

## Summary

This study develops four scenarios that can be used to think about the future of the Dutch economy in 2040. The study addresses the question of *how we will earn our money in 2040* by looking at people and cities. It is hard to predict how the Dutch economy will evolve in the next five years, or even in the next one or two years—let alone thirty years ahead. Yet, policymakers have to take decisions today that have long-lasting consequences—about infrastructure projects, investments in education and science and welfare state reforms, for example. How should policymakers deal with the uncertainty about the future—as far as 2040—when taking such strategically important decisions?

Decisions have to be made today based on current knowledge, and cannot be made conditional on future events. For policies that can be changed fairly rapidly, it is feasible to take action immediately and adjust the policy when it turns out to be the wrong one or when more knowledge about outcomes becomes available. It becomes quite another matter when policies have a long lead-time and/or when they involve investments with large sunk costs. In such circumstances, policymakers have to trade off the benefits of waiting (with the chance of amassing more knowledge and learning about the direction of future developments) against the costs of delay.

A fruitful approach to help answer our main question is to develop scenarios for the future Dutch economy in 2040. Scenarios provide different pictures against which policymakers are able to consider and reconsider decisions and their long-term implications. Scenarios bundle historical developments, current stylised facts and trends towards the future into consistent stories for the future. They compel assist policymakers in thinking through all possible outcomes of their decisions.

## People and cities

People and cities are at the foundations of the scenarios. The scenarios explore the questions of *who* earns the money and *where* the money is earned in 2040. People are considered in their role as workers, and each scenario has a different perspective as to their knowledge and the way the tasks they perform are divided: thus, what does the future hold for workers in the Netherlands? Cities are viewed in each scenario according to the type of production that occurs in them, and the connections that exist within and between cities: thus, what will the future bring for cities in the Netherlands? But first, why has this study chosen to focus on people and cities?

### People matter ...

Human capital is an essential input in innovation and production. Specifically, human capital is crucial for economic development. Education not only improves skills, but also generates various positive feedbacks. Investments in human capital affect social relations and the social

climate in communities, neighbourhoods and cities. This leads to higher levels of trust among citizens, which boosts the attractiveness of a country as a place of business and promotes further investment in education and innovation.

All over the world, firms are expressing high demand for skilled workers. Over the last decades the educational level of the world's labour force has risen substantially. Yet, in many countries the wages of high-educated workers have also risen, which indicates that demand for skills has thus far outpaced supply.

The way in which human capital is used in production is changing profoundly. Around 1980, less than 20 percent of all workers operated some sort of computerised equipment at work; by 2005, this had risen to over 80 percent. Computers change the way we work (who still totals up an account on a piece of paper?) and the way we communicate (who hasn't sent an email today, or perhaps even twittered his latest thoughts?). As a result, jobs are split up into different tasks, and trade in tasks replaces trade in final products. Increasingly, firms participate in complex global supply chains in which the many tasks required to manufacture a good are performed in different locations, often offshore.

### ... and cities matter ...

Cities flourish and deteriorate. Housing prices in Amsterdam tripled over a period of about 150 years in the golden age (from 1630 to about 1780), and fell to one-quarter of the 1780 price in the period up to 1816. This corresponds with the rapid urbanisation of the western part of the Netherlands (and especially Amsterdam), followed by a decline in economic prosperity when Britain took over Dutch leadership in trade. Only in the second half of the nineteenth century did the index rise again, which is consistent with the developments in the second half of the Industrial Revolution. More recently, after World War II, Dutch cities faced a difficult time, with de-urbanisation of economic activity, and social problems and racial tensions increasing. Stimulated by the development of the service economy and the emergence of the knowledge economy, cities have begun to flourish once again in developed economies. In the Netherlands, for instance, several large companies moved their headquarters to Amsterdam. This development has gone hand-in-hand with rising land rents in the densest areas relative to comparatively rural areas.

Cities bring together people who benefit from each other. Cities are the places where new technologies are being developed. At the beginning of the twentieth century, manufacturing firms settled near each other in order to benefit from knowledge spillovers in the development of electricity. Later on, in 1970-2000, ICT emerged and strongly affected services that concentrated in space. Cities are the places where high-educated people cluster, where start-ups flourish and face-to-face interactions increase productivity. As a result, cities are the places where productivity grows.

The ability of cities to change or even to re-invent themselves is a predictor for economic success. The evolution of the four biggest cities in the Netherlands illustrates this assertion. Amsterdam, Rotterdam, The Hague and Utrecht have led the city rankings in the Netherlands

for centuries. Meanwhile, their industry structure has changed dramatically. Other Western countries have experienced similar developments.

### ... and together they matter even more

One of the most persistent predictors of urban growth over the last century is the skill level of a city. Cities with a high-skilled labour force have done well. Boston is a case in point. Based on its historically deeply rooted top-level universities (Harvard, MIT) Boston excels in high technology, higher education and financial services. How should the scenarios deal with the notion that people and cities matter—and that together they matter even more? The answer requires a view on possible future technological change and its direction.

## Technology and globalisation

How do firms divide tasks among workers, and what will be the main characteristics of workers in 2040? What determines the size and structure of cities in 2040? Basically, the answer to both questions depends on the development of technology, which is the fundamental driver of future economic development. Technological developments are largely exogenous, uncertain and pervasive. This means that they can hardly be influenced by policymakers, and barely be predicted. Rather, policymakers have to be aware of the power of technology and deal with its development to the best of their ability.

General-purpose technologies (GPTs) drive technological change in the long run (that is, over periods of several decades). The arrival of these GPTs is unknown, but when they arrive society changes fundamentally. They affect the production of goods and services, the innovation of new products, the organisation of firms and the lifestyles of consumers. Previous examples include the steam engine, which took off around 1850, and electricity, which started to replace steam power around 1910. Information and communication technology (ICT) is the current GPT affecting a broad range of developments in society at large. Its development started to take off in the 1960s, with its societal impact kicking in with the introduction of the personal computer and, later on, the Internet.

### Technology steers people ...

ICT changes the division of tasks among workers through two main channels: communication and information. The communication technology (CT) part of ICT facilitates transmission of ideas and information, and enables people to quickly check and confirm their validity. At present, the speed of communication is so fast that sending and receiving messages occurs nearly simultaneously, which greatly improves the opportunity to check and double check whether the information has been rightly interpreted. Consequently, tasks that used to be highly integrated can now be disconnected and executed by different persons in different places. Workers specialise. For example, Texas Instruments' telecommunications chip looks like any other semiconductor. But it is the product of worldwide effort. Conceived by engineers from

Ericsson in Sweden, it was designed in France with software tools the company developed in Houston. The chip rolls off production lines in Japan and the United States, gets tested in Taiwan, and is put into phone systems in Sweden, the US, Mexico and Australia.

The information technology (IT) part of ICT improves the way workers process information. Many routine tasks have been taken over by computers and expert systems; they will never become tired of doing the same job repeatedly and endlessly. People are still needed to manage and operate the computer, however, and to add creativity and interpersonal contacts. The key strength of computers lies in the interconnection of routine tasks. Systems that link up with each other process larger and more complex types of information. This broadens the scope of work processes. No longer does a team of workers execute all routine tasks; with the aid of a computer a single worker can perform a range of tasks autonomously. Workers generalise and become jacks-of-all-trades. This process has been going on in banks and insurance companies, for example. While automated back offices produce files about clients, products and processes in an enterprise resource planning (ERP) system, the customer communicates with a single person about all of his insurance needs. The advisor is able to recommend a complete package for each customer using the company's ERP system.

Further improvements in ICT may emphasize either CT or IT. This uncertainty influences the division of labour and tasks in the scenarios. Better CT reduces the costs of coordination and communication, and leads to further specialisation of work. The limit to specialisation is the cost of coordinating the different tasks. In contrast, improvements in IT reduce the need to ask for specialist help and input. Workers become less dependent on fellow workers, in terms of both tasks and face-to-face interactions. The limit to generalisation is that workers have to divide attention over many tasks, which may lead to productivity losses when workers have to carry out tasks they are not so well equipped for.

### ... and cities towards 2040

Will a new GPT arrive over the next 30 years? How that question is answered implies certain shifts in city size in the scenarios. In its early phases, the development of a GPT strongly depends on face-to-face contacts. Researchers, innovators, designers and managers all benefit from close personal interaction in order to exchange knowledge—not only about the contents of the new technology, but also about the highly qualified experts in the field, the most promising new applications of the GPT, adjustment of organisations to the new technology, and so on.

Information and communication technology, the current GPT, has reached an advanced phase. As a result, the current trend in ICT makes physical presence less important, because a lot of modern communication is virtual in nature, and modern production involves knowledge displayed through firms' Intranets. This opens possibilities for production to take place independently of location and time. Cities will become smaller because of advanced ICT substituting for face-to-face contact. The internationalisation of production teams, the rise of international collaborations in science and the increasing number of production locations of multinationals are consistent with this trend. Take Boeing as an example: coordinated from

Boeing's headquarters in Chicago, 70 percent of the Boeing 787 Dreamliner is built by 43 firms in 135 production locations across the world. Only about a third of the activities are directly performed by Boeing.

Bio- and nanotechnology are the foremost candidates for a new GPT in the future. The presence of these technologies is already being felt in many areas of research, similar to the presence of computer technology in "number crunching" in the 1960s. When a new GPT emerges in the coming decades, it will require face-to-face contacts together with extensive laboratories and test sites to innovate in the new technological fields. This will initiate a shift towards larger cities. Economic activity will become more clustered and cities will become more important. Since the future arrival of a new GPT represents a major uncertainty, cities may either shrink or expand over the coming 30 years.

### What about globalisation?

Besides its direct impact on people and cities, technology also affects workers and cities through globalisation. The integration of economies, leading to trade in goods and services, exchange of knowledge and the migration of workers, is known as globalisation. To a great extent, globalisation is the result of technological change. A technology such as the steam engine (and beyond) boosted trade in goods; the current wave of ICT facilitates the division of the production chain in many pieces, and its distribution across many countries.

The implications of globalisation and technological change are far-reaching. First, the world income distribution has narrowed. The incomes of the majority of the world's citizens have increased since 1970. With an increasingly better-educated worldwide labour force, emerging economies take part in world trade and shift their comparative advantage more and more from raw materials to intermediates and final products. Foreign competitors challenge Dutch firms on domestic and world markets.

However, full equalisation of per capita incomes is unlikely to occur in the next decades. Much of the differences in income are due to the fact that the Western economies are performing tasks that are quite different from those performed by the economies of developing countries. Equalisation can only take place between identical tasks, and the Western economies have an advantage of specialising in the more-advanced tasks. Western economies increasingly specialise in high-end manufacturing and tradable services. Globalisation creates abundant opportunities, but to exploit the comparative advantage of the Dutch economy, an excellent educated workforce becomes ever more decisive.

Second, trade in tasks replaces trade in goods. The former means that production chains are split up in many pieces, in many tasks, which are operated in different countries. For instance, trade in intermediate inputs has grown substantially in recent decades: currently, intermediates represent 73 percent of trade in services.

Third, location becomes more important. With increased capital and labour mobility, economic activity is more footloose than it was thirty years ago. This implies that the quality of cities and the connections between them become more important than ever. A successful city is

able to attract high-quality production and to lock it in for a long time, whereas other cities fail to do so. The combination of tasks and cities is crucial. For example, the film industry can produce anywhere, but has chosen Hollywood as the main location for producing movies. Hollywood attracts top actors and producers from all over the world. Would it be possible to relocate (parts of) the Hollywood movie industry away from Los Angeles? It may happen, just like Detroit lost its competitive edge in producing cars. Whether it happens depends on the contestability of tasks and cities, which is determined by how easy it is to perform tasks elsewhere, and how easy it is to reproduce the infrastructure elsewhere.

### The future of people and cities

This results in three major lessons, which set the stage for the development of the four scenarios. First, knowledge is and will be the key to success for the Netherlands. Human capital and knowledge are essential for participation in technological progress and for maintaining a competitive edge in a globalising world. Second, jobs will be based more and more on a collection of tasks. Third, economic activity will cluster in cities. Cities attract skilled workers who benefit from face-to-face interactions. In addition, cities are the main hubs in the economy, replacing to some extent the role of countries as economic engines. This demands a novel view on the division of work and the location of production in the future.

### Four scenarios

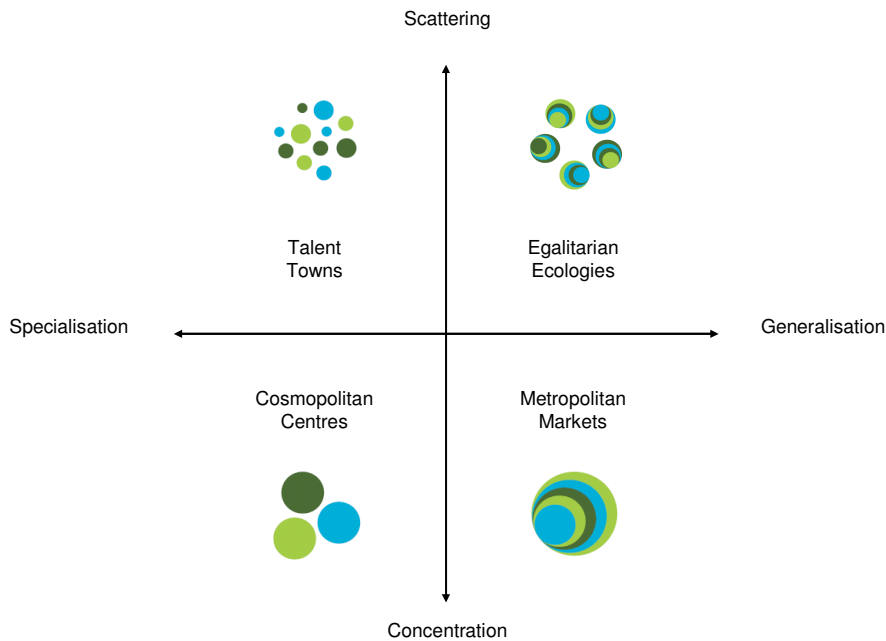
The power of imagination is crucial in creating scenarios because imagination makes it possible to draw pictures about possible future states of the world. People that are better able to deal with different future states will be more successful because they are better able to prepare for unforeseen contingencies. The scenarios in this study are four consistent stories for such contingencies. They deal with two basic uncertainties: (i) the future division of tasks among workers—will it occur anywhere in the world or will production occur more locally and (ii) whether the size of cities will become larger or smaller. Together, these two uncertainties lead to the four scenarios presented in the figure below.

The horizontal axis presents the options for the division of tasks, the vertical axis shows the possibilities for city size. The scenarios are labelled such that the first term reflects the characterisation of people and the second informs about the type of location. For example, the scenario in which workers specialise and city size is relatively small is labelled *Talent Towns*.

The economy is moving towards a task economy in which workers perform one or many tasks rather than producing one or a few products. This implies a new division of work. There are two possible directions. First, workers specialise and excel in one or a few tasks. They produce in teams of similar specialists, which may be virtual and of an international nature. The cost of coordinating tasks determines how specialised firms and cities become. Examples of specialised cities are Detroit, which has specialised in producing cars, and the city of Eindhoven, known for its consumer electronics. Second, workers are jacks-of-all trades and

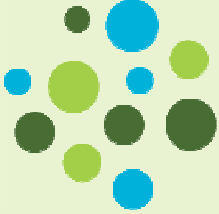
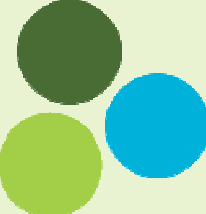
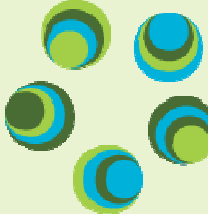

mainly produce for the local market. The generalist worker is employed easily in many occupations. He uses inputs from the world's knowledge stock and imports intermediate goods. Once again, the generalisation of work extends to firms and cities. Examples of generalised cities are New York, London, Paris and also Amsterdam.

#### Four scenarios for the Netherlands of 2040



The uncertainty about cities is not about cities becoming more important, since in all scenarios they will become more important. The question is about their size: large or small. The first possibility is that cities become relatively small (with 100,000 to 500,000 citizens) and are scattered across space. They serve as small economic and urban spikes. In this world, the reasons for economic activity to cluster are limited. Cities are formed because they offer a minimum scale to provide local goods and services. In such a world, firms exploit the connections between cities rather than benefiting from interactions within cities. A second option has economic activity becoming highly concentrated in a limited number of large cities. The cities are populated by several millions of people (or attract these numbers by day-to-day commuting). The cities are the meeting places of people for the purpose of trade, for the exchange of ideas, for the development of new technologies and to optimise the matching between workers and firms and between producers and consumers. The geographical area of demand for commodities or services, and the available supply of or potential demand for specified goods or services is large. The cities are magnets, or may even become black holes, absorbing most of the economic activity in the region, or even country, leaving the hinterland empty.

What are the main characteristics of each of the four scenarios, and what are the main differences that are relevant for policymaking? The table ‘Main scenario characteristics’ presents a summary.

<b>Main scenario characteristics</b>				
	Talent Towns	Cosmopolitan Centres	Egalitarian Ecologies	Metropolitan Markets
				
City size, in population	100k – 200k	2 – 8 m	100k – 500k	> 10 m
<b>Technology, knowledge</b>				
Direction ICT	Communication	Communication	Information	Information
New GPT	None	Research-oriented	None	Application-oriented
Innovation	Direct applications, strong competition	Radical, firm – university links	Applied and incremental	Fundamental and applied, within firms
<b>World economy</b>				
BRICs	Manufacturing	Manufacturing hubs	Inward orientation	Some metropolises
United States	Top-end innovation and design	GPT, services	IT products and local varieties	Many metropolises
EU (including the Netherlands)	Business services	High-end services	Local varieties	Few, autonomous metropolises
Trade	Global market, high trust, strong trade agreements	Global market, trade in intermediaries	In final products	Limited
<b>Place of business</b>				
Agglomeration	Scattered	Concentrated	Medium city size, local varieties	Highly concentrated
Infrastructure	Virtual + air connections	Between and within cities, high quality	Regional	Locally, high quality
<b>People</b>				
High-skilled workers	Talent is rewarded	Talent is highly rewarded and benefits from interactions	Moderate wages	High wages due to benefits from interactions
Income inequality	High due to specialisation	Very high due to size and specialisation	Low due to absence size of specialisation	High due to size
Vulnerability to shocks	High – specific human capital and city output	High – specific human capital and large city output	Limited	Low

### Talent Towns (TT)

Imagine a world with relatively small cities (100,000 - 200,000 inhabitants) and specialised workers and firms. Communication technology (CT) enables specialist workers to co-operate in virtual teams, particularly in service industries. People do not have to meet in person all of the time in order to successfully design new products, improve upon production processes or devise marketing campaigns. Consequently, firms employ specialists from all over the world.

Specialist workers gain from personal interaction with their fellow specialists, which determines their location choice. Meeting in person provides the opportunity to monitor the developments in their field, exchange ideas or discuss reputations. In addition, they select their place of residence on the basis of the attractiveness of the living environment and the availability and quality of consumption amenities such as restaurants, theatres, childcare centres, schools and so forth.

The comparative advantage of the Netherlands and other European countries lies with business services. In the coming years, manufacturing activities move for the most part to Asia, because manufacturing knowledge increasingly becomes generally available and because trade facilitates the global transfer of final goods and intermediates. Knowledge of business services becomes the distinctive comparative advantage of the Netherlands. Dutch consultants, financial specialists, designers and publicity experts operate worldwide. In this highly competitive world, exports of business services enable the Netherlands to increase imports of manufacturing products. Since intense competition perpetually creates new winners and losers, there always is a chance that interest groups lobby for protectionism. If some government gives in, then a cascade of retaliation may undermine the sources of wealth.

TT is a very dynamic world with excellent opportunities, but also major challenges. The strongly competitive environment enables high-skilled specialists to earn high incomes. However, the rising top performer of tomorrow can overtake the top performer of today, and when a certain specialisation becomes obsolete, an entire TT may lose its livelihood. Moreover, the wages of low-skilled workers suffer downward pressure due to global competition. The TT world faces the paradox of high demand for protection and redistribution, but limited supply. The high mobility of labour, capital and tasks puts bounds on redistribution. An elaborate social insurance system would urge high-skilled people with a small risk of becoming unemployed to move abroad, thereby eroding the premium base. Hence, substantial vulnerability and inequality together with low solidarity characterise TT.

### Cosmopolitan Centres

Envision a world of large cities (each of 2 to 8 million inhabitants) with global connections hosting specialised workers and firms. In a CC city, many specialists from all over the world combine their efforts in the design and production of toys and cars, games and business software, but also a range of new products and services. Some firms and workers specialise in design, financial services or transport, others in electrical engineering or packaging. Companies acquire intermediary products and support services from all over the world. This global division

of tasks relies above all on efficient and relatively cheap communication technologies, which facilitate intensive coordination between all steps in the production process. The second characteristic of this piecemeal production process is just-in-time trade in intermediate products and services, for which a stable international environment is crucial.

Cities develop into clusters of these specialised activities. The largely science-driven expansion of bio- and nanotechnology demands close cooperation between researchers in universities and firms. Also in other fields specialist workers substantially benefit from grouping together. Working on complex tasks in a common location, specialists disseminate knowledge, exchange ideas, share common facilities and establish a reputation among their peers. A cosmopolitan centre of biotech R&D arises at one location, another location develops into a logistics centre, and so on.

The Netherlands may host a few of these clusters in which it has a comparative advantage (stemming from our location and connections with the major economic regions in Europe and the rest of the world, from the educational level of the population and from our international orientation). In addition, our strength in the past may develop in the future, and the Dutch CC cities may specialise in, for instance, company headquarters, water management and engineering, biomass technology, medical engineering, creative activities or logistics services. The prosperity of these cities might be threatened if other cities contest or take over that comparative advantage. Therefore, income levels may differ substantially between centres and between a particular centre and its hinterland. Substantial income inequality also exists within cities, because the large CCs attract a broad range of supporting tasks.

### **Egalitarian Ecologies**

Variety and dispersion characterise egalitarian ecologies. Economic activity spreads out over medium-sized cities (100,000 - 500,000 inhabitants) that host medium-sized firms. Medium-sized cities in the east and south of the Netherlands flourish, building on their strengths in fields such as creative industries, agricultural services, healthcare products, fashion and design. Economic activity in the Randstad keeps pace, because the Netherlands retains its position in the transport of final goods all over Europe. Knowledge resides largely in the minds of the country's generalist employees in combination with the databases and other IT-applications of firms. The IT systems enable firms to produce differentiated products that cater to differences in local demand.

Living and working activities spread out over space. Due to in-house production and meagre inter-firm knowledge flows, firms benefit little from being located near each other. Firms turn away from large cities and settle in medium-sized cities, which offer high-quality non-tradable private and public services, and which provide agreeable living conditions for their employees. Successful cities are hotbeds of high-quality production, and offer opportunities for creative cooperation on a small scale. However, in the longer term cities also face the risk of stagnation. Workers and plants can become locked-in, with limited opportunities inside the city, limited opportunities for learning from outside companies and limited outside options.

EE represents a world with little income growth and modest income differentials. Because technological progress levels off and considerable wealth flows to suppliers of raw materials, disposable income grows only moderately. The relatively equal income distribution fits with the preference for equity in the Dutch society. However, social relations may come under pressure from the considerable migration of low- and medium-skilled workers, which also poses a challenge to the Dutch education- and vocational training system.

### Metropolitan Markets

Think of a few very large metropolises with more than 10 million inhabitants dominating the world. Large factories, huge office buildings and sky-high apartment blocks characterise these cities. Economic activity is concentrated in dense areas, where economies of scale and scope are optimally exploited. The hinterland and smaller cities face bleak prospects, talented workers leave and sufficient production size may never be reached. Metropolitan Markets is a world in which the winning cities take all.

In MM, bio- and nanotechnology break through. Their sheer complexity requires extensive research facilities and a high degree of tacit knowledge exchange within large firms to create sufficient potential for developing marketable applications. IT expert systems enable managers to delegate decision-making power. Still, managers need face-to-face contacts with experts in order to assess the technological potential of the firm's product portfolio. Hence, managers have the potential to run a large firm, as long as the various departments of the firm are situated in close vicinity to each other.

Metropolises attract firms and people. In metropolises, firms find trusted business partners, knowledge centres, a large supply of generalist workers and many consumers. People move to a MM city to select the best job, to build interesting relationships and to benefit from an appealing supply of cultural and recreational services. In addition, the scale of the community reduces uncertainty. Thus, if one's job doesn't satisfy, many other job options can be found.

Where the metropolis thrives, the hinterland lags behind. The metropolis attracts all of the highly productive firms and higher-qualified people. Income inequality is large—both within the metropolis and between the metropolis and the hinterland. This may pose serious social problems for a country with a preference for equity, such as the Netherlands. An even deeper problem arises if the Netherlands fails to host a local metropolis; given the scale and scope of MM cities there is a chance that this is impossible. In that case, the Netherlands as a whole becomes a hinterland. Neighbouring European metropolises would attract all company headquarters, research centres and talented people.

## Policy

How can this study, with four distinct scenarios, be used for strategic thinking about the future? The relatively broad scope of the study—using developments of cities, human capital and the world economy at large—has the advantage that it can be used as a background for and input into many different subjects that require a long-term perspective. It also means that to analyse other policy areas of interest a further elaboration of the framework will be needed.

### Policy environment

Technology determines the allocation of future production. This limits the scope for the government to intervene, but doesn't make its policies ineffective. The scope may be reduced, but the impact will rise. For example, it is important that government and business jointly develop and nurture specialisation in CC. Once the type of specialisation is given, there is a risk of others overtaking the successful place of business. An example is Detroit, which became a place of vast vertically integrated car companies that employed thousands of workers. The result was a massive growth of the city and economic prosperity. However, this model was unstable in the face of the increasing dominance of Japanese car producers, which eventually took over, leaving Detroit behind. In the Netherlands, cities such as Enschede and Tilburg were once known as wealthy textile cities, but suffered once production was taken over by cheaper places. Only after a while did these cities recover and flourish again. The task to monitor—and if necessary, reinvent—cities is one for both business and policy. Yet, the government has to swim with the tide and respond to the development of one of the four scenarios.

Policy should prepare for the future, which is impossible without imagining future developments. The scenarios reveal that uncertainties in future production mainly involve uncertainty about the division of labour and about its distribution across space. This sheds important light on today's choices. Investments in infrastructure should not only solve today's traffic jams, but should also take some account of possible future growth (or decline) of cities and the connections within and between cities. Public institutions for education, science and innovation have to look beyond today's questions and consider the possibility that specialisation becomes crucial. Finally, labour-market institutions were designed in the past, but should anticipate future problems in the best possible way. What should employment protection look like if workers and firms scatter, and people are expected to excel in highly specialised jobs?

### Common trends and policies

The scenarios have important implications for thinking about the future of the Netherlands as an attractive place of business, characterised by the emergence of a strong knowledge economy and a flexible labour market. Some of the key challenges for policy are the following:

- Technology drives long-run economic development. Firms located in the Netherlands should be able to at least apply leading technologies. Preferably, Dutch workers, universities and research departments operate at the frontier and help in pushing it forward. The challenge for policy is to design research institutions able to deal with the uncertain future—where progress stems either from improving specialised knowledge or from the integration of several knowledge areas. To accomplish this, two policy measures are of direct relevance in all scenarios. The emergence of the European Research Area (ERA) stimulates knowledge flows by facilitating transfer of researchers across borders. In addition, the move towards a European patent system will help make knowledge more easily accessible and applicable. This will benefit the growth and application of the knowledge stock.
- Production processes are unbundled. Improvements in ICT, together with reliable international relations, facilitate the unbundling of the production process, where each part of the production chain is processed elsewhere. The current strength of the Dutch economy might not be its future strength—but predicting future specialisations is hard, if not impossible. The old paradigm of investigating comparative advantages based on a sector decomposition of the economy does not work any longer, as production processes within and between sectors become unbundled. What remains similar is that free trade is important for a small open economy. Regardless of the scenarios, this is a sound policy. The challenge for policy is to protect workers against frequent shocks and at the same time support them in seizing their opportunities. What kind of glue will connect workers, tasks and cities in the different worlds? What policies lead to the best glue?
- Jobs change—in terms of both the degree of specialisation and their distribution across space. This demands flexibility and security, from the perspective of the welfare state. The challenge is that the provision of social security is likely to fail in scenarios where workers would need it most. To increase flexibility, policymakers should optimally invest in human capital. In addition, making the labour and housing markets more flexible is a no-regret policy. A higher educated workforce is more flexible and skill begets skill. In all scenarios this means that investing in the young instead of repairing deficiencies later is the optimal policy response. A flexible housing market is important to absorb shocks that would otherwise force people to move to other places.
- Cities flourish. Cities are the local networks for face-to-face connections in the development of knowledge and in matching firms and workers. They are also nodes in the global network of cities, and determine the division of production across space. The government has to develop cities, deal with congestion problems, and take care of healthy cities and good connections. The challenge for policy is to deal with uncertainty about urban development: Should we prepare for a world with large-sized cities or would we benefit from scattered cities in a world where location hardly matters? In all scenarios, cities become increasingly important, so regulation should be reoriented towards the city level.

## Policies for the future

In each of the four scenarios, policymaking shows a comprehensive and consistent package of successful measures.

In Talent Towns, flexibility and excellence rule the world. An excellent network of connections between cities is very important, with relations between people and place changing rapidly. Cities and workers have to be able to adjust to changing economic conditions, and produce some parts of computer games today, but switch to ICT security tomorrow. The new assignment involves the same tasks but probably a different way of dealing with producers, consumers and intermediate goods. This demands a lot of flexibility from the Dutch labour force, and workers can meet this flexibility only if they are highly educated and specialised in a certain field. They have to be able to both excel in their specialisation and switch jobs easily. The education system should prepare workers for their specialised jobs. Universities should be specialised, and science in general should focus on the utilisation of specialist knowledge. The incentives in the welfare state should favour frequent job-to-job changes and retraining. However, given the fact that workers frequently cross national borders, the means for a nationally organised welfare state to provide these incentives are limited. Talent Towns is a world of chances, which should be seized by workers, firms and government alike.

In Cosmopolitan Centres, large-scale specialisation dominates. Both connections between cities and high urban quality are needed to develop and sustain successful cities in this scenario. Cooperation between government and business is crucial to develop these large specialised cities. This cooperation would help to create an attractive place of business and in sustaining a highly-rated knowledge economy. Early selection and a focus on excellence in education are required to train specialised workers. The downside of specialisation is uncertainty and the cost of switching to another field. These downside risks are rare but far-reaching: a complete city will be hit once its specialisation fails, leading to very high unemployment rates and a substantial drop in housing values. Both the labour market and the housing market should be prepared. Strengthening the rental market should be seriously considered in this respect. CC is a world of extremes, where high prosperity and deep recessions take turns.

In Egalitarian Ecologies, small is beautiful. Medium-sized cities perform a variety of tasks. The labour force is well prepared to deal with negative shocks because workers are able to change jobs quickly. The downside of this generalisation is that although mean performance is reasonable, and volatility is relatively low, EE cities don't benefit to the full extent from new technological developments. The main challenge for the welfare state is not to provide security, but to create incentives. The education system should be geared towards training in general skills and by preparing workers to perform a variety of jobs. In particular, workers should be able to collect information from many sources and apply this in their productive activities. Science, too, should be directed towards the application of globally available knowledge. EE is a world of stability and moderate prosperity.

In Metropolitan Markets, size matters. Firms, workers and their activities will concentrate in a few extremely large cities. The opportunities for small-sized cities in the hinterland are

limited because all economic activity is attracted by the MM city. One of the challenges for the welfare state is to redistribute between the mega-city and its surroundings. Public infrastructure has to support the development of these cities, by developing public transport and local facilities (such as office parks). Science benefits from size and will be able to develop a new general-purpose technology, like bio- or nanotechnology. This will mainly take place within companies, with a focus on the application of the new technology in the production process and in the development of goods and services. Firms have to compete with other local firms, with limited international competition at hand. MM is a world of prosperity for the winners, but despair for regions that lag behind.

### Scenarios: from imagination to strategic policymaking

Young people choosing to invest in schooling, firms setting up a new business, workers deciding where to pursue their careers, and governments aiming at strategic policymaking all have to make decisions about an uncertain future. Scenarios help to visualise the consequences of their choices against a set of possible futures. And visualising scenario making helps to get a grip on the scenario outcomes and their policy implications. For that purpose the introductions to Part I, II and III of this study all start with a picture by J.W. Waterhouse.

In Part I *Echo and Narcissus* shows that scenario making is all about combining imagination and reality. Part I uses imagination to depart from a more conventional approach based on sectors and countries. It adds a large body of empirical evidence from reality, to argue that cities, people and their human capital play a central role in the future of the Dutch economy.

In Part II *Consulting the Oracle* acts as a mirror to show that scenarios do not predict the future, but instead tell different stories to underscore the fundamental uncertainties of the future. Building on the evidence from Part I, Part II develops four scenarios from two basic uncertainties: specialisation versus generalisation of workers and increase versus decrease of city size.

In Part III *The Magic Circle* illustrates both the importance of policy and the limits to policymaking. The influence circle of national governments shrinks, but the impact of their actions increases. This implies that governments both have to move with the tide of all-encompassing trends and have to respond to uncertain future developments. Often policy makers have to trade off the benefits of waiting against the costs of delay. When decisions have to be made, scenarios help to assess which policy options are robust to future uncertainties and which options are sensitive to changing circumstances and thus have to be closely monitored.

And ultimately, returning to *Echo and Narcissus*, it is of course to the reader to judge if this study really succeeds in squaring imagination with reality.