying force fields, viz. the exponential growth in the world population (with an average growth rate of approx. 1.2 percent per annum) and the rural-urban drift (due to the relatively more favourable socio-economic opportunities in urban agglomerations).

¹ 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 (see also Kourtit 2014b).

Figure 1: Map of the world with different urban rates



Source: UNFPA (2010) (map made by Paul Scruton)

This shows that people prefer to move towards urban areas and cities with a specific and local identity to seek better socio-economic opportunities. In this context, it is foreseen by the United Nations that until the year 2020, about 60 million people will move from sub-Saharan Africa to North-Africa and Europe. And by 2030, the urban areas and cities of the developing world will make up 80% of urban humanity (UNFPA 2010).

At the same time, it is increasingly recognized that cities are not only a source of immense problems, but may also become a source of new opportunities in an urbanized world. In particular, the transition towards knowledge cities – sometimes also coined 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; Caragliu et al. 2012, pp. 129-131).

A recent addition to the ‘survival of the fittest’ strategy of cities has been offered by the literature on creative cities (see Florida 2002, Scott 2001). Modern cities tend to become engines (or even power plants) of knowledge, innovation and technology in a global context. Creativity is then a key factor that may favour and enhance both centripetal and centrifugal forces of large urban agglomerations. This view is essentially based on the socio-economic diversity (or ‘melting pot’) hypothesis put forward by Jane Jacobs (1961). An extensive review of the socio-economic diversity effects can be found in Kourtit and Nijkamp (2011).

It is certainly recognized that urban performance does not only depend on the city’s endowment of hard infrastructure (such as transport facilities, ICT infrastructure, public amenities), but also on the availability and quality of knowledge and creativity infrastructure. In this context, the notion of ‘smart cities’ has become fashionable (Caragliu et al. 2012, pp. 129-131). Smart cities are based on a synergy of hard and cognitive infrastructure which provides increasing returns out of agglomeration advantages (including geographic hub functions in a broader spatial network). The cognitive infrastructure is related to human capital, such as an educated labour force, innovative entrepreneurship, a learning environment, and creative classes (see Berry and Glaeser 2005). A review of the literature on smart cities can be found in Caragliu et al. (2011). The authors distinguish then the features of a smart city into: a smart economy, smart mobility, smart environment, smart people, smart living and smart governance. Cities with an

above-average endowment of such growth-enhancing factors are called ‘*smart cities*’. This concept has joined much popularity in recent years.

1.2 Cities: Challenges and Opportunities

This dynamic perspective on the increasingly important role of cities in our world has prompted a wide range of research and policy concerns. A prominent issue in the current city debate is the question of the economic, social, cultural and technological performance of a city – and its actors – in comparison to other cities. This prompts the need for a solid evidence-based analysis of the drivers of urban growth and of socio-economic cohesion in modern cities. Not only the business sector, but also educational facilities, geographical accessibility, cultural assets, demographic diversity, and ‘*creative minds*’ are responsible for the social and economic achievement level of cities and their actors, as well as for their dynamic evolution (Kourtit 2014 a,b).

In addition, it should be noted that cities are not ‘*islands of isolation*’, but in general part of an international, functionally connected network (Neal 2012). Such a network connectivity offers many new opportunities for appropriate and effective urban competitiveness strategies, combining the advantages of both complementary and rivalling activities of various cities.

It goes without saying that human capital (e.g. education, entrepreneurship, leadership) in the city is a factor of pre-eminent importance for the performance of the city concerned. Human capital is a critical success factor for entrepreneurial success, innovative strategies, cognitive performance and cultural achievement of urban actors. City management without human capital management is bound to fail, as absence of human capital means an impediment to innovativeness and creativity, in both the public and the private sector. Clearly, the ‘*urban century*’ calls for a new perspective on the socio-economic and economic-geographical fabric of modern cities.

Angel (2012) has in a recent study offered an original description of the growth pace of cities on our planet, using both case studies and visual representations. This study serves to enhance the insights into urban performance conditions of cities by monitoring and measuring urban dynamic patterns (e.g., demographic growth, population densities, spatial expansion of agglomerations etc.). He pays particular attention to urban resilience, and the potential for adaptation to change in a heterogeneous urban world. He argues that the endogenous parameters

for growth induction (*'containment'*) are as important as measures for coping with spatial and socio-ecological threats (*'making room'*). To address local and global challenges calls for smart and intelligent city initiatives governed by cognitive and technological abilities of all actors. Smart responses will make cities growing in welfare and sustainability (see also Nijkamp and Kourtit 2011,2012,2013; Kourtit and Nijkamp 2013a,b; Kourtit et al. 2013a,b,c,d; Kourtit 2014a,b; Kourtit 2014; Kourtit and Nijkamp 2014; Bochniarz et al. 1994).

There is no doubt that, world-wide, cities go through both a quantitative change and a qualitative restructuring. The general urbanization trend exhibits at the same time a great variety in urban appearances and functionalities: metropolis, global city, connected city, global village, rural metropolis, wired city, virtual city, wifi city, smart city, sustainable city, green city, climate-neutral city, eCity, agora city, creative city, hot city, piazza city, or invisible city. Such imaginative urban concepts have also spurred original urban future scenarios. The urban world is by no means characterized by a standardized urban evolution: variety and size go hand in hand (see also Nijkamp and Kourtit 2011,2012,2013; Kourtit 2014; Kourtit and Nijkamp 2014).

The rising complexity of urban areas calls for a smart management of these multi-actor and diversified spatial entities, which often have a political power that far transcends the national borders. This challenge has – as mentioned above – prompted the concept of *'smart cities'* (see e.g. Caragliu et al. 2011; Caragliu et al. 2013; Deakin 2013; Kourtit and Nijkamp 2013a,b; Kourtit and Nijkamp 2014). It seems plausible that the material world and the virtual world are not antagonistic and disjoint worlds, but are an interwoven fabric of various manifestations of interactive behaviours, partly being invisible but very important.

As mentioned in Section 1.1, the key features of cities are: density, proximity, accessibility and connectivity. These features determine – together with cognitive skills, innovativeness and creativity – the agglomeration advantages generated in city life since early history. Their productivity enhancing effects have laid the foundation for the rise and growth of cities. The development of cities has of course a material-visible and physical component, in terms of e.g. land use, the built environment, public amenities, green areas etc. Most of the theory building on urban economics focuses the attention indeed on the physical world of cities in relation to associated economic variables (e.g., land gradients, wages or income). Far less attention however, has been paid to intangible, non-material and often invisible aspects of urban economies as reflected in communicative, cognitive or administrative information on cities. We observe

increasingly a trend breach in modern cities, viz. from functional-material socio-economic nodes to cyberplaces for the virtual economy (see also Nijkamp and Kourtit 2011,2012,2013; Kourtit 2014; Kourtit and Nijkamp 2014).

This modern development in cyberspace technology manifests itself in two distinct roles. In the first place, through digital connectivity, cities become hubs of social capital in the space-economy. The intensity of communication opportunities in urban areas – in combination with physical and virtual contact options – offers modern cities a competitive advantage, thus creating new platforms for social buzz, information exchange and local-global interaction. Secondly, modern cyber cities tend to become complex information and data machines (e.g., for banking, consultancy, creative industries, etc.). Clearly, much of these facilities are ‘footloose’, but in the reality of a modern world distance frictions still count. There is no clear ‘death of distance’: ICT tends to favour geographic concentration rather than spatial dispersion (Nijkamp and Kourtit 2011,2012,2013; Kourtit 2014; Kourtit and Nijkamp 2014). This has also caused the emergence of a new branch of research in Regional Science, viz. Internet or Cyberspace Geography, based on an unprecedented availability and use of data generated by the ‘urban data machine’ (including the need for advanced data mining techniques) (see also Malecki 2002, and Batty 2013).

The modern cyberspace is reflected in various complex data bases, such as GPS information, GSM data, camera’s, accentuators, financial transaction information, parking data, sensors etc. They provide an avalanche of new applications, such as fleet management, traffic control, surveillance, safety and security policy, crowd management, while they also are instrumental in creating new forms of social capital, such as social media use (Facebook, Twitter, Foursquare etc.). To the same extent that previously large metropolises were creating new opportunities for their residents and visitors, are modern cities offering unprecedented cognitive and informational opportunities that generate significant benefits from social, human and technological capital. Physical proximity may seemingly be replaced by virtual proximity (sometimes incorrectly called ‘the death of distance’), but the need for human contact – directly or indirectly – remains. The only difference is that – in contrast to the past where communication intensity was one of the *raisons d’etre* for cities – modern virtual proximity patterns are global in nature. Cities – if conceived of as communication-rich entities – become nowadays global in nature and hence largely ‘invisible’. Only the ‘real’ geography is needed to physically accommodate residents or firms, but their orientation is outward-oriented (Kourtit and Nijkamp 2014). The ‘New

Urban World' in combination with global communication technology may lead to the paradox of a global 'non-urban' world, that is invisible (see also Neal 2012).

1.3 Focus and Aim of the Dissertation

Cities display complex evolutionary patterns in the economic geography of our world. They may fluctuate in size, and some cities may even shrink (see Shetty and Reid 2013, Kuhlicke et al. 2012; Kabisch et al. 2012; Strykiewicz 2013). But the overall average pattern is one of continuing urbanization.

Our research concentrates on various research opportunities and challenges related to the 'urban century'. The general aim of this dissertation is: ***Identification of the critical success factors for the competitive performance of urban actors and/or cities in the 'New Urban World', through the application of quantitative evaluation tools.*** The conceptualization of this aim means that our study is instrumental in nature. It sets out to develop or apply suitable – novel and existing – quantitative research tools and methods for the identification of the critical success factors for the competitive performance of urban actors and/or cities in the 'New Urban World', on the basis of measurable key performance criteria. A series of applied modelling studies on the 'New Urban World' is presented in this study, by using several statistical and econometric tools, in order to provide an operational basis for the assessment aim of our research. A mixed package of tools and methods is adopted in the case studies concerned. All these tools – and their combinations – play an important role in identifying, measuring, explaining and comparing (input and output) performance indicators describing the cities' – and their actors' – socio-economic achievements.

In the applied part of the research, a cascade of three methodological stages will be used, viz. exploratory data analysis, explanatory causal analysis and strategic policy support analysis. In each of these stages a set of appropriate analytical methods or techniques is deployed (see Figure 2).

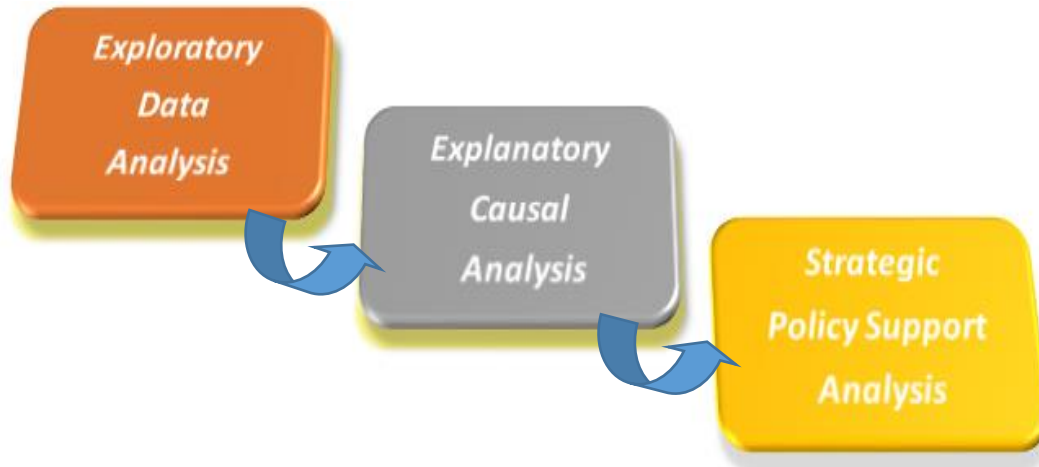


Figure 2. The methodological cascade framework

In the highest stage of the cascade, the following analytical tools are used in particular: data envelopment analysis (DEA), self-organizing mapping (SOM), and principal component analysis (PCA). Next, in the second stage, we employ inter alia the following techniques: multiple regression analysis (MRA), multi-level modelling (MLM), and complex network analysis (CNA). Finally, in the bottom stage we apply SWOT analysis, strategic choice matrix analysis (SCM), multi-actor, multi-criteria analysis (MCA/MAMCA) and strategic performance management (SPM) analysis.

1.4 Organization of the Study

Our study is based on a set of interconnected applied studies in the complex force field of urban dynamics that may enhance the knowledge potential of agglomerations, 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. They start from a global-macro perspective, move then on to an urban-meso approach and finish with an entrepreneurial-micro perspective. All these studies aim to offer new conceptual and empirical insights into the relationships between the actors' or cities' performance profile and the drivers of urban development. Most of these studies focus on the urban situation in the Netherlands. In combination with the use of modern advanced

management techniques, viz. *strategic performance management* (SPM), the assessment of the performance of various actors is based on a wide range of analytical approaches, such as self-organizing mapping (SOM) tools, multi-criteria analysis (MCA) techniques, geoscience-based tools, or data envelopment analysis (DEA) methods (see Section 1.3).

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: DYNAMIC CITIES**

In Praise of Megacities

High-Performing Cities

Urban Competition and Performance.

- **PART B: INNOVATIVE SECTORS**

Complex Spatial Economic Architecture

Creativity and Diversity in Urban Systems

Creative and Innovative Resources and Management.

- **PART C: CREATIVE DISTRICTS**

Cultural and Creative Assets for Locals

Urban Historical-Cultural Heritage and Creative Minds in Cities

Breeding Places and Urban Buzz.

- **PART D: NEW ENTREPRENEURS**

Urban Change Actors in Business

New Urban Business Demography

Creative Urban Diaspora Economy.

Each of these four 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, as well as methodologies, tools and techniques used (see Tables 1 and 2 in Chapter 15 for a retrospective summary). Furthermore, each chapter is systematically built around interconnected pillars (cornerstones) that lead to a focal point for specific research challenges on creativity, innovation and attractiveness of cities and actors (see Chapter 2). Consequently, a series of mutually complementary and interlinked detailed 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.

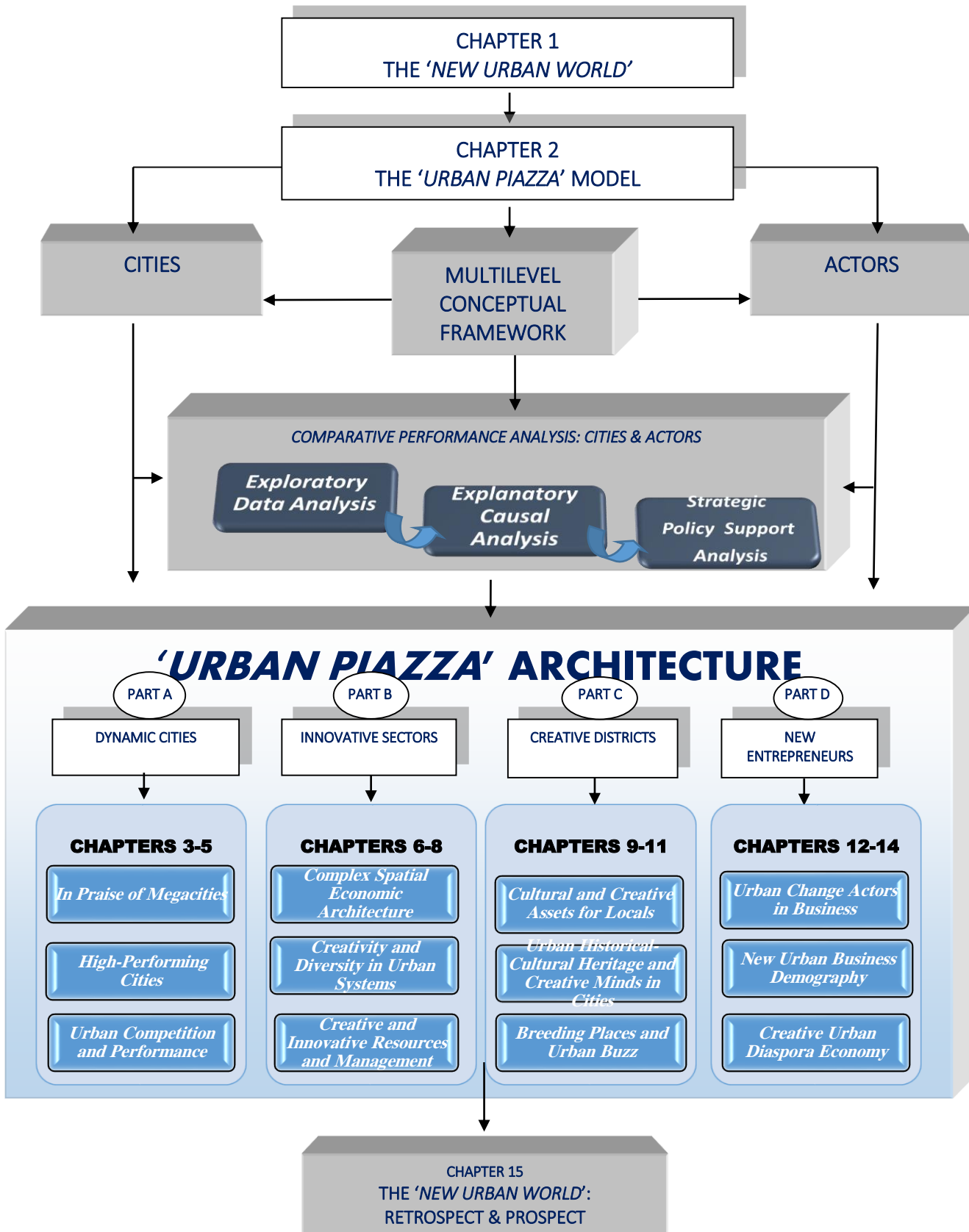


Figure 3. Organisation of the 'New Urban World' study

The systematic architecture of our study is mapped out in a comprehensive way in Figure 3. In the subsequent individual 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). Before moving to the conceptual framework presented in Chapter 2, we will briefly summarize the new urban perspective in the Epilogue of Chapter 1.

1.5 Epilogue

In the ‘*century of cities*’, our planet is gradually moving towards a ‘*New Urban World*’: more and more people will move towards urban areas, so that these cities become the ‘new home of humankind’ (Kourtit and Nijkamp 2013a,b,c,d; Kourtit et al. 2013a,b,c,d; Kourtit 2014b, pp.161-162). The ‘*New Urban World*’ tends to turn into a complex and critical evolutionary organism for spatial development in the future. Cities are becoming evolving information systems driven by a multiplicity of actors and stakeholders; they have many ‘faces’ and are not uniform or identical. The management and governance of such modern, complex and ever-rising urban agglomerations calls for an effective and focused explanation and comparison of the driving forces of city dynamics, including the impact of urban attractiveness and the implementation of appropriate urban governance measures from the global perspective of long-range ‘*grand challenges*’ (Zeng et al. 1994). There is a general awareness that traditional urban planning tools (simulation models, stakeholder analysis, consultation methods) are no longer able to cope with the multiplicity of challenges faced by cities in an open world (Nijkamp and Kourtit, 2011, 2012; Kourtit and Nijkamp 2013a,b; Kourtit et al. 2013a,b,c,d; Kourtit 2014b, pp.161-162; Kourtit and Nijkamp 2014).

The strong worldwide urbanization trend emphasizes the need for a repositioning of cities. Thus, the urban challenge is not stopping urbanization or migration, but calls for managing and governing – by continuously anticipating changing circumstances – actions that are being implemented to deal with these challenges in order to encourage cities to maximize their contribution to a high quality of life in a broad sense (see also the so-called ‘XXQ’ concept; see Nijkamp, 2008; Nijkamp and Kourtit 2012; Ratajczak 2011). The implementation of intelligent and 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 (Nijkamp and Kourtit, 2011, 2012; Kourtit et al. 2013a,b,c,d; Kourtit 2014b, pp.161-162). Clearly, over the years, cities have dramatically changed the way of managing dynamics in the space-economy, ‘making room for others’ without holding back in order to become and remain an attractive environment for various stakeholders (see also Arribas-Bel et al. 2013; Kourtit 2014b; Kourtit and Nijkamp 2014).

However, it is apparently a great challenge to monitor a complex urban management system and to trace whether the different actors involved are still on course (Kourtit et al. 2013a,b,c,d.; Kourtit 2014b, pp.161-162). A intelligent and smart approach supported by ICT becomes a critical complementary vehicle for pro-active strategic urban policy and planning that is better grounded in empirical realities in a global urban environment (see also Boyer 1983; Hall 1988; Ward 1994; Bochniarz 2007; Kourtit 2014b, pp.161-162). Using new comparable data and results supported by intelligent systems — for instance, the so-called ‘*urban i-dashboard*’ — helps to identify important patterns and trends. The new urban intelligence approach offers a convincing case for a novel view on a set of quantitative assessment instruments to map out the drivers of the performance of the ‘*century of cities*’ Kourtit 2014a, pp.161-162; Kourtit and Nijkamp 2014).

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2. THE ‘URBAN PIAZZA’ MODEL AS AN INTEGRATED ANALYSIS FRAMEWORK¹

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 force fields that act as critical success factors for the performance of various actors and/or cities that seek to achieve sustainable outcomes for urban actors 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.

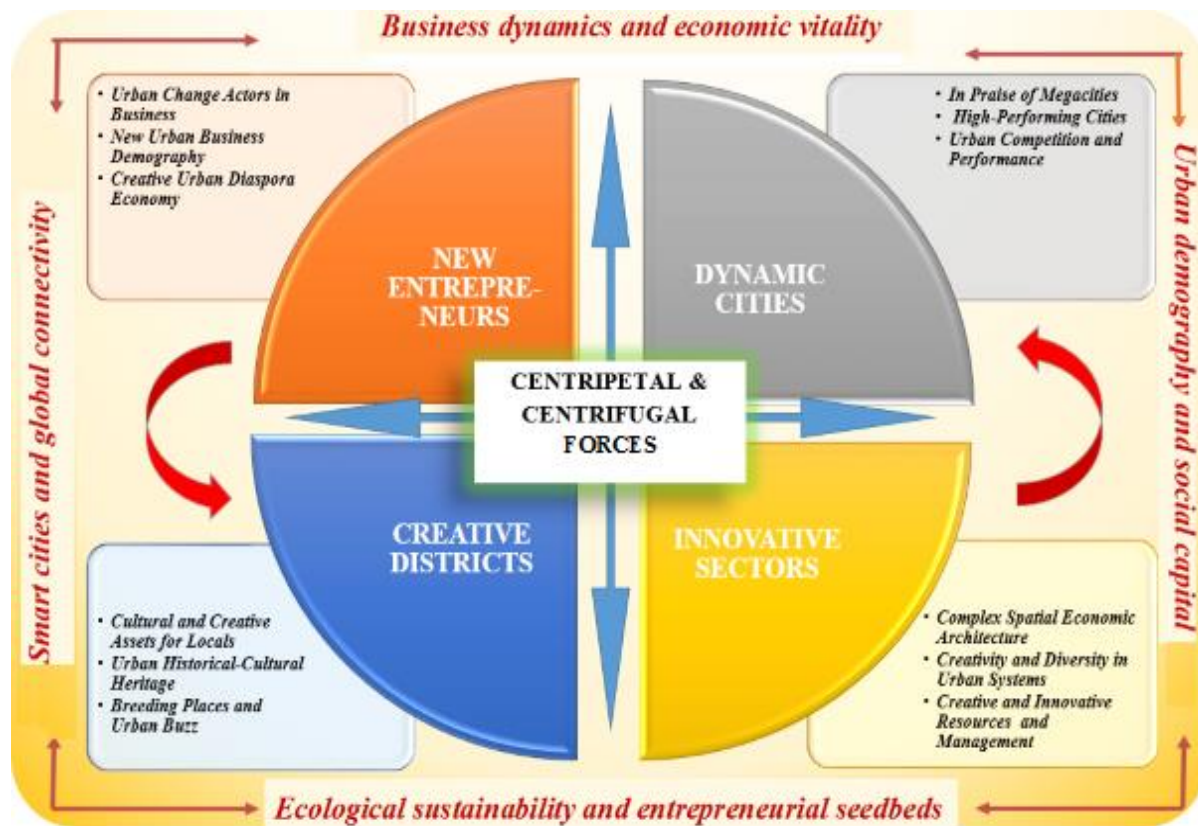


Figure 1. Knowledge arena of the ‘*urban piazza*’ in the ‘*New Urban World*’

¹ Source: This chapter was inspired by the studies that have been produced in the context of the Joint Programming Initiative ‘*Urban Europe*’ (see in particular Nijkamp and Kourtit 2011, 2012; Kourtit et al. 2014; Kourtit 2014).

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 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 (Nijkamp 2008, p. 15; Nijkamp et al. 2011; Nijkamp and Kourtit 2013, p. 18; Kourtit 2014). 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 force field.

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 force field that enhances the competitive capacities of different actors in the urban system (Kourtit et al. 2013a,b,c,e,f,g; Kourtit and Nijkamp 2013a,b,c,d; Kourtit et al. 2013d, p. 13). 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) (Nijkamp et al. 2010, p. 598; Kourtit and Nijkamp 2013, p. 10). 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 (Nijkamp et al. 2011). 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’) (Nijkamp et al. 2010, p. 598). 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 frontrunners 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 observation on urban dynamics highlight four research and policy foci for modern city life, which need to be taken into consideration in order to achieve the highest possible urban performance:

- A. *Dynamic Cities*
- B. *Innovative Sectors*
- C. *Creative Districts*
- D. *New Entrepreneurs.*

These four basic functional appearances of an ‘urban piazza’ are essentially supported by four pillars that constitute the connecting frames of the piazza. They are positioned at the interfaces of these functional foci. They are included in Figure 1 and will be listed here concisely:

- *Urban demography and social capital*
- *Entrepreneurial seedbeds and ecological sustainability*
- *Smart cities and global connectivity*
- *Business dynamics and economic vitality.*

These pillars form four interconnected challenges, for both urban research and urban policy. If we confront now the four components of the ‘*urban piazza*’ architecture with the four ‘challenge pillars’ of the piazza, it becomes clear 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 research and policy foci individually, by decomposing each of these four items into three elements; we will in particular address the interwoven nature of these four concerns (see Sections 2.2 to 2.5).

2.2 Part A: Dynamic Cities

The notion of ‘dynamic cities’ addresses in particular the evolutionary 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 spatial attraction resources result in the emergent socio-economic performance patterns of cities and regions (see also Nijkamp 2008; Nijkamp and Kourtit 2011; Nijkamp et al. 2011; Kourtit 2014). This increasingly means access to global relationships, and use of (informal and formal) networks or connected cities, as these highlight economies of scale.

2.2.1 In Praise of Megacities

This chapter (Chapter 3) argues that in the historical evolution of cities, large-scale urbanization is not only a fact, but a necessary outcome of the forces of globalization and

competition. The current trend towards large cities and megacities in a complex global urban system, operating and interacting at a local to global multi-layer scale, is inevitable. However, their dynamics is as yet a poorly understood phenomenon that deserves full-scale policy action and research attention in our highly diversified space-economy.

2.2.2 *High-Performing Cities*

This chapter (Chapter 4) aims to provide a new methodological and empirical contribution to the rising literature on the relative performance and benchmarking of large cities in a competitive world. On the basis of a recent detailed database on many achievement criteria of 35 major cities in the world, it seeks to arrive at a relative performance ranking of these cities by using Data Envelopment Analysis (DEA). A novel element is the use of a new type of ‘Super-Efficiency DEA’ to identify unambiguously the high performers (‘exceptional places’) in the group of world cities investigated. This new productivity-based approach is complemented with two new directions in DEA research, viz. a Distance Friction Method and a Context-Dependent method.

2.2.3 *Urban Competition and Performance*

This chapter (Chapter 5) examines the relative competitive performance of a set of various metropolitan areas in our world by means of multi-actor explanatory models. These are a specific class of a much broader technique known as multi-level modeling. In our study, extensive data bases on 35 world cities are derived from the so-called GPCI-data base created by the Institute of Urban Research of the Japanese Mori Memorial Foundation. These served as input data for comparative models addressing the multi-annual performance growth of these areas. A fixed-effects modelling approach is then used to identify and assess the determinants of urban performance from the perspective of different classes of stakeholders. An empirical application using R software is carried out. The study highlights the importance of different stakeholders in assessing the performance of metropolitan areas.

2.3 Part B: Innovative Sectors

This part of our study refers to the economic foundation that is necessary for the efficient operation of a sustainable urban area (similar to the XXQ concept; see Nijkamp 2008, p. 27). 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.

2.3.1 Complex Spatial-Economic Architecture

The performance of firms depends, inter alia, on the economic context in which these firms are operating. In combination with the use of advanced management techniques, therefore, the type and quality of capital resources included in the firms' production function crucially affects the firms' competitiveness on both local and international markets. Thus, there is a need for an evidence-based analysis of various capital assets – in particular, local conditions – that impact on the performance of firms. This chapter (Chapter 6) uses a novel micro data base with information on Dutch firms in knowledge and innovation-intensive industries and aims to assess the relative importance of different forms of capital on the firms' behaviour. Because of the different contribution of distinct forms of capital to various performance measures, an empirical model is designed, based on a multi-level framework. Next, this model – including spatial components – is estimated.

2.3.2 Creativity and Diversity in Urban Systems

The chapter (Chapter 7) aim to review the current state-of-art knowledge on SPM, with a particular view to the high-tech SME sector. To that end, a systematic framework will be offered to position various contributions from the recent literature and to create a frame of reference for the comparative studies that follow later in this study. Next, the empirical part consists of a mix of findings from a previously undertaken study on corporate firms, followed by the successes and failures of SPM strategies of high-tech SMEs.

2.3.3 Creative and Innovative Resources and Management

The purpose of this chapter (Chapter 8) is to identify whether there exists a relationship between the level of completeness of a strategic performance management (SPM) system implementation and the advantages and disadvantages an organization experiences from this system. Advantages and disadvantages encountered during the implementation and use of an SPM system are collected from the literature and tested during extensive interviews on prominent Dutch business organizations. During the interviews the level of completeness of the SPM system implementation is also assessed. Subsequently, the advantages, disadvantages and level of SPM

system implementation completeness are related to each other. The need for efficient and effective SPM systems has increased over the past decade and the successful implementation and use of these systems have become of paramount importance to these organizations (see also Kourtit and Nijkamp 2013d). In this respect, one issue has been underexposed in the literature thus far, namely: the relationship between the level of completeness of the SPM implementation and the benefits these organizations experience. This chapter provides an overview of the main advantages and disadvantages to be expected at various stages of SPM implementation completeness.

2.4 Part C: Creative Districts

‘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 (see also Nijkamp 2008, p. 27). 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 (see also Arribas-Bel 2013; Kourtit et al. 2013a,j; Leeuwen et al. 2013). Furthermore, these factors ensure that the urban or regional economy benefits from the related knowledge spillovers together with sharing and developing new knowledge and improving or promoting innovations in cities or regions that generate economic wealth and achieve competitive advantage.

2.4.1 Cultural and Creative Assets for Locals

Port cities are historically important breeding places of civilization and wealth, and act as attractive high-quality and sustainable places to live and work. They are core places for sustainable development for the entire spatial system as a result of their dynamism, which has in recent years reinforced their position as magnets in a spatial-economic force field. To understand and exploit this potential, this chapter (Chapter 9) presents an analytical framework that links the opportunities provided by traditional port areas/cities to creative, resilient and sustainable urban development. Using evidence-based research, findings are presented from a case study by employing a stakeholder-based model—with interactive visual support tools as novel analysis methods—in a backcasting and forecasting exercise for sustainable development. The empirical study in this chapter is carried out in and around the NDSM-area, a former dockyard in Amsterdam, the

Netherlands. Various future images were used—in an interactive assessment incorporating classes of important stakeholders—as strategic vehicles to identify important policy challenges, and to evaluate options for converting historical-cultural urban port landscapes into sustainable and creative hotspots, starting by reusing, recovering, and regenerating such areas (see also Kourtit and Nijkamp 2013c,e,f). This approach helps to identify successful policy strategies, and to bring together different forms of expertise in order to resolve conflicts between the interests (or values) of a multiplicity of stakeholders, with a view to stimulating economic vitality in combination with meeting social needs and ensuring the conservation of eco-systems in redesigning old port areas.

2.4.2 Urban Historical-Cultural Heritage and Creative Minds in Cities

The development of city systems takes place between rapid dynamics and conservation of heritage. This tension is sketched out in this chapter (Chapter 10). Particular attention is given to the existence of multiple policy criteria and of different classes of stakeholders. The main aim is to demonstrate that visualisation methods – in combination with modern plan evaluation approaches – may offer a novel contribution to contemporary urban planning. A new methodology based on a multi-stakeholder multi-criteria analysis, called MAMCA, is used to provide a practical assessment framework for policy choices (Kourtit et al. 2013k). This approach is applied to the development of an historical harbour front and shipyard area in Amsterdam (called the NDSM district), by using geo-imaging methods to elicit stakeholders' priorities for various land-use planning options for the area (called '*urban faces*'). The results and their robustness are extensively discussed.

2.4.3 Breeding Places and Urban Buzz

This chapter (Chapter 11) presents a new methodology for evaluating 'urban buzz' districts as part of a general urban rehabilitation policy, in which forward-fitting plans are incorporated and play a key role. Such plans are part of smart city initiatives based on a blend of creativeness and intelligence (see also Kourtit and Nijkamp 2013c,e,f; Arribas-Bel 2013; Kourtit et al. 2013a,j; Leeuwen et al. 2013). The so-called decompositional evaluation method based on a multicriteria analysis is illustrated for a case study in Amsterdam, viz. the NDSM-area.

2.5 Part D: New Entrepreneurs

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 (World Commission on Environment and Development 1987); Nijkamp and Kourtit 2011, p. 9). A focus on social participation is key when facing urban challenges.

2.5.1 *Urban Change Actors in Business*

This chapter (Chapter 12) aims to examine the critical success and failure factors for the new generation of ethnic (or migrant) entrepreneurs in high-tech and creative industries in Dutch cities (see also Kourtit and Nijkamp 2012b; Kourtit et al. 2013h). The present study in this chapter investigates their entrepreneurial behaviour with a particular focus on their personal and business characteristics as well as their motivations and driving forces, which all determine their entrepreneurship and their business performance. An empirical application is presented, in which the results from an in-depth interview study on second-generation Moroccan entrepreneurs are discussed.

2.5.2 *New Urban Business Demography*

This chapter (Chapter 13) highlights the importance of new forms of entrepreneurship – in particular, ethnic or migrant business – as a major driver of urban change and economic vitality. It provides a general account of the backgrounds and socio-economic implications of migrant entrepreneurship in modern cities and emphasizes the heterogeneity among different groups of migrant entrepreneurs. This diversity calls for new insights into the differences in business performance among various classes of migrant entrepreneurs. In the paper, a recently developed and amended version of data envelopment analysis (DEA) is presented and applied to a group of

Moroccan entrepreneurs in four large cities in the Netherlands. The aim is first to identify the best-performing firms (so-called ‘business champions’), while next the results are more thoroughly analysed. The paper ends with some concluding remarks on urban business strategies.

2.5.3 Creative Urban Diaspora Economy

This chapter (Chapter 14) highlights the ‘magic of diasporas’ – as a source of progress in a globalizing world – with special attention for migrant entrepreneurship. This chapter aims to identify and examine the critical success factors of migrant businesses and their socio-economic implications. We will assess the business performance of migrant entrepreneurs by employing a relatively new analytical instrument, coined Super-Efficient Data Envelopment Analysis (Super-DEA). Next, we will offer a multidimensional visualization of the relative differences in the performance of migrant entrepreneurs by introducing a recently developed technique from the cognitive sciences, coined Self-Organizing Maps (SOMs). This analytical apparatus will be tested on the basis of a sample of Moroccan entrepreneurs in four Dutch cities, namely Amsterdam, Rotterdam, The Hague and Utrecht. The study will be concluded with some strategic conclusions.

2.6 Concluding Remarks

Our planet becomes an urbanized planet, as is witnessed by the world-wide rise in interest in urban matters. It is noteworthy that Wired Science blogger Jeffrey Marlow (2013) has recently identified today’s hottest research fields, based on an examination of citations of core papers published in the years 2007-2012 (taken from the Thomson Reuters Essential Science Indicators database). One of the cutting edge research domains appears to be concerned with urban issues, in particular the interface between urban policy and global governance issues. The background of this interest among scientists is the massive urbanization trend witnessed by current societies all over the world: on average, every week more than one million people appear to give up their rural roots and to move to urban agglomerations. This unprecedented geographic shift in settlement patterns of people is of course accelerated by the rapidly rising world population, especially in the Third World. This spatial shift has profound consequences for our planet. It prompts the need for proactive spatial development strategies in terms of housing, labour markets, infrastructure, human health, education, security and social cohesion, based on a long-range urban perspective (Kourtit and Nijkamp 2014).

There is a clear need for a solid analytical framing of the many issues covered by contemporaneous urban development. The above-mentioned ‘*urban piazza*’ framework may provide meaningful signposts for operational research on urban systems, their dynamics and their stakeholders. Based on the piazza concept with its four angles, we will now present $3 \times 4 = 12$ operational studies on the ‘*New Urban World*’, by zooming in on the performance of urban systems.

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 multi-layered 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
DYNAMIC CITIES**

3. IN PRAISE OF MEGACITIES IN A GLOBAL WORLD¹

Abstract

This paper argues that in the historical evolution of cities, large-scale urbanization is not only a fact, but a necessary outcome of the forces of globalization and competition. The current trend towards large cities and megacities in a complex global urban system, operating and interacting at a local to global multi-layer scale, is inevitable. However, their dynamics is as yet a poorly understood phenomenon that deserves full-scale policy action and research attention in our highly diversified space-economy.

Keywords: megacities, global urban system, cities, urbanization, globalization, global competition, multi-layer scale, space-economy, location systems, mega-trend, settlement patterns, socio-economic externalities, urban population, migration, urban efficiency and performance

¹ Source: Kourtit, K., and Nijkamp, P. (2013). In Praise of Megacities in a Global World. *Regional Science Policy and Practice*, 5 (2), 167–182.

3.1 Space in transition¹

“I dream’d in a dream, I saw a city invincible to the attacks of the whole of the rest of the earth: I dream’d that was the new city of Friends.”

Whitman cited in O’Neill 2008, p. 124

“Cities are the abyss of the human species.”

Rousseau 1762, p. 59

Almost half a century ago Gould (1963) wrote an interesting article in which he argued that the long-run location patterns of human activity were the result of a rational choice process in the struggle of man against the environment. He used a game-theoretic framework to demonstrate the emergence of robust location systems under conditions of spatial choice uncertainty.

In our modern age there is still a need to trace the behavioural background of (structural changes in) locational patterns of households and firms, which manifest themselves nowadays in a long-range, persistent mega-trend towards rising urbanization and the formation of mega-cities all over the world. Spatial locational choices are apparently realized in a complex and dynamic force field, in which the interactions between climate and environmental change, demography, economic motives, and social drivers play a prominent structural role within the new global economic landscape (see for a review Kourtit and Nijkamp 2012). Global mega-cities and urban agglomerations are certainly major sources of changes in land use and land cover, and they are major users of their resources.

In the spirit of Gould, one may argue that the structural urbanization process in our world is the result of a ‘game strategy’ of modern mankind against external and hardly controllable background factors with locational responses, a strategy based on learning mechanisms and evolutionary adaptations in human spatial choice behaviour (see, e.g., Black et al. 2008). This

¹ The authors acknowledge the constructive input for the present publication, offered by members of the Joint Programming Initiative ‘*Urban Europe*’. And this chapter was inspired by several studies that have been produced in the context of the Joint Programming Initiative ‘*Urban Europe*’ (see in particular Nijkamp 2008; Nijkamp and Kourtit 2011, 2012, 2013) and other related documents produced in this context by the author (Kourtit and Nijkamp 2013a,b,c; Kourtit et al. 2013a,b,c,d Kourtit et al. 2014; Kourtit 2014; Kourtit and Nijkamp 2014).

tendency can be exemplified in the demographic domain by current spatial movements of the ‘healthy and wealthy’ elderly (pensionados) towards climatologically pleasant areas, such as urban sunbelts. On the other hand, in the environmental area the awareness is growing that delta regions may increasingly become vulnerable working and living areas that are sensitive to flood risks as a result of sea level rise or climate change, with the consequence that urban land-use planners in these regions are more reluctant to use these areas for residential or industrial development. Settlement patterns, demography, and climate are apparently closely interlinked phenomena. But this force field is even much more complex, as structural economic and social processes may also play a prominent role in spatial development and urban growth. An interesting illustration of the above observations can be found in a recent publication by Lucassen and Willems (2011), who offer a long historical overview of the evolution of cities. They argue that the city offers many positive amenities (e.g., shelter, a market place, socio-economic opportunities), but also many threats and disadvantages (e.g., institutional inertia, socio-economic externalities, inaccessibility). Apparently, urban history is a permanent adaptive process of continuity and change, which has ultimately led to a structurally increasing urbanization of the world over the course of the past centuries.

The above-mentioned observations clearly demonstrate that, in general, cities and urban agglomerations are subject to a great variety of dynamic forces that influence their morphology, size and multi-functionality, but many also develop opportunities for competitiveness and cohesion in a dynamic and irreversible way. As a consequence of these mega-trends, cities and urban agglomerations are faced with a broad spectrum of challenges of various kind, which call for smart and sustainable responses in our urban century. This means that a shift in urban policy and urban governance is fundamental and necessary (see e.g., Naess 2001; Tamagawa 2006; Slavin 2011). Moving forward, with an integrative approach to the socio-economic and environmental aspects of urban development and urban management strategies, with due regard to multidisciplinary perspectives, calls for a better understanding of the process of urbanization and global megacities as well as urban governance.

At present more and more people are moving from rural areas to cities, mostly drawn by the interaction of socio-economic dynamics as the result of a mix of various push-factors, for example, unemployment, low standards of housing and infrastructure, lack of educational facilities (Massey et al. 1993; EEA 2006; UNFPA 2007) and pull-factors, for example, economic

opportunities, attractive jobs, cultural attractiveness, better education, modern lifestyle (Portes and Böröcz 1989; Portes 1995; Rodriguez et al. 1998; Deurloo and Musterd 1998; Bodaar and Rath 2005; Bosque and Romero 2002; Favell 2002). This mega-trend offers various great opportunities for urban development, but at the same time puts enormous pressure on our urban areas. 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).

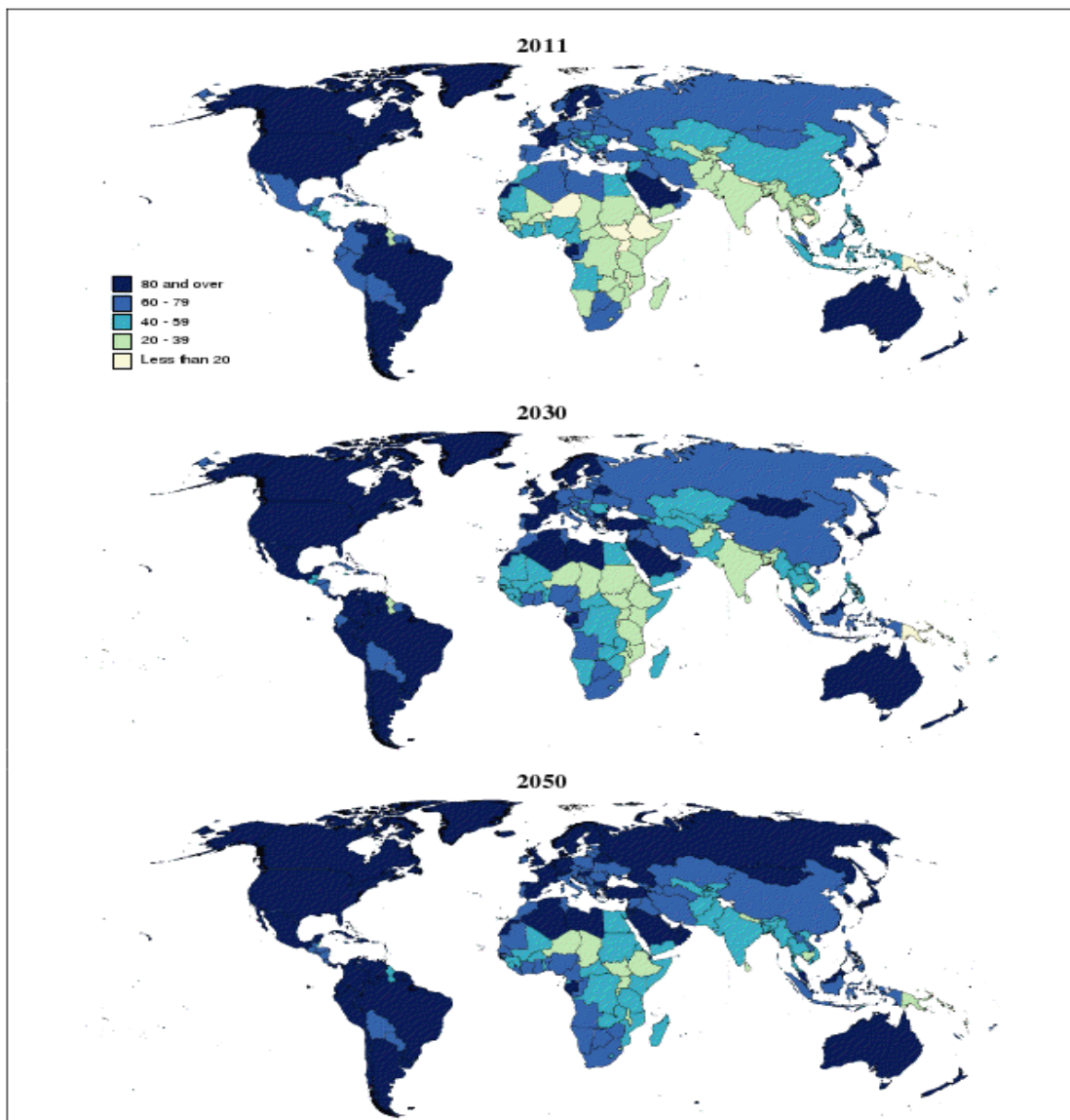


Figure 1. Percentage of the population in urban areas, 2011, 2030 and 2050

Source: United Nations, Department of Economic and Social Affairs, Population Division: World Population Prospects DEMOBASE extract. 2011, p. 26.

Cities are the hubs of human activity but at the same time they are places where economic, environmental and societal demands are magnified. Consequently, the drift from rural to urban areas plays a key role in the rapid growth of cities and will continue to grow and experience many important and significant economic, social and demographic transformations within and across cities, regions and countries during the coming decades. Table 1 presents the likely pattern of urbanization of the continents on our planet.

The findings in Table 1 show that level of urbanization is expected to increase in all major areas worldwide, with Africa and Asia urbanizing more rapidly than the rest of the world (United Nations 2011). However, the findings in Table 1 show that in 2050 Africa and Asia are still expected to have lower levels of urbanization than Latin America and the Caribbean, and the more developed regions such as Australia, New Zealand and Northern America (expected to be over 90 per cent urban, while Europe's level of urbanization is expected to be lower, with 82 per cent of its population living in urban areas) (United Nations 2011).

Table 1. Percentage of urban shares and rate of urbanization by major areas, 1920-2050

<i>Major area</i>	<i>Percentage urban</i>					<i>Rate of urbanization (percentage)</i>			
						<i>1950-1970</i>	<i>1970-2011</i>	<i>2011-2030</i>	<i>2030-2050</i>
	<i>1950</i>	<i>1970</i>	<i>2011</i>	<i>2030</i>	<i>2050</i>				
Africa.....	14.4	23.5	39.6	47.7	57.7	2.47	1.27	0.98	0.96
Asia.....	17.5	23.7	45.0	55.5	64.4	1.52	1.57	1.10	0.74
Europe.....	51.3	62.8	72.9	77.4	82.2	1.02	0.36	0.31	0.30
Latin America and the Caribbean	41.4	57.1	79.1	83.4	86.6	1.61	0.80	0.28	0.19
Northern America.....	63.9	73.8	82.2	85.8	88.6	0.72	0.26	0.22	0.16
Oceania.....	62.4	71.2	70.7	71.4	73.0	0.66	-0.02	0.05	0.12

Source: United Nations Department of Economic and Social Affairs/Population Division World Urbanization Prospects: The 2011 Revision.

It is noteworthy that cities currently account for around 70 per cent of global emissions, and are a major contributor to the overall ecological footprint. Moreover, migration and demographic change do create challenges for the future design of attractive cities that aim to provide an even higher quality of life. It is inevitable that international migration to large cities will continue in the coming decades, increasing the probability of social exclusion or even instability. The impact of climate change will present a new challenge to the living conditions in cities. However, there is no

doubt that future cities will become arenas for social action, economic vitality and ecological sustainability. The expected concentration of human capital in urban agglomerations – with more skilled, creative and educated people – will make urban agglomerations power-houses of economic growth (see Hanushek and Kimko 2000; Krueger and Lindahl 2001; Castello and Domenech 2002).

Cities will – with the expected rise in population in the next decades – turn into urban agglomerations, which may then turn into megacities¹ or polycentric urban areas. We shall most likely witness an unprecedented urban dynamics, with a transition from early ‘island cities’ (à la Van Thünen) and hierarchical cities (central places *à la* Christaller or Lösch) towards global megacities, network cities, and even city networks, together with the emergence of village cities and e-cities as complementary spatial constellations (Nijkamp and Kourtit 2011, 2012; Kourtit and Nijkamp 2012).

These global megacities and urban agglomerations will generate new network constellations and will functionally connect sub-urban areas (satellites) to strengthen the interaction on an inter-cluster basis, in order to serve common interests of a broad knowledge, innovation and technology economy and to create a visible constellation of a ‘*New Urban World*’ (see Kourtit et al. 2011). This natural increase of cities (the difference between births and shrinking of cities) may contribute significantly to urban population growth (United Nations 2009).

Against this background, the present paper aims to highlight the plausibility of the emergence of megacities in order to achieve a sustainable development of our planet. It is organized as follows. Section 2 gives an overview of urbanization trends in general. Section 3 then presents arguments for the rise of megacities from a broad urban-economic perspective, in which also analytical instruments for studying urban dynamics are discussed. And finally, Section 4 concludes with a number of retrospective and prospective remarks.

¹The minimum size of a megacity is usually supposed to range from 4 to 10 million inhabitants, depending on the source (Daniels, 2004).

3.2 Urbanization: A Global Destiny¹

The year 2007 was an important milestone in the long history of urbanization in our world: for the first time, the city took over the ‘power’ from its hinterland, since that year marked the point, when more than 50 per cent of the world’s population lived in urban areas. In various circles today, the 21st century is even called ‘*the urban century*’. Surprisingly, only a few centuries ago approx. 20 per cent of the world’s population lived in cities. The process of structural urbanization is still continuing, with degrees already exceeding 75 per cent in various European countries and elsewhere (for details, see, e.g., World Urbanization Prospects 2011; Mega 2010), while especially rapid urbanization continues in the developing world.

The findings from Figure 2 show that major disparities in the level of urbanization exist in the more developed regions. Although in various countries the proportion of the urban population was already above 50 per cent in 1950, it will still take another century for half of the population of the less developed regions to live in urban areas.

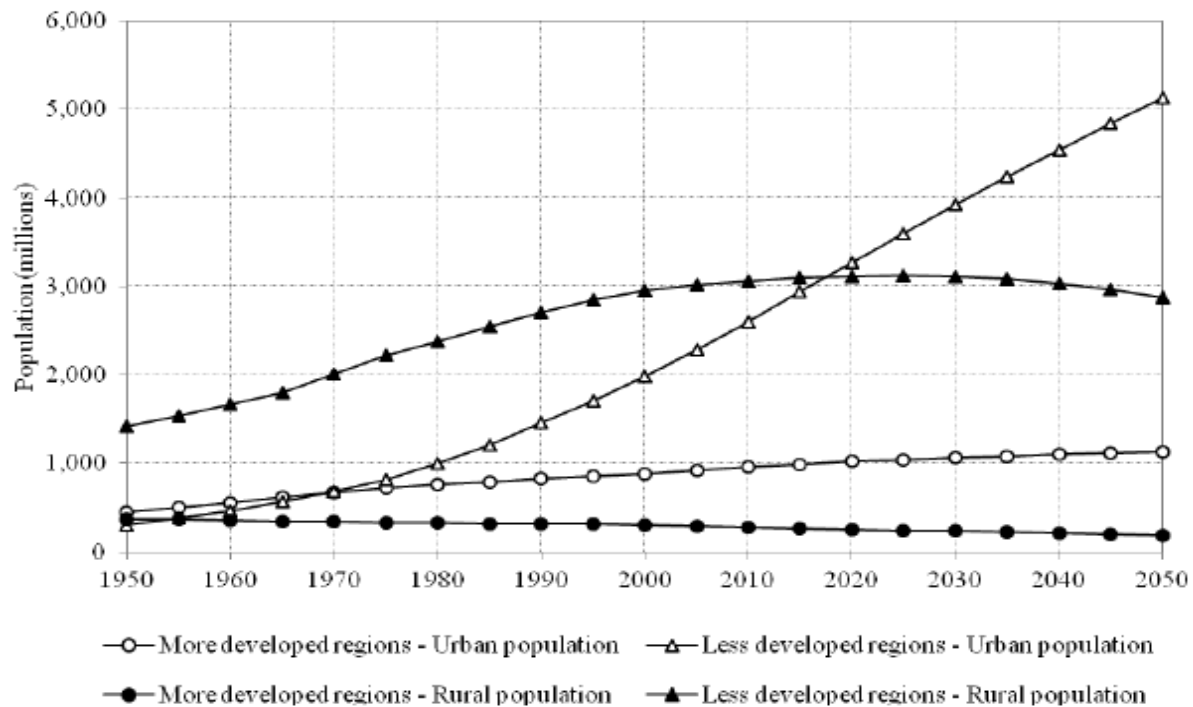


Figure 2. Urban and rural populations by development group, 1950-2050

Source: United Nations, Department of Economic and Social Affairs/Population Division World Urbanization Prospects: The 2011

¹ In the present paper, various urban concepts such as cities, urban areas, agglomerations, etc. are used in a rather loose way. For a precise definition of such concepts, we refer to Gregory et al. (2009).

It is noteworthy that the findings in Table 2 indicate that between 2011 and 2050 the world population will increase by 2.3 billion, rising from 7.0 billion to 9.3 billion (see United Nations 2011; World Urbanization Prospects 2011). At the same time, the growth in the ‘*New Urban World*’ population is expected to increase to 72 per cent by the year 2050, rising from 3.6 billion in 2011 to 6.3 billion in 2050, mainly concentrated in the urban areas of less developed countries with a population growth from 2.7 billion in 2011 to 5.1 billion in 2050 (see World Urbanization Prospects 2011). At the same time, the rural population of the less developed regions is expected to decline from 3.1 billion to 2.9 billion (see World Urbanization Prospects 2011). This means that, in the next four decades, urban areas are expected to take in all world's population growth.

Table 2. Total urban and rural populations by development group, 1950-2050.

Development group	Population (billion)					Average annual rate of change (percentage)			
	1950	1970	2011	2030	2050	1950-1970	1970-2011	2011-2030	2030-2050
Total population									
World.....	2.53	3.70	6.97	8.32	9.31	1.89	1.55	0.93	0.56
More developed regions....	0.81	1.01	1.24	1.30	1.31	1.08	0.51	0.23	0.06
Less developed regions.....	1.72	2.69	5.73	7.03	7.99	2.23	1.85	1.07	0.65
Urban population									
World.....	0.75	1.35	3.63	4.98	6.25	2.98	2.41	1.66	1.13
More developed regions....	0.44	0.67	0.96	1.06	1.13	2.09	0.89	0.52	0.29
Less developed regions.....	0.30	0.68	2.67	3.92	5.12	4.04	3.33	2.02	1.34
Rural population									
World.....	1.79	2.34	3.34	3.34	3.05	1.36	0.87	-0.01	-0.44
More developed regions....	0.37	0.34	0.28	0.23	0.18	-0.48	-0.48	-0.92	-1.14
Less developed regions.....	1.42	2.01	3.07	3.11	2.87	1.74	1.03	0.07	-0.40

Source: United Nations Department of Economic and Social Affairs/Population Division World Urbanization Prospects: The 2011 Revision.

In conclusion, population development and growth are becoming largely an urban phenomenon in the ‘new urban world’. Urban sustainability in terms of ecology, social dynamics, and vulnerability of cities and urban agglomeration calls for a careful urban management and strategy development, with a view to a balanced future for an XXQ urban system (based on the ‘XXQ’ principle focussing on the highest possible urban quality: see Nijkamp 2008).

The long-term megatrend in population movement towards the city is the result of two underlying force fields, viz. the exponential growth in world population (with an average growth rate of approx. 1.2 per cent per annum) and the rural-urban drift (due to the relatively more favourable socio-economic opportunities in urban agglomerations). In this context, it is foreseen by United Nations that, by the year 2020, about 60 million people will have moved from sub-Saharan Africa to North-Africa and Europe. Both natural population growth and (domestic and foreign) migration will present a formidable and unprecedented challenge to the resilience of urban systems in our world. And there is no reason to assume that the trend towards further urbanization will ever come to an end. It is anticipated that, in less than one generation, more than two-thirds of the population on our planet will live in urbanized areas. In Europe – but also in other regions of our world – the urbanization degree may well have risen to 83 per cent (557 million) by the year 2050 (European Commission 2010). Most likely, non-urbanites will gradually become a minority.

The above-mentioned megatrend will result in a dramatic transformation in settlement patterns. This emerging repositioning of cities may be interpreted as a *third* settlement revolution. The *first* revolution was essentially marked by a rural to urban shift in the past (instigated by safety and political motives), which led to the first geographically demarcated cities (often with walls and fortifications). This phase is marked by the development of manufacturing tools that began to take-over from the farm and at-home employer (see Tellier 2009). The *second* revolution took place in the period of the Industrial Revolution (19th century) when large-scale industrialization and far-reaching labour specialization led to the emergence of unprecedented scale advantages in large urban-industrial agglomerations. This phase created the growth of our modern cities: for many firms it was cost-efficient to locate in cities to gather cheap labor where people searching for jobs had move to. And nowadays, we witness the rise of urban networks and mega-cities – comprising not only urban centres and suburban areas, but also edge cities, suburban areas, new towns, and urban sprawl areas – that all together form spatially-connected and urban network agglomerations (see also Castells 1996). The trend towards global city networks is even imminent (see Sassen 1991, 2010; Scott 2001; Nijkamp 2008).

In less than a century, the urban landscape in Europe and elsewhere has completely changed. Until the mid-1850s, many of today's cities in Europe (Madrid, Lyon, Vienna, Paris, Torino, Stockholm, Frankfurt, Brussels or Amsterdam) were still relatively small. They turned into urban agglomerations with the rise of the Industrial Revolution which affected rural households and

small-scale farming and continued to grow on a structural basis (despite various ups and downs to have access to the cities' economic activities and facilities). Clearly, urban sprawl meant, in the short run, a disruption of existing urbanization trends, but in the long run the central position of cities was even reinforced (Tellier 2009). Nowadays, metropolitan development is increasingly turning into mega-city development, and currently it is hard to find a conclusive answer to Alonso's (1964) challenging question: "*How big is big enough?*" and "*How big is too big?*". It seems plausible that the ongoing urban dynamics will continue to be a reality in a globally-oriented, open society in the future (Nijkamp 2008).

It is noteworthy that modern urbanization means simultaneously a disappearance of the strict borderlines between urbanity and rurality (see also Vaz et al. 2006). While in the past centuries, the city was clearly demarcated by city walls separating it from its hinterland, in modern centuries the morphology of cities has become diffuse (with urban village districts, suburbs, new towns, satellite cities, and diffuse urban sprawl) and is characterized by spatially-segmented areas (see Musterd and Van Kempen 2009).

This evolution did not only reflect a quantitative change in the share of inhabitants in urban areas in the national territory but also had qualitative impacts of both a socio-economic and political nature. Modern network cities have turned into spearheads of (supra-)regional and (supra-)national power, from a number of different perspectives: socio-economic (business, innovativeness, jobs, wealth); geo-political ('*cities as global command and control centres*': see Sassen 1991); and technological (Nijkamp 2008).

Consequently, modern urbanization means not only a shift from rurality to urbanity but also the emergence of large-scale urban agglomerations which ultimately turn into mega-cities (see Nijkamp 2010). 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 for new settlement patterns in our modern society. Cities have turned into force fields with both centripetal and centrifugal movements in an open world, an observation which was already made a few decades ago by Dematteis (1988). Especially the seminal work of Friedman (1986) on world city developments – leading to an urban system as an inter-connected global system with a specific hierarchical functional structure – has inspired much research on

globalization and urban development (see also Beaverstock et al. 1999; Knox and McCarthy 2005; Kourtit et al. 2011; McCann 2008; Sassen 2006).

Is it possible to map out the future of our urban world? The current level of urbanization is essentially the result of a very complex set of many socio-economic forces that are closely interwoven with demographic, socio-cultural, political, economic and technological drivers at all geographic scales (from local to global). Cities go through ‘normal’ business cycles, with upturns leading to booming agglomerations, but also with possible downturns leading to socio-economic decay (‘shrinking cities’). A blueprint for the urban future is hard to design.

Therefore, the diversity in challenges and responses calls for a coherent approach, by means of which anchor points for effective action on sustainable urban futures can be identified. These anchor points provide smart principles for managing the increasing concentration of people in urban agglomerations, with a long-term view to the design and implementation of a liveable, sustainable, accessible, and economically-viable environment and settlement pattern for citizens. These four urban future pillars – which cover both local and global scales – are:

- cities as sources of economic vitality for a broader (supra-)regional system or network of urban areas;
- cities as nodes for smart logistics and sustainable mobility, at both intra-city and inter-city levels;
- cities as seedbeds for broad socio-economic participation and cultural diversity in an ethnically and socio-culturally segmented urban system;
- cities as centres for sustainable ecological development and for sustainable energy production and use.

In recent decades, these four pillars have become the focal points of urban policy and research and have individually received extensive attention in various distinct disciplines, such as social and economic geography, urban and regional economics, transportation and logistics, urban demography, political science, planning theory, urban ecology, urban architecture, business administration, and environmental science. But the interfaces between these pillars have received far less attention, although it is highly likely that new research perspectives and achievements are to be found exactly on these interfaces. However, research on the edges of these four pillars is

difficult, as it needs a clear interdisciplinary orientation that is centred on the future sustainability (ecological, social, economic, logistic) of urban areas. But it is likely that it is on such interfaces where one may expect breakthrough innovations which will reinforce the critical functions of cities in the future (e.g., during the period from 2020 to 2050). Scientific research in this area needs long-range strategic foresight experiments; multi-component modelling based on non-linear dynamic (complex) systems analysis; and the use of advanced research tools from different disciplines, based on solid information systems.

In addition to the strategic re-profiling of urban areas into an overall integrated network cities, we also observe a new gradual transformation of urban agglomerations into (regional, national or even global) spatial-economic networks. Worldwide, urban areas are becoming nodes in global city networks (Burger et al. 2009; Taylor 2001, 2004; Taylor et al. 2002), in which regional and national borders will play a less important role. This new development may turn into the *fourth* urban revolution in the history of human settlements, which may lead to the emergence of global hierarchical networks or interconnected global networks of urban agglomerations. Clearly, this may prompt new research endeavours on complex network analysis (such as the analysis of exploring and clarifying socio-economic black holes, scale-free networks, etc.). City networks will definitely become a source of creative and strategic research on the future of metropolitan areas (Nijkamp 2008).

Global trends, such as (rapidly) increasing urbanization, are putting pressure on the urban system, and causing negative externalities such as pollution, congestion, security issues, and social degradation. Demographic and climate change are having further impacts on this vulnerable system, making it a necessity, for scientists and policymakers alike, to look for effective ways in dealing with a fast-changing societal, economic and environmental reality.

However, more positively, at the same time, our urban areas are also innovation hubs themselves, where knowledge, policy, and practice come together to create innovative ideas, employ new technology, and benefit from fresh insights concerning the challenges and the drivers of urban development, as well as the solutions for urban problems. Good practices can be found in various urban economies, while good practices also exist in the conservation of cultural heritage and historic landscapes, for instance, in port areas (urban rehabilitation of port areas). Many cities have in the past years developed new policy mechanisms for upgrading, such a new port brownfield design through harbour front and seafront development (e.g. the London Dockyards,

the Kop van Zuid in Rotterdam, Cape Town, New York, Yokohama, Singapore, Helsinki etc.). The two keywords in this drastic land use conversion are: sustainable development and creative sector stimulation. Therefore, the traditional roles of (port) cities are constantly being redefined, as demands for high-quality amenities and public services are subject to permanent change. A thriving urban area must be able to ensure the sustainable accessibility and mobility of urban systems (including their logistics), and simultaneously develop effective measures to minimize its ecological footprint.

To meet the challenges of structural urbanization, it is necessary to ask what form future urbanization patterns will take. In the next section, we argue that megacities will play an indispensable role in shaping our ‘*urban century*’.

3.3 The Blessing of Global Megacities

According to recent population predictions (see UN 2009), our planet will have to accommodate 9 to 10 billion people by the year 2050. This would mean an average annual increase in the world’s population over the next 30 to 40 years of at least 50 million people. Most of these new citizens have to be housed in urban agglomerations; it would mean that from now onwards – particularly in the developing countries – every week a new city the size of Amsterdam has to be created. This would seem to be an impossible task. But a dispersal of these millions of people over rural areas is likely to have far more devastating effects in terms of ecological sustainability, economic efficiency, and socio-economic opportunities for the urban, regional and global development (World Bank 2005; Kraas 2007).

The world keeps on urbanising, and a greater share of the economic output will come from cities. The dynamics of urbanization and its processes differentiate in different regions. For example, Figure 3 presents the distribution of megacities for 2015. Today, there are more than 15 large metropolitan areas (United Nations 2011). According to United Nations (2011) there will likely be more than 25 global megacities with a population above 10 million by mid-century.

It should be emphasized here that cities and urban agglomerations can boost an enormous rise in efficiency and productivity (Duranton and Puga, 2004), as a consequence of a wealth of various externalities; in particular, agglomeration – or Marshall-Arrow-Romer (MAR) – externalities; diversity – or Jacobs – externalities; and cluster – or Porter – externalities (see de

Groot et al. 2009; Nijkamp 2008). Consequently, cities are able to create so many positive external benefits, that from an economic perspective, there will be a structural tendency for an increasing influx of people into urban areas (see also Glaeser 2011; Owen 2009).

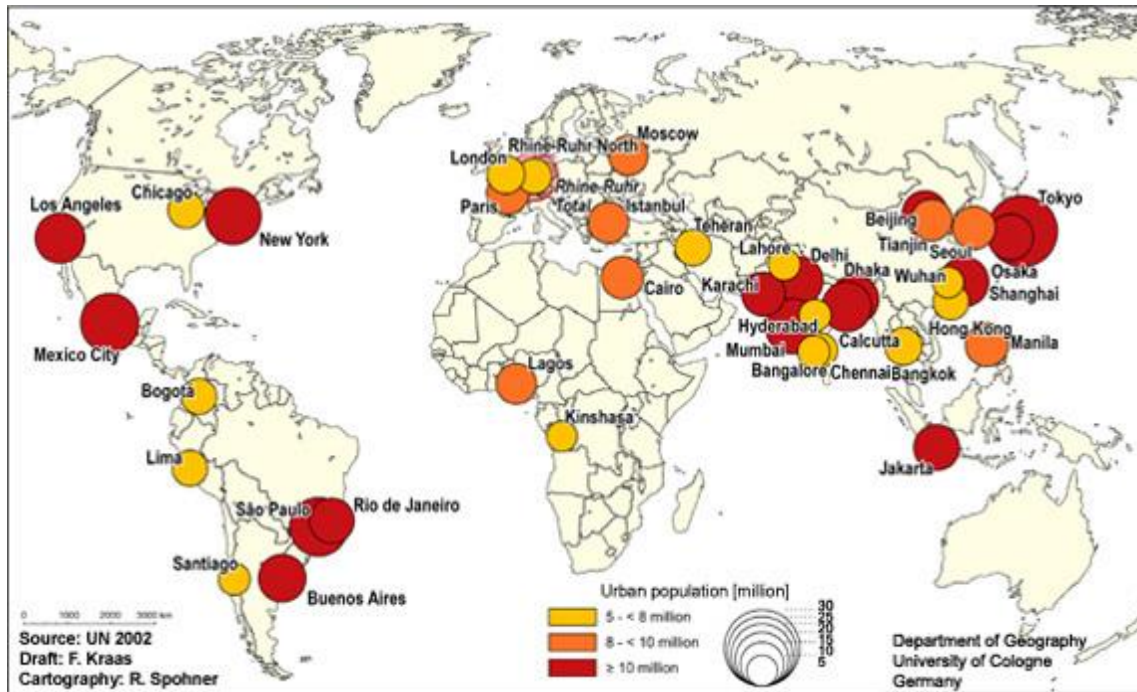


Figure 3. Spatial distribution of the world’s megacities 2015.

Source: IGU MegaCity TaskForce, 2012

The latter tendency has recently been empirically confirmed by Bettencourt et al. (2007), and later on by West, who demonstrated, in an interview in the *New York Times* (December 17, 2010) the validity of the urban scaling hypothesis: he was 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 found that, on average, cities benefit from a 15 per cent rise in productivity for each doubling of city size.

Clearly, not all cities are growing. There are many examples of shrinking cities (e.g. Dresden, Halle), acting more as satellite cities in a broader urban system, but, nevertheless, even in countries with shrinking cities (like Germany) the overall urbanization rate at national level is still rising. Urban agglomerations appear to generate more economies of density and proximity – in combination with social learning, creativity and self-organization – than any other type of spatial configuration.

In the *'New Urban World'* (see Nijkamp and Kourtit 2011, 2012,2013; Kourtit and Nijkamp 2012), increasing urbanization will likely continue as a robust trend, to the extent that many large cities and urban agglomerations will become nodes of global development. Cities will become the *'home of man'* (Ward 1976), and will gradually meet strict sustainability conditions. For the time being, there is no logical or rational argument which would convincingly demonstrate that cities have a natural ecological limit in terms of population size (Nijkamp 2008). Nowadays, we even observe a *'double urbanization'* phenomenon: medium-size cities turn into large cities, and large cities turn into megacities (or polynuclear agglomerations).

Managing urban development at a global scale is clearly one of the biggest challenges in the 21st century. Issues like housing policy, infrastructure and logistics, environmental sustainability, urban land use, smart energy use, ageing, human health, social segregation, negative urban externalities, and international migration will all require novel insights and policy strategies in order to make the future city *'a place 4 all'*. Indeed, urban productivity is key for urban performance. In an OECD study (2006) it was shown that productivity per worker outstrips all other factors in performance comparisons of cities. Besides agglomeration externalities, there are also additional drivers of a relatively high urban productivity, viz. the urban knowledge base and the level of ICT use in a city (see Henderson 2003). The complex urban dynamics of our world can be described in simple terms by means of the following circular causality model (see Figure 4).

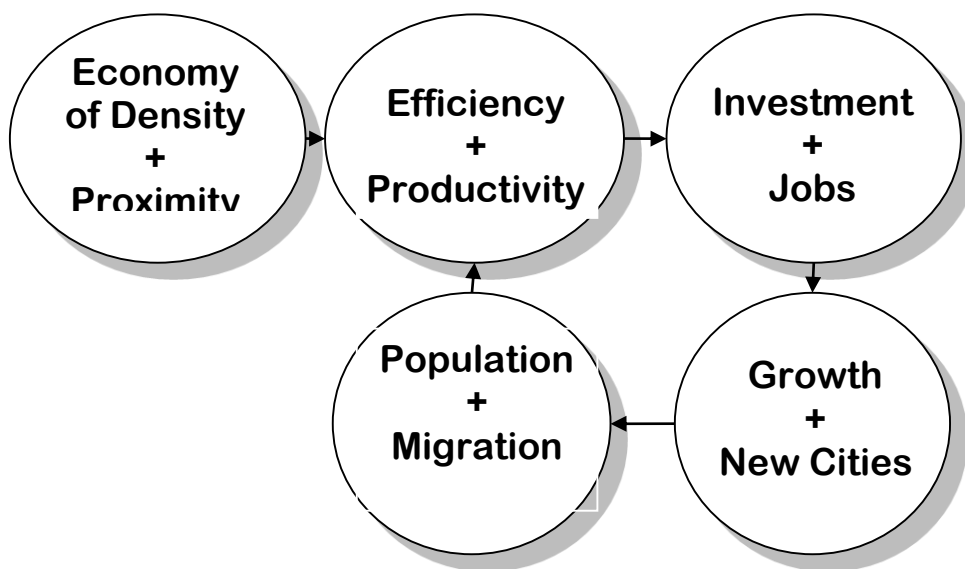


Figure 4. A circular causality model of urban growth

To interpret Figure 4, three background factors deserve special attention.

3.3.1 Migration

Migration at a worldwide scale is a sign of an open and global economy. It enhances the efficiency in the dynamic allocation of production factors and has generally – in contrast to existing popular wisdom – a (modest) positive impact on local economies (for an overview, see Nijkamp 2008; Nijkamp et al. 2012). Migration is a typical urban phenomenon, and one may expect a drastic future impact of migrants on the urban economy, especially if the trend towards global knowledge migration continues (OECD 2009). It seems plausible however, that a migration influx will have a positive influence on the economy of cities and shapes life for developing countries (World Bank 2009). Urban immigration not only implies the acquisition of new skills at low costs, but also enhances socio-cultural diversity which may boost urban innovativeness, migrant entrepreneurship, and human creativity.

3.3.2 Ageing

The demographic trend in many countries shows a double ageing process: more people are getting older, and the share of very old people is also rising. Although a (smaller) share of the elderly may move as ‘*pensionado*’s’ to rural areas, it seems plausible that the majority will still continue to reside in urban areas because of the much better provision of appropriate amenities. Clearly, immigration may partly be used to counter the effects of an ageing society, but whether this would be significant to offset the economic effects of population ageing and decline remains to be seen. Kresl and Ietri (2010) list various advantages of urban ‘seniors’ for the urban economy, viz. a stable size of the urban population, a revitalization of culture and arts in the city, a significant volume of expenditures on luxury and cultural goods by ‘healthy and wealthy seniors’, and the stimulation of a considerable urban voluntary social economy.

3.3.3 Knowledge

In a global and open economy, knowledge circulation is an important source of progress. Since knowledge production, transfer and absorption takes place predominantly in and between urban areas, it is plausible that urban agglomerations will emerge as knowledge hubs in a worldwide

knowledge network. The positive diaspora effects of international migration will be visible particularly in urban areas. In this context, the OECD (2009) has designed five long-run global scenarios, in which the spatial allocation of talent plays an important role, viz.: *Progress for All*; *OECD Long Boom*; *Uneven Progress*; *Globalization Falters*; and *Decoupled Destinies*. Admittedly, the simultaneous occurrence of push and pull factors for knowledge and talent may lead to complex brain gain and brain drain relationships among cities in the world, but – as in international trade – there is certainly the prospect of great economic gains for successful cities all over the world.

Table 3. Population of various large global megacities with more than 10 million inhabitants, 2011 and 2025 (millions)

2011			2025		
Rank	Urban agglomeration	Population	Rank	Urban agglomeration	Population
1	Tokyo, Japan	37.2	1	Tokyo, Japan	38.7
2	Delhi, India	22.7	2	Delhi, India	32.9
3	Ciudad de México (Mexico City), Mexico	20.4	3	Shanghai, China	28.4
4	New York-Newark, USA	20.4	4	Mumbai (Bombay), India	26.6
5	Shanghai, China	20.2	5	Ciudad de México (Mexico City), Mexico	24.6
6	São Paulo, Brazil	19.9	6	New York-Newark, USA	23.6
7	Mumbai (Bombay), India	19.7	7	São Paulo, Brazil	23.2
8	Beijing, China	15.6	8	Dhaka, Bangladesh	22.9
9	Dhaka, Bangladesh	15.4	9	Beijing, China	22.6
10	Kolkata (Calcutta), India	14.4	10	Karachi, Pakistan	20.2
11	Karachi, Pakistan	13.9	11	Lagos, Nigeria	18.9
12	Buenos Aires, Argentina	13.5	12	Kolkata (Calcutta), India	18.7
13	Los Angeles-Long Beach-Santa Ana, USA	13.4	13	Manila, Philippines	16.3
14	Rio de Janeiro, Brazil	12.0	14	Los Angeles-Long Beach-Santa Ana, USA	15.7
15	Manila, Philippines	11.9	15	Shenzhen, China	15.5
16	Moskva (Moscow), Russian Federation	11.6	16	Buenos Aires, Argentina	15.5
17	Osaka-Kobe, Japan	11.5	17	Guangzhou, Guangdong, China	15.5
18	Istanbul, Turkey	11.3	18	Istanbul, Turkey	14.9
19	Lagos, Nigeria	11.2	19	Al-Qahirah (Cairo), Egypt	14.7
20	Al-Qahirah (Cairo), Egypt	11.2	20	Kinshasa, Democratic Rep. of the Congo	14.5
21	Guangzhou, Guangdong, China	10.8	21	Chongqing, China	13.6
22	Shenzhen, China	10.6	22	Rio de Janeiro, Brazil	13.6
23	Paris, France	10.6	23	Bangalore, India	13.2
			24	Jakarta, Indonesia	12.8
			25	Chennai (Madras), India	12.8
			26	Wuhan, China	12.7
			27	Moskva (Moscow), Russian Federation	12.6
			28	Paris, France	12.2
			29	Osaka-Kobe, Japan	12.0
			30	Tianjin, China	11.9
			31	Hyderabad, India	11.6
			32	Lima, Peru	11.5
			33	Chicago, USA	11.4
			34	Bogotá, Colombia	11.4
			35	Krung Thep (Bangkok), Thailand	11.2
			36	Lahore, Pakistan	11.2
			37	London, United Kingdom	10.3

Source: United Nations Department of Economic and Social Affairs/Population Division World Urbanization Prospects: The 2011 Revision.

Table 3 gives a further look at various large global megacities (with more than 10 million inhabitants) and tells us that most of them are found in Asia and Latin America. Examples are: Tokyo, Delhi, Sao Paulo, Mumbai, Mexico City, New York, Guangzhou, Seoul, Shanghai, Calcutta, Dhaka, Karachi or Manila. Their size is the result of geography, history, demography, and economics. Clearly, there are significant differences in the growth rate of large cities. For example, Chongqing (China) with a current population of about 9 million is the fastest growing city in the world, and expects to achieve a 75 per cent growth rate in the period 2005-2015, whereas Detroit (USA) with a current population of 713,000 lost 25 per cent in the period 2000-2010.

The steady rise in megacities all over the world – both in numbers and in population size – can be explained by various background factors, in particular, decline in transportation costs, development of advanced logistic systems, better accessibility of metropolitan areas, returns to scale from agglomeration advantages, risk pooling, diversity benefits, labour pooling, specialized learning mechanisms, self-reinforcing sorting, and attractive amenities. Clearly, there are certainly many negative externalities caused by the existence of large cities, such as congestion, lower health conditions and crime rates, but as long as the positives exceed the negatives, the city will continue to grow (Glaeser 2011). From that perspective, megacities are a ‘blessing in disguise’.

Any scientific assessment of this outline of the dynamics of urban processes calls for insightful instruments. The previous observations on the evolution of megacities – often in relation to large polycentric agglomerations – highlight the systemic complexity of our urban world. The global urban landscape is indeed dynamic and pluriform. It displays quite surprising dynamics in individual cases, but it also combines change with continuity. For example, individual cities in a given country may go through wild and unexpected cycles, which might nevertheless be controlled by urban morphological or functional principles (such as rank-size rules or entropy) (see Nijkamp 2008; Reggiani and Nijkamp 2012).

The scientific analysis of city size and land-use development may be based on a wealth of analytical tools (see, for an overview, Capello and Nijkamp 2004). An interesting study on conceptual frameworks and analytical toolboxes for studying urban dynamics is contained in a recent study by Bertuglia and Vaio (2011). They use complexity theory as a unified framework for analysing the growth and decline of urban systems which are the product of the self-organizing efforts of all stakeholders. After a broad review of urban theories in the past century – mainly

sociological in nature, and less focussed on economic drivers of urban dynamics – the authors provide a useful overview of modern complexity instruments for analysing the space-time dynamics of urban systems. An example of such an operational and increasingly popular tool is agent-based modelling, an approach that uses individual interactions – through learning and social cognitive process – to map out the evolution of macro structures (e.g. at the urban systems level). It goes without saying that the complex and dynamic evolution of – modern and future – urban systems calls for new appropriate toolboxes that need to keep pace with the rapid changes in urban patterns worldwide. Such complexity instruments are an important analytical tool for studying both the evolution of the intra-urban system and the dynamic processes governing inter-urban networks (see, e.g., Tranos and Nijkamp 2012).

3.4 Retrospect and Prospect

Global urbanization is on a rising edge, not only for individual cities but also for global urban networks. Consequently, we observe a great pluriformity in contemporary urban forms and developments. It is clear that the achievement of sustainable urban development will be one of the greatest global challenges in the decades to come, in both the developed and the developing world. The ‘*urban way of life*’ will most likely be the dominant lifestyle in this century. In association with ICT developments, we will most likely increasingly witness a global lifestyle, which will be governed by interaction, evolution, and learning mechanisms.

This globalization trend will induce unprecedented urban dynamics, intensified by global migration processes and the battle for talents. In this multifaceted global urban dynamics competition, urban agglomerations will aim to act as ‘gatekeepers’ by seeking a strategic role as a global knowledge, innovation or creativity hub. It goes without saying that education will become a key variable in the battle for global urban competence, ‘*knowledge is power*’ (‘*nam et ipsa scientia potestas est*’, as Francis Bacon puts it in his *Editationes Sacrae* (1597).

The question of optimal city size will, of course, continue to be on the urban agenda. But it ought to be recognized that city size is a limited concept that does not incorporate intercity externalities, let alone global interactive forces between urban agglomerations. Most likely we will observe that ‘small is not always beautiful’, but ‘big is not always beautiful’ either. It seems likely that polynuclear urban configurations may become a meaningful intermediate structure for the ‘big size – small size’ dilemma. What counts in the end is the highest possible quality of urban life the

so-called the XXQ-City 2.0 (based on the above mentioned the ‘XXQ’ principle; see Nijkamp 2008).

The rise of global megacities calls for policy guidelines. First, agglomeration advantages – of all kind – are the essential and persistent driving force of the growth towards ever growing urban agglomerations. Wise agglomeration policy would have to follow and facilitate the ‘waves’ of agglomeration forces, in so far as they contribute to XXQ of these areas. Second, despite the generic concept of megacities, there is not a single and unambiguous policy panacea: a megacity is a species *sui generis*, with distinct features, a distinct cultural historical legacy, and place-specific opportunities and bottlenecks. Agglomeration policy is tailor-made, but relies on common resources offered by smart citizens, urban social capital, managerial talents, scientific skills and creative enthusiasm and ambition of all stakeholders involved, while due attention has to be paid to the city’s role in a broader, often open and global, networking context both industrial and knowledge networks). Thus, urban agglomerations have to design future strategies based on self-organizing principles in order to harness and develop indigenous strength, while obtaining a strong position on a global scale.

Global urbanization processes inevitably involve far-reaching issues relating to the governance of powerful urban mega-structures that far exceed the relevant administrative regional and national borders. New regulatory and logistic systems may be needed to fully reap the fruits of our urban century. This holds not only for migration dynamics, but also for global technology developments, human health care systems and sustainable development. Here the dilemma of self-regulation versus planning will play a critical role. The current concept of self-organizing urban complexes may provide new ideas, but it is clear that much intellectual effort and smart courageous policies are needed to effectively and efficiently govern global urban systems.

“If you want to escape from society, then you better go to a city, because this is the only place where you can still find a desert”

Albert Camus, *l’Homme Révolté* (1951)

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4. EXCEPTIONAL PLACES: THE RAT RACE BETWEEN WORLD CITIES ¹

Abstract

This paper aims to provide a new methodological and empirical contribution to the rising literature on the relative performance and benchmarking of large cities in a competitive world. On the basis of a recent detailed database on many achievement criteria of 35 major cities in the world, it seeks to arrive at a relative performance ranking of these cities by using Data Envelopment Analysis (DEA). A novel element is the use of a new type of ‘Super-Efficiency DEA’ to identify unambiguously the high performers (‘Exceptional Places’) in the group of world cities investigated. This new productivity-based approach is complemented with two new directions in DEA research, viz. a Distance Friction Method and a Context. Dependent method.

Keywords: Benchmarking, Major cities, Data Envelopment Analysis (DEA), Super-Efficiency DEA, Exceptional places, Productivity-based approach, Distance friction method, Context-dependent method Performance analysis, Urban competitiveness, Global power city index (GPCI), Attractive urban milieu and climate, Sustainability, Competitive advantage, Growth development

¹ Source: Kourtit, K. Nijkamp. P., and Suzuki, S. (2013). Exceptional Places: The Rat Race Between World Cities. *Computers, Environment and Urban Systems*, 38, 67-77.

4.1 Exceptional Cities

The structural and worldwide urbanization trend has prompted the emergence of metropolitan areas of an unprecedented scale. Especially in the current globalization age, such areas act as international power stations, with a rich pluriformity of centripetal and centrifugal economic, political and technological forces. Such world 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 (Glaeser & Kerr, 2009; Sassen, 1991; Shefer & Frenkel, 1998). In this context, the local R&D, knowledge and learning base also plays an important role (Acs, FitzRoy, & Smith, 2002; Kourtit, Nijkamp, & Stough, 2011; van Geenhuizen, & Nijkamp, 2011).

World cities are increasingly also involved in fierce competition on global product and service markets, and consequently these metropolitan areas have to create favorable conditions for economic agents, such as: a healthy entrepreneurial climate; a specialized basis of industrial clusters; a diversified economic structure; an ecologically sustainable urban environment; a high quality research and educational infrastructure; a balanced population structure with sufficient skills; international accessibility through majors hubs etc. (see also Cheshire & Magrini, 2009). World cities are essentially involved in a permanent global battle that is concerned with the maximum development and exploitation of agglomeration externalities in international spatial networks.

An interesting question is now how global players and local experts view the potential and performance of these cities. In recent years, 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. Arribas-Bel, Nijkamp, & Scholten, 2011; Grosveld, 2002; Kourtit, Nijkamp, & Arribas, in press-a; Suzuki, Nijkamp, & Rietveld, 2011; Taylor et al., 2009). Especially the seminal work of Taylor and associates has gained world-wide recognition. A main challenge in empirical research is the development of a consistent, quantitative data base that is appropriate for a comparative, strategic benchmark analysis.

One of the most detailed databases on world cities can be found in a recent study on the 'Global Power City Index' (GPCI) undertaken by the Institute for Urban Strategies and The Mori Memorial Foundation (2010). A thorough analysis of various world cities, 35 in total, was made in this study report, including not only the megacities of New York, London, Paris, Tokyo or Beijing but also cities from emerging economies such as Sao Paulo, Mumbai, Kuala Lumpur or

Cairo. The GPCI database contains six major clusters of relevant information on these cities. We employ this database for a benchmark analysis of these cities and, therefore, it is discussed in slightly greater detail in the next section.

The basic proposition of the present paper is that 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, our study aims to provide a more critical analysis of the performance data on these 35 metropolitan areas by using Data Envelopment Analysis (DEA) to position these cities on the basis of their relative performance, i.e. by relating their output to their input. This ratio is much more informative about the actual economic profile of the city concerned. In this study, we also make a new contribution to DEA analysis: namely, ‘Super-Efficiency DEA’, combined with a ‘Distance Friction Minimization’ model by introducing a new method for calculating and identifying super-efficient actors (in our case, cities). This methodology will be explained in Section 13.3–13.5. Then, Sections 13.6–13.8, respectively, present and interpret the various empirical findings for the database described above. Finally, the paper concludes with some suggestions for follow-up research and policy action.

4.2 Description of the World Cities Database

For a systematic comparison of cities’ performance analysis and their urban competitiveness, our empirical approach is based on a unique data set, the ‘Global Power City Index’ (GPCI), produced by the Institute for Urban Strategies, under the aegis of the Mori Memorial Foundation (2010) in Tokyo for the year 2010.

The GPCI index is used, as a strategic tool, to evaluate and rank the comprehensive power determinants of 35 major cities worldwide, in terms of the strengths and weaknesses of their performance in: creating wealth; enhancing social development; attracting investments; providing an open and attractive urban ‘milieu’ or climate; offering access to social capital and networks; encouraging integrated sustainability; and harnessing both human and technological resources in productivity and competitiveness at local and global scales. In other words, the aim of these world cities is to maximize urban XXQ (the highest possible urban quality) which may strengthen their foundations for securing socioeconomic development and competitive advantage in a global playing field (Nijkamp, 2008).

The comprehensive performance scores and rankings of these global cities in the GPCI-data set are based on six main categories, namely: “Economy”, “Research & Development”, “Cultural Interaction”, “Liveability”, “Ecology & Natural Environment”, and “Accessibility”. Each of these main indicators was subdivided into relevant and measurable sub-indicators, so that finally a consistent and tested database on 69 sub-indicators for 35 world cities was created. Thus, we have a complete, extensive and quantitative database for a great variety of relevant urban (sub-) indicators for all world cities under consideration.

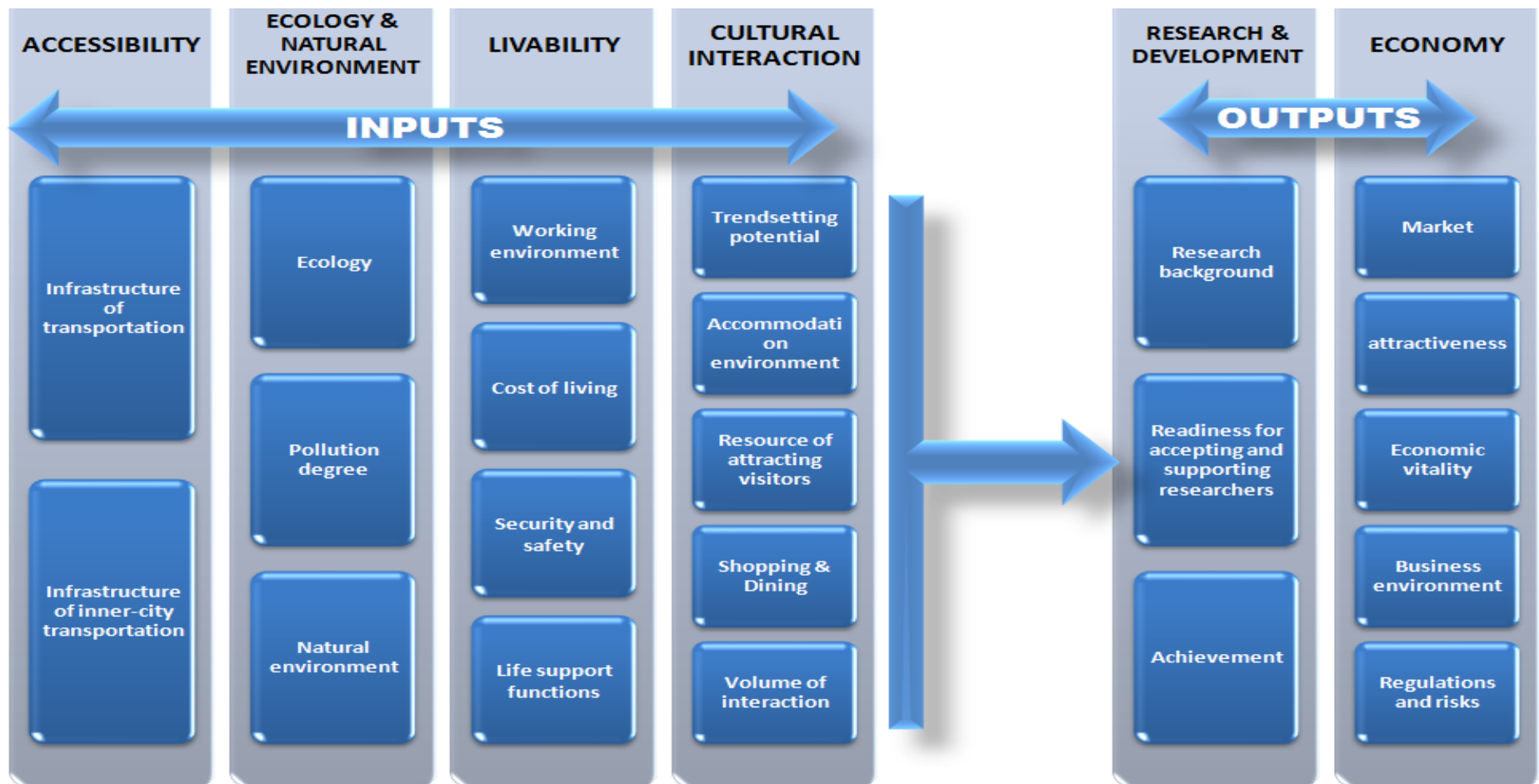


Figure 1. An overview of the main categories of performance indicators used in GPCI-2010.

Next, a set of five worldwide types of actors was identified: managers, researchers, artists, visitors, and residents. These people were asked to score the importance of each of these indicators, so that a weighted average importance score for each city could be calculated. All details can be found in the above-mentioned GPCI-2010 report. See Annex A in this paper for more details of the ranking results of these cities as presented in the above mentioned study (more details can also be found in Kourtit, Arribas, & Nijkamp, in press-b). Figure 1 provides a concise analytical presentation of the main categories of performance indicators derived from the GPCI report.

The GPCI-2010 database was collected systematically for all relevant cities in the sample. It was also carefully checked by both local experts and independent scientists, so that its reliability may be judged as satisfactory. Clearly, the sample of 35 world cities may be extended in the future, but for our analytical purposes it meets our demands. This operational framework of empirical information is used in our DEA analysis in order to explore and represent in a comparative sense the Super-Efficiency performance of these global cities in terms of urban input (or resource) and output indicators and outputs regarding their economic achievement.

4.3 Data Envelopment Analysis (DEA): New Roads⁹

4.3.1 The CCR model

In this section, we will outline the various steps of our DEA experiment, starting from a standard DEA tool and proceeded towards a Super-Efficient DEA, while using two additional techniques, viz. a Distance Friction Minimization (DFM) and a (Stepwise) Context-Dependent (CD) method. The standard Charnes et al. (1978) model (abbreviated hereafter as the CCR-input or CCR-I model) for a given Decision-Making Unit DMU_j ($j = 1, \dots, J$) to be evaluated in any trial o (where o ranges over 1, 2, ..., J) may be represented as the following fractional programming (FP_o) problem:

$$(FP_o) \quad \max_{v,u} \quad \theta = \frac{\sum_s u_s y_{so}}{\sum_m v_m x_{mo}}$$

⁹ Various technicalities in this paper display close similarities with one other article by two of the co-authors (Susuki and Nijkamp, 2011), which was developed in parallel at the time of the publication of the present article. These similarities pertain only to the methodology and not the application, which is novel and path breaking work. Proper credit must be recognized to this early publication (Susuki and Nijkamp 2011) in this article. The methodology used here to study world cities was in fact in parallel introduced in, although the present article draws on earlier work by these authors referenced in this article.

Reference:

Susuki, S., and Nijkamp, P. (2011). A stepwise-projection data envelopment analysis for public transport operations in Japan, *Letters in Spatial and Resource Sciences*, 4, 139-156.

$$\begin{aligned}
\text{s.t.} \quad & \frac{\sum_s u_s y_{sj}}{\sum_m v_m x_{mj}} \leq 1 \quad (j=1, \dots, J) \\
& v_m \geq 0, \quad u_s \geq 0,
\end{aligned} \tag{1}$$

where θ represents an objective variable function (efficiency score); x_{mj} is the volume of input m ($m=1, \dots, M$) for DMU j ($j=1, \dots, J$); y_{sj} is the output s ($s=1, \dots, S$) of DMU j ; and v_m and u_s are the weights given to input m and output s , respectively (see also Johnson and Zhu 2003; Cook, and Zhu 2005; Chen et al. 2005; Nijkamp and Suzuki 2009; Suzuki and Nijkamp 2010; Suzuki et al. 2010; Suzuki and Nijkamp 2011a,b). Model (1) is usually called an input-oriented CCR model, while its reciprocal (i.e. an interchange of the numerator and denominator in objective function (1), with a specification as a minimization problem under an appropriate adjustment of the constraints) is usually known as an output-oriented CCR model. Model (1) is obviously a fractional programming model, which may be solved stepwise by first assigning an arbitrary value to the denominator in (1), and then maximizing the numerator. But it is preferable to transform (1) into a linear programming model, as the CCR model (1) can be shown to have the following equivalent linear programming (LP_o) specification for any DMU j :

$$\begin{aligned}
(LP_o) \quad & \max_{v,u} \quad \theta = \sum_s u_s y_{so} \\
\text{s.t.} \quad & \sum_m v_m x_{mo} = 1 \\
& -\sum_m v_m x_{mj} + \sum_s u_s y_{sj} \leq 0 \\
& v_m \geq 0, \quad u_s \geq 0.
\end{aligned} \tag{2}$$

The dual problem of (2), DLP_o , can be expressed by means of a real variable θ , using the following vector notation:

$$\begin{aligned}
(DLP_o) \quad & \min_{\theta, \lambda} \quad \theta \\
\text{s.t.} \quad & \theta x_o - X\lambda \geq 0 \\
& Y\lambda \geq y_o \\
& \lambda \geq 0,
\end{aligned} \tag{3}$$

where the transposed (T) presentation $\lambda = (\lambda_1, \dots, \lambda_J)^T$ is a non-negative vector (corresponding to the presence of slacks for each DMU), X an $(M \times J)$ input matrix, and Y an $(S \times J)$ input matrix.

We can now define the input excesses $s^- \in R^m$ and the output shortfalls $s^+ \in R^s$, and identify them as ‘slack’ vectors as follows:

$$s^- = \theta x_o - X\lambda; \quad (4)$$

$$s^+ = Y\lambda - y_o. \quad (5)$$

These equations indicate that the efficiency of (x_o, y_o) for DMU_o can be improved if the input values are reduced radically by the ratio θ^* , and the input excesses s^{-*} are eliminated (see Figure 2). The original DEA models presented in the literature have thus far only focused on a uniform input reduction or a uniform output increase in the efficiency-improvement projections, as shown in Figure 2 ($\theta^* = OC'/OC$).

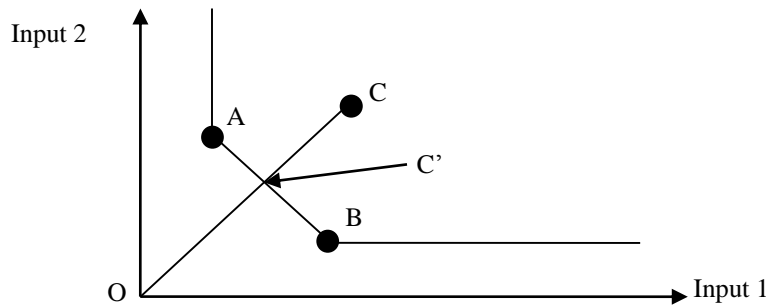


Figure 2. Illustration of original DEA projection in input space

We also observe that the maximum efficiency score to be achieved by efficient DMUs based on the CCR model is 1. In practice, this often means that the CCR model usually computes more than one high-ranking DMU. And that prompts the question whether out of the group of high-ranking DMUs the highest-ranking (super-efficient) DMU can be identified. This will be discussed in subsection 13.4.

4.4 The Super-Efficiency Model

The unsatisfactory identification of efficient firms in a standard DEA model – where all efficient firms get the score 1 – has led to focused research to discriminate between efficient DMUs, in order to arrive at a ranking – or even numerical rating – of these efficient firms, without affecting the results for the non-efficiency. In particular, Andersen and Petersen (1993) developed a radial Super-Efficiency model, while later on Tone (2002, 2003) designed a *slacks-based measure* (SBM) of super-efficiency in DEA. In general, a Super-Efficiency model aims to identify the relative importance of each individual efficient firm, by designing and measuring a score for its ‘degree of influence’ if this efficient firm is omitted from the efficiency frontier (or production possibility set). If this elimination really matters (i.e. if the distance from this DMU to the remaining efficiency frontier is large), and thus the firm concerned has a high degree of influence, and outperforms the other DMUs, it gets a

high score (and is thus super-efficient). Thus, for each individual firm a new distance result is obtained, which leads to a new ranking – even a rating – of all original efficient firms.

The main problem in Super-Efficiency DEA is how to define the distance between an efficient DMU and the production possibility set that emerges after the elimination of one single efficient DMU. In the literature, the SBM (see Tone, 2002, 2003) has been advocated. And this method will also be applied in our empirical investigation.¹⁰

Anderson and Petersen (1993) have developed the Super-Efficiency model to arrive at a ranking of all efficient DMUs. The efficiency scores from a super-efficiency model are thus obtained by eliminating the data on the DMU_o to be evaluated from the solution set. For the input model, this can then result in values which may be regarded – according to the DMU_o – as a state of super-efficiency. These values are then used to rank the DMUs and, consequently, efficient DMUs may then obtain an efficiency score above 1.000. The super-efficiency model may be suitable to find for our comparative data base on big cities in the world the set of highest performing smart cities. These can be ranked in descending order and are coined ‘Exceptional World Cities’ or ‘Exceptional Places’.

The super-efficiency model based on a CCR-I model can now be written as follows:

$$\begin{aligned}
 & \min_{\theta, \lambda, s^-, s^+} \quad \theta - es^- - es^+ \\
 \text{s.t.} \quad & \theta x_o = \sum_{j=1, \neq o}^J \lambda_j x_j + s^- \\
 & y_o = \sum_{j=1, \neq o}^J \lambda_j y_j - s^+ \\
 & \lambda_j, s^-, s^+ \geq 0
 \end{aligned} \tag{6}$$

where e is a unit vector (1,...,1), representing a utility factor for all elements. This model will be used in our search for ‘Exceptional Places’ from which an ambiguous ranking will emerge.

4.5 A New Super-Efficiency DEA Based on a Distance Friction Minimization (DFM)

4.5.1 Outline of the Distance Friction Minimization (DFM) approach

As mentioned, the efficiency improvement solution in the original CCR-input model requires that the input values are reduced radially by a uniform ratio θ^* ($\theta^* = OD'/OD$ in Figure 2). The (v^*, u^*) values obtained as an optimal solution for formula (1) result in a set of optimal weights for DMU_o;

¹⁰ In the meantime, the above mentioned literature has also mentioned some more refinements of the SMB approach, such as the Super-SBM-I-C (the super-efficiency SBM method with DEA input-orientation under constant returns to scale), the Super-SBM-I-V (under variable returns to scale), the Super SBM-O-CC (with output orientation under constant returns to scale), the super-SBM-O-V (under variable returns to scale), and even the Super-SBM-GRS (under general returns to scale).

(v^*, u^*) is the set of most favourable weights for DMU_o , in the sense of maximizing the ratio scale. v_m^* is the optimal weight for the input item m , and its magnitude expresses how much in relative terms the item is contributing to efficiency. Similarly, u_s^* does the same for the output item s . These values show not only which items contribute to the performance of DMU_o , but also to what extent they do so. In other words, it is possible to calculate the distance frictions (or alternatively, the potential increases) in improvement projections. Suzuki et al. (2010) used the optimal weights u_s^* and v_m^* from (1) as the basis for the efficiency improvement projection model. A visual presentation of this approach is given in Figures 3 and 4.

In this approach, a generalized distance friction is employed to assist a DMU to improve its efficiency by a movement towards the efficiency frontier surface. The direction of efficiency improvement depends, of course, on the input/output data characteristics of the DMU. It seems appropriate to define the projection functions for the minimization of distance friction by using a Euclidean distance in weighted spaces. This forms the key of the DFM (Distance Friction Minimization) model. Thus, the DFM approach can generate a new contribution to efficiency enhancement problems in decision analysis by employing a weighted Euclidean projection function, and, at the same time, it may address both input reduction and output increase. We will not provide a detailed description of the various steps involved, but details can be found in Suzuki et al. (2010).

By means of this DFM model, it is possible to present a new efficiency-improvement solution based on the standard CCR projection. This means an increase in new options for efficiency-improvement solutions in DEA. The main advantage of the DFM model is that it yields an outcome on the efficient frontier that is as close as possible to the DMU's input and output profile (see Figure 5).

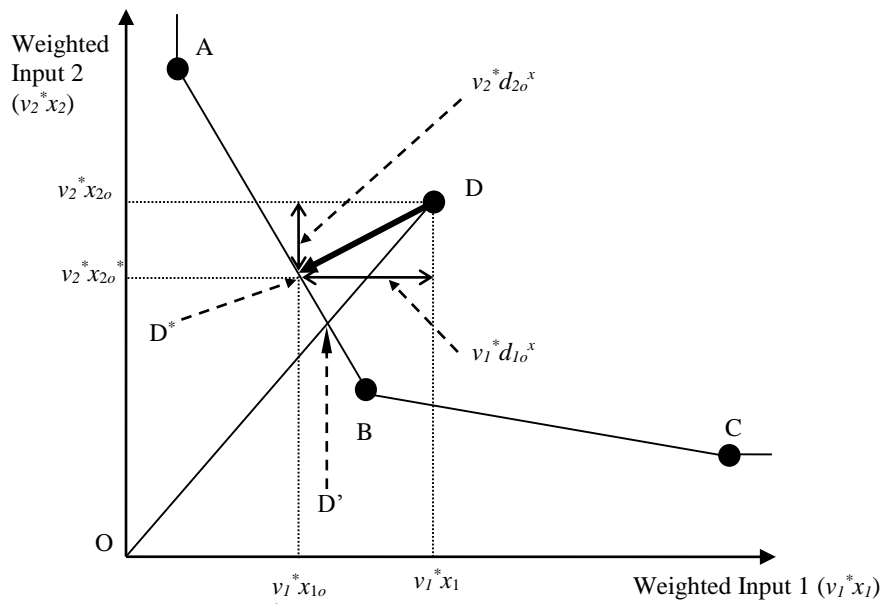


Figure 3. Illustration of the DFM approach (Input- $v_i x_i$ space)

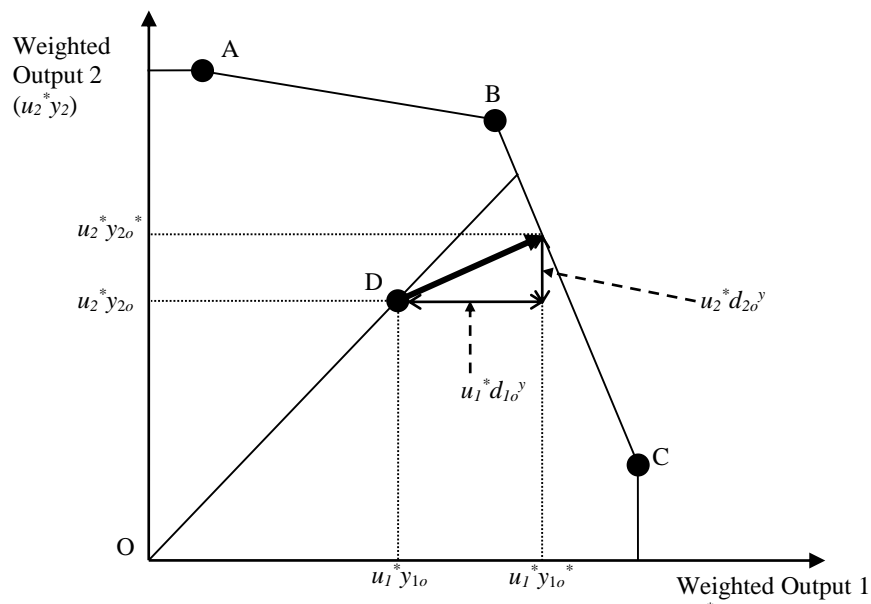


Figure 4. Illustration of the DFM approach (Output - $u_i y_i$ space)

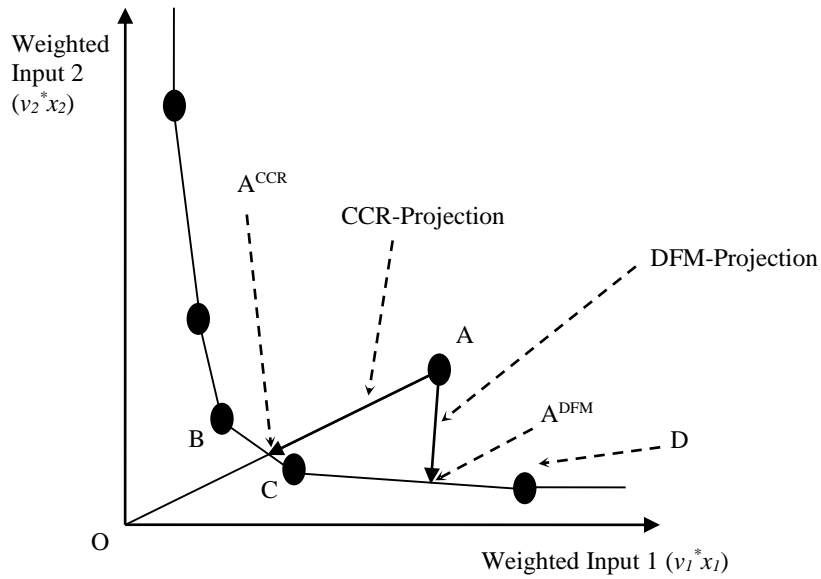


Figure 5. Degree of improvement of the DFM and the CCR projection in weighted input space

4.5.2 A proposal for a Super-Efficiency DFM model

We now design a Super-Efficiency DFM model that is integrated with a Super-Efficiency DEA model.

In a normal DFM model, the (v^*, u^*) values obtained as an optimal solution for formula (1) result in a set of optimal weights for DMU_o. Our new Super-Efficiency DFM model (hereafter SE-DFM) is now based on the idea that these optimal values result from the application of the Super-Efficiency model. The advantage of the SE-DFM model is that it yields an unambiguous and measurable outcome in a ranking of efficient DMUs, i.e. this new integrated model can be suitable to find the highest performing DMUs, while retaining all the advantages of the DFM model.

4.6 A Stepwise SE-DFM Model in DEA

4.6.1 Outline of a Context-Dependent model

The Context-Dependent (hereafter CD) model can generate efficient frontiers in successive stages (levels), and can yield a stepwise level-by-level improvement projection (for details, see Seiford and Zhu, 2003). A concise formulation of the CD model follows now.

Let $J^l = \{DMU_j, j = 1, \dots, J\}$ be the set of all J DMUs. We interactively define $J^{l+1} = J^l - E^l$, where $E^l = \{DMU_k \in J^l | \theta^*(l, k) = 1\}$ and $\theta^*(l, k)$ is the optimal value by using formula (1) (see Figure 6). When $l = 1$, the model becomes the original CCR model, while the DMUs in set E^1 define the first-level efficient frontier. When $l = 2$, it gives the second-level efficient frontier after the exclusion of

the first-level efficient DMUs, and so on. In this manner, we identify several levels of efficient frontiers. We call E^l the l th-level efficient frontier. The following algorithm accomplishes the identification of these efficient frontiers.

- Step 1:* Set $l = 1$. Evaluate the entire set of DMUs, J^1 . We then obtain the first-level efficient DMUs for set E^1 (the first-level efficient frontier).
- Step 2:* Exclude the efficient DMUs from future DEA runs, i.e. $J^{l+1} = J^l - E^l$ (If $J^{l+1} = \phi$, then stop.)
- Step 3:* Evaluate the new subset of “inefficient” DMUs. We then obtain a new set of efficient DMUs E^{l+1} (the new efficient frontier).
- Step 4:* Let $l = l + 1$. Go to step 2.
- Stopping rule:* $J^{l+1} = \phi$, the algorithm is terminated.

A visual presentation of the CD model is given in Figure 6.

4.6.2 An operational Stepwise SE-DFM Model

Any efficiency-improving projection model which includes the standard CCR projection supplemented with the SE-DFM projection is always directed towards achieving “full efficiency”. This strict condition may not always be easy to achieve in reality. Therefore, in this section we will integrate the CD model with the SE-DFM approach; this will be called the “Stepwise SE-DFM” model. It can yield a stepwise efficiency-improving projection that depends on l -level efficient frontiers (l -level DFM projection), as shown in Figure 7.

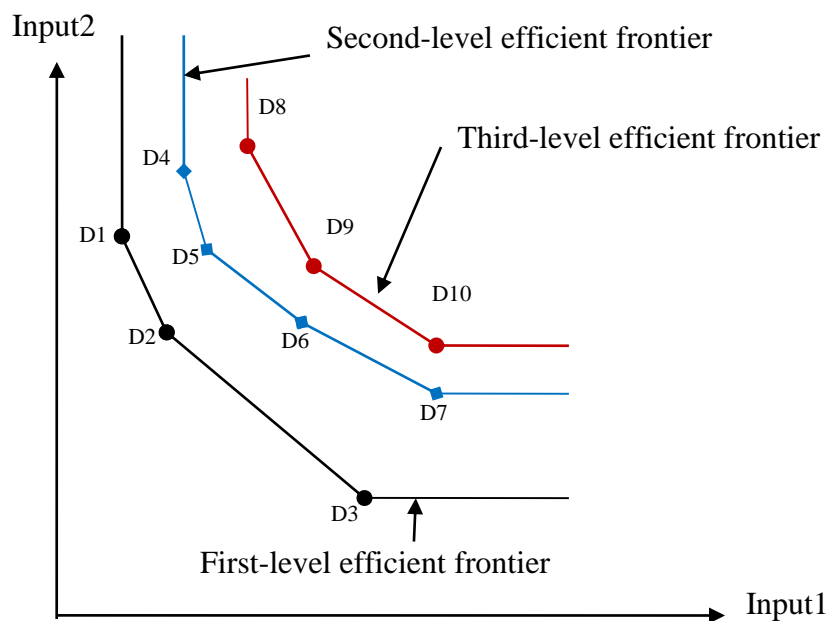


Figure 6. Illustration of the CD model

For example, a second-level DFM projection for DMU10 (D10) aims to position DMU10 on a second-level efficient frontier. In addition, a first-level DFM projection is just equal to an SE-DFM projection. We observe here that the second-level DFM projection is easier to achieve than a first-level DFM projection. A Stepwise SE-DFM model can yield a more practical and realistic efficiency improving projection than a CCR projection or a SE-DFM projection.

The advantage of the Stepwise SE-DFM model is that it also yields an outcome on a l -level efficient frontier that is as close as possible to the DMU's input and output profile, which means that the Stepwise SE-DFM projection can compute more effective solutions than the CD projection model (see Figure 7). This set of new DEA applications will now be applied to the GPCI database on world cities described in Section 13.2.

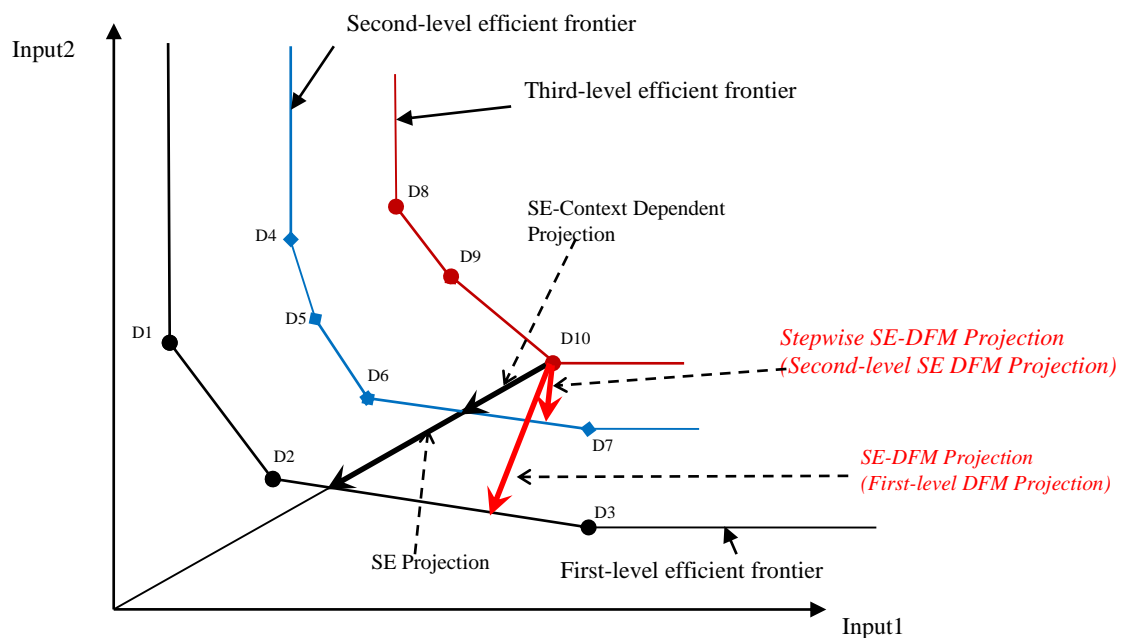


Figure 7. Illustration of the Stepwise DFM model

4.7 In Search of Exceptional World Cities

In our empirical application we will use the GPCI-2010 database-2010. But rather than seeking to achieve a ranking of cities based on a comprehensive set of indicators, we aim to look at the efficiency (or productivity) of these cities, by investigating more carefully the ratio between multi-attribute outputs and multi-attribute inputs. To that end, DEA is an appropriate tool. In our application, we will first apply the CCR model and the Super-Efficiency model in our search for exceptional world cities based on a Super-Efficiency DEA. In addition, we will apply the CD model based on the Super-

Efficiency concept; in this way, the cities in our sample can be categorized according to efficiency levels based on successive levels of efficient frontiers.

4.7.1 Efficiency scores for Super-Efficiency and CCR-I

The efficiency evaluation results for the 35 world cities based on the CCR model and the Super-Efficiency model using 4 inputs (“Cultural Interaction”, “Liveability”, “Ecology & Natural Environment”, “Accessibility”) and 2 outputs (“Economy”, “Research & Development”) are given in Fig. 8. The standard CCR model assigns an equal efficiency to 9 world cities, viz. New York, Boston, Genève, Moscow, Beijing, Hong Kong, Tokyo, Los Angeles and Fukuoka, so that it is not possible to discriminate among these cities. However, by applying a super-efficient DEA model a clear difference in performance of these 9 cities can be observed (see Fig. 8).

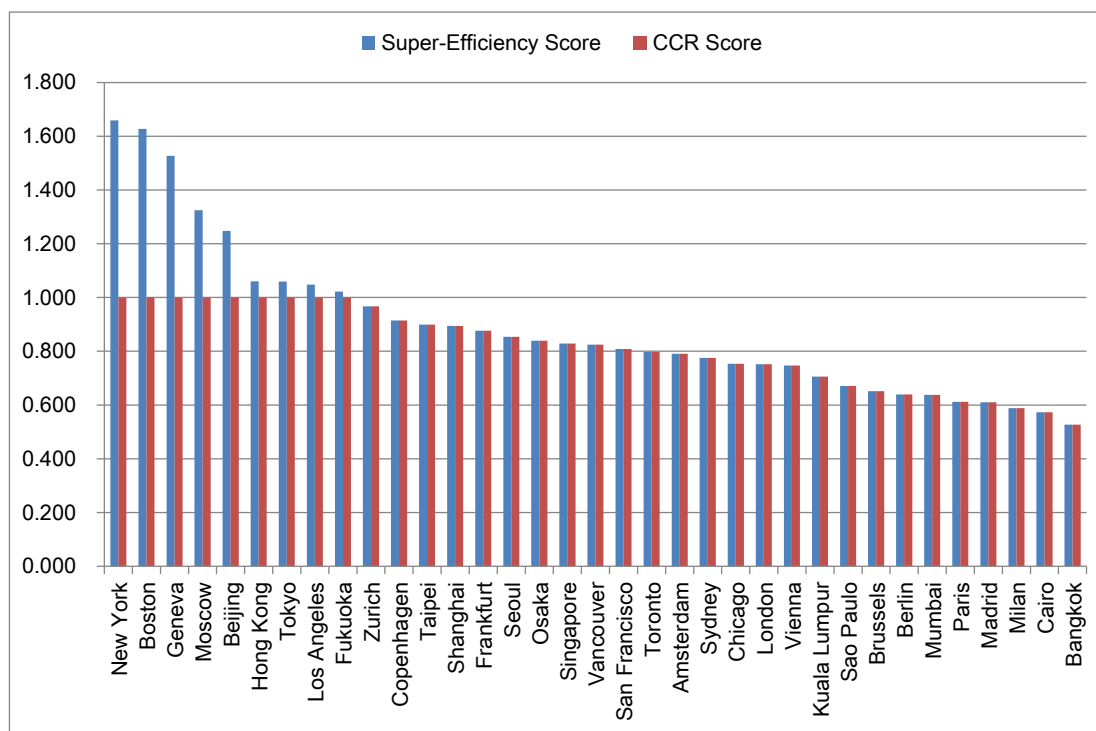


Figure 8. Efficiency score based on the CCR model and the Super-Efficiency model

In Fig. 8, the rankings of the Super-Efficiency values for 9 of the 35 world cities (i.e. New York, 1.659; Boston, 1.628; Geneva, 1.527; Moscow, 1.325; Beijing, 1.248; Hong Kong, 1.060; Tokyo, 1.059;

Los Angeles, 1.048; and Fukuoka, 1.022) were identified on the basis of their high Super-Efficiency score. It is noteworthy that in our analysis “New York” is the ‘Exceptional World City’ based on the Super-Efficiency model. This is an unambiguous result that originates from the advantages of the design of the Super- Efficiency model.

It should be added that these results differ quite considerably from those achieved in the original GPCI-2010 report (see Annex). The reason is that our productivity-based analysis allows non-megacities (such as Boston or Geneva) to achieve a favorable efficiency outcome, in which size and agglomeration effects are combined with smart management of the urban area concerned.

Nevertheless, metropolitan areas like New York or Tokyo have managed to maintain their high ranking in our efficiency analysis. Clearly, there are economies of scale for world cities, but some medium-sized world cities appear to perform exceptionally well.

4.7.2 Efficiency scores and categorization based on CD-Super-Efficiency

The detailed efficiency evaluation results for the 35 world cities based on the CD-Super-Efficiency model with the six performance categories E1-E6 are given in Fig. 9.

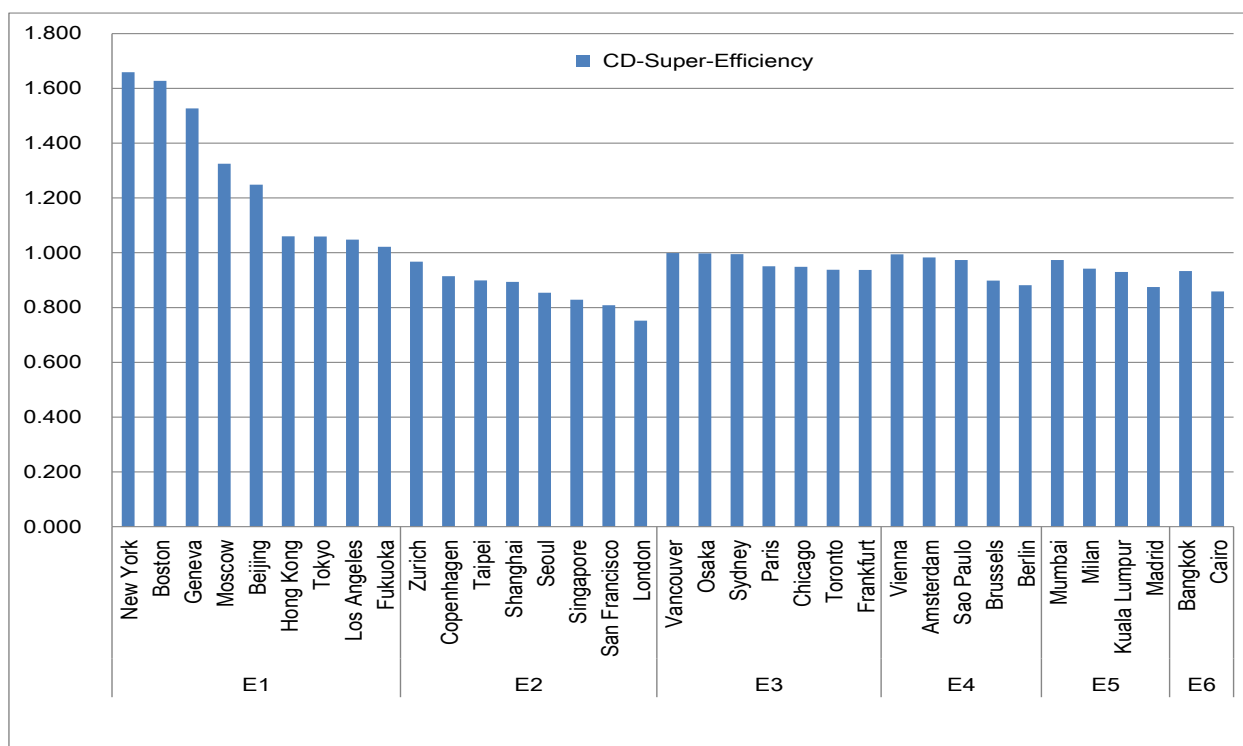


Figure 9. Efficiency scores and categorizations based on CD-Super-Efficiency

In Fig. 9, the DMUs in set E1 (New York, Boston, Geneva, Moscow, Beijing, Hong Kong, Tokyo, Los Angeles, and Fukuoka) represent the cities with the highest efficiency (these cities correspond to D1, D2 and D3 in Fig. 6, which define the first-level efficient frontier group). These nine are identified on the basis of the super-efficient DMU concept.

The eight DMUs in set E2 (Zurich, Copenhagen, Taipei, Shanghai, Seoul, Singapore, San Francisco, and London) are the second-tier efficient cities (these cities correspond to D4, D5, D6 and D7 in Fig. 6, which define the second-level efficient frontier group), after the exclusion of the first-

level efficient cities. The seven DMUs in set E3 (Vancouver, Osaka, Sydney, Paris, Chicago, Toronto, and Frankfurt) relate to the third-level efficient cities, after the exclusion of the second-level efficient cities. Next, the five DMUs in set E4 (Vienna, Amsterdam, Sao Paulo, Brussels, and Berlin) are fourth-level efficient cities, while the DMUs in set E5 (Mumbai, Milan, Kuala Lumpur, and Madrid) and the DMUs in set E6 (Bangkok and Cairo) represent the fifth-level and sixth-level efficient frontier, respectively.

On the basis of these more differentiated performance categories, we will compute in a quantitative sense an efficiency improvement projection for the nearest upper-level efficient frontier for inefficient cities in the next section.

4.8 Efficiency Improvement Projection for Inefficient Cities

4.8.1 Direct efficiency-improving projection based on SE and SE-DFM models

The direct efficiency improvement projection results based on the SE and the SE-DFM model for inefficient cities are presented in Tables 1a and 1b.

Table 1a. Direct efficiency improvement projection of the SE and SE-DFM model

DMU	Score	SE model		SE-DFM model		DMU	Score	SE model		SE-DFM model	
		Difference	%	Difference	%			Difference	%	Difference	%
London	0.752	1.000		1.000		Vienna	0.747	1.000		1.000	
(I)Cultural Exchange	60.6	-18.5	-30.6%	0.0	0.0%	(I)Cultural Exchange	24.9	-11.7	-47.2%	0.0	0.0%
(I)Livability	44.3	-11.0	-24.8%	0.0	0.0%	(I)Livability	47.5	-12.0	-25.3%	0.0	0.0%
(I)Environment	57.8	-14.3	-24.8%	-13.0	-22.5%	(I)Environment	64.3	-18.9	-29.3%	0.0	0.0%
(I)Accessibility	56.0	-15.8	-28.2%	0.0	0.0%	(I)Accessibility	28.7	-7.3	-25.3%	-6.7	-23.1%
(O)Economy	50.5	0.0	0.0%	7.2	14.2%	(O)Economy	36.7	0.0	0.0%	5.5	14.9%
(O)R&D	44.1	15.4	34.9%	0.0	0.0%	(O)R&D	15.6	0.0	0.0%	0.0	0.0%
Paris	0.612	1.000		1.000		Zurich	0.967	1.000		1.000	
(I)Cultural Exchange	51.3	-20.2	-39.4%	0.0	0.0%	(I)Cultural Exchange	8.0	-0.3	-3.3%	0.0	0.0%
(I)Livability	55.6	-23.9	-42.9%	0.0	0.0%	(I)Livability	45.7	-1.5	-3.3%	-0.9	-1.9%
(I)Environment	56.2	-21.8	-38.8%	-18.5	-32.9%	(I)Environment	71.4	-5.5	-7.7%	-4.3	-6.1%
(I)Accessibility	57.9	-22.4	-38.8%	0.0	0.0%	(I)Accessibility	29.6	-6.3	-21.3%	-5.6	-18.8%
(O)Economy	42.9	0.0	0.0%	12.5	29.1%	(O)Economy	41.3	0.0	0.0%	0.7	1.8%
(O)R&D	40.3	0.0	0.0%	0.0	0.0%	(O)R&D	19.2	0.0	0.0%	0.0	0.0%
Singapore	0.829	1.000		1.000		Frankfurt	0.876	1.000		1.000	
(I)Cultural Exchange	31.0	-5.3	-17.1%	0.0	0.0%	(I)Cultural Exchange	10.5	-1.3	-12.4%	0.0	0.0%
(I)Livability	38.6	-6.6	-17.1%	-6.3	-16.3%	(I)Livability	45.2	-5.6	-12.4%	-4.5	-9.9%
(I)Environment	59.0	-10.1	-17.1%	0.0	0.0%	(I)Environment	66.5	-8.2	-12.4%	0.0	0.0%
(I)Accessibility	42.1	-7.2	-17.1%	0.0	0.0%	(I)Accessibility	38.5	-14.3	-37.3%	0.0	0.0%
(O)Economy	43.0	0.0	0.0%	4.0	9.4%	(O)Economy	38.5	0.0	0.0%	2.5	6.6%
(O)R&D	29.7	3.5	12.0%	0.0	0.0%	(O)R&D	13.8	4.5	32.8%	0.0	0.0%
Berlin	0.639	1.000		1.000		Madrid	0.610	1.000		1.000	
(I)Cultural Exchange	28.2	-14.3	-50.7%	0.0	0.0%	(I)Cultural Exchange	21.4	-8.4	-39.0%	0.0	0.0%
(I)Livability	48.7	-17.6	-36.1%	0.0	0.0%	(I)Livability	48.6	-18.9	-39.0%	-20.3	-41.7%
(I)Environment	66.8	-24.5	-36.7%	0.0	0.0%	(I)Environment	60.6	-23.6	-39.0%	0.0	0.0%
(I)Accessibility	32.6	-11.8	-36.1%	-11.0	-33.9%	(I)Accessibility	35.4	-13.8	-39.0%	0.0	0.0%
(O)Economy	33.8	0.0	0.0%	7.8	23.0%	(O)Economy	32.1	0.0	0.0%	7.8	24.2%
(O)R&D	22.7	0.0	0.0%	0.0	0.0%	(O)R&D	10.9	2.8	25.8%	0.0	0.0%
Amsterdam	0.791	1.000		1.000		Vancouver	0.825	1.000		1.000	
(I)Cultural Exchange	17.9	-3.7	-20.9%	0.0	0.0%	(I)Cultural Exchange	12.4	-2.2	-17.5%	0.0	0.0%
(I)Livability	48.2	-10.1	-20.9%	-9.2	-19.0%	(I)Livability	60.7	-25.8	-42.6%	-22.4	-36.9%
(I)Environment	65.3	-13.7	-20.9%	0.0	0.0%	(I)Environment	56.4	-9.9	-17.5%	-10.1	-17.9%
(I)Accessibility	41.0	-10.8	-26.4%	0.0	0.0%	(I)Accessibility	25.9	-4.5	-17.5%	0.0	0.0%
(O)Economy	40.1	0.0	0.0%	4.7	11.7%	(O)Economy	34.6	0.0	0.0%	3.7	10.8%
(O)R&D	18.5	3.1	17.0%	0.0	0.0%	(O)R&D	17.8	0.0	0.0%	0.0	0.0%
Seoul	0.854	1.000		1.000		Copenhagen	0.914	1.000		1.000	
(I)Cultural Exchange	20.9	-3.0	-14.6%	0.0	0.0%	(I)Cultural Exchange	11.2	-1.0	-8.6%	0.0	0.0%
(I)Livability	38.8	-5.7	-14.6%	-4.5	-11.6%	(I)Livability	46.7	-4.0	-8.6%	-3.1	-6.7%
(I)Environment	55.8	-10.9	-19.5%	0.0	0.0%	(I)Environment	62.7	-5.4	-8.6%	0.0	0.0%
(I)Accessibility	36.1	-6.8	-19.0%	0.0	0.0%	(I)Accessibility	31.3	-3.4	-11.0%	-3.2	-10.2%
(O)Economy	36.4	0.0	0.0%	3.8	10.5%	(O)Economy	41.1	0.0	0.0%	1.8	4.5%
(O)R&D	40.2	0.0	0.0%	0.0	0.0%	(O)R&D	13.5	6.0	44.3%	7.4	54.8%
Sydney	0.776	1.000		1.000		Osaka	0.839	1.000		1.000	
(I)Cultural Exchange	23.2	-7.9	-34.0%	0.0	0.0%	(I)Cultural Exchange	12.9	-2.1	-16.1%	0.0	0.0%
(I)Livability	45.2	-10.1	-22.4%	0.0	0.0%	(I)Livability	51.6	-16.9	-32.7%	-13.5	-26.1%
(I)Environment	60.4	-14.1	-23.4%	0.0	0.0%	(I)Environment	52.8	-8.5	-16.1%	-9.4	-17.8%
(I)Accessibility	29.7	-6.7	-22.4%	-5.8	-19.6%	(I)Accessibility	39.5	-4.9	-16.1%	0.0	0.0%
(O)Economy	37.8	0.0	0.0%	5.0	13.1%	(O)Economy	34.0	0.0	0.0%	3.8	11.2%
(O)R&D	22.2	0.0	0.0%	0.0	0.0%	(O)R&D	24.1	0.0	0.0%	0.0	0.0%

Legend: I = Input ; O = Output

Table 1b. Direct efficiency improvement projection of the SE and SE-DFM model

DMU	Score	SE model		SE-DFM model		DMU	Score	SE model		SE-DFM model	
		Score(θ^{**})		Score(θ^{**})				Score(θ^{**})		Score(θ^{**})	
		Difference	%	Difference	%			Difference	%	Difference	%
I/O	Data			$d_{io}^{x^*} - s^{***}$		I/O	Data			$d_{io}^{x^*} - s^{***}$	
				$d_{ro}^{y^*} + s^{***}$						$d_{ro}^{y^*} + s^{***}$	
Brussels	0.652	1.000		1.000		Taipei	0.899	1.000		1.000	
(I)Cultural Exchange	21.4	-7.4	-34.8%	0.0	0.0%	(I)Cultural Exchange	7.3	-0.7	-10.1%	0.0	0.0%
(I)Livability	46.9	-16.3	-34.8%	-17.8	-37.8%	(I)Livability	45.4	-12.6	-27.7%	-10.7	-23.5%
(I)Environment	52.7	-18.3	-34.8%	0.0	0.0%	(I)Environment	48.5	-4.9	-10.1%	-3.9	-8.1%
(I)Accessibility	34.4	-12.0	-34.8%	0.0	0.0%	(I)Accessibility	28.4	-7.7	-27.0%	-5.9	-20.7%
(O)Economy	32.8	0.0	0.0%	7.0	21.4%	(O)Economy	30.2	0.0	0.0%	2.0	6.6%
(O)R&D	14.7	0.0	0.0%	0.0	0.0%	(O)R&D	16.7	0.0	0.0%	0.0	0.0%
San Francisco	0.809	1.000		1.000		Kuala Lumpur	0.706	1.000		1.000	
(I)Cultural Exchange	16.3	-3.1	-19.2%	0.0	0.0%	(I)Cultural Exchange	14.0	-4.1	-29.4%	0.0	0.0%
(I)Livability	40.0	-7.7	-19.2%	-8.2	-20.6%	(I)Livability	38.7	-11.4	-29.4%	-10.9	-28.1%
(I)Environment	54.8	-10.5	-19.2%	0.0	0.0%	(I)Environment	54.2	-15.9	-29.4%	0.0	0.0%
(I)Accessibility	29.3	-5.6	-19.3%	0.0	0.0%	(I)Accessibility	30.5	-9.5	-31.2%	0.0	0.0%
(O)Economy	33.9	0.0	0.0%	4.1	12.1%	(O)Economy	28.7	0.0	0.0%	4.9	17.2%
(O)R&D	28.1	0.0	0.0%	0.0	0.0%	(O)R&D	4.4	11.0	250.6%	0.0	0.0%
Toronto	0.798	1.000		1.000		Bangkok	0.527	1.000		1.000	
(I)Cultural Exchange	16.9	-3.4	-20.2%	0.0	0.0%	(I)Cultural Exchange	22.6	-10.7	-47.3%	0.0	0.0%
(I)Livability	46.4	-12.1	-26.0%	-8.3	-17.8%	(I)Livability	39.4	-18.6	-47.3%	-20.5	-52.0%
(I)Environment	52.2	-10.6	-20.2%	-12.8	-24.5%	(I)Environment	47.5	-22.5	-47.3%	0.0	0.0%
(I)Accessibility	30.8	-6.2	-20.2%	0.0	0.0%	(I)Accessibility	29.1	-13.8	-47.3%	0.0	0.0%
(O)Economy	35.8	0.0	0.0%	4.6	12.7%	(O)Economy	24.0	0.0	0.0%	7.4	31.0%
(O)R&D	20.1	0.0	0.0%	0.0	0.0%	(O)R&D	6.9	5.7	82.1%	0.0	0.0%
Chicago	0.754	1.000		1.000		Sao Paulo	0.671	1.000		1.000	
(I)Cultural Exchange	20.8	-5.1	-24.6%	-1.4	-6.5%	(I)Cultural Exchange	9.9	-7.1	-71.5%	-6.5	-65.8%
(I)Livability	36.9	-9.1	-24.6%	-9.1	-24.8%	(I)Livability	40.2	-13.3	-33.0%	-7.9	-19.8%
(I)Environment	46.0	-11.3	-24.6%	0.0	0.0%	(I)Environment	63.0	-23.0	-36.4%	-15.1	-23.9%
(I)Accessibility	32.8	-8.7	-26.5%	0.0	0.0%	(I)Accessibility	18.8	-6.2	-32.9%	-3.7	-19.7%
(O)Economy	31.5	0.0	0.0%	5.1	16.3%	(O)Economy	24.0	0.0	0.0%	4.7	19.7%
(O)R&D	28.9	0.0	0.0%	0.0	0.0%	(O)R&D	3.0	6.7	224.4%	8.6	288.4%
Shanghai	0.894	1.000		1.000		Mumbai	0.637	1.000		1.000	
(I)Cultural Exchange	23.9	-2.5	-10.6%	-2.2	-9.3%	(I)Cultural Exchange	9.4	-5.9	-63.3%	0.0	0.0%
(I)Livability	46.4	-9.1	-19.6%	-6.2	-13.3%	(I)Livability	42.7	-20.2	-47.2%	0.0	0.0%
(I)Environment	40.8	-4.3	-10.6%	-2.2	-5.4%	(I)Environment	51.1	-18.5	-36.3%	0.0	0.0%
(I)Accessibility	31.6	-3.4	-10.6%	0.0	0.0%	(I)Accessibility	17.4	-6.3	-36.3%	-5.1	-29.3%
(O)Economy	42.3	0.0	0.0%	2.4	5.6%	(O)Economy	20.7	0.0	0.0%	4.6	22.2%
(O)R&D	11.5	2.5	21.7%	4.6	40.0%	(O)R&D	3.9	4.1	104.0%	0.0	0.0%
Milan	0.588	1.000		1.000		Cairo	0.573	1.000		1.000	
(I)Cultural Exchange	20.2	-8.3	-41.2%	-4.8	-24.0%	(I)Cultural Exchange	11.9	-5.1	-42.7%	0.0	0.0%
(I)Livability	49.4	-23.8	-48.2%	-16.4	-33.2%	(I)Livability	33.0	-14.1	-42.7%	-14.4	-43.7%
(I)Environment	46.9	-19.3	-41.2%	-19.6	-41.7%	(I)Environment	42.5	-18.1	-42.7%	0.0	0.0%
(I)Accessibility	30.8	-12.7	-41.2%	0.0	0.0%	(I)Accessibility	29.3	-14.3	-48.6%	0.0	0.0%
(O)Economy	27.5	0.0	0.0%	7.1	25.9%	(O)Economy	19.6	0.0	0.0%	5.3	27.1%
(O)R&D	9.5	0.2	2.1%	7.0	73.4%	(O)R&D	1.3	9.2	721.5%	0.0	0.0%

Legend: I = Input ; O = Output

We will now offer a concise interpretation of the results presented in these tables. We will take Amsterdam as an illustrative example. From Table 1a, the SE projection shows that, for instance, Amsterdam – in order to achieve a super-efficiency state – should reduce its input volumes Cultural Exchange, Liveability, and Environment by 20.9 per cent, and Accessibility by 26.4 per cent in order to become efficient. On the other hand, the SE-DFM projection results show that a reduction in the Liveability of 19.0 per cent and an increase in the Economy of 11.7 per cent is required to become efficient. It should be added that in a deterministic DEA model these findings are numerically correct, but that in policy practice such accurate adjustments will hardly be achieved. Nevertheless, this information is indicative for the direction and intensity of necessary policy handles in a city to become efficient.

For the sake of illustration, a comparison of the projection results of Amsterdam is presented in Figure 10. This result clearly shows that a different – and more efficient and effective – solution is available than the SE projection to reach the efficiency frontier.

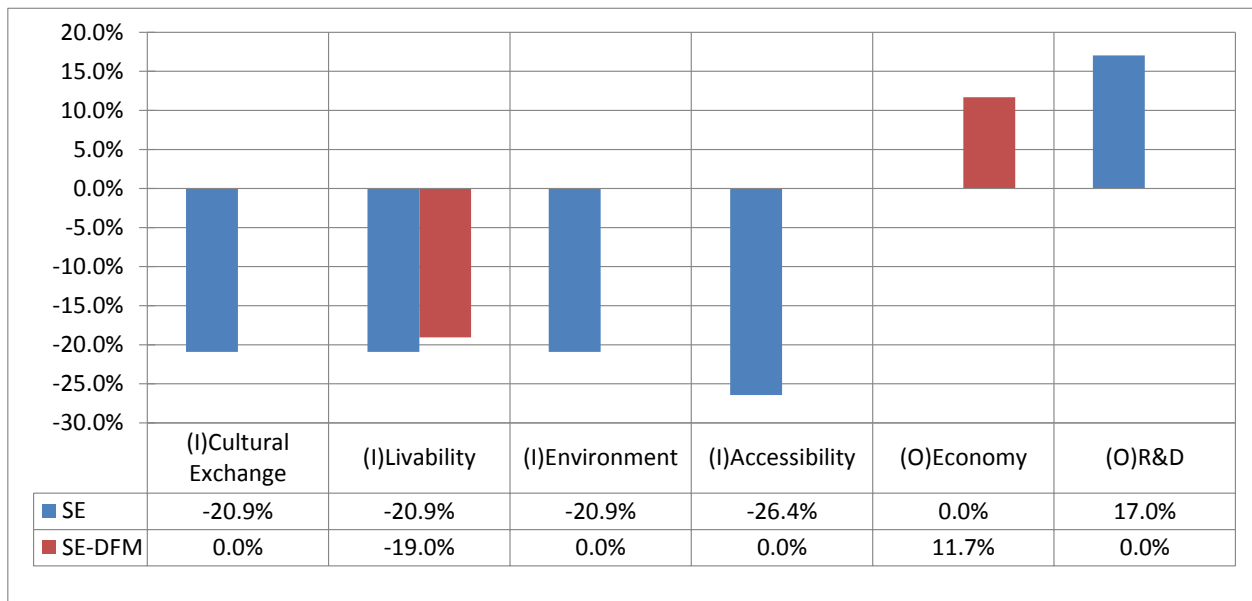


Figure 10. Projection results of Amsterdam, based on SE and SE-DFM

4.9 Stepwise Efficiency-Improving Projection Based on SE and SE-DFM Models

The stepwise efficiency-improvement projection results based on the SE and SE-DFM model for inefficient cities are presented in Tables 2a and 2b.

In Tables 2a and 2b, it appears that the ratios of change in the Stepwise SE-DFM projection are smaller than those in the Stepwise SE projection, as might be expected. In Tables 2a and 2b, this particularly applies to Sao Paulo, Brussels, Mumbai, and Kuala Lumpur, which are non-slack type DMUs (i.e. s^{-**} and s^{+**} are zero). Apart from the practicality of such a solution, the models show clearly that a different – and perhaps more efficient – solution is available than the Stepwise SE projection to reach the efficiency frontier.

The more advanced Stepwise SE-DFM model is able to present a more realistic efficiency-improvement result, which we can compare with the results of Tables 1b and b. For instance, the SE-DFM results in Table 1b show that Mumbai should reduce its accessibility indicator by 29.3 per cent, and increase the Economy by 22.2 per cent in order to become entirely efficient. On the other hand, the Stepwise SE-DFM results in Table 2b show that a reduction in Accessibility of 3.1 per cent, and an increase in the Economy of 1.3 per cent are required to become efficient (this means that Mumbai

can attain the E4 level efficient frontier moving up from the E5 level). It should be noted that also in this case the same proviso on the interpretation holds, as indicated above.

Table 2a. Stepwise efficiency-improvement projections based on SE and DFM

DMU	Score	Stepwise SE		Stepwise SE-DFM	
		Score(θ^{**})		Score(θ^{**})	
		Difference	%	Difference	%
Vancouver	0.999	1.000	1.000	1.000	1.000
(I)Cultural Exchange	12.4	-2.6	-20.5%	-2.6	-25.9%
(I)Livability	60.7	-22.0	-36.2%	-22.0	-56.7%
(I)Environment	56.4	-0.1	-0.1%	0.0	0.0%
(I)Accessibility	25.9	0.0	-0.1%	0.0	-0.1%
(O)Economy	34.6	0.0	0.0%	0.0	0.1%
(O)R&D	17.8	0.0	0.0%	0.0	0.0%
Osaka	0.998	1.000	1.000	1.000	1.000
(I)Cultural Exchange	12.9	0.0	-0.3%	0.0	0.0%
(I)Livability	51.6	-10.0	-19.3%	-9.8	-23.6%
(I)Environment	52.8	-0.1	-0.3%	-0.1	-0.2%
(I)Accessibility	30.5	-0.1	-0.3%	0.0	0.0%
(O)Economy	34.0	0.0	0.0%	0.1	0.2%
(O)R&D	24.1	0.0	0.0%	0.0	0.0%
Sydney	0.995	1.000	1.000	1.000	1.000
(I)Cultural Exchange	23.2	-9.8	-42.3%	0.0	0.0%
(I)Livability	45.2	-2.3	-5.0%	0.0	0.0%
(I)Environment	60.4	-0.3	-0.5%	0.0	0.0%
(I)Accessibility	29.7	-0.1	-0.5%	-8.1	-27.6%
(O)Economy	37.8	0.0	0.0%	0.1	0.3%
(O)R&D	22.2	0.0	0.0%	3.4	15.3%
Paris	0.951	1.000	1.000	1.000	1.000
(I)Cultural Exchange	51.3	-2.5	-4.9%	0.0	0.0%
(I)Livability	55.6	-15.5	-27.8%	-14.4	-35.9%
(I)Environment	56.2	-2.8	-4.9%	-1.5	-2.9%
(I)Accessibility	57.9	-9.5	-16.5%	-7.8	-16.0%
(O)Economy	42.9	1.4	3.4%	2.9	6.6%
(O)R&D	40.3	0.0	0.0%	1.0	2.5%
Chicago	0.948	1.000	1.000	1.000	1.000
(I)Cultural Exchange	20.8	-1.1	-5.2%	0.0	0.0%
(I)Livability	36.9	-3.6	-9.7%	-2.2	-6.5%
(I)Environment	46.0	-2.4	-5.2%	-1.4	-3.3%
(I)Accessibility	32.8	-2.8	-8.5%	-1.8	-5.9%
(O)Economy	31.5	0.0	0.0%	1.4	4.3%
(O)R&D	28.9	0.0	0.0%	0.0	0.0%
Toronto	0.938	1.000	1.000	1.000	1.000
(I)Cultural Exchange	16.9	-1.1	-6.2%	0.0	0.0%
(I)Livability	46.4	-7.0	-15.1%	-3.5	-9.0%
(I)Environment	52.2	-3.2	-6.2%	-3.0	-6.2%
(I)Accessibility	30.8	-1.9	-6.2%	0.0	0.0%
(O)Economy	35.8	0.0	0.0%	1.4	4.0%
(O)R&D	20.1	0.0	0.0%	0.0	0.0%
Frankfurt	0.937	1.000	1.000	1.000	1.000
(I)Cultural Exchange	10.5	-0.7	-6.3%	0.0	0.0%
(I)Livability	45.2	-2.8	-6.3%	-2.2	-5.3%
(I)Environment	66.5	-4.2	-6.3%	0.0	0.0%
(I)Accessibility	38.5	-10.5	-27.2%	-8.7	-30.9%
(O)Economy	38.5	0.0	0.0%	1.2	3.2%
(O)R&D	13.8	3.4	24.7%	5.7	33.4%

DMU	Score	Stepwise SE		Stepwise SE-DFM	
		Score(θ^{**})		Score(θ^{**})	
		Difference	%	Difference	%
Vienna	0.994	1.000	1.000	1.000	1.000
(I)Cultural Exchange	24.9	-3.8	-15.4%	-3.8	-18.2%
(I)Livability	47.5	-0.3	-0.6%	0.0	0.0%
(I)Environment	64.3	-5.5	-8.6%	-5.3	-9.1%
(I)Accessibility	28.7	-0.2	-0.6%	-0.1	-0.3%
(O)Economy	36.7	0.0	0.0%	0.1	0.3%
(O)R&D	15.6	5.6	35.9%	5.6	26.6%
Amsterdam	0.983	1.000	1.000	1.000	1.000
(I)Cultural Exchange	17.9	-0.3	-1.7%	0.0	0.0%
(I)Livability	48.2	-0.8	-1.7%	0.0	0.0%
(I)Environment	65.3	-1.1	-1.7%	-1.1	-1.7%
(I)Accessibility	41.0	-0.7	-1.8%	-0.9	-2.2%
(O)Economy	40.1	0.0	0.0%	0.3	0.9%
(O)R&D	18.5	5.3	28.5%	5.4	22.8%
Sao Paulo	0.974	1.000	1.000	1.000	1.000
(I)Cultural Exchange	9.9	-0.3	-2.7%	0.0	0.0%
(I)Livability	40.2	-1.1	-2.7%	0.0	0.0%
(I)Environment	63.0	-24.0	-38.1%	0.0	0.0%
(I)Accessibility	18.8	-0.5	-2.7%	-0.5	-2.8%
(O)Economy	24.0	0.0	0.0%	0.3	1.3%
(O)R&D	3.0	9.6	322.3%	0.0	0.0%
Brussels	0.898	1.000	1.000	1.000	1.000
(I)Cultural Exchange	21.4	-2.2	-10.3%	0.0	0.0%
(I)Livability	46.9	-4.8	-10.2%	0.0	0.0%
(I)Environment	52.7	-5.4	-10.2%	-4.4	-9.4%
(I)Accessibility	34.4	-3.5	-10.2%	0.0	0.0%
(O)Economy	32.8	0.0	0.0%	1.8	5.4%
(O)R&D	14.7	6.5	44.4%	0.0	0.0%
Berlin	0.882	1.000	1.000	1.000	1.000
(I)Cultural Exchange	28.2	-7.0	-24.8%	-6.7	-31.5%
(I)Livability	48.7	-8.5	-17.4%	-8.7	-21.6%
(I)Environment	66.8	-14.0	-20.9%	-15.0	-28.3%
(I)Accessibility	32.6	-3.9	-11.8%	-2.1	-7.1%
(O)Economy	33.8	0.0	0.0%	0.0	0.0%
(O)R&D	22.7	0.0	0.0%	2.3	10.3%

Table 2b. Stepwise efficiency-improvement projections based on SE and DFM

DMU	Score	Stepwise SE		Stepwise SE-DFM	
		Score(θ^{**})		Score(θ^{**})	
		Difference	%	Difference	%
Mumbai	0.973	1.000		1.000	
(I)Cultural Exchange	9.4	-0.2	-2.7%	0.0	0.0%
(I)Livability	42.7	-10.2	-23.9%	0.0	0.0%
(I)Environment	51.1	-1.4	-2.7%	0.0	0.0%
(I)Accessibility	17.4	-0.5	-2.7%	-0.5	-3.1%
(O)Economy	20.7	0.0	0.0%	0.3	1.3%
(O)R&D	3.9	0.2	4.2%	0.0	0.0%
Madrid	0.875	1.000		1.000	
(I)Cultural Exchange	21.4	-2.7	-12.5%	0.0	0.0%
(I)Livability	48.6	-6.5	-13.5%	-0.8	-1.8%
(I)Environment	60.6	-7.6	-12.5%	-5.4	-10.3%
(I)Accessibility	35.4	-4.4	-12.5%	0.0	0.0%
(O)Economy	32.1	0.0	0.0%	2.1	6.7%
(O)R&D	10.9	3.4	31.4%	4.5	31.3%
Milan	0.942	1.000		1.000	
(I)Cultural Exchange	20.2	-2.3	-11.3%	-1.7	-9.7%
(I)Livability	49.4	-10.1	-20.4%	-8.9	-22.6%
(I)Environment	46.9	-2.7	-5.8%	-1.4	-3.2%
(I)Accessibility	30.8	-1.9	-6.3%	-1.1	-3.7%
(O)Economy	27.5	0.0	0.0%	0.8	3.0%
(O)R&D	9.5	2.8	29.5%	3.2	25.8%
Kuala Lumpur	0.930	1.000		1.000	
(I)Cultural Exchange	14.0	-1.0	-7.0%	0.0	0.0%
(I)Livability	38.7	-2.7	-7.0%	0.0	0.0%
(I)Environment	54.2	-4.3	-8.0%	0.0	0.0%
(I)Accessibility	30.5	-2.1	-7.0%	-2.3	-8.1%
(O)Economy	28.7	0.0	0.0%	1.0	3.6%
(O)R&D	4.4	7.8	177.8%	0.0	0.0%

DMU	Score	Stepwise SE		Stepwise SE-DFM	
		Score(θ^{**})		Score(θ^{**})	
		Difference	%	Difference	%
Bangkok	0.933	1.000		1.000	
(I)Cultural Exchange	22.6	-7.5	-33.1%	-6.9	-45.3%
(I)Livability	39.4	-2.6	-6.7%	0.0	0.0%
(I)Environment	47.5	-3.2	-6.7%	-2.6	-5.8%
(I)Accessibility	29.1	-2.8	-9.6%	-1.8	-6.9%
(O)Economy	24.0	0.0	0.0%	0.9	3.7%
(O)R&D	6.9	0.0	0.0%	0.0	0.0%
E6 Cairo	0.859	1.000		1.000	
(I)Cultural Exchange	11.9	-1.7	-14.1%	0.0	0.0%
(I)Livability	33.0	-5.3	-16.0%	-1.5	-5.5%
(I)Environment	42.5	-6.0	-14.1%	-3.9	-10.7%
(I)Accessibility	29.3	-8.4	-28.5%	-6.6	-31.3%
(O)Economy	19.6	0.0	0.0%	1.5	7.6%
(O)R&D	1.3	2.3	178.6%	3.3	91.9%

4.10 Policy Lessons and Suggestions

Our DEA analysis has aimed to shed new light on the rankings of world cities. Most comparative studies are based on an aggregate (weighted or unweighted) average of a set of background factors that have been translated into operational indicators. The approach adopted in the present study has focused attention much more on the efficiency and productivity of large cities, using a comparative data set. These research presented in the present study has offered interesting insights into the benchmark position of world cities, based on an extensive data set. Our findings reveal striking differences compared with standard ranking and benchmarking procedures. In particular, the new methods to arrive at unambiguous DEA ranking results provide promising findings.

The Stepwise SE-DFM model provides the policy maker with practical and transparent solutions that are available in the SE-DFM projection to reach the nearest upper-level efficiency frontier. These results offer a meaningful contribution to decision support and planning for the efficiency improvement of strategic urban policy. And therefore, this Stepwise SE-DFM model may become a policy vehicle that may have great added value for operational decision making and planning in cities. Clearly, cities have the possibility to increase their potential. This improvement potential differs for each city, but our results offer operational guidelines on a case-by-case city basis.

In this paper we have in particular presented a new methodology, the SE-DFM and Stepwise SE-DFM model, which integrates a Super-Efficiency model, a DFM model and a CD model. The

new method minimizes the distance friction for each input and output separately. As a result, the combined reductions in inputs and increases in outputs that are necessary to reach an efficiency frontier are smaller than in the standard model. Furthermore, the new model could be adapted to reflect realistic conditions in an efficiency-improvement projection. In addition, the stepwise projection allows DMUs to include various levels of ambition regarding the ultimate performance in their strategic judgment. Clearly, our deterministic DEA modeling results have to be interpreted with some caution, as the level of precision implied by our findings is in practical situations not achievable. Nevertheless, our results offer an indication of the level of intensity and the direction of policy efforts that are needed to upgrade the efficiency profile of world cities. In conclusion, our Stepwise SE-DFM model is able to present a more realistic efficiency-improvement urban policy strategy, and may thus provide a significant support contribution to decision making and planning for the efficiency improvement of the relevant agents involved.

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5. MULTI-ACTOR ANALYSIS OF METROPOLITAN PERFORMANCE INDICATORS ¹¹

Abstract

This paper examines the relative competitive performance of a set of various metropolitan areas in our world by means of multi-actor explanatory models. These are a specific class of a much broader technique known as multi-level modeling. In our study, extensive data bases on 35 world cities are derived from the so-called GPCI-data base created by the Institute of Urban Research of the Japanese Mori Memorial Foundation. These served as input data for comparative models addressing the multi-annual performance growth of these areas. A fixed effects modelling approach is then used to identify and assess the determinants of urban performance from the perspective of different classes of stakeholders. An empirical application using R software is carried out. The study highlights the importance of different stakeholders in assessing the performance of metropolitan areas.

Keywords: metropolitan performance; multi-level modelling; stakeholders; GPCI database; fixed effects; R software.

¹¹ Source: Kourtit, K., Mazurencu Marinescu, M. and Nijkamp, P. (2014), *Multi-Actor Analysis of Metropolitan Performance Indicators*, Edward Elgar, Cheltenham (Accepted).

5.1 Introduction¹²

Our society lives in the ‘*urban century*’. Massive urbanization trends are increasingly seen as one of the hottest fields of research and policy, as these megatrends are decisive for the sustainable future of our planet. The development of urban systems and metropolitan areas is indeed critically dependent on various spatial-demographic forces of a global nature. First, the change in the world population will likely amount to approx. 2-3 percent growth per annum in the next decades to come (see UN 2008). Consequently, the earth will most likely have to be the habitat for at least 9 billion people by the year 2050 (Kourtit 2014a,b).

A second megatrend is the likely unequal spread of these rising numbers of people. It is forecasted that there will likely be an increasing geographic skewness in the spatial distribution of the world population, with a rapid rate of increase in major regions like Latin America, Africa and Asia, accompanied by a modest rate of increase, and even, a stable development in other parts of the world (in particular, Europe). Some countries like Japan or France may even show a considerable reduction in absolute population size (Kourtit 2014a,b).

A third megatrend is likely to be a rise in urbanisation rates, especially in those countries that may face a fast population rise. World-wide, we observe that more and more people tend to migrate to urban agglomerations, to the extent that for the first time in human history, more than 50 percent of the world population is now living in urban areas (see Kourtit 2014a,b). But these urbanization rates show an increasing diversity, which is rapidly rising in megacities (with more than 10 mln inhabitants) and in metropolises (in general, urban agglomerations, with more than 1 mln inhabitants) (see Angotti 1996; McNeill 1999; Kourtit 2014a,b). The future of our planet will likely be an urban future.

We observe nowadays an increasing interest in the development of metropolitan areas. Metropolises tend to become the common settlement pattern all over the world, ranging from small agglomerations (e.g., Brussels) to megacities (e.g., Sao Paulo) (see Turok 2004). It should be added that in many cases such metropolises are not isolated islands, but are often part of a broader network of interconnected metropolitan agglomerations. Joining forces among such urban regions reinforces the agglomeration benefits that are at the heart of any city formation (see Docherty et al. 2004; Ewen and Hebbert 2007; Kern and Bulkeley 2009; Neal 2012). Such intra- and inter-metropolitan externalities may be related to knowledge creation and transfer, innovative milieus, open and flexible labour markets, effective environmental and energy policy, joint marketing efforts, cultural performance, etc.

¹² A previous and partial analysis of the data base in the present paper can be found in Kourtit et al. 2014). Various material used in this paper display close similarities with one other article by the co-authors (Kourtit et al. 2014), which was developed in parallel at the time of the publication of the present article.

"Being a Parisian is not about being born in Paris, it is about being reborn there."

Anne_Hidalgo, Paris's new mayor

A variety of contemporaneous developments can be observed in poly-nuclear urban developments, with a satellite system of suburban areas (as opposed to a “star” pattern that characterizes older metropolises), edge cities and new towns around a central core area (Ile de France, Los Angeles etc.). All such geographically and functionally integrated settlement patterns serve to increase the efficiency and productivity – and hence the growth and competition potential – of urban agglomerations. But it is an as yet unanswered question which metropolises in our world are to be seen as the most successful ones; in other words, which ones would generate the highest performance, and why? This calls for a solid and empirical comparison of performance indicators – and their background factors – of major cities in our world.

This paper aims to advance knowledge on critical performance conditions of metropolises in our world by carrying out a statistical analysis of performance indicators for about 35 world cities. Extensive data-bases for these cities are derived from the so-called GPCI-data base constructed by the Institute of Urban Research of the Japanese Mori Memorial Foundation (2013). After an econometric analysis of the interest profiles of multiple stakeholders in these cities, some policy conclusions will be formulated.

5.2 Literature Review and Hypotheses

Our world has turned into a complex spatial-economic system. Scale advantages are the ‘*raison d’être*’ of growing business firms, and form the cornerstone for contemporary global business developments. ‘Big size’ of corporate organizations is perhaps as such not a human ideal, but more an economic necessity to survive in a competitive environment. Increased productivity – supported by innovative behaviour – is (or represents) the critical success factor to gain a strong competitive position in business life, and propels a permanent drive to do things better and to expand markets and market shares. The space-economy forms here an important action platform.

The above Neo-Schumpeterian interpretation of entrepreneurial dynamics holds essentially also for the life of cities. Cities are born and may grow, in population, in attractiveness or in wealth. Some cities conquer a stable position – sometimes even at a structurally low welfare level, – others may shrink – sometimes on a temporary basis as a result of unfavourable headwinds (Detroit, e.g.) –, and again others may gain an increasingly strong profile. The latter category is on a rising edge. Many cities in our world grow in population size, and several also in prosperity. But irrespective of urban

economic welfare, most cities on our planet appear to grow in population numbers. They are transformed into large urban agglomerations (metropolises), while many of these big cities – especially in the developing world – grow into mega-cities. Our planet is gradually moving towards an urban planet (see Sassen 1991), and many planners talk about ‘the urban century’.

But the emerging urbanization rates do not show a uniform pattern. City growth all over the world is rather heterogeneous. To some extent, one may compare the evolution of cities with that of business firms. The laws of competition stipulate that firms try to achieve an increasingly larger share of their relevant markets, and may exhibit fluctuating growth patterns. This strategy is also valid for cities in an open world. Such cities have to acquire and retain the patronage of (potential and actual) residents, visitors and business life. They have to attract various (selected) classes of important economic agents to their territory. Consequently, a successful city is a city that is able to attract a prominent share of the international market of urban agents and stakeholders. Thus, urban evolution calls for an endogenous explanation of the driving forces of city evolution, both the impact of available urban attractiveness indicators and the implementation of appropriate urban governance measures (Kourtit 2014a,b). The scientific, mainly quantitative estimation and evaluation of the various factors that determine the socio-economic performance of large cities, is called metropolitan performance analysis (MPA).

MPA is not a single and unambiguous research tool, but mainly a set of quantitative assessment instruments to depict the drivers of the performance of urban agglomerations. An overview of several of these tools can be found in a study by Kourtit (2014), which offers an empirical illustration of the relevance of several assessment tools, such as: self-organizing mapping models, data envelopment analysis (DEA) models, rough set analysis, and multi-criteria analysis.

The information needed to carry out a comparative benchmark analysis for several cities may originate from several statistical sources, in particular:

- generally accessible statistical data on cities;
- specific survey-based indicators on urban performance;
- perceptions of stakeholders on relevant urban features;
- quantitative assessments of urban attractiveness from expert opinions.

The recent literature on urban studies offers a wealth of contributions on comparable experiments regarding the economic, social, entrepreneurial, innovative or creative profile of cities. There is a rising interest in urban benchmark studies. This has led to a variety of general ranking studies of global cities, world cities, metropolitan agglomerations etc, while also various sectoral or

functional ranking studies have been performed, e.g. on tourist cities, business cities, financial cities, artistic cities and the like.

A noteworthy study was undertaken by Grosveld (2000) who applied the concept of Porter's (1990) competitive advantage theory to a comparison of leading cities in the world. His study is based on an extensive analysis of perceptions of 'city makers', from different socio-economic clusters: hospitality, real estate and architecture, corporate services, academia, performing arts, museums, international trade and transport, international organizations, media, finance and multinationals. The information on these perceptions stems from an extensive and focussed survey questionnaire approach among some 85 leading world cities: 31 in Europe, 19 in North America, 16 in Asia, 9 in Latin America, 5 in Africa, and 3 in the Middle East. His findings offer a wealth of detailed insights into the functional-sectoral rank order of various cities in our world. Such research results prompt the need for a solid and quantitative causal analysis.

An important question – after the great many exploratory studies in the past decades – is, therefore, whether an explanatory model can be designed that would offer a valid scientific linkage from a set of explanatory background factors to a set of relevant performance indicator(s) of a given city or a set of cities. This would call for an econometric-statistical analysis of detailed and standardized data covering a large number of cities, while taking into account the specific geographic characteristics of such cities (e.g., developed versus developing world, choice of continent, city size class etc.). Fortunately, in the framework of our study, we had access to a rather comprehensive and very detailed, multi-level data-base relating to 35 metropolises of our world, i.e. the above mentioned GPCI-database.

5.3 Multi-Actor Modelling Results

The current literature on urban developments is vast. It is widely accepted that cities are magnets of economic power, but also hubs in global networks. They are complementary to each other, but are also each other's competitors. The merger of internal strength and external orientation determines the performance and economic profile of cities (see Neal 2012).

Cities operate in an international playing field and, hence, their socio-economic performance may show much variation. The question is then: why do some cities outperform others? This idea formed the basis of the creation of the above-mentioned GPCI database to be used for our MPA. This database contains extensive information – in standardized and comparative quantitative form – of many world cities which are evaluated and ranked according to their 'magnetism', i.e. their competitive power to attract visitors, creative people and business enterprises from all over the world.

This open access database is carefully validated through field visits and in-depth assessment reports. It contains a wealth of multi-annual data on major critical indicators – and a very detailed list of sub-indicators – for economic strength of the relevant cities contained in the database. At present, this data system has accurate information on 35 world cities ranging from New York to Istanbul, and from Tokyo to Geneva. This extensive GPCI database offers also the possibility for a benchmarking of each individual city, in terms of strength and weakness regarding each individual performance indicator.

Thus, the GPCI aims to offer systematic and comparative information on the comprehensive economic position of major cities in the world, and it does so by focussing on a wide variety of functions performed by the cities under consideration. For each individual city, 6 main classes of functions were carefully mapped out and numerically assessed, viz. *economy* (EC), *research and development* (RD), *cultural integration* (CI), *liveability* (LIV), *environment* (ENV) and *accessibility* (ACC). In addition, the importance of these indicators was carefully assessed by 5 distinct groups of stakeholders, viz. *managers*, *researchers*, *artists*, *visitors* and *residents*.

The purpose of this paper is now to address these above mentioned substantive research questions by using a multilevel modelling approach. Multilevel analysis (or modelling) is a term used to describe a set of analyses sometimes also referred to as multilevel random coefficient models (Bryk and Raudenbush 1992; Kreft and De Leeuw 1998; Snijders and Bosker 1999; Bliese 2013, p. 5).

Usually, the definition of multilevel modelling reflects a wide range of interrelated multilevel features (see also Klein and Kozlowski 2000), like within-group agreement and reliability, contextual OLS models, covariance theorem decomposition, random coefficient modelling and random group resampling (Bliese 2013, p. 25). For the purpose of the current paper, we will restrict our analysis to the application of multilevel random coefficients models by using the GPCI data set gathered from the Mori Memorial Foundation Data Base for a five-year period ranging from 2009 to 2013.

The general model specification is based on the aim to explain the perception on the performance (or importance) of a given city for each of the 5 classes of stakeholders (i.e., managers, researchers, artists, visitors and residents) on the basis of the 6 background factors that shape: socio-economic development, research & development, cultural integration, liveability, environment and accessibility. The general model has the following expression (formulated as a fixed effects model):

$$y_{it} = \alpha + X'_{it}\beta + v_{it} \tag{1}$$

where y_{it} is the dependent variable, X_{it} is a matrix of explanatory or moderator variables, and v_{it} is an $\sim IID(0, \sigma_v^2)$ error term; the index i refers to a city i , while the index t refers to the time-period. In our statistical analysis, PROC MIXED in SAS software was used in order to determine which of

the various groups of city functions are statistically significant for the various stakeholder classes: managers, researchers, artists, visitors and residents.

To pursue this, model (1) was successively estimated having as the dependent variable the score assigned by the various actors (managers, researchers, artists, visitors and residents). The data base refers – as mentioned - to the years 2009-2013.

An analysis of the results of Table 1 show that the only coefficients that are statistically significant are related to the factors/dimensions *Economy* and *Accessibility*, a result which was to be expected for the class of Managers, as these factors are generally decisive for entrepreneurial performance. The results confirm the business model that firms have a main interest in economic background factors and efficiency-enhancing factors (accessibility), and less interest in other factors.

Table 1. Urban performance assessment by Managers (Fixed Effects)

Solution for Fixed Effects					
Effect	Estimate	Standard Error	DF	t Value	Pr > t
Intercept	17,3492	7,3564	4	2,36	0,0778
Economy	0,1178	0,01597	164	7,38	<.0001
RD	-0,0074	0,02011	164	-0,37	0,7141
CI	0,00947	0,01372	164	0,69	0,4913
Liv	0,02022	0,02134	164	0,95	0,3449
Env	-0,0014	0,01984	164	-0,07	0,9453
Acc	0,04711	0,02048	164	2,3	0,0227

For the class of Researchers, we find that the coefficients for *R&D* and *Liveability* are statistically significant at a 5% significance level (see Table 2). This is again a plausible result, as the seedbed conditions for research are often R&D profiles and quality of life.

Researcher are clearly interest in a well-developed R&D infrastructure, as well as in a good local quality of life.

Table 2. Urban performance assessment by Researchers (Fixed Effects)

Solution for Fixed Effects					
Effect	Estimate	Standard Error	DF	t Value	Pr > t
Intercept	5,7727	6,7235	4	0,86	0,439
Economy	-0,0104	0,0177	164	-0,59	0,5578
RD	0,2994	0,02231	164	13,42	<.0001
CI	0,01999	0,01522	164	1,31	0,1911

Liv	0,06098	0,0235	164	2,59	0,0103
Env	0,01182	0,02201	164	0,54	0,592
Acc	-0,0204	0,02272	164	-0,9	0,3701

Next, for the group of Artists, the driving forces *Economy*, *R&D*, *Cultural Integration*, *Liveability* and *Accesability* appear to be statistically significant at a 5% significance level, with Livability being even more important than Cultural Integration (see Table 3).

Artists appear to attach a high value to cultural integration and liveability, but are apparently conditions. This group seems to flourish better in less competitive and less logistically connected urban space.

Table 3. Urban performance assessment by Artists (Fixed Effects)

Solution for Fixed Effects					
Effect	Estimate	Standard Error	DF	t Value	Pr > t
Intercept	13,0929	5,8328	4	2,24	0,0882
Economy	-0,0535	0,01923	164	-2,78	0,006
RD	0,08552	0,02429	164	3,52	0,0006
CI	0,1188	0,01658	164	7,16	<.0001
Liv	0,156	0,02523	164	6,18	<.0001
Env	-0,0221	0,02396	164	-0,92	0,3578
Acc	-0,0683	0,02474	164	-2,76	0,0064

These statistical findings are largely partly in accordance with our expectations. It is noteworthy that *Economy* and *Accessibility* turn out to be statistically significant, but the sign is negative. This suggests some validity of the Jacobs-Florida hypothesis that culture may flourish in a somewhat stressful situation, in which the Economy and the Accessibility are not necessarily well organized. But this finding needs more careful examination.

The results in Table 4 indicate that Visitors highly value *Liveability* and *Cultural Integration*, followed by *R&D*. These factors are the only positively significant ones at a 5% significance level and confirm our prior expectations. The Environment exerts apparently a negative influence; this may be due to the fact that various environmental indicators are seen as more structurally important for residents than for temporary visitors.

Table 4. Urban performance assessment by Visitors (Fixed Effects)

Solution for Fixed Effects					
Effect	Estimate	Standard Error	DF	t Value	Pr > t
Intercept	18,5004	6,2764	4	2,95	0,0421
Economy	0,00947	0,01994	164	0,48	0,6353
RD	0,05156	0,02518	164	2,05	0,0422
CI	0,0612	0,01718	164	3,56	0,0005
Liv	0,08615	0,02622	164	3,29	0,0012
Env	-0,0773	0,02484	164	-3,11	0,0022
Acc	0,04195	0,02564	164	1,64	0,1038

Finally, for the Residents, *Liveability* matters most, but also *R&D* and *Environment* appear to exert a statistically significant effect, at a 5% significance level (see Table 5). The results are rather plausible: residents prefer good atmosphere to live and work, while R&D offers a good platform for skilled people and talent in the city.

Table 5. Urban performance assessment by Residents (Fixed Effects)

Solution for Fixed Effects					
Effect	Estimate	Standard Error	DF	t Value	Pr > t
Intercept	9,8702	10,7314	4	0,92	0,4098
Economy	0,00238	0,01691	164	0,14	0,888
RD	0,1225	0,02127	164	5,76	<.0001
CI	-0,0041	0,01451	164	-0,28	0,7807
Liv	0,1502	0,02274	164	6,61	<.0001
Env	0,04761	0,02098	164	2,27	0,0245
Acc	0,03105	0,02166	164	1,43	0,1535

5.4 Further Statistical Analysis

The GPCI data set is rich in nature, as it depicts in a multi-level form the various relevant characteristics of all 35 cities under consideration. The time span of this database is unfortunately rather short (2009-2013), but it still important to map out the short-term trend over the relevant time span of the data. With the data representation in univariate form, it is possible to examine also visually whether or not there are identifiable patterns between time and the performance outcome (total city

score). The software commands below use the Lattice Package in R to produce the plot of all 35 cities (see Figure 1) (see also Bliese 2013, p. 70). R is a user-friendly, open-source software that is flexible in using and amending standard software packages (such as SPSS). A disadvantage is the use of rather complicated statements and commands. The horizontal axis in Figure 1 represents the time axis, while the vertical axis measures the city scores for each of the cities under consideration.

```
> library(lattice)
> xyplot(MULTDV~TIME|as.factor(city), data= univ.dateorase [1:63,], type=c("p", "r", "g"), col="blue", col.line="black",
xlab="TIME", ylab="Score")
```

This technical sequence from the R software produces the following graph depicting the evolution in time, 2009-2013, of the cities' total scores.

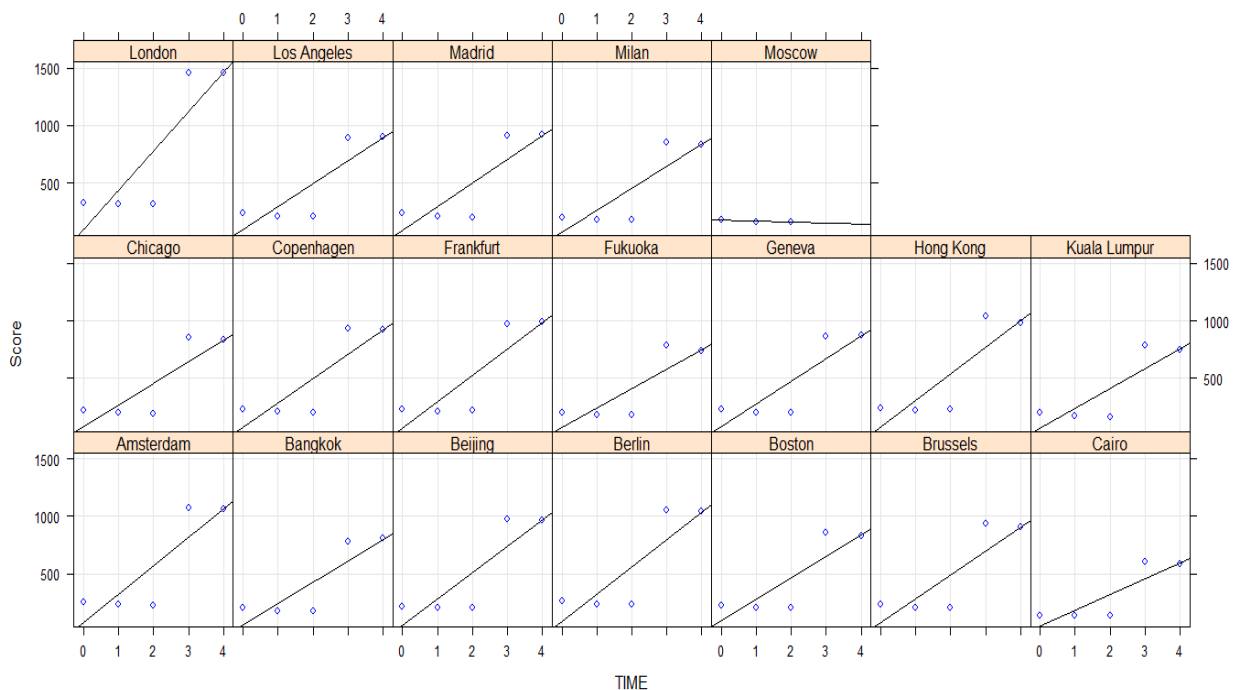


Figure 1. City variability across time

From this plot, we observe that there is variability in both levels of the total score and in the way it varies over time. The goal in our growth modelling exercise is now to determine whether or not there are consistent patterns in the relationship between time and the dependent variable (DV), which is the total city score. This will be highlighted in the subsequent subsections (see also Bliese 2013, p. 71). The general observation from the benchmarking exercise in Figure 1 is that there is a high score of variability in the growth performance of the cities concerned. These are several degrees of growth performance. An exception appears to be Moscow.

5.4.1 Examination of the Total City Score

The first step in our multi-level growth modelling is to analyse the features of the dependent variable, i.e. total city score. As in classical multilevel modelling, we start by estimating a null model and calculating next the intraclass correlation coefficient (ICC)¹³, represented in R (see also Bliese 2013, p. 71).

```
> null.model<-lme(MULTDV~1, random=~1|city, data=univ.dateorase, na.action=na.omit, control=list(opt="optim"))
> VarCorr(null.model)
city = pdLogChol(1)
```

The summary output of the null model is depicted in the table below, again denoted in R.

Table 6. The null model

	Variance	StdDev
(Intercept)	8.41	2.899378
Residual	143000	377.926541

From the variances obtained in the table above we can calculate the intraclass correlation coefficient (ICC).

```
>8.406391e+00/(8.406391e+00+1.428285e+05)
[1] 5.885307e-05
```

The ICC associated with the total score appears to be very small. This indicates that very little of the variance in any city score can be explained by the intrinsic properties of the city itself.

5.4.2 Modelling of Time Dependency

The second step involves modelling the relationship between time and the dependent variable. We shall begin by modelling a linear relationship and add progressively more complicated relationships such as a quadratic form, a cubic form, etc. In order to test whether a linear relationship exists between time and the total city score, we regress the total score in a given time in the model with a random intercept, which we call model.2 (see also Bliese 2013, p. 71).

```
>model.2<-lme(MULTDV~TIME, random=~1|city, data=univ.dateorase, na.action=na.omit, control=list(opt="optim"))
>summary(model.2)$tTable
```

¹³ The intraclass correlation (or the *intraclass correlation coefficient*), abbreviated as ICC, is a [descriptive statistic](#) that can be used when quantitative measurements are made on [units](#) that are organized into groups. It describes how strongly units in the same group resemble each other (see for details Satchel 2013, p. 105; another source is: <https://www.boundless.com/statistics/correlation-and-regression/correlation/other-types-of-correlation-coefficients/>).

These results are given in Table 7 below.

Table 7. Results of Model 2

Value	Value	Std.Error	DF	t-value	p-value
(Intercept)	78.55487	29.58726	139	2.655023	8.855996e-08
TIME	214.65069	11.89783	139	18.041169	3.094869e-38

An examination of the fixed effects indicates that there is a significant linear relationship between time and the total city score, such that the total score increases by 214.65 each time period. Since in our approach the first time period was coded as 0, the intercept value in this model represents then the average level of the total score in the first time period. Specifically, in the first time period the average city total score was found to be equal to 78.55.

Clearly, more complicated time functions can be included in various ways; either through raising the time variable to various power levels, or by converting time into power polynomials (see also Bliese 2013, p. 72). Below, the results of some of these techniques are represented.

Model.2b includes quadratic trend.

```

> model.2b<-lme(MULTDV~TIME+(TIME^2), random=~1|city, data= univ.dateorase, na.action=na.omit,
control=list(opt="optim"))
> summary(model.2b)$tTable

```

Table 8. Results of Model 2b

Value	Value	Std.Error	DF	t-value	p-value
(Intercept)	186.355	32.93	138	5.65	0.000
TIME	-0.951	37.49	138	-0.025	0.000
I(TIME^2)	53.900	8.98	138	5.997	0.000

While, model.2c includes time as a power polynomial.

```

>model.2c<-lme(MULTDV~poly(TIME,2), random=~1|city, data=univ.dateorase, na.action=na.omit,
control=list(opt="optim"))
> summary(model.2c)$tTable

```

Table 9. Results of Model 2c

Value	Value	Std.Error	DF	t-value	p-value
(Intercept)	507.8562	17.58	138	28.87	0.000
poly(TIME, 2)1	4015.74	198.95	138	20.18	0.000
poly(TIME, 2)2	1193.1397	198.95	138	5.99	0.000

Both models clearly show that there is a significant quadratic trend. We can thus conclude that time tends to have a quadratic relationship with the total city score.

5.4.3 Model Slope Variability

A potential limitation which is inherent in model.2 is that it takes for granted that the relationship between time and total city score is constant for all cities. Specifically, it assumes that each city score increases on average by 214.65 in each time period.

An alternative model that needs now to be tested is one that allows the slopes to vary randomly. Given the degree of variability in the graph above(Figure nr.1.), a random slope model seems quite plausible assumption in the light of the current data. The random slope model is next tested here by adding the quadratic effect for time as a random effect in our model. This will be called model 3.

Consequently, we will now update our previous model (2) by adding a different random effect component and next contrast model.2 and model.3c (see also Bliese 2013, p. 72).

```
> model.3c<-update(model.2, random=~TIME+(TIME^2)|city)
> anova(model.2, model.3c)
```

The results are shown in the table below:

Table 10. Results of contrasting model.2 and model.3c

Model	df	AIC	BIC	logLik	Test
model.2	4	2383.21	2395.82	-1187.65	
model.3c	9	2386.41	2414.79	-1184.207	1 vs. 2

L.Ratio	p-value
6.79	0.23

The results clearly indicate that a model that allows the slope between time and total city score to vary randomly does not fit the data better than a model that fixes the slope to a constant value for all cities. As we have progressively redone the calculations from a three-year to five-year database,

we can draw the following conclusion: the longer the time horizon, the more is a tendency appears to be in favour of a model that fixes the slope to a constant value for all cities.

5.4.4 Modeling Error Structures

The fourth step in developing the level-1 model involves assessing the error structures of the model. It is important to carefully scrutinize the level-1 error structures, because significance tests may be dramatically affected, if error structures are not properly specified. The purpose of this step is to determine whether the model fit improves by incorporating (a) an autoregressive structure with serial correlations and (b) heterogeneity in error structures. This will be called model 4.

Tests for an autoregressive structure (autocorrelation) are conducted here by including the correlation option in lme. We shall therefore update model.3c above and include a lag 1 autocorrelation as follows (see Bliese 2009, p.72-73):

```
> model.4a<-update(model.3c, correlation =corAR1())
> anova(model.3c, model.4a)
```

The results are depicted in Table 11.

Table 11. Results of contrasting model.3c and model.4a

Model	df	AIC	BIC	logLik	Test
model.3c	9	2386.413	2414.793	-1184.207	
model.4a	10	2350.887	2382.42	-1165.444	1 vs. 2
L.Ratio		p-value			
37.5259		<.0001			

It appears that a model that allows for autocorrelation fits the data better than a model that assumes no autocorrelation.

A summary of model 4a reveals that the autocorrelation estimate is -0.758622 (known as Phi coefficient). We can further examine the degree to which the variance of the responses of stakeholders changes over time. A test of variance homogeneity is conducted by examining the variance of the total city score at each time point using the Tapply Command (see for details Bliese 2013, p. 73).

```
> tapply(univ.dateorase$MULTDV, univ.dateorase$TIME, var, na.rm=T)
```


Table 12. Test for variance homogeneity

0	1	2	3	4
1799.609	1857.982	2035.171	39123.376	38257,354

The analysis of the results from Table 12 suggests that the variance of the total city score is increasing over time.

5.5 Conclusions

The application of multi-level models to competitive urban performance analysis is rather novel, to the best of our knowledge. R software appears to be an appropriate tool for examining the growth profiles of a series of competitive cities.

The statistical-econometric analysis in our study has brought to light important research findings. Firstly, we have tested which city functions are statistically significant for the various stakeholders/actors — managers, researchers, artists, visitors and residents — by using a fixed effect model operated in SAS software. For the managers, the dimensions *Economy* and *Accessibility* are statistically significant; for the researchers, the coefficients for *R&D* and *Liveability* are statistically significant at a 5% significance level; for artists, *Liveability* and *Cultural Integration* matter most; visitors value more *Liveability*, *Cultural Integration* followed by *R&D*.

Secondly, in order to extend the analysis, growth models from a multi-level modeling methodology have been applied. The results indicate that exceptionally tiny of the variance in any city score can be explained by the properties of the city itself.

A further examination of the fixed effects results indicates that there is a significant linear relationship between time and the total city score, such that the total score increases by 214.65 each time period. Since the first time period was coded as 0, the intercept value in this model represents consequently the average level of the total score in the first time period. Specifically, in the first time period the average total city score was found to be equal to 78.55. We can also conclude that time has a quadratic relationship with total score (see also Bliese 2013, p. 72).

In addition, the results clearly indicate that a model that allows the slope between time and the total city score to vary randomly does not fit the data better than a model that fixes the slope to a constant value for all cities from our sample.

Finally, a model that allows for autocorrelation does offer a better fit than a model that assumes no autocorrelation (see Bliese 2013, p. 72).

These preliminary findings will lead to better articulate metropolitan development policies in order to increase the cities' total score. The combined effect of the perception of stakeholders and the strength of the performance profile of the cities concerned offer important handles for focused urban

policies. Thus, these cities will become more appealing to various stakeholders, while maintaining at the same time their competitive advantage.

Unfortunately, in our MRA we have limited observation waves, but the current research is sufficiently promising to be further extended once we gain access to more data.

As we have undertaken various waves of calculations, we may conclude that various results remained consistent over time: for instance, the most significant dimension for Managers is ***Economy*** and for Researchers is ***R&D***, while other aspects may change over time. For instance, for three repeated measures (three years) a model that allowed the slope between time and the total city score to vary randomly fits the data better, while for five repeated measures a model that fixes the slope to a constant value for all cities fits the data better.

This current study has also intended to offer an illustration of how R software can be used in a niche of multilevel models for assessing metropolitan performance analysis. R is a very powerful programming language that circles around complex data analyses and can help solving complex data structures such as the GPCI-data base created by the Institute of Urban Research of the Japanese Mori Memorial Foundation. Clearly, this exercise is only the start of a more comprehensive research programme.

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PART B
INNOVATIVE SECTORS

6. IMPACTS OF MULTI-LEVEL SPATIAL CAPITAL RESOURCES ON BUSINESS PERFORMANCE ¹⁴

Abstract

The performance of firms depends, inter alia, on the economic context in which these firms are operating. In combination with the use of advanced management techniques, therefore, the type and quality of capital resources included in the firms' production function crucially affects the firms' competitiveness on both local and international markets. Thus, there is a need for an evidence-based analysis of various capital assets – in particular, local conditions – that impact on the performance of firms.

This chapter uses a novel micro data base with information on Dutch firms in knowledge and innovation-intensive industries and aims to assess the relative importance of different forms of capital on the firms' behaviour. Because of the different contribution of distinct forms of capital to various performance measures, an empirical model is designed, based on a multi-level framework. Next, this model – including spatial components – is estimated. Our results show that a broadly composed capital base (including human and social capital and local or urban resources) contributes to the performance of business operations in the high-tech sector.

¹⁴ Source:: Kourtit, K., Nijkamp, P., Caragliu, A., and Del Bo, C. (2014). Impacts of Multi-Level Spatial Capital Resources on Business Performance. In: *Applied Regional Growth and Innovation Models* (Kourtit, K., Nijkamp, P., and Stimson, R., eds.), Berlin: Springer-Verlag, 313-334.

6.1 Introduction

Firms may be seen as critical change agents in any spatial system. Consequently, the recent regional growth literature has rightly positioned firms at the centre of regional dynamics (see e.g. Capello and Nijkamp 2010). Entrepreneurship and innovation have assumed a dominant position in regional development studies. The presence of entrepreneurs is however, a necessary, but not sufficient condition for regional economic progress. A major question is how much firms contribute to regional well-being; in other words: what are their objectives and, ultimately, what is their performance? Firms' performance, in a broad sense, is a multi-faceted concept and is influenced by conditions both internal and external to the firm. In an increasingly globalized and interlinked economy, firms, especially those with several plants, are operating in complex environments, and this should be reflected in any model attempting to unveil the determinants of performance. In the present study, we will argue that in the context of modern high-tech industries, a firm's objective function and performance are determined by internal characteristics along with contextual conditions, at both the sectoral and spatial level. Therefore, we will first focus on the technological context and characteristics of the sector in which the firm operates, as this will directly influence its performance and goal-setting strategy. 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 and market demand conditions. We will thus include in our analysis, along with firm-specific internal factors sectoral dummy variables, an evaluation of the role of social and human capital at the regional level and the impact of the urbanization structure in which the firm operates.

Our study will also take for granted that different firm objectives, associated with different performance goals at different time horizons, should be modeled on the basis of goal-specific determinants. To this aim we will classify firm objectives into short-, medium- or long-term, by focusing, respectively, on profit growth, revenue growth, and product quality. While clearly related, these strategic goals imply different underlying decision models, warranting the formulation of three distinct empirical explanatory models.

The study is organized as follows. In Section 6.2 we will discuss the relevant literature in this field, and frame our contribution in the context of business performance studies, separated into firm-level determinants and broader contextual conditions. A brief overview on urbanization economies is provided as well, with the aim to stress the importance of localized context conditions for firm- and plant-level behaviour and performance. Section 6.3 sketches out the empirical model used and methodologies adopted, while Section 6.4 describes the novel data set collected for this study, with a particular focus on high-tech firms in the Netherlands. Section 6.5 then presents the results of the empirical estimation, carried out by means of Poisson and multi-level regression models, while Section 6 concludes and suggests possible avenues for further research.

6.2 Literature Review

The present study on the spatial dimensions on firms' behavior has a broader socio-economic and spatial ambition: it aims to encompass in the same empirical assessment model both firm-level characteristics as well as contextual conditions. For this reason, a multi-level modelling approach is adopted. This section will first summarize the main approaches to the understanding of business performance in order to provide a proper framework for our choice of firm performance determinants (Subsection 6.2.1). Next, an overview of the main theories concerning spatial contextual conditions possibly influencing a firm's performance is provided (Subsection 6.2.2); in particular, the role of social and human capital, and that of the urban and industrial context, are presented.

6.2.1 *Business performance: firm-level determinants*

One of the founding fathers of modern economics, Alfred Marshall, has laid the basis for efficiency analysis and hence for 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.

The aim of the present research paper is to focus on significant differences in economic performance of high-tech firms. The business performance of firms in the high-tech sector shows much variation related to their geographical location-decision choice (Kourtit and Nijkamp, 2013). The growing importance of external and environmental changes puts much 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, which all encourage businesses to stay competitive and profitable (Zeng and Zhao, 2005). High-tech firms have to embrace these spatial capital resources in their business strategies; their strategic goals have to be growth oriented and to search and develop new (long- and short-term) opportunities in order to enhance their entrepreneurial learning strategies and business performance to remain viable and to realize sustainable competitive advantages associated with their human capital.

Further, today's turbulent business environment demands a regular adaptation of organizational strategies based on local and regional determinants, capabilities and resources, and general economic conditions. It is thus important to understand and recognize that a firm's

strategic objectives must change constantly and to anticipate changing circumstances throughout the organization, from the top level down to the operational level. This also demands a better understanding, by all the firm's actors, as to their role and contribution towards the achievement of the short-term and long-term strategies and organizational goals in order to improve their business performance and to ensure a sustainable competitive advantage in regards to chosen organizational strategies, in a dynamic environment.

In a historical perspective, the development of today's business and managerial long-term and short-term strategies can be framed in the context of Sun Tzu's *'Art of War'* (1910), which leads to the understating of the importance of competition, competitive advantages and positioning in strategy to make the correct decisions and to create innovations in the competitive business environment to ensure financial viability (Kourtit and Nijkamp, 2013). To provide a better insight into differences in business performance among regional patterns of spatial business activities and to understand entrepreneurial learning strategies, our research will examine the relationship between the geographic location and industrial characteristics and the business objectives and performance of individual firms in the high-tech industries,¹⁵. The business performance in this research study is measured in terms of XXP, which refers to maximum contribution to productivity, quality and profitability (similar to the XXQ concept: see Nijkamp 2008), given the human and social capital, and other geographical and spatial resources it possesses, and commitments of the firm to strategic goals. In addition, a GIS approach will be used, in combination with multivariate econometric models, to integrate a set of different levels of information on individual firms' determinants and spatial attributes in core geographical zones.

6.2.2 Business performance: context conditions

From an industrial perspective, a firm's performance has often been found to vary across sectors, mainly because of the different type of production process each sector implies. In a first influential contribution, Pavitt (1984) suggests a classification of science-based manufacturing sectors, according to empirical regularities in the fields of potential innovation sources, type of innovations, appropriability of such innovations, potential barriers to the entry of incumbents, and the average size of firms. Fifteen years later, it became clear that manufacturing was no

¹⁵ Creative industries refer usually to those economic activities that generate both tangible and intangible innovative or knowledge-oriented goods and services, which have an income-generating capacity, while cultural industries refer to those activities that have an artistic, historic-social or entertaining connotation (Kourtit et al. 2013).

more the only (and oftentimes, even the major) source of innovation for advanced economies, having been substituted by Knowledge Intensive (Business) Services (henceforth, KIBS; see Miles et al., 1995 for the seminal definition).

Firms active in science-based manufacturing industries and in KIBS are expected to be characterized by higher average performance indicators, being both more innovative, as well as more productive. In the present study, the industries in which each firm is active is classified according to its technological intensity, thereby allowing for a classification of sectors into two classes, which represents the basis for adding the industrial environment to the multi-level approach adopted in this study. The details on these methodologies are summarized in Section 6.4. From a spatial/regional perspective, moreover, two main characteristics, summarizing the environment where firm activities take place, are the subject matter of our analyses, viz. *social* and *human* capital. Clearly, the impacts of non-material forms of capital, namely of place-specific soft characteristics, can be thought of as acting *ceteris paribus*, viz. with an equal distribution of physical capital and hard infrastructure across the observed space¹⁶

Social capital (Putnam, 2000; Putnam et al., 1993; Fukuyama, 1995; Bourdieu, 1983, among many others) refers to the set of norms, networks, and institutions forming the glue of a society. As such, its impacts on various performance indicators at many different levels has been tested in many studies. From this perspective, a region with a higher social capital is expected to decrease the contract costs for a firm located in the region. At the firm level, several different channels may transmit the positive effects of good quality of norms and institutions, and the availability of thick and wide networks, for firm performance. Belonging to social-capital rich regions may in fact imply belonging to environments where people share the same social language; in these contexts, it becomes less expensive to understand each other (Mc Closkey and Klamer, 1995). “*Better mutual understanding may also reduce transaction costs: whenever people get together to start a business, this is based on reciprocal trust. When this is not available, people must set up efficient rules and punishments for breaking them; and this process is costly*” (Capello et al., 2011, p. 100). Finally, contract theory convincingly explains why social capital is a lubricant for completing contracts at lower costs (Bowles and Gintis, 2002).

A second relevant issue considered here is the role of regional human capital in determining firm performance. The traditional human capital literature (Becker, 1964; Mincer,

¹⁶ An hypothesis which can be considered as realistic in the relatively limited and spatially homogenous setting of the present empirical analysis.

1974) finds theoretical grounding and empirical evidence about the positive role of an educated labour force on aggregate economic performance. Such evidence is widely available also at the firm level (see for instance Crook et al., 2011 for a recent meta-analysis). More recently, because of the increasingly wide availability of an educated labour force in most Western countries, different – and more complex – forms of human capital have been analyzed. Recent contributions (Wößmann, 2003; Vandebussche et al., 2006; Caragliu et al., 2012) posit that high-level professions, creative capital, and urban knowledge capital are increasingly relevant in determining urban performance.

In this paper, such calls for more attention to complex notions of human capital are simultaneously taken into account; the methodologies for capturing such complex relations between ‘modern’ human capital and firm performance will be summarized in the next section.

Finally, the environment where firms perform their activities matters in their location decision. According to a classical definition (Hoover, 1936), firms face productivity increases because of economies of *scale* (internal to the firm); external to the firm but internal to the industry (*localization* economies), i.e. those productivity increases stemming from *specialization* externalities, and finally economies external both to the firm and to the industry, viz. *productivity* increases accruing to those firms located in large urban areas, close to other firms active in technologically-compatible industries. In this paper the impact of urbanization economies on various firm performance indicators will also be analyzed.

6.3 Measurement Model

In order to empirically assess the relevance of each strand of literature summarized in the previous section, we resort to a multi-level modelling approach. In fact, in order to understand the determinants of the high-tech firms’ objectives and performance, both firm-level as well as contextual elements play a major role. Figure 1 summarizes the way in which such a multi-level framework is conceived. Firm performance is assumed to depend not only on firm-specific characteristics (oval figure on the right-hand side of Figure 1), but also on the regional and industrial context (oval top left part of Figure 1).

Also the effects of the regional (i.e., human capital and social capital endowments) and industrial contexts take place in different localizations where firms are active, with different intensities of urbanization. Since the geographical, productive, and relational context in which the firms’ activities take place also influences a firm’s productivity and innovativeness, the level of urbanization of such a context must also be included in our empirical analysis.

Methodologically, a multi-level econometric analysis is deemed to best capture the complex set of overlapping relations, which otherwise would be difficult to disentangle and fully understand.

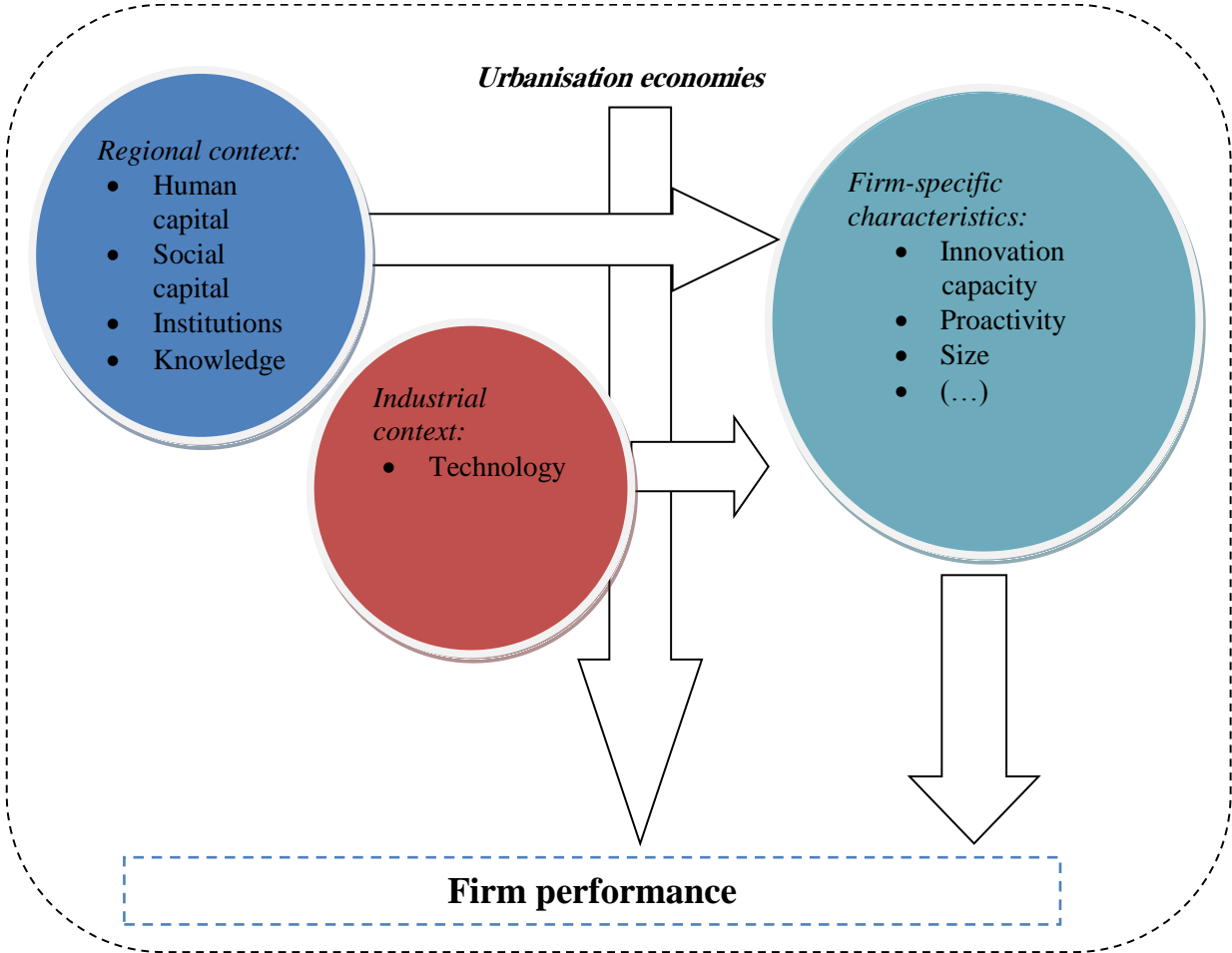


Figure 1. The conceptual framework: business performance in high-tech sectors.

Source: Authors' elaboration

Multi-level statistical data sets are typically approached with mixed-effects techniques (Snijder and Boskers, 2012; Rabe-Hesketh, Skrondal and Pickles, 2004 and 2005). Mixed-effects estimators allow the identification of possible sources of variation within groups in which individual observations can be classified. In our context, variation is expected to take place within the Dutch COROP (NUTS3 regions) where the firms being observed are located. In fact, the notions of social and human capital – and the level of urbanization – of the areas where the firms are active are by definition much more sticky than more mobile factors – for instance, capital or workers in non-specialized functions. Similarly, the industrial context where the firm is active – in particular because of localization economies (See Section 6.2 above) – is

expected to play a major role in the definition of a firm's competitiveness. In other words: geographical and industrial locations matter for a firm's performance.

A major issue in assessing a firm's competitiveness is the very definition of 'performance'. In fact, rather different results may be achieved if observing, for instance, short-run or long-run performance indicators, monetary (quantitative) or non-monetary (qualitative) performance indicators. In our study, we will provide estimates for three different empirical models, related to three different firm performance indicators. In the absence of proper firm-specific performance indicators, we resort on the firms' stated focus on three performance objectives, namely having the growth of profits or the growth of revenues as the main goal (Models 1 and 2), or the quality of the products brought to the market (Model 3).

The mixed-effects models being estimated, firm performance can, in general, be formulated as follows:

$$y_{ij} = \beta_{0ij} + \beta_1 x_{1ij} + \beta_2 x_{2ij} + \beta_3 x_{3j} + \dots + \beta_n x_{nj} \quad 1)$$

where Y is our measure of firm performance, the various x 's are vectors of firm-specific and group explanatory variables, and the β 's the parameters to be estimated. The multi-level structure is formalized by assuming that the first set of parameters obey the following law:

$$\beta_{0ij} = \beta_0 + u_{0j} + e_{0ij}, \quad 2)$$

where both u and e are vectors of *i.i.d.* disturbances, varying respectively at the group-level only, and the group and individual levels.

Finally, as anticipated in Section 6.2, in this paper we assume within-group variance to depend on the human and social capital of the region where the firm is located, on its level of urbanization, and on the industry the firm belongs to. The methods for measuring these contextual characteristics, along with the firm performance indicators and their determinants, are explained in Section 6.4.

6.4 The Data Set

In this Section, the data set assembled for estimating the empirical model presented in Section 6.3 is described.

Section 6.4.1, in particular, describes the methods for collecting the individual questionnaires administered to the firms; Section 6.4.2, instead, presents the methodologies used to calculate the indicators used in the subsequent empirical analyses, in order to measure

complex characteristics such as human and social capital, and the industrial characteristics of the interviewed firms.

6.4.1 Methods for data collection

Our empirical research aims to explore significant differences and relevant impacts of multi-level spatial capital resources on Dutch high-tech firms' performance (Section 6.3), broadly distinguishing between shorter- and longer-term strategic goal settings. This research extensive database for the multi-level model to be used consists of an original comprehensive spatial data set – micro-data on firms with meso-data on regional covariates – with various moderator variables in different NUTS3 regions (or COROP level) in the Netherlands. The georeferenced data about geographical and regional socio-economic indicators regarding, location characteristics, and meso-environmental factors (both municipal, with 467 municipalities, and regional, 40 Dutch regions) have been obtained mostly from Statistics Netherlands (CBS) for the year 2008.

We also obtained detailed micro-data on important business characteristics of a large set of individual firms in the high-tech sector in the Netherlands for the year 2008. Most observations are concentrated in highly urbanized areas of the Country (see Figure 2).

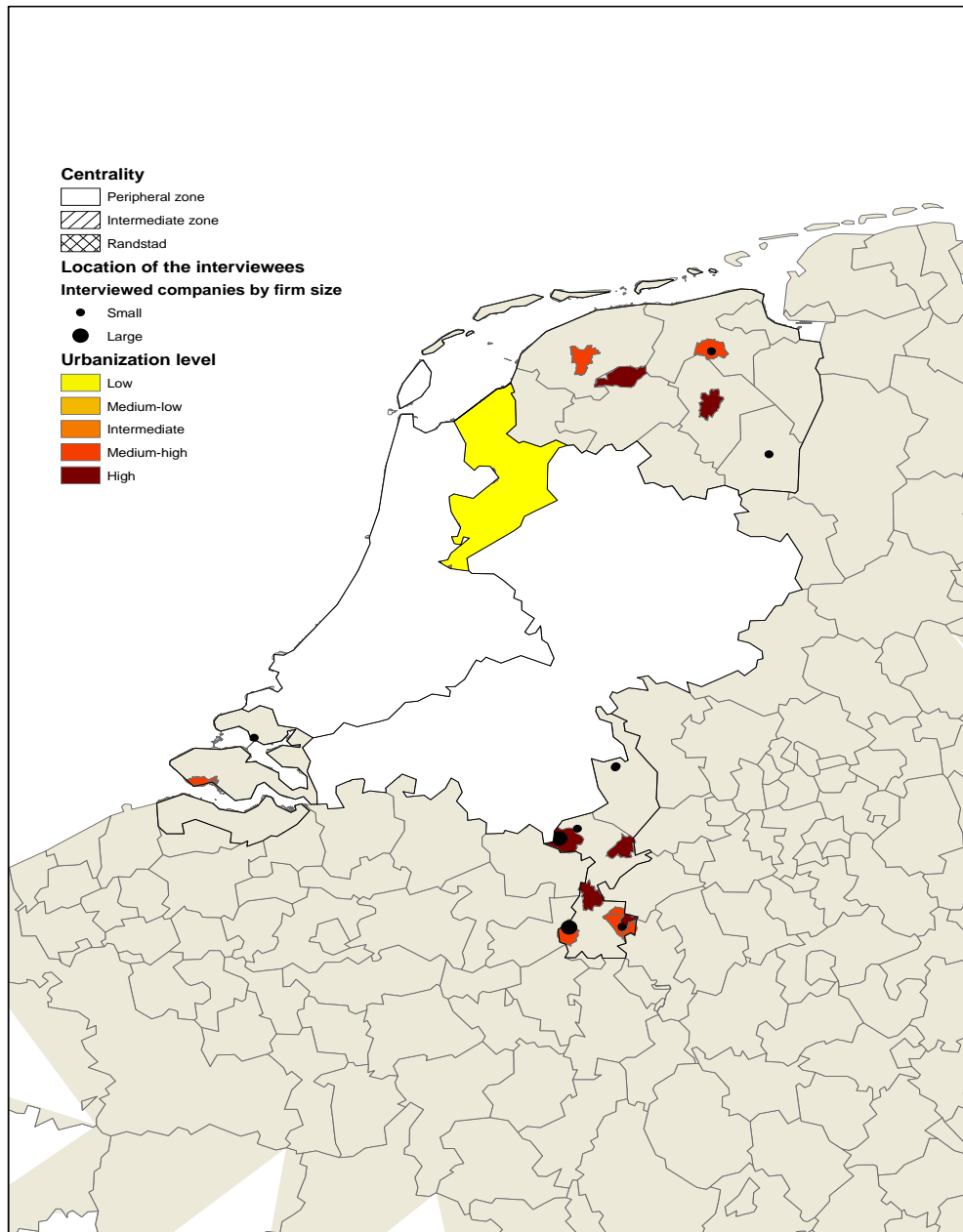


Figure 2. Spatial distribution of firms in the Netherlands

Source: Authors' elaboration

Detailed micro-based information was collected through extensive semi-structured interviews with firms' officials and executives in charge of the business strategy and economical decisions of the organization. The in-depth field survey was addressed to 61 prominent Dutch organizations, made up of 19 large firms and 42 SMEs, with an average of 4 key officers per firm from which both location and performance factors were collected. A self-

composed performance statements questionnaire – identified from the broad literature available, first tested at a company level and re-formulated – was used to obtain clear information from the firms on their critical performance success conditions and indicators that reflect business innovations in a competitive economic system (for details, see also Kourtit and Nijkamp, 2011; De Waal and Kourtit 2009, De Waal et al. 2009; Kourtit and Nijkamp 2013). Each representative had to give a rating on a 5-point Likert scale, varying from ‘1= not at all’ to ‘5 = very strong’ according to a long list of statements. The interviewees were also asked if they had experienced other important business and managerial conditions and benefits. Finally, a collection of information documents on their business characteristics was gathered, as well as motivational and driving forces that are demonstrating the decisive role for turning the firm into a high-performance firm.

Plant-level information was then obtained by aggregation of individual managers’ responses for each plant analyzed. Because both original micro- and macro-scale data formats consist of different geographical scales (separate and disaggregated), a GIS-oriented statistical analysis was used to aggregate these data for the target zone, the COROP-level (which contains 40 Dutch regions) in order to uncover a variety of information, and to identify geographically discriminating factors in the firms’ performance. Thus, it was also possible to offer a compact, systematic overview of the general micro and macro-scale data, as depicted in Figure 3.

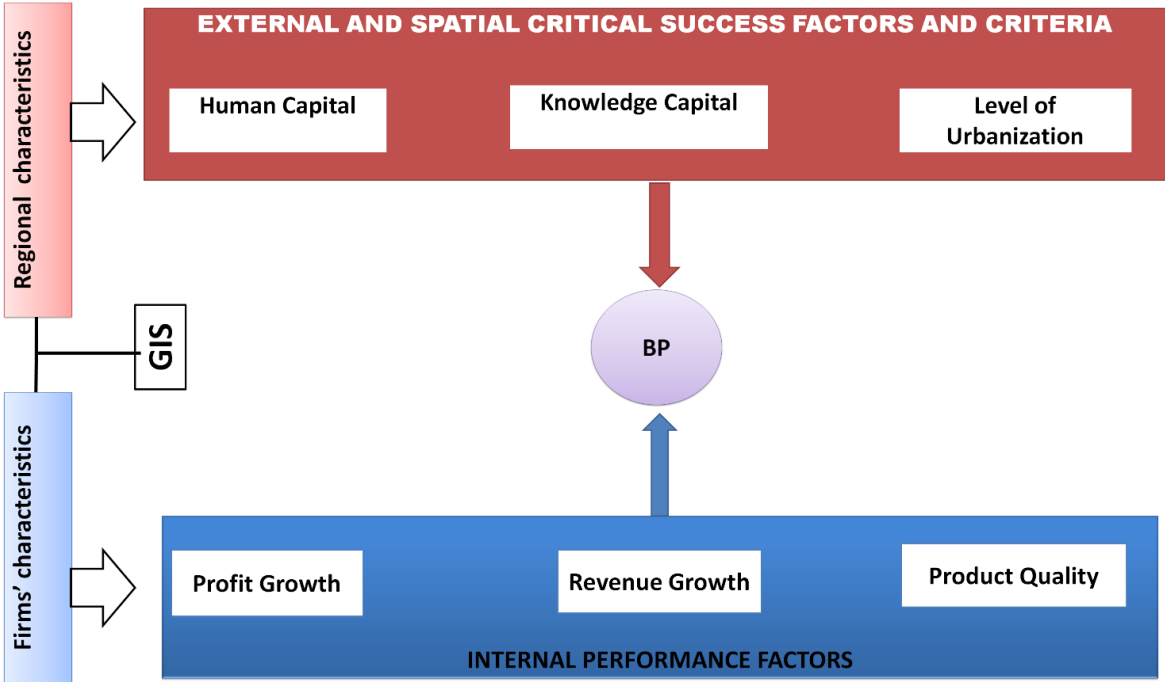


Figure 3. Structure of the systematic database for Dutch regions and high-tech firms
Source: Authors' elaboration

This conceptual information framework was inspired by the recently developed ‘*Flying Disc*’ multilevel model by Kourtit and Nijkamp (2013), and used in our conceptual framework (Figure 2) in order to extract significant relationships between firm performance and spatial capital resources and drivers, and to better understand the linkages between geographic and location business environments and the firms’ short-term and long-term strategic viable options and performance – and also to assess location decisions in line with their business strategy. More details can also be found in Kourtit et al. (2012). The results will be presented in Section 6.5.

6.4.2 Complex indicators

Given the multi-level structure of the data set, four complex indicators have been built, and collected in order to capture region-specific and industrial characteristics, namely, the region’s human capital, social capital, level of urbanization, and the industry in which each firm is active.

6.4.3 Human capital

Given the increasing complexity of the modern production system, a comprehensive measure of human capital cannot be summarized by the region’s average level of schooling. Therefore, in this paper we adopt the definition of human capital stated for the first time in Caragliu et al. (2012). This implies capturing four dimensions of human capital, viz. the average level of education of the region, the share of high-level professionals, the wealth of creative capital, and the urban knowledge capital. Table 1 shows the indicators used to measure each of the four components of human capital.

Table 1. Measures of human capital

Aspect of human capital	Indicator	Source of raw data
<i>Level of education</i>	Regional average years of schooling	European Values Study (EVS), 2008/2009 wave
<i>High-level professionals</i>	Share of workforce in medium-high and high-tech industries	Dutch Central Bureau of Statistic (CBS)
<i>Creative capital</i>	Principal Components Analysis on creative capital characteristics ¹⁷	Dutch Central Bureau of Statistic (CBS)
<i>Urban knowledge capital</i>	Number of Multinational Companies in the Fortune Top 500 list with Control Branches in the COROP region	ESPON Project FOCI

Source: Authors’ elaborations.

¹⁷ These include the yearly numbers per 1,000 inhabitants of:

- Visits to the region’s museums;
- Total book loans from public libraries;
- Visits to the region’s cafes;
- Total tourist inflows.

The first principal component obtained is associated to the only eigenvalue higher in modulus than 1 (this is equal to 3.26). The total share of variance in the data explained by thus vector is equal to 0.65. Details of the performed PCA are available upon request from the authors.

These indicators are then summarized by means of a Principal Components Analysis (PCA). The first vector, which represents our measure of human capital, explains 54 per cent of the total variance in the four vectors, and is associated with an eigenvalue equal to 2.14.

6.4.4 Social capital

Social capital has traditionally encountered difficult measurement issues. Given its multi-faceted nature, a complete list of definitions and corresponding indicators may require much more space than a single article. In order to follow a comprehensive definition, we resort to Putnam's work, which defines social capital as encompassing *norms*, *trust*, and *networks*. Besides, since investing in human capital is deemed to be associated with higher levels of social capital (Coleman, 1988), we also include a proxy for human capital investments in this measure.

Therefore, we have to look for a proxy for each of those axes, and next perform a PCA on the COROP region-varying measures described below in Table 2. The resulting first vector explains almost 40 per cent of the total variance in the data.¹⁸

Table 2. Measures of social capital

Aspects of social capital	Indicator	Source of raw data
<i>Norms</i>	Share of followers of the Dutch Reformed Church	Dutch Central Bureau of Statistic (CBS)
<i>Trust</i>	Percentage of citizens satisfied with life	Dutch Central Bureau of Statistic (CBS)
<i>Networks</i>	Share of citizens active at least on a monthly basis in voluntary associations	Dutch Central Bureau of Statistic (CBS)
<i>Investment in human capital</i>	Number of education institutions in the COROP region	Dutch Central Bureau of Statistic (CBS)

Source: Authors' elaborations.

6.4.5 Level of urbanization

In this case an indicator of the intensity of the COROP region's level of urbanization is made available by the Dutch Statistical Institute (CBS). Urban density is measured as reported in Table 3.

Table 3. Levels of urbanization (5 classes)

Intensity of urbanization	Value classes	Encoded as
Very strong	Average density of addresses of 2,500 or more per sq. kms.	5
Strong	Average density of addresses between 1,500 and 2,500 per sq. kms.	4
Intermediate	Average density of addresses between 1,000 and 1,500 per sq. kms.	3
Little	Average density of addresses between 500 and 1,000 per sq. kms.	2
None	Average density of addresses lower than 500 per sq. kms.	1

Source: CBS, "Stedelijkheid van een gebied".¹⁹ Authors' elaborations.

¹⁸ A remarkable level, given the highly orthogonal vectors included in the PCA.

¹⁹ Retrieved on Oct. 26, 2012 at the URL:

6.4.6 Industries

All firms in the data set (a total of 61) can be classified as high-tech. In fact, the few industries in traditional sectors (e.g. automotive, food processing, construction etc.) are active in high-technology market niches. The frequency of the firms in the interviewed sample per industry is shown in Figure 2.

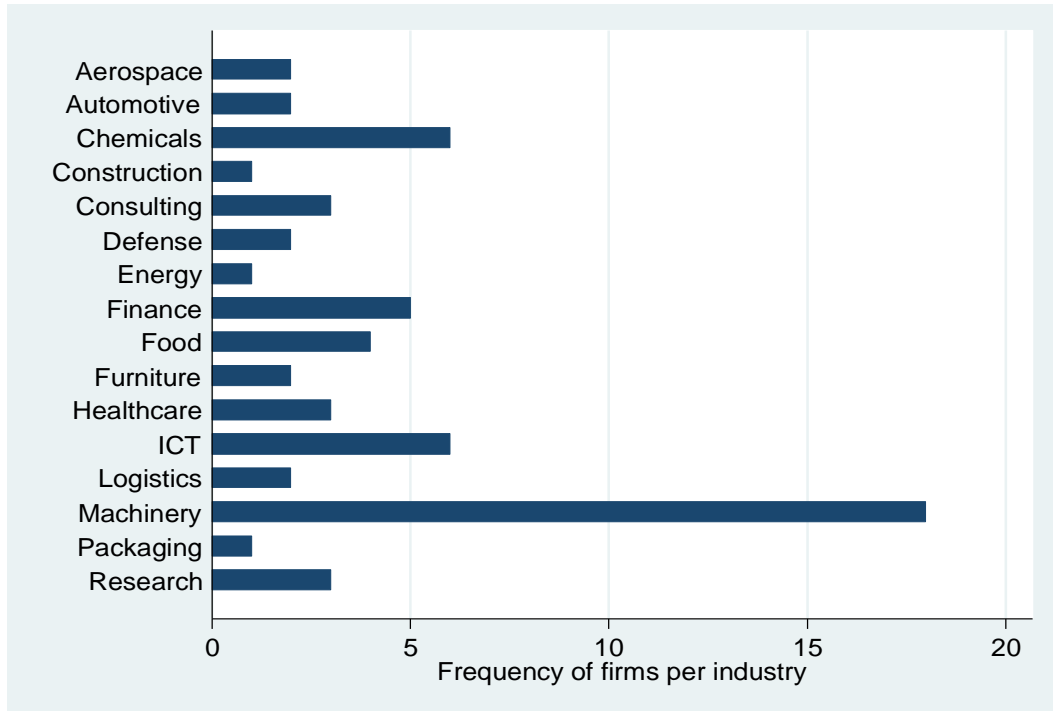


Figure 2. Frequency of the interviewed firms per industry

Source: Authors' calculations.

In order to further discriminate in terms of the firm's technological content, the 16 industries are clustered into 6 larger *meso* industries, which in turn collapse into two main classes, which we label as '*traditional high-tech*' and '*new high tech*'. New high-tech industries are those characterized by the highest intensity of innovativeness, and include ICTs, defense, chemicals, consulting, research, energy, and finance.

6.5 Estimation Results

6.5.1 Introduction

In this Section we propose a simple taxonomy of possible firms' objectives, broadly distinguishing between shorter- and longer-term goals. If the firm's owners and shareholders have a short-term perspective, profit maximization and growth may be identified as the primary objective. In this case, firm-level determinants include structural characteristics, such as firm size, with larger firms with a consolidated market share and status expected to be more focused on increasing profits; innovative activities and expenditures, with a higher focus on innovation conducive to the growth of firms; and a firm's attitude towards the external market environment, in particular associating the profit objective with a more proactive attitude.

A more medium-term objective is, instead, related to increasing revenues and sales and, ultimately, the market share. Important determinants are still innovativeness and proactivity, with the addition of a proxy for the internal institutional quality, in terms of a clear and understandable organizational structure. A medium-term objective revolving around the determination of the appropriate price level and quantity produced to increase sales, revenues and market shares will be facilitated inside a firm with a well-defined structure of control and command.

In a multi-level context, short-term objectives are also probably related to industry-specific factors, which suggest the use of the two-classes indicator described in Subsection 6.3.4. Having instead product quality as the primary objective suggests a longer-term perspective and requires the definition of a different model to understand the main determinants at the firm level. Increasing product quality requires that the internal organization of the firm is geared towards encouraging cooperation and coordination among the different actors and divisions; the existence, inside the firm, of a high quality monitoring system, which can ensure that all the appropriate steps are taken effectively; and the use of a reliable system of indicators of firm activity.

In a multi-level framework, human capital at the NUTS3 level is the relevant contour condition conducive to a quality objective. A more qualified workforce is able to understand and pursue this more complex objective; this is expected to be associated also with the presence in the region of more educated customers, which care more about quality aspects (if sales are space-specific) and in general to an external environment which stimulates and supports this kind of long term firm strategy (De Donder and Roemer, 2009).

The intensity of urbanization is also considered as a potential determinant of both short- and long-term objectives, as explained in the urbanization economies literature and briefly summarized in Section 6.2.²⁰

6.5.2 Profit growth

Table 4 shows estimation results for the analysis of determinants of the first firm objective we consider, namely profit growth. Aiming at increasing profits is usually identified as the primary objective of a firm's owner and shareholders, and is ultimately a growth objective (for classical references, see Baumol, 1962 and Williamson, 1966).²¹

We proceed, in the first four columns, by adding one variable at a time in the Poisson model, including a full set of industry dummies in each specification. The fifth column reports instead the results of the mixed effect multilevel model with all the independent variables.

Considering a firms' innovative activity, a higher focus on innovativeness and related activities at the firm level increases the probability of focusing on profit growth as an objective. The direction of causality is *a priori* unclear, as we expect more innovation to lead to higher profitability, which in turn might allow additional resources to be devoted to innovative expenditures. The positive and significant coefficient associated to the innovativeness variable is in line with previous literature which postulates that as increases in profits and innovation are positively correlated, and that the two effects, in a dynamic setting, are mutually reinforcing (Cainelli et al., 2006). This positive relationship appears particularly relevant in high-tech industries (Audretsch, 1995; Coad et al., 2008). The results in our sample confirm these expectations, since the coefficient associated with innovation is positive, highly significant, and remarkably stable across specifications (Columns a1-d1, Table 4).

²⁰ Although spatial heterogeneity and spatial dependence may potentially affect our data, they cannot be addressed with spatial econometric techniques because of an insufficient number of observations, which would invalidate any spatial statistical inference. Some degree of spatial autocorrelation can be nevertheless visualized on the maps shown on a contribution in this same line of research (see Kourtit et al., 2013).

²¹ Although as previously anticipated spatial processes may in principle characterize the firm objectives here analyzed, we do not observe any form of spatial autocorrelation in any of the three dependent variables in the tested models. Using both contiguity as well as distance matrices, and letting in the first case the threshold distance move over the minimum and maximum distance over which contiguity can be calculated for the observed data, we find no statistical significance associated to any standard Moran's I statistic.

Table 4. Results of empirical estimation on profit growth

<i>Dep. Variable</i>	<i>Profits growth</i>				
	a1	b1	c1	d1	e1
Type of estimator	Poisson	Poisson	Poisson	Poisson	Mixed effects
Constant term	1.18*** (0.00)	1.04*** (0.00)	0.50* (0.07)	0.65*** (0.02)	5.53*** (0.00)
Firm's innovativeness	0.12*** (0.00)	0.11*** (0.00)	0.13*** (0.00)	0.13*** (0.00)	0.65*** (0.00)
Firm's proactivity	-	-	0.11** (0.01)	0.12*** (0.00)	0.50** (0.01)
Firm size	-	-	0.34*** (0.00)	0.38*** (0.00)	2.18*** (0.00)
Level of urbanisation	-	-	-	-0.06 (0.11)	-0.34** (0.04)
Random effect in:					
High-tech industries	-	-	-	-	1.06*** (0.00)
High-social capital COROP regions	-	-	-	-	0 (1.00)
High-human capital COROP regions	-	-	-	-	0 (1.00)
Number of obs	61	61	61	61	61
Pseudo R2	0.07	0.07	0.09	0.09	0.33
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Robust standard errors	Yes	Yes	Yes	Yes	-

Standard errors are in parentheses. Statistical significance levels are labeled with ***, **, and *, referring to the 1, 5 and 10% level, respectively.

Adding a variable explicitly referring to firms' strategic management approach (firm's proactivity) allows a better understanding of targeting an increase in profits. A proactive market strategy, related to a firm's ability to actively discover and cater to the market's latent needs, by reacting to changes in consumers' preferences, ultimately leading to the uncovering of new market opportunities (Atuahene-Gima et al., 2005; Cox, 1996), is positively related to an increase in the probability of pursuing a profit growth objective. This result may be unveiling the implicit link between proactivity and increase in market share, thus compatible and positively associated with increase in profits.

Finally, larger firms, on average, are more likely to concentrate on profit expansion and growth. While the earlier literature on this subject has suggested that firm size should be unrelated to growth, more recent studies have instead highlighted the importance of the life cycle of the firm (Geroski, 1998) and have ultimately found support for the size-growth nexus (Pagano and Schivardi, 2003).

Since our data set includes large production plants, which typically belongs to large – often multinational – companies, a more densely urbanized location is found to be negatively associated with profit growth. This is fully in line with the agglomeration economies findings on the specialization of mature industries in less urbanized areas, vs. diversification of innovative sectors in denser agglomerations, summarized, among others, in Rosenthal and Strange (2004).

Finally, while no evidence is found on a differential role for social and human capital, strong evidence is instead found for the fact that *ceteris paribus*, a higher average profit growth characterizes firms active in high-tech industries. This effect is about 20 per cent as large as the overall average profit growth.

6.5.3 Revenue growth

In Table 5 we model the determinants of another firm objective, namely the growth of revenues. Along with the aim of increasing profits, a focus on increasing the stream of revenues is a typical short/medium-term firm objective, pursued, in particular, by management. We focus on its relation to internal innovative activities (firm's innovativeness), attitude toward the external market (firm's pro-activity) and an internal institutional factor, namely a proxy for organizational and bureaucratic complexity (the firm has imperfect knowledge of the structure organization).

Table 5. Results of empirical estimation on revenues growth

Dep. Variable Model	Profits growth				
	a2	b2	c2	d2	e2
Type of estimator	Poisson	Poisson	Poisson	Poisson	Mixed effects
Constant term	0.67*** (0.00)	0.73*** (0.00)	0.59*** (0.00)	0.77*** (0.00)	3.37*** (0.00)
Firm's innovativeness	0.16*** (0.00)	0.16*** (0.00)	0.13*** (0.00)	0.13*** (0.00)	0.55*** (0.00)
Firm has imperfect knowledge of the organisation structure	-	-0.02 (0.66)	-0.06 (0.19)	-0.06 (0.19)	-0.50** (0.01)
Firm's proactivity	-	-	0.12*** (0.00)	0.12*** (0.00)	0.34* (0.07)
Level of urbanisation	-	-	-	-0.05 (0.18)	0.11 (0.46)
Random effect in:					
High-tech industries	-	-	-	-	1.23*** (0.00)
High-social capital COROP regions	-	-	-	-	0 (1.00)
	-	-	-	-	0.01

High-human capital COROP regions					(0.99)
Number of obs	61	61	61	61	61
Pseudo R2	0.07	0.07	0.09	0.09	0.33
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Robust standard errors	Yes	Yes	Yes	Yes	-

Standard errors in parentheses. Statistical significance levels are labeled with ***, **, and *, referring to the 1, 5 and 10% level, respectively.

With respect to firm-level internal innovative activities, a higher focus on innovation is related to a higher probability of a revenue increasing objective, in line with results for profit growth (Table 1) and previous literature (Del Monte and Papagni, 2003; Corsino and Gabriele, 2011). The statistically significant positive coefficient is however, slightly decreasing, as additional determinants are added, from columns b2 to d2 in Table 2, suggesting that the importance of this factor is not the main determinant for revenue maximization. Firm's proactivity is also positively correlated with revenue growth, suggesting that a proactive market strategy is complementary to an increase in sales objective. A complicated and cumbersome internal firm structure, not fully understood by its members, appears instead to be an impedance factor to firm growth, although the coefficient becomes significant only in the multi-level mixed model specification (Column e2, Table 2).

Internal and external institutional factors have been recently considered in performance studies at the firm level, and have been shown to be an important determinant of a firm's success. Borghi et al. (2011) stress the importance of external, country level institutional quality and ownership structure, as an internal institutional factor, for firm level productivity in the electricity distribution sector. By considering the firm as an integration mechanism (Grant,1996), it is clear that a complex organizational structure, which hinders the ability of agents to communicate and coordinate effectively, will ultimately hamper the firm's ability to pursue a strategy of growth, in this case in terms of revenues.

In the case of revenues growth, no significant effect of the level of urbanization on firm performance is found. Instead, once again firms active in high-tech industries (previously defined as 'new high-tech') achieve on average higher levels of revenues, with a magnitude comparable to the overall estimated constant term.

In conclusion, firms appear to have strengthened their focus on what is important for the organization (consciousness of personnel) and on the achievement of organizational results (set-up priorities), a higher operational efficiency (flexible management to anticipate on changes) and a better achievement of organizational goals (constant focus on the question: what are we doing? clear organizational and individual performance indicators). Firms experienced the financial advantages frequently indirectly. The indirect increase in financial performance is mainly due to the non-financial advantages (e.g., better organizational structure, enhanced strategic intensive feedback and learning, smart objectives coupled with sustained improvement in decision-making, taking better 'GO-NO/GO' decisions, continuous focus on management structure and efficiency, direct communication lines, better process and costs orientation) and depends on various external factors (e.g., rapidly growing markets, increased competition, impacts of technology, shifts in customer expectations and economic growth).

Furthermore, human capital in the organization has become more pro-active, is more committed to the organization, and is more oriented towards processes which help achieve organizational results. The strengthened involvement and understanding of people of the strategy, coupled with the improvement in the quality, motivated employees, pro-activity, better steering on projects and more innovativeness, considerably facilitates the achievement of organizational goals. However, it could be argued that focus and result-orientation are higher on achieving organizational results than for large firms, because they have simpler organizational structures, fewer customers and are flexible and more adaptable to market and environmental changes.

Finally, firms have to clarify the management's responsibility and link authority and responsibility with improved accountability. The firms tends to experience an increase in revenue (approximately average 5 %) and a decrease in cost (approximately average 5 %), resulting in an increase in total profit. The decrease in costs is specifically caused by higher operational efficiency, better management of the organization, and more effective management control. The strengthened focus on what is important for the organization, coupled with the improvement in the decision-making, considerably facilitates the achievement of organizational goals.

6.5.4 Product quality

Moving on to a broader, longer term perspective, an important firm-level objective is related to increasing product quality. Manufacturing high-quality products, especially in high-tech industries, ensures the creation of a base of satisfied consumers, which helps build the

firm's reputation and ultimately helps increase sales and market shares through reputational and word of mouth mechanisms (Rogerson, 1983; Kirmani and Rao, 2000). Successfully investing in higher product quality involves specific organizational and internal strategies that may well differ from those aimed at achieving shorter term goals, such as profit and revenue maximization, discussed in Sections 6.5.1 and 6.5.2.

To this end, our empirical model for the determinants of product quality is different from the previous set-up, and includes different firm-level determinants (Columns a3-d3) and context conditions (Column e3, Table 3). A first facilitating factor geared towards quality improvements is related to the cooperativeness of the different compartments and actors inside the firm. The higher the degree of internal cooperation and coordination, the higher we expect the ability to invest in a long term product quality objective. Sethi (2000) convincingly documents how product quality is positively related to information integration of internal cross-functional teams, as this enhances a common understanding and consistency of decisions made by the team. This prior is confirmed by our analysis, as the coefficient associated with cooperation is positive and statistically significant in all specifications, although its importance is decreasing with the introduction of new determinants. A well-functioning and high quality monitoring system is also an important pre-requisite for successful product quality improvements, and should enhance the probability that firms with such a system in place may focus on this longer-term objective. This factor, however, appears only mildly related a quality objective in our sample, and is statistically significant, with the expected positive sign, only in one specification (Column b3). Once the existence of a sub-optimal performance indicator system is accounted for, the effect of a monitoring system loses significance. A poor performance indicators system might imply a misalignment between objectives and actual progress made, and is expected to be negatively associated with a quality objective. This is confirmed by our empirical results, but only in the multi-level modeling specification (Column e3).

The level of urbanization has once again no impact on product quality. What is interesting here is that instead the measure of group variance is found most significant, which is, unlike the short-term firm objectives commented in Sections 6.5.2 and 6.5.3, the level of human capital. Firms located in COROP regions with higher levels of human capital are found to be more likely to pursue long-term, rather than short-term, objectives, and target product quality as a firm goal. This relation is found to be strongly significant and is once again rather relevant also in terms of magnitude.

Table 6. Results of empirical estimation on product quality

<i>Dep. variable</i>	<i>Product quality</i>				
	a3	b3	c3	d3	e3
Model					
Type of estimator	Poisson	Poisson	Poisson	Poisson	Mixed effects
Constant term	0.69*** (0.17)	0.58*** (0.18)	0.74*** (0.20)	0.65*** (0.26)	5.60*** (0.00)
Firm actors are more cooperative	0.12*** (0.04)	0.07* (0.04)	0.08* (0.04)	0.09** (0.04)	0.38* (0.09)
Firm has a high-quality performance monitoring system	-	0.08* (0.04)	0.06 (0.04)	0.06 (0.04)	0.24 (0.34)
Firm has non-reliable internal performance indicators	-	-	-0.07 (0.05)	-0.07 (0.05)	-0.59** (0.02)
Level of urbanisation	-	-	-	0.02 (0.04)	0.25 (0.19)
Random effect in:					
High-tech industries	-	-	-	-	0 (1.00)
High-social capital COROP regions	-	-	-	-	0.53 (0.36)
High-human capital COROP regions	-	-	-	-	0.92*** (0.01)
Number of obs	61	61	61	61	61
Pseudo R2	0.02	0.02	0.03	0.03	0.11
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Robust standard errors	Yes	Yes	Yes	Yes	-

*Standard errors in parentheses. Statistical significance levels are labeled with ***, **, and *, referring to the 1, 5 and 10% level, respectively.*

Not all (important) organizational performances are determined and (well) measured, in particular the ‘soft’ performance indicators, and not all indicators are relevant for these firms. Clearly, the feedback of the results and measurement of various issues (hard and soft indicators) have to be clear, before an unambiguous statement can be made.

It is clear that firms have to pay too much attention to various drivers of business performance, if the information base does not contain sufficient strategic information to take a consistent and precise business direction and to consider what and how to improve. This situation gives apparently an unbalanced view of the total organization’s performance, with a focus on mainly a financial perspective. They do recognize the importance of non-financial measures of performance for both managing and evaluating their achievements, as financial figures alone did not identify the elements that may lead to good or poor future financial results.

This suggests that firms want to improve continuously the performance of the organization and to achieve sustainable success to become and stay world-class in everything they do through a particular approach or mentality. They need e.g. to be able to anticipate on

changing circumstances in its industry and to stay ahead of the extreme – often global - competition, to have the right information at the right time to make the best decisions and take the best actions for the benefit of the development of continuously and sustained organizational improvement and enhance quality of the organization, to know if strategic goals are going to be met and if it is able to satisfy the stakeholders of the organization and strengthen stronger accountability.

A higher organizational quality improves internal processes such as the communication process on the organization's strategy, the performance information supply process, and the strategic planning process. As a result, employees are more satisfied, while the quality of the products and services provided by the organization increase by contributing to a strengthened reputation of the firm as a quality organization.

Next, too much financial information does not give a balanced view of the organization's performance. It is also too voluminous, making it too expensive and bureaucratic. In addition, the system causes the wrong behaviour in people as peer pressure escalates in internal competition and mutual strive. Too much financial information due to a lack of standardization (taxonomy) of non-financial information, and the fact that there are many systems in organization.

Finally, information systems that contain too many performance indicators do not give strategic information. In addition, the performance information cannot be trusted as it tends to become unreliable. This basically renders the performance information meaningless. People cannot focus on too many data therefore they do not have a clear view (no priorities) and focus on the business. The art is to get tailor-made information that leads to a meaningful strategy orientation and better focus. In addition, the system causes the wrong behaviour in people as peer pressure escalates in internal competition and mutual strive. It is a disadvantageous effect of individual performance measurement that organizations may achieve, which causes islands of culture mainly due to miscommunication and poorly alignment between collective and individual KPIs.

6.6 Concluding Remarks

This study has made an evidence-based attempt to identify the drivers of the performance of firms in the high-tech sector in the Netherlands. On the basis of a unique and detailed database, a new multi-level model was constructed that encompassed various new forms of capital

resources, including urban and regional resources. This framework was used to empirically estimate the impact of both firm-intrinsic and context conditions on the firms' performance. The performance indicators used in our study were: profit growth, revenue growth and product quality. The empirical results offered a wealth of insights into the determinants of the firms' achievements.

Clearly, more empirical research would be needed to come up with generalizable results. On the one hand, the urban and regional context conditions would need further empirical investigation, such as physical infrastructure, digital accessibility etc. Another factor that would deserve more attention in future modelling experiments in the network configuration in which firms operate. And finally, it would be interesting to acquire more insights into the institutional support framework for high-tech business.

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7 CREATIVITY AND DIVERSITY: STRATEGIC PERFORMANCE MANAGEMENT OF HIGH-TECH SMES IN DUTCH URBAN AREAS ²²

Abstract

Strategic performance management (SPM) has become an important vehicle for business management in today's turbulent business environment. SPM has in recent years attracted much research interest from the side of both scientists and policy-makers. The question is however, whether the assumed broad coverage of SPM as described in the management and scientific literature has been experienced successful by organizations in practice? This paper examines advantages, disadvantages and reasons factors behind the implementation of SPM within organizations in practice, as predicted by the literature, in a structured survey and to give a better view of the direct relationship(s) between these factors that are decisive for the obtaining of consistent good results to improve organisational performance. The empirical study research was performed which identified four advantages, two disadvantages and two reasons factors as to be clear and important. The research also showed various relationships between these factors, which do not assume the existence of a general law from which outcome of each reason or advantage bring alone automatically particular advantages or disadvantages.

Keywords: Strategic performance management, organizational results, management control performance-orientation

²² Source:: Kourtit, K., and Nijkamp, P. (2011). Creativity and Diversity: Strategic Performance Management of High-Tech SMEs in Dutch Urban Areas. In: *Drivers of Innovation, Entrepreneurship and Regional Dynamics* (K. Kourtit, P. Nijkamp and Stough, R. eds.), Berlin: Springer-Verlag, 143-164.

7.1 The Role of High-Tech SMEs: Introduction

The world of business environments in modern economies and cities has changed dramatically the way of pursuing business (Spence 2004), and depends nowadays heavily on the performance in generating and utilizing new knowledge, imagination, creativity, innovations and technologies. This holds even more so in the high technology industry which is usually characterized by an extremely volatile, dynamic and uncertain business climate.

The trend in this high technology sector is that – next to the presence of large multinationals corporations – small and medium-sized enterprises (SMEs) emerge and grow continuously, thus increasing their employment, while large firms tend to decline in number (down-size and focus on their core business activities) and to cut their employment (Tether and Storey 1998). The decline in the manufacturing employment in large firms in the West corresponds with the industrialization of China and India and the relocation of many large firms to these and other nations which act as a magnet for manufacturing.

High-tech firms are the most active forces of the dynamics in SMEs. High-tech SMEs are creating and implementing technological innovations (a major source of developing the high-tech industry) and represent a powerful medium for the creation of new jobs and wealth for society as suggested often in the literature (Lee et al. 2004; McGranahan and Timothy 2007). Policy makers increasingly view high-tech SMEs as key contributors to industrial creativity and innovation performance, technological change, social development and (building and sustaining) economic growth and progress (Jones-Evans and Klofsten 2005; Bommer and Jalajas 2002).

The increasingly vital role of high-tech SMEs in creativity and innovation – in both regional and national economic growth and social development and global competitiveness – has been widely acknowledged in the economic and entrepreneurship literature (Berry and Taggart 1998; 2007; Cooper and Park 2008). High-tech SMEs are designed to be flexible and innovative and are often built around a successful innovative product (Trumbach et al. 2006). However, the death rate of high-tech SMEs is higher than that of large enterprises due to capital scarcity and their small scale. They operate and compete in continually changing business environment where innovation is continuous (Torraco and Swanson 1995) and the competition is often so intense that there is no breathing space for relaxation and strategy development (Sureshchandar and Leisten 2005).

The above sketched uncertainty, whether in terms of competition, technology advancements or business culture (Sureshchandar and Leisten 2005) warrants the design of a

valid and tailor-made model for these firms that shows how they are performing and that offers the means to improve their creative and innovative performance and to support (control and manage) them better in the challenging business environment. This, in order to enhance their performance by remaining viable and to realize sustainable competitive advantages associated with their human capital.

The growing importance of external and environmental changes puts much emphasis on entrepreneurship (information and knowledge-based activities) and has further intensified and supported the need for efficient and effective management techniques which encourage businesses to stay competitive and profitable (Zeng and Zhao 2005).

Currently the most popular management technique in business practice is Strategic Performance Management (SPM) (Davis and Albright 2004). There is no universally valid definition of SPM, however. Cummings and Worley (2005) define SPM as an “integrated process of defining, assessing, and reinforcing employee work, behaviours and outcomes”. In this respect, 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).

Following this definition, the SPM concept offers opportunities not only for managing human capital, but also for acquiring a sustainable competitive advantage through providing an environment that fosters entrepreneurship. SPM is often seen as a sine qua non for executing an effective business strategy (Mohrman and Mohrman 1995), and offers aids and knowledge to evaluate and monitor how a business performs, provides reliable and robust steering measures at both the management level and at the workforce level that are in tune with the manifold circumstances of firms.

Against this background, the first aim of the present paper is to review the current state-of-art knowledge on SPM, with a particular view to the high-tech SME sector. To that end, a systematic framework will be offered to position various contributions from the recent literature and to create a frame of reference for the comparative studies that follow later in this paper. Next, the empirical part consists of amuse of findings from a previously undertaken study on corporate firms, followed by the successes and failures of SPM strategies of high-tech SMEs.

The paper will be concluded with an outline of the future research question: “do the SPM use and outcomes depend on business geographic clustering?” This research examines the

relation between business performance and location choice factors that high-tech enterprises concern in the choice of location.

7.2 Strategic Performance Management

SPM has become a critical and an increasingly important approach for business management which not only reflects the growing complexity in today's unpredictable, open, diverse and dynamic business world, but also monitors the firm's strategic response to this complexity. Today's turbulent business environment demands regular adaptation of organizational strategies based on market and economic conditions. And therefore, it is important to understand and recognize that firm's strategic objectives can change constantly and to anticipate changing circumstances throughout the organization, from top-level further to operational level. This also demands more clarity of people about their role and contribution (transparency in the added value is of the employees) towards the achievement of the strategy and organizational goals and a better strategic alignment of individual objectives to organizational objectives (better operationalization of the strategy through further cascading of SPM) to improve the performance of the firm and to ensure a sustainable competitive advantage in regards to its chosen organizational strategies, in a dynamic environment.

The development of today's business and managerial strategies have been influenced by Sun Tzu's "Art of War" (1910) to understand the importance of competition, competitive advantages and positioning in strategy to make the correct decisions and to create innovations in the competitive business environment to ensure financial viability. The findings in the book, which have influenced government and military policy, illustrated and recommended a (military) strategic method "How to achieve a mission" without conflict, an approach which had already become favourite in the Napoleonic time. To link the company's long-term strategy to the day-to-day operations in modern business, an operational Performance Measurement System (PMS) has to be designed (Kald and Nilsson 2000). PMS may be defined as: "the formal, information-based routines, procedures and process of collecting and tracking data used in Performance Management by managers to maintain or alter pattern in organizational activities" (adapted from Simons 2000; de Waal 2002).

There are numerous, operational methods for PMS, which can be used by management to regularly assess the performance of the firm e.g., shareholder value, human resource accounting, activity-based costing, knowledge management scorecards. The currently most popular PMS method in business practice is the Balanced Scorecard (BSC), created by Kaplan

and Norton (1992, 1996a, 2001a, 2001b). It is a strategic management system that uses Critical Success Factors (CSFs) and Key Performance Indicators (KPIs) for translating an organization's mission and strategy into a balanced set of integrated performance measures (Ho and Chan 2002; Brignall 2002). The performance measures provide a complete picture of an organization's progress towards its mission and goals (Ho and McKay 2002).

The BSC contains a varied set of performance measures, a combination of non-financial measures (leading indicators) and financial measures (lagging indicators), organized according to four distinct perspectives, namely financial performance, customer relations, internal business processes, and the organization's learning, innovation and growth activities (Kaplan and Norton 1992; Lipe and Salterio 2000). The BSC essentially follows a linear one-way approach (Kaplan and Norton 1992); it assumes the following causal relationship: it starts with the learning, innovation and growth perspective and culminates in financial results or outcomes (Brignall 2002). But this research does not only concentrate on the measurement tool BSC, but on all types of measurements tools, and therefore, the more general term SPM is used in this type of research.

The effectiveness of the SPM process is defined as the achievement of financial as well as non-financial targets, the development of skills and competencies, and the improvement of customer care and process quality (de Waal 2007). In order to get the right approach, firms need to start thinking in terms of strategy and business activities instead of IT systems. They need to get straight into the necessary detail to describe what they are doing (their market position), what they want to do and how they want to achieve it (a top-down framework). The starting point of the process of SPM begins with:

1. *Reviewing the mission and strategy*

Firms have to establish a mission and determine a strategy, they need to ask: "what do we want to do and accomplish" and "how can we achieve that mission?"

2. *Formulating strategic objectives*

In order to make a firm's strategy concrete and tangible, strategic objectives need to be formulated, so that it becomes clear which activities have to be undertaken in order to implement the organization's strategy.

3. *Monitoring with critical success factors (CSFs) and key performance indicators (KPIs)*

Finally, whether or not objectives and value creation are being achieved (guide and improve all the business functions within the firm) can be monitored with the help of indicators that are

expressed in the form of critical success factors (CSFs) (which factors define their success), and measured by key performance indicators (KPIs). Thus, firms need to ask: “What is the measurement for the objective?” and “how can this objective be measured?” The use of CSFs and KPIs enables the measurement, and thus the control of strategic objectives and value creation of a firm. Figure 1 gives an illustration of the development of these measures.

SPM involves performance measurement at the following levels: mission, strategies, objectives, critical success factors and finally key performance indicators and to establish a clear link between performance and strategy. Thus, firms need a starting point of access to view, monitor and measure their performance, which in turn can improve performance at all levels of a firm; firms and their agents need to

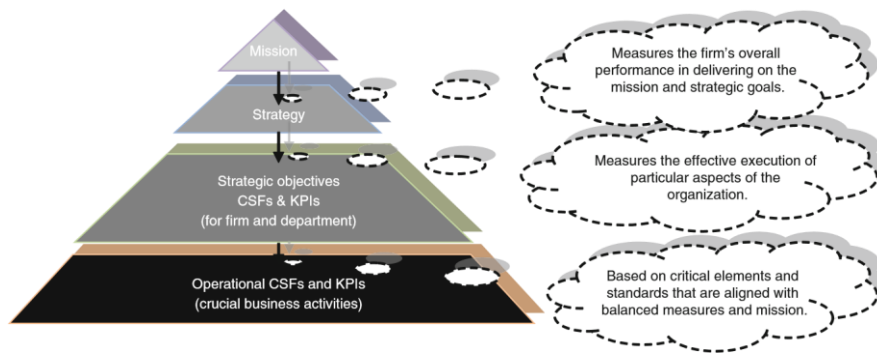


Figure 1. The development of CSFs and KPIs illustration (see also Kaplan and Norton 1996b)

know and understand the strategy and their role and contribution in it. Thus, it is more a process that starts with understanding where the organization is today (positioning), which direction it wants to take, what targets should be set, and how resources should be allocated to achieve those targets. Furthermore, it helps firms to continuously anticipate changing circumstances within their industry and build a flexible capacity for continuous adaptation of their firm. As Sun Tzu said: “All men can see the tactics whereby I conquer, but what none can see is the strategy out of which victory is evolved”. We will now address the link between SPM and the development and performance of SMEs.

7.3 High-Tech SMEs and SPM

There is no commonly accepted definition of high-tech SMEs, regardless of the overall recognition of their important contribution to (regional) economic growth. For the selection of these firms or sectors within the industry, our study draws on the broad conceptual approach of

the Commission of the European Communities (2003). Table 1 below outlines the key aspects of the definition as recommended by the European Commission; which are those enterprises with fewer than 250–300 employed persons.

These high technology enterprises operate in an extremely volatile, dynamic and uncertain business climate with continually changing technologies, markets, and business strategies, and shifting consumer needs for products and services (fundamental transformations). They are engaging in development, manufacturing, and distribution of high-tech products, technology transfer and consultation. The Dutch SMEs include 14,500 technology firms, concentrated in high-tech sectors, as well as in the machine and devices industry, the chemical industry, the food and nutrition industry, the engineering and architecture branch and the ICT-branch (CBS 2011). They are frequent users of the creative and innovation policy with a particularly high degree of professional specificity to generate significant new value for the stakeholders and their firm, both economically and morally.

Table 1. Number of employees and financial thresholds determining the categories of enterprise

Enterprise category	Headcount	Annual turnover	Annual balance sheet total
Medium-sized	<250–300	€ 50 million	€ 43 million
Small	<50	€ 10 million	€ 10 million
Micro	<10	€ 2 million	€ 2 million

Source: Commission of the European Communities (2003)

Creativity is changing the way the world does business; it is becoming an increasingly important input into the production process of all goods and services – and therefore also critical for a business’s long-term viability over the years – and an essential part of the economy (Glaeser 2005). Creativity and development are the key elements of innovation and are improving competitiveness, particularly high-tech SMEs, in a rapidly changing global economy. They are challenged to continually innovate and improve – continual process of improvement – the quality of their already existing products and services, and methods and techniques to stay ahead of the heavy – often global – competition in which the combined pressures of economic liberalization, technological change and shifts in regulatory systems lead to a complex action space and create a changing and challenging business environment.

High-tech SMEs have to embrace innovation in their business strategies; their strategic goals have to be growth oriented and to search for new (long- and short-term) opportunities or even create new products and services or business models that change their strategies and generate significant new value for the stakeholders and the firm (strategic innovation). They need to do things differently by using performance management strategies for executing their business strategies (Mohrman and Mohrman 1995), which not only affects the current organizational performance, but also their future performance and (strategic) directions (Millett 1998; de Haas and Kleingeld 1999; Norreklit 2000); and bring people together, aiming to achieve more teamwork. Innovation is a “magic word”, in particular when it becomes a part of management and when it is managed further to an operational level, because fast (integration of) innovation (operationalizing) in the entire organization increases through a structural approach e.g. with high interaction with different actors, collective goals and creativity which increases also the employees’ involvement by triggering discussions and calling attention of organizational members.

The SPM concept is not new and has only been acknowledged more recently, because of the changing business environments. Firms are now also recognizing the importance of non-financial information which can be related to the strategic indicators, such as customer and employees satisfaction, research and development, changes in external environment of the corporate organization, manufacturing and production, sales and marketing. The traditional approach focused mainly on financial results (e.g., sales, turnover, profit, costs) and lacked match between the company’s competences and its dynamic business environment; there was no strategic alignment, and management had a short-term vision overwhelmed with data (Kald and Nilsson 2000; Bourne et al. 2003; Kanji 2005). These shortcomings enticed organizations to search for performance measurement systems that supported them better in the challenging business environment (Waal and Counet 2006). As a result, the traditional financial indicators (past performance) were complemented with “non-traditional soft indicators” – the drivers of future performance – about e.g. customer and employees satisfaction, innovation and growth for translating a firm’s mission and strategy into a balanced and comprehensive set of integrated performance measures (Brignall 2002; Ho and Chan 2002) “blending traditional and nontraditional approaches to business strategy” (Fernandes et al. 2006), e.g. a balance between short- and long-term objectives, between financial and non-financial measures, between leading and lagging indicators, and between internal and external performance perspectives (Fernandes et al. 2006). The BSC has become one of the first SPM methods that really succeeds in

translating mission and strategy into financial (lagging indicators) and non-financial indicators (leading indicators) that can lead to action (Waal and Counet 2006).

Nowadays SPM has become “paramount” to the overall success of organizations in the today’s business environment (innovative strategic business practice). SPM offers opportunities to encourage entrepreneurial spirit and competition in the longer term, creativity and development; to contribute to the growth and progression of knowledge needs; to attract and maintain competent human capital (qualified and technological workers), and to achieve superior financial performance (survival and growth strategies). Both the popular and scientific literature (Berry et al. 1995; Kaplan and Norton 1996b; Chow et al. 1998; Zairi and Jarrar 2000; Niven 2002; Andersen et al. 2006) indicates a broad coverage of SPM e.g. to perform health checks throughout the organization; to clarify and translate vision into operational strategy; to clarify the objectives of the organization; to facilitate the setting of targets for the organisation and its managers; to understand the processes within the organisation; to communicate and link strategic objectives and business measures; to enhance strategic feedback and learning; to use performance levels to conduct detailed operational planning of activities and processes; to establish an early warning system through monitoring of key indicators; to influence and alter employee behavior to promote desired changes, and to promote the accountability of the organization to its stakeholders.

It is estimated that around 60–70% of medium-to-large sized for-profit firms in the US and Europe – as well as many governmental departments – have adopted (with varying degree of adaptation rates) – or are familiar with – the SPM concept (Silk 1998; Rigby 2001; Neely et al. 2004; Marr et al. 2004). SPM is mainly adopted by large organizations (Fernandes et al. 2006). Translating SPM into SMEs requires light to be shed on the following questions:

1. To what extent have firms practiced SPM?
2. What are the implications of SPM use:
 - (a) Advantages
 - (b) Disadvantages
 - (c) Reasons for implementation?
3. How do the reasons for SPM influence advantages and disadvantages?

Various literature, case studies and practical experience (Hronec 1993; Lynch and Cross 1995; McDonald and Smith 1995; Lingle and Schiemann 1996, 1999; Kaplan and Norton 1996b; Atkinson et al. 1997; Armstrong and Baron 1998; Waal 2001; Lawson et al. 2003) show

that companies that have implemented SPM perform better, financially as well as non-financially, than companies that are less SPM-driven over a longer period of time. Nonetheless, many of these studies of SPM's positive impact on performance is anecdotal (Neely et al. 2004) and stems from case studies that are less based upon a rigorous, systematic, scientific analysis of empirical facts or solid business management theory, and focus on research in large firms in general, and are very limited within high-tech SMEs. This is mainly due to:

- The gap in the literature of the perception and knowledge of high-tech SMEs regarding SPM
- The understanding and application of SPM concepts by high-tech SMEs is often unknown e.g. no linking to business strategy, unstructured assessments, inconsistent measures throughout the firm
- These firms tend to focus only on the core business (purely technological side of their business) and neglect other key strategic issues.

Furthermore, despite recent empirical research, little is actually known about the specific reasons why high-tech SMEs (or normal organizations) have implemented SPM (Robinson 2004), because specific reasons for using SPM can yield automatically particular advantages (positive relationship) and disadvantages (negative relationship).

Because SPM has attracted much research interest in recent years from both the academic and business communities, it is essential to know whether the implementation of SPM in high-tech SMEs will yield particular advantages and disadvantages, as predicted by the literature (Dumond 1994; Groves and Valsamakis 1998; Haas and Kleingeld 1999; Lovell et al. 2002; Hoque and James 2000; Kald and Nilsson 2000; Norreklit 2000; Malina and Selto 2001; Shulver and Antarkar 2001; Sim and Koh 2001; Hoque 2003; Braam and Nijssen 2004; Davis and Albright 2004; Papalexandris et al. 2004; Robinson 2004; Scheipers et al. 2004; Lawson et al. 2005; Tapinos et al. 2005). To provide answers to these three questions it is necessary to undertake empirical research. The research methods adopted in this paper include:

- (a) Analysis of the literature
- (b) Structured interviews
- (c) Common Factor Analysis (1st-stage: identify the main components: advantages, disadvantages and reasons for use)
- (d) Multivariate Analysis (2nd-stage: identify the various relations between the factors).

This paper has nine sections. Section 7.3 examines the advantages, disadvantages and reasons for SPM use, as identified in the literature. These are reviewed, summarized and then tested on 43 high-tech SMEs in Netherlands. Additional testing using common factor analysis and multiple regression analysis is presented in Sects. 7.6–7.8. Finally, the last section provides a summary and discusses the limitations of our research.

7.4 High-Tech SMEs and SPM

Analysis of Key Literature An analysis of key literature focusing on advantages, disadvantages and reasons for use SPM in practice was undertaken. This involved a review of a wide range of measurements tools relevant to the application of SPM. The analysis identified 3 financial advantages, 22 non-financial advantages, 8 non-financial disadvantages associated with SMP and 41 reasons for using SPM. The financial and non-financial advantages indicators refer to People (P), Results (R), Information (I) and Organization (O), the disadvantages indicators refer to Systems (S) and Information (I), and the reasons for use SPM indicators refer to Control (C) and Strategy (S). These indicators are summarized in Table 2.

Table 2. Listing of SPM advantages, disadvantages and reasons for use, as identified from the literature

Quantitative advantages	Indicators refer to	Literature source
Increase in revenue	R = Result	Malina and Seltto (2001), Sim and Koh (2001), Davis and Albright (2002), de Waal (2002), Said et al. (2003), Braam and Nijssen (2004), Davis and Albright (2004), Neely et al. (2004) and Robinson (2004)
Increase in profit		Epstein et al. (2000), Davis and Albright (2002), de Waal (2002), Said et al. (2003), Braam and Nijssen (2004), Davis and Albright (2004), Neely et al. (2004) and Robinson (2004)
Reduction in costs		Sim and Koh (2001) and Neely et al. (2004)
Qualitative advantages	Indicators refer to	Literature source
More focus on the achievement of results	R = Result	Dumond (1994), Bititci et al. (2004), Lawrie et al. (2004), Neely et al. (2004) and Self (2004)
Higher innovativeness		Sim and Koh (2001), de Waal (2002) and Self (2004)
Better achievement of organisational goals		de Waal (2002), Hatch (2005) and Tapinos et al. (2005)
Higher quality of products and services		de Waal (2002) and Brown (2004)
Closer collaboration and better knowledge sharing and information exchange between organisational units	O = Organization	Mooraj et al. (1999), Kald and Nilsson (2000), Neely et al. (2004), Lawrie et al. (2004), Papalexandris et al. (2004) and Robinson (2004)
Strengthened focus on what is important for the organization		Mooraj et al. (1999), Kald and Nilsson (2000), Baraldi and Monolo (2004), Neely et al. (2004) and Self (2004)

Better strategic alignment of organisational units		Malina and Selto (2001), Shulver and Antarkar (2001), Lovell et al. (2002), Neely et al. (2004), Lawson et al. (2005)
Higher operational efficiency		de Waal (2002), Neely et al. (2004) and Robinson (2004)
Improvement in the decisionmaking process		Dumond (1994), Mooraj et al. (1999) and Kald and Nilsson (2000)
More effective management control		Malina and Selto 2001 and Neely et al. (2004)
Stronger process orientation		Shulver and Antarkar (2001) and Neely et al. (2004)
Strengthened reputation of the organisation as a quality firm		de Waal (2002) and Self (2004)
Better strategic planning process		Lovell et al. (2002) and Tapinos et al. (2005)
Improvement in communication in the organization on the strategy	I = Information	Lovell et al. (2002), Baraldi and Monolo (2004), Heras (2004), Neely et al. (2004), Papalexandris et al. (2004), Robinson (2004) and Lawson et al. (2004)
Higher quality of performance information		Lawson et al. (2004), Neely et al. (2004), Robinson (2004), IOMA. Business Intelligence at Work (2005) and Tapinos et al. (2005)
Better understanding of organizational units of the strategy		Lovell et al. (2002), Heras (2004) and Neely et al. (2004)
More clarity of people about their contribution towards achievement of the strategy and organizational goals		Lawson et al. (2004), Neely et al. (2004) and Papalexandris et al. (2004)
Improvement of management quality	P = People	Malina and Selto (2001), de Waal (2002) and Neely et al. (2004)
Higher commitment of organizational members to the organization		Malina and Selto (2001), Neely et al. (2004) and Bititci et al. (2004)
More pro-activity of organizational units		Neely et al. (2004), Hatch (2005), Tapinos et al. (2005)
More clarity for organizational units about their roles and goals to be achieved		Lawson et al. (2004) and Neely et al. (2004)
Higher employee satisfaction		Sim and Koh (2001) and Papalexandris et al. (2004)

Qualitative disadvantages	Indicators refer to	Literature source
It causes too much internal competition		Kald and Nilsson 2000 and Papalexandris et al. (2004)
There is too much financial information		Kald and Nilsson 2000 and IOMA, Business Intelligence at Work (2005)
It is too expensive and too bureaucratic	S = System	Braam and Nijssen (2004) and IOMA, Business Intelligence at Work (2005)
There are too many performance indicators		Dumond (1994), Kald and Nilsson (2000), Self (2004) and IOMA, Business Intelligence at Work (2005)
The performance information is too aggregated	I = Information	Kald and Nilsson (2000) and Neely et al. (2004)
There is not enough strategic information in the system		Kald and Nilsson (2000) and Sim and Koh (2001)

The performance indicators are too subjective and therefore unreliable		Kald and Nilsson (2000) and Malina and Selto (2001)
There is too much historical information		Kald and Nilsson (2000), IOMA, Business Intelligence at Work (2005)
Reason for use More accurate measurement of performance	C = Control	Robinson (2004)
Stronger accountability		Robinson (2004)
Need for a broader set of measures of performance		Robinson (2004)
Stronger individual accountability of employees		Robinson (2004)
Handling the increase in complexity of the organization		Tapinos et al. (2005)
Improve the performance of the organization		Lawson et al. (2004)
Obtain a better understandings of knowledge and skills of people		Lawson et al. (2004)
Better control and with that a better "obedience" of people		Lawson et al. (2004)
Tracking progress towards achievement of organizational goals		Lawson et al. (2004)
Being able to measure people, projects and strategy		Lawson et al. (2004)
Being able to measure performance at various organizational levels		Lawson et al. (2004)
Need to correlate measures and actions better		Lawson et al. (2004)
Linking rewards to performance		Lawson et al. (2004)
Enforcing and monitoring regulatory compliance		Lawson et al. (2004)
Expectation of the stock market		Lawson et al. (2004)
Requirement of governmental regulations		Lawson et al. (2004)
Providing a better picture of customer and product profitability		Lawson et al. (2004)
Making responsibility accounting possible		Lawson et al. (2004)
Facilitate comparison with other, similar business units		Lawson et al. (2004)
Determination of the bonus of management and/or staff		Lawson et al. (2004)
Monitor whether the business is creating value for shareholders	Lawson et al. (2004)	
More focus on the strategy Better facilitation of crossfunctional understanding	S = Strategy	Robinson (2004) Robinson (2004)
Better goal setting		Robinson (2004)
Formalization of the strategic planning process		Robinson (2004)
Stronger commitment of top management		Robinson (2004)
Higher commitment to the strategy		Neely et al. (2004)
Better description of mission, strategy and goals		Neely et al. (2004)
Aligning employee behaviour with strategic objectives		Lawson et al. (2004)
Better communication of strategy to everyone in the organization		Lawson et al. (2004)

Aligning the organization to the strategy		Lawson et al. (2004)
Translating the strategy into operational terms		Lawson et al. (2004)
Need to make strategy everyone's job		Lawson et al. (2004)
Requirement of a business opportunity		Lawson et al. (2004)
Decision support at top management level		Lawson et al. (2004)
Decision support at operational level		Lawson et al. (2004)
Identify possible needs for changes in strategy		Lawson et al. (2004)
Facilitate implementation of business strategy		Lawson et al. (2004)
Provide information for external reporting		Lawson et al. (2004)
Enhance quality of the organization		Lawson et al. (2004)
Facilitate a process orientation		Lawson et al. (2004)

An analysis of these findings from the literature indicates that profit and non-profit organizations using SPM achieved better organizational results (significant increase in both financial and non-financial terms) than those organizations that are less SPM-driven. Organizations achieved for instance a significant increase in revenue and profit and succeeded in establishing a continuous forum for strategic communication. However, the implementation of SPM varies widely from organization to organization, but has a common feature, namely a focus on KPIs. The introduction of SPM and new style of fashionable management technique that came with it resulted not only into enhanced strategic awareness among the top and middle management but also into a significant shift in “governance policy” at board level. The creative thinking required to understand the need for change sharpened the vision for the future of the organization and the way it intended to fulfil its mission.

The development of corporate and department SPM made it possible to achieve quantifiable and qualitative breakthrough results. In general, the changes and increases in scorecards outcomes and financial performance have encouraged organizations to continue using SPM. However, various studies emphasised that the insignificant impact of SPM in the areas detected is not only a result of the inadequacies of SPM but also of those implementing it. Thus, it is understood that the factors that determine the success of SPM initiatives require commitment, effort and resource allocation at all organizational levels. A further conclusion from various sources is that the increase of complexity either expressed with the organizational size or with environmental turbulence increases the need for information, which can be provided by making effective utilisation of SPM. Further, the literature highlights the fact that there is relatively little evidence into performance impact of SPM and whether the SPM actually works.

Therefore, it still requires an empirical investigation of more organizations that implemented SPM into a longer timescale over which this performance impact can be observed, because this would allow for a more detailed analysis. Finally, based on this literature SPM tools in general helped organizations to communicate the strategy of the business to the managers and their subordinates and determine what impact a potential change will have on the rest of the organization.

7.5 Research Approach: A Prior SPM Study

Recently, a major study on SPM among major business firms in the Netherlands was carried out (Kourtit 2007). This prior study provides now the basis for crafting a conceptual framework, which can be used for further research on experiences of advantages, disadvantages and reasons for use in high-tech SMEs. The same quantitative and qualitative methodological approach is undertaken for the present study in order to address the experiences of SPM in high-tech SMEs active in the three enterprise category (see Table 1) operating in the Netherlands, which are familiar with the firm's SPM and performance.

In the present study, a total of 52 members of a top management team - managers, CEOs and company owners – of 43 SMEs that had implemented SPM and a total of 15 members of a top management team – managers, CEOs and/or company owners – of 15 high-tech SMEs that were not using SPM at all, selected from the high technology industries, participated in the research. The main research instrument was a self-established survey questionnaire based on the previous research and in-depth interviews.

Our sample comprised a new set of high-tech SMEs that were recently approached. Based on the answers to the interview questions, a comparison can now be made in terms of the performance of firms using SPM for a period of less than or more than 1 year.

Table 3 lists the average scores for the financial and non-financial advantages, disadvantages and reasons for implementing SPM, on a scale of 1 (not at all) to 5 (very strong) of high-tech SMEs – both with and without SPM – which are active in the enterprise categorization from Table 2. The higher the score in Table 3, the stronger the firms experienced the (dis)benefits and more important the reasons for implementing SPM are to steer the business firms into long lasting success.

Table 3. Average score of advantages, disadvantages and reasons for use with (out) SPM

Average scores per experienced SPM variable								
Business firms	Financial advantages		Non-financial advantages		Disadvantages		Reasons for use	
	Average scores (m)	Standard deviation (s)	Average scores (m)	Standard deviation (s)	Average scores (m)	Standard deviation (s)	Average scores (m)	Standard deviation (s)
SMEs with SPM	3.56	0.8	3.49	0.7	1.72	0.6	4.58	0.8
SMEs without SPM	3.03	0.6	2.86	0.7	2.53	0.5	4.33	0.9

Table 3 shows that the scores on advantages for small firms using SPM do actually differ significantly from other small firms not using SPM. These firms using SPM indicate that both financial as well as non-financial performance indicators (clear and determined KPIs) – e.g., increase in revenue, profit, communication, customers and employees satisfaction – really need attention to survive in a turbulent business environment.

The small firms not using SPM are only focused on very tight financial indicators and outputs, and less on the non-financial aspects. However, the disadvantages turn out to be hardly experienced by the small firms using SPM (m is 1.7; $\sigma^{1/4}$ 0,6), while small firms that are not using SPM definitely experienced the disadvantages. This suggests that the use of SPM brings clear advantages which outweigh the disadvantages.

Furthermore, all firms using SPM (or without another fashionable management technique) want to improve continuously the performance of their organization and to achieve sustainable success to become and stay at a world-class level in everything they do. They all indicate that the identified reasons to steer the business are virtually equally important (m is between 3.64 and 4.58). This suggests there is no particular reason that plays a dominant role in the decision to implement and use SPM (or another fashionable management technique). Further details on our results are recorded in Fig. 2.

Average score of small firms (not) using SPM

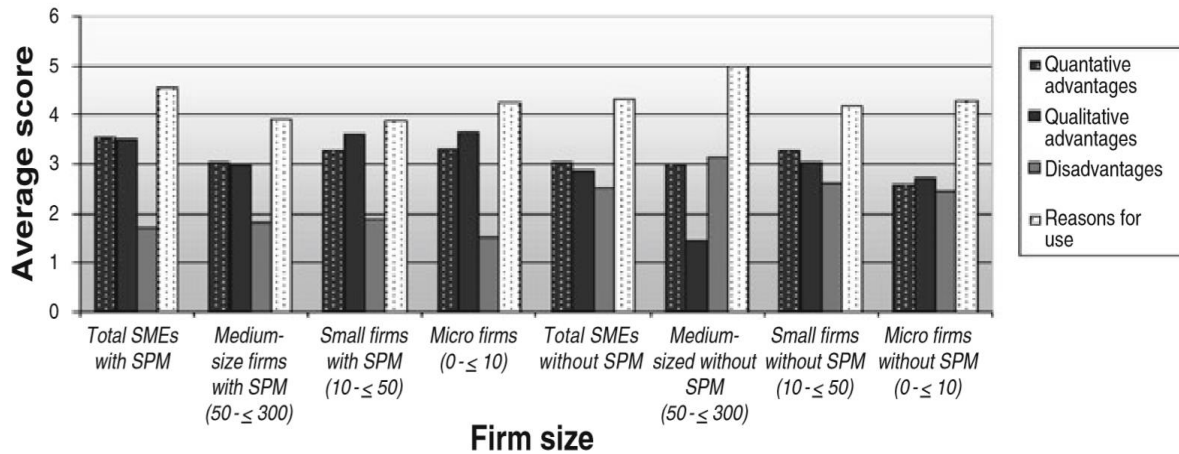


Figure 2. Average score of advantages, disadvantages and reasons for use per firm size class

Our sample of businesses was categorized in two groups, in relation to their size and use of SPM. The first group consists of 52 members of a top management team of 43 high-tech SMEs, which are engaged in the development, manufacturing, distribution of high-tech, bio- and agro-products, software and web design, technology transfer and consultancy (Commission of the European Communities 2003) and is using SPM for a period of less than or more than 1 year. The second group comprises in total 15 members of a top management team of 15 high-tech SMEs, which are engaged in the same sectors but not using SPM at all (or another management approach); they are also categorized. Figure 2 shows that the scores on both financial as non-financial advantages are strong for both the large firms and the high-tech SMEs using SPM which had practical experience with it, a finding which can be attributed to the introduction of SPM in practice, as described in the management and scientific literature. The introduction of SPM has had a positive impact on the financial and non-financial performance of firms, in particular of small firms with less than 10 employees followed by small firms with employees between 10 and 50. Through SPM, they have:

1. *Strengthened their focus*

In the first place they have strengthened their focus on what is important for the organization and the achievement of organizational results e.g. consciousness and involvement of personnel, better set-up priorities. Members of the business firms want to understand the KPIs and through determining clear objectives and KPIs they understand things better and what is important, which lead them to become more target-oriented and performance-driven. This is

more a continuous process, which translates the strategies into focus, points out and clearly identifies individual activities (responsibility), and which also stimulates the participation of personnel. This leads to a better focus on transparency and clarity in the alignment of the strategy and the related KPIs (understanding how each KPI is related to the strategy) and the importance of employees' activities and actions as well as their (individual) responsibilities in achieving desired performances.

2. *Higher operational efficiency*

Next, a higher operational efficiency that is reflected in a better organizational structure (e.g., clarify processes through a decrease in ad hoc work) and flexible management to anticipate (external) changes can be achieved. They do not spend time on activities that will not lead to achievement of organizational objectives. Through this, a strong employee commitment is developed; they actually perform better in order to achieve their objectives (independent of the rewards). Managing on results helped them to focus more clearly on the position they take (operationfield) and where they ultimately want to be (success).

3. *Better achievement of organizational goals*

And in the third place, a better achievement of organizational goals is possible, because operational objectives have been translated into better and clearly measurable KPIs and undertaken actions, which are related to strategic objectives. There is a constant focus on the questions “what do we want to do?” “what are we doing?”, “what are the real priorities and real focus points”, and is it feasible and how to deliver it?

Furthermore, small firms using SPM experienced the financial advantages (e.g. revenue, profit) mainly through non-financial advantages. They indicate that through a better organizational structure e.g. better process and costs orientation, transparency, direct communication lines, and steering on structured methods and modes of outputs e.g. continuous focus on management and efficiency managers achieved the desired levels of performance and operational excellence, and realize what is promised in an efficient manner. And through enhanced strategic intensive periodical feedback, learning and evaluation (bottom-up) of what has been realized, objectives can be adapted, “it is a learning process”. Finally, SMART (i.e. Specific, Measurable, Achievable, Realistic, and Timed) objectives and resultoriented appointments coupled with sustained improvement in decision-making through cutting off pointless discussions and reliable information – supported by informative reports – leads to more pro-activity, people react fast in developing actions and taking better “GO-NO/GO”

decisions, “Focus + Facts ¼ Actions”, that contribute to organizational improvements. However, various external factors, e.g. economic, social, environmental, political, governmental, technological and competitive forces, influence also the financial advantages.

The scores on the advantages for small firms not using SPM are in general resulting from less experienced firms or are unclear (m is 1.4 and 3.0), in particular small firms with employees less than 10. A possible explanation is that not all (important) organizational performances are determined and (well) measured to achieve sustainable success, in particular the “soft” performance indicators are not or poorly defined and not all indicators are identified correctly, and considered as important for these firms. This may cause firms to use their metrics ineffectively, because they believe that the best way to achieve a better focus on organizational performances is not to manage it! They do not plan consciously, because people have their own responsibility. If performance indicators that measure the execution of the strategy and the creation of value are not included in the SPM process, it will not be transparent whether strategic objectives and value creation are being achieved (Waal 2001). If organizations cannot define the overall performance of their organization, they cannot measure or manage it (Armstrong and Baron 1998). Clearly, the feedback of the results and measurement of various issues (hard and soft indicators) have to be clear, before an unambiguous statement can be made.

The disadvantages are rarely experienced by small firms using SPM (m is 1.7 and 1.8). Their perception is “we can learn from our experiences, thus from historical information in the system”. These firms indicate e.g. historical information in the system as a positive point of departure to determine their objectives, which are actually adjusted in the course of the time (process), and give them an image to steer the organization on it in order to be able to take corrective actions to keep the organization on track. They confirm that each action plan to achieve organizational objectives includes important strategic information (highly focused and resultoriented), so to know all the strategic assessments makes little sense to them. They said: “How to steer the organization without a clear (definition of the) strategy and objectives of the organization?” Thus, organizational objectives have to be specific and unambiguous by using structured business taxonomy, explained with simple terminology for the masses; understandable for organizational members. In other words “they must be well defined and precisely delimited by the start” (measurable and feasible). They content to have a dashboard scorecard with 5 or 6 performance indicators (mix of internal and external measures) to measure and focus on, but find it difficult sometimes to determine good quantitative objectives. Through regular communication and discussion of the “abstract context” on the indicators people remain

focused. This suggests that the use of SPM brings clear advantages which are dominant over the disadvantages.

The scores on the disadvantages are strong for small firms not using SPM, in particular small firms with employees between 50 and 300, followed by small firms with employees between 10 and 50. They have to pay too much attention to various drivers of business performance that included too much historical and financial details (focusing excessively on the past and on the short run) without enough strategic information to choose a uniform and appropriate business direction and to consider what and how to improve, instead of prominent indicators that forecast future results. This can create frustration and unfocused decision making. Too much information and indicators can overload individuals and the provision of too many, or conflicting, performance measures may create an opposite reaction. This means that structurally the financial perspective dominates over the other, non-financial indicators (short-term strategy). This appears to give an unbalanced view of the total organization's performance, with a focus on mainly "hard indicators," e.g. revenue, profit, costs. These firms indicate that the financial perspective is an easy factor to measure and manage on, which may create a "tunnel vision" (narrow perspective) especially where problems, decisions and other issues are viewed from a "disciplinary" viewpoint; only from a "financial perspective". With a lack of openness to other organizational excellence outcomes (e.g., improve employee and customer satisfaction, improve organizational performance and productivity, innovativeness), which promotes a form of blindness given the complexity of the environmental factors, firms do not recognize the importance of non-financial measures of performance for both managing and evaluating their achievements, as financial figures alone did not identify the elements that may lead to good or poor future financial results. It is important to understand organizational excellence, which potentially leads to the success of a business in the future (better achievement of organizational goals).

Finally, all interviewees indicate that all the reasons for use of SPM (or other fashionable management techniques than SPM) to steer the business firm are important, in particular small firms not using SPM with employees between 50 and 300 (m is 5.0), which showed also a strong score on the disadvantages. This suggests that they all want to improve continuously and optimize the performance of the organization (e.g. higher quality of products and services) which has now become standard, and to achieve sustainable success through a particular approach or mentality. Therefore, learning and innovation perspectives are very important for them, because it is intended to measure an organization's capacity to innovate, continuously improve and (cooperative) learn, and creative approaches to addressing business results.

Therefore, they have to be able e.g. to analyse how economic and social changes affect their businesses now and in the future; to anticipate on changing circumstances in the industry and to stay ahead of the extreme – often global – competition; to build a capacity for continuous adaptation of their organisations in order to achieve sustained high performance; translate strategy into action at each level within the organisation in order to bring the business strategy to successful life; to focus on ‘doing the right things right’ which implies that the link between information and successful management action in the business environment is essential; to have the right information at the right time to make the best decisions, to take the best actions for the benefit of the development of continuous and sustained organizational improvement and to enhance quality of the organization. In conclusion, they suggest that the fundamental reason for implementing a particular management technique is improvement of e.g. strategy and communication. Strategy and communication included both the need to communicate strategy to everyone and the need to align employee behaviour with strategic objectives. Thus, communication is essential for employee acceptance of SPM. They need to know the reason(s) behind the implementation of SPM and how it benefits both the organization and themselves.

7.6 Application of Common Factor Analysis

In this section we apply “Commonfactoranalysis (CFA)” (Tuckeretal.1969;Rummel 1970; Ford et al. 1986) based on a “Maximum Likelihood Method” as a multidimensional analytical tool, to identify the main independent components: advantages, disadvantages and reasons for use. This approach avoids generation of an overwhelming amount of data. The results of this are discussed below.

7.6.1 CFA Results of SPM Advantages for Small Firms Using SPM

The application of CFA to the SPM advantages yielded four factors, namely Higher Result-Orientation of workforce (HROW), Better Organizational Structure (BOS), Better Information communication (BIC) and Higher Result-Orientation of Management (HROM), as shown in Table 4.

Table 4 Common factor analysis of the SPM advantages components

SPM advantages	Factor 1 (HROW)	Factor 2 (BOS)	Factor 3 (BIC)	Factor 4 (HROM)
Strengthened reputation of the organization as a quality firm (O)	0.884	0.209		0.166
More innovativeness (R)	0.774	0.207	0.106	
Higher quality of products and services (R)	0.748			0.236
Increase in revenue (R)	0.746			0.114
Increase in profit (R)	0.711		0.168	
More pro-activity of organizational members (P)	0.697		0.368	
Reduction in costs (R)	0.474	0.181	0.248	0.253
Better understanding of organizational members of the strategy (I)	0.466			
More effective management control (O)		0.780		
Better focus on the achievement of results (R)	0.130	0.737		
Stronger process orientation (O)		0.711		0.144
Better strategic alignment of organizational units (O)	0.137	0.682		
Higher quality of performance information (I)		0.603	0.316	
Improvement in the decision-making process (O)		0.570		0.229
Better strategic planning process (O)			0.759	0.228
More clarity for organizational members about their roles and goals to be achieved (P)			0.713	0.129
Higher commitment of organizational members to the organization (P)	0.384		0.519	0.334
Improvement in communication in the organization on the strategy (I)	0.207	0.492	0.514	
More focus on the achievement of goals (R)	0.295		0.458	0.295
Higher employee satisfaction (P)	0.327	0.205	0.453	
Better focus on what is important for the organisation (O)		0.213	0.430	0.145
More clarity of people about their contribution towards achievement of the strategy and organizational goals (I)	0.343		0.402	
Higher operational efficiency (O)	0.191	0.117	0.185	0.705
Improvement of management quality (P)	0.176	0.241		0.604
Better knowledge sharing and information exchange between organisational units (O)	0.172	0.202		0.410

Factor 1, labeled as a higher result orientation of workforce (HROW), consists of variables which all have to do with a good communication, customer focus, higher result orientation and accountability of employees (shared governance become more efficient) on achieving organizational results, by using SPM. Firms want to manage effectively by clarifying the individual's responsibilities (defining specific goals and objectives) for employees which is part of the process of delegation, and developing accountabilities with employees through participation in decision-making and management processes to evaluate their needs to make better use of themselves and time, because within small firms the workforce is actually the "management" mainly due a simple and flat organizational structure (which encourage

employees to take part in decision-making and management processes) with less or no organizational levels (removed middle management layers).

Thus, the level of participation of employees in decision-making and management processes is partly dependent on the degree to which an organization has many or few levels of management hierarchy. And because of the simpler organizational structures, fewer customers and flexibility and more adaptable to market changes, it seems plausible that result-orientation of small firms are higher on achieving organizational results than for large firms.

Furthermore, this factor can be explained by considering this advantage as a logical consequence or outcome measures of the other factors, which result in a higher orientation on organizational results. They make and communicate effectively a clear and understandable plan regarding the desired results aligned to the strategy (well-organized report of the results and how people perform). This is the result of the top-down and bottom-up method to make strategies tangible and understandable (better focus on defining objectives which furnishes also more quality), and to stimulate the participation of employees (responsibility and accountability) in the thinking-process throughout the entire organization in order to make the strategy owned and understandable.

The strengthened involvement and understanding of people of the strategy, coupled with the improvement in the quality (e.g., qualitative solutions lead to customers retention), motivated employees (“lower employees illness, less internal blockades and less complaints”), pro-activity (e.g., employees want to take a step further, anticipate fast on positive as well as negative situations, and are enthusiastic because things are going well), better steering on projects (e.g., determined “Critical to Quality” parameters for improvement and secure) and more innovativeness (e.g., people are now thinking from different perspectives to achieve organizational objectives and many ideas and processes are carried out and developed, which give employees the space and time to realize these objectives and innovations without personal and financial consequences), considerably facilitates the achievement of organizational goals and results.

Finally, small firms also experienced an increase in revenue of approximately 10–15% on average, and a decline in cost of approximately 6% on average, (e.g., better insight and understanding into costs, failure reduction, less internal blockades and complaints, improved business activities), resulting in an increase in profit.

Factor 2, labeled as better organizational structure (BOS), consists of variables depicting advantages which are caused by SPM increasing focus, control, responsibility and alignment throughout the organization on the strategic goals to be achieved.

The business activities in small firms are more focused and structured on clear (financial) facts and targets (e.g. revenue, costs and profit consciousness of employees, clear measurable KPIs, conscious undertaken actions which are related to strategic objectives) more tightly planned, managed and monitored (clear rules and timelines, fast and simple to adjust) and objective decision-taking (fixed procedures, clear and determined values and norms, benefit-cost analysis, action and decision list), because of simple measurement tools (e.g., BSC, LEAN, Six Sigma), simpler organizational structures (e.g., enabled to delegate responsibility for operational activities and to focus more on planning and strategic functions, better flow of information, effective communication, better flow of authority and responsibility in the organization), greater flexibility of change (e.g., more ability to adapt to changes in the environment), shorter communication-lines and higher interaction and consensus between various disciplines (e.g. implementation of extensive ICT-systems such as CRM, prick plate, clarity and openness, constructive and active meetings, a frequent review of progress performance regarding the strategy leads to a better alignment), daily face-to-face evaluation moments between manager(s) and their employees for improvements and their customers (e.g., clear appointments, delivery times), and fast reaction on pursuing and achieving desired strategic goals (e.g. to realize optimal sales results). In addition, this factor can be explained by clarity and accountability; a continuous strategic thinking-process which translates the strategy into operational results, identifies individual activities and responsibilities, and which also stimulates the participation of personnel or units and the alignments throughout the organization towards achieving the strategy.

SPM improve the business structure by systematic translating vision into operational strategy, which define tactics and processes to support the strategy and demonstrate measurable organizational and individual results; supported by regular and better quality of performance information. This creates more structure and insight for organizational members on goals to be achieved and their role in this and in (fixed) business processes (less ad hoc work) which leads to fast links and reaction within the management. A better translation of the strategy into clear focus points and individual activities (better cascading of the strategy), people better understand how their contribution fits within the total process (transparent added value of employees) or know why they are engaged in particular activities, it prevents a great deal of (behavioural) frustration and employees perform better. Thus, the outcome measures of BOS leads to a more transparency and clarity in the alignment of the strategy and the relevant KPIs (understanding how each KPI is related to the strategy), a better integral approach of distribution of people and production, the importance of employees' activities and actions as well as their specific

responsibilities and accountabilities in achieving desired performances, a good planning and a more conscious strategic choice, coupled with actions (and rewards). This includes that there is a movement of “loose control” to “tight control” and frequently communication between members of the organization e.g. periodical feedback and evaluation, which created clarity and a better focus in the business (better focus leads to more effort of people and a better efficiency in sale actions), and a better steering and execution of business activities that help people to take a consistent business direction and to consider what and how to improve things and focus on issues that are important for the organization. This leads to tremendous results for instance increase in revenue, profit, innovativeness, and pro-activity which have also been improved and achieved in the organizations.

Factor 3, labeled as better information communication (BIC), consists of variables depicting the increased clarity and better communication on the strategy and business’s performance to organizational members and their participation. A better and effective communication on the organizational strategy contributes to operationalizing the strategy from management further to individual objectives e.g. clear and transparent focus points. It creates more focused discussions on what is important for the organization, the business direction and segmentation(s), and on future performances and opportunities. BIC contributes to a better translation of the strategy into more concrete and tangible objectives and clear KPIs, with clear and well understood language (taxonomy). These firms want to make their members more aware and to provide a better understanding of the business direction and to encourage them to be more committed to their organization which contributes to a better achievement of business results. Employees are continuously informed (qualitative reports and communication-tools) about the business performance, the direction of which the organization intends to take (communicating clear targets), what their individual contribution is expected to be in the relation to the entire process (clear constructions) and how they fit within it (integral improvement) and their responsibility and accountability (this results in less external complaints and higher efficiency). All these factors make personnel more concerned about the overall success of the organization.

Firms make and communicate a clear and understandable plan regarding the desired results aligned to the strategy (well-organized report of the results and how people perform). This is the result of the top-down and bottom-up method to make strategies tangible and understandable, and to stimulate the participation of employees (accountability) in a integral process throughout the entire organization in order to make the strategy owned and understandable, and to perform more effectively. This leads to no-nonsense discussions on

objectives and targets (result-oriented), people can refer to various policies, relate their work and to the strategy (know which direction the organization aims), and various issues are better to follow. Through this, a strong employee commitment is developed; they actually perform better in order to achieve their objectives and mainly independent of the rewards. Managing on results helped them to focus more clearly on the position they take in the operation-field and where they ultimately want to be (success).

Finally, Factor 4, labeled as higher result orientation of management (HROM), consists of variables, which have to do with improving the quality of management and processes on achieving organizational results, by using SPM. Managing real value drivers (quantitative as well as qualitative) behind the business with a continuous strategic planning process combined with learning- and thinking process for value-creation and achieving organizational results is a daily preoccupation for these firms. Thereby, it is important to communicate clear the key performance indicators (empowerment), which clear-up the accountability and responsibility of people and leads them to a better action-orientation and improvement of executing strategic planning and realising a competitive advantage. Through improved and intensive communication, knowledge share and exchange and cooperation have been improved between firm parts and members. Through this, members indicate earlier discrepancies in the indicators and understand the business strategy better, which reduce Ad Hoc work, reduce costs and increase profit. A better steering and execution, which in using specific concepts and taxonomy that everyone is expected to know, help people to take a consistent business direction and to consider what and how to improve things and a better focus on issues that are important for the organization and its shareholders.

7.6.2 CFA Results of the Disadvantages

The CFA of the SPM disadvantages yielded two factors, as depicted in Table 5. Table 5 shows that Factor 1, badly aligned system (BAS), consists of variables showing that the implemented SPM system leads to a meaningless discussion and unclear focus on the business, which does not have the right fit with the organization. Despite that historical information in the system provides its users with appropriate information about their past performances; much historical information in the system is not always the best “measuring norm” for the future.

Table 5 Common factor analysis of the disadvantages high-tech SMEs

SPM disadvantages	Factor 1 (BAS)	Factor 2 (LIQ)
There is too much historical information in the system (S)	0.760	
There is not enough strategic information in the system (S)	0.685	
It is too expensive and too bureaucratic (S)	0.576	
The performance indicators are too subjective and therefore unreliable (S/I)	0.471	0.440
It causes too much internal competition (I)	0.130	0.700 0.598
There are too many performance indicators (I)		
The performance information is too aggregated (I)		0.493

However, historical information which gives a good overview of the achieved organizational performances is necessary during the implementation of SPM, which they can learn from the experiences (e.g. market prices, machine calculations, work hours and labour-intensive trade) in order to be able to take corrective actions to keep the organization on track. However, high-tech firms have not experienced too much historical information, because it is the starting point to define mission, strategy and short and long term goals and objectives of the organization. But that has to be adjusted with new and strategic information after the introduction year. Firms have to work on this minor experienced disadvantage; they have to use a combination of non-financial and financial measures to assess how well their operations are aligned with their business strategy to make it possible to measure strategy aspects. However, each action to achieve the determined objectives related to the strategy. This approach is a crucial component, because there is actually a strategy that goes beforehand at the choice of the performance indicators; and in managing the strategic direction and decisions of an organization and measuring its success: “how would you like to organize without a strategy?”.

In addition, a quite technical organized system can be costly and time-consuming (i.e., depends on the size of a firm) for instance to develop “product information manual” for stakeholders and “manpower” which demands a lot of work hours and specialized employees (investing in specialized co-workers is a little risk and it can be costly on short term), but it yields opportunities and possibilities when there are good, clear and determined appointments without a lot of rules and bureaucracy.

Factor 2, low information quality (LIQ), consists of variables which depict the bad quality of the performance information generated by SPM system. The system contains too many performance indicators, which are too aggregated and do not give strategic information; and leads to too many reports, and finally bureaucracy. It becomes difficult for employees to focus on too many issues and results, and moreover to discuss these in short time; important

indicators will lose their value and context. However, improvements are certainly possible to make a selection of KPIs that are meaningful. The art is to get successful business information (findability and system usability) that serve both individual users and their organisation, which leads to “no-nonsense” discussions. The objectives are simple and good to understand, but the problem is the “translation” to other levels because of difficult terms and priorities statement.

There are various terms and performance-indicators, which some of the employees do not always understand and concrete these in the frontline due to e.g. low-educational background. In addition, the system causes unwanted behaviour of employees as peer pressure escalates in internal competition and mutual strive. It leads to isolation of information for job security, low commitment to the organization, minimal collaboration improve the corporate, and other negative effects, which cause islands culture mainly due to miscommunication and poor alignment between collective and individual KPIs.

7.6.3 CFA Results of the Reasons for Use in High-Tech SMEs

The CFA of the reasons for use of SPM yielded two factors in high-tech SMEs, as depicted in Table 6. Table 6 shows that Factor 1, focus on strategy (FoS), consists of reasons for use that have to do with creating a focus on formulating, deploying, communicating, implementing and understanding the strategy throughout the organization. A better two-way exchange of information (top-down and bottom-up), systemic direction of communication (structurally more attention for communicating results) with limited number of concretely and objectively defined KPIs allows the cascading of the strategy to the operational level to be more successfully carried out.

Table 6 Common factor analysis of the reasons for use high-tech SMEs

High-tech SMEs: reasons for use	Factor 1 (FoS)	Factor 2 (FoC)
Better communicating of strategy to everyone in the organization (S)	0.911	
Aligning employee behaviour with strategic objectives (S)	0.749	
Stronger accountability (C)	0.739	
Stronger individual accountability of employees (C)	0.734	0.132
Translating the strategy into operational terms (S)	0.638	0.273
Higher commitment to the strategy (S)	0.610	0.167
Improve the performance of the organization (C)	0.557	0.260
Linking rewards to performance (C)	0.548	
To measure better the performance of organisation parts (C)	0.493	0.269
To obtain a better understanding in knowledge and skills of people (C)	0.484	0.130

Better control and with that better “obedience” (C)	0.416	
Handling the increase in complexity of the organization (C)	0.248	0.922
To describe the mission, strategy and targets of the organisation (S)	0.190	0.617
Enhance quality of the organization (S)	0.185	0.428
More focus on the strategy (S)	0.216	0.417

Through that employees do not lose their focus on the business (people are not overwhelmed with information). Consequently, a greater awareness develops and more consistent attention is given to matters that relate to quality performance.

Factor 2, focus on control (FoC), consists of reasons for use that have to do with a better control of the organization and strategic objectives. SPM is used to deploy accountabilities and responsibilities on all levels in the organization and subsequently measure and control the performance of these levels. Firms want to be the “best-in-class” and achieve better organisational goals, therefore it is important that they have to create a better focus on the strategy (Factor 2, FoS), future performances, market and business changes, and new challenges and opportunities through e.g. a better communication and translate of the strategy to the operational level. Managing actively changes which take place in order to respond to new opportunities, is a transform of “re-active” into “proactive” approach to anticipate on changes and to avoid threats, indicate earlier discrepancies in organization and understand the business better.

7.7 Results of the Correlation Analysis

It is necessary that the factors are not subjected to the principle of multicollinearity, nor with a strong correlation, to analyze the relationships between the factors (Hoerl 1959, 1962; Hoerl and Kennard 1970, 1976). This is because strongly correlated factors would explain the same phenomenon. Although there is no clear limit in the literature for the strength of a correlation, an informal rule of thumb suggests it has to be around 0.6 ($X_1 \perp X_2$). Table 7 gives the correlation matrix.

Table 7 shows that the correlations indicate a linear positive as well as a negative relationship between two variables that are not stronger than 0.6, which are mainly autonomous features. But the variables will almost always have some correlation with one another. These results make it possible, initially, to launch a multiple regression analysis without fearing an obvious problem of multicollinearity between factors.

7.8 Results of Multiple Regression Analysis

Using a multiple regression analysis, a structural model can be created from the SPM advantages, disadvantages and reasons for use factors (Fig. 3). This model is constructed to identify the various relationships between the factors. In this respect, several hypotheses can be made, such as: (1) specific reasons for using SPM will yield specific advantages (positive relationship) and disadvantages (negative relationship); (2) specific SPM advantages will create specific disadvantages (negative relationship); and (3) specific SPM advantages will cause specific other SPM advantages (positive relationship). Figure 3 depicts the results of the multiple regression analysis.

Figure 3 shows there are several significant relations between the SPM advantages, disadvantages and reasons for use factors. Results indicate that the reasons for use factors have significant positive relations with three of the advantages factors, namely Better Organizational Structure (BOS), Better Information and Communication (BIC), and Higher Result Orientation Management (HROM), and a significant relation with one disadvantage factor, namely Low Information Quality (LIQ). However, the reasons for use do not have a direct relation with the advantage Higher Result Orientation Workforce (HROW). This can be explained by considering this advantage as a logical consequence of the other advantages: a better organizational structure, which is drive by the organization's strategy to help firms translate the strategy into operations and reach their objectives, and better information and communication will result in a higher orientation on results by the workforce and subsequently achieving higher organizational results.

Moreover, a better organizational structure improves organizational efficiency or effectiveness, reflects efficient (information) flows and internal business processes, and identifies lines of authority and splits responsibilities (less ad hoc work). Next, results indicate that there is a significant relationship between the reasons for use Focus on Control (FoC) and the disadvantage Low information Quality (LiQ). A possible explanation is that firms during the introduction of SPM still feel traditional financially oriented and therefore still too much and emphasis on financial indicators and measures. The provision of too many performance measures can effect the quality of information and overload individuals. Employees do not always understanding and are not always conscious of these indicators.

Table 7 Component correlation matrix of factors high-tech SMEs

Factors	Mean (μ)	Standard deviation	HRO	BSC	HPQ	HOQ	BAS	LIQ	FoC	FoS
Achieved organizational results Workforce (HROW)	3.5	0.8	1							
Better organizational structure (BOS)	3.5	0.8	0.351	1.000						
Better information communication (BIC)	3.5	0.7	0.449	0.386	1.000					
Achieved organizational results Management (HROM)	3.5	0.8	0.409	0.331	0.515	1.000				
Badly aligned system (BAS)	1.6	0.8	-0.340	-0.423	-0.462	-0.213	1.000			
Low information quality (LIQ)	1.8	0.7	-0.007	0.203	0.269	0.437	0.087	1.000		
Focus on control (FoC)	4.6	0.8	-0.191	-0.028	-0.118	0.026	0.073	0.440	1.000	
Focus on strategy (FoS)	4.5	0.7	0.141	0.065	0.047	-0.098	-0.123	0.131	0.476	1

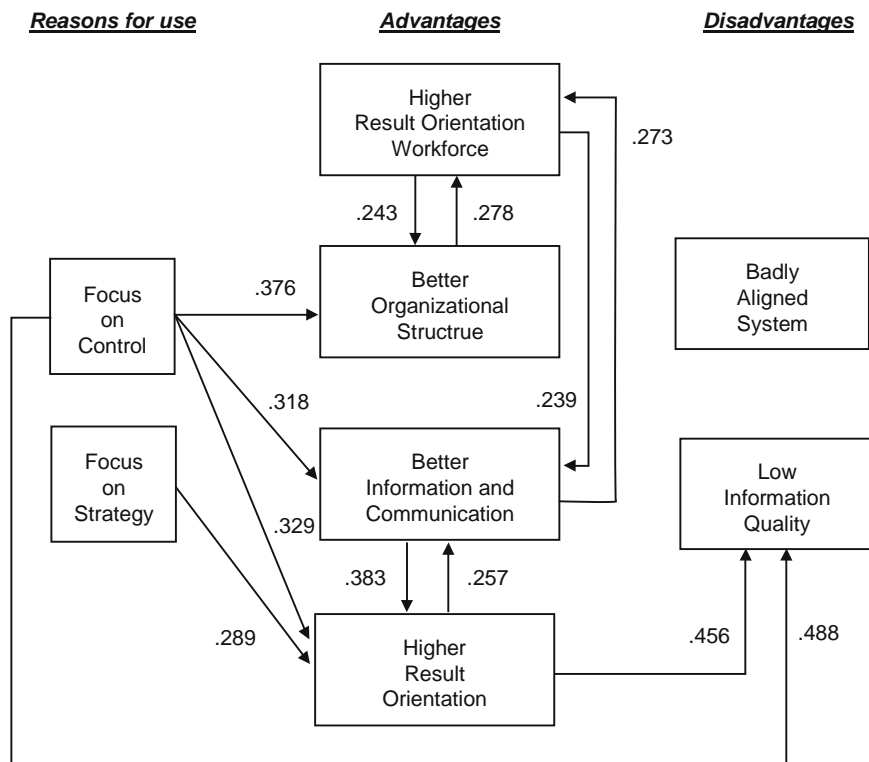


Figure 3. Structural relations in high-tech SMEs

Further, results indicate also that there is a significant relationship between the advantage High Result Orientation of Management and the disadvantage Low information Quality (LiQ), a possible explanation is information that is needed to build quality-oriented decisions and actions. For many employees too many performance indicators, in particularly financial measures, are too aggregated and not appropriately and accurately related to outcomes they directly influence, and organizational goals to provide useful feedback on their decisions and actions. Finally, the disadvantages, which did not occur very often anyway (see Table 5), do not ‘automatically’ stem from specific reasons for use or are inescapably linked to specific advantages. If these disadvantages are experienced in firms, they occur stand-alone.

7.9 Summary and Evaluation

The research described in this paper focused on answering the research questions first introduced in Chap. 3 as follows: To what extent have small high-tech business firms practiced SPM? What are the advantages, disadvantages and reasons behind the implementation of SPM in these firms in practice? How do the reasons for SPM influence advantages and disadvantages? At this point, the study undertook to solve the research questions by exploring

the understanding of and knowledge about SPM and experiences in practice by the Dutch high technology business firms. The evidence in this research supports a well-developed understanding of and extensive knowledge about SPM by the Dutch high technology firms. These firms have incorporated a number of unique financial as well as non-financial performance measures to enforce their quality and service initiatives in terms of e.g. employees, customer focus and improvements points, related to the strategy for achieving organizational sustainability and long-term success, and for maximizing opportunities for gaining and enhancing a competitive advantage.

They strengthened involvement and understanding of employees (cost and added value consciousness of personnel) in the decision-taking and determining and formulating organizational and individual objectives which are fast and simple to adjust. In particular small-sized firms, with less than 10 employees followed by small firms with employees between 10 and 50, have a more distinct focus on firm and employee performance than the large-sized firms, because of simple measurement tools, simpler organizational structures, shorter (and informal) communication-lines and higher interaction and consensus between various disciplines (e.g. daily face-to-face evaluation moments between manager(s) and their employees for improvements) and fast reaction on achieving organizational results (e.g. to realize optimal sales results).

Further, based on a literature study and practical research at 43 Dutch high-tech firms, four main advantages, two main disadvantages and two main reasons for use were discovered, which are to be expected from using SPM. The practical implication of this research is that implementing and using SPM in crafting and executing of strategy and increase the contribution of employees to strategic plans in a daily preoccupation yields specific benefits for an organization in gaining and sustaining their competitive advantages in terms of products and services. Overall, the findings and their possible implications give insight into the firms' experiences and enables management to adopt a useful approach to increasing their potential to progress (local) firms' health and create a strong and professional human capital pool that sustains the firm's competitive advantage.

This research contains a few limitations. Although there have been statistically significant improvements and correlations after using SPM within the business firms, findings are not generalisable beyond the context of this study in which the research was conducted, because the sample size is limited to 43 Dutch high-tech firms. On the other hand, the study approach facilitated the understanding of SPM using and its experiences in various Dutch high technology business firms. Further research might replicate this study in a large sample of

similar organizations for further research on SPM. A large sample of similar organizations would increase the overall validity of the results. Another limitation is that this research is not longitudinal. Longitudinal studies would better examine and observe (without manipulating) the developments and shifts in the relations between SPM advantages, disadvantages at different points of time, and reasons for use.

7.9.1 Future Research

Future research is needed into environmental factors (external driving forces) such as spatial dimensions (e.g. accessibility, agglomeration principles) or localized concentrations of economic activity. This interest is warranted because of the farreaching influence that localized concentrations of economic activity (development of creative clusters) and business performance have on regional and national modern economies.

The future research will be able to answer these research issues address the location challenges identified in the future research.

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8 THE RELATIONSHIP BETWEEN THE LEVEL OF COMPLETENESS OF A STRATEGIC PERFORMANCE MANAGEMENT SYSTEM AND PERCEIVED ADVANTAGES AND DISADVANTAGES ²³

Abstract

The need for efficient and effective SPM systems has increased over the past decade and the successful implementation and use of these systems have become of paramount importance to organizations. In this respect, one issue has been underexposed in the literature thus far, namely: the relationship between the level of completeness of the SPM implementation and the benefits organizations experience. This paper provides an overview of the main advantages and disadvantages to be expected at various stages of SPM implementation completeness.

²³ Source:: Waal, A.A. de, Kourtit, K., and Nijkamp, P. (2009). The Relationship between the Level of completeness of a Strategic Performance Management System and Perceived Advantages and Disadvantages. *International Journal of Operations and Production Management*, 29 (12), 1242-1265.

8.1 Introduction

In the past few decades strategic performance management (SPM) has attracted much interest from both academics and practitioners (Letza, 1996; Marr and Schiuma, 2002). In this article, SPM is defined as ‘the 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’ (Waal, 2007). While practitioners were primarily concerned with the implementation of SPM systems, either new or improved, academics have been studying whether regular use of SPM systems leads to better organisational results (Ahn, 2001; Ittner et al., 2003; Said et al., 2003; Sandt et al., 2001; Waal et al., 2004; Lawson et al., 2005). However, there is still little known about the *actual* mechanisms underlying possible effects of SPM (Bourne et al., 2000; Bourne et al., 2005). Fortunately, this intriguing issue is gaining interest and researchers are increasingly examining the factors which cause SPM to work (Vakkuri and Meklin, 2000; Malina and Selto, 2001; Neely et al., 2004). One of the questions which has been underexposed in the literature so far, is whether there exists a relationship between the status of SPM system implementation and the perceived benefits of the system (McCormack et al., 2008). Or more specifically: Does a company experience more advantages and less disadvantages the further implemented and thus the more complete the SPM system is? This article describes empirical research that deals with this question, by aiming to provide an answer to the following research question: *What advantages and disadvantages of SPM do practitioners experience, and are these influenced by the level of completeness of a SPM system implementation?*

This article is organized as follows. The following two sections deal with the literature on the advantages and disadvantages of SPM and the effects of SPM system implementations. The literature findings have been tested in a series of interviews conducted at 17 Dutch business companies and the results are discussed in the fourth section of the article. Finally, the last section provides a summary and a discussion of the limitations of the research. The research described in this article may help management to focus on the need to complete SPM system implementations to maximize benefits of the system.

8.2 Advantages and disadvantages of SPM and completeness of implementation

The main source of our research to identify SPM advantages and disadvantages consisted of academic and management publications discussing real-world experiences of organizations with SPM. A general search among academic and management databases on the topic of SPM advantages and disadvantages initially yielded 5.625 matches. However, most of these sources were either purely conceptual/theoretical or anecdotal in nature. After narrowing down the search criteria exclusively to literature containing empirical academic research, only 28 sources remained. From these sources, a list of 4 quantitative and 22 qualitative advantages and 8 qualitative disadvantages was compiled (Kourtit and Waal, 2009). Appendix 1 summarizes the SPM advantages and disadvantages (in decreasing order of number of literature sources) and lists the publications in which these were found. It is interesting to see that the number of quantitative advantages (i.e. financial advantages) found was limited, and that quantitative disadvantages were even non-existent in the literature.

As noted in the Introduction, the relationship between the completeness of the implementation of a SPM system and benefits experienced by the organization has been underexposed in the literature. There is some literature that states that a SPM system has to be completely implemented in order to assure an operational SPM system which is used regularly. A complete SPM system can thus be seen as a precondition for achieving benefits from the system. ‘Completely implemented’ means that there is a fully operational system in place which contains critical success factor and key performance indicator data of the organization, which is used on a regular basis to monitor, discuss and manage business performance related issues (Bourne et al., 2002; Waal, 2003; Bititci et al., 2006). Several studies (Nudurupati, 2003; Evans, 2004; Lockamy and McCormack, 2004; McCormack et al., 2008) confirm that properly designed, implemented and used SPM systems are positively associated with improvements in organizational results. Many other studies that have made observations with regard to the relationship between completeness of the SPM system implementation and perceived benefits are of an anecdotal nature and less based on solid business management theory (Letza, 1996; Axson, 1999; Hepworth, 1998; Carlin, 1999; Frigo and Krurnwiede, 2000; Kueng, 2000). Finally, there is literature that states that higher levels of maturity in any business process result in: better control of results; improved forecasting of goals, costs and performance; greater effectiveness in reaching pre-defined goals; and improved management’s ability to propose new

and higher targets for performance (Srai et al., 2006; McCormack et al., 2008). In this context, maturity is defined as a measure of the level of development or sophistication of a process; the more developed a process is the more benefits it will yield. Given that SPM system implementation is a type of business process, the ‘maturity literature’ may be assumed to implicitly state that the more complete the SPM system implementation is, the more an organization will benefit from this system. To our knowledge however, this proposition has not yet been tested and reported in empirical literature. Neely et al. (1995) provide an extensive overview of the status of SPM systems and list many research questions which need to be addressed, but ignore the issue of completeness of SPM system implementation. Toni and Tonchia (2001) give a comprehensive overview of different types of SPM systems, but fail to address the relationship between the completeness of SPM system implementation and organizational performance. Evans (2004) states in his research on the relationship between SPM systems and performance that his results “suggest that organizations with more mature performance measurement systems report better results in terms of customer, financial and market performance.” This suggests that an organization with a SPM system achieves higher turnover, more profit, higher customer satisfaction and higher market share than an organization that does not use a SPM system. Evans, however, does not define maturity of SPM systems nor does he elaborate on this particular issue. Aken et al. (2005) make an implicit assumption that a more mature and more complete enterprise performance management system (as these authors call the SPM system) will yield more benefits for an organization, but again this assumption is not tested in practice. Olsen et al. (2007) put forward that the effectiveness of an SPM system is based on three criteria (causality, continuous improvement and process control), but do not link this effectiveness to the level of completeness of a SPM system implementation. Radnor and Barnes (2007) give an excellent overview of the development of SPM systems, but do not link the different development stages they distinguish to the benefits experienced by organizations. This offers an opportunity to investigate whether the level of completeness of a SPM system implementation bears a direct relation to the perceived benefits of such a system. This leads to the following research question: *What advantages and disadvantages of SPM do practitioners experience, and are these influenced by the level of completeness of a SPM system implementation?* To investigate this question, the concept of completeness of a SPM system implementation has to be operationalized. As the literature did not provide us with a clear and practical definition of completeness of a SPM system implementation, we decided to formulate one. To be able to do this, we asked the organisations participating in the research whether they

had completed the implementation of the SPM system in their organisation and if so, whether the implementation had gone according to plan. The underlying assumption was that the best way of telling whether a SPM system yields certain advantages or disadvantages is to compare real SPM system implementations in various stages of completion. The three stages of SPM system implementation we distinguished on the basis of responses given were: completely implemented, almost (completely) implemented, not (yet) completely implemented.

8.3 Research approach

To test whether SPM advantages and disadvantages that organizations experience are related to the level of completeness of the SPM system implementation, we interviewed organizational staff members of prominent Dutch business firms. As the literature search did not yield a structured, validated questionnaire to obtain information from organizations on the SPM advantages, disadvantages and level of completeness of a SPM system implementation, a self-composed questionnaire was used. The advantages and disadvantages identified from the literature were converted into questions and presented to the interviewees. For instance, the advantage ‘improvement in communication in the organization on the strategy’ translated into the following question: “Have you noticed that communication on the strategy has improved since the implementation of the SPM system?” The participating companies, all from the profit sector, were selected on the basis of one criterion, namely whether they had implemented or were in the process of implementing a SPM system. To determine the degree to which these organisations experienced advantages and disadvantages, the statements in the questionnaire were formulated in such a manner that interviewees had to give a rating on a Likert 5-point scale, varying from ‘1= not at all’ (i.e. ‘we did not at all experience the (dis)advantage’) to ‘5 = very strong’ (i.e. ‘we experienced the (dis)advantage very strongly’). The interviewees were also asked if they had completed the implementation of the SPM system as it was initially planned. The questionnaire was first tested at one company after which some small adjustments were made in the formulation of several questions.

The research procedure was as follows. A letter was sent to a selected group of organisations in the Dutch profit sector, inviting them to participate in the research. The organisations were chosen on the basis of previous contacts we had with them so we could get easy access. In total 52 people of 17 organisations were interviewed. No selection of industries was made in order to heighten the chance of generalization of the research results. Appendix 2

gives information on the participating organisations and interviewees. The questionnaire was not sent in advance to interviewees in order to increase the spontaneity of answers. This was because the research was more about what interviewees' experiences were with SPM than about getting a 'correct' answer. At the beginning of the interview, the two interviewers first gave a short introduction explaining the research objective, a definition of a SPM, and the interview procedure. After that, the interviewees were asked to what degree they experienced a certain advantage or disadvantage from the SPM system, by choosing one of the five ratings and explaining their choice. The interviewers were careful not to influence the interviewees in any way during the interview. They gave, for instance, no comments on the responses given by interviewees. This procedure minimized the risk on response bias. After the interviews, the interview reports were sent to the interviewees for confirmation of their responses. After interviewees had approved the interview reports, the answers given were averaged for each company.

8.4 Research results

Based on the answer to the interview question 'Did you complete the implementation of the SPM system as it was initially planned?' the organizations were categorized, creating three groups with different levels of completeness of a SPM system implementation. The first group consisted of organizations that had fully completed the implementation of the SPM system, either according to plan or not. This group consisted of five organizations. The second group included organizations that had not yet but almost fully completed the implementation of the SPM system. This group contained eight organizations. The third group consisted of organizations that were not near to completing the SPM system implementation. This group contained four organizations. For each group, the scores for all organizations in the group were averaged. Appendices 3 through 5 provide lists of detailed scores for each advantage and disadvantage. Table 1 summarizes the average scores for the advantages (quantitative and qualitative) and disadvantages, on a scale of 1 to 5. The higher the score in Table 1, the stronger the organization experienced the advantage or disadvantage.

Level of completeness of SPM implementation	Average scores					
	Quantitative advantages	Standard deviation	Qualitative advantages	Standard deviation	Disadvantages	Standard deviation
Yes/ Yes, but not according to plan	3.39	0.84	3.40	0.60	1.72	0.25
No, but almost	3.26	0.98	3.51	0.56	1.77	0.36
No, still a lot to do	3.11	0.65	3.37	0.21	2.10	0.35

Table 1: Average score per level of completeness category

Table 1 shows that the hypothesis that ‘the more complete the SPM system implementation is, the more the organization will experience benefits’ holds true for the quantitative advantages and partially for the qualitative advantages. At the same time, the more complete the SPM system implementation, the less disadvantages the organization experiences. It is interesting to notice however, that the organizations in the ‘no, but almost’-category experience more qualitative advantages than the organizations with a more complete SPM system. It has been recognized in previous SPM research that qualitative, non-financial results precedes quantitative, financial results (Kaplan and Norton, 1996; Wiersma, 2003; Waal, 2007). This could also be the case in this research, as qualitative advantages experienced by the ‘no, but almost’-category might not yet have resulted in quantitative advantages. When the SPM system implementation nears completion, some of the qualitative advantages seem to disappear while the quantitative advantages become more strongly noticeable. At the same time, the standard deviations in Table 3 show that the differences between the completeness categories might not be significant. In this respect, when looking into more detail at Appendix 4, it is interesting to notice that for eight of the 22 qualitative advantages, the ‘yes’-category experiences the strongest advantages. These advantages seem to be of a more organization-wide (better knowledge sharing, better management, more employee commitment, more clarity of contribution, higher quality, higher employee satisfaction) or strategic nature (better strategic communication, better organizational reputation) which initially take time to achieve but in the long run may develop into lasting and strong benefits of the SPM system. The other 14 qualitative advantages mostly relate to processes (e.g., better focus, better information quality, higher efficiency, better decision-making, more effective control) and can be achieved more quickly than the organisation-wide and strategic advantages.

Looking at appendix 5, it is interesting to note that two disadvantages in particular are strongly experienced by organizations with a completely or almost completely implemented SPM system: ‘the SPM system does not contain enough strategic information’ and ‘the SPM system is too expensive and bureaucratic.’ It can be argued that these disadvantages are of the type that will only be experienced after use of a complete or almost complete SPM system. When organizational staff use a SPM system for a prolonged period of time, they may become more demanding and require higher-quality information, especially strategic information as many performance management systems contain enough operational information. At the same time, staff may be aware of the system becoming too elaborate (because it includes too many types of information) and bureaucratic and consequently too expensive.

8.5 Summary and limitations

The research described in this article focused on answering the question whether more complete SPM systems yield more advantages and less disadvantages for an organisation. Based on a literature study and practical research among 17 prominent Dutch companies, it became clear that the answer to this question is affirmative: organisations that have a fully implemented SPM system do seem to be gaining more financial and non-financial advantages than organisations that are still implementing such a system. Companies that have almost completed the implementation of a SPM system are gaining qualitative benefits, but they experience less financial rewards. Because the ultimate goal of all organizations is to obtain better financial performance, the research results seem to argue in favour of completely implementing a SPM system, as only then organizations will be fully supported in achieving this goal. The practical implication of this research is that implementation and use of a complete SPM system does yield specific quantitative and qualitative advantages for an organization. The research results provide management with the knowledge about the advantages to be expected at each stage of completeness of a SPM system implementation. Management can use this knowledge to convince organizational staff that a SPM system is only beneficial for the organization if it is completely implemented. Management now also has a means to check whether complete implementation of the SPM system has been achieved. If the organisation does not experience the financial benefits of the SPM system, management has to investigate whether parts of the SPM system have not yet been properly deployed.

The research discussed in this article has several limitations. The sample size of the research was relatively small. Although 17 organisations participated in the research, only 52 people were interviewed, which restricts the generalisation to all companies. Also, the selection of the 17 organisations produced a sample that may have been biased. It is not unlogical to assume that organisations which have successfully implemented and used SPM are more willing to participate in the research than companies which did not have these positive experiences. As a result, the SPM advantages may have been overstated in the research results, while the SPM disadvantages may have been underexposed. Furthermore, only profit companies were included in the research, so a generalisation to non-profit and governmental organizations cannot be made. Finally, only Dutch organizations took part in the research so claims about benefits from SPM systems for organisations in other countries may be problematic. Further research should therefore concentrate on a larger sample including more and different types of organizations from different sectors and from different countries, and on longitudinal studies that examine the developments and shifts in the relationships between advantages and disadvantages and the level of completeness of a SPM system.

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APPENDIX 1 – LIST OF SPM ADVANTAGES AND DISADVANTAGES

This appendix summarizes the SPM advantages and disadvantages (in decreasing order of number of literature sources) and lists the publications in which these were found.

Quantative advantage	Literature source
Increase in revenue	Malina and Selto, 2001; Sim and Koh, 2001; Davis and Albright, 2002; Waal, 2002; Said et al., 2003; Braam and Nijssen, 2004; Davis and Albright, 2004; Neely et al., 2004; Robinson, 2004.
Increase in profit	Epstein et al., 2000; Davis and Albright, 2002; Waal, 2002; Said et al., 2003; Braam and Nijssen, 2004; Davis and Albright, 2004; Neely et al., 2004; Robinson, 2004.
Reduction in costs	Sim and Koh, 2001; Neely et al., 2004.
Higher ROA	Sim and Koh, 2001; Neely et al., 2004.
Qualitative advantage	Literature source
Improvement in communication in the organization on the strategy	Lovell et al., 2002; Baraldi and Monolo, 2004; Heras, 2004; Neely et al., 2004; Papalexandris et al., 2004; Robinson, 2004; Lawson et al., 2004.
Closer collaboration and better knowledge sharing and information exchange between organisational units	Mooraj et al., 1999; Kald and Nilsson, 2000; Neely et al., 2004; Lawrie et al., 2004; Papalexandris et al., 2004; Robinson, 2004.
Strengthened focus on what is important for the organization	Mooraj et al., 1999; Kald and Nilsson, 2000; Baraldi and Monolo, 2004; Neely et al., 2004; Self, 2004;
More focus on the achievement of results	Dumond, 1994; Bititci et al., 2004; Lawrie et al., 2004; Neely et al., 2004; Self, 2004.
Higher quality of performance information	Lawson et al., 2004; Neely et al., 2004; Robinson, 2004; IOMA. Business Intelligence at Work, 2005; Tapinos et al., 2005.
Better strategic alignment of organisational units	Malina and Selto, 2001; Shulver and Antarkar, 2001; Lovell et al., 2002; Neely et al., 2004; Lawson et al., 2005.
Higher operational efficiency	Waal, 2002; Neely et al., 2004; Robinson, 2004.
Improvement of management quality	Malina and Selto, 2001; Waal, 2002; Neely et al., 2004.
Better understanding of organizational members of the strategy	Lovell et al., 2002; Heras, 2004; Neely et al., 2004.
Improvement in the decision-making process	Dumond, 1994; Mooraj et al., 1999; Kald and Nilsson, 2000.
Higher commitment of organizational members to the organization	Malina and Selto, 2001; Neely et al., 2004; Bititci et al., 2004.
More clarity of people about their contribution towards achievement of the strategy and organizational goals	Lawson et al., 2004; Neely et al., 2004; Papalexandris et al., 2004.
Higher innovativeness	Sim and Koh, 2001; Waal, 2002; Self, 2004.
Better achievement of organisational goals	Waal, 2002; Lawson et al., 2003; Tapinos et al., 2005.
More pro-activity of organizational members	Neely et al., 2004; Hatch, 2005; Tapinos et al., 2005.
More clarity for organizational members about their roles and goals to be achieved	Lawson et al., 2004; Neely et al., 2004.
Higher quality of products and services	Waal, 2002; Brown, 2004.
More effective management control	Malina and Selto, 2001; Neely et al., 2004.
Higher employee satisfaction	Sim and Koh, 2001; Papalexandris et al., 2004.
Stronger process orientation	Shulver and Antarkar, 2001; Neely et al., 2004.
Strengthened reputation of the organisation as a quality firm	Waal, 2002; Self, 2004.
Better strategic planning process	Lovell et al., 2002; Tapinos et al., 2005.
Qualitative disadvantage	Literature source
It causes too much internal competition	Kald and Nilsson, 2000; Papalexandris et al., 2004
There is too much financial information	Kald and Nilsson, 2000; IOMA, Business Intelligence at Work, 2005
It is too expensive and too bureaucratic	Braam and Nijssen, 2004; IOMA, Business Intelligence at Work, 2005

There are too many performance indicators	Dumond, 1994; Kald and Nilsson, 2000; Self, 2004; IOMA, Business Intelligence at Work, 2005
The performance information is too aggregated	Kald and Nilsson, 2000; Neely et al., 2004
There is not enough strategic information in the system	Kald and Nilsson, 2000; Sim and Koh, 2001
The performance indicators are too subjective and therefore unreliable	Kald and Nilsson, 2000; Malina and Selto, 2001
There is too much historical information	Kald and Nilsson, 2000; IOMA, Business Intelligence at Work, 2005

APPENDIX 2 – OVERVIEW OF THE PARTICIPATING ORGANIZATIONS

This appendix lists the organizations that participated in the research, and provides some detail on the level of completeness of the SPM system implementation and the interviewees.

Organization	Industry	Size	Type	SPM system completely implemented?	No. of interviews	Functions interviewed
Abrona	Care	Medium	National	No, but almost	5	Chairman of the Board, HRM Director, Region Manager, Cluster Manager (2)
De Lage Landen	Financial services	Large	Multinational	No, still a lot to do	4	Divisional COO (2), CFO, Program Manager
Eneco	Energy	Large	National	Yes	3	Services Manager, Corporate Controller, COO
Heemskerk	Food	Medium	Multinational	No, still a lot to do	4	Operations Director, HRM Director, Operations Manager, Business Desk Manager
ING	Financial services	Large	Multinational	No, but almost	2	Project and Change Manager (2)
KLM	Transportation	Large	Multinational	Yes	2	Network Senior Vice President, Passenger Senior Vice President/Controller
KLM Cargo	Transportation	Large	Multinational	No, but almost	2	Finance and Control Vice President, Financial Planning and Control Director
Philips Research	Manufacturing	Large	Multinational	No, but almost	4	Works Counsellor, Research Vice President, HRM Senior Manager, Secretary of the Board
PQ Europe	Manufacturing	Medium	Multinational	No, but almost	3	Plant Manager, HRM Officer, Health and Safety Manager
Rabobank	Financial services	Large	Multinational	Yes, but not according to plan	4	HRM Retail Manager, HRM SS&F Manager, Corporate HRM Manager
Sara-Lee/DE	Food	Large	Multinational	No, but almost	2	Corporate Control Vice President, Divisional CFO
Schiphol Group	Professional services	Large	Multinational	No, but almost	1	HRM Manager

Stork	Manufacturing	Large	Multinational	No, still a lot to do	2	Corporate Strategy and Control Manager (2)
Tempo-Team	Professional services	Large	National	Yes, but not according to plan	4	Business Unit Manager, Account Specialist (2), Business Unit Analyst
Trespa	Manufacturing	Medium	Multinational	No, but almost	4	CFO, Financial Support Manager, Commercial Manager, Industrial Engineer
Wessanen	Food	Large	Multinational	No, still a lot to do	5	Reporting Manager, Supply Chain Manager, Operations Manager, Financial Manager, Sales Director
A well-known car manufacturer	Manufacturing	Large	Multinational	Yes, but not according to plan	1	Internal consultant

APPENDIX 3 – AVERAGE QUANTITATIVE ADVANTAGE SCORES FOR SPM SYSTEM LEVEL OF COMPLETENESS CATEGORIES

This appendix gives an overview of the average scores per level of completeness category on the advantages experienced in practice.

- *Yes/Yes, but not according to plan* = organizations that implemented the SPM system, either according to plan or not;
- *No, but almost* = organizations that are almost finished with implementing the SPM system
- *No, still a lot to do* = organizations that are in the process of implementing the SPM system and still have a lot to do;
- Possible responses: 1= not at all; 2 = a little bit; 3 = unclear; 4 = clear; 5 = very strong.

Level of completeness category	Organizational scores	Quantitative advantages			
		Increased revenue	Increased profit	Reduced costs	Averaged score
Yes/ Yes, but not to plan	Eneco	3.00	4.33	4.33	3.89
	KLM	3.00	5.00	5.00	4.33
	Tempo-team	3.50	3.25	3.25	3.33
	Rabobank	2.75	2.00	1.50	2.08
	Car manufacturer	4.00	2.00	4.00	3.33
	<i>Group average</i>	3.25	3.32	3.62	3.39
No, but almost	Abrona	3.60	4.00	3.00	3.53
	Schiphol	3.00	3.00	4.00	3.33
	Trespa	4.25	4.50	4.00	4.25
	Sara-Lee/DE	3.00	4.00	3.00	3.33
	PQ Europe	1.33	4.00	4.00	3.11
	ING	1.00	1.00	1.00	1.00
	KLM Cargo	4.00	4.00	3.50	3.83
	Philips Research	4.25	4.75	2.00	3.67
	<i>Group average</i>	3.05	3.66	3.06	3.26
	De Lage Landen	1.50	2.75	2.25	2.17

No, still a lot to do	Heemskerk	1.75	4.25	4.00	3.33
	Stork	3.00	4.00	4.00	3.67
	Wessanen Nederland	2.60	3.20	4.00	3.27
	<i>Group average</i>	2.21	3.55	3.56	3.11

APPENDIX 4 – AVERAGE QUALITATIVE ADVANTAGE SCORES FOR SPM SYSTEM LEVEL OF COMPLETENESS CATEGORIES

This appendix gives an overview of the average scores per level of completeness category on the advantages experienced in practice.

Level of category	Organizational	Qualitative benefits												
		better strategic communication	better knowledge sharing	better processes	better result management	better decision quality	better alignment	higher efficiency	better cost management	better understanding	better taking	more employee commitment	more clarity distribution	more innovation
Yes/ Yes, but not to plan	Eneco	4.00	4.00	4.33	3.67	4.67	2.67	3.33	3.67	3.00	4.00	4.00	3.00	3.00
	KLM	4.00	5.00	4.00	4.00	5.00	4.00	4.00	4.00	3.00	4.00	3.00	4.00	1.00
	Tempo-team	4.25	3.50	3.75	3.75	3.75	3.25	3.25	3.50	4.25	3.50	4.25	3.75	2.50
	Rabobank	3.50	1.75	4.00	3.75	2.50	2.00	1.75	3.25	1.50	1.75	1.75	2.50	1.00
	Car manufact.	4.00	4.00	4.00	4.00	2.00	3.00	4.00	4.00	4.00	4.00	4.00	4.00	1.00
	Group average	3.95	3.65	4.02	3.83	3.58	2.98	3.27	3.68	3.15	3.45	3.40	3.45	1.70
No, almost	Abrona	4.20	3.00	4.40	4.40	4.00	4.20	3.40	4.20	3.60	3.60	3.60	4.00	3.20
	Schiphol	5.00	5.00	5.00	5.00	5.00	5.00	4.00	5.00	4.00	5.00	5.00	3.00	3.00
	Trespa	4.75	4.25	4.75	4.75	4.50	4.00	4.00	3.25	3.75	4.25	4.50	4.00	2.75
	Sara-Lee/DE	3.00	2.50	4.00	4.50	4.00	2.50	3.00	3.00	4.00	3.00	3.00	3.00	3.00
	PQ Europe	2.67	3.33	4.00	4.00	4.00	3.33	2.67	2.67	4.00	3.67	2.67	3.67	1.00
	ING	4.00	1.00	5.00	5.00	4.00	1.00	1.00	1.00	4.00	1.00	1.00	4.00	1.00
	KLM Cargo	4.00	4.50	5.00	4.50	4.50	3.50	5.00	4.00	3.50	4.50	4.00	4.50	2.50
	Philips Research	3.25	2.50	4.50	4.25	3.00	3.00	3.00	3.00	2.00	3.25	2.75	4.00	2.50
Group average	3.86	3.26	4.58	4.55	4.13	3.32	3.26	3.26	3.61	3.53	3.31	3.77	2.37	
No, still a lot to do	De Lage Landen	3.50	3.50	3.75	3.75	3.25	4.00	3.25	3.50	3.75	3.25	3.50	3.00	3.50
	Heemskerk	3.75	3.50	4.50	3.75	4.75	3.00	4.00	4.00	2.75	3.25	3.75	3.00	2.25
	Stork	4.00	3.00	5.00	4.00	4.00	3.00	4.00	3.00	3.00	4.00	2.00	2.00	4.00
	Wessanen	4.00	2.60	3.00	3.20	3.80	3.00	3.40	3.00	3.40	2.60	3.20	3.20	2.20
	Group average	3.81	3.15	4.06	3.68	3.95	3.25	3.66	3.38	3.23	3.28	3.11	2.80	2.99

Level of completeness category	Organizational scores	Qualitative benefits									Averaged score
		better goal achievement	higher pro-activity	more role clarity	higher quality	more effective control	higher employee satisfaction	better process orientation	better organisational reputation	better strategic planning	
Yes/	Eneco	4.00	2.00	3.67	4.00	4.67	3.00	4.00	4.00	1.67	3.56
Yes, but	KLM	5.00	4.00	4.00	4.00	4.00	3.00	5.00	4.00	4.00	3.91
not to plan	Tempo-team	3.50	3.75	3.75	3.50	3.75	2.00	4.75	3.00	3.50	3.58
	Rabobank	1.50	2.75	3.25	1.75	3.25	3.00	1.75	1.25	2.50	2.36
	Car manufact.	4.00	2.00	4.00	4.00	4.00	4.00	3.00	4.00	4.00	3.59
	Group average	<i>3.60</i>	<i>2.90</i>	<i>3.73</i>	<i>3.45</i>	<i>3.93</i>	<i>3.00</i>	<i>3.70</i>	<i>3.25</i>	<i>3.13</i>	<i>3.40</i>
No, almost	Abrona	4.60	3.20	4.20	3.00	4.40	2.80	3.80	3.00	4.20	3.77
	Schiphol	5.00	5.00	1.00	4.00	5.00	3.00	1.00	4.00	5.00	4.18
	Trespa	4.25	3.75	4.00	3.50	4.50	2.50	4.25	4.25	4.00	4.02
	Sara-Lee/DE	4.00	3.00	3.00	3.00	4.00	3.00	4.00	3.00	2.00	3.25
	PQ Europe	3.67	1.67	4.00	2.67	4.00	1.33	1.00	1.33	1.67	2.86
	ING	4.00	1.00	4.00	3.00	4.00	3.00	4.00	3.00	4.00	2.86
	KLM Cargo	4.00	3.00	4.00	4.00	5.00	4.00	4.50	3.00	4.00	4.07
	Philips Research	4.25	2.25	2.25	3.50	3.00	2.25	2.50	3.25	3.00	3.06
	Group average	<i>4.22</i>	<i>2.86</i>	<i>3.31</i>	<i>3.33</i>	<i>4.24</i>	<i>2.74</i>	<i>3.13</i>	<i>3.10</i>	<i>3.48</i>	<i>3.51</i>
No, still a lot to do	De Lage Landen	3.25	3.25	3.50	3.50	3.75	2.75	4.67	3.33	4.00	3.52
	Heemskerk	3.00	3.75	3.25	4.00	4.25	2.25	3.50	3.25	3.25	3.49
	Stork	4.00	2.00	3.00	3.00	4.00	3.00	4.00	3.00	4.00	3.41
	Wessanen	3.00	2.80	2.80	3.20	3.00	2.40	3.60	3.40	2.80	3.07
	Group average	<i>3.31</i>	<i>2.95</i>	<i>3.14</i>	<i>3.43</i>	<i>3.75</i>	<i>2.60</i>	<i>3.94</i>	<i>3.25</i>	<i>3.51</i>	<i>3.37</i>

APPENDIX 5 – AVERAGE DISADVANTAGE SCORES FOR SPM SYSTEM LEVEL OF COMPLETENESS CATEGORIES

This appendix gives an overview of the average scores per level of completeness category on the disadvantages experienced in practice.

Level of completeness category	Organizational scores	Disadvantages								Averaged score
		too many KPIs	not enough strategic info	too much inter-nal competition	too expensive/ bureaucratic	KPIs too subjective	info too aggregated	too much financial info	too much historical info	
Yes/ Yes, but not to plan	Eneco	3.33	3.00	1.00	2.67	1.67	1.33	1.00	2.67	2.08
	KLM	2.00	4.00	2.00	1.00	1.00	1.00	2.00	1.00	1.75
	Tempo-team	2.75	2.75	1.25	1.50	1.75	1.00	1.25	1.00	1.66
	Rabobank	2.00	2.25	1.25	3.50	1.25	1.50	1.00	1.00	1.72
	Car manufacturer	1.00	1.00	1.00	4.00	1.00	1.00	1.00	1.00	1.38
	Group average	2.22	2.60	1.30	2.53	1.33	1.17	1.25	1.33	1.72
No, but almost	Abrona	2.20	1.40	1.80	2.00	1.60	1.20	2.40	1.00	1.70
	Schiphol	1.00	1.00	4.00	4.00	1.00	4.00	4.00	1.00	2.50
	Trespa	3.50	1.25	1.75	1.00	1.75	1.00	1.00	3.75	1.88
	Sara-Lee/DE	1.00	2.50	2.50	2.00	2.00	1.00	1.50	1.50	1.75
	PQ Europe	4.00	2.00	1.00	1.00	1.67	3.00	1.00	1.00	1.83
	ING	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	KLM Cargo	2.00	1.00	1.00	1.00	1.50	1.50	2.50	2.50	1.63
	Philips Research	3.50	3.00	1.00	1.75	1.75	1.75	1.25	1.25	1.91
	Group average	2.28	1.64	1.76	1.72	1.53	1.81	1.83	1.63	1.77
No, still a lot to do	De Lage Landen	2.00	2.50	2.25	2.75	2.25	2.00	2.75	2.00	2.31
	Heemskerk	1.50	2.75	1.50	1.25	1.25	2.00	1.25	1.25	1.59
	Stork	1.00	1.00	1.00	3.00	1.00	1.00	4.00	5.00	2.13
	Wessanen	3.00	2.80	1.60	2.20	1.80	3.00	2.00	2.60	2.38
	Group average	1.88	2.26	1.59	2.30	1.58	2.00	2.50	2.71	2.10

PART C
CREATIVE DISTRICTS

9. THE USE OF VISUAL DECISION SUPPORT TOOLS IN AN INTERACTIVE STAKEHOLDER ANALYSIS – OLD PORTS AS NEW MAGNETS FOR CREATIVE URBAN DEVELOPMENT ²⁴

Abstract

Port cities are historically important breeding places of civilization and wealth, and act as attractive high-quality and sustainable places to live and work. They are core places for sustainable development for the entire spatial system as a result of their dynamism, which has in recent years reinforced their position as magnets in a spatial-economic force field. To understand and exploit this potential, the present study presents an analytical framework that links the opportunities provided by traditional port areas/cities to creative, resilient and sustainable urban development. Using evidence-based research, findings are presented from a case study by employing a stakeholder-based model—with interactive visual support tools as novel analysis methods—in a backcasting and forecasting exercise for sustainable development. The empirical study is carried out in and around the NDSM-area, a former dockyard in Amsterdam, the Netherlands. Various future images were used—in an interactive assessment incorporating classes of important stakeholders—as strategic vehicles to identify important policy challenges, and to evaluate options for converting historical-cultural urban port landscapes into sustainable and creative hotspots, starting by reusing, recovering, and regenerating such areas. This approach helps to identify successful policy strategies, and to bring together different forms of expertise in order to resolve conflicts between the interests (or values) of a multiplicity of stakeholders, with a view to stimulating economic vitality in combination with meeting social needs and ensuring the conservation of eco-systems in redesigning old port areas. The results indicate that the interactive policy support tools developed for the case study are fit for purpose, and are instrumental in designing sustainable urban port areas.

Keywords: port city; urban landscape; multifunctional landscape; stakeholder-based model; backcasting; forecasting; sustainable development

²⁴ Source: Kourtit, K., and Nijkamp, P. (2013). The Use of Visual Decision Support Tools in an Interactive Stakeholder Analysis – Old Ports as New Magnets for Creative Urban Development. *Sustainability*, 5, 4379-4405.

9.1 Introduction

Ports are the oldest logistics centers in international trade and have always been economic powerhouses in transport systems. Already in the 18th century, the grandfather of modern economics, Adam Smith, was referring to seashores and riverbanks as poles of economic wealth, as their openness allowed them to establish trade relationships with the rest of the world. In the course of time, ports have developed as major logistic magnets generating trade and transport connections all over the world. In addition, consequently, many port areas laid the foundation for an increase in welfare, not only for the direct urban or industrial areas concerned, but also for the hinterlands connected with these areas, and for all other places served by these ports. Over the course of time, port areas have become hotspots of economic activity. The ports' history, culture and economy originate predominantly from their adjacent oceans, seas, lakes and rivers. They acted as (centripetal and centrifugal) transportation hubs that favored openness in trade in a global economy. They were also often the scene of socio-economic inequality, with a strong tension between white-collar managers ('barons') and blue-collar workers. Especially with the advent of the Industrial Revolution (mid-19th century), ports became symbols of a new industrial age, thanks to advanced steamships, large-scale shipyards, *etc.*

In the past few decades, many port areas all over the world went through a phase of decline, as they became outdated, or were replaced by modern facilities elsewhere. This has left many cities with large harborfront areas that were dilapidated and showed clear signs of environmental decay and even poverty. Such brownfield sites have increasingly become a source of policy concern, and have stimulated the emergence of various urban land-use initiatives in order to exploit the hitherto unused economic, social, logistic, cultural and environmental opportunities of such areas. As a result, in recent years many cities have developed new policy mechanisms for upgrading their port brownfield sites through harborfront and seafront development (e.g., the London Dockyards, the Kop van Zuid in Rotterdam, and waterfronts in Cape Town, New York, Yokohama, Singapore, Helsinki, *etc.*). The two key phrases in this drastic land use conversion are: sustainable development and creative sector stimulation. Port areas may thus become precious containers of past architectural and socio-cultural heritage and expression. But this heritage is not a passive phenomenon, but may be the basis for innovative developments in urban areas by offering new residential, business, and tourist facilities in the short and middle to long term.

Harborfront development and port revitalization are all part of urban gentrification processes. This has not only a physical dimension (e.g., land use, real estate, infrastructure), but also a socio-economic dimension, (e.g., labor force participation, inclusion of less privileged groups, cultural diversity). We refer in this context to relevant studies on these issues by Atkinson [1], Butler [2] or Watt [3]. Harborfront have many things in common, but they may differ in terms of their social and economic functions and activities, where important aspects related to urban renewal and revitalization—including policy scenarios for creative and sustainable urban development—are considered to be necessary for effective interventions. This means that a reformulation of port cities' policies may require 'out of the box thinking', while bringing together different perspectives, original interpretations, imagination, and appropriate tools for conflict management. This calls for imagining a future with a full understanding of the consequences before creating it. This may lead to a new process of (re)designing port cities ranging from small to large interventions regarding the functionality and architecture of the port areas concerned—interventions which preserve historical heritage (tangible and intangible) in combination with smart modern buildings and facilities. This task has to be undertaken against the background of a complex urban carousel of challenges in order to enhance the socio-economic and ecological resilience of the port area—in relation to the city system—and to activate many initiatives that would convert historico-cultural urban port landscapes into sustainable and creative hotspots, starting by reusing, recovering, and regenerating such areas. However, the high degree of tension between different stakeholders' needs and local government strategies or urban planning initiatives related to these port areas may frustrate sustainable development. This presents the challenge to review the port city system from the perspective of new paradigms, based, for example, on '*creative minds*' principles [4]. For the definition of creative minds, we use the classification created by TNO [5] as a basis for the interviews. The definition of all these branches of the creative industries is based on the standard industrial classification [6] from Statistics Netherlands (CBS), which contains three types of creative firms, viz. arts, media and entertainment, and creative business services. Table 1 shows which economic activities are classified in these three groups.

Table 1. The classifications of the stakeholders ‘*creative minds*’ in the creative industries and the SBI codes: Arts, Media, and Creative Business Services (Source: [4]).

Main domains	Segments	Standard Industrial Classification (SBI)	
		SBI-1993	Description
Art	Music & Performing Arts, Museums, Theatres and Art galleries	92311	Performing of live stage art
		92312	Production of live stage art
		92313	Performing of casting art
		92321	Theatres, concert rooms, concert buildings
		92323	Services for performing art
		92521	Art galleries, exposition areas
		92522	Museums
Media	Film, TV, Radio, Photography, Publishing Broadcasting, Amusement and entertainment, Press	2211	Publishers of books
		2212	Publishers of periodicals
		2213	Publishers of magazines
		2214	Publishers of sound recording
		2215	Other publishers
		74811	Photography
		92111	Production of movies
		92112	Supporting services for movie production
		92201	Broadcasting organizations
		92202	Production of radio- and TV programs
		92203	Supporting activities for radio and TV
		9212	Distribution of movies
		9213	Cinemas
92343	Other entertainment		
9240	Press-, news agencies; journalists		
Creative Business Services	Advertising and Marketing, Information and Technology, Architecture, Design and Fashion	74201	Architecture and technical design
		74202	Technical design/advice, e.g., city building
		74401	Commercial design- and consultancy agencies
		74402	Other commercial services
		74875	Interior and fashion designers

Such novel ways of thinking are increasingly required and linked to new, efficient and effective urban planning, governance, and management processes in order to finally ensure broad stakeholder acceptance. This calls for new evaluation and assessment tools and techniques in order to confront decision makers with a consistent set of sustainable strategic choices and changes (by extending the range of possibilities and preferences) in relation to creative urban development, while considering a stakeholder participation-based approach

(‘bottom up’ strategy) [7,8], using, for example, interactive methods based on what we call the ‘urban Facebook’ concept. In this context, such a concept could be an important analytical vehicle, through a multilayered bottom-up approach, to systematically map out various local stakeholders’ needs, knowledge domains, interventions and perspectives (backcasting) into new visions and urban development strategies [9]. These various stakeholders may be characterized as early adopters or social innovators [10], and hence their behavior may be seen as trend-setting for a much larger population.

The present paper aims to further develop the multilayered stakeholder-based framework by introducing and elaborating what we call the ‘*urban Facebook for urban facelifts*’, an approach that is extensively supported by high-quality visual assessment tools for mapping novel redevelopment initiatives, in order to be able to identify and understand specific local needs and necessary spatial developments. It offers a basis for interventions that tackle present and future urban problems, foundations, challenges, and consequences (in combination with urban scenarios, which are essentially strategic future image experiments based on, for example, the imagining of future port cities’ positions) designed to achieve the desired goals related to urban strategic visions, while, in addition, this approach may encourage the urban economy to stay (internationally) competitive.

Our empirical case study was carried out in and around the NDSM-area, a former dockyard in Amsterdam, the Netherlands. This study was undertaken in the context of transitional urban port systems for sustainable urban development, from a forward-looking long-term strategic policy perspective (a combination of backcasting and forecasting approaches), which meets the needs, and addresses the concerns, of its various users, where vision and strategy have to fit well with their environment. This bottom-up approach is, *inter alia*, based on information collected, during interviews, from different stakeholders with a wide range of interests in relation to the area, followed by the use of a strength-weakness opportunities-threats (SWOT) analysis methodology with visual support tools. All this is done in order to develop a collective and quantitative evaluation of the socio-economic performance of the NDSM, which focuses on its physical use, characteristics, and historical landscape attributes.

This paper is organized as follows. Section 2 is devoted to an overview of the NDSM Wharf as a new development core in Amsterdam. Then, Section 3 presents the methodology for assessing the NDSM-district, whereby past, current and future effects are assessed from a broad perspective. Section 4 then introduces the SWOT analysis, which leads to the design and presentation of a conceptual ‘urban Facebook’ for an NDSM Facelift. In Section 5, the urban Facebook is elaborated, including the database employed and the architecture of our exploratory data analysis, leading ultimately to the identification of the most suitable ‘Urban Facelift’. This information is then further used in Section 6, which presents the results of our operational ‘urban Facebook’ by linking the present performance of the area to various future perspectives and urban future images for the revitalization of the NDSM. Finally, Section 7 makes some retrospective and prospective observations on our policy research, in particular on the NDSM district.

9.2 The NDSM Wharf as a New Development Experiment

The NDSM, a former dockyard on the northern banks of the River IJ in Amsterdam, has become a culture-based creativity and social innovation district with a great diversity of trendy facilities and seemingly uncontrolled land use. This area is sometimes called the NDSM-Safari (see Figure 1).



Figure 1. Map of the NDSM-Safari in Amsterdam.

Source: PICNIC 2011 in de steigers; by Waag Society (Institute for art, science and technology. Waag Society is situated in Amsterdam and develops creative technology for social innovation).

The ‘*NDSM-Safari*’ serves as a laboratory of informal and formal living and working spaces with new infrastructure for the collaboration of creative minds—a bubbly mix of activities directly involved in the development and production of cultural, creative and innovative products and services—for new urban development and advanced urban competitiveness. It is hoped that creative minds will develop innovative ideas and suggest new pathways to sustainable development, and act as central breeding places for a broad range of various stakeholders in search of original concepts in a globalizing competitive world [4]. From this perspective, creative minds have an exceptional innovation potential in terms of both ideas and practices. Therefore, they may act as effective growth engines in modern cities.

The existing ‘bohemian landscape’ of the NDSM shipyard, with its historical background, exploits its rough and untouched diversity and flexibility characteristics. It has gone through a number of different phases generated by the creative minds of the district and renews itself often, so its creative bubble of mixed functionality and working class population [11] is well-recognized and a great inspiration for the next stage of the development of the urban core. It can provide many illustrations of an informal repositioning and redevelopment of a district with a great potential, but the local authority has no clear long-term strategic view or commitment regarding the potential of the ‘creative minds’.

The future form of the *NDSM-Safari* is already taking shape. However, as just mentioned, it lacks both long-term strategies (e.g., a solid and integrated breeding place policy) to meet the important needs and preferences of the various stakeholders and guarantees by the local authority to create a ‘*sustainable home*’ for various professionals, businesses, and artists. And it should not remain only as a temporary ‘*project*’, but become a new part of a future productive urban landscape instead of an isolated breeding place. This means that viable strategic options have to be interpreted and discussed in an integrated multilayered framework in order to provide a sound basis for the possible preparation of conditions for the further redevelopment of the NDSM location as a district for the production of urban culture. There, place-based characteristics and opportunities, and historical landscape attributes may draw (more) creative minds and innovative business models to certain sites, where they can share and combine their (international) knowledge and expertise with challenging socio-economic opportunities. This requires an understanding of more than just the commercial side of this

district or the decrease of the 20 sub-clusters located there, in order to realize their common interests in the NDSM vision and come to a general strategic core policy.

It is noteworthy that the presence and experience (individual visions, preferences and values) of creative minds can create critical conditions for the level of attractiveness of this historical and cultural district as a favorable concentration of geographical space (clusters). In and around the NDSM district, the various stakeholders can experience the inspiring urban atmosphere and ‘cool image’ (e.g., visual features, reputation), which are crucial for creative and innovative working processes. The value, for instance, that firms put on the NDSM-district regarding their location-decisions based on their preferences intensities and criteria for visual assets may positively influence these firms’ (business) performance and strategic choices. These, in turn, may bring about positive socio-economic achievements, which may enhance the attractiveness of port cities and regions and, ultimately, achieve a high degree of sustainability and competitive advantage [12]. In order to generate positive externalities, regions and cities have to listen to the various stakeholders and provide unique geographical and location conditions and facilities—beyond other competitive assets—in order to attract talent and firms to relatively deprived regions. This issue has been repeatedly addressed in the past by the local authority.

From this perspective, the present situation regarding the sustainable development of NDSM calls for a careful evaluation of this hotspot, which assumes that this ‘port system within a system’ of the city Amsterdam [13] will create the possibilities and new opportunities for the entrance of new cultural and innovative activities such as ‘hip’ cultural areas, which can give a sense of freedom to (new) creative minds. Hence, the main aim of this empirical research is to develop and support a new and promising future orientation for the district’s sustainable development, based on a multilayered stakeholder-oriented approach (which, in redesigning the port area, attempts to resolve conflicts between the interests or values of a multiplicity of stakeholders, while favoring economic prosperity in combination with meeting social needs).

9.3 Research Methodology

Our central methodological research task is to develop a multilayered stakeholder-based analysis framework that is fit-for-purpose for the NDSM-district, and is able to analyze its

future potential, using interactive methods, where the form of the urban facelift embraces different levels of urban revitalization for the district’s sustainable development.

This conceptual evaluation framework can be characterized as a pro-active process of choosing viable strategic choice(s) and a facelift for areas based on various stakeholders’ preferences and values, in the form of a SWOT analysis. In this analysis, the indicators that can influence the constellation of socio-economic characteristics of port and city systems were converted into a long list of important criteria and presented to the interviewees. This process can be systematically divided into six steps, with regard to the socio-economic context (based on the ‘Strategic Choice Analysis’ (SCA) approach [14], starting from the NDSM development assessment, and ending with conclusions and the identification of policy recommendations for a new urban facelift (see Figure 2). This approach can also be seen as a toolkit for the sustainable development of other port cities, cities and regions, which are aiming to enhance their dynamic profile.

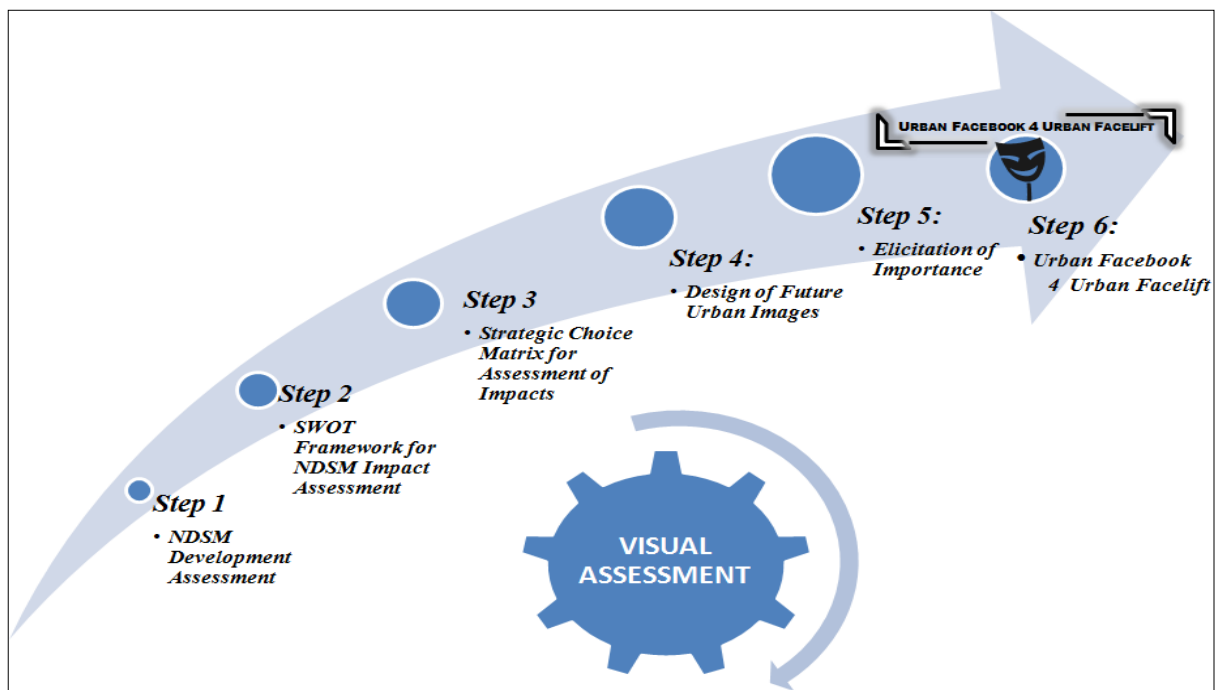


Figure 2. Stepwise presentation of the evaluation to identify the most effective strategic choices, images, and opportunities for the sustainable development of the NDSM district.

This process starts with the assessment of the physical use, characteristics, and historical landscape attributes and developments of the NDSM district, and ultimately identifies general

strategic ideas for its future sustainable development (by backcasting and forecasting). Furthermore, this process is fully supported by a collection of interesting pictures of buildings, restaurants, hotels, abandoned areas, the general atmosphere, and spaces (urban faces) that can be considered as important factors for the district's future sustainable development.

Based on these most representative pictures of the NDSM-district, which illustrate both positive and negative aspects, four representative urban faces emerged, and were presented to a group of important stakeholders (from artists to entrepreneurs), operating in and around the NDSM-district, during a semi-structured interview. This was done in order to find the optimal level of revitalization to maximize their strategic options and opportunities for future sustainable development. Figure 3 presents the four strategic urban faces of the NDSM district as they exist at present.



Figure 3. The four most representative pictures of the NDSM-district.

These four strategic urban faces are based on two dimensions: first, the combination of historical heritage (tangible and intangible) and modernity, regarding the functionality and architecture of the district; and, second, either piecewise (project) or integrated (program) redevelopment of the district. From this point of view, a 'strategic future urban faces diagram' can be created in which specific levels of revitalization are distinguished (see Figure 4). These four strategic urban faces cover both local and global scales.

To evaluate the performance of these four strategic urban faces, each stakeholder was asked to rank each urban face with a score, varying from '1 = low' to '5 = very high', according to a long list of criteria (pairwise comparison of indicators) (see Appendix A, Table A1) extracted from the SWOT analysis. Interviewees were also asked if there were other important

indicators they have had experienced. The long list of criteria gathered from extensive interviews with various stakeholders and literature sources on, respectively, the negative and positive benefits of the NDSM area (in a SWOT analysis) was then systematized and summarized by means of a Principal Component Analysis (PCA). This enabled us to extract the four most important strategic components: namely, economic vitality; accessibility; cultural diversity; and ecological sustainability (for details of the PCA see Appendix B, Tables B1 and B2 and Figure B1).

To link the long-term strategies to short- and medium-term operations, these strategic domains have to be translated into a new potential vision of the NDSM district that can lead to a clear strategic direction and effective related actions. Thus the focus on these strategic domains needs a clear interdisciplinary orientation that is centered on the future sustainability of the port city system, which may bring breakthrough innovations on that could reinforce the creative bubble of mixed activities and multifunctionality in and around the NDSM district.

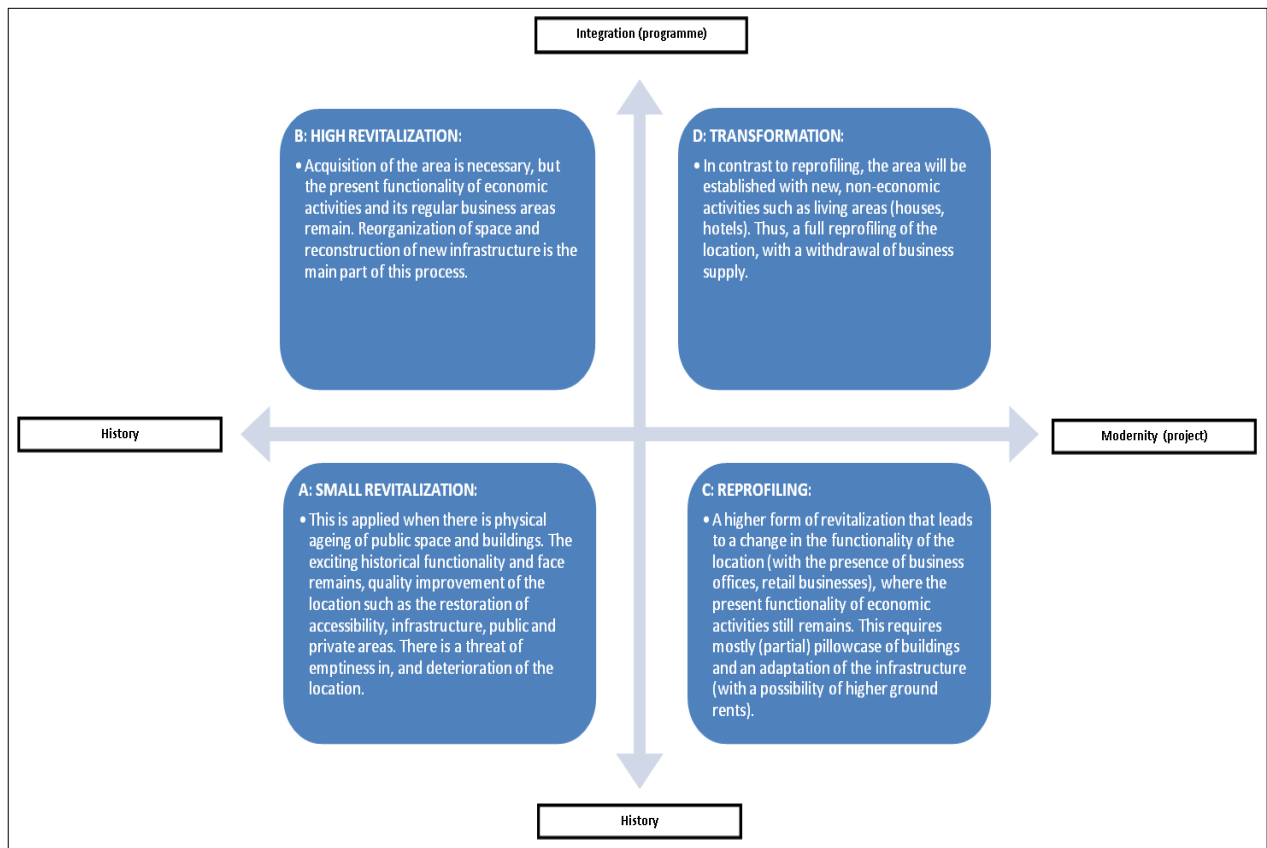


Figure 4. Four strategic future urban faces.

Table 2 shows the long list of indicators that we used to evaluate each of the four components with regard to the values and preferences of the four strategic urban faces. The NDSM-district calls for strategic public governance systems that reinforce its potential. To assess the ‘competitive advantage’ a la Porter of such new urban governance systems, it is necessary to design a relevant indicator system that shapes the multilevel creative resources of this urban district. This is also a necessary step for a benchmark performance analysis of the success and failure conditions of urban policy. Clearly, such indicators should be transparent, manageable, testable, comparable, representative, and policy-relevant [15].

Next, to extract from these main domains systematic and coherent viable long-term strategies for sustainable urban development, we adopted four related thematic alternatives, which we called ‘urban future images’ of stylized appearances of urban agglomerations in the year 2050, introduced for the first time in Nijkamp and Kourtit [16]. These urban images may be used as strategic vehicles to identify important challenges and foundations for the innovative development of the NDSM district towards a new ‘urban facelift’ (by forecasting and backcasting approaches). These strategic alternatives are briefly described in Table 3. Thus, to evaluate the performance of these four strategic urban faces (A–D), each stakeholder was asked to rank each urban face with a rating, varying from ‘1 = low’ to ‘5 = very high’ in the context of the four alternative ‘urban images 2050’—in a structured impact matrix, where the alternatives refer to future developments of the NDSM district.

Table 2. Evaluation indicators of the four components with regard to the values and preferences of strategic urban faces.

Main domains	Criteria
Accessibility & Learning School	<i>Independent ultimate events venue</i> <i>Enjoyment</i> <i>Dynamic ‘oasis’</i> <i>Accessibility</i> <i>Independence & creative atmosphere</i> <i>Learning</i> <i>Function</i> <i>Transportation</i>
Innovation & Economic Vitality	<i>Urban socio-economic climate</i> <i>Traditional workspaces and activities</i> <i>Cultural profile</i> <i>Creative image</i> <i>Strong cultural and creative profile</i> <i>Business climate</i>





	<i>Long-term strategies</i> <i>Quality of life and sustainability</i>
Cultural Diversity & Entrance	<i>Quality of urban life</i> <i>Demography</i> <i>Cultural amenities</i> <i>Low rent</i>
Quality & Ecological Sustainability	<i>Urban design and architecture</i> <i>Urban land use</i> <i>Criminality</i>

Source: authors' elaboration.

The images in this Facebook are based on smart-physical and immaterial-infrastructure. All of their elements are centered on a spatially integrated force field for the NDSM-area that entrances the competitive capacities of different stakeholders in that area. In a recent study [15], various analytical contributions can be found, such as the FIRES-Quare model, the XXQ Pentagon model, the leader and organizing capacity approach, or the smart infrastructure model.

This '*urban Facebook*' framework has found support from previous scientifically orientated works that have shifted the focus of evaluation models in policy design and urban planning towards the sustainable development of the diversity of the important values and preferences relating to urban areas. This includes the need for the involvement of different stakeholders whose preferences and values are associated with these areas, in the process of design, and ultimately implementation. Examples of such works are: '*strategic choice analysis*' [14]; the evaluation of historical districts in cities [17]; and the assessment of district visual quality in the location decisions of creative entrepreneurs [18].

Table 3. Strategic Choice Impact Matrix.

		FUTURE URBAN IMAGES			
		The Entrepreneurial City 2050	The Connected City 2050	The Pioneer City 2050	The Liveable City 2050
URBAN FACES		This image assumes that in the climate of current and future global and local competition, Europe can only survive if it is able to maximize its innovative and commercial potential in order to gain access to emerging markets outside Europe; cities are then spearheads of Europe's globalization policy. This image covers a range of entrepreneurs, from SMEs and migrant entrepreneurs to globally-operating firms. The key drivers behind this image, and supporting the change, are innovation and economic vitality.	The image of a connected city refers to the fact that in an interlinked (from local to global) world, cities can no longer be economic islands in themselves ("no fortresses"), but have to seek their development opportunities in the development of advanced transportation infrastructures, smart logistics systems and accessible digital communication systems , through which cities become nodes or hubs in polycentric networks (including knowledge and innovation networks). The key drivers that influence the form of this image are Smart logistics and sustainable mobility.	This image refers to the innovative "melting pot" character of urban areas in the future, which through open communication channels will show an unprecedented cultural diversity and fragmentation of lifestyles in European cities; this will present not only big challenges but also great opportunities for smart and creative initiatives in future cities, through which Europe can become a global pioneer. In this image important key elements to reduce the welfare gap are social participation and social capital.	This ecological-based image addresses the view that cities are not only energy consumers (and hence environmental polluters), but may through smart environmental and energy initiatives (e.g. recycling and waste recuperation) act as engines for ecologically-benign strategies, so that cities may become climate-neutral agents in a future space-economy; cities in Europe will then be attractive places to live and work, with a global international outreach. In this image, the critical components ecological sustainability and high quality of life will lead to a better balance between resources and efforts used to achieve this.
	Urban face A				
	Urban face B				
	Urban face C				
	Urban face D				

Source: authors' elaboration.

This approach improves and increases the ability to recognize the importance of understanding the characteristics of an area and the preferences for socio-economic and environmental values, including the involvement of all stakeholders' interests in a way that brings and keeps them together, and thus offers a broader perspective regarding the district's sustainable development. It is noteworthy that the local authority has to realize that it needs the support of important stakeholders (private companies and, for instance, representatives of civic organizations) to make the revitalization and the implementation of urban facelifts successful.

It is of the utmost importance to distinguish the various stakeholders, and involve them in the planning process of sustainable development under uncertainty.

9.4 NDSM State of the Art: SWOT Analysis

To position the impacts on the NDSM-district in a broader strategic context of socio-economic benefits, this section give a systematic overview of the various effects, mainly in the form of a Strength-Weakness Opportunities-Threats (SWOT) analysis, in which past, current, and future effects are assessed from a broad perspective, extensively supported by the strategic urban faces (A–D) [14]. This review results in the construction of a list of the impacts on the NDSM-district that is used here as a case study. In this connection, the stakeholders were asked to identify and to prioritize the most important strength (S) and weakness (W) factors for the NDSM-district from a long-term strategic perspective for the distinct domains of innovation development and cultural diversity importance (derived from the strategic view concerning the future of the NDSM-area).

The results in Tables 4 and 5 show the key factors, as identified by the various stakeholders in the process, including both the S and W elements. These data indicate the relevant factors of both domains of the NDSM district, along with their impact on the elements Opportunities (O) and Threats (T). This information represents the vital and creative contribution of creative minds to the urban economy, and can aid the development of appropriate strategic policies for countries [14]. Tables 4 and 5 present the impacts from the SWOT analysis undertaken in this section, and will be used later in this paper as an input in the framework developed for identifying the level of revitalization necessary to achieve a new urban facelift and related strategies with regard to the NDSM-district.

Table 4. SWOT analysis—innovation development.

Innovation Development	
Strengths (S)	Weaknesses (W)
<ol style="list-style-type: none"> 1. <i>Innovation force</i> *** 2. <i>Creative industry</i> *** 3. Innovative cluster 4. Entrepreneurship 5. Strength of competition 6. Economic growth 7. Supply of affordable work and living spaces 	<ol style="list-style-type: none"> 1. <i>Below-average growth</i> *** 2. <i>Transfer abroad</i> *** 3. Recognition of creative minds 4. Poor professionalization 5. No long-term strategies or clear vision 6. Youth participation 7. Traditional sectors
Opportunities (O)	Threats (T)
<ol style="list-style-type: none"> 1. <i>New innovative products and services</i> 2. <i>New markets</i> 3. <i>Urban vitality</i> 4. Launch new initiatives 5. Employment opportunities 6. Creative business climate 7. Internationalization of the city 8. Knowledge spillovers 9. International contacts 10. Enhancement of small- & medium-sized businesses 11. Sustainable competition 	<ol style="list-style-type: none"> 1. <i>Poor institutionalization</i> *** 2. <i>Rise of the informal economy</i> *** 3. Temporary area projects

Source: authors' elaboration.

Table 5. SWOT analysis—cultural diversity.

Cultural Diversity	
Strengths (S)	Weaknesses (W)
<ol style="list-style-type: none"> 1. <i>Creativity</i> *** 2. <i>Economic profile</i> *** 3. Network organizations well-known and connected with the Dutch and international creative industries 4. Urban benefits ‘cultural diversity’ 5. Socio-cultural enrichment 6. Strong social networks 7. Diverse facilities 8. Accessibility 9. Cultural and free image 10. High quality lifestyles 11. Cultural identities 12. Connect informal and formal networks 13. Largest cultural hub in Amsterdam 	<ol style="list-style-type: none"> 1. <i>Quality of Life</i> *** 2. <i>Dual society</i> *** 3. Insufficient use of cultural diversity 4. Lost of trust in the government 5. Abandoned areas 6. No structured interaction between creative minds and the local authority
Opportunities (O)	Threats (T)
<ol style="list-style-type: none"> 1. <i>Innovativeness</i> *** 2. <i>Social cohesion</i> *** 3. <i>Social solidarity</i> *** 4. A wide arrangement of resources and efforts 5. Inspiration and cultural expression 6. Cooperation between different disciplines 7. Reinforcement of internationalization 	<ol style="list-style-type: none"> 1. Neighborhood criminality

Source: authors’ elaboration.

Table 4 shows that the majority of the stakeholders valued innovation force and creative industry (S1 and S2) as the most important strengths, which have a strong impact on new products, new markets, urban vitality and also the creative business climate (O1, O2, O3 and O4). Where below average growth and transfer abroad (W1 and W2) were identified as the most important weaknesses, these have a strong impact on poor institutionalization, the rise of the informal economy (T1 en T2), and urban vitality (O3).

Table 5 shows that the majority of the stakeholders were convinced that creativity and a strong economic profile of businesses (S1 and S2) are the most important strengths, and both have a strong impact on innovativeness (O1) and neighborhood criminality (T1). However,

quality of life and the dual society (W1 and W2) are experienced as the most important weaknesses, both having a strong impact on social solidarity, social cohesion (O2 en O3), and neighborhood criminality (T1).

In recent years, the creative industries [19] have received increasing attention from policymakers in the Netherlands, particularly in Amsterdam, where long-term policies for these industries are included in strategic city policies and the planning of several different fields. Amsterdam is the base for a rich diversity of cultural and economic activities, including international-related knowledge-intensive activities. It has developed many policy strategies that aim to attract the firms of the creative industries, especially SMEs, in order to encourage the further development of this promising sector for socio-economic growth. Abandoned industrial locations like the former NDSM shipyard are being gradually transformed stage by stage into attractive locations as ‘creative and innovative hubs’ with a ‘cool’ image for a growing number of talented and skilled firms and people in both the creative and other industries.

Nowadays, the NDSM district is the largest cultural hub in Amsterdam, and offers facilities for several artistic disciplines. Thus, the area is not only a geographic hub for the bohemians, but is also becoming a strong ‘innovative cluster’ for various firms in the creative industries. Over the years, it has become the place for the creation of employment opportunities and the supply of affordable work and living spaces, and it has presented a cultural and unconstrained image for potential users of the district. All this plays an important role in the development and maintenance of high-quality lifestyles and cultural identities within the city. It brings together several informal and formal networks that create added value (incl. inspiration, cultural expression opportunities, cooperation between different disciplines). Furthermore, it encourages innovation forces in the creative industries and the launch of new initiatives (e.g., PICNIC, CCAA, Amsterdam Creativity Exchange, Amsterdam Innovation Motor, HTNK), new products, and the development of new market segments (most artists cannot live from the art market alone), which all contribute to the attractiveness and vitality, and an increase in the national and international appeal of the port and city system. Already in 1989, Harvey stated that “it particularly does so when an urban terrain is opened for display, fashion and the ‘presentation of self’ in a surrounding of spectacle and play. If everyone, from punks and rap artists to the ‘yuppies’ and the haute bourgeoisie can participate in the production

of an urban image through their production of social space, then all can at least feel some sense of belonging to that place” ([20], p.13).

Unfortunately, the cultural diversity of this ‘urban terrain’ in Amsterdam is insufficiently used as a cultural, economic and international asset for the broadening and growth of the creative industries, which could put the area on the international map. In the opinion of the various actors, the importance and presence of these available innovative businesses, and their trendy products and services for the various market (mostly highly segmented) that provide future income sources, have not been sufficiently recognized by the public and the government.

The creative professionals do often not interact with the local authority on a structural basis. However, the new initiatives (network organizations) are well known and have connections with the Dutch and international creative industries both to stimulate their maturity and professionalization and to improve their economic performance. They open their informal and formal networks for the creative industries in order to develop a coaching and managing trajectory (a one-stop-shop for the creative industries) and increase the wide provision of resources and efforts that play a very important role in halting the neglect of areas. Furthermore, by enhancing their cultural position, realizing a varied and high-quality image (the general atmosphere and hospitality), bundling and strengthening their innovative powers, increasing national and international knowledge sharing and contemporary collaborations of different partners and firms (social cohesion and social solidarity), they help to turn a raw talent into a potential and professional entrepreneur and attract international sponsors and large projects (e.g., the Red Light Fashion Amsterdam Project, Redlight Design Amsterdam) for establishing cross-cultural collaborations, creative and innovative networks and (formally) strengthening Amsterdam’s international cultural reputation and the city’s economic growth (and the decline of the informal economy in this district).

It would help to invest more in the development of creative and cultural competences and talents (entrepreneurial skills) and to connect the chain of cultural and economic activities, as the NDSM-district could stimulate high quality cultural production and international trade-connections. Therefore, it is important to: create opportunities to stimulate young creative and innovative entrepreneurs; encourage their creativity, professional development (economic independence) and entrepreneurship; market their activities more efficiently; and innovate in

order to adjust to changing markets, both locally and internationally. Therefore, opportunities to share knowledge, exchange information and gain access to international market segments are very important. In this respect, the interdisciplinary engagement of innovative professionals from different fields, such as architecture, music, and art, would provide an opportunity to develop innovative products.

In conclusion, the NDSM-district is a good example of a source of creativity and innovation, but is still lacking a clear and robust vision to develop a ‘*sustainable home*’. This increases the risk of losing important growth opportunities to transform or improve the district and city’s image into a cultural and creative ‘*safari*’ that clearly reflects its unique identity and high values, including the involvement of creative minds and their preferences in order to develop a shared vision that illustrates a strong synergy of collective expertise and development plans. This new approach leads to new opportunities for different levels of revitalization, in the transformation from a historical industrial area into a more healthy creative urban bubble of mixed functions. Here, the innovative hub with its cultural activities serves several more goals than just providing a cheap place to work and live. Moreover, it clearly stimulates a social infrastructure or network and contributes to the cultural enrichment of a city.

The next section takes a closer look at the possibility to have an ‘urban facebook for urban facelifts’ for the NDSM shipyard, based on the preferences of creative minds and the value they put on the NDSM district.

9.5 An Urban Facebook for Facelifts

The SWOT analysis resulted in an overview that respects the history of the area and integrates many of the historic elements, in order to identify its potential ‘look’ and find the optimum solution for the area by taking into consideration the stakeholders’ opinions and points of view. Based on the SWOT analysis and the strategic and visual assessment derived from the interviews, our Strategic Choice Analysis (SCA)—as a vehicle for assessing and developing strategic policies for the development of the NDSM district—aims to identify [14]:

- the most important Strength factors to be used to participate in, or take advantage of, Opportunities (SO strategies) and to counter or avoid Threats (ST strategies) with regard to the various levels of revitalization;

- the most important Weakness factor to be eliminated (SO) or improved in order to be able to participate in Opportunities (WO strategies) and to counter or avoid the impact of Threats (WT strategies) with regard to the various levels of revitalization;
- the most important strategic proposals to be used to take advantage of the Strengths and Opportunities detected or to avoid the Weaknesses and Threats identified with regard to the various levels of revitalization.

The results are organized according to the importance of the NDSM landscape, future strategies, the needs, preferences, and values of the users, and the *safari*-profile defined as policy guidelines for the sustainable development of the area. To determine the degree of importance of the various levels of revitalization, the rank order of the urban faces ranges from 0 points for each irrelevant impact to 5 points for the most important impacts. After multiplying each score with its given importance classes, we are then able to synthesize all scores to determine the strongest factors for the two relevant, socio-economic domains derived from the strategic view for the NDSM district. Once all the important factors have been reviewed in order to assess perceived importance categories, strategic choices are then made by selecting the particular urban face that will most greatly influence policy strategies, viz. a combination of S and W elements for the two relevant socio-economic areas of the NDSM area, along with their impact on O and T. All this information can aid in the development of appropriate strategic policies for the port and city, including the NDSM district [14].

In Section 4, several challenges and opportunities were identified for the transformation and improvement of the NDSM-district, with a view to providing a balanced future for an XXQ urban system (based on the ‘XXQ’ principle that refers to the highest possible urban quality [21]). According to this, the unique NDSM area definitely needs a clear and transparent long-term strategy that takes into consideration both the entire potential of the place and the individual preferences, in order to ensure a high degree of transparency and future security. The spider diagram in Figure 5 represents the importance and values with regard to the levels of revitalization recommended by various stakeholders, according to the long list of criteria considered in the urban facebook evaluation system.

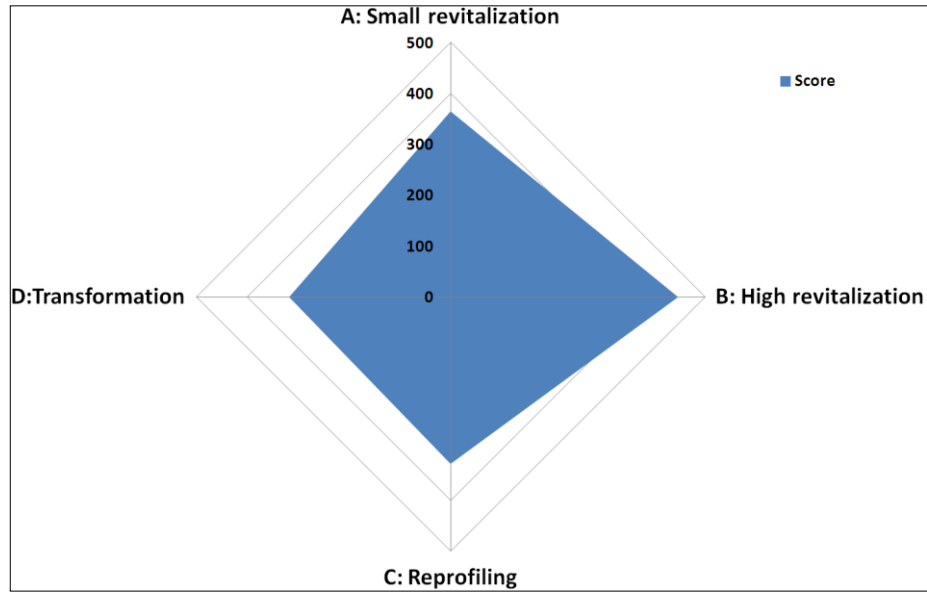


Figure 5. Visual representation of the various levels of revitalization recommended by the stakeholders.

The findings shown in Figure 5 indicate that, on the basis of the long list of criteria, Urban Face B that envisages a high degree of revitalization for the NDSM district is considered by the majority to be the most important and preferable strategic choice for it to become a place for a variety of events and cultural activities which can bring visitors and business into the area. The second preferred strategic option for the district is Urban Face A with a small degree of revitalization, where the presence of different users and socio-economic segments and activities in and around the district, including professional needs and interests will arise in the (re)development process. The results show that Urban Faces C and D compared with the other two Urban Faces play a less dominant role in the preferences.

Figure 6 shows that Urban Face A includes a combination of key effective forces, such as creative atmosphere (score: 19), learning (score: 19), accessibility (score: 18), independent events venue (score: 17), dynamic ‘oasis’ (score: 17), traditional workspaces and activities (score: 18), all of which are driving evolutionary and successful change, in an overall transition from a weak to a strong multi-functional and energetic creative hub.

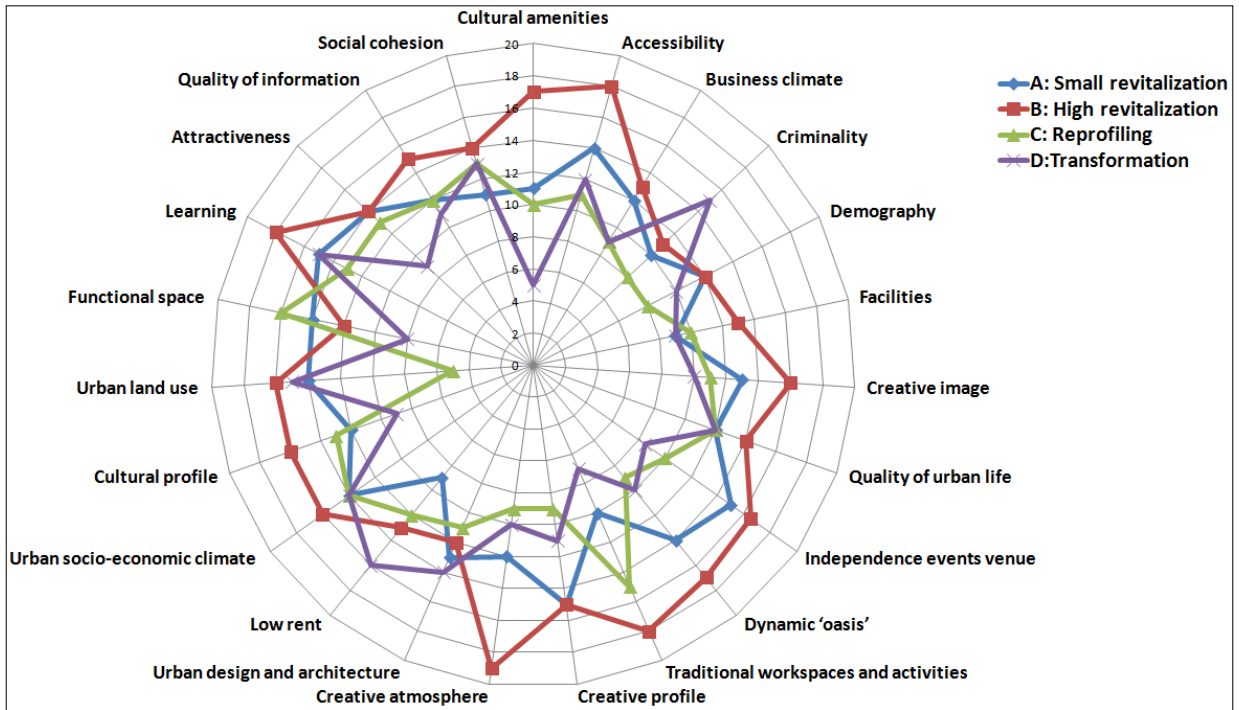


Figure 6. The criteria scores of the urban faces.

The NDSM area is a place of creativity and innovation (the main strengths of the area), and is currently being experienced as a *‘warm nest for creative minds’*, and a place that provides the creative inspiration that the stakeholders need in order to develop their projects, and where they can develop their entrepreneurial skills without being disturbed. Furthermore, it is a perfect place for all kinds of events. The community consists of young creative pioneers—the average age of the entrepreneurs in the NDSM is very low, so the area can become a place for the young generation to start their business and enrich their professional experience (in sustainability learning centers supported by innovation forces). Thus, it is a *‘welcome place’* for start-ups where the creative and innovative community is consolidated and always willing to help. This presents a potential ‘look’ that maintains the district’s important historical originality and architecture, but with a strong recommendation for the reorganization of space and the reconstruction of new infrastructure, while simultaneously preserving the cultural values.

However, the need for a long-term strategy for the area is still felt strongly among the creative minds, although they did not always agree with the previous transformations and direction of (re)development. For example, event planners would like to attract more tourists to

this area, while the artists do not agree with this idea. However, they do share certain opinions based on their field of activities, and do believe that is necessary to strike a balance between independence (to give a feeling of creative freedom to various people about all the possibilities of the area) and efficient regulation and policies, and a balance between the need to revitalize the economic side of the area (tourism) and the possibility to be able to explore their creativity (core business) without constraints.

Finally, they still do not see a clear relation between the selected pictures and the criteria to score the performance of the Urban Faces in and around the NDSM-district. This brings our research study to the next level in the urban Facebook framework and a prompt breakthrough, based on the list of criteria, in developing a realistic future potential look ('Urban Face') and a *place 4 all*. The lack of clear long-term strategies and steering mechanism (governance strategies) may distort people's perception and points of view. This suggests the need to create a complex '*welcome image*' regarding the history and the current use of the area in order to adopt an integrated approach for the realistic metamorphosis of the area—including the involvement of all stakeholders' interests, which brings and keeps them together and offers a broader perspective regarding the district's sustainable development.

In conclusion, the presence of the creative bubble of mixed functionality of cultural and economic activities, historical buildings and historic values, and memories is perceived as very important and represents a welcoming image of the area. However, the need to further revitalize the space and provide new infrastructure and networks is still an important part of this process. In this respect, the integrated approach of the local authority to the notion of 'creative community' is noteworthy. This embraces different sets of common preferences and options that together address issues in the evaluation process, and come up with the development of innovative solutions in order to prevent the area from declining in its attractiveness for the various stakeholders, who would subsequently experience a degradation in their quality of urban life (the 'XXQ' principle [19]); and, from a broader perspective, to ameliorate the socio-economic issues.

9.6 Urban Future Images NDSM-District

To evaluate the strategic position of the Urban Faces for the NDSM-district towards *a place 4 all* for future sustainable development, it is necessary to look at the present situation in terms of the performance across the different viable future image areas: the Entrepreneurial City, the Connected City, the Pioneer City, and the Livable City. These four future images highlight the strategic dimensions of urban futures in Europe. They lend themselves to systemic approaches for the future positioning of the NDSM-district, and reflect the need for strategic thinking on the governance of urban agglomerations for this area from different future perspectives. The ranking levels that each Urban Face achieves in a particular future urban image are: low (1); medium (2); high (3); and very high (4) (pairwise comparison) in order to identify which urban face fits best in different future circumstances in 2050. Figure 7 presents photos A–D in an order that best fits the importance of, and preferences for the four Urban Faces, in order to develop a shared vision and strategies that could lead to new opportunities for different preferences.



Figure 7. Urban faces positioned in best-fit urban perspectives.

A. Livable City 2050

Urban face A is strongly related to the Livable City 2050. This image shows a more or less abandoned area and buildings with no clear environmental function or relation to general city policy strategies for the coming years. However, it has strong historical value and special historical memories. Therefore, various stakeholders strongly prefer to keep its original structure and make it a liveable place for eco-tourists and visitors who visit the area for ecological reasons. This approach definitively needs high revitalization. This image perspective

envisions the area as a place to live and for leisure activities, in other words, as a residential area.

B. Connected City 2050

This image focuses more on the connection between the NDSM-district and other parts of Amsterdam in terms of transport and infrastructure. This image refers more to the Connected City 2050, where just a small degree of revitalization is required. A few modifications are needed regarding this image to value its potential as a factor for the accessibility of the area.

C. Pioneer City 2050

This image needs a total transformation in order to keep the vibe ('spiky environment') in the area on a high level instead of only being a cheap 'sleeping place' for students—which leads us strongly to the Pioneer City 2050. However, students are a source of creativity and innovation, and need to be involved in this dynamic knowledge arena. This image is more connected to an entrepreneurial perspective that is open to new technologies and has the potential for innovation.

D. Entrepreneurial City 2050

In this case this area would be focused on creative business and start-ups. The building in Photo D and part of the area have an important meaning for all the people living and working in the NDSM district due to their history and activities during the weekend (a market has been opened inside). This area is not fully used. An option would be to give entrepreneurs more freedom and space to develop all kinds of activities in this area and inside the building so that the place may become more productive. According to various stakeholders, this Urban Face will need new functions, and therefore it has to be included in the reprofiling category.

In conclusion, the lesson from the previous analysis is that the local authority should involve various stakeholders and gain their trust in (re)developing a positioning strategy towards a high level of transparency, and a high level of productive environment that can positively affect issues such as social segregation, housing policy, infrastructure and logistics,

environmental sustainability, urban land use, smart energy use, negative urban externalities, and the NDSM district's (international) competitive position. All this requires novel insights and policy strategies in order to make the future '*a place 4 all*'.

This would give the area the opportunity to have a new kind of urban facelift in the form of the *Welcome City 2050*. The new image addresses the view that cities in an open world have always been a place of cultural exchange. The urban multi-historical component plays a key role in determining the identity, diversity, and cultural richness of the port and city system. In this image, both the port and city become an attraction pole for a rising number of international creative minds and tourists. The area is culturally and ethnically located in a strong diverse metropolitan area. Historically, different groups and activities in and around the district have populated this area, in which these groups have actually been seeking spatial segregation to strengthen the cultural and creative identity of this district, as is often the case with immigrant groups.

There is strong collaboration between the creative entrepreneurs working in the NDSM-district, mostly based on technical issues and part of their product value chain. The very act of sharing a workplace and/or working with people full of passion regarding their work and being helpful when needed can play an important role in their positioning strategy. Furthermore, the industrial and rough nature of the area, the free spirit, and being close to people who have the same interests are also factors which are considered to be as important in the location-decision of these entrepreneurs and affects their productivity. Therefore, the potential 'look' to become a '*warm nest for creative minds*' is a realistic mission to achieve in order to build an extraordinary community that strongly contributes to the city's sustainable development, and includes them in the long term strategies (see Figure 8).

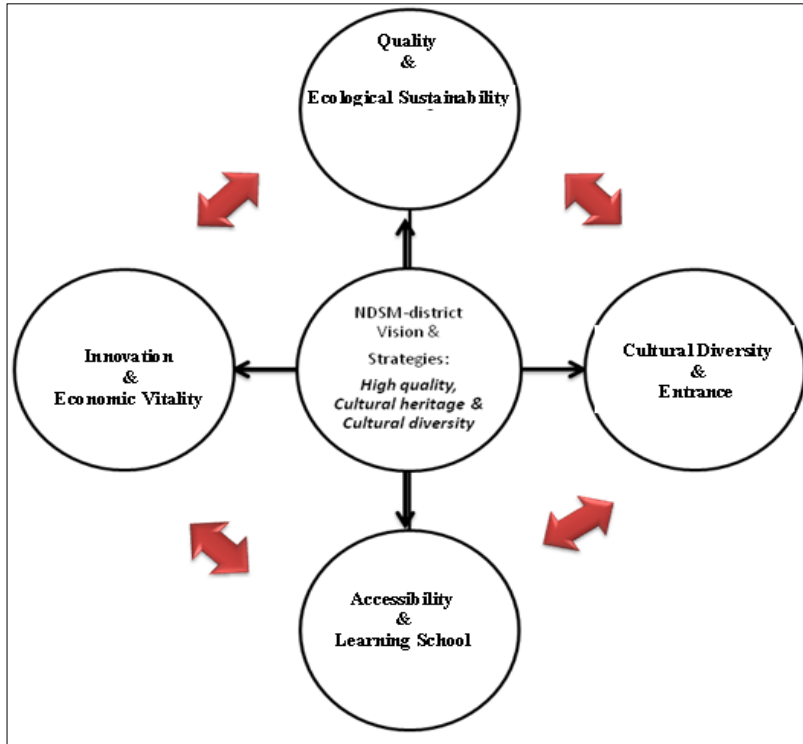


Figure 8. An interconnected view of the new “NDSM-district’ architecture.

This image of intense revitalization and transformation prompts the need for a new intervention in innovative developments with regard to cultural modernity, with a clear focus on spaces of social interaction and cultural integration, and the enlargement of the variety of facilities, through the high-quality urban design and equipment of those spaces in the process of the creation of *a place 4 all*. This will make Amsterdam once more a place where energy is generated, which is a continuous process. This new identity is central to the overall transformation of Amsterdam North, with the adaptation or transformation of an older waterfront into a contemporary creative bubble of mixed functions.

This image refers to the innovative ‘melting pot’ character of urban areas in the future. There will be an unprecedented cultural diversity and fragmentation of lifestyles in and around this district; this will present not only big challenges but also great opportunities for smart and creative initiatives in the future city, whereby it can become a global pioneer. This environment provides various opportunities and solutions to create a connection between artists, economic activities, citizens and government. In other words, a further democratic development of a city-

in-a city, what we call the City 2.0, which provides the perfect opportunity to create a living lab in a cultural city of high quality.

9.7 Discussion and Conclusions

Clearly, cities are not only engines of economic progress, but are also places where cultural heritage is prominent. This also holds for port cities, which house a wealth of remains from the past: warehouses, silos, wharfs, lighthouses, industrial architecture, and so forth. It seems therefore, plausible to seek the anchor points of the urban rehabilitation of port areas in their undervalued land use related to logistic port activities from the past. It is noteworthy that the NDSM dockyard is being transformed further to have a more independent atmosphere with less support from the local authority, more successful and autonomous businesses, and ultimately an events venue (such as Robodock). It is becoming the largest cultural and creative project in terms of the city of Amsterdam's core breeding place policy.

Nowadays, port areas—even in a state of decay—often constitute the entry point and core area for the sustainable development of the entire urban system. Port areas offer an unprecedented heritage of a political, architectural, logistic, economic, social and artistic nature, with a great future potential. To understand and exploit this potential, it will be necessary to design an analytical framework which links the manifold opportunities provided by traditional port areas to future sustainable and creative urban development. This challenging objective needs a combination of forecasting and backcasting tools. From that perspective, there is a need to develop fit-for-purpose, dedicated policy tools and gentrification initiatives, on the basis of general planning principles for harborfront and seafront development. An ambitious implementation of policy goals associated with port development—such as job creation, foreign direct investment, creative sector development, environmentally-benign mobility, or sustainable land use—would thus become a major task for a modern port city. It will indeed be a great challenge to redesign and re-image port areas as multifunctional epicenters of creative urban initiatives and developments. These can essentially be seen as living laboratories and innovative urban areas for the development of sustainable practices in an extraordinarily innovative work and residential environment. Such living labs benefit from highly interactive socio-economic activities among firms, residents, universities and research institutes, as well as governmental institutions and organizations, which all shape the urban innovation system

and highlight its role as a bubbling creative cauldron of centers of excellence. This aspect has to be addressed in the context of any port city re-development plan with a lively mix of activities comprising specific patterns, heritage components, demographic developments, economic situations, future potential and international connectivity links, in order to make sustainability work and to improve international competitiveness.

This study has provided, on the basis of structured interviews, an overview of experience and findings that address the socio-economic impacts of the NDSM district in a broader context. In reinventing the port areas, the urban Facebook framework, first developed in Kourtit and Nijkamp [14]) helped us to identify successful strategic policies, and to bring together different expertise to balance: conflicts between the interests and values of a multiplicity of stakeholders; and economic prosperity with social needs and the conservation of eco-systems. In other words, a preference elicitation exercise was organized through the main focus group of users of the NDSM district, while the systematically collected information was analyzed within the urban Facebook evaluation framework, which includes a visual support tool (*i.e.*, the four Urban Faces). This present framework adopts the same general idea, but extends it by recognizing the importance of the visual appearance of the urban cultural ambience and urban future images and ambitions of historic and modern urban districts, based on a stakeholder-oriented (a bottom-up approach). In this framework, visual features and values were integrated in a set of urban future images, which map out different levels of urban planning on the basis of a set of different evaluation criteria. Thus, the framework is a direct action platform that offers social utilities to connect various people who work and live together, supported by high-quality visual assessment tools, for mapping novel redevelopment initiatives.

Taking into consideration each stakeholder's preferences, values, and point of view on the area helps to attract and keep creative minds living and working to develop flourishing, dynamic economies. Each stakeholder has his/her own option and vision for the area. This diversity has helped to create more complex and accurate future images of the area. Thus, a possible (ranging from little to strong) facelift aim of the NDSM-district is to attract and retain creative, high-skilled people, creative firms, *etc.* to formerly neglected areas in order to achieve sustainable development.

A prerequisite for a promising revitalization policy is that port cities should be able to develop highly innovative strategic approaches to urban planning, conservation and

management that really integrate harbor development with urban development. Indeed, both the organizational and economic innovation of the urban space is key to improving the resilience of a port city system, and thus its overall sustainability.

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APPENDIX A. ASSESSMENT CRITERIA

Table A1. Long list of criteria.

Criteria: <i>Visual aspects of neighborhoods may attract creative entrepreneurs to certain districts</i>		Urban Faces			
		A	B	C	D
1.	Cultural amenities				
2.	Accessibility (Is the Urban Face accessible for various users and visitors?)				
3.	Business climate				
4.	Criminality				
5.	Demography				
6.	Facilities and access to facilities				
7.	Creative image				
8.	Quality of urban life				
9.	Independent ultimate events venue (art and nightlife venues)				
10.	Dynamic ‘oasis’				
11.	Traditional workspaces and activities				
12.	Strong cultural and creative profile				
13.	Independent & creative atmosphere				
14.	Long-term strategies				
15.	Urban design and architecture				
16.	Low rent				
17.	Urban socio-economic climate (Does the Urban Face have an impact on the performance of economic sectors such as tourism, hospitality, and businesses?)				
18.	Quality of life and sustainability (Does the Urban Face have an impact on the safety [crime rate, vandalism, preventive measures taken], quietness [noise, destruction of local customs/residents, visual intrusion], pollution [air pollution, water pollution, littering], and urban green [supply of green spaces, accessibility of urban green, the area of urban green assigned as cultural/natural heritage?])				
19.	Cultural profile (Does the Urban Face have an impact on cultural facilities, exhibitions, events, manifestations, and conventions?)				
20.	Urban land use (Does the Urban Face have an impact on the buildings, infrastructure facilities (availability of roads, rail, bicycle roads, pavements, pedestrian areas), the perception of the city scope, and urban water systems)				
21.	Transportation (Does the Urban Face have an impact on network congestion (traffic congestion, queuing of tourists to enter cultural heritage attractions, accessibility to cultural heritage attractions by public transport), noise (car or airport), and transport safety?)				
22.	Function (Does the Urban Face have all the functions the users, visitors, <i>etc.</i> need?)				
23.	Enjoyment (Is the Urban Face enjoyable? Does it contains fun and interesting elements)				
24.	Learning				
25.	Participation (Does the Urban Face encourage participation (with both residents and other tourists), and is it rich in terms of stakeholder participation?)				
26.	Quality of information and up-to-date information (Is the information provided reliable?)				
27.	Increasing social awareness of the access to cultural heritage values				
28.	A reduction in social distance between cultures				

29.	A strengthening of social cohesion				
30.	Change in visitors behaviour (also in time and place) towards cultural heritage				
31.	Other.....				
32.				

APPENDIX B. OUTPUTS OF PRINCIPAL COMPONENT ANALYSIS

Table B1. Communalities.

	Initial	Extraction
Cultural amenities	1.000	0.710
Accessibility	1.000	0.840
Business climate	1.000	0.901
Criminality	1.000	0.426
Demography	1.000	0.542
Facilities	1.000	0.779
Creative image	1.000	0.821
Quality of urban life	1.000	0.713
Independent ultimate events venue	1.000	0.824
Dynamic ‘oasis’	1.000	0.678
Traditional workspaces and activities	1.000	0.615
Strong cultural and creative profile	1.000	0.677
Independent & creative atmosphere	1.000	0.665
Long-term strategies	1.000	0.470
Urban design and architecture	1.000	0.593
Low rent	1.000	0.386
Urban socio-economic climate	1.000	0.752
Quality of life and sustainability	1.000	0.508
Cultural profile	1.000	0.600
Urban land use	1.000	0.639
Transportation	1.000	0.475
Function	1.000	0.186
Enjoyment	1.000	0.780
Learning	1.000	0.787

Extraction Method: Principal Component Analysis.

Table B2. Total Variance Explained.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.169	29.870	29.870	7.169	29.870	29.870	4.714	19.642	19.642
2	3.412	14.218	44.088	3.412	14.218	44.088	4.557	18.986	38.628
3	2.891	12.047	56.135	2.891	12.047	56.135	3.430	14.290	52.918
4	1.896	7.899	64.034	1.896	7.899	64.034	2.668	11.116	64.034
5	1.609	6.704	70.738						
6	1.531	6.380	77.119						
7	1.234	5.143	82.261						
8	1.227	5.111	87.372						
9	0.991	4.131	91.504						
10	0.640	2.665	94.168						

Table B2. *Cont.*

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
11	0.452	1.884	96.053						
12	0.344	1.435	97.488						
13	0.290	1.209	98.697						
14	0.153	0.637	99.334						
15	0.103	0.429	99.762						
16	0.057	0.238	100.000						
17	2.859E-016	1.191E-015	100.000						
18	2.038E-016	8.492E-016	100.000						
19	3.567E-017	1.486E-016	100.000						
20	-2.748E-018	-1.145E-017	100.000						
21	-1.867E-017	-7.780E-017	100.000						
22	-9.516E-017	-3.965E-016	100.000						
23	-1.386E-016	-5.777E-016	100.000						
24	-2.682E-016	-1.117E-015	100.000						

Extraction Method: Principal Component Analysis.

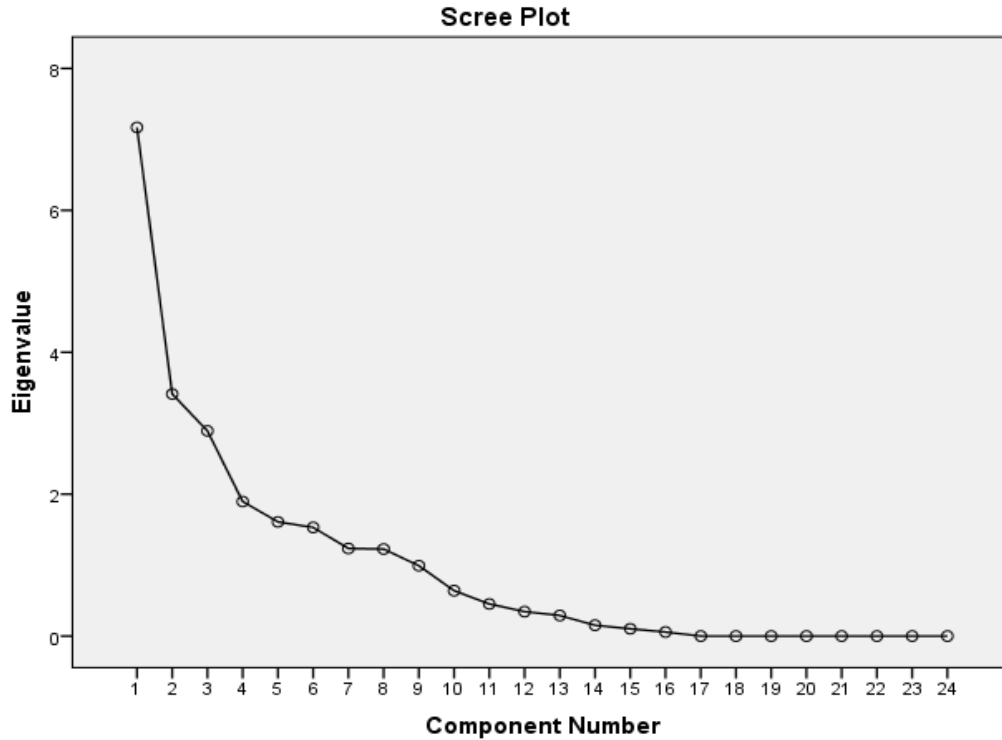


Figure B1. Scree Plot.

Table B3. Pattern Matrix.

	Component			
	1	2	3	4
Independent ultimate events venue	0.841	0.281	-0.119	0.155
Enjoyment	0.819		0.122	-0.301
Dynamic 'oasis'	0.797		0.201	
Accessibility	0.759	0.215	0.384	0.266
Independent & creative atmosphere	0.739	0.177	0.247	-0.161
Learning	0.673	0.418	-0.304	0.258
Function	0.333	0.216	0.168	
Urban socio-economic climate		0.772		0.377
Traditional workspaces and activities		0.772		
Cultural profile	0.212	0.728		-0.156
Creative image	0.517	0.720	-0.186	
Transportation	0.165	0.656		0.111
Strong cultural and creative profile		0.636	0.241	0.455
Business climate		0.620	0.543	0.463
Long-term strategies	0.292	0.553		-0.282
Facilities		-0.107	0.870	
Quality of urban life	0.335		0.718	-0.289
Demography		0.206	0.680	0.174
Cultural amenities	0.540	0.105	0.634	
Low rent		-0.310	0.536	
Urban design and architecture	-0.176			0.748
Urban land use	0.322	0.101		0.720
Quality of life and sustainability		0.405	0.245	-0.526
Criminality		0.267	0.366	0.468

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. (Rotation converged in 12 iterations).

10 PLANNING FOR URBAN HISTORICAL-CULTURAL HERITAGE: A GEO-IMAGING MULTICRITERIA APPROACH ²⁵

Abstract

The development of city systems takes place between rapid dynamics and conservation of heritage. This tension is sketched out in this paper. Particular attention is given to the existence of multiple policy criteria and of different classes of stakeholders. The main aim is to demonstrate that visualisation methods – in combination with modern plan evaluation approaches – may offer a novel contribution to contemporary urban planning. A new methodology based on a multi-stakeholder multi-criteria analysis, called MAMCA, is used to provide a practical assessment framework for policy choices. This approach is applied to the development of an historical harbour front and shipyard area in Amsterdam (called the NDSM district), by using geo-imaging methods to elicit stakeholders' priorities for various land-use planning options for the area (called '*urban faces*'). It turns out that a particular land-use plan focused on intensive revitalization of the area may enjoy the highest appreciation of most stakeholders, as this plan may create new opportunities for visitors and business firms. The results and their robustness are extensively discussed.

²⁵ Source: Kourtit, K., Macharis, C., and Nijkamp (2014). Planning for Urban Historical-Cultural Heritage: A Geo-Imaging Multicriteria Approach, *Built Environment* (Accepted).

10.1 Tensions in the Urban World

Our World is increasingly turning into an urban world. This phenomenon, called the “*New Urban World*” (see Nijkamp and Kourtit 2012), is *inter alia* reflected in the uninterrupted urbanization trend in the past centuries, to the extent that nowadays even more than 50% of the world population is living in cities (or urban areas). Especially in the developing world and in emerging economies the urbanization rate shows a rapid pace. It appears that urban agglomerations do not only attract people, but also economic activity, so that in many countries urban and industrial agglomerations are developing in tandem.

Urban areas – in both the developed and the developing world – are increasingly becoming engines of prosperity and growth opportunities (Kourtit and Nijkamp 2013c). The structural urbanization trend prompts at the same time a radical transformation of cities and urban agglomerations, partly in the form of urban dispersion (e.g., suburbanization, urban sprawl, new towns, edge cities etc.) and partly in the form of a drastic transformation of inner city areas. The wealth-enhancing potential of urban agglomerations caused by various externalities may sometimes lead to countervailing developments which may lead to an erosion of agglomeration advantages. These developments may also show quite some variety in different parts of the world. Urban evolution in OECD countries may differ significantly from the situation in developing countries or emerging economies. But in all cases, there is a need for a balanced development strategy for urban agglomerations and cities.

Traditional city centres house a wealth of historical-cultural amenities (e.g., museums, monuments, performing arts), entertainment centres (indoor and open-air facilities), architectural heritage (stand-alone buildings or a historical ‘*urban ambiance*’), and socio-political communities of people connected by a common politico-ethnic background (e.g., a China-town). Rapid urban dynamics – especially in inner city areas – tends to exert severe impacts on the historical and cultural heritage, and ambiance of a city, as nowadays a resilient and growing city may have to adjust itself to the demands of a modern, open and globally-oriented lifestyle. This creates an often painful tension between maintenance of the past and adjustment to future needs. There is an increasing pressure on land use in urban centres, on infrastructural adjustments and on a rehabilitation of the built environment, as outdated urban functions, replaced by contemporary functions, if require a drastic transformation of the historical built environment and infrastructure. But what is the social and economic value of

historical heritage in an urban environment? And which bottlenecks do emerge to protect historical areas? This issue has been discussed several times in the scientific literature (see e.g. Ginsburgh and Throsby 2006, Navrud and Ready 2002, and Throsby 2010). From a methodological perspective, we witness nowadays a rising number of sophisticated statistical techniques and research tools, but there are still serious doubts on the usefulness and applicability of these toolkits under changing and different urban contexts, in particular, the presence of different interest groups.

There are many modern cities where the lack of respect for history, cultural identity and architecture has led to a modern outlook of the city concerned, but often without a clear sense or recognition of the historical or architectural heritage. Other cities, on the contrary, have tried to protect and maintain their heritage to the maximum extent possible, but this may create a static urban environment characterized by a various of variance economic functions and of competitiveness which may lead to socio-economic decay. Against this background, it is an important question how people and entrepreneurs respond to the presence and quality of historic city centres and districts. Their ‘voting-by-feet’ principle – following Tiebout’s (1956) theory on the spatial choice consequences of the supply of public amenities – will be decisive for the future dynamics of our urban world. Smart urban policy requires a smart mix of historical and cultural awareness and future-oriented ‘imagineering’ of the city.

Over the past years a rapidly emerging interest can be observed in the (socio-)economic meaning of cultural heritage for the city (see Bowitz and Ibenholt 2009). An important strand of literature focuses the attention on the spatial externalities caused by the presence of historical-cultural heritage, in particular the implications of the presence of heritage for the value of the housing stock in the vicinity (or real estate in a more general sense) (see for a review and applications van Duijn 2013, Lazrak et al. 2013, and Nijkamp 2012). There is a great variety of evidence-based research that demonstrates that urban cultural heritage may exert significant and positive impacts on real-estate values. There is another strand of literature that aims to trace the economic consequences of heritage by examining its attractiveness to visitors and tourists (see e.g. Matias et al. 2011, van Leeuwen et al. 2013). Also here, there is abundant empirical research that demonstrates that urban historical heritage prompts significant revenues of all kind to the economy of the city. And finally, there is a strand of literature that seeks to assess the spatial attractiveness of inner city’s heritage for residents and business. In a

recent study, the centripetal force of urban cultural heritage for business, in particular the creative industries, has extensively been investigated for Dutch cities (see Kourtit et al. 2013). Relatively less attention has been paid in the literature to the attractiveness of the city's heritage for residents or for workers. This holds true, especially when residents with creative jobs seem to be attracted by historical-cultural amenities in older city centres (see for further clarifications Chen and Chen 2010; Kourtit et al. 2013; Pratt 2008; Storper and Venables 2003; Zukin 1995).

In conclusion, urban growth, historic-cultural heritage and creative activities appear to be closely intertwined phenomena. The prominent question addressed in this paper is: is there a decisive impact of urban heritage on the wealth and values created in the city, as perceived by various stakeholders? And if so, how can geospatial research tools and visualisation methods be used to assess the value components of urban heritage in a multi-actor planning context? These questions will be answered by reviewing the literature and by illustrating the answers on the basis of some evidence-based research results regarding a historical industrial area in Amsterdam. The present paper is organized as follows. Section 2 will offer a general overview of evaluation methods in urban planning, while it will discuss concisely some recent advances in visualisation methods ('geo-imaging tools') as a pedagogic tool for identifying and assessing societal values of urban heritage. We will then present in Section 3 the methodological foundation for the evaluation approach to the historical and cultural assets analyzed on the basis of our case study on an old shipyard area in Amsterdam. The results of our evaluation tool, the MAMCA model, will next presented in Section 4.

10.2 Evaluation of Cultural Heritage

The value of historical and cultural heritage is determined by its perceived, potential or actual usage, including a source of socio-political history or of a common experience (see Smith 2006). For example, the museum district of Berlin derives its value mainly from the large number of visitors who can enjoy a broadly composed package of cultural services offered by the concentration of these museums and their related support amenities. Malta derives its importance as a political-cultural heritage centre from a fascinating variety of architectural heritage assets that map out the rich history of this place and that made the capital city Valletta world-renowned as a protected UNESCO site. Visitors (actual, potential, virtual) and residents

(actual or potential) are thus decisive for the socio-economic meaning of a historic city centre. There may be other groups as well, which add to the historico-cultural importance of a place, in particular, the business sector and the workforce attracted by the historical specificities of a place (see also Comunian 2011; Cooke and Lazzaretti 2008). Clearly, the valuation of historic buildings, districts or city centers, including a picturesque and attractive urban ambiance, is based on human perceptions and judgments. The assessment of such historical-cultural assets is clearly fraught with severe difficulties, both conceptually and empirically. We will offer here a concise, selective overview.

A seminal contribution to the evaluation issues of historical and cultural heritage has been provided by Bourdieu (1986) who has introduced the notion of cultural capital. Cultural capital can be both tangible and intangible, and has one prominent feature: it generates cultural value, which can be measured through various attributes (both financial and non-financial). Such capital may refer to individual buildings or the urban ‘ambiance’ as a whole. Evaluation may take place by means of an array of methods ranging from cost-benefit analysis to stated and revealed preference methods. In this way, modern assessment tools can be instrumental in judging the development potential of cities, against the background of global competitiveness, local creativeness and sustainable development (see e.g. Currid and Williams 2010; Florida 2002; Marlet and van Woerkens 2005; Scott 2000). There is an increasing awareness that cultural and industrial heritage can act as a driver for new urban development. Clustering of creative industries and creative professions in older urban districts with a high cultural value may lead to an upsurge of attractiveness and productivity in these urban breeding places.

Urban development is of course never cast in iron; it means dynamics and change in functions. Sometimes different disciplinary orientations (e.g. archeology, history, arts, economics, political science, planning, demography) may lead to tensions, so that there is a need for a bridging or integrating analytical framework, supported by evidence-based research. This framework may encapsulate both numerical estimates of past or future developments and alpha-numerical information on history or future trends. From this perspective, it is also important to realize that historical and cultural heritage is essentially a living organism, as both its interpretation and its methods are permanently subjected to change. This calls for an innovation-oriented, open-minded view on the value of urban cultural heritage in a multi-actor urban setting.

Our approach will be based on geo-information science multi-stakeholder visualisation methods for urban land-use planning. Several recent advances can be found in Areiniegas et al. (2011), Hage et al. (2010) and Hemmati (2002). Our framework – illustrated by a case study in Amsterdam – uses various corner stones. First, it employs a series of reference images on the future of historical areas. These images act as learning tools in a kind of global scenario experiment which maps out various alternative and abstract futures. Next, a set of concrete land use plans (called ‘faces’) are introduced by using geo-information based visualisation methods. These photographic-based alternatives lead to choices by various classes of stakeholders (in particular, artists, residents (or habitants) and firms).

It should be noted that historical and cultural heritage (either as a set of individual objects such as museums, castles, theaters, monuments or as architectural landscapes) is not a passive object, but derives its meaning from the active interface with human behaviour and perceptions. For that reason, the notion of ‘cultural cluster’ has come into being as a concept that presents an integrated urban setting of architectural heritage (sometimes even urban ecologies) and human beings. In a study by Zarlenga (2012) on cultural clusters in Barcelona, a distinction was made between cultural clusters as a bureaucratic organization (e.g. cultural production and consumption) and cultural clusters as a community dynamic (e.g., creative clusters, non-formalized creative relationships). The latter study illustrates the above remarks on the interfaces between cultural objects and human appreciation.

Cultural heritage in cities is normally not an abstract or unidentified object; it is often tangible and visible. In contrast to a community sense of place, it can be photographed and visually represented. There is a variety of mapping and visualisation methods of historic-cultural objects as well as measurement methods for semantic information (see e.g., Daniel 2001; Ervin and Steinitz 2003). The same holds for landscape evaluation. For example, Arriaza et al. (2004) make a distinction into five classes of evaluation tools: geographic information systems, photographic information, survey of observers’ or visitors’ preferences, intensity assessment of attributes and elements, and correlation and regression techniques. This new approach forms the foundation of our study, in which we will address in particular geo-science based evaluation methods in a multi-actor context.

An interesting study on the importance of visual appearance of the built environment in historic urban districts can be found in Smit (2011). The author used a wealth of photographic

material to identify the preference intensities of creative entrepreneurs for older urban districts. She found indeed a significant relationship between district visual quality and the locational choices of creative entrepreneurs. A major element in her research findings was the importance of distinctive features of the architecture and the district concerned.

In conclusion, most cities offer a wealth of historical and cultural memories from the past. These characterize a city, provide a historical identity, offer limits to its future evolution, and are a source of attractiveness for residents, visitors and business life. In the evaluation tradition, a large set of different methods has been developed over the past decades. The present study aims to offer two new perspectives: (i) a closer involvement of stakeholders through the use of interactive evaluation approaches; (ii) the design of a novel evaluation framework based on a merger of visualisation methods and geo-information science methods.

10.3 Methodology Used for the Amsterdam Case Study – the NDSM District

The evaluation literature on land use planning already has a long history. Over the past decades, a series of quantitative evaluation tools has been developed, to judge the relative socio-economic importance of various alternative choice possibilities in cities. In many cases, such methods were based on multiple criteria analysis (MCA), which has become an established tool in the planning literature. In recent years, also the presence of multiple stakeholders or interest groups has been extensively addressed in MCA (Banville et al., 1998).

The evaluation methodology used here is the Multi Actor Multi Criteria Analysis (in short, MAMCA). This methodology has been developed by Macharis (2005) in order to include different points of view of different stakeholders in a multi-criteria evaluation analysis (see Figure 1).

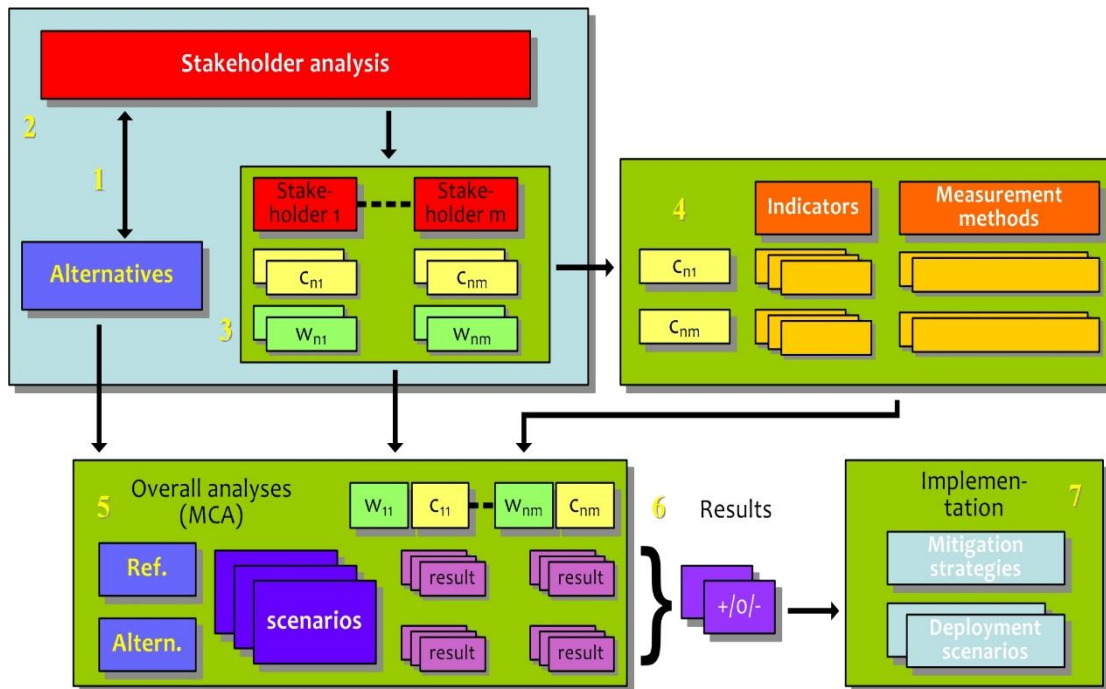


Figure 1. MAMCA model representation

Legend: C= criterion; W= weight

After the traditional first step of describing the problem identification and of the search for possible solutions, within the MAMCA framework, a stakeholder identification step is added. In this step, the analyst will look at who is involved in the problem, who will be impacted, or who can have an impact on the problem and choice situation. Next, these stakeholders are asked what their main objectives are and how important these criteria are to them, i.e. their priorities. These objectives and their priorities are used as the criteria and weights in the multiple criteria analysis (MCA) models later on. These first three steps are important steps, as they describe the decision problem concerned. They should be undertaken in close connection with each other, as the stakeholders may have varying ideas on which alternatives to include and how to get a better view on the objectives or alternative choice possibilities. In the next step (step 4 in Figure 1), the criteria are operationalized in the sense that for each criterion one or more indicators are defined; the way these indicators will be measured is made explicit. In the 5th step, for each actor an evaluation model is set up and analyzed with an MCA method in practice (often the AHP method or the PROMETHEE method, but any other method able to handle several levels of criteria and sub-criteria may in

principle be used (Macharis et al. 2004; Saaty, 1980; Saaty, 1982). Next to these mono-actor models also a multi-actor view is offered. In this perspective, the points of view of the different stakeholders are confronted with each other. This analysis provides a clear view on the advantages and disadvantages of the different alternatives, from different points of view. This provides a crucial input for defining transition paths, deployment schemes or mitigation strategies. For further details and an overview of the theory and applications of this methodology, including case studies, we refer to Macharis et al. (2012).

The case study in Amsterdam is focused on the NDSM area, an old industrial area and shipyard. This was until recently a dilapidated urban brownfield area. But in the past years the area has shown the first signs of a revival, by attracting cultural and artistic activities, creative firms, entertainment opportunities, while in the future also residential possibilities might become available (see for a detailed description Kourtit and Nijkamp 2013a, 2013b). Various classes of stakeholders were distinguished, in particular, firms, residents and artists. The general framing of the research was based on the creation of four abstract future *images* (Connected City, Entrepreneurial City, Liveable City and Pioneer City) which provided a reference background – similar to a scenario experiment – for identifying concrete alternative choice options for the NDSM district. These general images were used to extract more specific information from actors involved regarding concrete land-use plans for the NDSM area. This interactive experiment led to a distinction of four mutually comparable land use options possibility to be realized in the area at hand. These alternative options were illustrated by means of visualisation methods. The four alternative choice possibilities, called ‘*urban faces*’, were thus based on photographic material to be judged by the stakeholders. This is called a geo-imaging approach (for details, we refer to Kourtit and Nijkamp 2013a, 2013b). Geo-imaging is a geo-information science tool which uses spatially discriminating visualization tools (e.g. photos, videos, etc.) to create awareness on various choice options among groups of users or stakeholders. Detailed data on land use and actors’ preferences can be found in Kourtit and Nijkamp (2013a, 2013b). Figure 2 offers a flow diagram of our research, while Figure 3 represents the ‘*urban faces*’ used in our analysis.

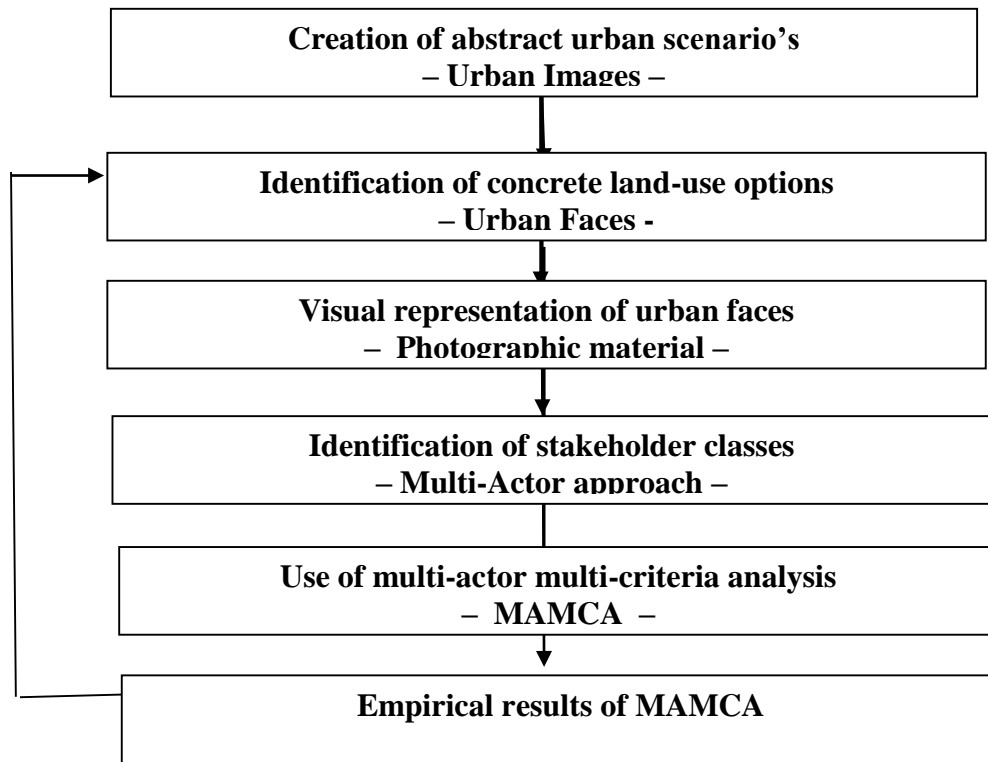


Figure 2. Flow diagram of our research

The abovementioned four ‘*urban faces*’ distinguished in the empirical part of the NDSM study are:

- A. Modest revitalization
- B. Intensive revitalization
- C. Reprofiting of the area
- D. Radical transformation

In a previous study based on a SWOT analysis (see Kourtit and Nijkamp 2013a) it was found that ‘urban face’ B – an intensive revitalization strategy for the NDSM district – would have the highest support from most interest groups involved, as this land-use implementation plan would create many opportunities for organizing a variety of events and cultural activities which might bring many visitors and new business into the area. This conclusion will now be tested by adopting a multi-actor multi-criteria analysis (MAMCA).

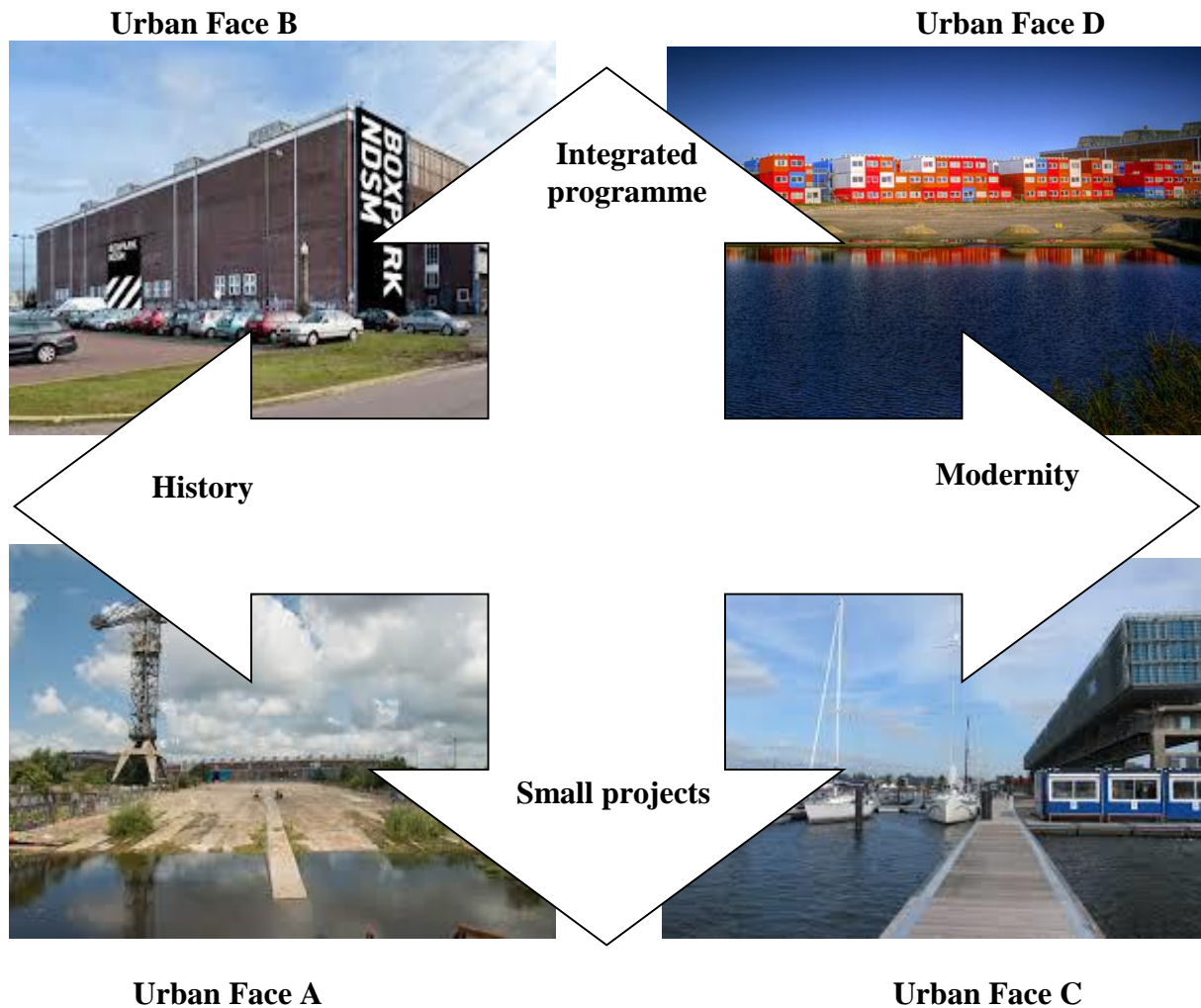


Figure 3. Four 'urban faces' for the NDSM district in Amsterdam

The data obtained from the NDSM case study were inserted in a MAMCA model constructed within the D-sight software package. The data were obtained in 2012 by a survey among the different stakeholders in the NDSM area. Scores were given on a 1 to 4 scale (1= very weak, 4= very strong).

The following criteria were considered for each actor group:

Artists

- Presence of cultural amenities
- Cultural and creative use profile
- Authentic and creative atmosphere

- Design and architectural quality
- Creative image
- Cultural and arts events
- Conventions and exhibitions
- Cultural heritage awareness
- Visitors' perception of cultural heritage

Habitants

- Safety and security
- Recreation and entertainment
- Learning opportunities
- Participatory development planning
- Quality of planning information
- Social proximity between cultures
- Social cohesion initiatives
- Demography
- Accessibility to users and visitors
- Access to facilities
- Quality of environment
- Socio-ecological sustainability Internal areal connectivity
- Transport facilities for visitors

Entrepreneurs

- Business climate
- 'Oasis' of business initiatives
- Availability of floorspace
- Long-term strategic orientation
- Low rent
- Socio-economic climate
- Multifunctional land use

The scores given on the different criteria in the survey were used as input for the evaluation tables of the D-Sight software. The PROMETHEE method (Brans, 1982) transforms these scores to a 0 to 1 preference score. All criteria used here were assigned – as a start – the same weight. Also the actors themselves were initially weighted equally, as the main aim was to

obtain insight in to their preferences, and not to get at the outset immediately a final score that would decide what to do.

10.4 Empirical Results

The MAMCA approach is able to reveal the points of view of the different actors. In the topological space represented in Figure 4 portraying differences among the stakeholders regarding their preference for ‘urban faces’, the global visual analysis shows the different options (the blue dots are representing the alternatives ranging from the Connected C city and its four faces A, B, C and D (C- A, B, C, D) towards the Enterpreunial city (E-A,B, C or D), Liveable City (L-A, B, C or D) to Pioneer City (P and its variants). These dots are projected in the two dimensional plane with a principal component analysis.

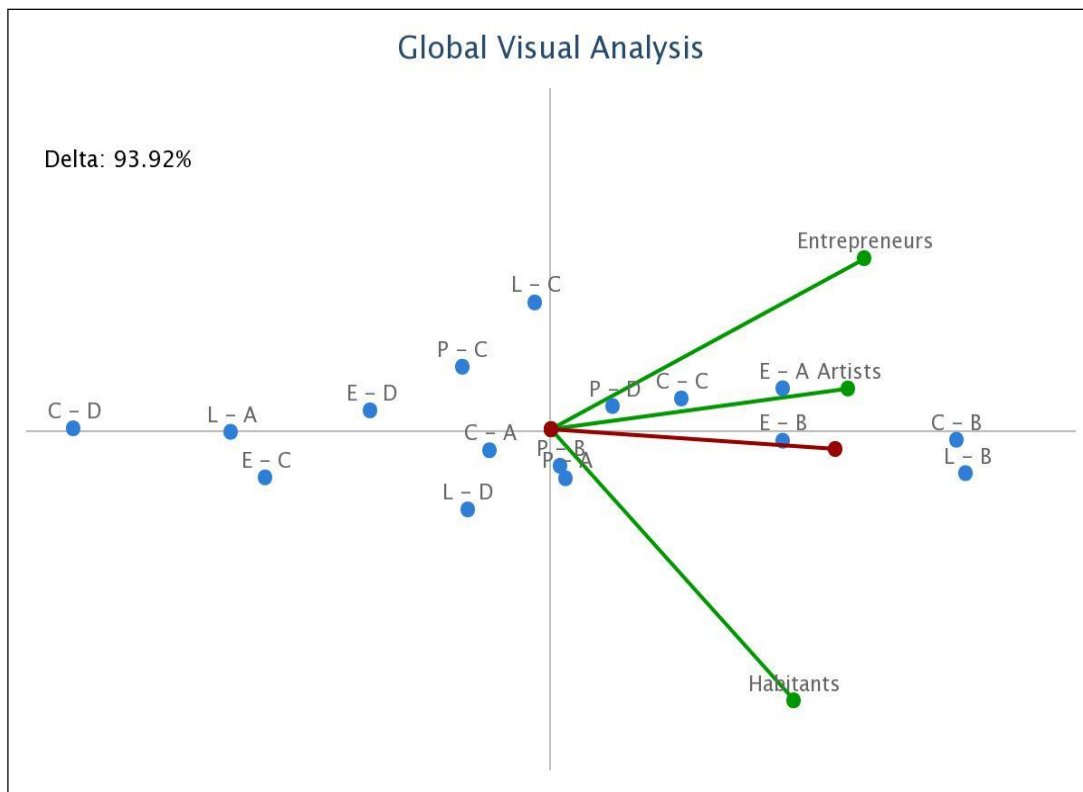


Figure 4. The global visual analysis based on preferences

The Delta value in the upper left corner provides an estimation of the representation quality (high values correspond to good representations). The plane is automatically computed in order to optimize this value. It is clear from the graph that Entrepreneurs and Habitants (or residents) are somewhat different in their preferences (visualized by the green axes). The artists appear to have an opinion in between. The overall (red) axis points to the alternatives that are most suitable when aggregating the three points of view. The B-faces are clearly a good compromise when ending up in a Connected, Liveable and Entrepreneurial city. Thus, these results confirm largely the findings from the previously mentioned SWOT study on the area.

This finding is also visible in Figure 5. Here the overall score for each urban face is depicted along the points of view of the three actors. The three B faces are clearly preferred by the three actors in case of the Liveable and Connected city. In the Entrepreneurial city, face B is most wanted by the artists. Entrepreneurs in that scenario prefer face A. If one would end up in a Pioneer city, face D is more desired, closely followed by face A and B. This aggregate analysis appears to lead to findings that support the previously obtained results from our SWOT analysis.

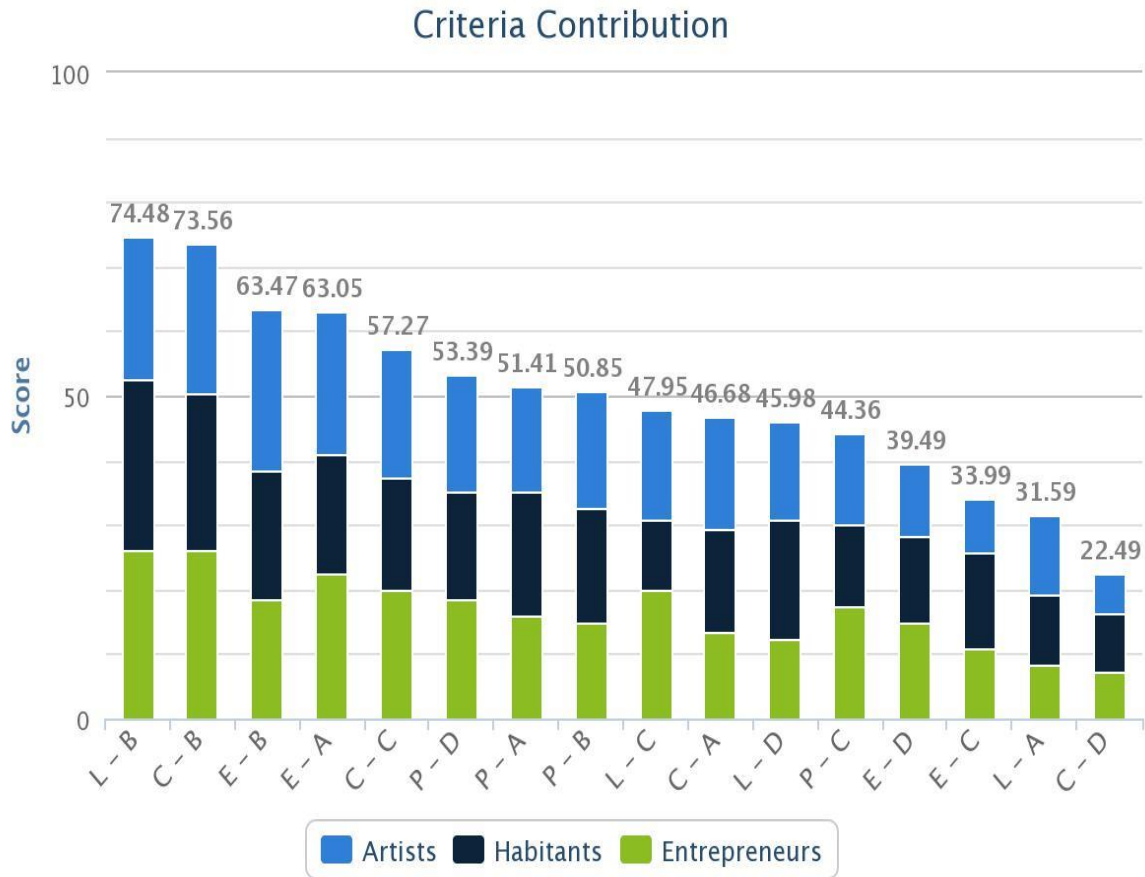


Figure 5. The overall score for each alternative together with the points of view of actors

The scores appear to be very robust. When applying a sensitivity analysis (for example, for the weight of the criterion “presence of cultural amenities” in Figure 6), one can see that the Connected city face B and the Liveable city face C will always stay on the top of the others. Their ranking would only change, if their weight would become 20% instead of the current 11% (see Figure 6).

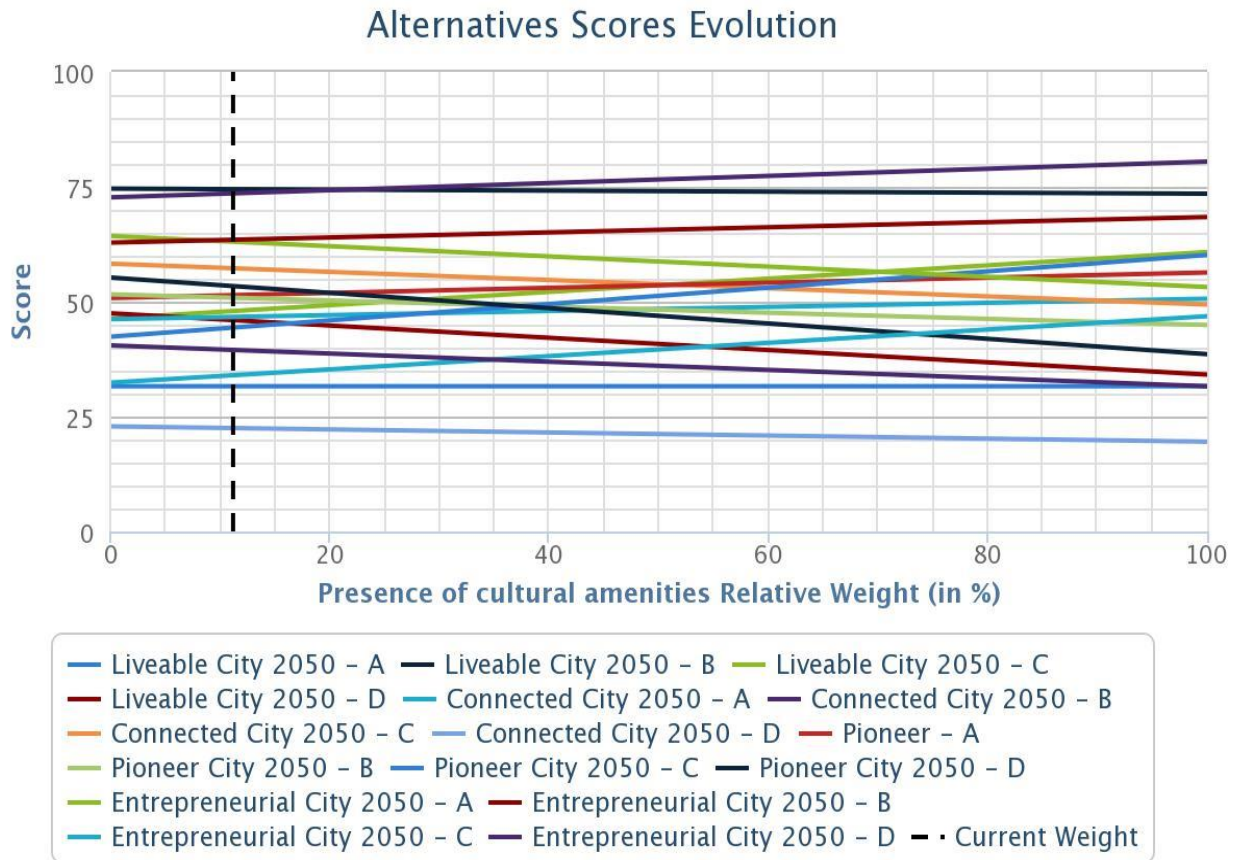


Figure 6. A sensitivity analysis for the weight of the criterion “presence of cultural amenities”

A complete overview is given by the stability intervals (see Figure 7). The stability intervals indicate the range within which the weight of a criterion can be changed without affecting the first ranked alternative. For each criterion, the black dot represents its current absolute weight.

The blue bar displays the stability interval. In this case, one can see that many criteria can have entirely different weights without changing the ranking of the first alternative. The ones to be carefully inspected are those which could make a difference in the ranking, and these are: presence of cultural amenities, design of architectural quality, cultural heritage awareness, social cohesion initiatives, demography, access to facilities, business climate, availability to floor space. At the top however, we see always Liveable city-face B and Connected city-face B. So changing the weights might only give a change in ranking between these two. This means that the results are very robust and that clearly those two choice possibilities are the most

preferred ones. In conclusion, the intensive revitalization land-use option B appears to play a key role in most choice alternatives. This will be further examined now by a spider approach.

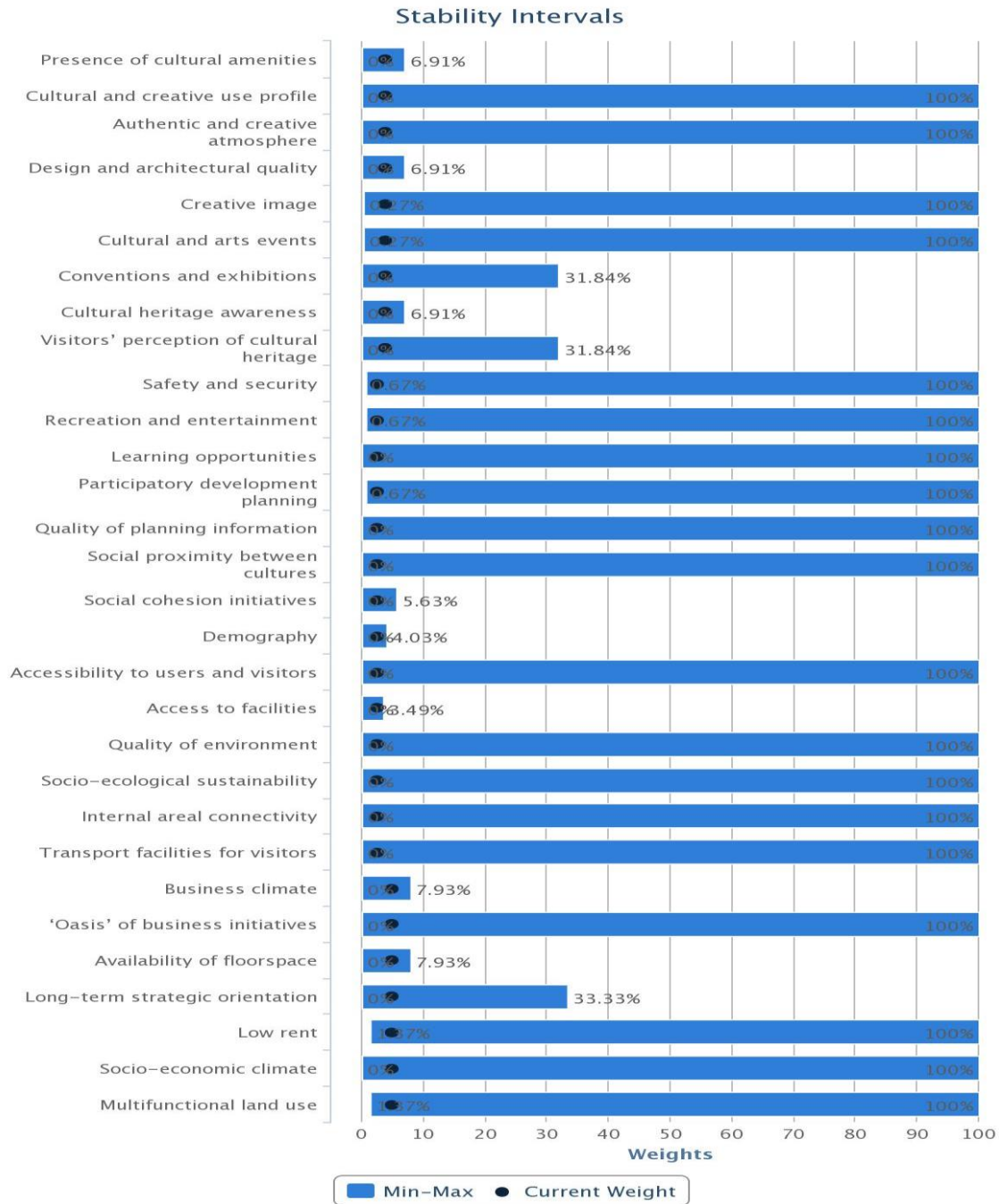


Figure 7. Presentation of stability intervals for criteria and weights

Next, if we take a closer look at this top-2, we can see from the Spider web in Figure 8 that the scenario Liveable City-face B is indeed scoring very high on many of the specific criteria. This scenario, however also has some drawbacks. It scores, for example, very low on access to facilities and demography (two criteria of the habitants) and cultural heritage awareness (a criterion of the artists).

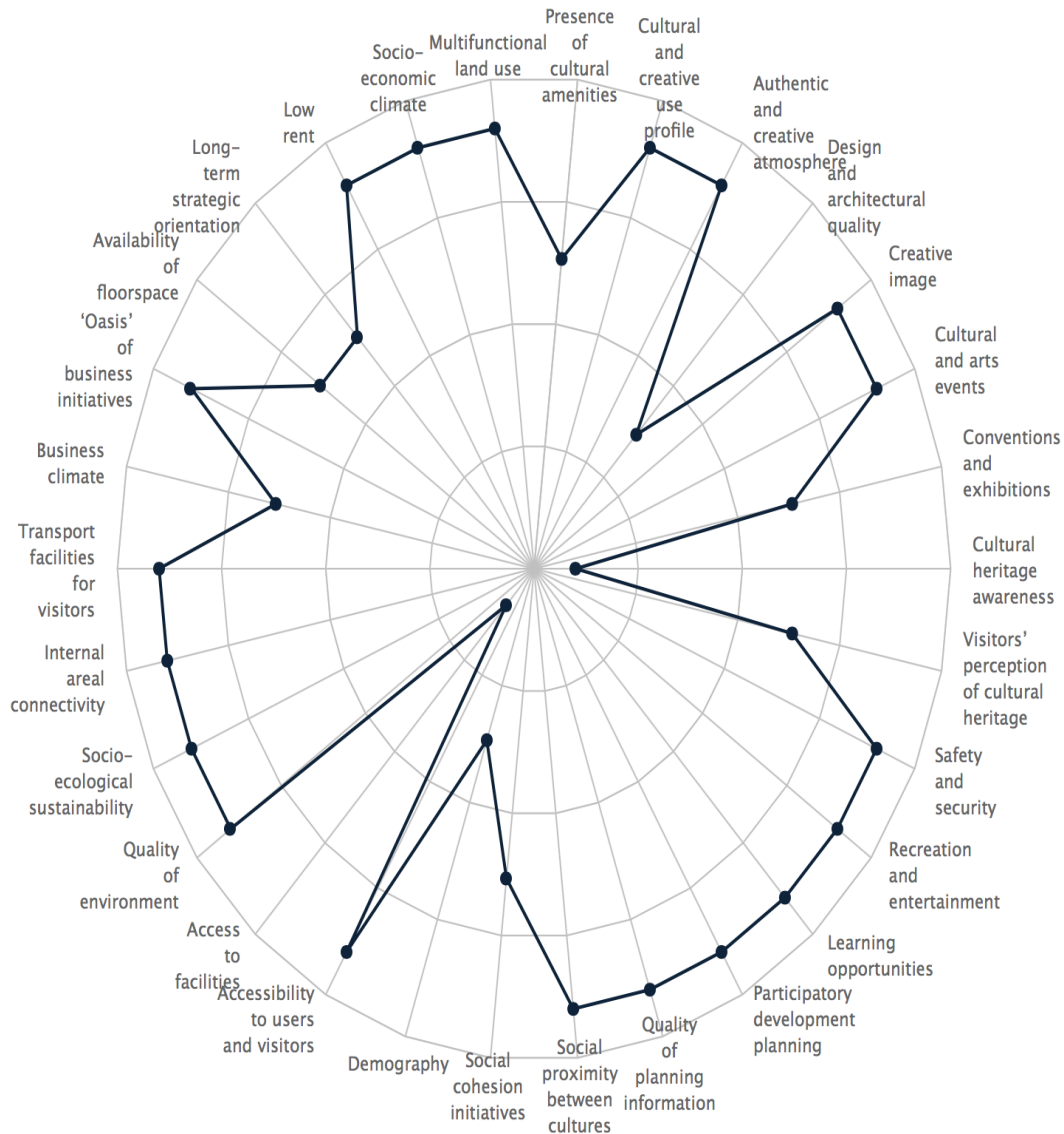


Figure 8. Spider web for the Liveability Scenario (face B) on all the criteria.

The other top scenario is Connected City-face B. In Figure 9, one can see that for this scenario there are less extremes, but that for a whole range of criteria only medium scores are

obtained. So these images show which weak features the preferred scenario's have, and where possible actions can be taken to compensate this for the associated stakeholder.

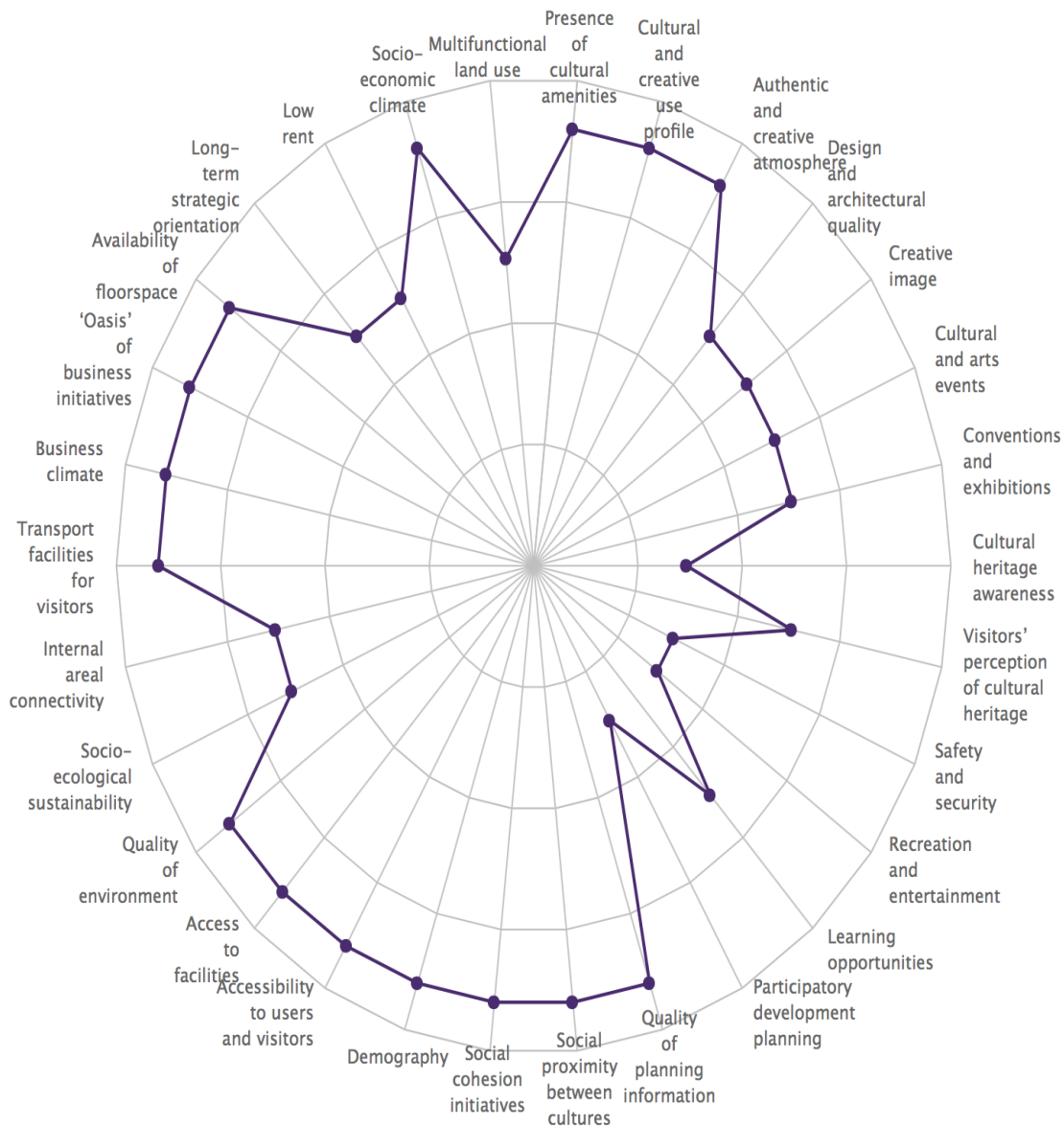


Figure 9. Spider web for the Connected City-Face B alternative on all criteria.

Our final conclusion is rather straightforward. In most combinations of 'urban images' (scenario's) and 'urban faces', the choice option in which intensive revitalization of the NDSM area plays a crucial role is the most preferred alternative for most stakeholders. These findings are confirmed by the robustness analysis and the sensitivity analysis based on spider diagram.

10.5 Conclusion

The aim of our study was to illustrate the research potential of interactive visualisation methods – in the context of a multi-actor multi-criteria analysis – for modern urban planning, in particular for policy issues emerging at the interface of fast urban dynamics and conservation of heritage.

The use of virtual, spatially-discriminating pictures to elicit preferences of users (or to create awareness) on urban land-use options offers a new operational contribution to complex multi-actor land-use planning issues. Our case study based on the MAMCA approach has demonstrated the viability of this planning instrument for the NDSM area in Amsterdam. Our specific findings for the area concerned highlight the importance of intensive revitalisation as a core strategy. The robustness test carried out has demonstrated that it is possible to identify resilient land-use options, even in the context of conflicting criteria and different stakeholders.

Modern evaluation tools are indeed important instruments for highlighting and identifying differences and conflicts among groups of stakeholders, future visions and concrete planning options in a dynamic urban setting. Tensions between cultural heritage and technological advances in modern cities deserve careful attention and need appropriate advanced assessment tools. The present paper has demonstrated the potential of the MAMCA approach in evaluating urban development strategies. This approach enables to take into account the stakeholders' points of view and to integrate them into the decision-making process regarding conflictual urban land-use options.

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11 CREATIVE BUZZ DISTRICTS IN SMART CITIES: URBAN RETRO-FITTING AND URBAN FORWARD-FITTING PLANS ²⁶

Abstract

This paper presents a new methodology for evaluating ‘urban buzz’ districts as part of a general urban rehabilitation policy, in which forward-fitting plans are incorporated and play a key role. Such plans are part of smart city initiatives based on a blend of creativeness and intelligence. The so-called decompositional evaluation method based on a multicriteria analysis is illustrated for a case study in Amsterdam, viz. the NDSM area.

²⁶ Source: Kourtit, K., and Nijkamp, P., (2013), Creative Buzz Districts in Smart Cities: Urban Retro-Fitting and Urban Forward-Fitting Plans, *Romanian Journal of Regional Science*, 7 (2), p37-57.

11.1 The Smart City Movement

The notion of a smart city has become ‘en vogue’ over the past years (see e.g. Caragliu et al. 2011). It has also prompted a great deal of policy and research interest, as it is based on the idea that cities are prominent vehicles of economic competitiveness, industrial innovativeness, creative open-mindedness and ecological sustainability. The modern – often large – city offers indeed a strategic constellation of opportunities through which a city can outperform other human settlement patterns in terms of productivity and efficiency (for an economic analysis we refer to Shapiro 2006).

This ambitious positioning of urban agglomerations in a global, open and competitive world has recently been advocated in a series of publications, in the context of the Joint Programming Initiative ‘*Urban Europe*’ (see Nijkamp and Kourtit 2012a,b; Kourtit and Nijkamp 2013; Kourtit 2014). The critical argument in the current debate on ‘*The New Urban World*’ is that in our age of urbanization – with ever increasing urbanization rates in most countries of the world, in particular in emerging and developing economies – more and more people will move towards urban areas, so that these areas become the ‘new home of humankind’. This spatial settlement revolution does not come about by coincidence, but reflects the deeply rooted economic forces through which modern cities – mainly as a result of unprecedented agglomeration forces – offer more possibilities for welfare, new opportunities and quality of life than other residential location pattern.

Admittedly, the potential of such cities is also under threat. Cities lead clearly to many negative externalities, such as traffic congestion, environmental decay, low quality of life, social stress and so forth. And therefore, it is a challenging task for modern cities to maximize the positive agglomeration benefits and the minimize at the same time the negative side-effects of (large) city formation. Such a policy challenge refers inter alia to energy efficiency, waste management, traffic control, land use management, built environment, and economic vitality in the city. It is clear that a full-scale introduction and implementation of ICT opportunities will be a *sine qua non* for a healthy urban evolution in the future, of course, in combination with innovative and knowledge-based urban development initiatives. This task of modern cities has in recent years been conceptualized in the idea of a ‘*smart city*’ (see also Kourtit et al. 2012).

A smart city aims ‘to do things better’ and ‘to offer better things’ as a result of integration – or a networked design – of the various activity patterns (consumption, production, transport,

environment, health, education, resources, knowledge etc.), so that the city becomes an intelligent ‘system of intelligent sub-systems’. Smart cities try to improve their performance on the basis of various strategic dimensions: economic, knowledge, mobility, environment and resources, quality of life, social cohesion and governance. Such a meta-systemic perspective can only be generated through an appropriate and effective use of the fruits of a digital society. Consequently, a ‘smart city’ is by definition also a digital city. However, a city is more than a computer-controlled spatial entity; it is also governed by human beings. Since these human beings form the ‘software’ and ‘socioware’ of a modern city, it is clear that a smart city cannot exist without a proper provision with urban ‘social capital’ (see also Putnam 2001). Furthermore, a smart city is not an urban island, but derives its indigenous strength from linkages and associations with other cities. And consequently, a smart city is also a ‘connected city’ (see Neal 2012).

Despite the appeal of the ‘smart city’ concept, it ought to be asked whether this ambitious meta-systemic perspective is not too generic to be of any effective help to daily policy-making. If the city is a human-made system, bottom-up initiatives ought to be respected as well. In many cases – especially in the developed world – the manoeuvre space for drastic urban changes (land use, built environment, transformation of economic functions etc.) is extremely limited. And therefore, it is an important question how smart city ideas – as a set of generic policy objectives – can be geared towards improvement or better utilization of the existing urban space (e.g., through mobility policy, green space initiatives, brownfield development, adjusted public amenities, better waste management etc). This would call for new plans on retro-fitting the existing urban space or remodeling specific urban districts (see also Batty 2012).

The latter issue will be the focal point of the present paper. It aims to offer an interactive assessment framework for an appropriate management of urban districts that have been subject to socio-economic and architectural dilapidation over the past decades, but that may play a pivotal role in a smart urban redevelopment plan. The cornerstone of our contribution is formed by an evaluation exercise for an urban district that needs to be revitalized and that has a great development potential as a creative buzz district.

The paper is organized as follows. Section 2 is devoted to a concise description of urban buzz districts in smart cities. It pays in particular attention to the importance of cultural and historical heritage in cities as a seedbed for promising rejuvenation initiatives. The next section

offers a short summary of evaluation analysis as a convenient method for assessing the social value of intangible assets in a city. In Section 4 we outline the case study in our research, viz. the NDSM area in Amsterdam (an old shipyard area). The decompositional architecture of the assessment exercise and the empirical results are described in Section 5. The particular focus will be on the identification of robust development plans (*‘Urban Faces’*) under conditions of uncertain scenarios (*‘Urban Images’*). Section 6 will outline some concluding remarks.

11.2 Retro-fitting and Forward-fitting of Creative Urban Buss Districts

For existing urban agglomerations, a comprehensive smart city policy – with all its great and creative ambitions – may be less realistic and feasible. But urban areas have many districts that may lend themselves for a creative adjustment as part of a broader rehabilitation policy. This is sometimes called a retro-fitting policy. Such a policy may in principle address a broad set of policy domains, such as: energy efficiency, environmental quality, quality of infrastructure (including parking facilities), provision with green spaces, public safety, economic vitality and entrepreneurship, up-to-date communication infrastructure, social cohesion, gentrification, cultural and recreational amenities, health and educational facilities etc.

It should be noted however, that sometimes urban retro-fitting is regarded from a more narrow re-engineering and environmental perspective. For example, Eames – quoted in Dixon and Eames (2013) – defines sustainable urban retro-fitting as “directed alteration of the fabric, form or systems which comprise the built environment in order to improve energy, water and waste efficiencies”. While the ‘hardware’ of a city definitely needs a rigorous up-scaling for the sake of efficiency and competitiveness, it ought to be mentioned that the ‘software’ (including sophisticated geoscience-based digital information) and the ‘humanware’ (in particular, the cooperative attitude to improve the conditions for the city’s well-being and socio-economic vitality) also need full-scale attention. A recent special issue of *‘Building Research & Information’* edited by Dixon and Eames (2013) offers a wealth of information on urban retro-fitting initiatives, but neglects largely the institutional and social capital requirements that are needed to make a retro-fitting strategy a success. In the current approaches to retro-fitting there is an underevaluation of the importance of social facilitators and bottlenecks in a rehabilitation policy, which runs the risk to regard retro-fitting strategies mainly as backward-

looking repair initiatives. In our approach, we will position the socio-institutional fabric as a central component in any future-oriented rehabilitation policy, reason why we will introduce here the concept of a forward-fitting urban development strategy. A forward-fitting strategy looks into the needs of urban stakeholders through a participatory experiment with a view to the identification of desirable development options for an urban area, in which – next to hardware adjustments or transformations (e.g., in the built environment or infrastructure) – in particular functional changes – through new creative, socio-economic, entrepreneurial or cultural initiatives and plans – are introduced as the core of a future-oriented repositioning of the area concerned with a view to a fulfillment of strategic smart city objectives.

A smart city is thus not a uniform efficient urban space, but offers a variety of creative urban buzz areas in which new technology, socio-economic vitality and progress, sustainable development, and innovative and creative talent are essential in a tailor-made upgrading of specific urban districts. Such districts may become the decentralized powerhouses of new and competitive urban evolution, against the background of the global urbanization trend. As mentioned above, human and social capital are critical in this context, as the ‘creative mind’ is the strategic engine for future sustainable survival strategies of the multiplicity of varied urban districts that altogether will make up the future urban fabric.

If such creative urban districts are the social buzz mechanisms for smart city development, then human interaction is key. This is once more important in the current digital age, where social media are becoming increasingly decisive for socio-economic behavioural patterns in modern cities (see for an applied modeling study on social entertainment mechanisms in Amsterdam Arribas-Bel et al. 2013). Most likely, it might be more appropriate not to speak any longer of cyber cities, creative cities, digital cities or smart phone cities, but of cyber districts, creative districts, digital districts or smart phone districts. It seems plausible that such creative urban districts are characterized by formal and informal networks, various forms of social capital, a high utilization rate of digital technology, a strong learning and cognitive orientation, and an open eye for global developments. Such strategic urban districts may become local territories with a high capacity for learning and innovation, exploiting the creativity of people, their cognitive talents, their communication and knowledge skills, and the relevant institutional constellations (cf. Komninos 2006). In the remaining part of this paper we will offer an applied analytical perspective on an interactive stakeholder-oriented forward-

fitting assessment experiment for the city of Amsterdam, while using the above presented arguments. The next section first address assessment issues in urban rehabilitation plans – in particular, forward-fitting perspectives – and will therefore offer a concise description of evaluation frameworks for urban rehabilitation or revitalization strategies and initiatives.

11.3 Evaluation of Cultural Heritage Rehabilitation Plans

Urban futures are not uncontrolled movements: they are normally subject to a complex and varied technological, socio-economic, historico-cultural, legal and institutional force field. This multidimensional context as well as the great variety in personal and group views on urban futures do not lead to a rectilinear perspective on the city. In reality, there are many alternative choice possibilities for historic-cultural cities or districts whose pros and cons have to be assessed. In the history of valuation a series of attempts has been made to offer operational and measurable contributions to this challenging task (see for a review Nijkamp 2012). We mention here the following valuation methods:

- *Hedonic pricing* method; this method takes for granted a market perspective and identifies the direct and indirect price impacts of cultural assets on private and public property as a result of normal market transactions.
- *Travel cost* method; this is a method that looks into the total additional financial sacrifices made by visitors of the cultural asset concerned.
- *Shadow (or compensation) project* method; this method seeks to assess the financial costs (or revenues) for a Pareto-optimal compensation, if a given cultural heritage would cease to exist (or would be restricted in its usage or access).
- *Insurance value* approach; in this case, the financial compensation (to be) paid by an insurance company for a damage or destruction of the asset at hand is seen as the monetary value of the asset concerned.
- *Willingness-to-pay* method; this psychology-oriented approach uses controlled experimentation techniques to assess the financial sacrifices which a given individual (or set of individuals) is willing to pay in case of a change in the quality or quantity of a cultural good; there is a wide variety of such techniques (e.g., *contingent valuation* methods, *conjoint* analysis).

- *Expert opinion* methods; in this case, real experts in historical evaluation are collectively asked to assess the economic value of a cultural heritage object.

Clearly, there may be other assessment methods, but for financial-economic purposes the above-mentioned methods are the most typical. Such methods do often not have a stand-alone meaning, but may be incorporated in a broader cost-benefit analysis or preferably in a more integrated evaluation method, in particular multi-criteria analysis (MCA). Despite the analytical solidity of the above mentioned valuation approaches, there are still many severe difficulties involved with the assessment of cultural heritage, as in many historical-cultural evaluation issues various intangible expressions and value systems come into play, such as historical memory, symbolic meaning, authenticity, self-identity, cultural diversity, creative seedbed functions, and so forth. Such expressions may complicate valuation tasks, in particular since also often a distinction is made between three distinct types of interventions to be evaluated in urban historic-cultural heritage planning: *conservation, restoration, development*. Consequently, a historical-cultural valuation method is not a simple toolkit, but has to be fit for purpose, and therefore, evaluation of urban cultural heritage will continue to be a source of inspiration and concern for both research and policy on modern cities.

To shed more systematic light on the complex issue of cultural heritage valuation, it is from an economic perspective meaningful to adopt a functional value perspective, in which the following direct and indirect cultural heritage effects are distinguished:

- effects on production and innovation
- effects on consumption and attractiveness
- labour market effects and urban vitality
- housing and land use implications
- visitors and entertainment services
- broader effects on urban cultural climate, etc.

The question is now whether an assessment system can be designed that offers a practical and operational handle for creative cultural heritage management. An example of a policy-oriented approach that looks into the contextual factors of cultural heritage management is a so-called PEST (Political, Economic, Socio-cultural and Technological) analysis, which aims

to map out systematically the critical contributions and experiments related to each of these four factors. In practice, the comparability and testability of a PEST analysis is not always convincing. In many cases, researchers resort to a more practical approach, viz. an (extended) SWOT analysis. A SWOT analysis is a common tool in industrial management and business planning, but it can also be used in other contexts including cultural heritage management (see Kourtit and Nijkamp 2011, 2013).

After an assessment of all such effects, one may use a systematic performance analysis of alternative development plans based on MCA, in order to infer final solid conclusions on future historic city plans or urban district plans, based inter alia on the value of the urban cultural heritage assets at hand.

In our empirical evaluation study, we will use a simple (weighted summation) MCA to identify the most promising future development alternatives for a forward-fitting analysis of a historical district in Amsterdam. Clearly, a more advanced evaluation technique could have been adopted (see Nijkamp et al. 1991), but for our purposes – a case study with 16 combinatorial development options from the perspective of four strategic ‘*Urban Images*’ – it suffices to filter out less important options and to concentrate on the most appropriate ones. The next section will now offer a description of the Amsterdam case study, while Section 5 will offer more details on the results.

11.4 The NDSM District in Amsterdam

The NDSM District – located at the Northern side of the river IJ crossing the city of Amsterdam – has a cultural-historical and economic meaning as a source of welfare, international connectivity, local pride and political status of the city. It was used for shipbuilding and ship repair services, and was for centuries a major economic force of Amsterdam. After World War II, the shipbuilding activities in Western Europe were confronted with fierce competition from low-wage countries, and gradually this major growth pole for the city declined in importance. At the end, some thirty years ago, only a dilapidated area was left. But in the past decade, this brownfield in decay has attracted new and creative small-scale activities, e.g. architecture, media activities, sports facilities, etc. The NDSM area is gradually turning into a largely

unplanned urban buzz district. This development has prompted a new perspective for this area, so that the city is now considering new development options for the area concerned.

Our research aims to design systematically — through interactive stakeholder involvement using social media (Facebook, e.g.) — to rationalize the decision-making process for this area. It does so by combining future scenario analysis with a systematic plan/project identification using advanced interactive assessment methods that are cast in the framework of a multi-criteria evaluation. The procedure starts from scenario experiments, moves then on to a step-wise decomposition of plans/ projects, and concludes with a multicriteria application for the NDSM area in Amsterdam.

This two-step decomposition follows the standard procedure of an advanced scenario analysis. First, a series of systematic scenarios is composed for forward-fitting images of the urban development and hand. These images, coined liveable City 2050, Connected City 2050, Pioneer City 2050, and Entrepreneurial City 2050, may be conceived of as external possible futures of the city concerned; they are not a choice possibility for local policies, but are determined by external forces beyond the control of policy-makers.

These ‘*Urban Images*’ can briefly be described as follows (see also Nijkamp and Kourtit 2011, pp. 26-36; Kourtit and Nijkamp 2013, pp. 305-211):

- *Liveable City 2050*

This ecological-based image addresses the view that cities are not only energy consumers (and hence environmental polluters), but may through smart environmental and energy initiatives (e.g. recycling and waste recuperation) act as engines for ecologically-benign strategies, so that cities may become climate-neutral agents in a future space-economy; cities will then be attractive places to live and work, with a global international outreach. In this image, the critical components ecological sustainability and high quality of life will lead to a better balance between the resources and efforts used to achieve this.

- *Connected City 2050*

The image of a connected city refers to the fact that in an interlinked (from local to global) world, cities can no longer be economic islands in themselves (“no fortresses”), but have to seek their development opportunities in the development of advanced transportation infrastructures, smart logistic systems and accessible digital communication systems, through which cities become nodes or hubs in polycentric

networks (including knowledge and innovation networks). The key drivers that influence the form of this image are smart logistics and sustainable mobility.

- *Pioneer City 2050*

This image refers to the innovative “melting pot” character of urban areas in the future, which through open communication channels will show an unprecedented cultural diversity and fragmentation of lifestyles in European cities; this will present not only big challenges, but also great opportunities for smart and creative initiatives in future cities, through which Europe can become a global pioneer. In this image important key elements to reduce the welfare gap are social participation and social capital.

- *Entrepreneurial City 2050*

This image assumes that in the climate of current and future global and local competition, Europe can only survive if it is able to maximize its innovative and commercial potential in order to gain access to emerging markets outside Europe; cities are then spearheads of Europe’s globalization policy. This image covers a range of entrepreneurs, from SMEs and migrant entrepreneurs to globally-operating firms. The key drivers behind this image, and supporting the change, are innovation and economic vitality.

These four images form possible contextual conditions for policy choices on concrete urban forward-fitting plans. In the framework of a systematic policy assessment for the NDSM area, four distinct operational plans can be distinguished. These plans are called ‘*Urban Faces*’, as (i) they describe the physical appearances of the area concerned, and (ii) these plans can be judged on the basis of their visual representation by making use of a Facebook mechanism (see also Figure 1A-1D).

These four ‘faces’ can now be described as follows (see also Kourtit and Nijkamp 2013):

- *Face A*

Face A applies when there is physical ageing of public space and buildings. The exciting historical functionality and ‘face’ may then remain, based on quality improvement of the location such as the restoration of accessibility, infrastructure, public and private areas. There is a threat of empty spaces in, and deterioration of, the location and a need for small-scale rehabilitation.

- *Face B*
Acquisition of the area is necessary in case of Face B, but the present functionality of economic activities and of its regular business areas remains. Reorganization of space and reconstruction of the infrastructure is the main part of this process, and therefore there is a need of drastic revitalization. This is a clear case of future-oriented spatial planning.
- *Face C*
A higher form of revitalization emerges in Face C; this leads to a change in the physical functionality of the location (with the presence of e.g. business offices, retail businesses), while the present functionality of socio-economic activities still remains. This requires mostly a (partial) pillowcase of buildings and an adaptation of the infrastructure (with a possibility of higher land rents) and, therefore, a need for reprofiling with a view to the future.
- *Face D*
In contrast to reprofiling, the area will be refurbished with new, also non-economic, activities such as living areas (houses, hotels). Thus, a full reprofiling of the location, with a withdrawal of business supply, brings us to a radical transformation with a loss of historical sense.

This set of ‘faces’ can be visualized as follows (see Figures 1A-1D).



Figure 1A. Face A of NDSM area



Figure 1B. Face B of NDSM area



Figure 1C. Face C of NDSM area



Figure 1D. Face D of NDSM area

These four ‘*Urban Faces*’ can next be confronted with the four ‘*Urban Images*’ described above, and this leads thus to $4 \times 4 = 16$ choice options for urban rehabilitation policy. Each of these 16 choice options can next be judged on the basis of relevant and interactively determined evaluation criteria originating from an ‘*Urban Facebook*’ experiment. These evaluation scores can be found in Table 1. The results will be further discussed in Section 5.

11.5 Empirical Results from Multi-Criteria Analysis

The evaluation of various development options of the NDSM-area is based on a multidimensional analysis of relevant aspects and aims associated with a forward-fitting policy for the area concerned. The relevant evaluation criteria were extracted from interactive stakeholder experiments (businessmen, visitors, policy makers, planners, architects etc.). An extensive description of the integrated methodology for the multi-actor assessment of alternative developments against the background of relevant judgement criteria (such as economics, land use, ecology, cultural heritage etc.) can be found in Mrak (2013).

For our case study a decompositional approach was adopted, which means essentially a two-stage evaluation analysis based on MCA. First, the main criteria to be considered were distinguished in the form of latent variables, while next for each of these criteria measurable indicators were identified that were suitable for actual observation and comparison. This led to the following list of general main criteria I – IV and specific sub-criteria associated with each individual main criterion.

I. Cultural importance and potential

1. *Presence of cultural amenities*
2. *Cultural and creative use profile*
3. *Authentic and creative atmosphere*
4. *Design and architectural quality*
5. *Creative image*
6. *Cultural and arts events*
7. *Conventions and exhibitions*
8. *Cultural heritage awareness*
9. *Visitors' perception of cultural heritage*

II. Territorial ecological importance

10. *Accessibility to users and visitors*
11. *Access to facilities*
12. *Quality of environment*
13. *Socio-ecological sustainability*
14. *Internal areal connectivity*
15. *Transport facilities for visitors*

III. Business potential and vitality

16. *Business climate*
17. *'Oasis' of business initiatives*
18. *Availability of floorspace*
19. *Long-term strategic orientation*
20. *Low rent*
21. *Socio-economic climate*
22. *Multifunctional land use*

IV. Social cohesion and cooperation

23. *Safety and security*

24. *Recreation and entertainment*
25. *Learning opportunities*
26. *Participatory development planning*
27. *Quality of planning information*
28. *Social proximity between cultures*
29. *Social cohesion initiatives*
30. *Demography*

As outlined in Section 4, the evaluation of future options for the NDSM-area is based on 4 ‘*Urban Images*’ 2050, each of which is in turn characterized by 4 ‘*Urban Faces*’. This leads to a combinatorial set of $4 \times 4 = 16$ alternative development plans for the future of the area to be evaluated. For each of these 16 future options the above list of criteria has to be used to arrive at consistent and appropriate scores. This scoring exercise is based on a simple rank order assessment of all 4 ‘*Urban Faces*’ within a given ‘*Urban Image*’.

This means a ranking of all Faces in each Image on the basis of a complete rank order of criteria results ranging from 4 (very high performance) to 1 (relatively low performance). These (perceived) rankings were the result of an interactive communication with the stakeholders of the area concerned. The overall results can be found in the comprehensive score list in Table 1.

Next, we can apply a simple MCA based on an (unweighted or weighted) summation technique. The performance score of any alternative I, denoted as P_i , can be calculated as follows:

$$P_i = \sum_j w_j c_{ij}$$

where c_{ij} is the criterion score of criterion j for alternative I, and where w_j is the weight attached to criterion j.

We will carry out this MCA in a stepwise – decompositional – way. First, we will apply an unweighted summation method to each of the main criteria I-IV for each of the 4 ‘*Urban Images*’ separately, through which we will obtain a ranking of all 4 alternative ‘*Urban Faces*’ per ‘*Urban Image*’ for all main criteria. Next, we will carry out successively an (unweighted)

MCA to this condensed evaluation table to identify the final rank order of alternatives. These steps are all incorporated in Table 1.

The information contained in Table 1 – including the description of the BAU (Business as Usual) image coined the Current City 2013 – can be visualised in a systematic form for each of these 1+4 ‘*Urban Images*’ (see Figure 2A – 2E). It can easily be seen from Figure 2B - 2E that there is one dominant ‘*Urban Face*’ in each of these four forward-fitting future options, viz. Face B. Face B represents a drastic revitalisation of the area while retaining its existing functionality. This face is prominently present as the highest performing plan option under each ‘*Urban Image*’, and may thus be seen as a very robust choice alternative that is invariant under changing external circumstances. The robustness of Face B is confirmed by the comprehensive information on all Images and Faces brought together in Figure 3.

Table 1. Decompositional criterion score table for main criteria and sub-criteria of the NDSM redevelopment plan (in rank orders)

MAIN CRITERIA	SUB-CRITERIA	CURRENT CITY 2013				LIVEABLE CITY 2050				CONNECTED CITY 2050				PIONEER CITY 2050				ENTREPRENEURIAL CITY 2050			
		URBAN FACE				URBAN FACE				URBAN FACE				URBAN FACE				URBAN FACE			
		A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
I. CULTURAL IMPORTANCE AND POTENTIAL	<i>Presence of cultural amenities</i>	3	4	1	2	2	3	4	1	3	4	2	1	3	2	4	1	2	4	3	1
	<i>Cultural and creative use profile</i>	4	1	2	3	3	4	2	1	3	4	2	1	1	3	2	4	4	3	1	2
	<i>Authentic and creative atmosphere</i>	4	3	1	2	1	4	2	3	3	4	2	1	3	4	1	2	1	4	3	2
	<i>Design and architectural quality</i>	4	1	3	2	3	2	1	4	1	3	2	4	1	3	4	2	4	3	1	2
	<i>Creative image</i>	3	4	2	1	1	4	3	2	2	3	4	1	3	2	1	4	4	3	1	2
	<i>Cultural and arts events</i>	3	4	2	1	1	4	2	3	4	3	2	1	4	3	1	2	4	3	1	2
	<i>Conventions and exhibitions</i>	4	3	1	2	2	3	4	1	2	3	4	1	1	3	2	4	3	4	2	1
	<i>Cultural heritage awareness</i>	2	4	3	1	4	1	3	2	3	2	4	1	4	3	1	2	4	3	1	2
	<i>Visitors' perception of cultural heritage</i>	1	3	2	4	1	3	2	4	2	3	4	1	2	1	4	3	2	4	1	3
	Rank order main criterion I	4	3	1	2	1	4	3	2	2	4	3	1	2	4	1	3	3	4	1	2
II. TERRITORIAL ECOLOGICAL IMPORTANCE	<i>Accessibility to users and visitors</i>	3	4	1	2	2	4	3	1	3	4	2	1	4	3	2	1	4	3	1	2
	<i>Access to facilities</i>	3	1	2	4	3	1	2	4	3	4	1	2	2	3	4	1	1	4	3	2
	<i>Quality of environment</i>	3	1	2	4	1	4	2	3	3	4	2	1	4	1	3	2	1	4	3	2
	<i>Socio-ecological sustainability</i>	1	3	2	4	1	4	2	3	2	3	4	1	2	3	1	4	1	3	4	2
	<i>Internal areal connectivity</i>	4	2	1	3	2	4	1	3	2	3	1	4	2	4	1	3	4	3	1	2
	<i>Transport facilities for visitors</i>	2	3	4	1	1	4	2	3	3	4	2	1	1	3	2	4	2	4	1	3
	Rank order main criterion II	3	2	1	4	1	4	2	3	3	4	2	1	2	4	1	3	3	4	2	1
III. BUSINESS POTENTIAL AND VITALITY	<i>Business climate</i>	4	1	3	2	4	3	2	1	3	4	2	1	1	2	3	4	4	3	1	2
	<i>'Oasis' of business initiatives</i>	4	3	1	2	1	4	3	2	3	4	2	1	4	3	2	1	2	3	1	4
	<i>Availability of floorspace</i>	2	3	4	1	2	3	4	1	2	4	3	1	1	4	2	3	3	4	2	1
	<i>Long-term strategic orientation</i>	4	3	1	2	1	3	4	2	2	3	4	1	3	1	2	4	4	2	3	1
	<i>Low rent</i>	3	2	1	4	1	4	3	2	1	3	2	4	3	1	4	2	1	3	2	4
	<i>Socio-economic climate</i>	3	2	4	1	1	4	2	3	2	4	3	1	1	3	2	4	4	2	1	3
	<i>Multifunctional land use</i>	3	1	4	2	1	4	2	3	2	3	4	1	4	2	3	1	4	2	3	1
	Rank order main criterion III	4	2	3	1	1	4	3	2	2	4	3	1	2	1	3	4	4	3	1	2
IV. SOCIAL COHESION AND COOPERATION	<i>Safety and security</i>	3	1	2	4	3	4	1	2	1	2	3	4	2	3	1	4	4	1	2	3
	<i>Recreation and entertainment</i>	4	3	1	2	1	4	2	3	3	2	4	1	4	3	2	1	2	4	3	1
	<i>Learning opportunities</i>	3	4	2	1	3	4	1	2	2	3	4	1	3	4	1	2	4	3	1	2
	<i>Participatory development planning</i>	2	3	4	1	1	4	3	2	4	2	3	1	3	2	1	4	4	3	2	1
	<i>Quality of planning information</i>	4	3	1	2	1	4	2	3	1	4	3	2	2	3	4	1	4	1	2	3
	<i>Social proximity between cultures</i>	4	2	1	3	3	4	2	1	2	4	3	1	2	1	3	4	2	1	3	4
	<i>Social cohesion initiatives</i>	1	2	3	4	1	3	2	4	2	4	3	1	4	3	2	1	1	3	4	2
	<i>Demography</i>	1	2	3	4	3	2	1	4	3	4	1	2	4	1	2	3	4	3	2	1
	Rank order main criterion IV	4	2	1	3	2	4	1	3	2	4	3	1	4	3	1	2	4	3	2	1
	Rank order all main criteria I – IV	4	2	1	3	1	4	2	3	2	4	3	1	2	4	1	3	3	4	2	1

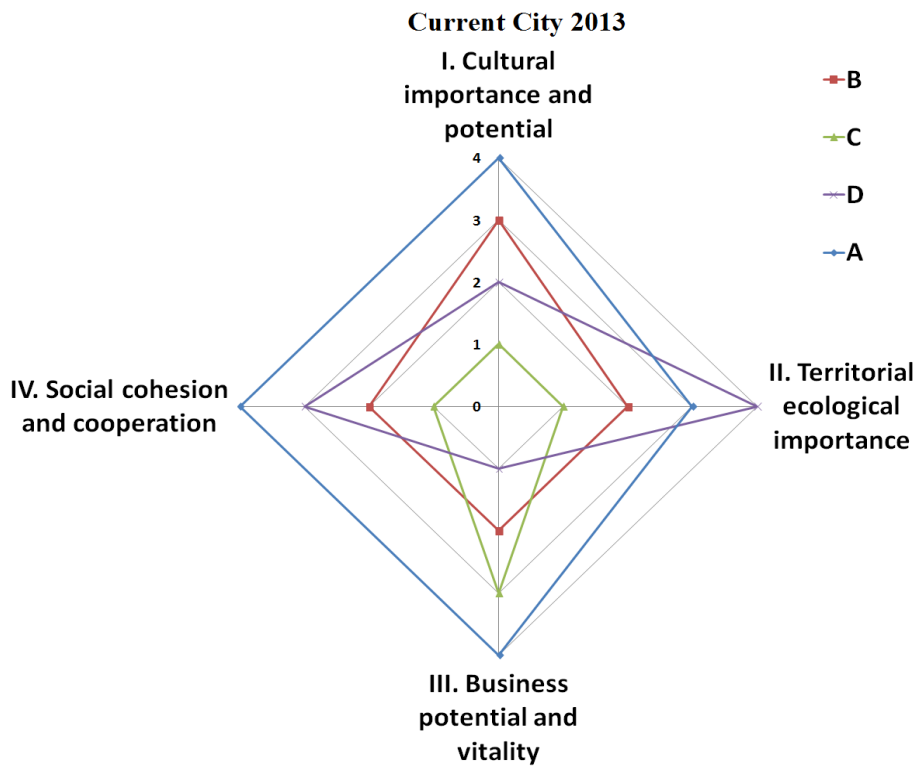


Figure 2A. Performance of 4 ‘Urban Faces’ of Current City 2013 in terms of 4 main criteria

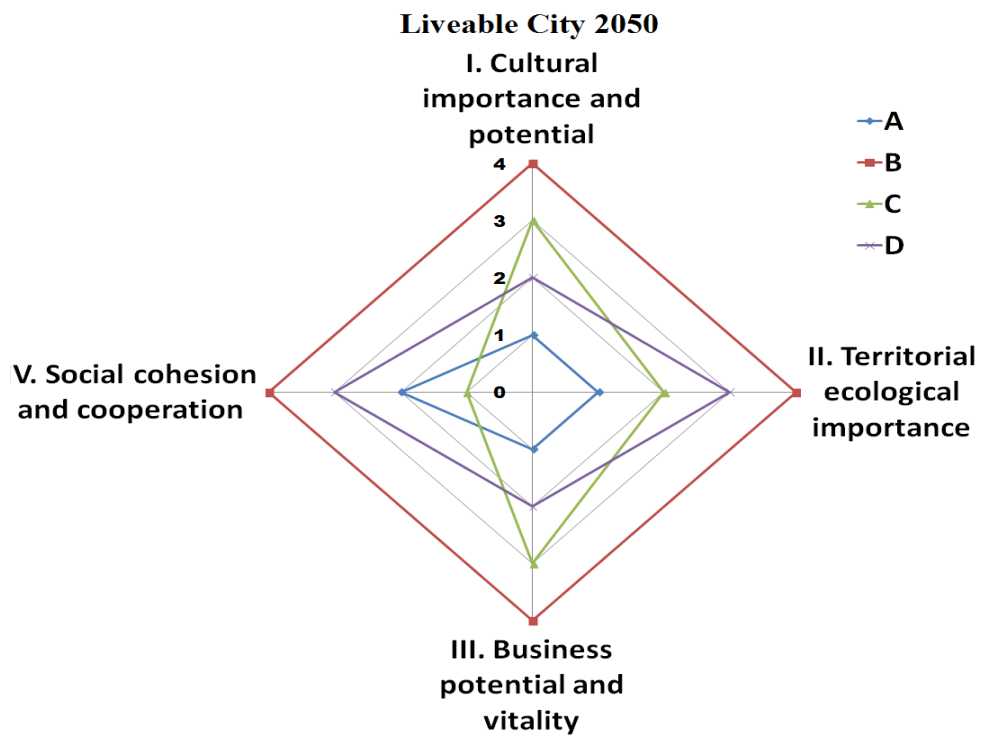


Figure 2B. Performance of 4 ‘Urban Faces’ of Liveable City 2050 in terms of 4 main criteria

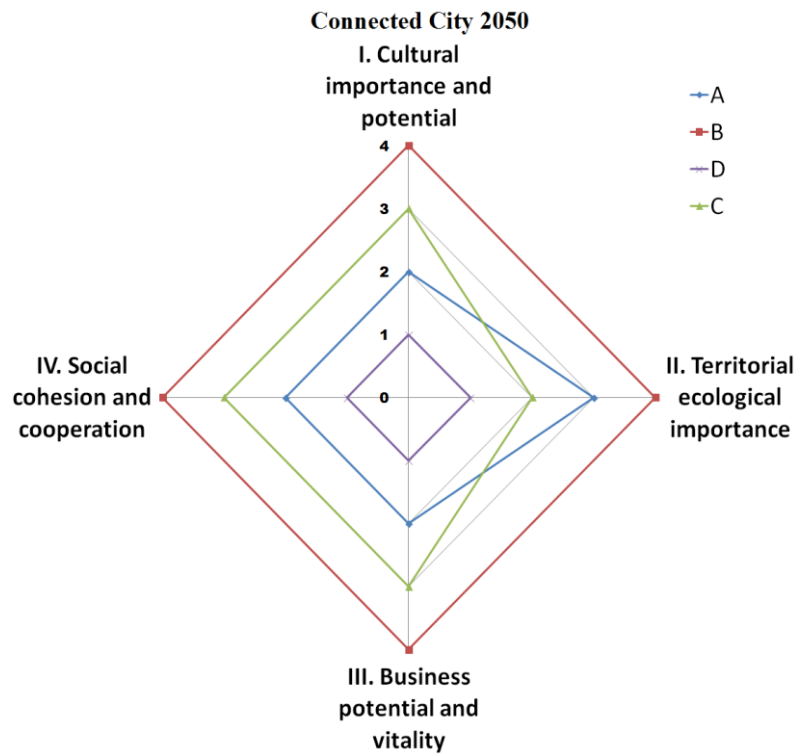


Figure 2C. Performance of 4 'Urban Faces' of Connected City 2050 in terms of 4 main criteria

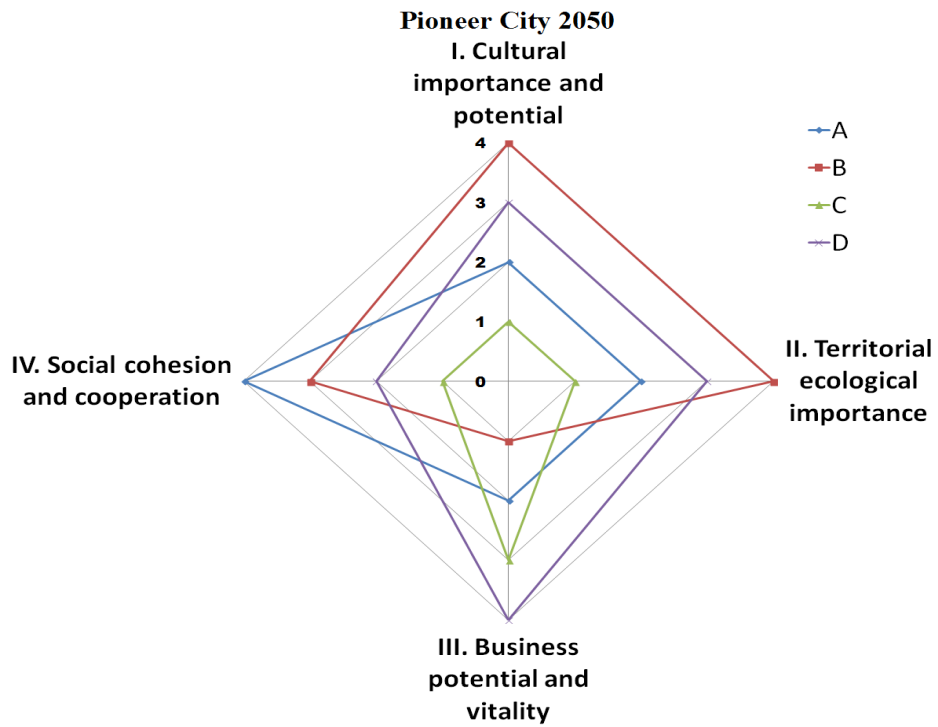


Figure 2D. Performance of 4 ‘Urban Faces’ of Pioneer City 2050 in terms of 4 main criteria

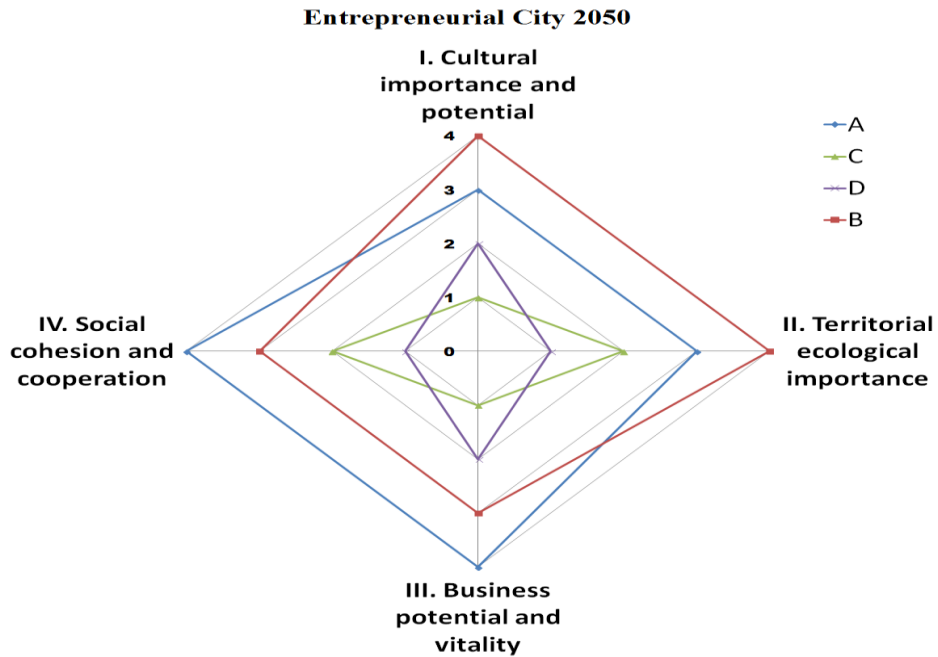
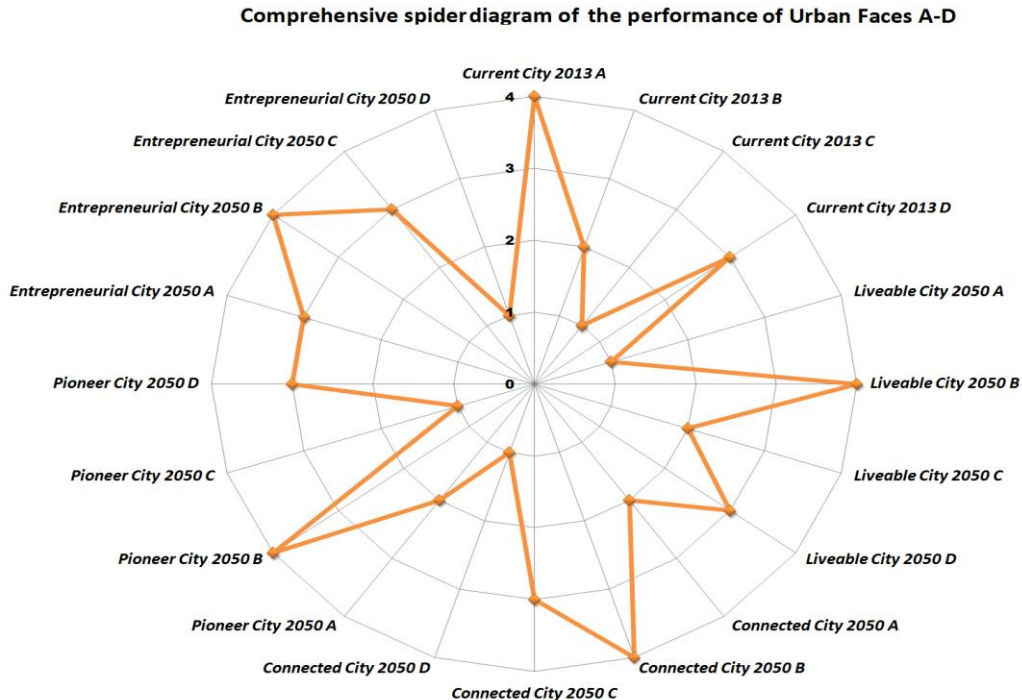


Figure 2E. Performance of 4 ‘Urban Faces’ of Entrepreneurial City 2050 in terms of 4 main criteria



Legend: The Current City 2013 is used here as a frame of reference

Figure 3. Comprehensive spider diagram of the performance of ‘Urban Faces’ A-D with respect to ‘Urban Images’ I-IV.

11.6 Conclusion

Creative cities have become in recent years new policy concepts for exploiting the development potential of urban agglomerations. Uncertain futures prompt the need for applying solid analytical tools. In our study, the notion of '*Urban Images*' has proven to be a fruitful vehicle for mapping out uncertain urban futures. Next, operational policy plans can be designed through the use of interactive social media experiments, leading to an open set of choice possibilities; coined '*Urban Faces*'. The use of interactive MCA methods appeared to offer a novel framework for identifying a robust development alternative for the case study concerned. Smart city design has to be based on urban intelligence of all stakeholders involved,

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PART D
NEW ENTREPRENEURS

12 STRANGERS ON THE MOVE: ETHNIC ENTREPRENEURS AS URBAN CHANGE ACTORS²⁷

Abstract

This paper aims to examine the critical success and failure factors for the new generation of ethnic (or migrant) entrepreneurs in high-tech and creative industries in Dutch cities. The present study investigates their entrepreneurial behaviour with a particular focus on their personal and business characteristics as well as their motivations and driving forces, which all determine their entrepreneurship and their business performance. An empirical application is presented, in which the results from an in-depth interview study on secondgeneration Moroccan entrepreneurs are discussed. The findings of our study show that, in general, these entrepreneurs are more open and are looking for new opportunities beyond the traditional markets by using modern break-out strategies. This research helps to map out key factors that influence their entrepreneurial behaviour and activity, business entry decisions, and creative business strategies. It also identifies conditions for success and other factors that impact on the performance of ethnic entrepreneurs in the Netherlands, within the broader context of entrepreneurship. These findings are informative for various stakeholders such as other ethnic entrepreneurs, policy makers and business investors in this dynamic and promising urban business environment.

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²⁷ Source: Kourtit, K., and Nijkamp, P. (2012). Strangers on the Move: Ethnic Entrepreneurs as Urban Change Actors. *European Review*, 20 (3), 376-402.

12.1 The Modern City as a Multicultural Melting Pot

The concept of an urban melting pot has gained much popularity since the seminal contributions of Jane Jacobs.^{1,2} In the vein of this literature, nowadays multicultural creativity, innovation and entrepreneurship are often mentioned as critical success factors that spur urban economic development and growth. Lee et al.³ argue that entrepreneurship and innovation are often associated with creativity and cultural diversity, so that these factors offer a positive stimulus for new firm formation in an open and competitive economy

The development of today's business environment, the reinforcement of the SME sector, and the emerging globalising economy have, in recent years, brought cultural, creative and innovative business into a new focus. The emergence of the 'new paradigm' of creativity, innovation and entrepreneurship⁴ is often ascribed to the perceived international success of the creative sector,^{5,6} as witnessed by Florida's⁷⁻⁹ and Scott's¹⁰ seminal work on Creative Industries (CIs) in modern cities. Entrepreneurship and innovation are two intertwined phenomena that are closely associated with a nation's, region's or city's economic growth and wealth. They prompt new forms of productivity and act as engines of continued prosperity and cultural diversity. Entrepreneurship and innovation are often found in the SME sector, while in this sector we also find an abundance of first- and second-generation immigrants with a business-oriented attitude.

Migration is one of the most studied subjects in modern social and behavioural sciences, e.g. in demography, sociology, geography, economics. Several academics speak nowadays of the 'age of migration', and this suggests that mankind is structurally 'on the move'. The age of migration has clearly led to a different population composition of cities in the developed world. Most foreign migrants tend to settle down in urban areas – often in the form of ethnic or language clusters – and create an unprecedented multicultural diversity in most European cities. The position of various new migrant groups in urban areas is sometimes problematic, but there is one field where they tend to be rather successful, namely in small- and medium-sized business. Many foreign migrants appear to possess excellent entrepreneurial skills and are responsible for a flourishing SME sector in many cities. They are known as ethnic or migrant entrepreneurs. Ethnic entrepreneurship, which includes business owners, start-ups or takeovers originating from non-Western countries, including first- and second-generation ethnic

entrepreneurs, has become an essential socio-economic dimension of the ethnic minorities' presence in modern cities (also raising the living standards of ethnic groups) and an important aspect of multicultural urban life. An extensive overview of these phenomena, their backgrounds and consequences can be found in Dana.¹¹

In today's open world characterized by global competitiveness and unprecedented migration flows, cities become geographic melting pots, with a surprising innovative, creative and cultural diversity – which are competitive assets to improve the socioeconomic performance of cities. This megatrend shapes a spectacular new and diverse urban design and lifestyle that favours accelerated economic growth. This new paradigm reflects a trend for a creative, open and globalizing economy with new social, cultural and environmental challenges.^{4,8,12} Cities offer through their agglomeration advantages (e.g. local identity, an open and attractive urban 'milieu' or atmosphere, use of tacit knowledge, the urban embeddedness of new business initiatives, and access to social capital and networks) a broad array of business opportunities for creative cultures, in which, in particular, self-employment opportunities and SMEs may play a central role in creating new urban vitality.

12.2 Emerging Migrant Entrepreneurship

12.2.1 General Trends

As mentioned, the SME sector in modern cities has a relatively large share of migrant entrepreneurs. Their economic position has been extensively studied (see inter alia Refs 13–16). They appear to be present in many traditional sectors (such as repair services, cleaning services, hospitality services, and so on). However, the second-generation of migrant entrepreneurs is gradually adopting a different business model, more oriented towards innovation and creative entrepreneurship. Our study aims to map out the critical success (and failure) factors of migrant entrepreneurs who are operating in the more advanced and creative branches of urban economies. Our research will be based on empirical work in Dutch cities. Before describing our approach and the statistical findings, we will first offer a brief sketch of migrant entrepreneurship in the Netherlands.

In an open and global world characterized by an increasing urbanization, modern cities function as the habitat of international migrants and magnets of economic growth,¹⁷ in which SMEs are a major source of new employment, economic growth, international competitiveness, business dynamics, creativity, and innovation in the global economy.^{3,17} According to the Commission of the European Communities,^{18,71} SMEs are socially and economically important, since they represent by far the majority of all enterprises in the EU, provide around 65 million jobs (67% of Europe's private-sector jobs are in SMEs), and contribute to entrepreneurship, creativity, and innovation.³

Entrepreneurship has emerged as a key economic factor, and as one of the most important and dynamic forces shaping the changes in the global economic and social landscape throughout the world (see Ref. 19). More than 50% of Europeans would like to be self-employed, while less than 45% prefers to work as dependent employees.²⁰ In the USA, more than 50% of the population prefers to be their own boss, and only 37% prefers an employee status.²⁰ The increasingly vital role of SMEs in innovation – in both regional and national economic and social development and (international) competitiveness – has been widely acknowledged in the economic and entrepreneurship literature.^{21–24}

The notion of entrepreneurial competition was developed more than a century ago by Alfred Marshall.²⁵ Later, a really path-breaking contribution to the analysis of entrepreneurship from a broad historical perspective was made by Joseph Schumpeter in his book *The Theory of Economic Development*.²⁶ He addressed in a more explicit way the critical role of entrepreneurs – driven by the gift to innovate and possessed by the dream and will to found a private kingdom – as an important driving force of economic progress in the theory and practice of economic growth and development. Schumpeter's book *Business Cycles*²⁷ introduced entrepreneurship as the necessary condition to create innovations in a competitive economic system driven by profit motives. The entrepreneur is not a manager charged with routine activities, but a restless seeker – under uncertain conditions – for new combinations and components in his activity portfolio, while leaving behind old production constellations ('creative destruction'), thus creating discontinuities in economic life. Migrant entrepreneurs – especially second-generation migrants – appear to become increasingly a part of this innovative business life.

Practitioners and policy makers are well aware of the increasing importance of entrepreneurship in our society as a provider of new industrial creativity, innovation performance, and technological change, and as a key player for the well-being of local and regional communities.^{28,29} They have developed various focused tailor-made policy strategies and addressed migrant human capital – including knowledge, institutions, skills, information channels, attitudes, leadership potential, solidarity, cultural values and solidarity – that favour new activities to encourage urban ethnic entrepreneurship, with a view to solving structural unemployment problems among many groups with a distinct cultural identity.²⁵

Previous research relevant to the ethnic minority's economy and entrepreneurship can be traced back in much of the earlier classic works of Weber³⁰ and Sombart.³¹ The birth of their concept '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. Migrant entrepreneurs have become a source of new economic opportunities for regions and cities. But it should be recognized that in various cases significant barriers do still exist (e.g. language and cultural barriers, skill levels, etc), so that a valid and intriguing question is: what are the critical success conditions for ethnic (or migrant) entrepreneurs (see, for example, Ref. 32) in the large urban areas?

Creative migrant entrepreneurship is emerging as one of the most challenging and rapidly growing sectors amongst ethnic minorities and migrants, and has become a popular broader concept – explained within the demand-supply relation (goods and services): 'what customers want to buy and what immigrants can provide' – in a modernizing multicultural society and open economy.^{33,34} This new type of entrepreneurship contributes to cultural integration and to a great diversity in entrepreneurship in modern cities.³⁵

12.2.2 Trends in Dutch Migrant Entrepreneurship

Ethnic entrepreneurs in the Netherlands can be categorized in two groups: namely, Western immigrants originating from Europe (excluding Turkey), North-America, Japan, Oceania and Indonesia; and non-Western immigrants, originating from Africa, Asia, South- and Central-America, and Turkey, not including Japan and Indonesia.³⁶ Over the past few decades, in many urban areas across the Netherlands, a remarkable change has occurred in the

overall Dutch demographic and (ethnic) economic determinants of urban development as a result of the large influence of migrants, induced in particular by the rise of ethnic entrepreneurs. Today, first and second-generation migrants in the Netherlands comprise one-fifth of the total Dutch population – that means 3.3 million people with a foreign background from a total 16.5 million Dutch population – and this is expected to rise to 5.0 million in 2050 with a stable position in the job market.³⁷

Most migrants in the Netherlands come from a wide variety of places of origin such as the Mediterranean regions, particularly Turkey (0.7%) and Morocco (0.5%), and Surinam (1.2%), the Dutch Antilles/Aruba (0.3%) and China/Hong Kong (0.1%).³⁶ Many of them were recruited in the 1960s and at the beginning of the 1970s for temporary unskilled/low-paid jobs that could easily be replaced by a succession of sojourners in traditional industries, e.g. shipbuilding, textiles.³⁸

Today, the dominant group of the migrant population (approximately 60%) is formed by the non-Western migrants: Turks, Moroccans and Surinamese immigrants (who belong to either the first generation or the second generation); and the share of Western migrants in Dutch society is approximately 20%.³⁹⁻⁴¹ There are considerable differences in terms of the demographic composition of the immigrant groups. The Turkish and Moroccan immigrants are rather similar regarding their demographic composition; on average, they have the lowest educational level, are unfamiliar with the Dutch culture and language, and are most often married.

However, Surinamese and Antilleans have, on average, a higher educational level (yet not as high as that of the native population), are more familiar with the Dutch culture and language, and are more often unmarried. Compared with the indigenous Dutch population, all immigrant populations have in common that they are relatively young, and most immigrants of at least 15 years of age are first-generation immigrants.

Immigrants appear to form a heterogeneous group of people with an extreme diversity in terms of skills, education, innovativeness and business attitude. In the past, selfemployment has been a source of economic survival (the so-called ‘lifeboat economics’, which refers to Garrett Hardin’s Lifeboat Ethics,^{42,43}) for immigrants and ethnic minority groups. Historically, migrants had often a specific and isolated position: ‘the stranger is the trader’ (a possible

solution to their unemployment situation, by improving their working conditions, while also escaping from discrimination and ‘integration and emancipation’ problems), but nowadays we observe an overwhelming impact of specific migrant groups on the regional and local economy in many host countries.

The total number of businesses in the Netherlands has continued to grow from 925,800 to 939,799 (818,300 indigenous entrepreneurs, 74,500 Western entrepreneurs, 46,900 non-Western entrepreneurs) in the period 1999 to 2004 (see Table 1). The share of ethnic entrepreneurs in the total number of entrepreneurs increased from 106,800 (11.5%) in 1999 to 121,400 (13%) in 2004.⁴⁴ However, within these percentages, the total share of non-Western ethnic entrepreneurs in the Netherlands shows a consistent and strong growth in the period between 1999 and 2004 from approximately 32% (30,200 first-generation, 3900 second generation) to 39% (40,100 first-generation, 6800 second generation), while indigenous and Western ethnic entrepreneurs remained almost constant.

Table 1 shows that, in the last decade, the number of non-Western ethnic firms has considerably increased; in particular, firms owned by the second generation has doubled from 3900 firms in 1999 to 6800 firms in 2004. This means that, in five years, there has been an increase of more than 50% of the second generation starting as ethnic entrepreneurs. They belong to traditional large migrant groups from Morocco, Turkey, Suriname, the Antilles and Aruba entrepreneurs.

Table 1. Development of the number of firms in the Netherlands, 1999–2004

Year	Native entrepreneurs	Western immigrants entrepreneurs	Non-Western immigrant entrepreneurs			Total
			1st generation	2nd generation	1st and 2nd generation	
1999	819,000	72,700	30,200	3,900	34,100	925,800
2000	835,400	75,000	33,700	4,700	38,400	948,806
2001	845,100	77,200	38,100	5,500	43,600	965,900
2002	841,400	77,200	39,500	6,000	45,500	964,100
2003	842,300	77,300	40,700	6,400	47,100	966,799
2004	818,300	74,500	40,100	6,800	46,900	939,799

Source: Ref. 72.

In 2004, over 45,000 non-Western migrants entrepreneurs (first- and second-generation) started an enterprise in the Netherlands; that was 12,000 enterprises more than in 1999. In particular, entrepreneurs with a Chinese and Egyptian background (who are small minority groups) often start up their own business, followed by Turks and Surinamese, while Moroccans in the past rarely set up their own firm.

Despite a high start-up rate of non-Western enterprises in recent years, the native entrepreneurs have the highest survival rate, followed by Western entrepreneurs. The survival rate of non-Western entrepreneurs is relatively low, particularly for the firstgeneration ethnic entrepreneurs, due to low educational and professional preparation including lack of human capital (such as language skills), legal information, limited knowledge of the local culture, insufficient business experience (such as bookkeeping), and lack of entrepreneurial qualifications, e.g. poor design of a business plan, low access to business consultancy, or an inadequate financial plan.⁴⁵ At least 38% of the enterprises started up by non-Western entrepreneurs in 2002 still existed in 2006, while the survival rate of enterprises started up by native entrepreneurs was 62%, followed by Western entrepreneurs of 44%. However, the survival rates of entrepreneurship among immigrants from different cultures and per economic branch also show a high dispersion and differ significantly.^{46,47}

Almost 70% of the non-Western entrepreneurs in the Netherlands originate from Morocco, Turkey, Suriname, the Antilles and Aruba or China/Hong Kong.³⁶ However, within this percentage, the relative growth of the self-employment rate is higher for Turkish immigrants (followed by the Surinamese immigrants) than it is for Chinese immigrants.

Table 2 shows that the largest group of immigrant entrepreneurs in the Netherlands, from both the first- and the second-generation, originate from Turkey, with 12,300 Turkish firms in 2004, followed by Suriname, with 7700 Surinamese firms in 2004, all of which are more concentrated in large Dutch urban areas.

However, in the period 1999–2004, the sharpest rise was among Moroccan entrepreneurs: namely, 61%. The number of the Turkish and Antilles entrepreneurs has also strongly increased in that period by 56% and 47%, respectively, while the number of Chinese and Surinamese has grown by 32% and 27%, respectively.³⁶

Table 2. Number of entrepreneurs (31000) specified by country of origin (both first- and second- generation), 1999–2004

Year	Turkey	Morocco	Netherlands/Antilles	Suriname	China/Hong Kong
1999	7.9	2.8	1.5	6.4	5.3
2000	9.2	3.3	1.8	7.1	5.7
2001	11.0	4.0	2.0	7.8	6.2
2002	11.5	4.3	2.1	7.9	6.2
2003	11.9	4.4	2.2	8.0	6.6
2004	11.8	4.6	2.1	7.7	7.0

Source: Ref. 44.

For a long time, particularly the large Dutch conurbations and cities were places of settlement for major migrant groups of different national and cultural origin, because of higher agglomeration advantages, e.g. a better business environment and employment, which is now an important strategic activity of modern cities and leads to the new ‘urban imperative’. Nowadays, almost 9% of the ethnic entrepreneurs (21% Western ethnic entrepreneurs and 39% non-Western) are concentrated in Amsterdam, one of the four largest cities (called after here ‘G4’: Amsterdam, Rotterdam, The Hague and Utrecht) of the Netherlands. The first-generation entrepreneurs form the largest group of non-Western entrepreneurs in the G4; the second-generation the smallest group.

Table 3 shows that the number of ethnic entrepreneurs in the G4 increased considerably more than the number of indigenous entrepreneurs. Almost one out of every three entrepreneurs in the cities of Amsterdam, The Hague and Rotterdam has an ethnic background, while in Utrecht fewer than one in four entrepreneurs is involved in ethnic entrepreneurial activities. However, in this growth, the number of non-Western entrepreneurs was stronger than the Western entrepreneurs, and the sharpest rise was particularly among the second-generation non-Western entrepreneurs.

The first-generation entrepreneurs are relatively more concentrated in the poor districts in Rotterdam, The Hague and Utrecht – where average house prices are lower than in other districts – than are the higher-educated young ethnic second and third generations. Most of these enterprises are small businesses, mainly oriented towards their own ethnic niche markets – characterized by low barriers of entry in terms of required capital and educational

qualifications, their informal nature, less formal ownership, small-scale production, high labour-intensity, and low added value. These businesses are usually in traditional sectors: travel, clothing, hotel and catering sectors are still most popular.^{36,48}

The younger generation is, however, more open and is seeking new opportunities outside the traditional sectors and geographical areas – an external market orientation beyond their own ethnic group, which might offer better opportunities to serve target groups outside the original niche. They are attracted to new sectors, such as ICT, marketing, accountancy, global trade, real estate, consultancy, and leisure and recreation management agencies. Thus, they want to expand into high-volume trade by engaging in trade with native entrepreneurs and other ethnic groups. Among the foreign entrepreneurs, the position of the second generation is much better than that of the first generation, because the second generation has been educated in the Netherlands and also participates more intensively in Dutch society. This means that they experience fewer barriers and problems than the first-generation foreign entrepreneurs.

The development of the distribution of the entrepreneurs by group of immigrants is changing and enhancing the image of urban interests in the potential of foreign entrepreneurs (the lead sector for accelerated economic growth) as major attraction forces and sources of strategies for economic growth.

Cities are now pursuing various diversity strategies, which have a strong influence on the self-employment propensities of different ethnic groups,⁴⁹ in order to maintain agglomeration opportunities that make cities more accessible for all kinds of minority groups. In this way they can improve their position, satisfy their needs, and offer an attractive business location environment, and better financial activities and business services (by way of absorption and upward economic mobility).⁵⁰ This is a major challenge to cities and policy-making bodies, especially in the context of sustainable local development.

It is noteworthy that ethnic entrepreneurs form a rather heterogeneous class. Thus, urban (ethnic) entrepreneurship and diversity policies are becoming segmental and tailormade activities, in which minority groups and firms may play a critical role. Ethnic entrepreneurship has a variable trajectory with many opportunities, but also with many hurdles and failures.⁵¹ To identify these chances and barriers, more empirical fieldwork is necessary. Therefore, in the next section we will describe the results of a case study on one of the three largest ethnic groups that has had the sharpest rise in the absolute number of non-Western entrepreneurs and a

relatively high birthrate: namely the higher-educated young Moroccan entrepreneurs in the ICT, legal services, media, financial, real estate, consultancy and marketing sectors concentrated in the G4 in the Netherlands.

Table 3. Number of entrepreneurs (31000) specified by group of immigrants in the G4 (1999, 2002 and 2004)

	Native entrepreneurs			Non-Western immigrant entrepreneurs			Western immigrants entrepreneurs			Total		
	1999	2002	2004	1999	2002	2004	1999	2002	2004	1999	2002	2004
Amsterdam	31,3	33,3	33,7	5,8	7,8	8,3	7,7	8,5	8,9	44,8	49,5	50,9
Rotterdam	16,8	17,4	17,2	3,5	4,3	4,8	2,6	2,8	2,8	22,9	24,6	24,8
Den Haag	13,8	15,6	15,3	3,0	4,5	4,7	2,9	3,3	3,3	19,7	23,4	23,3
Utrecht	8,1	10,3	10,3	1,0	1,3	1,5	1,3	1,5	1,5	10,3	13,1	13,3

Source: Ref. 72.

12.3 Moroccan Entrepreneurs in Dutch Cities: an Exploratory Investigation

12.3.1 Introduction

Nowadays, the Moroccan entrepreneurs show the sharpest rise in terms of absolute numbers of all the non-Western entrepreneurs, and have a relatively high birthrate in the Netherlands. Many of the survivors appear to be small-sized, relatively young, and active in small (ethnic) niches, and do not always have the expertise and know the right people in order to make the big step towards an external market orientation. The important research question is now: What are the critical success conditions for these ethnic entrepreneurs?

In order to trace the opportunities and barriers for ethnic entrepreneurs, we recently made an in-depth field survey of a limited new set of rather representative Moroccan entrepreneurs in the G4. The G4 have a large share of most of the ethnic groups present in the Netherlands. Our study seeks to analyse the behaviour of the second-generation ethnic entrepreneurs of Moroccan origin in the G4 in terms of their entrepreneurial behaviour – with a focus on their personal and business characteristics and on their motivation and driving forces, which all can explain their entrepreneurship and business performance. Our database stems from a sample of 24 ethnic entrepreneurs of Moroccan origin (8 females and 16 males) selected from a group of creative and innovative ethnic entrepreneurs in the business-related professional service sectors with higher educational level and skills, and who are different from the traditional ethnic niche in terms of their products, services and communication channels. This is a relatively small sample, but in this emerging new market it turned out to be extremely difficult to find more secondgeneration entrepreneurs who were willing to participate in our interview. Consequently, we will present in the next section a combination of quantitative and qualitative research methods and exploratory results.

12.3.2 Personal Characteristics of Moroccans Entrepreneurs

The average age of entrepreneurs of Moroccan origin who participated in the research is between 35–39 years (33%) and they are mostly male (67%). Most of the Moroccan entrepreneurs are married (75%) and have children (37%). When the country of birth is taken into consideration, Figure 1 (see C) shows that the majority of the Moroccan entrepreneurs

were born in Morocco (67%) and came to the Netherlands between 1971 and 1980 (54%); while 29% were born in the Netherlands.

The majority of the Moroccan entrepreneurs (92%) achieved their educational attainment in the Netherlands and speak both Dutch as well English fluently (see Figure 1, A). Depending on their arrival year, which was younger than 12 years (the border between primary and secondary education), and educational attainment in the Netherlands, the majority of the entrepreneurs (70%) fall in the category of the second generation (see also Refs 45, 52). The majority of the Moroccan entrepreneurs (58%) have a high level of vocational education (HBO) and university education (WO), followed by those with a post-doc level (21%), and the rest had a middle level of vocational education (17%) (see Figure 1, B).

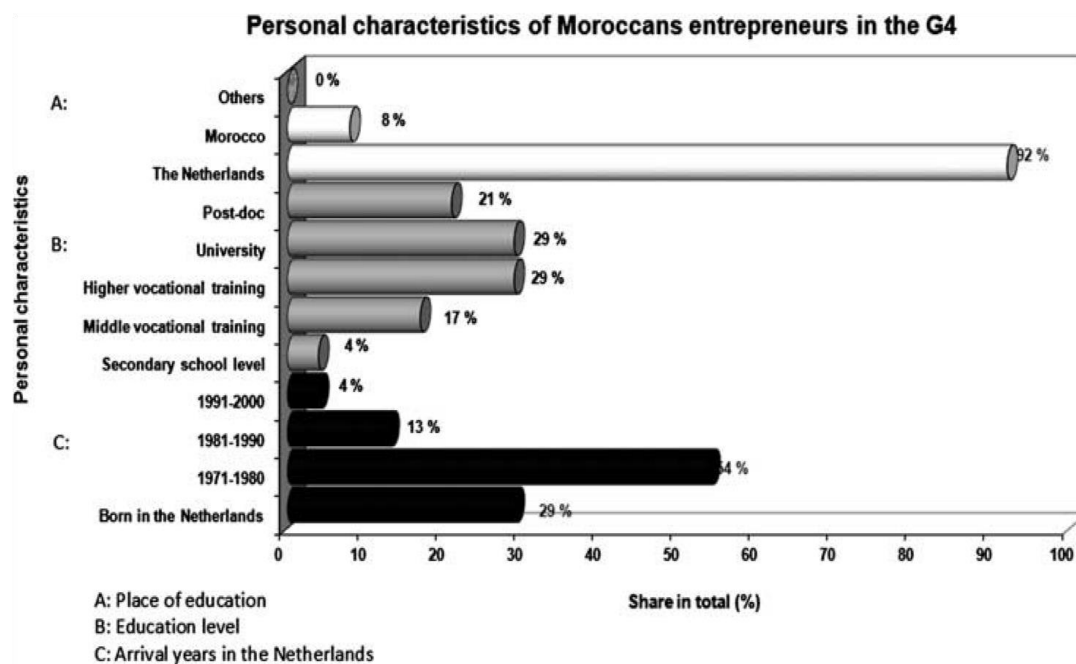


Figure 1. Personal characteristics of higher-educated young Moroccans entrepreneurs in the G4.

12.3.3 Motivation and Driving Forces of Moroccan Entrepreneurs

Figure 2 shows that the majority (67%) of the Moroccan entrepreneurs were students before they started their own business, and 17% were already active as entrepreneurs (17%) in

their previous position (see Figure 2, E). This shows that unemployment has not pushed the majority to become self-employed as a means of economic survival.

Their previous experience of entrepreneurs through their studies and employment (71%) and, moreover, their obtaining this kind of experience in a similar sector to their own (83%) motivated them to start their own business (see Figure 2, E and F). Depending on their previous experience and sector choice (see Figure 2, D), the main reasons to become entrepreneurs came from the desire to be independent and their own boss, followed by extra income and the ambition to be a leader. More than 75% of the Moroccan entrepreneurs have chosen to be active in a sector similar to that in which they had their work experience and because of the market opportunities and high demand in that sector, while the minority of the entrepreneurs have chosen this sector because of their educational background and interest (hobby).

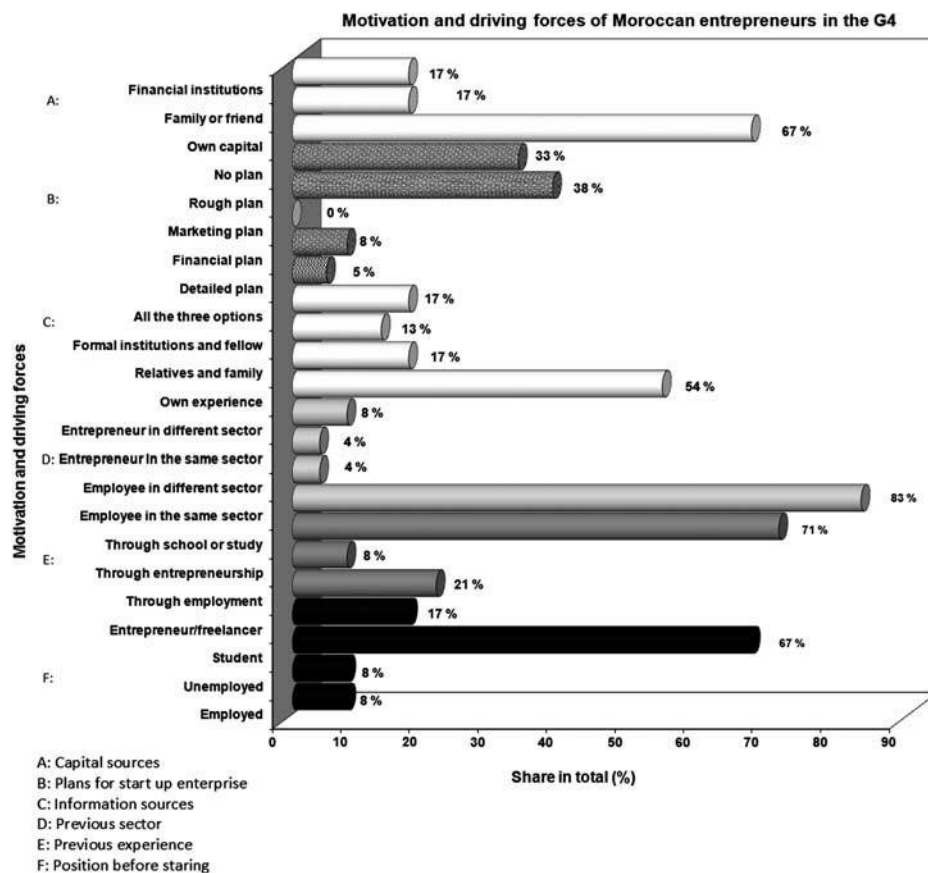


Figure 2. Motivation and conditioning factors of higher-educated young Moroccan entrepreneurs in the G4.

However, the majority of the Moroccan entrepreneurs (71%) had no or an inadequate business plan to start up their own business (lack of entrepreneurial qualifications) (see Figure 2, B); factors such as sources of capital and information show that 67% of the entrepreneurs have used their own capital, and 54% used their own experience, while 17% obtained information from family and relatives (see Figure 2, A and C). On the other hand, the minority of the entrepreneurs had a very detailed financial plan to start up their own business, and had obtained financial capital and information from formal institutions and fellow entrepreneurs, as well as from family or friends. Although the minority of the entrepreneurs had a family member who is an entrepreneur, factors such as capital and information sources show that entrepreneurs are quite independent of their family or friends.

The current situation in a dynamic economy was evaluated by the majority of the entrepreneurs as attractive, and as having a growing and promising structure with scope for sustainability, specialization, new innovative techniques of services and products and less intense competition. Seventy-one percent of the entrepreneurs mentioned that the share of Moroccans in the sector is increasing, while only 4% claimed that their share is decreasing. Almost 30% of the Moroccan entrepreneurs stated that their total orders had slightly decreased because of the financial crisis and government spending cuts. But they are positive and see this as temporary, because they are convinced that the information and communication technologies (ICTs) will probably always play an increasingly significant role in all industries by supporting their business and marketing strategies and internal and external business processes.

12.3.4 Business Characteristics of Moroccan Entrepreneurs

Figure 3 shows that the surveyed Moroccan businesses from the creative industries belong to the following sectors: consultancy and research (38%), ICT (37%), marketing and sales (13%), and real estate and entertainment/music (12%) (see Figure 3, see C). When the foundation year of the enterprise is taken into consideration, the findings show that more than 50% started their own small-sized business after 2006 – mostly in sole proprietorship (88%) with fewer than five employees (38%) – while 8% of the entrepreneurs started their business in 1990 (see Figure 3, A and B). It is very interesting to observe that Moroccan entrepreneurship really took off after 2001, at 38%.

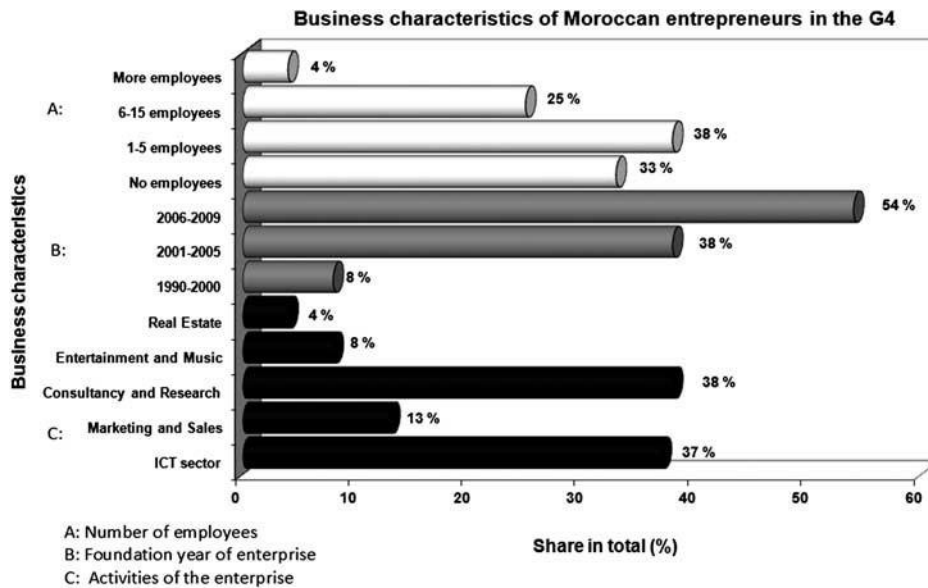


Figure 3. Business characteristics of higher-educated young Moroccan entrepreneurs in the G4.

12.3.5 Strategic Business Performance of Moroccan Entrepreneurs

Figure 4 shows that the Moroccan entrepreneurs experienced a positive development in their business performance results in the year 2008. Almost 75% of the businesses had an increase in sales, while 8% of the entrepreneurs experienced stable sales results in 2008 (see Figure 4, D).

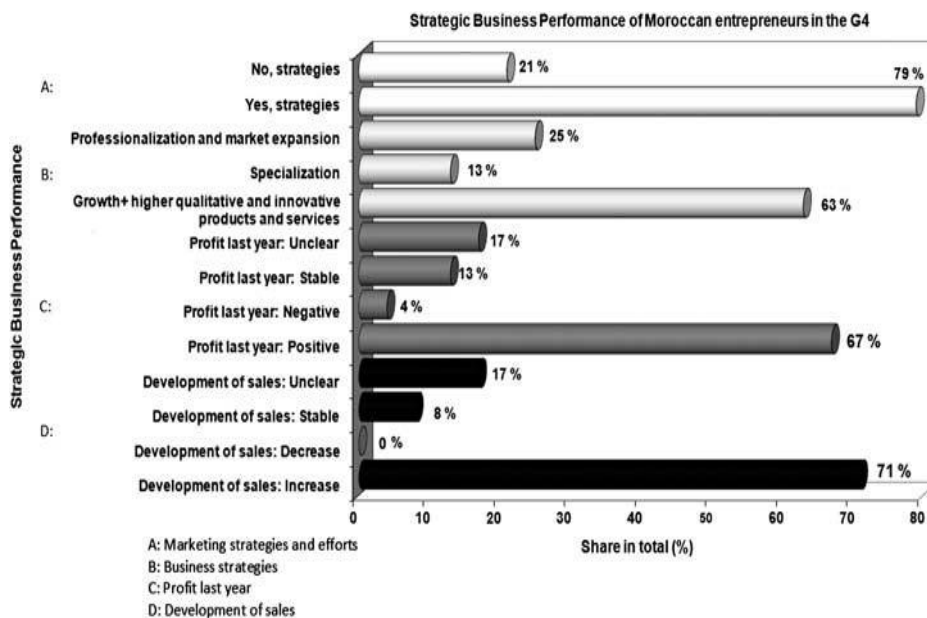


Figure 4. Strategic business performance of higher-educated young Moroccan entrepreneurs in the G4, in 2008.

The profit of the previous year shows that 67% of the businesses had a positive profit; while 13% did not see any changes in their profit (see Figure 4, C). In order to stay ahead, and remain competitive under various conditions, they have become very critical and use more formal practices. This formal approach increases the focus on the management of the business, which not only reflects the growing diverse and dynamic business environment today, but also helps to monitor the firm's strategic response to this complexity. More than 50% of the entrepreneurs regularly adapt their organizational growth strategies in response to market and economic conditions (see Figure 4, ad A).

Sixty-three percent want to provide higher quality and innovative products and services, while 25% want to focus on professionalization (namely improvement in the organizational and management structure and attracting high-skilled employees) and market expansion; the remaining 13% want to focus on specialization to achieve strategic and organizational goals and a better alignment of individual objectives to organizational objectives, in order to improve the performance of the business and to ensure a sustainable competitive advantage with regard to its chosen organizational strategies, in a dynamic environment (see Figure 5, B).

12.3.6 Composition of Employees and Clients of Moroccan Entrepreneurs

Figure 5 shows that the Moroccan entrepreneurs are not dependent on customers and labour from their own ethnic group in their business environment, because they do not really offer specific ethnic products or services. More than 50% indicated that their target group is Dutch natives and others (such as particular sectors, firm-size, females, governments, etc), while 42% indicated that they do not have a target group (see Figure 5, B). This applies particularly to Moroccan entrepreneurs in the ICT sector, where their products and services are not related to the needs of a particular (ethnic) group. Therefore, more than 60% of the entrepreneurs mentioned that they actually preferred to hire Dutch employees and 8% of the entrepreneurs do not have any Moroccan employees (see Figure 5, D).

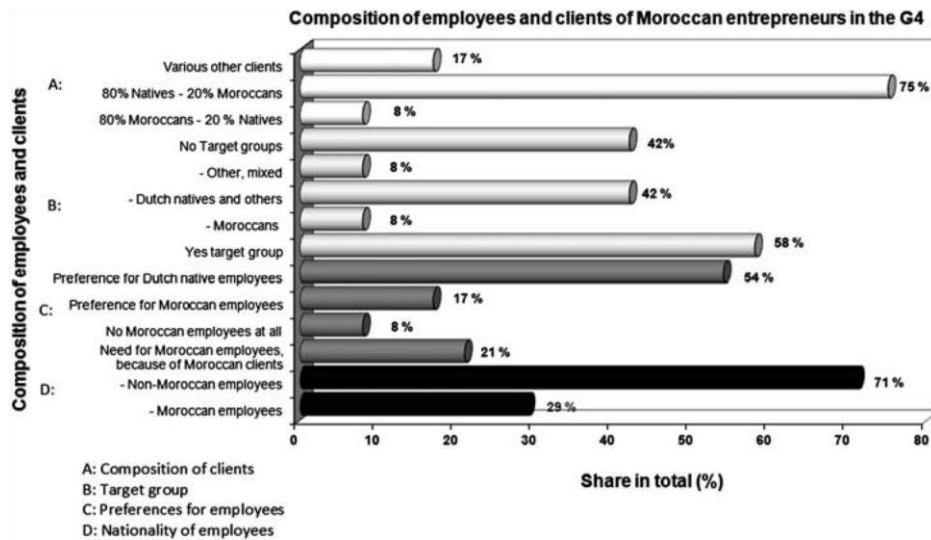


Figure 5. Employees and clients of higher-educated young Moroccan entrepreneurs in the G4.

A few Moroccan entrepreneurs (8%) indicated that their target group is Moroccan clients. Therefore, only 21% of the entrepreneurs explained that they needed to have Moroccan employees because of their Moroccan target group (see Figure 5, C).

The composition of the clients also shows that more than 90% of the entrepreneurs have a clientele who consist of 80% native-Dutch and other clients, while the minority of the entrepreneurs (8%) have a clientele who consist of 80% Moroccans and 20% nativeDutch (see Figure 5, A). The overall evaluation is that the majority of our case-study Moroccan entrepreneurs in the creative industries serve a large group of native clients and provide an employment opportunity for 121 people, who are mainly not from their own ethnic group (71% are non-Moroccan employees).

12.3.7 Participation in Social Networks and Support from Social Capital of Moroccan Entrepreneurs

Figure 6 shows that the majority of the entrepreneurs (84%) make extensive use of their own social networks (for information, general information, promotions, shared experiences, recruitment of cheap and loyal labour, involvement in the decision making, cooperation, advice on the amount of crucial resources for the desired growth strategies, the ownership of multiple businesses, and the expansion of their own network) within their own ethnic groups through friendship and shared community of origin in their destination areas (on the local level) (see

Figure 6, A). Only 17% of the entrepreneurs make use of formal social networks, and do not really participate in the informal networks (17%) (see Figure 6, B).

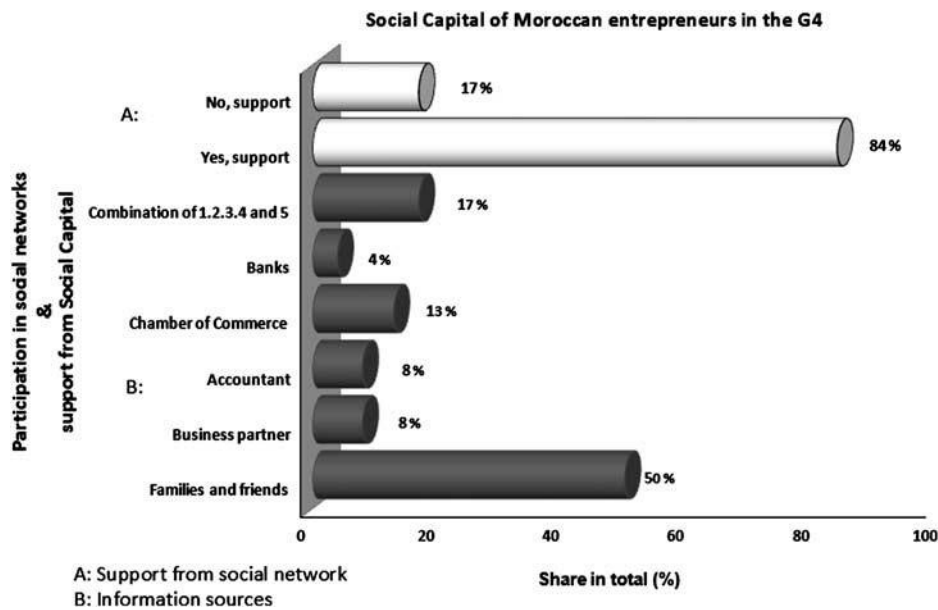


Figure 6. Present Social Capital of higher-educated young Moroccan entrepreneurs in the G4.

Nevertheless, they still see the informal social networks as a valuable and important asset, which contributes to increased flexibility in strategic decision making (see also Ref. 53), and a central source of ‘social capital’ (see also Ref. 54). The relationships among these entrepreneurs, and the interaction and connections within their social networks and their shared values, shared challenges and equal opportunities within specific cities/regions, enable them to commit themselves to each other. These relationships are based on a sense of trust, tolerance, hope and norms of reciprocity among the entrepreneurs.

A final remark in the statistical reliability of the results presented in Figure 1–6 is relevant here. The values of alpha coefficient (α_i) . 0.6 (0.703; 0.678; 0.751, and 0.622, respectively, for Personal Characteristics (PC), Participation and Support Social Capital (PSSC), Motivation and Driving Forces (MDF), and Business Performance (BP)) showed that the measurement scales used in this research are sufficiently reliable.⁵⁵

In general, the empirical results of our case study research shows that the secondgeneration Moroccan entrepreneurship in the Netherlands really took off after 2001. Nowadays, the higher-educated young Moroccan entrepreneurs are focusing on nontraditional and fast-growing sectors and operate in a volatile environment with continually changing

technologies, markets and business strategies, and shifting consumer needs for products and services, which differ widely on the national, regional and local level⁵⁶ and offer business opportunities on different geographical scales.⁵⁷

However, the majority of these entrepreneurs still make extensive use of their local informal social networks, with whom they have a strong common interest, and see these as an important and central source of ‘social capital’, which may confine the desire to grow their entrepreneurship only within their local social networks. In the long run, however, the lack of formal commitments and expectations will result in failure to meet the members’ needs (no formalized network structure). This will not help to bridge the gaps that exist between the various ethnic entrepreneurs in their local social network and (other) formal networks, institutions or groups in Dutch society (on the local, regional and national levels), all of which build confidence and lead to increased awareness, knowledge and trust. As Putnam⁵⁸ stated: ‘a society of many virtuous but isolated individuals is not necessarily rich in social capital’.

Therefore, isolation brings limitations in, for example, network, cooperation, breakout strategies, in particular as local clients are not necessary big spenders; city clients do not visit their area; and fewer new product-market combinations are developed. The isolated (migrant) entrepreneurs do not make use of opportunities from formal organizations, governments, financial institutes and potential partners on the local, regional and national levels, which creates loners in the crowded melting pots; in particular, migrant entrepreneurs do not find it easy to make their way in the complexities of modern society. However, most migrants appear to be proud, work hard, offer good service, have loyal customers and are always open to new markets.

12.3.8 Challenges and Success Factors Moroccan Entrepreneurs

The majority of our case study Moroccan entrepreneurs (62%) have not faced any problems in running the business that impede growth and success in a challenging and dynamic business environment. However, 38% of these entrepreneurs have to cope with critical problems, which are also quite commonly experienced by native-Dutch entrepreneurs. There are seven main types of issues often perceived as problematic:

- (1) a confusing and complex tax structure, overregulation (long delays in getting approval for trade licences and business registration), and government policies

- (relating to working hours, labour relations and working conditions) which are often overly complex and unclear;
- (2) difficulties with the implementation of strategies and formulation of goals: a better achievement of organizational goals is possible, but the operational objectives have to be translated into better and clearly measurable key performance indicators (KPIs) and undertaken actions, which are related to strategic objectives;
 - (3) the inability to maintain an accurate internal business process and administration;
 - (4) the difficulty of attracting good and well-skilled employees;
 - (5) the challenge of offering quality products and services for a broader group of clients and in broader markets (strong competition);
 - (6) the need to reduce the overall costs; and
 - (7) the limited access to financial capital from governmental and private institutions that is so essential for continuous business and sustainable development in order to become and remain world-class players in everything they do (to empower their strategic position in the market).

The most important variables that contribute to the success in our case study on Moroccan entrepreneurs are their: (1) growing (new) social network; (2) strong motivation, enthusiasm and persistence; (3) strong reputation of the organization as a high quality and honest firm with a lot of personality and expertise; (4) high-quality of customized services; (5) wide language ability; (6) strengths in business and managerial skills; and (7) higher result orientation. All these variables have to do with improving the quality of management and processes and thus achieving successful organizational results.

A daily preoccupation for these firms is managing real value drivers (quantitative as well as qualitative) behind the business with a continuous strategic planning process, combined with a learning and thinking process for value-creation and achieving organizational results. Thereby, it is important to clearly communicate the KPIs (i.e. empowerment), which brings transparency to the accountability and responsibility of people and leads them to better action-orientation and improvement of strategic planning and to gaining a competitive advantage.

Through improved and intensive communication, knowledge share and exchange, and cooperation, these entrepreneurs can receive early warning of potential problems, and thus can understand better how to improve their business strategy, which reduces ad hoc work, lowers costs and increases profit. Better steering and execution, which, by using specific concepts and

taxonomy that everyone is expected to know, helps people to take a consistent business direction, and to consider how to improve things, and to have a better focus on issues that are important for the organization and its shareholders.

12.4 Statistical and Multiple Regression Analysis

Despite the relatively small sample in our research, it is interesting to pursue some further statistical analysis. Using a multiple regression analysis, a structural relation model can be created on the basis of the following factors: personal and business characteristics (PC and BC), motivation and driving forces (MDF), participation in social networks and support from social capital (PSSC), and strategic business performance (SBP) (see Figure 7).

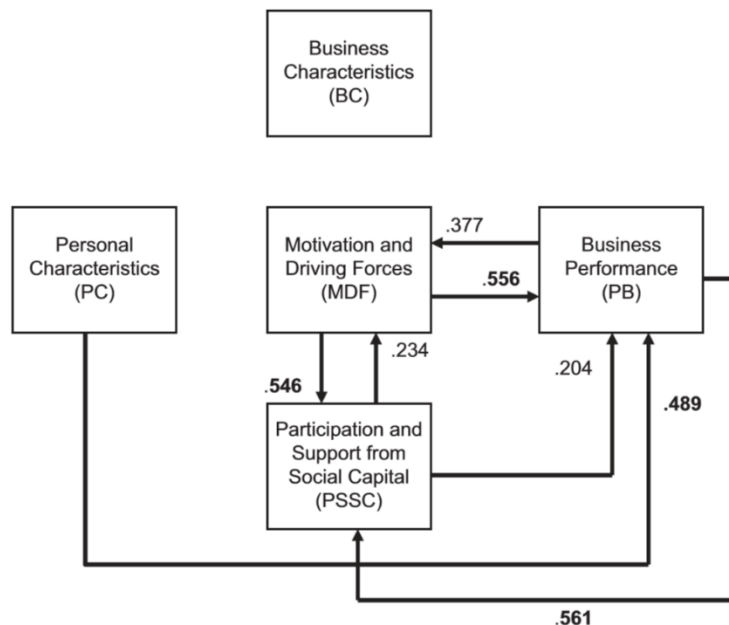


Figure 7. Structural relations model.

This model is constructed to identify the various relations between the factors. In this respect, several hypotheses can be made, in particular: (1) there is a significant relationship between personal and business characteristics (PC and BC) and business performance (BP); (2) there is a significant relationship between motivation and driving forces (MDF) and business performance (BP); and (3) there is a significant relationship between participation and support

from social capital (PSSC) and business performance (BP). Hence, we can specify the following measurement model (in logarithmic form):

$$\ln BP = \alpha \ln MDF + \beta \ln PSSC + \gamma \ln PC + \varepsilon$$

An ethnic entrepreneur is endowed with human capital PC, which increases the ability to understand how to steer a business in a challenging and turbulent business environment. This may, at a particular stage, lead to a higher BP in growth in employee numbers, sales turnover, and value of capital assets.

The migrants benefit from their previous employment experience before starting their own business, and those who are already entrepreneurs benefit from their years as businessmen or women in similar challenging industries and sectors, MDF, which makes them more highly-orientated towards business growth, and subsequently the achievement of a higher BP. Naturally, an ethnic entrepreneur will build up, and make an extensive use of, local level personal and social relationship capital, PSSC, to create competitive advantages to further successfully improve their economic and business performance and the related business objectives, BP. Figure 7 depicts the results of the multiple regression analysis.

Figure 7 shows that the PC factor has significant positive relations with PB, and no significant relations with the other factors. The explanation for this is that human capital (such as age, arrival year, level and place of formal education, a very well-integrated individual, business strengths and managerial skills in generating ideas and dealing with people, management styles (e.g. in terms of mutual empowering, collaboration, sharing of information), and language ability) positively influences the entrepreneurs' ability:

- to be more aware of changes in the business environment;
- to understand how to manage the business;
- to develop and execute effective strategies and related determined objectives; > to seek informal networks and financial capital;
- to get access to the information necessary to discover, evaluate and exploit (profit) opportunities and possibilities for market expansion in the dynamic business environment (i.e. become more conscious of the reality of the business world); and

- to translate this information into strategic decisions for growth (e.g. decisions to grow, improve and innovate) which shows greater renewal and clarity in their strategies.

It seems reasonable to assume that a higher business performance (e.g. growth in numbers of employees, sales, turnover, value of capital assets) will occur:

- when the entrepreneurs have arrived very young and achieve their high educational attainment in the Netherlands and speak the language very well; have a higher ability to be involved in all areas of business activities;
- think from different perspectives to achieve organizational objectives and innovations without personal and financial consequences;
- are better focused on strategic planning; and
- understand how to manage their business in a dynamic market (high quality of entrepreneurs with knowledge and modern skills).

There is no significant relationship between the BC, and the other factors. From this result it can be inferred that the BC are closely linked to specific business performances, and are more stand-alone. However, there are several significant relations between MDF, PSSC, and PB, specifically between MDF and PSSC, between MDF and PB, and between PSSC and PB. These factors can be interpreted as mutually-reinforcing pairs.

The success and economic survival, BP, of the entrepreneurs depends not only on their PC. In addition, MDF and PSSC also have a positive relationship with the BP of Moroccan entrepreneurs. This concerns their previous position before starting their own business, the entrepreneur's years of prior experience in a similar (growing and attractive) industry (see also Refs 59, 60), and the information they receive from social family and relatives. The entrepreneur's previous educational attainments and work experience in the long run (learning-by-doing) in a similar type of business (see also Refs 61–63), coupled with an innovative and positive entrepreneurial attitude (e.g. being a hard worker, acceptance of risk, loyalty, participating in a strong social network) and motivation (e.g. being ambitious, wish to be their own boss), and strengthened involvement and commitment to the strategy to meet their strategic (personal) objectives, are all dominant predictors of a higher orientation on business growth, and subsequently the achievement of higher business results. In turn, this strong focus

will increase the capability of their business to achieve its financial results and strategic goals and objectives.

However, there is also a significant relationship between MDF and PSSC; that is, motivation factors (e.g. achievement, self-confidence and satisfaction, the search for independence, locus of control (pull factors)) and supportive environmental factors (e.g. attractive and growing industry sector, and sources of information and finance) help Moroccan entrepreneurs to exert themselves and create dynamic businesses.

The entrepreneurs (with their motivational driving forces) make extensive use of their informal advisory and mentoring supportive relationships to create competitive advantages, such as informal advice and relevant contacts. These social support (ethnic) networks motivate them to start up their own business, and can help by delivering a number of important resources to overcome the disadvantages and obstacles which the entrepreneurs face that impede growth, success, and personal fulfilment in a challenging and dynamic business environment (see also Refs 64, 65).

The influence of strong ethnic informal social networks is often intense and reaches further, because these networks are based on (ethnic) business associates, and on family and friendship networks in which these entrepreneurs participate and are an intrinsic part of their lifestyle (see also Ref. 66). These networks are strongly involved in their entrepreneurship and still massively influence the decision-making process of these entrepreneurs concerning, for example, self-employment and selection of localization.

They use different functions of their personal and social relationships (informal advisors and mentors, (ethnic) business associates, family and friends) to access important information resources, lower cost via trust, and support in quick and efficient decision making and related collective action in order to successfully further their economic (i.e.mass of potential customers) and business performance and their related business objectives (see also Ref. 67), and to identify new opportunities and transform these into new commercial business ideas for market expansion. This creates a challenging social environment to develop and establish (new) networks among these entrepreneurs who are constantly interacting – via information flows between newcomers and settlers (see also Ref. 68). Such networks generally serve as platforms for further exchange of information, experiences and interests, growth and fruitful cooperation between businesses.

It seems reasonable to assume that what makes Moroccan entrepreneurs more capable of managing their business successfully is:

- when they have been involved for a long time in a similar type of business to that in which they gained knowledge and managerial skills through education and work experience and an increase in their ability to recognize relevant (re)sources (information) to solve problems, supported by reliable environmental factors such as source of (informal) information (channels), contact networks, low-cost financing and cheap personnel, training and skills, customers and suppliers, competition, and dedicated government policies (see also Ref. 56), and
- when these entrepreneurs have access to training courses and workshops on entrepreneurial development and improvement.

All these advantages lead to a better focus on the survival and growth (path) of the firms, e.g. in terms of turnover, profit, number of employees,⁶⁹ and the entrepreneur's satisfaction and expectations.⁷⁰

On the other hand, BP, such as profitability, revenues and sales growth, and the provision of higher quality and innovative products and services, also has a significant influence on MDF. It seems reasonable to assume that the positive business results obtained by achieving successful strategic goals and objectives make it possible for entrepreneurs, as well as their informal advisors and mentors, to become more enthusiastic and satisfied, and have a better focus on, and, be connected and committed to, the strategic goals and objectives. If they can pro-actively achieve these goals and deliver more and better performances (positive reinforcement), this will also increase the capability of the business to achieve its financial results and organizational goals and related objectives.

12.5 Conclusion and Lessons

The research described in this article has focused on answering the question: What are the critical success conditions for higher-educated young (and creative) Moroccan entrepreneurs in major cities in the Netherlands? On the basis of field research conducted among 24 prominent Dutch-Moroccan businesses in the high-tech and creative industries, it was possible to discover more about the success factors of the 'new generation of Moroccan

entrepreneurs' in the four big cities in the Netherlands (the G4: Amsterdam, Rotterdam, The Hague, and Utrecht), which have a rich variety of migrant entrepreneurs. In order to provide a comprehensive answer to this research question, the following variables were considered: human, social and business capital, and the motivation and driving forces of the second-generation Moroccan entrepreneurs in the creative industries.

The new generation of Moroccan entrepreneurs is very well-educated and integrated in the Dutch community (very familiar with the Dutch culture and speak the language fluently). Hence, with their very good previous study and work experience in a similar type of business, coupled with innovative and positive entrepreneurial attitude and motivation, they have the ability to be involved in all areas of business activities, thinking from different perspectives in order to achieve their organizational objectives and innovations without personal and financial consequences. All this contributes to a higher economic and business performance and success level for the younger Moroccan entrepreneurs.

Moroccan entrepreneurship in the Netherlands started mainly after 2001, and there was an enormous increase in start-ups of small-sized enterprises with fewer than five employees after 2006, in particular in the service sectors, such as ICT and consultancy and research.

The critical factors cited as pulling the younger generation of Moroccan migrants to become entrepreneurs are the market opportunities and possibilities, as well as the growing and promising structure of the business environment with scope for sustainability, specialization, new innovative techniques of services and products, and less intense competition in the sector, which all differ widely on the national, regional and local levels and offer many business opportunities on different geographical scales. All these factors are supported by the young entrepreneurs' reliable social capital in the form of family and friends who provide them with (informal) advice, information, workshops on business development and improvement, and make them more capable of managing their business successfully. However, it is important for these entrepreneurs to realize that in their decision-making process, the (informal) social networks may confine the desire to grow their entrepreneurship only to within the melting pot communities. Therefore, to benefit from potential formalized social capital, diversity and business opportunities demand a high level of interaction and connection within various social networks and between the individuals within and across cities/regions.

The most important factor that contributes to the success of the entrepreneurs is the strong reputation of the organization as a high quality and honest firm with a lot of personality

and expertise. To grow a (new) social network requires strong motivation, enthusiasm and persistence, factors that were also cited as critical success variables. In running their business, only a few entrepreneurs faced that impeded growth and success. Their main problems are: overregulation, concerning, for instance, long delays in getting approval for trade licences and business registration; the challenge of implementing strategies and formulating goals; the need to maintain an accurate internal business process and administration; the difficulty in attracting good and well-skilled employees; and their limited access to financial capital.

It became clear that motivation and driving forces and human and social capital have a significant relationship with entrepreneurship business performance, which is linked to success. Thereby, motivation and driving forces have to do with the ability to recognize and get access to the information necessary to discover, evaluate and exploit (profit) opportunities and possibilities, and to integrate this important and crucial information into strategic decisions for growth (namely, thinking from different perspectives and implementing and understanding their business strategies), which all require proactive involvement in all areas of business activities, and yield higher organizational results.

Furthermore, the social capital, based on (ethnic) business associates, family and friendship networks, has to do with helping to deliver a number of important resources for tackling the disadvantages and obstacles, which the entrepreneurs face that impede growth, success, and personal fulfilment; and is also concerned with identifying new opportunities and transforming these into new commercial business ideas for market expansion to successfully further their economic and business performance in terms of profitability, revenues and sales growth, and the provision of higher quality and innovative products and services, all of which also had an significant influence on motivation and driving forces and social networks.

The business characteristics turned out to be stand-alone (i.e. they are not related to the other factors). The research also showed that the motivation and driving forces and social capital form several mutually-reinforcing pairs, which strengthen the business capital to be successful in practice in order to maintain a firm's competitive advantage in today's turbulent and challenging business world.

The general results of our study show that the younger generation of Moroccan entrepreneurs are more open and are looking for new opportunities beyond the traditional markets (economic expansion). They want to expand their market domain through breakout

strategies, by offering high quality products and services for a broader group of clients and markets, outside their own indigenous ethnic group.

This research study can help to explain how to achieve a better understanding of the important factors that influence entrepreneurial behaviour and activity, the business entry decision and the creation process, and the conditions for success and other factors that can have an effect on the performance of ethnic entrepreneurs in the Netherlands, within the broader context of entrepreneurship. This has implications for various stakeholders such as other ethnic entrepreneurs, policy makers and business investors in this dynamic and promising business environment.

There are several limitations to the research. One is that the sample size of the research was relatively small. Another limitation is that this research is not a longitudinal panel study. Such studies would be able to better examine the developments and shifts in the relations between human, business and social capital and the motivation and driving forces of the Moroccan entrepreneurs in the services sectors. Further research is necessary on the various success conditions depicted in the relation framework, comparing findings between nations, and between genders.

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13 NEW URBAN ECONOMIC AGENTS: A COMPARATIVE ANALYSIS OF HIGH PERFORMANCE NEW ENTREPRENEURS ²⁸

Abstract

Migrants are often the carriers of new skills and original abilities. This present study focusses on the importance of ‘new urban entrepreneurship’ – in particular, ethnic or migrant business firms – as a major driver of creative and urban dynamics and economic vitality in urban agglomerations. The paper offers a general account of both backgrounds and socio-economic implications of migrant entrepreneurship in large agglomerations and highlights the socio-economic heterogeneity in motivation and performance among different groups of migrant entrepreneurs. This demographic-cultural diversity prompts intriguing questions on the differences in business performance among distinct groups of migrant entrepreneurs, even in the same ethnic group. In the paper, a recently developed and amended version of data envelopment analysis (DEA), viz. super-efficiency, is presented and applied to a group of Moroccan entrepreneurs in four large cities in the Netherlands. The main research aim is (i) to identify the best-performing firms (so-called ‘entrepreneurial heroes’) from a broad management and business perspective, while (ii) the background of our findings are more thoroughly analysed. The paper ends with some general concluding remarks on urban business strategies.

Keywords: economic vitality; urban development; entrepreneurship; migrant entrepreneurs; diversity; global diaspora economy; economic spillovers

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13.1 Setting the Scene: the Homo Mobilis

We live in the era of foreign migration, characterized by the emergence of the ‘homo mobilis’. Millions of people leave annually their home country in order to find a better fortune somewhere else. This megatrend will most likely not come to a standstill in the foreseeable future. Open cross-border communication, global access to information on other countries and cultures, rising international orientation and mobility, and increasing social and economic globalization have paved the road towards a geographic shift in human capital that is unprecedented in the history of our world (for more information see also Nijkamp et al. 2012). Clearly, migration is not an exclusive feature of our century, but the extent and nature of migrant flows are clearly distinct from previous periods. Apart from the global background of contemporaneous migration – in contrast to a mainly regional orientation of foreign migration in past centuries –, modern migration centres largely on the acquisition and use of human capital, often of a high-skilled and innovative nature. From that perspective, international migration has turned into a new vehicle for spreading ideas and knowledge and skills. The ‘homo mobilis’ is the carrier of creative concepts and abilities that favour recipient areas.

The above described megatrend is reflected in massive structural migration flows from and into many regions of the world, leading to a ‘global diaspora economy’. Over the past few decades, cross-border migration has turned into a puzzling pattern of complex socio-economic, cultural and political developments in an interconnected global system (see Gorter et al. 1998; Sassen and Thielemann 2005; Zimmermann 2005). Nowadays, several scholars argue that especially the international migration of highly skilled workers is a vehicle to enhance global socio-economic and business efficiency (see e.g. Gheasi et al. 2013). The socio-economic profile of the current migrant volumes is often rather different from that of the host population in terms of demographic, cultural and entrepreneurial attributes. Worldwide, migrant settlement tends to be concentrated in specific geographic magnets (or attraction poles), in particular in the metropolitan agglomerations of the developed world (see Longhi et al. 2010; Kourtit and Nijkamp 2012). It is of course important to know whether foreign migrants have a positive or negative long-range impact on the local, regional or national economy; their – in-groups and between-groups – diversity may lead to vast differences in economic migration impacts. It is noteworthy that the impact of the heterogeneity in motivation and behaviour among migrants is a challenging question (Nijkamp et al. 2012).

Clearly, migrants are by no means a uniform species. They are characterized by a great diversity and heterogeneity regarding skills, age, gender, income, wealth, cultural background, ethnicity and motivation. Consequently, we do not only observe geographically diverse patterns of migrant concentration (e.g., segregation), but also considerable differences in the geographic socio-economic impacts of foreign migrants on the urban economy. Over the past years, the study on the ‘*new geography of migration*’ has brought about a wealth of new insights into the socio-economic and spatial effects of migrants on the host economy, in particular regarding local/regional labour markets and local self-employment. Empirical research has shown that it is not easy to obtain an unambiguous answer to the question of whether foreign migration serves the interest of host countries or regions. Various quantitative research methods have been developed in order to provide an evidence-based picture of the multi-faceted impacts of migration on national or regional welfare or on local labour markets (on the latter issue, see e.g. Greenwood et al. 1996; Longhi et al. 2005a, 2005b, 2008; Okkerse 2008; Nijkamp et al. 2012).

In this context, there is a growing strand of literature that argues that migrants may create new and untapped opportunities for the local economy. This appealing idea needs to be tested, however; it calls for a challenging research approach in order to make an empirically valid estimation of the system-wide socio-economic consequences of foreign migration, both nationally and locally. The recently developed concept of ‘migration impact assessment’ (MIA) may be an important analytical vehicle to enable the pros and cons of international migration to be mapped out systematically (see Nijkamp et al. 2012).

The empirical estimation of immigration impacts on local host economies certainly deserves due attention in contemporaneous spatial-economic research in the western world. These effects appear to be often localized in urban areas. The extent to which immigration induces creativity, innovation and technological change is an emerging topic in the contemporaneous immigration literature that prompts much attention of both researchers and policymakers. This can be illustrated, *inter alia*, by the current research interest in migrant entrepreneurship, sometimes referred to as ‘*New Entrepreneurship*’ (Dana 2007; Kourtiti and Nijkamp 2011a; Sahin 2012). This type of self-employment appears to provide in many urban agglomerations a – or vital urban districts – vital and creative contribution to a flourishing urban economy and may enhance labour force participation of sometimes marginalized groups (see also Razin and Light 1998).

The spatial transfer of skills – combined with the existing natives’ knowledge on the host country – has become a major focal point in current research and policy on foreign migration. This synergy of different competences may create significant positive externalities for the business sector – local or national – in the country or region of destination. Such advantages may be generated along two different channels:

- *The cultural diversity channel.* This channel brings together people from different ethnic or cultural origins, with complementary skills and competences, so that through socio-cultural interaction among employees in business firms considerable productivity gains may be achieved. The cultural diversity channel is in particular based on the assumption that a culturally diverse workforce will favour innovation and creativity (the knowledge spillover hypothesis; see Cohen and Levinthal 1989). Various studies have tried to quantify and test the cultural diversity hypothesis (see e.g. Nijkamp and Poot 2013, Ozgen et al. 2011, Ozgen 2013; Suedekum et al. 2009)
- *The migrant entrepreneurship channel.* This channel finds its origin in the fact that migrants in the host country may be forced to adopt lower-paid jobs, due to language or educational deficiencies. To reach a higher place on the economic or career ladder, they will be strongly encouraged to be self-employed and/or to start their own business. Migrant entrepreneurship has in the past decades become a prominent feature of major urban agglomerations in many host countries. An avalanche of conceptual and applied research contributions has been published in the recent past, far too many to be summarized in the context of this article. For extensive reviews we refer to Dana (2007), Nijkamp et al. (2012), and Sahin (2012), which offer a wealth of systematic ideas, research findings and relevant literature references.

The present study will focus in particular on the second channel, i.e. the migrant entrepreneurship channel. It takes for granted that urban economies in large cities in the developed world act as magnets, not only for traditional low-skilled migrants, but increasingly also for economic opportunity seekers, in the form of skilled migrant entrepreneurs (see Mitra 2012). In general, migrant entrepreneurship refers to business activities undertaken by migrants from a specific socio-cultural and ethnic background (Choenni 1997). Migrant entrepreneurs seek to enter the complex ramification of large population concentrations, with the aim to identify and explore interesting new market niches (ranging from ethnic products to cheap mass

products). They create significant socio-economic benefits from a new cultural diversity in the city as a result of foreign migration. Many of these migrant entrepreneurs originate from different cultural, language or ethnic backgrounds. They have to survive under sometimes highly competitive conditions, using different business strategies (see also Aldrich and Waldinger 1999, and Van Delft et al. 2000).

Ethnic (or migrant) entrepreneurs do not only have a significant impact on the local or district economy, but they may also form a positive stimulus for advanced and creative business making in modern cities all over the world. The analysis of the heterogeneity in local migrant entrepreneurship from different backgrounds forms the core research challenge of the present paper. There is a wealth of both general and case-study literature on the economic achievements of migrant business firms (see Dana 2007), but in many cases such migrant firms are treated as a rather homogeneous group or species. With the above mentioned backgrounds in mind, the present study seeks to assess differences in the business performance among distinct classes of migrant entrepreneurs, with the aim to trace the driving forces of mutual performance differences. Such differences may be ascribed to specific skills, attitudes or behaviours (e.g. risk taking) of migrants (the human capital factor) or to favourable urban socio-environmental (or contextual) conditions in the form of social bonds, networking, market densities or community support (the 'social urban embeddedness' framework; see e.g. Kloosterman and Rath 2003). After a review of the motives and the socio-economic aspects of migrant entrepreneurship and of the urban constellation of this new type of entrepreneurship in the present paper, the attention will be focused on salient differences in the business performance of groups of distinct migrant entrepreneurs. On the basis of data from a detailed survey among ethnic entrepreneurs in the four large Dutch cities, a recently developed type of data envelopment analysis (DEA) is presented and applied as an appropriate analytical tool in order to trace the differences in business performance between specific groups of migrant entrepreneurs. The paper will conclude with some retrospective and prospective remarks.

13.2 Migrant Entrepreneurship: Diversity in Motives

Migrant entrepreneurship has assumed a prominent place in modern urban business activities and is well documented in the early literature since the 1980s (we refer here to e.g. Hardin 1974a,b; Ward and Jenkins 1984; Min 1987; Waldinger et al. 1990; van Delft et al. 2000;

Masurel et al. 2002; Kloosterman and Rath 2003). In the past, self-employment was often prompted by the need for economic survival for immigrants and ethnic minority groups, known as the ‘lifeboat economics’ (see Garrett Hardin’s *Lifeboat Ethics* 1974a,b). Historically, migrants had often a specific and isolated position – ‘the stranger was the trader’ (a survival strategy to ensure financial independence, while improving their working conditions and escaping from discrimination and stigmatization). Nowadays, we observe an overwhelming presence of specific migrant groups in the regional and local economy in many host countries all over the world.

This ‘new entrepreneurship’ – distinct from ‘normal’ entrepreneurship – started originally its business by an orientation towards migrant products and services (‘ethnic goods’), migrant market customers or indigenous or traditional migrant business growth strategies (see e.g. Choenni 1997; Masurel et al. 2002; Masurel et al. 2003; Rusinovic 2006; Sahin et al. 2007; Kourtiti and Nijkamp 2012). A wealth of recent research has addressed the opportunities for and the barriers to successful migrant entrepreneurship. According to Sahin (2012), some scholars advocate the culturalist approach by claiming that migrant groups have specific values, skills and cultural features that make these groups suitable for entrepreneurship, while others argue that the sociocultural situation in the host country or in the local economy prompts the need for resorting to entrepreneurial activities. Social exclusion and discrimination, poor access to markets or high levels of unemployment are examples of the latter structuralist response factors (Sahin et al. 2007). In this context, Chaganti and Greene (2002) distinguish three categories of migrant businessmen: (i) *immigrant entrepreneurs*: individuals who are forced to start an own business as a strategic economic survival; (ii) *migrant entrepreneurs*: migrants who share socio-cultural connections and common patterns of interaction, often based on a common national background or common migration experiences (Waldinger et al. 1990); (iii) *minority entrepreneurs*: business owners belonging to ethnic groups that do not represent the majority population. It should be added that in recent years a gradual transition has taken place in the profile of migrant entrepreneurs, especially those belonging to the second generation of migrants. Traditional motives (such as social exclusion or a weak position in the labour market) are gradually being replaced by mainstream entrepreneurial motives (profit making, social esteem).

Clearly, migrants may have different motives for engaging in entrepreneurship. Examples of various explanatory models for opting for entrepreneurship are: (i) the *economic*

opportunity model; (ii) the *culture model*; and (iii) the *reaction model* (see Sahin 2012). The economic opportunity model assumes that migrant minority businesses rely on market chances for their economic fortunes. The culture model takes for granted that some cultures predispose group members to the successful implementation of entrepreneurial goals, while the reaction model takes for granted that self-employment amongst members of migrant minority groups is a socio-economic response to racism and to barriers in mobility. Furthermore, according to Waldinger et al. (1990), migrant minority businesses tend to originate from the interplay of opportunity structures, group features and business strategies in adapting to the local environment. Many migrants appear to prefer the benefits of the independence of (risky) entrepreneurship rather than having a low paid job at the bottom of the labour market ladder. By starting up a new enterprise, migrants want to increase their income and climb up the social ladder of an urban economy.

It should be noted that there may be a multiplicity of other reasons for migrants to engage in entrepreneurship, for instance, to be independent, to earn a higher income, to gain new work experience, or to have a more flexible lifestyle. These motives have been extensively addressed by Masurel et al. (2002, 2003), Sahin et al. (2007) and Kourtit and Nijkamp (2011b). Based on empirical evidence, Brush (1992), Fagenson (1993), Fischer et al. (1993), Kloosterman et al. (1999), Kloosterman and Rath (2003) and Sahin et al. (2007) have identified the individual characteristics of migrant entrepreneurs in the local economy, in particular, demographic features, personal motivations or specific educational or occupational experience as entrepreneurs. Their research has demonstrated that there are significant differences in their work experience, skills, business goals and management styles. Sahin (2012) has identified the most prominent personal characteristics of migrant entrepreneurs: a lower education level, a less-favoured socio-economic position, and a generally low level of labour market access. They also share various common problems in starting or performing their business, in particular: administrative and regulatory barriers, lack of capital and credit, lack of knowledge, inadequate command of the language, lack of appropriate education, lack of management skills, constraints on access to formal business networks and migrant discrimination (Sahin et al. 2007). These studies thus demonstrate the existence of pluriform motives in migrant entrepreneurship. This heterogeneity will most likely have a significant impact on economic performance. This will be further investigated in the present study.

The behaviour and economic position of migrant entrepreneurs has extensively been studied in many countries (we refer to Sahin 2012 for a description of several of these studies). But a very important question is whether migrant entrepreneurs are a uniform species whose business performance will be largely identical in a competitive environment, or whether differences in their socio-cultural backgrounds and in indigenous features are also reflected in differences in attitudes and behaviour, and consequently in their business performance. Even though such migrants may be driven by similar motives (e.g. profit maximization or economic advancement), they may have different skills, attitudes or risk-taking perceptions, which are decisive for their economic success. On top of it, also the socio-urban constellation in which these migrant entrepreneurs operate shows often a great variety, so that it may seem plausible that migrant diversity may mirror differences in economic performance of migrant business firms. Recent research (Sahin et al. 2010, 2012; Kourtit and Nijkamp 2012) shows that nowadays the younger generation of entrepreneurs tends to be higher educated and better integrated into the local community. Through their human capital, motivation and driving forces, they have improved their ability to become involved in new areas of business activities. They tend to be more outward looking for new business opportunities outside traditional markets and products (economic expansion and business growth strategies; see Ansoff 1957). They also look for appropriate break-out strategies (Engelen 2001), by offering high-quality products and services to a broader market niche, outside their own indigenous ethnic group. Furthermore, they are more inclined to use support systems such as capital and information sources, in order to be more independent of their family, friends and social bonds. Thus, this ‘new entrepreneurship’ creates interesting possibilities for employment in a time when it is difficult for ethnic groups to find a job (Dagevos and Gesthuizen 2005; Kourtit et al. 2013a; Masurel et al. 2002).

An important implication from the above presented concise and selective ‘tour d’horizon’ is that most likely the migrants’ capacities and resources matter – and most likely their ethnicity less so – in achieving different degrees of business performance and success. Given the variety of motivations and background conditions of migrant entrepreneurs, it seems plausible to hypothesize that their economic performance will also show considerable diversity. This heterogeneity in the performance of migrant entrepreneurs will be further tested in the present study. We will first pay attention to locational factors determining the development of migrant entrepreneurship.

13.3 Migrant Entrepreneurship: Socio-economic Diversity in Cities

Urban agglomerations all over the world tend to become increasingly magnets for new socio-economic opportunities. The urban economy offers ample opportunities for a variety of job seekers and self-employed, not only for low-skilled segments of the labour market, but also of higher-skilled segments. Job diversity, a large job market, contact density and a multiplicity of communication channels facilitate human interaction and responses in the urban space. Such conditions provide a great socio-economic potential for migrants, reason why modern cities exert a centripetal influence on foreign migrants. From this perspective, the emergence of migrant entrepreneurship in many large cities is a logical development.

Migrant (or ethnic) entrepreneurs have – as mentioned above – in recent years become a fascinating complement to the traditional urban space-economy. Cultural diversity is nowadays often seen as increasingly valued as a positive developmental factor, and its social, cultural and economic benefits are broadly recognized (for a review see Sahin 2012). Cultural diversity has, over the past decades turned into a signpost for modern urban society. Several European countries have over the past decades become a host region for foreign migrants, be it for work purposes or family reunion. Many of these foreign migrants appear to be more risk-oriented than natives. In addition, barriers in obtaining work has induced many migrants to set up their own business. Their spatial preference for urban agglomerations and their business strategy to provide specific ethnic products or services have often led to a flourishing business life in these cities. This has of course increased the initial market size of the migrant entrepreneurship within the ethnic community itself and has thus prompted a new urban dynamics.

It has been argued in the literature that the decision to become self-employed differs usually between immigrants and native people (Borjas 1986; Fairlie and Meyer 1996). In particular, education and duration of stay are important drivers of self-employment (Fairlie and Meyer 1996). Nowadays, the emerging ‘new entrepreneurship’ is highly important for the socio-economic and urban development of Europe (Audretsch 2002). Migrant entrepreneurs start often promising, but high-risk activities in sectors where other people see less opportunities.

Several migrant groups appear to have become a highly creative and qualified entrepreneurial class in urban business life. The market size and dynamic opportunities in the urban economy create clearly the seedbeds for many new business opportunities, e.g., fast economic growth, upscaling of the labour force, and exploitation of new market niches (see

also Sahin 2012). And consequently, dynamic urban agglomerations are a magnet ‘par excellence’ for new forms of creative entrepreneurship. Especially the small and medium size enterprise (SME) sector appears to comprise an increasing share of migrant entrepreneurs, originating from many countries and involved in many branches of the urban economy (e.g. catering, cleaning, taxi services, but also increasingly high-tech services, consultancy etc.). Migrant entrepreneurs tend thus to bring vitality to the urban business sector, where traditional or incumbent firms are sometimes no longer able to survive (see also Jacobs 1961, 1969; Light and Gold 2000). In particular, the new generation of young migrants engages more than ever before in education, business and the high-skilled urban workforce (Cormack and Niessen 2002). Clearly, successful self-employed migrants or migrant business firms contribute to a better socio-economic symbiosis of a modern urban society.

The fascinating urban socio-economic dimensions of the ‘new entrepreneurship’ have increasingly prompted much research, also in a European context. Earlier studies on migrant entrepreneurship focused preponderantly on the USA (Light 1972; Waldinger et al. 1990), while later studies also emerged across Western Europe (Chaganti and Greene 2002, Masurel et al. 2002, Fairlie 2004, 2005, Sahin et al. 2007, 2010, 2012, Kourtit and Nijkamp 2011a, 2012). Several studies also address the critical success or performance conditions for migrant entrepreneurs (van Delft et al. 2000; Zhou 2004). They examine in particular *structural* factors, *cultural* factors or a blend of these factors (included, *inter alia*, in the *interaction* model formulated by Waldinger et al. 1990) that were decisive for the step towards new forms of migrant business in cities.

The socio-economic consequences of migrant entrepreneurs are clearly reflected in local and regional labour markets (see e.g. Masurel et al. 2002; Longhi et al. 2010; Kahanec and Zimmermann 2011); in public finance systems (see Hodgson and Poot 2011); in international trade (see e.g. Genc et al. 2012); and – as indicated in the present study – in business innovation and entrepreneurship (see e.g. Ozgen et al. 2011; Sahin et al. 2012). Clearly, a thorough, operational and comprehensive analysis of the manifold entrepreneurial consequences of foreign migration is needed (see e.g. Hodgson and Poot 2011; Kourtit and Nijkamp 2011; Nijkamp et al. 2012). Consequently, as argued above, migration impact assessment (MIA) may have to be positioned in the broader context of cultural diversity and business performance (see e.g. Fearon 2003; Ottaviano and Peri 2006; Constant and Zimmermann 2008; Kourtit and Nijkamp 2012).

In conclusion, urban migrant entrepreneurship is a multi-faceted phenomenon that reflects the great socio-economic diversity in business life in modern cities. It is therefore important to investigate in more detail the differences in business performance among this important group of urban economic agents. This will be undertaken in the following sections by means of a new type of performance analysis, coined Data Envelopment Analysis (DEA), carried out among a group of migrant entrepreneurs in Dutch urban areas.

13.4 Empirical Database and Methodology

The present study aims to map out the differences in economic performance among migrant entrepreneurs, and *not* the differences between native and migrant entrepreneurs. Migrant entrepreneurs operate traditionally in specific niche markets (e.g. ethnic products) in which native entrepreneurs are less active; hence, a comparison among these groups is less meaningful. This section describes the characteristics of our database and the methodology employed. Our empirical approach is based on a unique, extensive and detailed micro-information base – obtained through empirical fieldwork – on the characteristics of mainly new-generation (or migrant) entrepreneurs of Moroccan origin, mostly in the high-tech and creative industries in Dutch cities. Many migrant entrepreneurship studies address members of the first generation, who are more concentrated in the traditional sectors (e.g. the clothing, hotels, catering and cleaning sectors). More recently, we observe a rising attention for migrant entrepreneurship in non-traditional sectors – in particular, the creative industries –, which are receiving an increasing interest from second-generation entrepreneurs.

The analysis of new trends in ethnic/migrant entrepreneurship and its growth strategies (see the conceptual framework described in Ansoff's 1957 business growth theory) highlights that second-generation migrant entrepreneurs in the creative sector focus more on an external market orientation ('break-out strategies'; see also Engelen 2001), in contrast to traditional sectors, in which the first generation of migrant entrepreneurs is often engaged. Their goal is to expand their market domain by means of 'break-out strategies', by offering high-quality and innovative goods to a broader group of clients and markets outside their own ethnic group (see also Kourtit and Nijkamp 2012; Kourtit et al. 2013a).

From one of the three largest ethnic groups in the Netherlands, Moroccan entrepreneurs show the sharpest absolute rise of all non-Western entrepreneurs. They have a relatively high

birth rate, engage in interesting new markets and provide a positive stimulus to creative and new forms of business making in Dutch cities. These entrepreneurs can also make a critical contribution to the improvement of the social climate of a specific neighbourhood. Therefore, it is interesting to focus the attention on the critical success factors of these migrant business firms. Our empirical work focuses mainly on the higher-educated young Moroccan entrepreneurs in mostly high-tech and innovative sectors in the four largest Dutch cities, Amsterdam, Rotterdam, the Hague and Utrecht, which all have a rich variety of migrant entrepreneurs. These urban agglomerations have turned into multicultural ‘melting pots’ made up of people of different cultures, races and religions (Jacobs 1961, 1969).

The purpose of our empirical research is to explore and trace the motives, opportunities and barriers of these ethnic entrepreneurs and the critical success conditions of the highest-performing ethnic firms (‘business champions’) in the innovative and creative sector, while making a distinction between the high and low performance of these ethnic firms in Dutch cities. Since the collection of individual data on the business performance of migrants (including financial information) is extremely hard, detailed databases on migrant entrepreneurs’ successes are extraordinarily hard to obtain, so that normally we are forced to work with small sample data, which brings the research close to comparative case study research which is rather popular in business administration and industrial organization.

To identify these opportunities and barriers and to achieve a better understanding of drivers of entrepreneurial behaviour and performance of the second-generation ethnic entrepreneurs of Moroccan origin in Dutch cities – with a focus on their personal and business characteristics and on their motivation and driving forces –, we have employed and organized an extensive in-depth field survey (a ‘self-composed statement questionnaire’) in our search for such ‘entrepreneurial heroes’ or ‘business champions’ with a peak business performance²⁹. Our entrepreneurship database is based on this questionnaire, which was administered on the basis of a sample of 24 ethnic entrepreneurs of Moroccan origin (2008-2009). They were selected from a group of skilled and innovative ethnic entrepreneurs in the business-related professional services sector, who distinguish themselves from their traditional ethnic niche by offering new products or services and by using modern communication channels. This is a clearly relatively small sample, but in this emerging new market it turned out to be extremely

²⁹ This survey was part of the so-called SUS-DIV project.

difficult to find more second-generation entrepreneurs who were willing to participate in such an in-depth and time-consuming interview with many privacy-sensitive issues. It turned out that this group size was reasonably sufficient, as after more than 20 in-depth interviews the degree of new information obtained and new insights went rapidly down.

Our analytical framework aims to depict the various forces that impact on the firms' performance. The individual firm data are related to both output and input performance characteristics, as well as to the motivational and driving forces that are decisive for turning the firm into a high-performance firm, which we can call 'entrepreneurial heroes' or 'business champion', taking into consideration all relevant aspects of its business structure.

In our research, we use the original micro-data, containing more than 35 indicators, with detailed information on the firm's characteristics and the critical factor conditions that exert a decisive impact on the firm's performance. These critical success factors (CSFs), which essentially represent a high-performance systemic perspective, are conceptually summarized in the 'pentagon model' in Figure 1 (see also Nijkamp and Pepping 2007; Akgün et al. 2011). The individual firm data are organized according to this model.

This model maps out the critical drivers of the business performance of migrant firms, mainly in the innovative or creative sector. This systemic strategic framework is based on detailed assessments and evaluations of performance determinants of the migrant firms concerned, grouped into the five key factors that are incorporated into the model of Figure 1. This model is a systemic approach that involves a balanced set of original, promising and integrated CSFs and conditions that can lead to effective action for maximizing business performance (output). The five main key performance factors of this model and their detailed breakdown are as follows:

- Factor 1, *human capital (HC)*, consists of variables (e.g., education level, Dutch language proficiency, duration of stay, reason to start up a business) that refer to the quality of labour input obtained by means of education, training or new skills (e.g. in ICT) and may be seen as a productivity-enhancing factor (see also Sjaastad 1962). Clearly, the distribution of human capital over people is of critical importance, while the availability of productive capital (PC) also plays an important role, similar to neo-classical production theory, in which the output is determined by the traditional production factors labour and capital.

- Factor 2, *social capital (SC)*, contains contextual conditions (e.g. network participation, support from the social network) that comprise interaction and communication between people and firms, socio-economic bonds, social support systems, business networks (formal and informal), relations based on trust, and so forth (see e.g. Kloosterman et al. 1998). This factor represents the drivers that create a socially sustainable society, in particular (see also Nijkamp 2008):
 - creativity (a potential human asset that forms the foundation of innovative ideas);
 - diversity (a systemic notion that supports open-mindedness, coping with stress, etc.)
 - accessibility and connectivity (by exploiting the hub character of a city for business opportunities in a worldwide competitive setting)
- Factor 3, *creative capital (CC) and knowledge capital (KC)*, refers to variables (e.g. years of existence of the firm, previous qualifications, business plans for start, use of information sources, diversity of employees) that indicate a great ability to cope with challenges and new opportunities, reflected in entrepreneurial spirit, new ways of thinking and acting, trend-setting artistic expressions, innovative foresights, etc. These factors are often found in a multicultural urban ‘melting pot’.
- Factor 4, *financial capital (FC)*, consists of variables (e.g., size of capital source, financial support) that refer to the financial basis that is necessary for the efficient operation of a business-oriented urban area (Dubini 1989). In particular, two forces are relevant here (see also Nijkamp 2008):
 - open competition among many actors (to induce a creative search for new decisions and courses of action)
 - entrepreneurship in business life (to stimulate innovativeness).
- Factor 5, *entrepreneurial capital (EC)*, contains various variables (e.g. start-up situation of the firm, extent of start-up problems, economic situation of the sector, extent of attractive market, diversity in customs or habits, marketing efforts, managerial and operational support, degree of strategic vision) that reflect the business drivers of the firm concerned, in the spirit of earlier contributions in business management such as *need for achievement* and *desire for independence* drivers (see Maslow 1943, 1954; McClelland 1953, Schere 1982; Shane et al. 2003), *risk-taking propensity* (see Ansoff

1957; Brockhaus 1980) and *access to new markets*: ‘break-out strategy’ (see Waldinger 1986; Engelen 2001)).

The five main constituents of the model in Figure 1 should not be viewed in isolation, but form an interconnected set of inputs in a performance system, in which the firm’s development strategies, skills for making the right strategic decisions and the integration of available inputs into the corporation’s daily strategy are extremely important for its future strategic planning. Clearly, an imbalance in the pentagon prism of Figure 1 may mean a threat and may have a negative impact on the performance of all activities involved. Clearly, any business success in a competitive economic system is driven by profit motives, but the underlying constituents should be balanced against each other, as they are also mutually connected. Linking together these five areas in an interactive chain is an essential challenge for each firm, and will have a positive impact on the performance of these firms, particularly as this brings firms potential benefits from efficiency and competitiveness. Furthermore, a positive firm (business) performance will bring about positive socio-economic results for cities and regions.

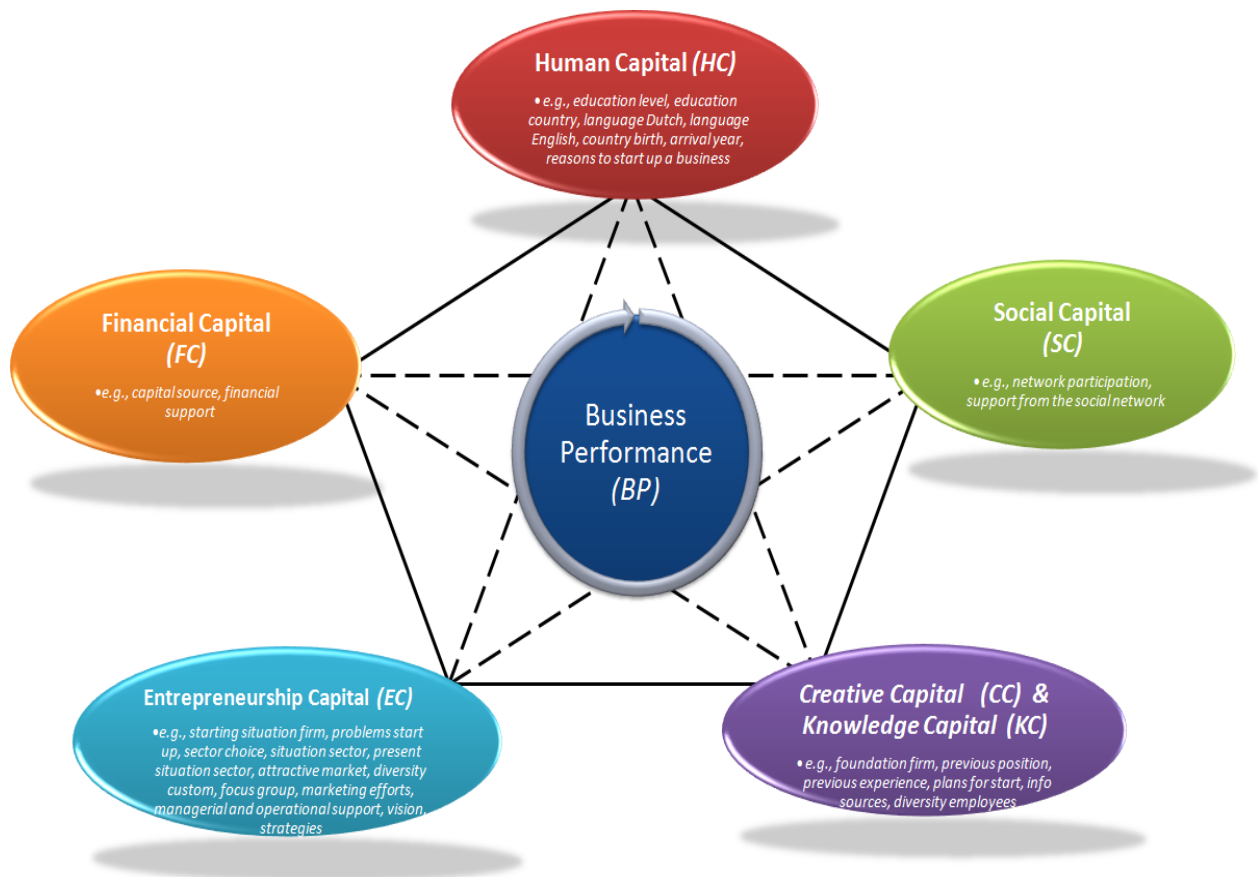


Figure 1. A model of the complex forcefield of business performance

Before focusing on pursuing a further statistical analysis of Figure 1 in order to offer a comprehensive quantitative estimation of high-performing firms, the so-called ‘entrepreneurial heroes’ or ‘business champions’, we first present a novel approach to assessing business performance based on data envelopment analysis (DEA) in order to judge in an appropriate way the comparative achievement of these ethnic firms. The aim of the DEA is to obtain comparative insights into the relative efficiency of a firm compared with other firms.

13.5 Data Envelopment Analysis (DEA): New Roads³⁰

13.5.1 The standard DEA model

A wealth of literature in the industrial organization field has been published on quantitative benchmark analyses of the performance of rather similar business organizations in a given domain of economic activity. The measurement of economic performance is essentially based on the ratio between a set of output factors (e.g. products, profits, jobs) and a set of input factors (e.g. production factors, capital use, etc.). Thus, the performance of a business firm is essentially a generalized productivity or efficiency measure. This is extensively covered in the abundant DEA literature.

In this section, we outline some essential steps of our DEA experiment, starting from a standard DEA tool, and then moving forward to a super-efficient DEA, while using a recently developed technique, viz. a distance friction minimization (DFM) method. The standard Charnes et al. (1978) model for a given decision-making unit (DMU) – abbreviated as the CCR model – aims to assess the relative performance of a given DMU relative to the performance of other DMUs. DEA is a deterministic multi-objective programming technique that is able to cope with multiple input and output objectives. It has found wide application in the industrial

³⁰ Various technicalities in this paper display close similarities with one other article by two of the co-authors (Susuki and Nijkamp, 2011), which was developed in parallel at the time of the publication of the present article. These similarities pertain only to the methodology and not the application, which is novel and path breaking work. Proper credit must be recognized to this early publication (Susuki and Nijkamp 2011) in this article. The methodology used here to study world cities was in fact in parallel introduced in, although the present article draws on earlier work by these authors referenced in this article.

Reference:

Susuki, S., and Nijkamp, P. (2011). A stepwise-projection data envelopment analysis for public transport operations in Japan, *Letters in Spatial and Resource Sciences*, 4, 139-156.

organization literature, and may be regarded as a sort of benchmark analysis that judges the multidimensional efficiency of the operation of a DMU in comparison with other DMUs. Whether a DMU is efficient or inefficient depends on the question of whether or not it is located on the efficiency frontier of all the DMUs together (the set of all possible maximum achievement levels). DMUs on the efficiency frontier have an efficiency score of 1, while less efficient DMUs have a lower score, depending on their distance from the efficiency frontier.

DEA has become an established method in the recent management literature as a tool for benchmarking and performance management, and a myriad of applications can be found in the literature (for an overview, see Anderson and Petersen 1993; Seiford and Zhu 2003). It has also been applied several times in the regional and urban field (see e.g. Macmillan 1986; Athanassopoulos and Karkazis 1997; Maudos et al. 2000; Zhu 2001; Afonso and Fernandes 2006; Halkos and Tzeremes 2010; Suzuki et al. 2010, 2011; Kourtit et al. 2011a,b; Kourtit et al. 2013a,b). It will now be used in our study as a quantitative tool to assess the business performance of a set of individual migrant entrepreneurs. The sample of firms used in our study is not very large, but this is rather common in DEA practice, as the collection of detailed data is costly. Representativeness is less important than the presence of comparable agents. For that reason, DEA – as a deterministic comparison technique of DMUs with some similar features – is different from Stochastic regression methods based on larger sample sizes. Furthermore, in a given market niche with a limited number of suppliers, there is often no need for an extension of the database.

13.5.2 A new DEA based on distance friction minimization (DFM)

As mentioned above, the efficiency improvement solution in the original DEA model is based on the assumption that in the efficiency frontier map the input values are reduced radially at a uniform rate. Recently, a new generalized distance friction has been developed to assist a DMU to improve its efficiency by a movement towards the efficiency frontier surface. The direction of efficiency improvement depends, of course, on the input/output data characteristics of the DMU. This relatively new approach defines the projection functions for the minimization of distance friction by using a Euclidean distance in weighted spaces. This forms the key aspects of the DFM (distance friction minimization) model. Thus, the DFM approach generates a new contribution to efficiency enhancement problems in decision analysis by employing a weighted Euclidean projection function and, at the same time, it may address both input

reduction and output increase (see for more technical details, Nijkamp and Suzuki 2009; Suzuki and Nijkamp 2011; Suzuki et al. 2010, 2011; Kourtit et al. 2013a,b).

We will not provide a detailed description of the various steps involved in the DEA model, but the details can be found in Nijkamp and Suzuki (2009); Suzuki and Nijkamp (2011); Suzuki et al. (2010, 2011); Kourtit et al. (2013a,b). This more satisfactory and sophisticated approach will be used in our analysis. By means of this DFM model, it is possible to present a more appropriate efficiency improvement solution compared to the standard CCR projection. This means through the DFM application there is an increase in new options for efficiency improvement solutions in DEA. The main through the DFM application advantage of the DFM model is that it yields an outcome on the efficiency frontier that is as close as possible to the DMU's input and output profile.

13.5.3 The super-efficiency model

As mentioned earlier, in a DEA model efficient DMUs have an identical score 1. The existence of equal scores of 1 for all the efficient DMUs does not allow us to discriminate further among these DMUs. This unsatisfactory assessment of efficient DMUs in a standard DEA model – in which all efficient firms obtain an equal ranking – has prompted new research to discriminate between efficient DMUs, in order to arrive at a ranking – or even a numerical rating – of these efficient firms, without, however, affecting the results for the DMUs with a given degree of inefficiency. Anderson and Petersen (1993) develop a radial super-efficiency model, while Tone's (2002, 2003) later work designs a so-called *slacks-based* measure of super-efficiency in DEA. In general, a super-efficiency model aims to identify the relative importance of each individual efficient DMU, by designing and measuring a score for its 'degree of influence' when this efficient firm is omitted from the efficient production possibility frontier. If this elimination really matters (i.e. if the adjusted distance from this omitted DMU to the remaining efficiency frontier is large), and thus the DMU concerned has a high degree of influence and outperforms the other DMUs, it obtains a high score (and is thus super-efficient). It should be noted that the rating of the non-efficient firms remain equal in this super-efficiency model.

Anderson and Petersen's (1993) super-efficiency model provides the possibility to arrive at a ranking of all the efficient DMUs. The efficiency scores from a super-efficiency model are thus obtained by eliminating the data on the DMU to be evaluated from the solution set. For

the input model, this can then result in values that may be regarded – according to the DMU concerned – as a state of super-efficiency. These values are then used to rank the DMUs and, consequently, efficient DMUs may then obtain an efficiency score above 1. The super-efficiency model may thus be suitable for finding, for our comparative database on ethnic entrepreneurs, the set of highest-performing firms.

In this way, for each individual DMU, a new distance result is obtained, which leads to a new ranking – and even a rating – of all the original efficient firms. Clearly, the main problem in super-efficiency DEA is how to define the distance between an efficient DMU and the production possibility set that emerges after the elimination of one single efficient DMU. In the literature, the slacks-based approach (see Tone 2002, 2003) has been advocated. In our empirical investigation, this method will also be applied in our empirical investigation of migrant firms in Dutch cities.

13.5.4 A combined super-efficiency DFM model

We can next design a super-efficiency DFM model that is integrated with a standard DEA model. In a normal DFM model, the input or output values obtained as an optimal solution result in a set of optimal weights for the DMU. Our new super-efficiency DFM model (hereafter SE-DFM) is now based on the idea that these optimal values result from the application of the super-efficiency model. The advantage of the SE-DFM model is that it yields an unambiguous and measurable outcome in a ranking of efficient DMUs, i.e. this new integrated model can be suitable for finding the highest-performing DMUs, while retaining all the advantages of the DFM model. Therefore, ultimately, the SE-DFM model forms the basis of our performance analysis of migrant entrepreneurs (references) in Dutch cities. This will be further empirically dealt with in the next section.

13.6 In Search of ‘Business Champions’

As mentioned above, we have extensive micro-based data on the individual and contextual performance conditions of a set of Moroccan entrepreneurs in the Netherlands. Our empirical work focuses on higher-educated young Moroccan entrepreneurs in the high-tech and innovative sectors in the four largest Dutch cities. After a review of the needs, motives and socio-economic aspects of this new and colourful entrepreneurship, our attention will be focused on the interrelated determining factors that influence their business performance and

the differences in the business performance of these entrepreneurs. This set of factors is at the core of our business performance model (see Figure 1). This model encompasses all the factors that are critical success drivers and conditions (as inputs) that can lead to effective action to maximize business performance, measured along various dimensions. The scale of these firms does not differ significantly, so that a comparative analysis based on DEA is warranted. On the basis of our survey among these entrepreneurs in the four large Dutch cities and a subsequent multivariate data reduction method, first a standard DEA is applied in order to trace the differences between these entrepreneurs. Next, we use the new technique of super-efficient DEA for individual firms in order to identify those ‘business champions’ that have an extraordinary business performance.

13.6.1 Efficiency scores for super-efficiency and CCR-I

For any DEA exercise, all relevant input and output factors of all DMUs have to be included. In our study, we distinguish for each firm five input factors (see again Figure 1) – *human capital* (HC), *social capital* (SC), *creative capital* (CC) and *knowledge capital* (KC), *financial capital* (FC) and *entrepreneurial capital* (EC) – and four output factors – *sales*, *profit*, *higher results* and *quality*. All this information originated from detailed face-to-face interviews with the entrepreneurs concerned. These data were included in the DEA analysis that forms the core analytical instrument in our study. The efficiency evaluation results for the 24 ethnic entrepreneurs’ firms based on the standard DEA model and the super-efficiency model using the five inputs and the four outputs are now given in Figure 2. Clearly, given the large number of input factors – in comparison to the number of the DMUs – several DMUs with an efficiency score of 1.0 can be found. Therefore, this is an ideal case to test whether an application of the SE-DFM model leads to a more refined analysis and more interesting conclusions on the relative performance of these firms.

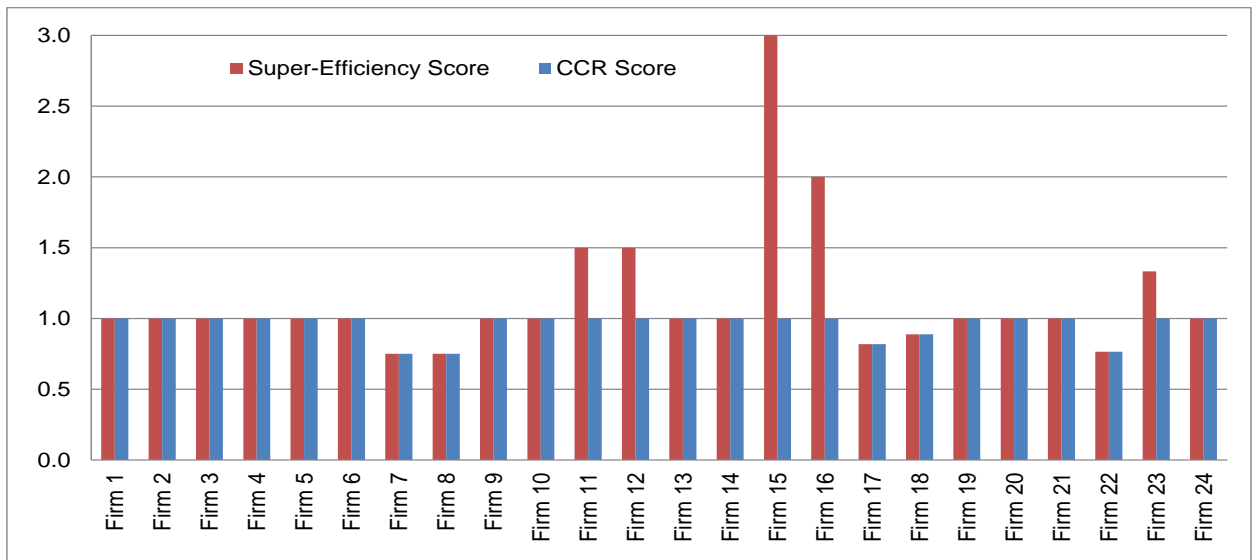


Figure 2. Efficiency score based on the CCR model and the super-efficiency model

From Figure 2, the rankings of the super-efficiency values for 19 of the 24 firms were identified on the basis of their high super-efficiency score (efficient DMUs that obtained an efficiency score above 1). It is noteworthy that in our analysis ‘Firm 15’ is *the* ‘business champion’ based on the super-efficiency model. This is an unambiguous result that originates from the advantages of the design of the super-efficiency model. The next in the ranking appears to be Firm 16, followed by Firms 11 and 12, and then Firm 23.³¹ There appears to be no systematic variability of the performance of firms across cities.

13.6.2 Efficiency-improving projection based on the SE and SE-DFM models

The efficiency improvement projection results based on the SE and the SE-DFM model for inefficient firms are presented in Table 1. The SE projection in Table 1 shows that, for instance, Firm 18 – in order to achieve a super-efficiency state – should reduce its input volumes SC, CC&C and EC by 11.1 per cent, HC by 14.8 per cent and FC by 40.7 per cent and increase its profit by 80.6 per cent in order to become efficient. On the other hand, the SE-DFM projection results show that a reduction in the EC of 6.6 per cent and an increase in the sales of 25.5 per cent are required to become efficient. This is further illustrated in Figure 3.

We will now illustrate our results by focussing on one firm in particular. Firm 18 focuses on non-traditional and fast-growing sectors and operates in a volatile environment with continually changing technologies, markets and business strategies as well as shifting

³¹ For privacy reasons, the names and nature of these firms are not disclosed.

consumer needs for products and services, which differ widely on the national, regional and local levels (Boissevain et al. 1990) and offer (new) business and market opportunities on different geographical scales (Razin and Light 1998).

In running its business, this firm has faced some entrepreneurial problems that impeded its growth (sales) and success. Its main problems reported are: overregulation concerning, for instance, long delays in obtaining approval for trade licences and business registration; the uncertain challenge of implementing unknown strategies and formulating goals; the bureaucratic need to maintain an accurate internal business process and administration; the problems faced in attracting good and well-skilled employees; and its limited access to financial capital (see also Kourtit and Nijkamp 2012).

Table 1. Efficiency improvement projection of the SE and SE-DFM models

DMU	Score	SE model		SE-DFM model		DMU	Score	SE model		SE-DFM model	
		Score(θ^{**})		Score(θ^{**})				Score(θ^{**})		Score(θ^{**})	
		Difference	%	Difference	%			Difference	%	Difference	%
I/O	Data			$d_{io}^{s^*} - s^{***}$		I/O	Data			$d_{io}^{s^*} - s^{***}$	
				$d_{ro}^{s^*} + s^{***}$						$d_{ro}^{s^*} + s^{***}$	
Firm 7	0.750	1.000		1.000		Firm 18	0.889	1.000		1.000	
(I)HC	3.000	-0.8	-25.0%	-0.7	-31.7%	(I)HC	3.000	-0.4	-14.8%	0.0	0.0%
(I)SC	5.000	-2.0	-40.0%	-1.6	-52.4%	(I)SC	3.000	-0.3	-11.1%	0.0	0.0%
(I)CCandKC	4.000	-2.0	-50.0%	-1.7	-85.7%	(I)CCandKC	2.000	-0.2	-11.1%	0.0	0.0%
(I)EC	4.000	-1.0	-25.0%	-0.6	-19.0%	(I)EC	4.000	-0.4	-11.1%	-0.2	-6.6%
(I)FC	4.000	-3.0	-75.0%	-2.9	-285.7%	(I)FC	3.000	-1.2	-40.7%	0.0	0.0%
(O)sales	4.000	0.0	0.0%	0.6	14.3%	(O)sales	4.000	0.0	0.0%	1.0	25.5%
(O)profit	4.000	0.0	0.0%	0.6	14.3%	(O)profit	2.000	1.6	80.6%	0.0	0.0%
(O)HR and Q	5.000	0.0	0.0%	0.7	14.3%	(O)HR and Q	5.000	0.0	0.0%	0.0	0.0%
Firm 8	0.750	1.000		1.000		Firm 22	0.765	1.000		1.000	
(I)HC	3.000	-0.8	-25.0%	-0.7	-31.7%	(I)HC	4.000	-1.1	-27.9%	0.0	0.0%
(I)SC	5.000	-2.0	-40.0%	-1.6	-52.4%	(I)SC	5.000	-1.2	-23.5%	0.0	0.0%
(I)CCandKC	3.000	-1.0	-33.3%	-0.7	-35.7%	(I)CCandKC	2.000	-0.5	-23.5%	0.0	0.0%
(I)EC	4.000	-1.0	-25.0%	-0.6	-19.0%	(I)EC	4.000	-0.9	-23.5%	-0.5	-17.4%
(I)FC	3.000	-2.0	-66.7%	-2.9	-285.7%	(I)FC	5.000	-2.2	-44.7%	0.0	0.0%
(O)sales	4.000	0.0	0.0%	0.6	14.3%	(O)sales	1.000	2.2	217.7%	3.6	114.0%
(O)profit	4.000	0.0	0.0%	0.6	14.3%	(O)profit	1.000	2.5	252.9%	0.0	0.0%
(O)HR and Q	1.000	3.0	300.0%	4.7	117.9%	(O)HR and Q	5.000	0.0	0.0%	0.0	0.0%
Firm 17	0.818	1.000		1.000							
(I)HC	5.000	-2.5	-50.9%	-2.3	-93.7%						
(I)SC	3.000	-0.5	-18.2%	0.0	0.0%						
(I)CCandKC	3.000	-0.5	-18.2%	-0.6	-24.4%						
(I)EC	4.000	-0.7	-18.2%	-0.4	-12.2%						
(I)FC	4.000	-2.5	-61.4%	-2.2	-142.4%						
(O)sales	4.000	0.0	0.0%	0.8	20.0%						
(O)profit	4.000	0.0	0.0%	0.2	5.0%						
(O)HR and Q	1.000	3.3	327.3%	3.8	88.9%						

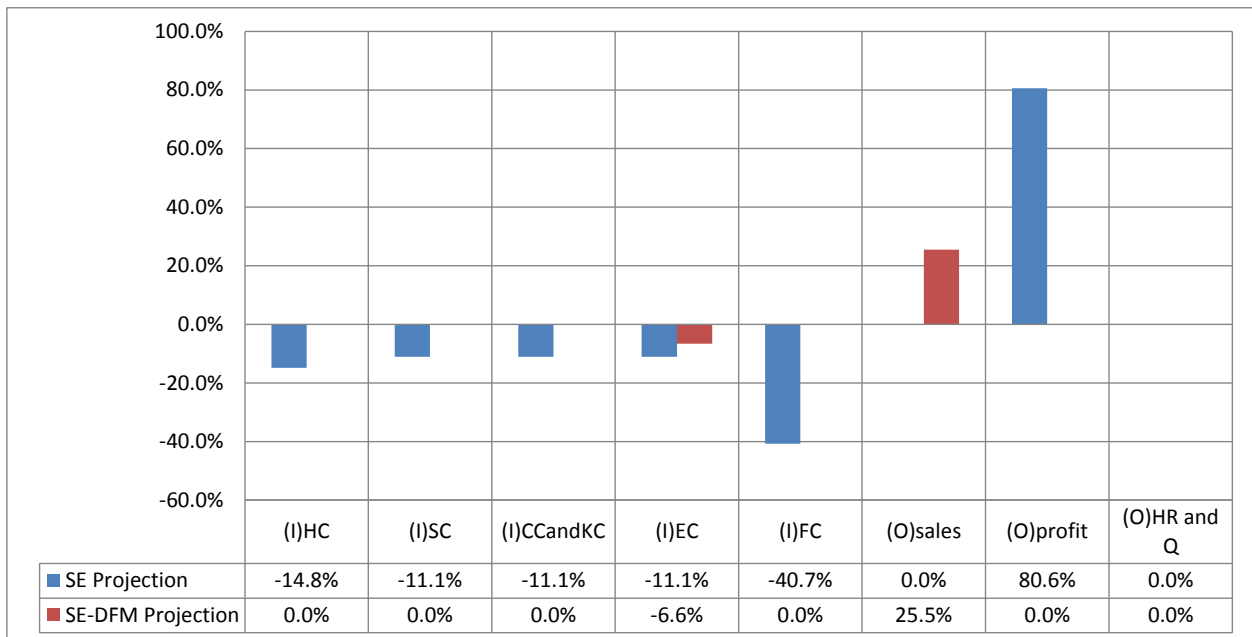


Figure 3. Projection results of Firm 18, based on SE and SE-DFM

Furthermore, in order to stay ahead and remain competitive under various conditions, this entrepreneur needs to become very critical in its business operations, for instance, to reduce an over extensive and often costly use of local informal social networks and to use more formal or standardized practices. In the long run, the extensive use of social networks may reduce the competitive drive for the growth of entrepreneurship in a creative and innovative melting pot. The current resulting isolation of the firm brings limitations in, for example, the use of formal networks and cooperation (e.g. for managerial and operational support), effective break-out strategies and new market segmentations, in particular, since local clients are not necessarily big spenders; furthermore, many city clients do not visit the migrant entrepreneurs' area (diversity of customers), while fewer new product–market combinations are developed.

A more formalized and routine approach would increase the business focus on the management of the firm (e.g., a focus on professionalization, viz. improvement in the organizational and management structure and more emphasis attracting highly skilled employees, and on market expansion), which would not only be in accordance with reflect the growing diverse and dynamic business environment today, but also help to monitor the firm's strategic response to this complexity. The firm should, therefore, regularly adapt its organizational growth strategies in response to the market and economic conditions (viz., so as to increase its sales).

Therefore, benefiting from potential formalized social capital, diversity and business opportunities demands a high level of interaction and connection within various formal and standardized networks and between the individuals within and between cities/regions. Several of these results appear to be in line with results obtained in a previous study by Kourtit and Nijkamp (2012).

13.7 Conclusion

Over the past few decades, international migration has become a phenomenon of worldwide importance, in which developed countries – and mainly large cities – have acted as magnets for foreign migrants. The latter group seeks new opportunities in a host country; hence, it is clear that in the case of mass migration, various significant socio-economic impacts may be expected in the country of destination.

As mentioned above, migrant entrepreneurs are not only involved in low-skill business activities in the urban economies, but more and more migrant entrepreneurs (especially those with a higher education, often belonging to the second-generation migrants) are involved in high-tech business and advanced branches of the service economy. This transition from traditional markets to mainstream markets is normally called a ‘break-out strategy’. As a consequence, migrant entrepreneurs are more and more in competitive business actions in mainstream urban markets. Thus, there is a clear trend in migrant entrepreneurship towards a dovetailing of their activities in relation to the more advanced business sector in cities. Instead of a focus on a protected market, these entrepreneurs reach out to a ‘normal’ comparative market in an advanced economy. In conclusion, urban agglomerations offer powerful seedbeds for economic emancipation of migrant entrepreneurs. However, their economic performance may vastly differ. This heterogeneity was explored in the present paper.

Heterogeneity among migrants promotes great cultural diversity, mainly in large cities and urban agglomerations (e.g. in terms of cultural identity, a creative urban ‘milieu’ or atmosphere, access to new knowledge, orientation towards the urban embeddedness of new business initiatives, and adequate use of social and financial capital and networks). Therefore, new self-employment modes, the birth of SMEs and the internationalization of the city may induce new (urban) economic vitality (Kourtit and Nijkamp 2011).

Cultural and socio-ethnic heterogeneity may offer various impulses that stimulate (often highly skilled) ethnic groups to resort to creative industries and to deploy urban space as a business action platform by mobilizing all their human and social resources. Such a strategy can contribute to the urban economy by raising the economic, social and cultural diversity and by offering new job opportunities to among immigrants. Consequently, many modern cities have become multicultural Jacobian ‘melting pots’ with a great development potential.

Migrant entrepreneurship – not only as an individual business activity, but also as a collective entrepreneurial feature of new industrial districts in the city (‘the melting pot’ phenomenon) – is one of the fascinating manifestations of Schumpeterian urban development.

The SE-DFM model used in this empirical research study appears to provide decision makers with the practical and transparent solutions that are available in the SE-DFM projection in order to reach the efficiency frontier and thus to improve their performance. These results offer a meaningful contribution to decision support and planning for greater efficiency in the development of the firm’s strategy. Therefore, this SE-DFM model could become a useful policy vehicle that may have great added value for operational decision making and planning in firms. Clearly, firms have the possibility to increase their potential. This potential for improvement differs for each firm, but our results offer operational guidelines on a case-by-case firm basis.

In this paper, we have, in particular, presented a new methodology, the SE-DFM model, which integrates a super-efficiency model and a DFM model. The new method minimizes the distance friction for each input and output separately. As a result, the reductions in inputs and increases in outputs that are necessary to reach an efficiency frontier are smaller than in the standard model. Furthermore, the new model could be adapted to reflect realistic conditions in an efficiency improvement projection. In conclusion, our SE-DFM model is able to present a more realistic efficiency improvement firm policy strategy, and may thus provide a significant contribution to support decision making and planning for the improvement of the efficiency of the agents involved. Admittedly, the technicality involved with the use of generalized DEA models is rather high, but the benefits for a better understanding of the manifold backgrounds of the differences in the economic performance of migrant firms are high as well; we are now able to extract quantitative information on the performance of migrant firms on a case-by-case comparative basis.

Acknowledgement

This study is part of a sequence of publications on migrant entrepreneurship; see e.g., Kourtit, K., and Nijkamp, P. (2012). Strangers on the Move: Ethnic Entrepreneurs as Urban Change Actors. *European Review*, 20 (3), 376- 402 .

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14 THE CREATIVE URBAN DIASPORA ECONOMY: A DISPARITY ANALYSIS AMONG MIGRANT ENTREPRENEURS ³²

Abstract

This paper highlights the ‘magic of diasporas’ – as a source of progress in a globalizing world – with special attention for migrant entrepreneurship. This paper aims to identify and examine the critical success factors of migrant businesses and their socio-economic implications. We will assess the business performance of migrant entrepreneurs by employing a relatively new analytical instrument, coined Super-Efficient Data Envelopment Analysis (Super-DEA). Next, we will offer a multidimensional visualization of the relative differences in the performance of migrant entrepreneurs by introducing a recently developed technique from the cognitive sciences, coined Self-Organizing Maps (SOMs). This analytical apparatus will be tested on the basis of a sample of Moroccan entrepreneurs in four Dutch cities, namely Amsterdam, Rotterdam, The Hague and Utrecht. The study will be concluded with some strategic conclusions.

Key words:

migrant entrepreneurship, diaspora economy, ethnic diversity, foreign migrants, economic performance, social capital, immigrant networks, social networks, Super-Efficient Data Envelopment Analysis, Self-Organizing Maps, SWOT analysis, migration impact assessment

³² Source: Kourtit, K., Nijkamp, P., and Arribas-Bel, D. (2013). The Creative Urban Diaspora Economy: A Disparity Analysis among Migrant Entrepreneurs. In: *Handbook of Research Methods and Applications in Urban Economies* (Kresl, P., and Sobrino, J., eds.), 472-496.

14.1 The Diaspora Economy

A recent article in *The Economist* (November 19, 2011) highlighted the ‘magic of diasporas’ by arguing that foreign migrants make a significant contribution to a nation’s economic growth. In particular, immigrant networks are a source of progress in a globalizing world. Many foreign migrants are not individual opportunity seekers, but exhibit a herd behaviour in which social bonding and mutual support systems among members of the same ethnic or socio-economic group are crucial success conditions. Such diaspora networks based on kinship, language, culture or geography appear to create the basis for new and flexible forms of economic activity, in which social capital and trust play an important role (see Kloosterman and Rath 2001, Kourtit and Nijkamp 2011). Clearly, there are additional factors that also help to create the foundation for a successful economic operation in host countries, in particular, knowledge, involvement in local cultures and accessibility to broader communication and social exchange networks (see also Fukuyama 1996, and Putnam 2000).

There has been an upsurge of – often unjustified or politically motivated – views on the negative socio-economic impacts of foreign migrants. As extensively demonstrated by Nijkamp and Poot (2012), many of such assertions are based on wrong prejudices or false premises: the actual contribution of migrants to local or national economies range from modest to significant positive impacts. Clearly, there are cases of crowding-out effects and negative externalities, but in most situations such phenomena are offset by other positive welfare consequences for local or national economies at large. And with an increasing dominance of skilled migration, the positive impacts of foreign migrants for host countries will likely rise even more.

The integral and systematic assessment of local, regional or national effects of the presence and of the economic participation of foreign migrants is called ‘*migration impact assessment*’ (MIA) and has led to a new strand of applied quantitative impact studies on foreign migration. A review and illustrations can be found in a recent study of Nijkamp et al. (2012).

Admittedly, migration is a social-geographic phenomenon of all times and places, and hence not unique for our era. But the scale and international coverage of this phenomenon make it new in our age, with more than 3 per cent of the world’s population living outside the country of birth. In a way, migration is a sign of the increasing globalization of our societies which runs parallel to the rising flow of goods and services, (sub-)culture, information, expertise, knowledge or technology across traditional boundaries. Unravelling the multidimensional

economic aspects and effects of foreign migrants is fraught with many difficulties, but MIA can be instrumental in mapping out and assessing the most prominent impacts. This calls for a systematization and operational typology of these impacts. In a recent study by Christensen et al. (2011) four principal, quantifiable categories were distinguished:

- contributions to federal, state, and local revenues in the form of income, property, sales, and other taxes and fees;
- contributions to gross domestic product (GDP) in the form of consumer spending;
- contributions to economic output and national income based on the immigrants' influence on labour productivity;
- contributions to job creation and new business formation.

A review of experiences and findings from a broad MIA can be found in a recent study by Kourtit and Nijkamp (2011). The authors have summarized various findings by designing a framework for a migration SWOT (strength-weakness opportunities-threats) analysis based on five distinct domains of socio-economic importance. The results from each SWOT analysis were then used as an input for compiling strategic choices and possible policies.

In the present study, we will focus our attention in particular on an issue of increasing importance in western cities, viz. migrant entrepreneurship. Our aim is to identify the critical success factors of migration business and their socio-economic implications. We will measure the business performance of migrant entrepreneurs by employing an appropriate analytical instrument, coined Super-Efficient Data Envelopment Analysis (Super-DEA). Next, we will offer a new visualization of the relative differences in the performance of migrant entrepreneurs by introducing a recently developed technique from the cognitive neuro-learning or sciences, namely Self-Organizing Maps (SOMs). This analytical apparatus will be tested on the basis of a sample of Moroccan entrepreneurs in the four largest Dutch cities namely Amsterdam, Rotterdam, The Hague and Utrecht. The study will be concluded with some strategic conclusions.

14.2 Migrant Entrepreneurship

Migrant entrepreneurship – sometimes called ethnic entrepreneurship or minority entrepreneurship – has become a vehicle for many foreign migrants to reach the ‘heaven’s door’ (Borjas 1999), either in a voluntary way (as an opportunity seeker) or in a forced way (‘the stranger is the trader’). In many countries, foreign-born immigrants have led to the birth of many new firms, often in the lower segments of the business market such as repair services or catering (see the ‘market penetration’ concept in the Ansoff Model 1957), where new comers increase their market share in a competitive business market with low-cost products or services. Sometimes these business firms move to a higher segments, e.g., engineering firms, marketing and consultancy firms (see the ‘diversification’ concept in the Ansoff Model 1957), where they develop and provide a new product or service for a completely new market (‘break-out strategies’). With the advent of the knowledge-driven society, we see also the emergence of high-tech and advanced business firms in migrant segments of society based on innovativeness and intellectual property. Figure 1 shows clearly a drastic transformation and re-positioning of ethnic entrepreneurship, in particular the second and third generation, towards innovative or creative industries in urban agglomerations (‘breaking-out approach’).

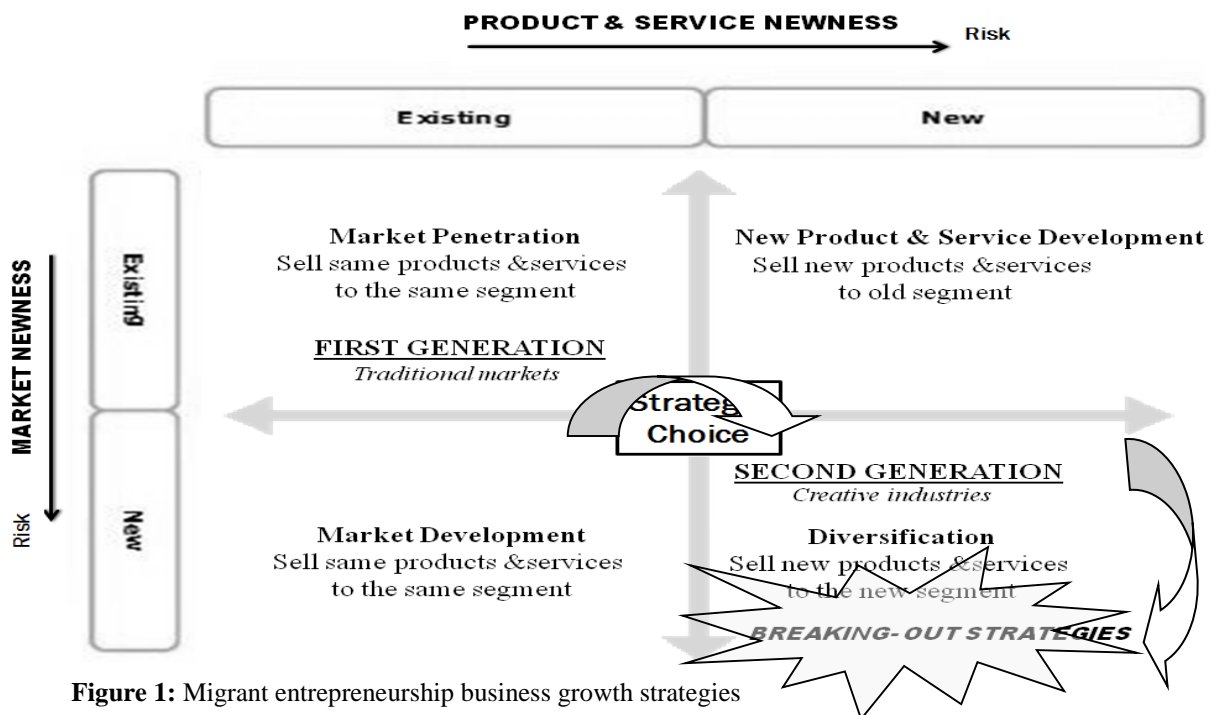


Figure 1: Migrant entrepreneurship business growth strategies

Source: Ansoff Matrix (1957), adjusted by authors

Figure 1 shows a systematic strategic framework of migrant entrepreneurship that is helpful for mapping out new business growth strategies and opportunities of migrant firms, derived from the Ansoff Model (1957). This model is based on two dimensions, namely products & services and markets, for which four growth strategies can be developed, viz. market penetration, market development, new product & service development, and diversification.

In general, ethnic businesses have the innovative drive to grow by employing business actions for determining the best course of action, where growth is their priority. Figure 1 shows that new trends in ethnic entrepreneurship and in innovative growth strategies tend to show a rise in second-generation migrant entrepreneurs in the creative sector towards an external market orientation ('break-out strategies'; see also Engelen 2001), instead of focusing on the traditional sectors, in which the first generation is operating. They aim to expand their market domain by means of diversification through '*break-out strategies*' by offering high quality and innovative products and services for a broader group of clients and markets outside their own co-ethnic clientele.

Nowadays, the first-generation entrepreneurs tend to look also increasingly for new opportunities by providing new products and services in order to increase their sales and profits, though in an existing business market (from *market penetration* towards *new product & service development*). Thus, they often try to develop and provide other new products to their regular (co-ethnic) customers or to a market which they have already entered. On the other hand, the second generation uses new types of strategic approaches for detecting innovative growth strategies. Their business strategies are based on *conglomerate diversification* and rather *risky type of strategies*, because they enter new markets with new products or services.

It is noteworthy, most of these firms have started in a rather informal and flexible way, but – especially in the stage of second-generation migrants – they have been upscaled to modern R&D-oriented firms ('break-out approach') (Kourtit and Nijkamp 2011). Recent research (Sahin et al. 2010, 2012; Kourtit and Nijkamp 2012) has shown that the second generation of ethnic entrepreneurs tends to be well-educated, and better integrated in the host community, where this community is mostly also the country of birth of this new generation. An extensive review of the literature and a series of applied studies can be found in Sahin (2012).

An important conclusion from recent research is that the migrants' talents, capacities and resources matter – and their less so ethnicity – in achieving business performance and success. Given this new perspective on a variety of motives and background conditions of migrant entrepreneurs, it seems plausible to hypothesize that their economic performance will also show quite a diversity, not only among different ethnic groups, but also across age or education. This will be further tested in the present study.

It should be noted at the outset that migrant business does not demonstrate a uniform socio-economic spectrum; it covers a wide range of economic activities ranging from traditional to sophisticated, from low-skilled to high-skilled market segments. High-skilled migration, in particular, tends to create a well-educated diaspora which facilitates trade by helping to enforce contracts, acts as intermediaries or brokers, and expands international cooperation (World Bank 2006, Nijkamp et al. 2012). In the context of an ageing population and the need for proper skills and talents, migrants may make an important economic contribution to the host region. Since many migrants move from poor to rich countries, one may argue that the globalisation process prompts spatial mobility and accessibility to places with a different socio-economic profile (Poot et al. 2008). At the beginning, migrant enterprises may be oriented towards traditional ethnic products from the country of origin, but – as mentioned – they are also increasingly found in advanced producer services in a modern economy.

The above described new orientation on non-traditional sectors with a combination of attractive personal characteristics, skills and experience may produce a high economic performance and success level for the second-generation migrant entrepreneurs. This new orientation may also help them to escape from the 'social trap', or from ethnic or migrant enclaves causing less incentives for a full fledged social and labour force participation. This new attitude enhances also social cohesion, solidarity and trust in the crowded melting pot of modern cities. Such break-out strategies are increasingly supported by formal networks or organisations or institutional back-up systems. Moreover, this new external orientation may also help them to expand their market towards higher volume by engaging in commercial contacts with indigenous entrepreneurs and other ethnic groups, which may positively contribute to the local or regional business climate and urban vitality. However, this external orientation does not mean that they will stop benefiting from their own ethnic group ('enclave economy'). Thus, migrant groups who produce a strong entrepreneurial climate can be of great

economic significance for the migrant community itself, as well as for the entire community, e.g. through job and opportunity creation.

The increasing variety of migrants may prompt a great cultural diversity, mainly in urban agglomerations (e.g., in terms of local identity, an open and attractive urban ‘milieu’ or atmosphere, use of tacit knowledge, local embeddedness of new business initiatives, and access to social and financial capital and networks). It can also significantly contribute to the local or regional economy by increasing the economic and cultural diversity of a city and reducing unemployment among immigrants. As a consequence, many cities in the Western world gradually become a multicultural melting pot: a society with people of different cultures, races and religions (Jacobs, 1961, 1969) and a magnet to deliver new ideas for the creative industries and economic growth. Thus, they mirror an amazing spectrum of activity patterns that are to a large extent co-determined by the specificities in terms of culture, language, attitude or behaviour related to the country of origin. They exhibit a new socio-economic potential that may further enhance trade, with its intriguing mix of competitiveness and cooperative behaviour, which represents a new challenge and provides opportunities for many cities in host countries. International studies of various cities show that cultural diversity leads to favourable socio-economic conditions where there are complementary labour opportunities or niche-markets. Managing cultural diversity – with a focus on the optimisation of potential socio-economic benefits of cities – requires the utmost in strategic courage and governance ability (Kourtit and Nijkamp 2012).

Diversity has in general a positive effect on creativity, innovation and performance at different scales from company or organization to city, region or country. The reason is that being linked to creative activities is a major source of competitiveness for multicultural cities, as it not only stimulates creative ideas and facilitates creative activities, but also encourages cities to boost their international profile, e.g. by attracting investment and a well-educated, creative workforce. Therefore, cultural diversity tends to contribute to the improvement of the creative capacities of cities and regions (see Florida 2002, 2003, 2004; Landry....., Scott 2000). While Jane Jacobs (1961) was still talking about the urban ‘melting pot’ as the source of creative entrepreneurship, nowadays we speak of a ‘mosaic’ (see Gang et al. 2011) as a culturally distinct but economically integrated urban migrant constellation.

Cultural diversity may create diverse economic activity patterns among migrants, but an important question is whether such economic diversity can also be observed among business

owners of the same ethnic or cultural background. In other words, it is an intriguing question whether enterprises with a given cultural or geographic origin have a similar business performance. The answer to this question calls for a conceptual and operational business performance model which comprises both individual-specific determinants (e.g. skills, age) and general moderator variables (e.g. geographic location). This set of micro and meso input variables then determines the output (or performance indicators of the firm concerned. In other words, our conceptual model can be presented as follows (see Figure 2):

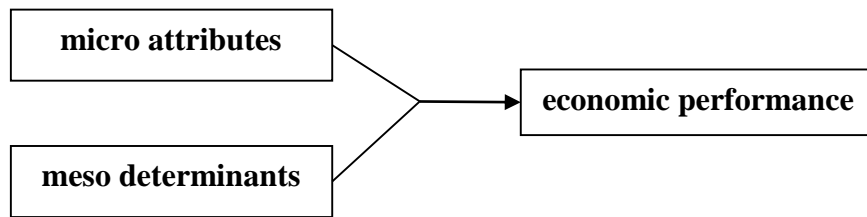


Figure 2. A simple performance scheme for business firms

The input variables call for a micro-meso data set on the attributes and moderator variables of individual firms, while the analysis of their business performance has to be based on individual firm achievement information. Our database will be based on extensive field interviews with a sample of Moroccan entrepreneurs in the four largest cities in the Netherlands (see Section 3). Next, the economic analysis of the firms' performance will use a recently developed and tested method for comparative business achievement viz. a Super-Efficient Data Environment Analysis (Super-DEA) (see Section 4). In the subsequent section, the statistical analysis of the disparities among these migrant firms will be presented, while we use a relatively new method for socio-economic data and mapping analysis, called a Self-Organizing Map (SOM) (see for an introduction Section 5). Finally, in Section 6 the empirical results of the Super-DEA experiment and of the SOM experiment will be combined and interpreted, while Section 7 will offer some concluding remarks.

14.3 Description of Database

This section will describe the details of our database and the methodology employed. Our study aims to investigate the critical success factors (CSFs) behind the business performance of the new-generation migrant entrepreneurs, who are active in creative or innovative sectors, and to assess their socio-economic implications. Our case study will address the economic performance of Moroccan entrepreneurs in the Netherlands. Therefore, in our research we will present the results of an investigation on one of the three largest ethnic groups in the Netherlands, which has shown the sharpest rise in absolute numbers of non-Western entrepreneurs and a relatively high birth rate of new firms. These are the higher-educated young Moroccan entrepreneurs operating in the ICT, consultancy, marketing, media, financial, and real estate sectors, mostly concentrated in the four largest Dutch cities, namely Amsterdam, Rotterdam, The Hague and Utrecht. These cities have also a large share of many ethnic groups present in the Netherlands.

The important research question is now whether these businesses, with a similar cultural or geographic origin, have the same business performance, in particular financial as well as non-financial achievements, even when they are using a relatively small amount of inputs. All these factors are at the core of the simple conceptual model (see Figure 1) developed in this paper, and their importance and impact will be assessed on the basis of an extensive data set on these relevant population groups. Thus, our empirical approach is based on unique data gathered from a structured in-depth field survey of a selected set (24) of rather representative Moroccan entrepreneurs in the business-related professional service sectors with a higher educational level and skills. They are different from the traditional ethnic niche in terms of their products, services and communication channels used. Clearly, the sample is relatively small, but in this emerging new market it turned out to be extremely difficult to find more second-generation entrepreneurs who were willing to participate in our interview.

The answer to our research question, our simple conceptual model (Figure 1) has been adjusted accordingly, and thus all main input and output factors have been included in the model, which comprises both individual-specific determinants (e.g., skills, age,) and general moderator variables (e.g. geographic location). This set of micro- and meso- input variables serves as independent explanation factors that are supported to determine for the overall outputs (or performance indicators) of the firms concerned.

In order to avoid the collection and use of unstructured micro- and meso- input data, the long list of indicators from the survey questionnaire was systematized and summarized by means of a clustered presentation in 5 input groups (see Table 1), which contains the main indicators. These input groups are: *Human Capital (HC)*, *Social Capital (SC)*, *Creative Capital & Knowledge Capital (CC&KC)*, *Financial Capital (FC)* and *Entrepreneurship Capital (EC)*. Similarly, the outputs of these individual firms were also clustered according to two main characteristic groups, viz. *Financial business performance (FBP1&2)*, and *Non-financial business performance (NF-BP3)*. Finally, the precise geographical coordinates of these firms were, of course, known. And therefore, it was possible to assign the location of each individual firm in our study. Table 1 offers a compact, systematic picture of the general main categories of the micro- and meso- indicators used in this research.

Table 1: List of input and output indicators of Moroccan entrepreneurs

MAIN CATEGORIES	INDICATOR GROUP	NR	INDICATORS	
OUTPUTS	Financial business performance (FBP1&2)	1	<i>Sales</i>	
		2	<i>Profit</i>	
	Non-financial business performance (NF-BP3)	3	<i>Higher orientation</i>	
		4	<i>Higher quality</i>	
INPUTS	Human Capital (HC)	5	<i>Age</i>	
		6	<i>Education level</i>	
		7	<i>Education place</i>	
		8	<i>Educational level</i>	
		9	<i>Language ability (e.g. Dutch, English, French)</i>	
		10	<i>Country birth</i>	
		11	<i>Arrival years in the Netherlands</i>	
			<i>Reasons to start up a business</i>	
		Social Capital (SC)	12	<i>Network participation</i>
			13	<i>Support from social network</i>
		Entrepreneurship Capital (EC)	14	<i>Starting situation firm</i>
	15		<i>Problems startup</i>	
	16		<i>Sector choice</i>	
	17		<i>Situation sector</i>	
	18		<i>Present situation sector</i>	
	19		<i>Market competition in sector,</i>	
	20		<i>Attractive market</i>	
	21		<i>Diversity in clientele</i>	
	22		<i>Number of clientele</i>	
	23		<i>Strategic segmentation</i>	
	24		<i>Marketing strategies and efforts</i>	
	25		<i>Managerial support</i>	
	26		<i>Operational support</i>	
	27		<i>Vision and business strategies</i>	
	28		<i>Professionalization and market expansion</i>	
	Creative Capital & Knowledge Capital (CC&KC)		29	<i>Foundation year of enterprise</i>
			30	<i>Position before start-up</i>
		31	<i>Previous experiences</i>	
32		<i>Business plans for start-up</i>		
33		<i>Informal and formal information sources</i>		
34		<i>Diversity in employees</i>		
35		<i>Number of employees</i>		
Financial Capital (FC)	36	<i>Formal capital sources</i>		
	37	<i>Informal capital resources</i>		
GEOGRAPHIC LOCATION	Four largest Dutch cities (G4)	38	<i>Amsterdam</i>	
		39	<i>Rotterdam</i>	

		40 41	<i>The Hague</i> <i>Utrecht</i>
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These individual firm data are related to both output and input performance characteristics, as well as to motivational and driving forces that are decisive for turning the firm into a high-performance firm, a so-called ‘business champion’. As a prior broad literature search did not create a solid basis for a useful, validated questionnaire to obtain verified and systematically structured individual information from the firms on their critical performance success conditions and indicators that reflect innovations in the relevant sectors, a self-composed ‘statement questionnaire’ was used (related to all the above main categories). The participating Moroccan entrepreneurs were selected on the basis of two dominant criteria: namely whether they operate in the advanced and/or creative industries, and have a Moroccan background. The performance statements in the questionnaire were next identified from the broad literature available (indicators were converted into statements and presented to the interviewees) and were then re-formulated so that the interviewees had to give a rating on a 5-point Likert scale, varying from 5 (the highest score per answer) to 1 (the lowest). The average sum of the scores for each of the indicators was used for further statistical analyses.

This conceptual input and output information framework was used to identify the critical success factors of migration business and their socio-economic implications. In order to measure the business performance and to judge in an appropriate way the comparative achievement of these ethnic firms, a new analytical instrument, coined Super-Efficient Data Envelopment Analysis (Super-DEA) was employed (see Section 4). The aim of a general DEA is to obtain comparative insight into the relative efficiency of a decision unit as compared to other decision units. Next, in Section 5, we will introduce a new visualization technique that is able to map out the relative differences in the performance and the business performance of migrant entrepreneurs in the Dutch cities concerned. This method, which is able to identify and explain their positions in virtual topological space, is based on an increasingly popular approach from neuro-learning sciences, namely Self-Organizing Maps (SOMs). This analytical apparatus will be tested on the basis of our sample of Moroccan entrepreneurs in four Dutch cities in Section 6.

14.4 New Analytical Instrument: An Introduction

14.4.1 *he Self-Organizing Map (SOM)*

The Self-Organizing Map (SOM, Kohonen, 2001) is an algorithm that belongs to the family of computational neural networks. It is a data-reduction technique that was first developed in relation to the study of the spatial organization of brain's functions and aimed to perform two main types of compression: on the one hand, it shrinks the number of input observations (quantization); on the other hand, it compresses the number of dimensions or attributes of each observation, usually to two of them (projection). Although it has not been widely applied in the context of social sciences until recently (e.g. Skupin and Hagelman 2005; Spielman and Thill 2008; Yan and Thill 2009; Arribas-Bel et al., 2011), the SOM features a number of characteristics that make it very useful for exploration and presentation of complex relationships buried in high-dimensional socio-economic datasets. This in turn converts it in a useful device to present information in an intuitive way to a non-technical audience, for instance in the context of support decision making.

Most of the interest on the SOM stems from its ability to spatially represent statistical relationships. In effect, the algorithm is able to extract the meaningful information in the several dimensions of the data and collapse them usually into only two. These two dimensions may then be plotted in what is also called a SOM, a graphical device whose topological structure preserves the statistical patterns contained in the original data. This is achieved through an iterative process called training in which the dataset is sequentially presented to the SOM, which progressively learns its properties, hence the self-organization. Since a detailed description of the technique is well beyond the scope of this paper, in this section we focus on the intuition, describe the output of a SOM and put particular emphasis on how to interpret it.

Typically, the output of a SOM is a network of topologically connected hexagons that represent the "compressed" version of the original multidimensional dataset. A vector of as many dimensions as original variables is assigned to each of these hexagons and, once the SOM has undergone the training process, these vectors contain the statistical properties of the original dataset. Not only that, such properties are distributed across the network in a way that similarity is translated into distance: closer hexagons tend to be very similar in terms of the statistical characteristics from the original dataset, while more distant ones

are less alike. It is important to understand this specialization of the statistical characteristics because it is one of the most powerful features of the algorithm: by summarizing in a topology the statistical space contained in the original dataset, the SOM provides a visualization that makes intuitive the detection of particular patterns that would otherwise remain hidden.

A SOM network can be used in many ways. Two of the most popular ones include the component planes and the visualization of the best matching units (BMUs). As mentioned before, each hexagon represents a vector of as many dimensions as the original dataset and, once trained, these vectors incorporate its statistical properties as well. One way to visualize the output of a SOM is to map onto the network of hexagons the values of each of these dimensions (component planes) to analyze how different variables are distributed and, particularly, whether there are any patterns or resemblance between variables. For example, a similar distribution for two variables would indicate positive correlation between them. Another possibility the SOM offers is to link the network of hexagons to the original observations. This is done by exploiting the concept of best matching unit (BMU): for each observation in the original dataset, its BMU is defined as the most similar hexagon in the SOM as measured by (Euclidean) distance to the vector assigned to it. The BMUs represent the XY coordinates of the original observations in the new map created. This means we can now map each of those observations onto the statistical map we have created and analyze their distribution. Because of the properties of the SOM, statistical similarity is translated into spatial distance so observations that are very much alike will tend to be located close to each other while very different ones will be distant in the network.

14.4.2 Data Envelopment Analysis (DEA): Standard CCR model and Super-Efficiency Model

The Standard CCR model

The standard Charnes et al. (1978) model (abbreviated hereafter as the CCR-input or CCR-I model) for a given Decision-Making Unit DMU_j ($j = 1, \dots, J$) to be evaluated in any trial o (where o ranges over $1, 2, \dots, J$) may be represented as the following fractional programming (FP_o) problem:

$$\begin{aligned}
(FP_o) \quad & \max_{v,u} \quad \theta = \frac{\sum_s u_s y_{so}}{\sum_m v_m x_{mo}} \\
\text{s.t.} \quad & \frac{\sum_s u_s y_{sj}}{\sum_m v_m x_{mj}} \leq 1 \quad (j=1, \dots, J) \\
& v_m \geq 0, \quad u_s \geq 0,
\end{aligned} \tag{1}$$

where θ represents an objective variable function (efficiency score); x_{mj} is the volume of input m ($m=1, \dots, M$) for DMU j ($j=1, \dots, J$); y_{sj} is the output s ($s=1, \dots, S$) of DMU j ; and v_m and u_s are the weights given to input m and output s , respectively. Model (1) is often called an input-oriented CCR model. Model (1) is obviously a fractional programming model, which may be solved stepwise by first assigning an arbitrary value to the denominator in (1), and then maximizing the numerator.

Super-Efficiency Model

The unsatisfactory identification of efficient firms in a standard DEA model – where all efficient firms get the score 1 – has led to focused research to discriminate between efficient DMUs, in order to arrive at a ranking – or even numerical rating – of these efficient firms, without affecting the results for the non-efficiency. Anderson and Petersen (1993) have developed the super-efficiency model to arrive at a ranking of all efficient DMUs. The efficiency scores from super-efficiency model are obtained by elimination the data on the DMU_o to be evaluated from the solution set. For the input model, this can then result in values which may be regarded – according to the DMU_o – as a state of super-efficiency. These values are then used to rank the DMUs and, consequently, efficient DMUs may then obtain an efficiency score above 1. The super-efficiency model may be suitable to find the highest performing DMU. A super-efficiency model based on a CCR-input model can be written as follows:

$$\begin{aligned}
& \min_{\theta, \lambda, s^-, s^+} \quad \theta - es^- - es^+ \\
\text{s.t.} \quad & \theta x_o = \sum_{j=1, \neq o}^J \lambda_j x_j + s^- \\
& y_o = \sum_{j=1, \neq o}^J \lambda_j y_j - s^+
\end{aligned} \tag{2}$$

$$\lambda_j, s^-, s^+ \geq 0$$

where e is a unit vector (1,...,1), representing utility for all elements.

In general, a Super-Efficiency model aims to identify the relative importance of each individual efficient firm, by designing and measuring a score for its ‘degree of influence’ if this efficient firm is omitted from the efficiency frontier (or production possibility set). If this elimination really matters (i.e. if the distance from this DMU to the remaining efficiency frontier is large), and thus the firm concerned has a high degree of influence, and outperforms the other DMUs, it gets a high score (and is thus super-efficient). Thus, for each individual firm a new distance result is obtained, which leads to a new ranking – even a rating – of all original efficient firms. The Super-Efficiency model may thus be suitable to find, for our comparative database on ethnic entrepreneurs, the set of highest performing firms. In this way, for each individual DMU a new distance result is obtained, which leads to a new ranking – and even a rating – of all original efficient firms.

These methods will be used in our search for ‘magic of diasporas’ using statistical analyses of the disparities among these migrant firms.

14.5 Results of DEA and SOM of Migrant Entrepreneurs

This section presents the results from applying a SOM approach in a series of steps to understand better the structure and a short-term evaluation of the information contained in our ethnic entrepreneurs’ dataset described in Section 3. Where three different SOMs have been run based on three different partitions of the dataset:

1. The input variables *HC*, *SC*, *CC&KC*, *EC* and *FC*
2. The output variables *FBPI&2* and *NF-BP3*
3. All eight variables together so-called ‘global score’

The main objective of this mapping is to identify possible interesting profiles and patterns in the performance that emerge among the observations of migration businesses. Thus, first we will show the main network with the mapping of spatial representation of these firms performance to gain an adequate understanding of its composition, followed by

maps with the location and the efficiency scores. This map will also displays an additional layer of information by using different colours to mark the location of each firm and where a set of efficiency scores will be divided in five categories by the natural breaks methodology and assigned by a colour in the gradient from light to dark blue. Finally, the component planes are also presented in a gradient of five quantiles from light to dark blue to present the distribution of values of each variable across the SOM.

14.5.1 Location factors and spatial distribution of migrant entrepreneurs

The main tool we use to accomplish our purpose is the SOM network whose results are displayed in Figure 4. Onto this map, it is possible to locate each of the input the firms used in our analysis, according to their values for each variable considered. Figure ? shows a statistical map with the distribution of the migrant entrepreneurs, where one group of firms may be very similar in terms of performance and share similar characteristics, while others are as different as the sample gets. An interesting question to ask now is whether there is any systematic pattern across the configuration of migrant firms within the statistical map displayed in Figure 4.

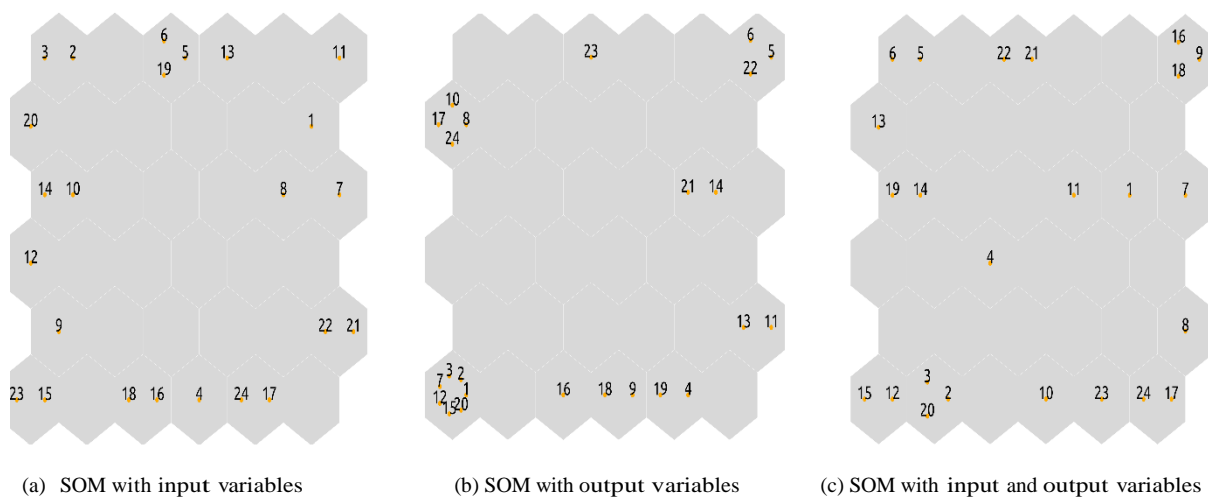


Figure 4. Firm distribution across statistical space

Figure 4 represents a topological virtual map obtained from a SOM network trained by using all three different partitions of the dataset explained in Section 3. Comparing the general layouts of the observed migrants businesses in each SOM reveals some interesting aspects. Figure 4 displays the position of the firms based on statistical associations, where one

group of firms are very similar in terms of performance, while others are as different as the sample gets. Figure 4 (b) and (c) SOM results based on the output variables show 2 clear large clusters of migrant firms and high global score degree of clustering, suggesting that there are groups of the observed migrant firms. Where Figure 4 (a) shows that the distribution of migrant firms across the input and the global score SOMs is better spread across the networks suggesting larger degree of diversity between the observations and more particular and unique combinations of characteristics. Thus, distance in Figure 4(a) implies dissimilarity: the more distant two observation points are, the more different characteristics they have, and vice versa. Some of observations such as firms 5 and 6 are very similar in all the SOM outputs since they are located very close to each other, while others firms such as firms 14 and 19 show similar characteristics based on one SOM, the global score, while somehow different if the input or the output variables are considered separately.

14.6 Highlights on the location and score patterns of migrant firms

In our search for dispersion or location patterns of migrant firms, first we also use a geographically-oriented variable ‘*their geographical location in the Netherlands*’ of the firms concerned in order to analyse how this variable relate to their performance (in the spirit of the SOM approach presented in Section 6.1). Second, we also use now the variable we map onto the SOM is a quantitative index of performance derived from (a new variant of) Data Envelopment Analysis (DEA), the Super-DEA. Its main idea is to find a numerical expression (based on a performance score ranging from 0 to 1, with 1 being the highest score or the highest efficiency level (see also Suzuki et al. 2010, 2011)).

We are trying to answer the question whether these firms geographically located in the same Dutch city are mapped onto the same topological area of the SOM and thus have a similar performance. The maps in Figure 5 (a, c, e) display the distribution of the different four large Dutch cities³³ across the firm’ performance space of the SOM where each category is assigned a colour and firms are coloured based on the category to which they belong in the variable of analysis. Where Figure 5 (b, d, f) divides the firms into those with an efficiency score of 1 (dark blue) and those below that level (white).

³³ Note: Colours in Figure 5 are associated with the following four large Dutch cities, in order of appearance in the legend: Amsterdam, The Hague, Rotterdam and Utrecht.

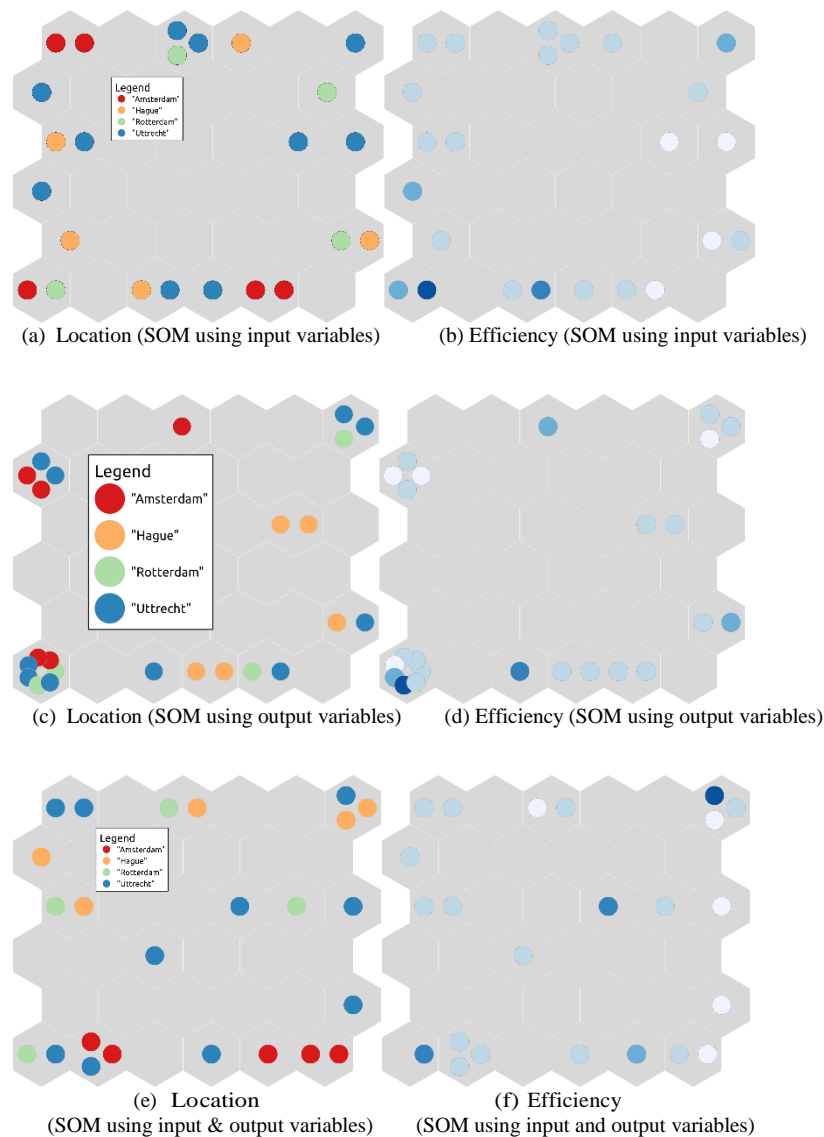


Figure 5. Distribution of super-efficient DEA scores and spatial variables across a performance-based SOM

In both cases, Figure 5 shows not clear patterns in neither the geographical location nor the efficiency scores. They both do not seem to display a high correlation with the inputs or the outputs to a great extent. This is particularly true in the case of location. Despite a lack of general patterns, a few observed firms located in cities can be found under same specific regions of the SOM. An example in Figure 5 (a, c, e) are Amsterdam in the global score (located along the bottom part) and the output SOMs (along the left hand side) and The Hague (upper and bottom-right parts, respectively). However, Utrecht does not display a clear pattern at all

probably due to the fact that the number of observations in this city is the largest, which makes it harder from a cognitive perspective to visually detect patterns, even if they were to exist.

Figure 5 (b, d, f) presents the map based on super-efficient DEA in which the index divides the firms into those with highest scores (dark blue), middle high scores (light blue) and those below that level (white). In the case of the super-efficient DEA, a few patterns can be distinguished in Figure 5 (b, f). In Figure 5 (b) the highest scores (dark blue) are either in the upper-right or bottom-left corners, middle high scores (light blue) are on the upper-left while the lowest scores (white) can be found on the bottom-right region of the SOM. This pattern is also visually detected in Figure 5 (f) where the highest scores are also found along the diagonal from the bottom-left to the top-right. The lowest scores can be found along the right edge while the middle scores are more spread. In the case of Figure 5 (d) almost no pattern can be detected.

This implies that the right edge and bottom-right regions of the map may be identified with low performance scores, while the upper-right or bottom-left regions display higher ones and, in this sense, are the winner areas of the SOM.

14.6.1 A Further Analysis of the location patterns of migrant firms

In order to better understand what these location patterns may mean, we need to know what being located. We use an additional tool for that purpose: the component planes. The component planes are a representation of the distribution of the values of one of the dimensions used to run the SOM algorithm in different parts of the SOM implies.

The component planes in Figure 6 show the distribution over the SOM of each of the variables used to train the network in different parts of the SOM implies. The planes are also very useful when compared to the location of the firms as well as with efficiency scores, and to characterize different regions of the SOM and link this information to the observations mapped into those areas.

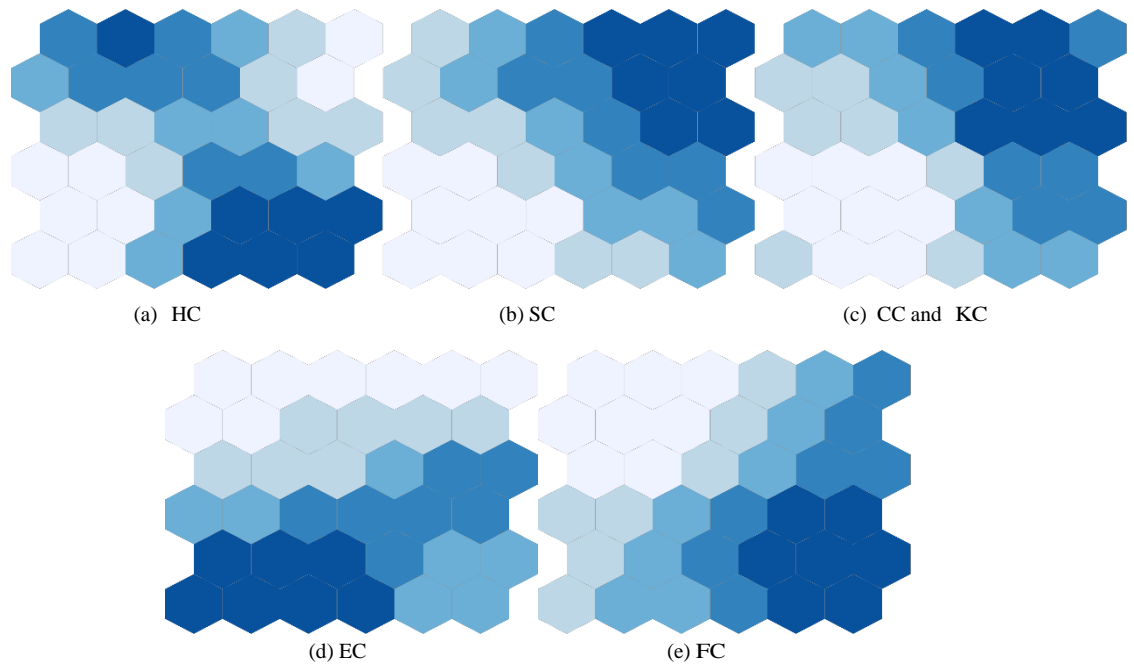


Figure 6 (a-e). SOM using input variables

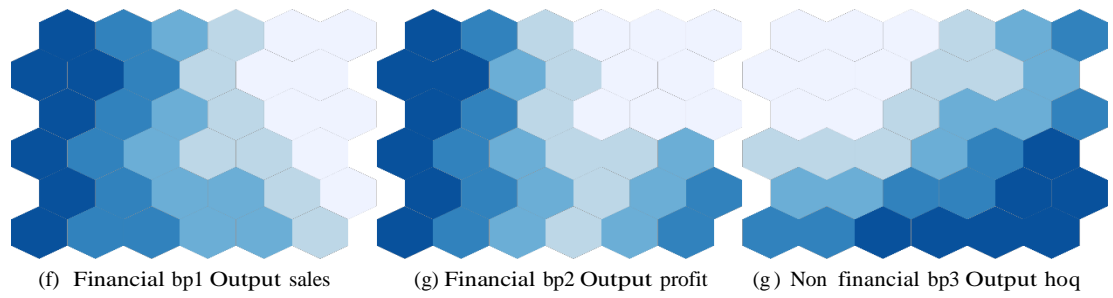


Figure 6 (f-g). SOM using output variables

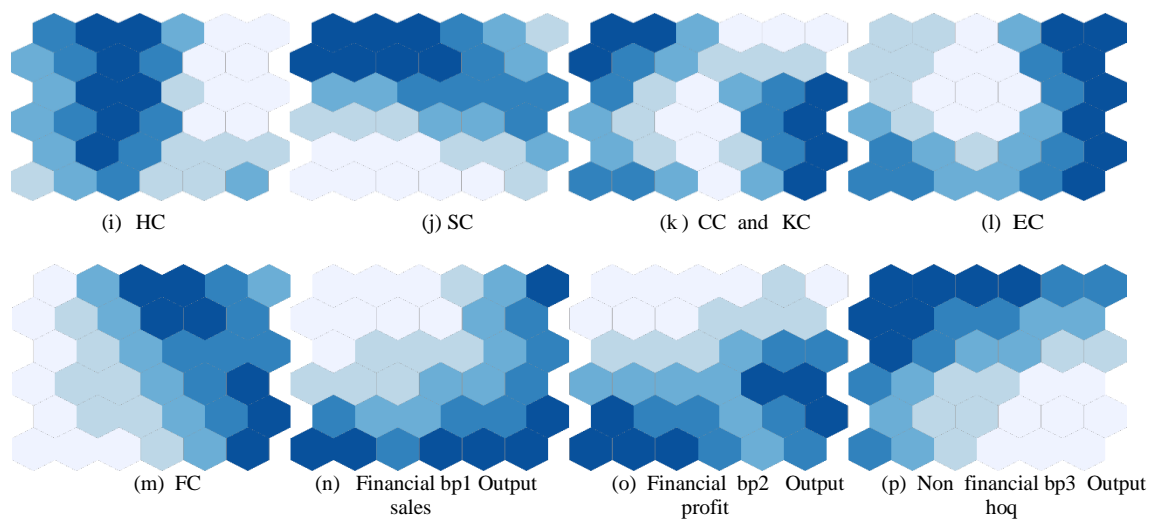


Figure 6 (i-p). SOM using input and output variables

Figure 6 displays, as a complement to Figure 5 (b, d, f), now the component planes for each of the performance specific variables in which the values are displayed on a gradient from white (lowest levels of that factor of performance) to dark blue which always implying a better performance (highest). For instance, plane 4 in Figure 6 (d), where SOM using input variables, displays the distribution of values of the variable *'Entrepreneurship Capital (EC)*. It is easy to see that the upper-right corner firms 23, 15, 18 and 16, as we can see in figure 4 (a), have very high scores on *'EC'*, but poor on *'Creative Capital & Knowledge Capital (CC&KC)'*; or how the upper-left firms (3, 2, 20, 6, 19, 5, 13, 11) performs poorly on this variable.

14.7 Retrospect and Prospect

In the age of globalisation international mobility, closely related to migration, is a 'normal' socio-economic phenomenon. Where there is clearly no forced migration (e.g., refugees), migration has a clear socio-economic background in terms of income, wage, and job motives. Therefore, it cannot be ignored that the rising importance of migration worldwide is becoming an important part of our modern economic research. It is clearly a major development in our society, with many positive but also negative consequences involved.

Migration, with the exception of forced migration, has a clear social-economic background. Better opportunities and network externalities are offered by large cities. Therefore it comes as no surprise that large cities in the Netherlands have a relative high share of migrants. Those cities are increasingly experiencing the same phenomenon as that in North America: namely, a 'melting pot' of cultures and people. Cultural diversity represents a new challenge and provides opportunities for cities in host countries, and international studies of various cities show that cultural diversity leads to favourable socio-economic conditions where there are complementary labour opportunities or niche-markets. To manage cultural diversity with the focus on the optimisation of constellation of socio-economic characteristics of cities requires the utmost in managerial courage and ability.

The research described in this article has focused on answering the question whether enterprises with a given cultural or geographic origin have clear interesting and novel patterns across migrant firms in terms of their performance in distinct Dutch regions, as well as on the drivers that determine such outcomes. To answer to this question we developed a conceptual

and operational business performance model which comprises both individual-specific determinants (e.g. skills, age) and general moderator variables (e.g. geographic location).

Nowadays, the younger generation of Moroccan entrepreneurs is very well educated, and integrated in the Dutch community; and through their human capital and motivation and driving forces they have the ability to be involved in all areas of business activities; they are more open and look for new opportunities outside the outside the traditional sectors and geographical areas – an external market orientation beyond their own ethnic group, which might offer better opportunities to serve target groups outside the original niche. They are attracted to new sectors, such as ICT, marketing, accountancy, global trade, real estate, consultancy, and leisure and recreation management agencies. Thus, they want to expand into high-volume trade by engaging in trade with native entrepreneurs and other ethnic groups.

Next, a multidimensional visualization and Super-DEA show the relative differences in the performance of migrant entrepreneurs. The observations are operating in the same location, but more interesting is to uncover the main performance characteristics that define the areas where each of these firms are located. They share high values on the particular variable so in that regard they are similar. However, they may differ by not sharing the same value on other variables. These results offer a meaningful contribution to decision support and planning for the efficiency improvement of strategic firm. Clearly, firm have the possibility to increase their potential. This improvement potential differs for each firm, but our results offer operational guidelines on a case-by-case firm basis.

However, the general conclusion would be that their capacities and resources are importance and not their ethnicity that influence business performance and success.

Acknowledgement

This study is part of a sequence of publications on migrant entrepreneurship; see e.g., Kourtit, K., and Nijkamp, P. (2012). Strangers on the Move: Ethnic Entrepreneurs as Urban Change Actors. *European Review*, 20 (3), 376- 402.

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15.3 The ‘Urban Century’: A Rejoinder

This study has focused the attention on an intriguing new phenomenon in the geography of our planet, called the ‘New Urban World’. In Chapters 3–14, a series of applied modelling studies on the ‘New Urban World’ has been presented. The concept of an ‘urban piazza’ acted as an integrating framework for the various analyses undertaken. In this final chapter, I will offer a synthesis, both in general terms and thematically, through a scoping of the findings of each individual chapter. The general aim of our study has been defined in Chapter 1 as:

Identification of the critical success factors for the competitive performance of urban actors and/or cities in the ‘New Urban World’, through the application of quantitative evaluation tools.

This study is based on the premise of structural world-wide urbanization, denoted as the ‘New Urban World’. As argued extensively in Nijkamp and Kourtit (2012,2013) and Kourtit and Nijkamp (2013), our present world moves increasingly towards an urban world. This ‘New Urban World’ has to accommodate in the coming years and decades some 7 to 9 billion people, which creates formidable challenges for urban policy and research. This fast changing geographic, economic, social and environmental reality will prompt great opportunities for effective and future-oriented urban strategies, but will at the same time confront our world with a great variety of negative externalities in urban areas, such as human health effects, congestion, environmental decay, safety and social stress. The overriding goal of attractiveness, sustainability and prosperity of urban areas is of course praiseworthy, but not automatically in reach for each city. This is further complicated by the fact that cities are no longer ‘islands of splendid isolation’, but tend to be both hubs and spokes in a complex local-to-global network constellation, so that modern urban policy also needs a concerted action among cities at different geographical scale levels. Urban policy tends to become a complex

³⁴ Source: This chapter was inspired by several studies that have been produced in the context of the Joint Programming Initiative ‘Urban Europe’ (see in particular Nijkamp and Kourtit 2011, 2012, 2013; Kourtit and Nijkamp 2013) and other related documents produced in this context (see in particular Kourtit et al. 2013a,b,c,d; Kourtit 2014; Kourtit and Nijkamp 2014; Kourtit et al. 2014).

undertaking with many actors and uncontrolled mechanisms. There is consequently a clear need for forward- and long-term oriented research on the future of our cities, which have to be 'smart' entities in an open global system. (see also Caragliu et al. 2011; Nijkamp and Kourtit 2011,2012,2013; Kourtit and Nijkamp 2014).

Our planet shows indeed the signs of an urban landscape dominated by cities and agglomerations. Our world moves increasingly towards an urban world, with an increasing share of people residing in urban agglomerations. This urban orientation is a rather recent phenomenon in the history of human geography and demography, and started only a few centuries ago. From an urban population share in the world of some 10 to 15% in the Napoleonic times, the urbanisation rate has shown a structural rise, exceeding now more than 50%. This unprecedented urbanisation increase is caused by the economic, social, technological and resource advantages and opportunities created by modern cities. Over the years, cities tend to become sustainable wealth creators and are increasingly acting as engines of sustainable prosperity, not only for the city itself, but also – through its centripetal and centrifugal forces – for the broader spatial environment (including the hinterland and other connected cities) (see Nijkamp 2008; Nijkamp and Kourtit 2013; Kourtit and Nijkamp 2013). The multi-faceted benefits of urban agglomerations are partly economic in nature, but partly also social, cultural and technological. Cities appear to include creative, innovative and entrepreneurial talent which lays the foundation for wealth-creating activities of all urban actors involved. Consequently, such cities are a *sine qua non* for a healthy, wealthy and sustainable future of our planet (see also Angotti, 1996; McNeill, 1999; Nijkamp 2008). Clearly, it should be added that – in addition to wealth creation – also wealth distribution is a major issue in modern metropolitan areas. The development of slum areas in large urban agglomerations is a sign that socio-economic disparities may lead to an erosion of urban sustainability (Fusco et al. 2013; Nijkamp et al. 2013).

What is the socio-economic explanation for the miracle of persistent urbanization in the 'New Urban World'? In general, cities are able to produce positive externalities in the form of proximity advantages (various production and consumption agglomeration benefits that accrue from economies of scale, density, localization and urbanization). Consequently, cities are able to generate productivity rises, entrepreneurial 'animal spirits', creativity and innovations, and knowledge benefits. Clearly, cities may exhibit different rising and declining fortunes over time, but the overall urban trend is one of structural growth. It should be added that the

evolutionary dynamics of urban systems in our world cannot be separated from demographic trends, in particular ageing and migration. Finally, urban areas are often central hubs of new knowledge and innovation. But the exploitation of this strategic position of cities presupposes functional specialization, with a clear diversification over regional, national and global scales. A further understanding of this phenomenon calls for due insight into the mechanism of urban land use, labour markets, housing markets, knowledge centres and urban entrepreneurship. In this context, the role of both large and small firms is of the utmost importance, as these firms are central in (international) trade in goods and services. They position the city through their gateway function in the centre of networks and (global) competition (Kourtit et al. 2013e).

This synthesis chapter is organized as follows. First, in Section 15.2, we will provide a concise overview of the main findings regarding the ‘*urban piazza*’ architecture, with particular emphasis on messages, methodologies, general observations and empirical findings. This will mainly be presented in a tabular form; a series of more general observations, messages and ideas will be presented concerning the ‘*New Urban World*’. Section 15.3 will offer a synthesis of specific results from the ‘*urban piazza*’ framework and further supported by visualization tools based on a ‘*content cloud*’ analysis of key concepts of our research. Finally, Section 15.4 will offer a more strategic and integrated perspective on the future of the ‘*New Urban World*’, and concludes with some general policy lessons.

15.4 Overview of the ‘*Urban Piazza*’ Results

Our study is based on methodological heterogeneity: different statistical methods are used for different empirical research issues on a fit-for-purpose basis. The various findings can be integrated in a comprehensive survey table. Table 1 provides in ‘staccato’ form a systematic tabular presentation of the messages, research methods, general observations and empirical findings in the individual Chapters 3–14. This comprehensive and succinct overview of the results of our research reflects a diversity of messages, methods, observations and empirical findings. Despite their pluriformity, they all confirm the proposition that cities are economic agents whose performance is enhanced by the presence of various types of urban externalities. This table offers the ingredients for answering the question of whether the research aim formulated in Chapter 1 has been achieved. We note that Table 1 uses the ‘*urban piazza*’

architecture, which thus acts as the main navigation tool for assessing urban performance criteria under varying conditions, ranging from the macro-level (urban agglomerations) to the micro-level (entrepreneurs). These criteria are captured under the heading of the XXP framework (see Nijkamp 2008).

Table 1. Overview of messages, research methods, general observations and empirical findings from the study

PART	CHAPTER	MESSAGES	DATA METHODS	GENERAL OBSERVATIONS	EMPIRICAL FINDINGS
A	3	<ul style="list-style-type: none"> In the historical evolution of cities, large-scale urbanization is not only a fact, but a necessary outcome of the forces of globalization and competition 	<ul style="list-style-type: none"> Literature overview of urbanization trends in general Analysis of the rise of megacities from a broad urban-economic perspective, in which also analytical instruments for studying urban dynamics are employed <p>Tools:</p> <ul style="list-style-type: none"> Literature review 	<ul style="list-style-type: none"> Great pluriformity in contemporary urban forms and developments 'Urban way of life' will most likely be the dominant lifestyle in this century A megacity is a species sui generis, with distinct features, a distinct cultural historical legacy, and place-specific opportunities and bottlenecks 	<ul style="list-style-type: none"> Global urbanization is on a rising edge, not only for individual cities but also for global urban networks Agglomeration advantages – of all kind – are the essential and persistent driving force of the growth towards ever growing urban agglomerations Globalization trends will induce unprecedented urban dynamics, which is intensified by global migration processes and the battle for talents Achievement of sustainable urban development will be one of the greatest global challenges in the decades to come, in both the developed and the developing world Rise of global megacities calls for effective policy guidelines Agglomeration policy is tailor-made, and relies on common resources offered by smart citizens, urban social capital, managerial talents, scientific skills and creative enthusiasm, and ambition of all stakeholders involved
	4	<ul style="list-style-type: none"> Urban efficiency improvement is important for urban policy strategy 	<ul style="list-style-type: none"> Data analysis of achievement criteria for major global cities GPCI data set on urban performance analysis <p>Tools:</p> <ul style="list-style-type: none"> Data envelopment analysis (DEA) Super-efficiency model (Super-DEA) 	<ul style="list-style-type: none"> Differences between standard ranking and benchmarking procedures Scope for efficiency improvement of strategic urban policy 	<ul style="list-style-type: none"> Significant support for decision making and planning for efficiency improvement Intensity and effective direction of policy efforts needed to upgrade the efficiency profile of global cities
	5	<ul style="list-style-type: none"> Cities will become more appealing to various stakeholders, while maintaining at the same time their competitive advantage 	<ul style="list-style-type: none"> Multi-level models for competitive urban performance analysis GPCI data set on urban performance analysis <p>Tools:</p> <ul style="list-style-type: none"> Regression analysis Fixed-effect Multi-Level model (MLM) R software 	<ul style="list-style-type: none"> Combined effect of the perception of stakeholders and the strength of the performance profile of the cities concerned offer important handles for focused urban policies 	<ul style="list-style-type: none"> Low variance in city scores can be explained by the properties of the city itself Significant relationship between time trajectory and the total city performance score
B	6	<ul style="list-style-type: none"> Firms' performance depends on spatial-economic context Type and quality of capital resources affect firms' competitiveness in both local and international markets 	<ul style="list-style-type: none"> Micro-database on high-tech firms Multilevel database on various forms of capital resources Literature review Self-constructed interview questionnaire Extensive interviews <p>Tools:</p> <ul style="list-style-type: none"> PCA Regression analysis SPM Geosience-based tools 	<ul style="list-style-type: none"> Need for evidence-based analysis of various spatial capital assets 	<ul style="list-style-type: none"> Broadly composed capital resources contribute to business performance Significant differences in relevant impacts of multilevel spatial capital resources on Dutch high-tech firms' performance
	7	<ul style="list-style-type: none"> SPM is beneficial to the firm 	<ul style="list-style-type: none"> Explore the understanding of and knowledge about SPM and experiences in practice by Dutch high technology business firms Micro-database on high-tech and innovative firms Literature review Self-constructed interview questionnaire Extensive interviews 	<ul style="list-style-type: none"> Firms have incorporated a number of unique financial as well as non-financial performance measures to enforce their quality and service initiatives SPM yields specific benefits for an organization 	<ul style="list-style-type: none"> Significant improvements and correlations after using SPM within firms Advantages were experienced to a much greater degree than the disadvantages Specific reasons for SPM-implementation are related to specific advantages

			<p>Tools:</p> <ul style="list-style-type: none"> • PCA • Regression analysis • SPM 		
	8	<ul style="list-style-type: none"> • SPM system will yield full benefits to the organization when it has been completely implemented 	<ul style="list-style-type: none"> • Provide an overview of the main advantages and disadvantages to be expected at various stages of SPM implementation completeness • Micro-database on high-tech and innovative firms • Extensive interviews • Self-constructed interview questionnaire <p>Tools:</p> <ul style="list-style-type: none"> • SPM • Self-constructed interview questionnaire • Literature review 	<ul style="list-style-type: none"> • Advantages, disadvantages and level of SPM system implementation completeness are related 	<ul style="list-style-type: none"> • Firms that have fully completed the SPM implementation gain more financial and non-financial advantages and experience less disadvantages than firms that are still in the process of implementing such a system • Firms that have almost completed the implementation of the SPM system already gain qualitative advantages from this system, but they experience fewer financial advantages
C	9	<ul style="list-style-type: none"> • Cities are not only engines of economic progress, but are also places where cultural heritage is prominent • Interactive policy support tools are fit for purpose, and are instrumental in designing sustainable urban port areas • Port cities house a wealth of cultural-historical remains from the past 	<ul style="list-style-type: none"> • Multilayer stakeholder-based model—with interactive visual support tools—in a backcasting and forecasting exercise • Micro-database on firms in the cultural and creative sector • Self-constructed interview questionnaire • Extensive interviews <p>Tools:</p> <ul style="list-style-type: none"> • Literature review • SWOT analysis • SCM analysis • Urban Facebook for ‘<i>Urban Facelifts</i>’ • Geo-science visual assessment tools 	<ul style="list-style-type: none"> • Urban Facebook framework helps identify successful strategic policies, and to bring together different expertise • Design of a direct action platform that offers benefits to various people who work and live together, supported by high-quality visual assessment tools for redevelopment initiatives • Facelift maps help to attract and retain creative, high-skilled people, creative firms, etc. to formerly neglected areas in order to achieve sustainable development 	<ul style="list-style-type: none"> • Conflicts between the interests and values of a multiplicity of stakeholders • Consideration of stakeholders’ preferences, values, and points of view helps attract and keep creative minds living and working to develop flourishing local districts • Diversity helps create complex and attractive future images of areas
	10	<ul style="list-style-type: none"> • Development of city systems takes place between rapid dynamics and conservation of heritage • Most cities offer a wealth of historical and cultural memories from the past 	<ul style="list-style-type: none"> • Demonstrate visualisation methods – in combination with modern plan evaluation approaches – that may offer a novel contribution to contemporary urban planning • Micro-database on firms in the cultural and creative sector • Self-constructed interview questionnaire • Literature review • Extensive interviews <p>Tools:</p> <ul style="list-style-type: none"> • Multi-stakeholder multi-criteria analysis (MAMCA) • Multiple criteria analysis (MCA) • Geo-imaging methods for ‘<i>Urban Faces</i>’ 	<ul style="list-style-type: none"> • Urban growth, historic-cultural heritage and creative activities appear to be closely intertwined phenomena 	<ul style="list-style-type: none"> • Combinations of ‘<i>urban images</i>’ (scenario’s) and ‘<i>urban faces</i>’ plays a crucial role to identify most preferred alternatives for stakeholders • Creation of new opportunities for visitors and business firms
	11	<ul style="list-style-type: none"> • Creative cities have become in recent years new policy concepts for exploiting the development potential of urban agglomerations 	<ul style="list-style-type: none"> • Evaluate ‘<i>urban buzz</i>’ districts as part of a forward empirical urban rehabilitation strategy • Micro-database on firms in the cultural and creative sector • Self-constructed interview questionnaire • Literature review • Extensive interviews 	<ul style="list-style-type: none"> • A smart city is not a uniform efficient urban space, but offers a variety of creative urban buzz areas • Uncertain futures prompt the need for applying solid analytical tools 	<ul style="list-style-type: none"> • Notion of ‘<i>Urban Images</i>’ has proven to be a fruitful vehicle for mapping out uncertain urban futures • Operational policy plans can be designed through the use of interactive social media experiments, leading to an open set of choice possibilities; coined ‘<i>Urban Faces</i>’ • Use of interactive MCA methods appeared to offer a novel framework for identifying a robust development alternative for the case study concerned

			<p>Tools:</p> <ul style="list-style-type: none"> • Decomposition MCA-evaluation method • Interactive stakeholder-oriented forward-fitting assessment • Multi-actor MCA analysis • Geo-imaging methods for 'Urban Faces' 		
D	12	<ul style="list-style-type: none"> • Creative migrant entrepreneurship is emerging as one of the most challenging and rapidly growing sectors amongst ethnic minorities and migrants 	<ul style="list-style-type: none"> • Identify empirically critical success and failure factors for the new generation of ethnic (or migrant) entrepreneurs in high-tech and creative industries in Dutch cities • Micro-database on second-generation migrant entrepreneurs • Self-constructed interview questionnaire • Literature review • Extensive interviews <p>Tools:</p> <ul style="list-style-type: none"> • PCA • Regression analysis 	<ul style="list-style-type: none"> • New type of entrepreneurship contributes to cultural integration and to a great diversity in entrepreneurship in modern cities • Ethnic entrepreneurs form a rather heterogeneous class • Urban (ethnic) entrepreneurship and diversity policies are becoming focused and tailor-made activities, in which minority groups and firms may play a critical role 	<ul style="list-style-type: none"> • Younger generation of 'new entrepreneurs' are more open and are looking for new opportunities beyond the traditional markets (economic expansion) • Ethnic entrepreneurship has a variable trajectory with many opportunities, but also with many hurdles and failures • New generation of Moroccan entrepreneurs is educated and better integrated in the Dutch community
	13	<ul style="list-style-type: none"> • Migrants' capacities and resources matter – and most likely their ethnicity less so – in achieving business performance and success 	<ul style="list-style-type: none"> • Ollection of new insights into the differences in business performance among various classes of migrant entrepreneurs • Micro-database on second-generation migrant entrepreneurs • Self-constructed interview questionnaire • Literature review • Extensive interviews <p>Tools:</p> <ul style="list-style-type: none"> • Data envelopment analysis (DEA) • Super-efficiency model (Super-DEA) • Distance friction minimization (DFM) model • SE-DFM model • PCA 	<ul style="list-style-type: none"> • Migrants may create new and untapped opportunities for the local economy • Urban agglomerations offer powerful seedbeds for economic emancipation of migrant entrepreneurs • New self-employment modes, the birth of SMEs and the internationalization of the city may induce new (urban) economic vitality • Cultural diversity is nowadays often seen as a positive developmental factor, and its social, cultural and economic benefits are broadly recognized 	<ul style="list-style-type: none"> • Several migrant groups appear to become a highly creative and qualified entrepreneurial class in urban business life • Heterogeneity among migrants promotes great cultural diversity, mainly in large cities and urban agglomerations
	14	<ul style="list-style-type: none"> • Migrants' capacities and resources are more important, and less their ethnicity, for business performance and success 	<ul style="list-style-type: none"> • Identify and examine empirically the critical success factors of migrant businesses and their socio-economic implications • Micro-database on second-generation migrant entrepreneurs • Self-constructed interview questionnaire • Literature review • Extensive interviews <p>Tools:</p> <ul style="list-style-type: none"> • DEA • Super-DEA • Self-Organizing Maps (SOMs) • CNA • PCA 	<ul style="list-style-type: none"> • Cities are increasingly experiencing, a 'melting pot' of cultures and people • Cultural diversity represents a new challenge and provides opportunities for cities in host countries • Cultural diversity leads to favourable socio-economic conditions with complementary labour opportunities or niche-markets 	<ul style="list-style-type: none"> • Much diversity in the geographical location and efficiency performance scores of migrant businesses • Younger generation of Moroccan entrepreneurs are attracted to new sectors or markets segments

The methodological heterogeneity adopted in our study implies that different methods are used in different cases. The frequency of the use of various research tools in Chapters 3–14 is presented in Table 2. It turns out that SPM, DEA, PCA and multiple regression play a dominant role in this context. These statistical instruments – and their combinations – are crucial in identifying, measuring, explaining and comparing (input and output) performance indicators illustrating the actors’ economic achievement. Assessment is obviously not a single instrumental methodology, but requires tools that are tailor-made for individual cases.

Table 2. Integrated methodological overview of the research

PART	CHAPTER	The ‘New Urban World’ CHAPTERS 1–15	Methodologies and Tools											
			Exploratory Data Analysis			Explanatory Causal Analysis			Strategic Policy Support Analysis					
			DEA	SOM	PCA	LITERATURE REVIEW	REGRESSION	MLM	CNA	MCA/MAMCA	SWOT	SCM	SPM	
	1	<i>The ‘New Urban World’ – Aims and Scope</i>												
	2	<i>The ‘Urban Piazza’ Model as an Integrated Analysis Framework</i>												
A	3	<i>In Praise of Megacities in a Global World</i>				X								
	4	<i>Exceptional Places: The Rat Race Between World Cities</i>	X		X			X						
	5	<i>Multi-Actor Analysis of Metropolitan Performance Indicators</i>			X		X	X	X					
B	6	<i>Impacts of Multi-Level Spatial Capital Resources on Business Performance</i>			X	X	X	X	X					X
	7	<i>Creativity and Diversity: Strategic Performance Management of High-Tech SMEs in Dutch Urban Areas</i>			X	X	X		X					X
	8	<i>The Relationship between the Level Completeness of a Strategic Performance Management System and Perceived Advantages and Disadvantages.</i>				X								X
C	9	<i>The Use of Visual Decision Support Tools in an Interactive Stakeholder Analysis – Old Ports as New Magnets for Creative Urban Development</i>			X	X						X	X	
	10	<i>Planning for Urban Historical-Cultural Heritage: A Geo-Imaging Multicriteria Approach</i>			X	X		X		X				
	11	<i>Creative Buzz Districts in Smart Cities: Urban Retro-Fitting and Urban Forward-Fitting Plans</i>			X	X		X		X				
D	12	<i>Strangers on the Move: Ethnic Entrepreneurs as Urban Change Actors</i>			X	X	X		X					X
	13	<i>New Urban Economic Agents: A Comparative Analysis of High Performance New Entrepreneurs</i>	X		X	X	X		X					X
	14	<i>The Creative Urban Diaspora Economy: A Disparity Analysis among Migrant Entrepreneurs</i>		X	X	X	X		X					X
	15	<i>The ‘New Urban World’: Retrospect and Prospect</i>												

Table 2 displays a scattered pattern of frequencies of various statistical and econometric tools employed in our study. These results confirm once more the methodological heterogeneity principle in this study.

Our research lessons can be made more specific by linking them to the individual chapters. This will be undertaken in Section 15.3, but in the light of the information contained in Table 1, we may already present our view on the future of the ‘New Urban World’. The ‘New Urban World’ is clearly a dynamic phenomenon that will never be finished, but will always be in motion. The city is essentially a project that is never complete: it is a living

organism – some sort of ‘living lab’ – that is driven by ‘challenge and response’ mechanisms (see Toynbee 1946). This will be further considered in the next section (Section 15.3).

15.5 Synthesis of Specific Results from the ‘*Urban Piazza*’ Framework

Our assessment study of the performance of urban actors and cities is characterized by a quantitative methodology. The framework of our research on the ‘*New Urban World*’ is formed by the ‘*urban piazza*’ architecture. Our piazza is decomposed into four segments, four pillars and two layers of stakeholders (cities and actors), which form the major foci of our research. We will now concisely summarize the findings from these four parts (A–D) of our study. The integrated, substantive conclusions from part A-D will be further backed up by the usage of a visual content analysis of the key conceptualizations in all foci of our research (Chapters 3 – 14). To that goal, we adopt a ‘*content cloud*’ analysis. A ‘content cloud’ offers a hierarchically decomposed and visualized presentation – often in a multi-colour format – of the most relevant terms used in a scientific text, based on the frequency of their use. It is not a research tool in itself, but merely a visualization method of qualitative contents (see also Kourtit 2014).

Part A: Dynamic Cities

Part A zooms in on the emerging mega-trends that prompt new challenges for urban research and urban policy. It serves to map out the complex force field of urban dynamics; to identify the main drivers of urban evolution; and to explore promising land-use management, in relation to infrastructural, cultural, economic and knowledge-based policy initiatives, that may enhance the sustainable growth potential of modern (mega-) cities. After a framing of the research and a literature review, various data were put together, in order to offer an international multi-dimensional benchmark framework for empirical assessment of the multi-dimensional performance of large cities in our world, on the basis of the ‘*New Urban World*’ paradigm of our study. We will now present the results from the ‘content cloud’ analysis applied to Part A (see Figure 1).



Figure 1. A ‘content cloud’ of the key concepts in Part A (Chapters 3-5)

The ‘content cloud’ related to Chapters 3-5 in Part A, presented in Figure 1, shows that the key concepts are centred around the dynamic socio-economic performance and efficiency improvement patterns of urban areas and cities, for example, large-scale urbanization, globalization and population, efficiency and growth development. These findings are confirmed by the information contained in Table 1.

Part B: Innovative Sectors

Part B, on business environments in a competitive and open economy, covers a rich variety of issues, on a quantitative basis, of the creative sector. This part offers a framework for assessing significant differences in business performance of firms in the Netherlands. The conceptualisation has focused here in particular on the main advantages and disadvantages to be expected at various stages of SPM implementation completeness of Dutch firms, and the relation between the level of completeness of the SPM implementation and the benefits organizations experience. We will now again identify the core elements of Part B by means of a ‘content cloud’ analysis (see Figure 2).

15.6 Conclusion and Lessons ³⁵

The long history of our world has mainly been characterised by low spatial population densities, with only a few scattered human settlement concentrations. Most people were living in agricultural or rural areas. Clearly, there were cities, even in the ancient world, but in most cases they had a modest size. The limit to city size was the result of logistic constraints, such as handling waste or waste water, lack of energy resources, insufficient supply of foodstuff and of perishable goods such as fresh fruits, meat and vegetables, and slow modes of transportation.

The real breakthrough towards large urban concentrations took place in the period of the Industrial Revolution, when (internal) scale advantages from industrial production were combined with (external) localisation and urbanisation economies. This heralded a new epoch of mass concentration of human and industrial activity, and ever since the urbanisation rates of countries and of the globe as a whole has been on a rising edge. Whereas an urbanisation rate of 10 to 15% in most countries was quite normal a few centuries ago, nowadays the global urbanisation rate has exceeded 50%, with urbanisation rates ranging to 70 or even 80% in many OECD countries. This phenomenon is often called the ‘*urban century*’ (see also UN, 2011). Clearly, there are also people moving to the urban fringe, or to rural areas (e.g., ‘pensionados’), but this countermovement is rather selective and also modest in size, compared to the dominant movement towards the city.

This drastic transition in the settlement pattern of our world – for both people and production – presents many intriguing challenges, for instance, the supply of the necessary infrastructure, the provision of adequate housing, the protection of cultural and historical heritage, the need for sustainable modes of living, or the maintenance of social cohesion and social capital (see e.g., Tanguay et al., 2010). The ‘face’ of cities exhibits nowadays fast changes, as growing cities – and in particular mega-cities with their millions of inhabitants – have to be re-modelled so as to keep the need for progress in balance with the need for sustainable development. Clearly, urban environments have to be designed in such a way that they offer a suitable habitat for human activity. There is indeed a need for resilient behaviour of modern cities, by combining vitality and flexibility with harmony and balanced evolution. An extensive treatment of these issues can be found in Tellier (2009).

³⁵ Source: This chapter was inspired by the studies that have been produced in the context of the Joint Programming Initiative ‘*Urban Europe*’ (see in particular Nijkamp and Kourtit 2011, 2012, 2013; Kourtit et al. 2014; Kourtit 2014).

It is noteworthy that the magnet role of cities is determined by scale, localisation and urbanisation economies emerging from the size of these settlements. But it is not only the sheer size which matters, but also the efficiency (or productivity) generated by its multiplicity of functions. Thus, urban externalities emerge from both scale and specialisation. The functional specialisation is also important for rural areas, as they are able to provide complementary services with respect to cities. But the main competitive advantage of cities (or urban agglomerations) is that they are able to benefit from dense interactions. In the same vein, a repositioning of the urban-rural divide is needed. We do not only observe rural to urban movements, but also rural-rural and urban-urban movements, although the traditional rural-urban divide is increasingly disappearing.

It should be added that by no means cities offer always an attractive habitat. There are many cities with a dilapidated infrastructure, with inferior dwellings, and outdated facilities. But, in general, the positive attraction forces seem to compensate for the existence of weak city structures.

The previous observations call for new modes of urban planning and policy. The urban environment is a complex ecosystem which may be hard to manage in a top-down fashion. Consequently, novel and innovative modes of planning – such as interactive and participatory modes – may be needed, in combination with coordination and collaboration, through multi-layer stakeholder involvement. The current urban dynamics needs a systemic approach to urban planning, urban management and governance, in which economic, social and environmental aspects are incorporated. It goes without saying that appropriate data bases and information systems are key to effective (future- oriented) urban planning.

The transformation of our world into an urbanised settlement pattern induces several great challenges for research and policy. Modern urban agglomerations exhibit an unprecedented spatial accumulation of economic activity, a dense agglomeration of human activity and an intense land use. They also face the social implications of this geographical pattern, such as social deprivation, criminality, low quality of life, segregation and urban sprawl. Especially for European cities – with their wealth of historico-cultural heritage – this presents many sustainability issues which call for a proper and timely response, if they aspire to remain recognised players in an urban world. The appearance of cities in the '*New Urban World*' (Kourtit 2014) may exhibit a great variety; for example, they may range from urban agglomerations as hubs of innovation and testbeds building on a diversity of talents and firms to spatial sustainability poles offering eco-friendly and smart transport and logistics systems,

and low spatial ecological footprints as a result of smart energy supply and use. Urban appearances are never static, but demonstrate a structural permanent transformation of our society, economy, environment and technology. The urban resilience to cope with a multiplicity of challenges, such as social deprivation, urban sprawl, congestion, lack of safety, environmental degradation, and societal participation would ideally have to be optimised so as to serve the well-being of our urban world. The playing ground of cities is clearly diverse, as there are significant inter-urban and intra-urban differences in terms of population density, sustainable modes of living, land use quality, access to public amenities, accessibility, social cohesion, urban sprawl, health and social participation.

Despite ‘splintering urbanism’ (Graham and Marvin, 2001), our planet is moving increasingly from urban islands to an urban archipelago. Not only is the relative position of cities drastically changing (e.g., as a result of the trend towards megacities), but cities – or more generally, urban agglomerations – are becoming mutually connected spatial entities (Allen, 2010; Bowen and Leinbach, 2011; Hanley, 2004; O’Connor, 2010). This tendency towards an increasingly functionally connected urban world was also highlighted by Hall (2002).

In the ‘*New Urban World*’ – with its persistently rising urbanisation rate – urban agglomerations are becoming magnets of economic development and sources of policy action. The emerging urban century displays a great pluriformity in urban appearances and growth profiles, but in all cases this new geographical phenomenon poses challenges to policymakers and research all over the world. These challenges comprise in particular:

1. the transformation of urban agglomerations into open hubs of innovation and creativity;
2. the design of eco-friendly and smart intra- and inter-urban transport and logistics systems;
3. the construction of an urban social fabric geared toward social cohesion and integration;
4. the maintenance of a high quality of life by implementing climate-neutral initiatives (in relation to a reduction of the ecological footprint).

This list of four challenges runs parallel to the UN Habitat Report on ‘*State of the World’s Cities 2012/2013*’, in which five concerns are listed:

1. environmental sustainability
2. equity and social inclusion
3. productivity
4. quality of life

5. infrastructure.

There is indeed a need for reconsidering and managing the fast dynamics in current urban development patterns in order to sustain and enhance the urban development potential, with a view to the creation of resilient, liveable, inclusive and accessible cities, not only for the present generation but also for future generations.

Shaping urban futures based on an integrative perspective is fraught with many problems of a conceptual, behavioural, technological and governance nature. A prominent condition for coping with this task is the design and implementation of feasible and fit-for-purpose information and research tools. Another, equally important prerequisite is the development of a learning policy and cognitive community aiming at combining efficient governance measures, effective planning instruments and comprehensive strategic policy perspectives.

Finally, strategic urban policy in the ' *New Urban World* ' is not uniform, but has to be tailor-made and fit-for-purpose. For example, even though everyone would agree on the need for sustainable urban development and planning, this does not mean that there is an identical panacea for all cities. Social demography, crime, technology, transport and quality of life are place-specific. The same holds for spatial behaviour of people, or environmental and energy planning. Cities offer extremely useful experimental possibilities of governance, but cannot be treated in a one-size-fits all policy model. Urban strategic policy calls for specificity in a world characterized by general urbanisation trends.

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“When a man rides a long time through wild regions he feels the desire for a city”

(Italo Calvino, *Invisible Cities*, Random House
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THE ‘*NEW URBAN WORLD*’

Economic-Geographical Studies on the Performance of Urban Systems

The ‘*New Urban World*’ is a recent phenomenon in the rich history of cities. Nowadays does not only more than 50 per cent of the world population live in cities, but also urbanization is still persistently and rapidly increasing. Urban agglomerations will most likely become the socio-economic powerhouses of the future. The collection of analytical and quantitative studies in this dissertation contributes to a deeper understanding of the forces at work. It does so by designing and employing the metaphor of the ‘*urban piazza*’ as a frame of reference for analyzing the economic-geographical performance of urban systems. Within this analytical framework four domains of urban activity – ranging from global to local – are systematically addressed, viz. dynamic cities, innovative sectors, creative districts and new entrepreneurs. Thereby, this study aims to identify the critical success factors for the competitive performance of urban actors and/or cities in the ‘*New Urban World*’, through the application of quantitative evaluation tools. A wealth of empirical applications – ranging from migration to entrepreneurship and from cultural heritage to global cities – is provided to illustrate the relevance of a solid research methodology for determining the position of modern cities and its actors.