Nederlandse economie

Gebrek innovatie nekt

De Volkskrant

Porter presenteert

innovatie-agenda voor Nederland

Hoewel de Nederlandse economie op de eerste plaats een economie is die maakt met innovatie, is Nederland de laatste jaren te zwaar achterban- gen. Porter, de bekende econoom, heeft een nieuw concept opgesteld voor het stimuleren van innovatie in Nederland. De Porter-agenda stelt een nieuwe baan op voor de Nederlandse economie en de ondernemers. Porter pleit voor een meer gericht aanpak van innovatie en een aanscherping van de Nederlandse economische strategie. Hij ontwikkelde een nieuw interdisciplinair concept dat de Nederlandse economie in de hedgezitting stelt. Porter's ideeën zijn een stempel op de Nederlandse economie en zijn een beloofde impuls voor de innovatiecirkel.
Nederland moet poldermodel, om uiteindelijk Nederland kan bij ouderwetse keten liggen dwars door vorderen. Het is dat het zo moeilijk is aansluit van een succesvolle als die nog werkt.
INNOVATION: WORK IN PROGRESS

WHAT DO YOU UNLEASH WHEN YOU INVITE ONE OF THE UNITED STATES’ MOST EMINENT ECONOMISTS TO MAKE A CRITICAL EXAMINATION OF THE DUTCH KNOWLEDGE-BASED ECONOMY? A GREAT DEAL, AS WE FOUND AFTER THE ADDRESS GIVEN BY PROFESSOR MICHAEL E. PORTER DURING THE INNOVATION LECTURE ON 3 DECEMBER 2001, WHICH WAS ORGANIZED BY THE MINISTRY OF ECONOMIC AFFAIRS. THE MEDIA DEBATE ABOUT PROFESSOR PORTER’S VIEWS RAGED ON FOR MONTHS AFTERWARDS.

_In his lecture, Professor Porter gave a sharp analysis of the Dutch economy. His message was that the Netherlands must watch its step because it is losing momentum as a knowledge-based economy. Not because it is performing badly, but because other countries are doing better. The Netherlands’ success model of recent years has now come to the end of its cycle. A strategy based largely on cost control will no longer work. The Netherlands will have to realise its future economic growth through innovation._

Introduction by the Minister of Economic Affairs, Mrs A. Jorritsma-Lebbink, for the report on Professor M.E. Porter’s Lecture on Innovation for the Ministry of Economic Affairs booklet
According to Professor Porter, our agenda for innovation should look like this:

- Companies must invest more money in research and development; the government is already contributing a reasonably large amount; now it's time for trade and industry to do the same.
- More researchers and engineers should be employed to make up the current shortfall.
- The institutional structure of research institutes must change so that new scientific knowledge leads to genuine innovations within the private sector and society.
- Cluster policy must be strengthened; the emphasis must shift from analysis to action.
- Universities must undergo an attitude shift so that a better dialogue can be established between university researchers and companies.

I see Professor Porter's message as supporting the policy we pursue at the Ministry of Economic Affairs. Innovation is and will remain a top priority. However, the problems cited by Professor Porter are deep-rooted and will take time and effort to resolve. In my opening speech for the Innovation Lecture, I named three imbalances which we must urgently redress if we are to achieve sustainable economic growth. These challenges are clearly recognisable in Professor Porter's agenda for innovation.

1. Dutch Companies Invest Too Little in R&D

Investing in R&D is something companies must do for themselves. The role of the Ministry of Economic Affairs is to reduce those thresholds which deter companies from making these investments. My innovation policy also gives priority to cooperation in R&D between companies, and between the private sector and research institutes. This will help to implement our cluster policy. During the panel discussion that followed the lecture, I underlined the
importance of continuing the cluster policy by remarking that this is not something the government can do by itself. According to Professor Porter, companies must play much more of “a leadership role in cluster efforts”. I therefore challenge them to do just that.

2. SCIENTIFIC KNOWLEDGE CAN BE USED MORE EFFECTIVELY

_The supply of, and demand for, knowledge is not adequately matched. Our universities and researchers are highly regarded, but all this brain power is not leading to enough market-orientated innovation and new industry. This is because scientists are primarily valued according to their scientific publications. Why not also according to ideas they generate which are picked up and applied by companies and organisations? When allocating funding to universities and research institutes, we should also take more account of the social and economic impact of their research._

_We must move towards a more flexible system in which the allocation of funding is more closely related to agreements concerning output. And part of that output includes the degree to which knowledge is picked up and applied by society and the private sector. To improve the return on public investments in knowledge, I would therefore argue for a more dynamic research system through the introduction of more competition, a more flexible deployment of financial resources and more public-private partnerships in the sphere of research. Professor Porter’s call for a change of attitude among scientific researchers and managers is a key precondition for this._
3. WE HAVE A SHORTAGE OF RESEARCHERS

_There has been a slowdown in the growth of talented young researchers in this country, especially in the field of science and technology. In statistical terms, the Netherlands lies well below the EU average. We will need to do our utmost to solve this problem in cooperation with the education and research institutes. This means putting more effort into encouraging young people to opt for a research career in technology subjects, improving the career outlook of university and non-university researchers alike, increasing the knowledge potential of women and attracting more researchers from abroad by expanding opportunities for immigration._

WE MUST ACT NOW!

_The key to removing these shortfalls lies mainly with parties outside government. That is not to say the government will simply stand on the sidelines. Where it can play a role, it will certainly do so._

_Our goal is well-known: we want to be among the front-runners. We want to play in the first division of competing knowledge-based economies. And we want this not just for the Netherlands, but also for the European Union as a whole. We concluded specific agreements on this at our summit in Lisbon. The big challenge now, however, is to turn those commitments into practical achievements. To remove the shortfalls mentioned, we must make reforms. But because we have been doing so well over the past few years, not everyone recognises this._
But if we fail to act now, our prosperity growth will come to a standstill, according to Professor Porter. By ‘us’, I do not just mean the government but also companies, researchers and the managers of research institutes and intermediary organisations. Dedication and commitment from all our knowledge partners is crucial if we are to achieve real success. This presents us with a new challenge. If the ‘polder model’ stands for a joint approach to tackling problems, then there is certainly still much to be gained from it. In an ‘innovated form’, the polder model can lead us towards a new future of sustainable economic growth.
On December 3, 2001, Professor Michael E. Porter delivered the annual ‘Innovation Lecture’ organised by the Ministry of Economic Affairs. Professor Porter is the Bishop William Lawrence University Professor, based at Harvard Business School, and a leading authority on competitive strategy and international competitiveness. Professor Porter co-chairs the Global Competitive Report, a collaboration of Harvard University and the World Economic Forum. This Report analyses the state and causes of competitiveness and innovative capacity in over 70 countries around the world. Some of the data used in Professor Porter’s speech comes from the Report. Professor Porter teaches strategy and economic policy and also leads a workshop for newly appointed chief executive officers of major corporations. In addition, Professor Porter serves as a strategy advisor to leading U.S. and international companies, as well as to various governments worldwide. A widely-read author and commentator, he has published some 16 books and over 75 articles, in addition to a series of influential competitiveness reports at the national and regional levels.

In his speech, Professor Porter addressed the competitiveness and innovation performance of the Netherlands. While acknowledging that the Netherlands’ economy has performed well, he believes that this prosperity may not be sustainable because its foundations are weak. Professor Porter’s recommendations include replacing the country’s traditional industrial policy with cluster-based development and redirecting the country’s policy approach to science, technology, and innovation. He stresses the need to place greater emphasis on R&D, and to reorient and increase the level of collaboration between government, businesses and universities.
IS THE NETHERLANDS’ PROSPERITY SUSTAINABLE?

For at least the past decade, the Dutch economy has performed well, with high growth rates, substantial job generation and a significant reduction in unemployment. However, the model that produced this success is reaching the end of its life. The Dutch model essentially held down wages and kept costs low to make the Netherlands an efficient place to do business. There are reasons to suspect that this model is no longer sustainable.

In order to sustain its success, the Netherlands needs to shift from an approach based on low cost and efficiency to one based on innovation and dynamism. To see why this is necessary, we must understand the fundamental sources of long-term success in an economy, especially as they relate to the role of innovation.

The Netherlands has also benefited from the relative slowness of its European neighbours in improving their competitiveness. However, the country will no longer be able to enjoy this advantage. As the Euro is adopted and a nation’s currency is no longer a variable that can be manipulated, competitive pressures are going to build inexorably in all European countries. Productivity growth is going to have to be stepped up and there is going to have to be more innovation.

(1) Dr. Veronica Ingham and Dr. Christian Ketels of the Institute for Strategy and Competitiveness contributed greatly to the research underlying this lecture.
A nation’s standard of living (wealth) is determined by the productivity with which it uses its human, capital, and natural resources. The appropriate definition of competitiveness is productivity.

- Productivity depends both on the value of products and services (e.g. uniqueness, quality) as well as the efficiency with which they are produced.
- It is not what industries a nation competes in that matters for prosperity, but how firms compete in those industries.
- Productivity in a nation is a reflection of what both domestic and foreign firms choose to do in that location. The location of ownership is secondary for national prosperity.
- The productivity of “local” industries is of fundamental importance to competitiveness, not just that traded industries

- Nations compete in offering the most productive environment for business
- The public and private sectors play different but interrelated roles in creating a productive economy
THE SOURCES OF NATIONAL PROSPERITY

Over the past 10 to 15 years it has become clearer and clearer that competitiveness stems from productivity (see Figure 1). Being wealthy, and staying that way, requires that an economy produce a lot of valuable output per day of work and for every euro of capital invested. If a nation is productive, it can afford to pay itself a lot. Low productivity, conversely, means low wages. If a nation is productive, it can earn a good return on the capital invested. Low productivity, however, means scraping by with mediocre returns. If a nation is not constantly improving its productivity, if it is not dynamic, then its improvement in prosperity will eventually grind to a halt.

The old model of competing based on the cost of inputs - low wages, low taxes, and cheap capital, for example - could succeed in a less global economy. This strategy, however, has become increasingly ineffective for advanced nations. Today, production can migrate to even lower wage and lower cost locations in developing countries, and capital flows to those regions where an opportunity arises.

A nation can improve prosperity for some time without fundamentally improving productivity by adding people to the workforce. GDP per capita can grow even if productivity is not rising very rapidly. This is basically what has been happening in the Netherlands. However, Dutch productivity has not grown rapidly enough to sustain a rising standard of living. Now the country has reached full employment and its old economic model is starting to show signs of stress.

A country’s economic success is determined not by what industries a nation competes in, but by how it competes in them. A country that competes in very productive ways with lots of skill and technology, can be prosperous in virtually any field.

A nation’s prosperity depends on its ability to create an environment in particular fields in which its resources can be used productively. If a country
Prosperity

Competitiveness (Productivity)

Innovative Capacity

- Innovation is more than just scientific discovery
- There are no low-tech industries, only low-tech firms

Figure 2: Innovation and the Standard of Living
can create such an environment, not only will it prosper but firms from other countries will gravitate to it and establish operations to tap into this productive potential.

**INNOVATION PROMOTES PRODUCTIVITY GROWTH**

What causes productivity to increase? Productivity fundamentally increases through innovation. Innovation involves more than just science and technology. It also involves improvements in marketing, service, branding, and the way a product is delivered to the customer. Innovation drives productivity, which increases wages and returns to capital. Over time, standard of living rises (see Figure 2). This is no quick fix, however. It can take years for investments in innovative capacity to translate themselves into new products, processes, and companies that will propel an economy forward.

The United States illustrates this point. Its economy has received an enormous boost from the information technology revolution. This started 30 or 40 years ago with some basic investments in U.S. universities by government, and it took a number of years for these to produce a series of technologies, including the Internet, that allowed a sustained increase in productivity growth. That is the way to attain sustainable economic growth: you nurture innovation, which leads to increased productivity, which leads to a rising standard of living.

The relationship between prosperity, productivity, and innovative capacity is becoming even more important in the new century. Most advanced countries are facing demographic changes that are slowing the growth of their workforce. Traditionally, one of the factors that fuelled economic growth in many countries was a growing workforce. Going forward, continued economic growth will require an increasingly productive workforce, which can only be achieved through innovation.
Figure 3: Relationship between GDP Growth and Patenting
Selected Countries, 1990 - 2000
INNOVATION INVOLVES ALL INDUSTRIES

It is important to understand that innovation is not just restricted to a few high-tech industries. There are no low-tech industries, only low-tech firms. Virtually every industry today can employ highly advanced technology to improve its efficiency and products. There has been a tendency in the Netherlands to think that only few firms and industries need advanced technology. That mentality is fundamentally dangerous. To have a high and rising standard of living, the Netherlands must increase its rate of innovation across the board. There's considerable reason for concern about the innovative capacity of this country. It has not been a fundamental constraint over the last decade, but it is going to be.

PATENT GROWTH IN THE NETHERLANDS

Because of the technological sophistication of the United States, patenting in the U.S. is a good test of international innovative capacity. A Dutch technology with significant commercial potential is very likely to be patented in the U.S. As can be seen in Figure 3, the Netherlands is a lagging patenting performer. The rate of patenting per capita is relatively low and, more ominously, its growth rate is low. Moreover, there is usually a strong relationship between the per capita GDP of a country and patent growth. Although the growth performance of the Netherlands’ economy has been strong, the country’s rate of innovation raises questions about its future potential.

R&D INVESTMENT

One of the most important reasons for the low rate of innovation in the Netherlands is the country’s rate of R&D investment, as seen in Figures 4 and 5.

In 1985, Dutch R&D spending was quite high but its R&D growth over the early 1980s was relatively low. These trends continued, so that by 1998, the Netherlands had markedly lost position.
Figure 4: Change in R&D Investments  
*Compound Annual Growth Rate in R&D Expenditures, 1981 - 1985*

Figure 5: Change in R&D Investments

**Compound Annual Growth Rate in R&D Expenditures, 1985 - 1998**

Figure 6: Sources of Productivity

The Microeconomic Business Environment

- A local context that encourages investment and sustained upgrading
- Open and vigorous competition among locally based rivals

- Sophisticated and demanding local customer(s)
- Unusual local demand in specialized segments that can be served globally
- Customer needs that anticipate those elsewhere

Related and Supporting Industries

- Presence of capable, locally-based suppliers and firms in related fields
- Presence of clusters instead of isolated industries

Demand Conditions

Context for Firm Strategy and Rivalry

Factor (Input) Conditions

- high quality, specialized inputs available to firms:
  - human resources
  - capital resources
  - physical infrastructure
  - administrative infrastructure
  - information infrastructure
  - scientific and technological infrastructure
  - natural resources

- A local context that encourages investment and sustained upgrading
- Open and vigorous competition among locally based rivals

- Sophisticated and demanding local customer(s)
- Unusual local demand in specialized segments that can be served globally
- Customer needs that anticipate those elsewhere

Context for Firm Strategy and Rivalry

Factor (Input) Conditions
THE IMPORTANCE OF CLUSTERS

The picture that emerges is clear: the patenting output in the Netherlands has been lagging, and a main reason seems to be the low investment in innovative activity. To understand why this has occurred, we have to consider what we have learned about innovation over the last decade or so. The first major lesson is that while the environment for innovation and productivity growth requires stable and sound macroeconomic policies, the real impetus comes from the microeconomic level - specifically, from clusters.

Innovation involves more than R&D spending per se. It is also strongly influenced by the presence of ‘clusters,’ - geographically proximate groups of interconnected companies and associated institutions in a particular field. Clusters thrive where there is a high-quality microeconomic business environment (see Figure 6).
Figure 7: The California Wine Cluster

Sources: California Wine Institute, Internet search, California State Legislature. Based on research by MBA 1997 students R. Alexander, R. Arney, N. Black, E. Frost and A. Shivananda.
An example is the California Wine cluster, as illustrated in Figure 7. A small number of counties in California produce around 96 percent of all the wine produced in the United States. Approximately 400 wineries constitute a part of the cluster which also includes a range of suppliers that provide related products, such as the grapes, grape stock, fertilisers, barrels, bottles, caps, and so on.

Specialized service providers such as advertising and public relations are also part of the cluster, as are institutions such as universities with departments or programmes relevant to wine. For example, every branch of the University of California has a degree programme in winemaking, and the University of California at Davis has a substantial research programme in wine-related technologies. As a result, the wine companies learn from the universities and vice-versa.

Clusters provide an environment and combination of assets, institutions, and knowledge that tend to produce extraordinary rates of innovation. How does this occur? It is easier to perceive opportunities and develop ideas if you are right in the middle of the action with a group of leading companies and suppliers nearby. What makes a cluster even more important is that it is a place where it is easier to commercialise new ideas. New ideas can be introduced to the market without a company having to take the risk of doing it all itself.

Clusters, therefore, nurture the fundamental conditions that allow innovation to take place, as shown in Figure 8. They tend to stimulate the growth of sophisticated and trained workforces, as well as the development of knowledge and technology in that particular field. As a result, when a cluster develops, it tends to export not only the product but also intellectual capital and technology.
Clusters Increase Productivity / Efficiency
- Efficient access to specialized inputs, employees, information, institutions, and "public goods" such as training programs and training institutions
- Ease of coordination across firms
- Rapid diffusion of best practices
- Ongoing, visible performance comparisons and strong incentives to improve vs. local rivals

Clusters Stimulate and Enable Innovations
- Better ability to perceive innovation opportunities
- Presence of multiple suppliers and institutions to assist in knowledge creation
- Ease of experimentation given locally available resources

Clusters Facilitate Commercialization
- Opportunities for new companies and new lines of established business are more apparent
- Lower barriers to entry into cluster related businesses because of available skills, supplies, etc

- Competition is fundamentally enhanced by externalities, linkages, and relationships across firms, industries and associated institutions

Figure 8: Clusters and Innovation
### General
- Chambers of Commerce
- Professional associations
- School networks
- University partner groups
- Religious networks
- Joint private/public advisory councils
- Competitiveness councils

### Clusters-specific
- Industry associations
- Specialized professional associations and societies
- Alumni groups of core cluster companies
- Incubators

### Institutions of collaboration are formal and informal organizations that
- facilitate the exchange of information and technology
- foster cooperation and coordination

### They can improve the business environment by
- creating relationships and the level of trust supporting them
- encourage the definition of common standards
- facilitate the organization of collective action
- support the definition and communication of beliefs and attitudes
- providing mechanisms to develop a common economic or cluster agenda

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**Figure 9: Institutions for Collaboration**
INSTITUTIONS FOR COLLABORATION

Innovation also benefits from the presence of institutions of collaboration. In the old model of economic development, there was a clear distinction between government, business and universities: government ran the economy, businesses competed, and universities taught students and conducted research.

In modern competition, these traditional roles have merged and there is a heightened need for interaction between government, business and universities. Institutions for collaboration help this interaction to take place by building links between various parts of a cluster and facilitating the transfer of ideas (see Figure 9).

These institutions often fall somewhere in between the private and public domains. They include such organisations as chambers of commerce, professional associations, industry associations and even informal networks such as university alumni groups.

INDUSTRIAL POLICY VS. CLUSTER-BASED DEVELOPMENT

It is important for policymakers in the Netherlands to clearly distinguish between industrial policy and a cluster-based development process. A frequent response to the cluster concept is: “We already tried that - we targeted particular sectors and supported them and it didn’t work.” However, cluster-development is not just another name for industrial policy. Quite to the contrary, as demonstrated in Figure 10 industrial policy is about picking winners, favouring domestic companies, and intervening in competition by means of subsidies or other forms of intervention. In the Netherlands, as elsewhere, industrial policy has distorted and impeded competition.

Cluster-based economic development departs significantly from industrial policy. It is not about picking winners, but about enhancing productivity in every field. Cluster development is inclusive: it can encompass all parts of
Industrial Policy

- Target desirable industries / sectors
- Focus on domestic companies
- Intervene in competition (e.g., protection, industry promotion, subsidies)
- Centralizes decisions at the national level

Cluster-based Policy

- All clusters can contribute to prosperity
- Domestic and foreign companies both enhance productivity
- Relax impediments and constraints to productivity
- Emphasize cross-industry linkages/complementarities
- Encourage initiative at the state and local level

Figure 10: Cluster Policy versus Industrial Policy
an economy and embodies both domestic and foreign companies. Clusters help create an environment that is productive, attracts people with the right skills, and provides a good supplier base and research organisations. Instead of distorting competition, cluster development raises the level of competition for all the participants.

H OW T O I M P R O V E I N N O V A T I O N I N T H E N E T H E R L A N D S

As a nation, the Netherlands has competitive advantages and disadvantages. Dutch firms are strong in distribution, serve broad international markets, employ sophisticated production processes, among other strengths. However, the country falls behind in uniqueness of product design, capacity for innovation, and company spending on R&D. In Dutch industry, there seems to be a characteristic approach to competing on efficiency, but this is one of the reasons behind the country’s relatively low innovation output.

Change is needed in at least five areas if the Dutch economy is going to be prepared for the future.

- Increase R&D spending in the corporate sector;
- Produce more science and technology workers;
- Improve the institutional structure for science, technology and innovation;
- Move cluster development from an academic process to a change process;
- Change attitudes towards productivity and innovation.

The country has made progress in some of these areas, but significant improvement is needed in all of them.

Increase R&D spending in the corporate sector

R&D spending by the Dutch private sector is low, and public sector spending has partially been compensating for this (see Figures 11 and 12). In developing countries, this public sector bias is often necessary, but in an advanced nation like the Netherlands, it is an ominous sign, and will adversely affect innovation in the long run. Both Finland and Sweden have high public
Figure 11: Company R&D Spending in Selected Countries

Private Expenditure on R&D, Share of GDP
Figure 12: Public R&D Spending as % of GDP, 1998

Source: EU Scoreboard
Figure 13: Prevalence of Scientists & Engineers

Proportion of Researchers in the Workforce, Selected Countries

Researchers per 10,000 Employed
1997 or latest year

Spain

Denmark

US

Japan

Sweden

Finland*

Average: 61.7

Average: 3.86%

Canada

Norway

UK

US

Germany

France

Canada

Denmark

Ireland

Average: 61.7

Note: Finnish Growth Rate for 1991-1998
Source: OECD, 2001
R&D expenditures. However, these two countries also have very high private sector spending, so that their combined total is much higher than the Netherlands. The Netherlands has to shift - not by reducing public sector R&D investment, but by boosting that of the private sector. In addition, the Netherlands needs to improve the way it spends its public R&D money.

_There are various reasons why Dutch private sector investment in R&D is below the desired level. One is the widely held belief that the Netherlands is a service economy and thus does not have to spend much on R&D. However, many other countries with even greater service sector shares of GDP have substantially higher levels of R&D spending. A more important reason why Dutch companies are not investing more aggressively in R&D is that this is not part of their strategy. The traditional strategy of Dutch companies has been to be low-cost and efficient in producing relatively standard products and services. In a region where there are many lower-cost locations, especially in Eastern Europe, this cost-based model is losing its relevance. Instead, it will be necessary to shift to a more technologically based model with sophisticated products and processes. This will require stepped up R&D spending._

**Produce more science and technology workers.**

_ Science and technology is not attracting enough young people in the Netherlands. Figure 13 illustrates the lagging prevalence of Dutch scientists and engineers in the workforce, compared to other countries. The public school system is not equipping or motivating students in science and technology, and not enough women are enrolling in this field. The country must address this problem because such skills are increasingly becoming the determining factor for economic success._

**Improve the institutional structure for science, technology, and innovation**

_ The list of the top Dutch holders of patents issued between 1996-2000 leads to some immediate observations (see Figure 14). Universities are far
### Figure 14: Leading Dutch U.S. Patent Holders

**Total of 1996-2000**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Total Patents, 1996-2000</th>
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<tbody>
<tr>
<td>1.</td>
<td>U.S. PHILIPS CORPORATION 1,698 patents</td>
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<tr>
<td>2.</td>
<td>AKZO NOBEL N.V. 226</td>
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<tr>
<td>3.</td>
<td>SHELL OIL COMPANY 174</td>
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<tr>
<td>4.</td>
<td>DSM N.V. 125</td>
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<td>5.</td>
<td>KONINKLIJKE PTT NEDERLAND N.V. 89</td>
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<td>6.</td>
<td>MEDTRONIC INC. 80</td>
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<tr>
<td>7.</td>
<td>OCE-NEDERLAND B.V. 53</td>
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<td>8.</td>
<td>GENERAL ELECTRIC COMPANY 52</td>
</tr>
<tr>
<td>9.</td>
<td>CORDIS CORPORATION 39</td>
</tr>
<tr>
<td>10.</td>
<td>OCE-TECHNOLOGIES (office equipment), B.V. 38</td>
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<tr>
<td>11.</td>
<td>GIST-BROCADES, B.V. 37</td>
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<tr>
<td>12.</td>
<td>LEVER BROTHERS COMPANY 37</td>
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<tr>
<td>13.</td>
<td>LUCENT TECHNOLOGIES INC. 35</td>
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<td>14.</td>
<td>VITATRON MEDICAL B.V. 35</td>
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<tr>
<td>15.</td>
<td>BERG TECHNOLOGY, INC. 34</td>
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<td>16.</td>
<td>NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO 34</td>
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<td>17.</td>
<td>AGENCE SPATIALE EUROPEENNE 33</td>
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<td>HOLLANDSE SIGNAALAPPARATEN B.V. 31</td>
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<tr>
<td>22.</td>
<td>UNIVERSITY OF NORTH CAROLINA 13</td>
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<td>23.</td>
<td>TECHNISCHE UNIVERSITEIT DELFT 11</td>
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<td>24.</td>
<td>RIJKSUNIVERSITEIT LEIDEN 6</td>
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</tbody>
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Source: U.S. Patent and Trademark Office

### Figure 15: Top 25 Patenting Universities in the U.S. Total of 1995-1999

<table>
<thead>
<tr>
<th>Rank</th>
<th>University</th>
<th>Total Patents, 1995-1999</th>
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<tbody>
<tr>
<td>1.</td>
<td>University Of California 1,585</td>
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<td>2.</td>
<td>Massachusetts Institute Of Technology 605</td>
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<td>3.</td>
<td>University Of Texas 444</td>
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<td>4.</td>
<td>Wisconsin University 339</td>
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<td>6.</td>
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<td>7.</td>
<td>Johns Hopkins University 275</td>
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<td>State University Of New York 217</td>
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<td>University Of Michigan 209</td>
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<td>13.</td>
<td>Michigan State University 200</td>
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<td>14.</td>
<td>Columbia University 196</td>
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<td>15.</td>
<td>University Of Minnesota 180</td>
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<td>University Of Washington 173</td>
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<td>17.</td>
<td>Harvard University 164</td>
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<td>18.</td>
<td>University Of North Carolina 154</td>
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<td>19.</td>
<td>Washington University 151</td>
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<td>20.</td>
<td>Duke University 139</td>
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<td>21.</td>
<td>University Of British Columbia 137</td>
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<td>22.</td>
<td>North Carolina State University 129</td>
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<td>23.</td>
<td>University Of Nebraska 122</td>
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<td>University Of Utah 121</td>
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<td>25.</td>
<td>Penn State University 116</td>
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Source: U.S. Patent and Trademark Office

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down the list, and far behind the top 25 patenting universities in the U.S., over a similar time-period (see Figure 15). The top U.S. university produced 1585 patents, while the top Dutch university produced just 13. To create vibrant innovation and rapid new company formation, and country needs institutions and universities - not just companies - to perform intensive R&D and aggressively disseminate technology.

Universities in the Netherlands have traditionally been much less commercially oriented than in the U.S., where commercial activities are more highly regarded. In the Netherlands, universities have little contact with companies, and filing patents and seeking to license technology to the private sector is not part of the culture.

In the U.S., universities such as MIT see patents as an important indicator of success. Also, U.S. universities often specialise in particular fields, with the goal of becoming world-class in them. Meanwhile, universities in the Netherlands are more broad-based. Dutch universities are strong, the quality of science and technology is high, and the amount of money the government spends is substantial. The need is to create norms and incentives that will allow universities to provide greater benefits to society. There are just too many barriers standing in the way in the current structure.

Move cluster development from an academic process to a change process

The Netherlands has well-developed clusters in areas such as medical equipment, plastics, beverages, and computers. The issue, however, is whether and how clusters are being upgraded and how they are performing (see Figure 16). Cluster development is a long process that involves a series of public and private investments. A particular mindset also helps drive this process. Different parties have to work closely together to enhance competition and innovation, not rely on government subsidies. Subsidies usually do not allow companies to win; they just keep them from dying.
Strengths
• An important phenomenon in the country's economic history (e.g., finance and trade)
• Early adopter of cluster thinking

Challenges
• Much analysis but limited action:
  - While policy documents acknowledge the role of clusters in innovation, the cluster approach is not yet central to government innovation policy
  - The private sector is reluctant to assume a leadership role in cluster efforts
  - Companies underestimate the importance of the local business environment
• Few linkages between clusters and universities due to the structure of most Dutch institutions of higher learning
  - An exception is the Wageningen Agricultural University and the agriculturally-based clusters
• Limited coordination among ministries in the allocation of R&D funds
  - In the field of ICT investments government is trying to develop a more coordinated strategy
• Not enough focus on emerging fields of knowledge
While the Netherlands was an early adopter of cluster thinking, there is still a long way to go to realise it. Figure 17 lists some of the pitfalls that need to be overcome for clusters to develop in any country, including the Netherlands. A major problem in the Dutch case is that there has been a lot of analysis, but not enough action. Although many policy documents have been published, clusters are not yet an integral part of the country’s innovation policy. The lack of linkages between clusters and universities can partly be explained by the structure of Dutch higher-learning institutions, the limited degree of co-ordination among government ministries, and the process for allocating R&D funds. It is important that the Netherlands implement cluster thinking to allow the innovation agenda to move forward.

**Change attitudes towards productivity and innovation**

A number of attitudes are hindering co-operation between Dutch universities and companies. First, science is pursued for science’s sake and its application is considered of lesser importance. Second, the commercialisation of science is not seen as critical and many believe it threatens the independence of universities. Finally, universities do not recognise the need to establish relationships with industry and fail to see the opportunity to learn from the private sector.

These attitudes need to be revisited. In the U.S., researchers and companies see opportunities for productive dialogue and act upon them. The Netherlands needs to follow this example, creating an atmosphere where there is excitement when a scientist comes up with an idea that can have a real impact on society.
Figure 17: Common Pitfalls in Cluster Development Initiatives

- Picking priority clusters
- Government-driven vs. private sector-driven
- Using the cluster concept as a cover for intervention and industrial policy
- Overly broad or overly narrow cluster definitions
- Overly broad or overly narrow geographic area considered
- Orientation towards subsidies or limiting competition
- Ignoring small or emerging clusters
- Attempting to create clusters where there is no foundation
THE NETHERLANDS NEEDS TO ACT NOW

The Dutch government, business and universities need to address multiple issues immediately in order to create an environment that fosters increased innovation. There is no single panacea. Many steps need to be taken.

The final challenge facing the Netherlands is creating the will to act. This can be difficult when an economy is perceived to be performing well. Changes in a nation’s strategy and innovation policies are hard to accomplish and take time. Other countries have shown that a fundamental change in attitude towards entrepreneurship, commercialisation and innovation can produce impressive results. Perhaps the greatest challenge facing the Netherlands is to realise that the currently healthy situation is not sustainable, and that the time to act is now.
PANEL DISCUSSION

PROFESSOR PORTER’S ASSESSMENT OF THE DUTCH ECONOMY WON MUCH INTEREST AND GENERAL AGREEMENT FROM THE INVITED PANEL. AFTER THE SPEECH THEY DISCUSSED PROFESSOR PORTER’S VIEWS.

Mr. Wijffels, Chairman of the Social and Economic Council, believed that Professor Porter’s analysis was very convincing, adding, “I hope we will indeed start to act.”

Mr. Nieuwenhuis, Director of Strategy and Technology at PinkRoccade, was particularly struck by Professor Porter’s remark about Dutch attitudes. “I think as a nation we’re not used to being proud about our inventions. That is a great challenge to change this attitude and to be proud of our own capabilities.”

Mrs. Jorritsma, Minister of Economic Affairs, saw some promise in the fact that the Netherlands has a lot going for it. She accepted that the Netherlands has to proceed with a cluster-based policy, but added that this is not something the government can do alone. “Government wants to play a role. Personally I’m still much more pre-occupied with industrial policy than with cluster-based policy, though I do think we should replace the former with the latter.”

Mr. Bikker, member of the Executive Committee of Euro RSCG worldwide, believed that more young people have to be stimulated to become entrepreneurs. “At that age, you can influence them and make them enthusiastic about certain skills and fields.”
Mr. Dunn, President and CEO of ASM Lithography, said, “Professor Porter gave us a wake-up call.” Of the five key areas that Professor Porter mentioned, Mr. Dunn believed that the most important was attitude. “Celebrating heroes or success stories is good, but we also have to learn to make mistakes. Entrepreneurship and innovation require risk-taking, and we must be more open to that idea.”

Mrs. Jorritsma continued, “What we have to do is bring people together. We definitely have to do something now and I agree with Professor Porter that it is difficult to do so if things are going relatively well. We as a nation did best when the economy was down in the early eighties. As a result, we have a sound social-economic policy. Now it will be harder to motivate people. It’s a challenge.”

Mr. Wijffels agreed that the Netherlands is under-investing in innovation. “It’s a real problem, and in my view we will have to fully redesign the whole fabric of universities and research institutions, and also re-assess how the government funds these institutions. After this, we should adopt the cluster policy, as other countries have successfully done.”

Mrs. Jorritsma believed that every company in Holland should be challenged to find and form its own cluster. “If a company wants to be innovative and grow, then they should be able to find knowledge institutions that can help. If a university has specific knowledge why not ‘sell’ it to the private sector?”

Professor Porter reiterated that although the Netherlands has nearly full employment and is competitive within Europe, the introduction of the euro will see that relative advantage shrink. “The goal of a country is not to hold down its wages, but to see to it that they continually rise. To do that, its industry must create better products or produce them more efficiently. That is the simple equation of prosperity.”
Professor Porter expressed doubts about a European-wide science and technology network, saying that regions and countries should instead compete in what they do uniquely well. “You must allocate European resources based on merit and not force a Pan-European collaborative process.”

Mrs Jorritsma said that European innovation policy is supplemental to, and does not supersede, the Dutch national policy: “The issue, though, is how do we stimulate scientists to move around Europe more and exchange their scientific bases. If there are similar knowledge centres, let’s exchange knowledge. In Europe, we also have to break down barriers such as the patent system. We have a dreaded system, where a company needs 15 separate patents to be able to function.”

Mr. Porter said that he believed the European patent system was unnecessarily costly and a disincentive to patenting. “Intellectual output is an asset and I would advocate the streamlining of the European system to foster the pursuit of intellectual property as a competitive advantage.”
PUBLISHER
Directorate-General for Innovation, Ministry of Economic Affairs

CONCEPT & COORDINATION
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PHOTOGRAPHY
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DESIGN AND LAYOUT
Moos_design

Additional copies can be ordered from the Information and Press Unit of the Ministry of Economic Affairs.
Telefoon 0800-6463951 (09.00 - 21.00 hours)
(+31-(0)703081986)
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Ordernumber 02/09

The Hague, April 2002