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**The construction of knowledge-based economies versus knowledge societies:  
The cases of Germany and Singapore**

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# The Construction of Knowledge-based Economies versus Knowledge Societies: The Cases of Germany and Singapore

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## 1. Introduction

In the past decades, terms such as ‘knowledge-based economy (KBE)’, and ‘information/knowledge society’ have been adopted by governments worldwide in order to underline their interest in developing their economies and societies further and assure future growth. Many governments used these catchwords as labels for government programs and action plans aiming at economic and social prosperity. This aim of national governments to construct knowledge-based economies, information/knowledge societies, the actions taken and especially the ability or disability to do so, is the topic of this paper. As two cases of comparison act Singapore and Germany.

The term ‘knowledge-based economy’ is used by the Singaporean government by adopting the definition summed up by APEC: “A Knowledge-Based Economy is an economy in which the production, distribution, and use of knowledge is the main driver of growth, wealth creation and employment across all industries”.<sup>1</sup> Furthermore, Singapore government states in its vision paper “Singapore21” that the “knowledge-based economy is one in which information and knowledge, rather than material resources, drive activities.”<sup>2</sup> The term ‘information society’, mainly used by the German government, exchanges the strong focus on economic growth with the emphasis on the role of information and communication technologies in future economic and social development. As stated in the action programme of the German government, “modern information and communication technologies (ICT) are crucial to harnessing knowledge and innovation in order to raise growth, competitiveness and employment in today's networked world.”<sup>3</sup> The term ‘knowledge society’ is mainly used in academic circles as well as in some action programmes of the German government. This term emphasises the increasing importance and value of knowledge in all economical, political and social actions and interactions. The knowledge society is often seen as a state

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<sup>1</sup> APEC Economic Committee (2000), Towards Knowledge Based Economies in APEC, APEC Secretariat.

<sup>2</sup> Accessible under: <http://www.singapore21.org.sg/>.

<sup>3</sup> Bundesministerium für Wirtschaft und Arbeit (BMWA) and Bundesministerium für Bildung und Forschung (BMBF) (2003). Informationsgesellschaft Deutschland 2006 - Aktionsprogramm der Bundesregierung. Berlin.

of societal development, which is one phase higher than KBE and information society. It can also be seen as a society, where every member of it actually can and does use knowledge in order to create new knowledge.

In the following, I argue that the political, economical and cultural structures in each country shape country-specific arenas of actors. Institutionally embedded actors cooperate and influence each other in specific ways which then again shape the arena of actors in each country. These actors, related to each other, define what is considered as valuable knowledge. The definition, which kind of knowledge is regarded as valuable and hence its creation as supportable in a country, determines the politics of knowledge production practised and hence, what kind of KBE, knowledge/information society is created. It is the focus of this paper to outline this development and process of creation in Singapore and Germany, looking at state activities that aim at the construction of KBE, information/knowledge societies.

The research, underlying the basic assumptions of this paper, was conducted in Germany and Singapore in the shape of semi-structured, qualitative expert interviews with representatives of government agencies, as well as publicly financed research institutes and political foundations. The interviews are codified and analysed using the grounded-theory approach developed by Strauss.<sup>4</sup>

## 2. The Arena of Actors

The focus of this article lies on the role of the state in constructing a KBE, information/knowledge society. Hence, I concentrate on institutionally embedded actors representing state administrative bodies, as well as state-financed research institutes. Apart of these actors, industry, media as well as society (non-governmental organisations and associations) are active groups in creating and shaping KBE, information/knowledge societies in both countries. This study nevertheless focuses on the state activities and hence looks at actors representing the state as well as actors intensively shaping the policies and activities of the state through advisory, expert committees and enquiry-commissions.

In Germany the engagement into creating and shaping a German information/knowledge society by the state is conceptually headed by the Federal Ministry of Economics and Labour (BMWA = Bundesministerium für Wirtschaft und Arbeit) as well as the Federal Ministry of Education and Research (BMBF = Bundesministerium für Bildung und Forschung). Further federal ministries head separate activities that contribute to the information/knowledge society Germany. As examples can be mentioned the Federal Ministry of the Interior (BMI = Bundesministerium des Innern) coordinating BundOnline, the eGovernment-activities of the Federal Government, the Federal Ministry of Health and Social Security (BMGS = Bundesministerium für Gesundheit und Soziale Sicherung) supporting the introduction of the electronic health card, as well as the Federal Ministry of Finance (BMF = Bundesministerium der Finanzen) coordinating Elster, a programme for filing tax electronically as well as Atlas, a programme for electronicising custom duty. In the process of conceptualising action plans such as the current "Information Society Germany 2006", the Federal Ministries cooperate closely with each other but also with academics and representatives of the industry. While academics influence the processes as

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<sup>4</sup> Strauss, A. L. (1987). *Qualitative Analysis for Social Scientists*. Cambridge, Cambridge University Press.  
Strauss, A. L. and J. Corbin (1990). *Basics of Qualitative Research. Grounded Theory Procedures and Techniques*. London, Sage Publications.

members of expert committees and commissions, the industry takes influence mainly through private-public-partnership structures. The non-governmental sector/society has only limited influence. In Germany the cooperation between state and industry with the aim of shaping and creating an information/knowledge society is structured by the Initiative D21. The Initiative D21 is Germany's largest public-private partnership. More than 400 representatives of enterprises, associations, parties, political institutions and other organizations are currently involved, including board members from companies such as Alcatel, AOL, Cisco Systems, Debitel, IBM, Microsoft, Siemens and TNS Emnid. They are assisted by an Advisory Council chaired by German Chancellor Gerhard Schröder.

While non-governmental organisations and other groups representing society do not have much influence on government programmes such as "Information Society Germany 2006", it is important to mention that they do have very strong impact on defining which kind of knowledge is regarded as valuable through interest groups but also the academia. The definition of knowledge, which then again structures the politics of knowledge production and dissemination in Germany is carried out by a very wide range of actors in society including the state, the industry, the academia and various interest groups in society. The academia takes a strong influence on this process for example through the German Research Association (DFG = Deutsche Forschungsgesellschaft), society in general is represented in this process for example by political and cultural foundations as well as the German Academic Exchange Service (DAAD = Deutscher Akademischer Austauschdienst).

In Singapore, this process of defining which knowledge is regarded as valuable is mainly guided by the state. The state budgeting for various fields of research and development (R&D) as well as for different fields of study in the universities heavily structures the process of knowledge production. Interest groups representing society, as for example foundations hardly exist; the industry takes influence on the government decisions, as discussed below. The creation and shaping of a knowledge-based economy (KBE) was originally approached by the state by building vast information and telecommunication infrastructure, computerising the public service and investing into computer education. Main actor was the National Computer Board (NCB). As a result of a merger between the National Computer Board and the Telecommunication Authority of Singapore in 1999, the Infocomm Development Authority (IDA) was formed. IDA is since then a statutory board of the Singaporean Government and operates under the Ministry of Information, Communications and the Arts (MICA). Besides the infrastructural emphasis of IDA, MICA focuses at the content development, which is seen as an important aspect of the KBE. Furthermore, the Ministry of Education (MoE) emphasises the use of computer technology as well as the development of creativity in schools. Besides MICA and MoE, mainly statutory boards are focussing on shaping the KBE further. As example, the National Library Board (NLB) can be mentioned. Libraries are supposed to become centres of knowledge creation and social capital building. Creativity is seen as a key for future success and creative industries, industries dealing with design, publishing, advertising etc. are seen to become more important in the future KBE. Besides the creative industry sector, the statutory board A\*Star works actively on building a Singaporean life- and bioscience hub.

Up to what extent these activities lead to economic growth, is monitored by the Economic Development Board (EDB) which is also responsible for attracting foreign investors.

Besides state bodies, the academia as well as the industry, but not so much social groups are important actors. Through a broad engagement process coordinated by IDA, industry representatives take part in the planning of future infrastructural programmes. The influence of the industry on developing the "soft" sectors of the KBE, such as creative industries and the library scene is of far less importance. Yet, the overall conceptualisation of developing certain clusters, such as creative industries, information and telecommunication industries,

bio- and life sciences, media hub, is done by the cabinet of the government and with the help of industry and academic consultancy from all over the world.

### 3. Definitions of Knowledge

In each country – as described above – either the state, the industry, the academia or interest groups representing society, basically the dominant elite, define what kind of knowledge<sup>5</sup> is perceived as valuable and hence its production and dissemination as support worthy. This definition or definitions are represented by action. Action in terms of government financing for certain sectors, curricula from primary up to tertiary education emphasising the importance of certain subjects, scholarship programmes for certain fields of study and research, just to name a few examples.

Looking at Singapore and Germany, one can state, that the differences in who acts, outlined in part 2, are also reflected in the definition of what is considered as valuable knowledge. In Singapore, it is the state, meaning the government and its administration that defines which knowledge is valuable, according to which knowledge might generate future economic growth for the Singaporean economy.

In Germany, knowledge production and dissemination has a very long tradition at university level but also in form of privately and publicly financed R&D. Furthermore, the federal system with education being under the right of the states, not the federal government, provides a much decentralised ground for defining which knowledge is regarded as valuable. Definitions in different states regularly differ and this differing again enables a rather open approach to knowledge. Knowledge in general is seen as something positive, whether it leads to economic growth or not. This rather humanistic definition of knowledge is represented by the sponsoring of high-technology research in Fraunhofer and Max-Planck-Institutes at the same time as financing theatres in most German cities, museums and heritage preservation<sup>6</sup>, hence financially supporting a wide range of different fields of knowledge production and dissemination. Another indicator for this rather liberal definition of which kind of knowledge is seen as valuable is the German education system or what is known as “deutsche Allgemeinbildung”. While in most Anglo-Saxon systems and also in Singapore students decide at the age of sixteen which three to five subjects they will concentrate on, it is common for students in Germany to study ten to eleven subjects, with special focus on two to four, until graduation from secondary school.

The Head of the Centre for Advanced Media Technology (CamTech), a collaborative project between the Nanyang Technological University in Singapore and the Fraunhofer Institute for Computer Graphics in Germany, describes the research situation in Germany and Singapore as follows:

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<sup>5</sup> Berger and Luckmann define ‘knowledge’ “as the certainty that phenomena are real and that they possess specific characteristics.” This rather broad definition is also suitable in the context of this text. (Berger, P./Luckmann, Th., *The Social Construction of Reality*, The Penguin Press, London, 1967.)

<sup>6</sup> Specific numbers on the funding can be found in the following two references:  
Statistisches Bundesamt (2004 (Berichtszeitraum 2002)). Ausgaben und Einnahmen der öffentlichen und öffentlich geförderten Einrichtungen für Wissenschaft, Forschung und Entwicklung. Wiesbaden, Statistisches Bundesamt.  
Statistisches Bundesamt (2003). Bericht zur finanziellen Lage der Hochschulen. Wiesbaden, Statistisches Bundesamt.

“It is definitely important that the state creates a certain environment in which plants can grow; meaning that basic research can be conducted without having to justify it with economic success. In Germany, still enough possibilities exist. In Singapore, A\*Star looks into research and not simply market oriented development. Yet, it is increasingly requested to conduct research along the demand of the market. This is problematic, in my opinion, since research requires space in order to make creativity possible.” (Translation by the author.)

The Managing Director of the German Centre for Industry and Trade Pte Ltd in Singapore describes the different definitions of knowledge as follows:

“At the moment, knowledge is still broken down to a very small element in Singapore, while in Germany, knowledge and creativity means abstract, critical thinking. (...) Merely the knowledge of Singapore’s government that the lack of creativity hampers development especially in the areas of branding and tourism lets the government enforce these topics.” (Translation by the author.)

The Dean of the School of Communication & Information, Division of Journalism of the Nanyang Technological University describes the dominant definition of knowledge in Singapore by relating to Germany in the 1940s, when the Nazis had to learn that the theoretical physics, which were often regarded as useless knowledge, only enabled the Americans to build the atomic bomb. Drawing a parallel to today's Singapore, he states:

“Singapore is still where Germany was in the 1940s, asking, what is the point in knowing how many atoms are in somewhere. The Singaporean approach is, how can we make economic value of certain knowledge and ideally fast. This mentality is very pervasive. (...) There isn't the idea of producing knowledge just for the knowledge sake. So a lot of research in Singapore is applied research. This might change slowly, but I think Singapore will be very cautious and you probably will need some basic output at least.”

In the 1980s, Singapore’s government invested heavily into computer education, fuelling the computer and especially disk drive industry in Singapore<sup>7</sup>. Yet, with increasing manufacturing sites moving out of Singapore to the neighbouring countries, Singapore government had to identify new economic sectors to indulge into, in order to further move up the value chain and increase local content production as well as local development of advanced technologies<sup>8</sup>. Consequently, there has been a significant increase in government spending on R&D during the 1990s, which has resulted in a steady increase in the number of research scientists and engineers in Singapore<sup>9</sup>.

In the beginning of the 1990s, Philip Yeo, then chairman of the Economic Development Board of Singapore advised the government to put more emphasis on the production of scientific knowledge as well as bio- and life science. This decision then formed the basis for the creation of A\*Star, a statutory board of the Singaporean government focussing on the

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<sup>7</sup> compare: Ang, P. H. (1992). Singapore's Disk Drive Initiative. The 42nd Annual Conference of the International Communication Association, Miami, Florida.

<sup>8</sup> compare: Anwar, S. and M. Zheng (2004). "Government spending on research and development and industrial production in Singapore." International Journal of Asian Management 3: 53-65.

<sup>9</sup> The number of research scientists and engineers increased from 4329 in 1990 to 17 074 in 2003 (Agency for Science, Technology and Research (A\*Star)., downloadable under [http://www.A\\*Star.edu.sg/astar/front/media/content\\_uploads/Booklet\\_2003.pdf](http://www.A*Star.edu.sg/astar/front/media/content_uploads/Booklet_2003.pdf).)

development of research institutes in the field of bio- and lifesciences<sup>10</sup> as well as on the education of scholars in these fields at top-universities worldwide. The process leading to the founding of A\*Star and a heavily increased financing of R&D-institutes by the Singaporean Government was described by the Director of Temasek Laboratories, a research institute of the National University of Singapore (NUS) as follows:

“The government realised, that all developed, industrialised countries were investing more than 2% of the GDP into R&D, while Singapore invested far less. So Singapore Government decided to aim for 2% of GDP. That was the time when the National Science and Technology Board (NSTB) which later was renamed into A\*Star was formed.”

Describing the way knowledge had to legitimise itself, he continues:

“At that time, it was also important to change the mindset. Before that, people used to always believe that research needs to pay off immediately. But R&D that pays off directly, does not create substance. So A\*Star was founded and together with the universities it aims increasingly higher than just doing directly paying off R&D.”

Even though a change, increasingly emphasising the importance of basic research, might be taking place, this change is driven by the awareness that basic research might lead to a more sustainable economic development. This change is taking place only with regard to fields of knowledge that might potentially be of economic importance. It is not standing for a change in the overall definition of knowledge in society.

Local content production, the development of new ideas, or what could be named creativity often is interlinked with critical thinking. Criticism leads to new ideas, and to innovations. Yet, critical thinking requires space, the freedom to be critical, as well as the awareness that ones own criticism might actually lead to change. It requires the knowledge and trust that being critical cannot harm the individual. As long as people self-censor themselves in a way, that is counterproductive to the development of new ideas, the framework created by the government, will not be able to make people creative. This space is given in Germany. The federal structure as well as the right for free speech foster critical thinking, socio-political activism and the development of ideas, which can be described as creative thinking.

#### **4. Three Concepts of the Future in the Political Sphere**

The concept of knowledge and its importance to society is very old. While, for instance, the philosopher Plato (428-347 BC) rated intelligence as the most important quality of a political leader, the philosopher and economist Mill<sup>11</sup> argued, in 1863, that intellectual and moral education even surpasses industry and wealth in its effects on societal development. Yet, it was not until the mid 20<sup>th</sup> century that these concepts, connected to the terms "information and knowledge societies", advanced as political and economical slogans: in 1959, Drucker<sup>12</sup> addressed the increasing importance of "knowledge workers", while in 1962 Machlup<sup>13</sup>

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<sup>10</sup> A\*Star currently oversees 12 research institutes and centers in Singapore. ([http://www.A\\*Star.edu.sg/astar/about/action/about\\_institutes.do](http://www.A*Star.edu.sg/astar/about/action/about_institutes.do))

<sup>11</sup> Mill, John Stuart, Das System der deduktiven und induktiven Logik, in: Friedrich Jonas, Geschichte der Soziologie 1. Reinbek bei Hamburg: Rowohlt, 434-445.

<sup>12</sup> Drucker, P. F. (1959). The Landmarks of Tomorrow. New York, Harper.

<sup>13</sup> Machlup, F. (1962). The Production and Distribution of Knowledge in the United States. Princeton, Princeton University Press.

published his findings on the importance of knowledge for the economy and the growth of a knowledge sector. In 1966, Lane<sup>14</sup> finally introduced the term "knowledgeable society", assuming that knowledge replaces industrial organisation and production as the major source of productivity. This thought was also adopted by Drucker<sup>15</sup> in his book "The age of discontinuity", in which he was contending that knowledge "has become the foundation of the modern economy" as we have shifted from "an economy of goods" to "a knowledge economy". Yet, in the meantime, the Japanese economist Umesao<sup>16</sup> invented the term "joho shakai" (information society), focussing on the effect of Information and Communication Technologies on economy and society. Also taking this technological approach, Bell<sup>17</sup>, in 1973, spread the term further by concentrating on the increasing dependence of technological change on knowledge. As one of very few Europeans researching this subject, Alain Touraine<sup>18</sup> discusses in his book "société postindustrielle", in 1972, the possibly arising conflict between knowledge have and knowledge have-nots.

Once introduced, the terms "information/knowledge society" rapidly entered governmental reform plans of many countries, including Singapore and Germany. Yet, the term "knowledge-based economy" was developed slightly later (end 1980s), mainly by economists, focussing on the role of knowledge in economic development, as product and source of production.<sup>19</sup> As such, it was – just as the terms "information/knowledge society" – quickly adopted and developed further in the political sphere. The OECD, for instance, emphasises the importance of knowledge as "the driver of productivity and economic growth, leading to a new focus on the role of information, technology and learning in economic performance".<sup>20</sup> APEC defines the knowledge-based economy as "an economy in which the production, distribution, and use of knowledge is the main driver of growth, wealth creation and employment across all industries."<sup>21</sup>

Until today the three concepts KBE, information/knowledge society are often used interchangeably and without clarifying their distinct meanings. In the following, I will outline briefly on how these three concepts are perceived in Singapore and Germany as well as discuss potential reasons for using one or the other term in the two countries political spheres. While Singapore mainly uses the term 'knowledge-based economy', Germany's politicians seem to prefer the term 'information society'. Nevertheless, 'knowledge society' appears rather regularly in government publications, speeches and newspaper articles, especially in Germany but also to a smaller extent in Singapore.

#### 4.1. Germany

In Germany, a brief search for the terms information/knowledge society on the websites of all federal ministries yielded the frequency of usage shown in the table below. Nevertheless,

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<sup>14</sup> Lane, R. E. (1966). "The Decline of Politics and ideology in a Knowledgeable Society." *American Sociological Review* 5.

<sup>15</sup> Drucker, Peter (1969), *The Age of Discontinuity. Guidelines for a Changing society*. London 1969.

<sup>16</sup> Umesao, T. (1963). "Information Industry Theory: Dawn of the Coming Era of the Ectodermal Industry." *Hoso Asahi Jan.*: 4-17.

<sup>17</sup> Bell, Daniel (1979), *Die nachindustrielle Gesellschaft*. Reinbek.

<sup>18</sup> Touraine, Alain: *Die postindustrielle Gesellschaft*. Frankfurt am Main 1972, S. 33-91

<sup>19</sup> Harris, R. G. (2001). "The knowledge-based economy: intellectual origins and new economic perspectives." *International Journal of Management Reviews* 3(1): 21-40.

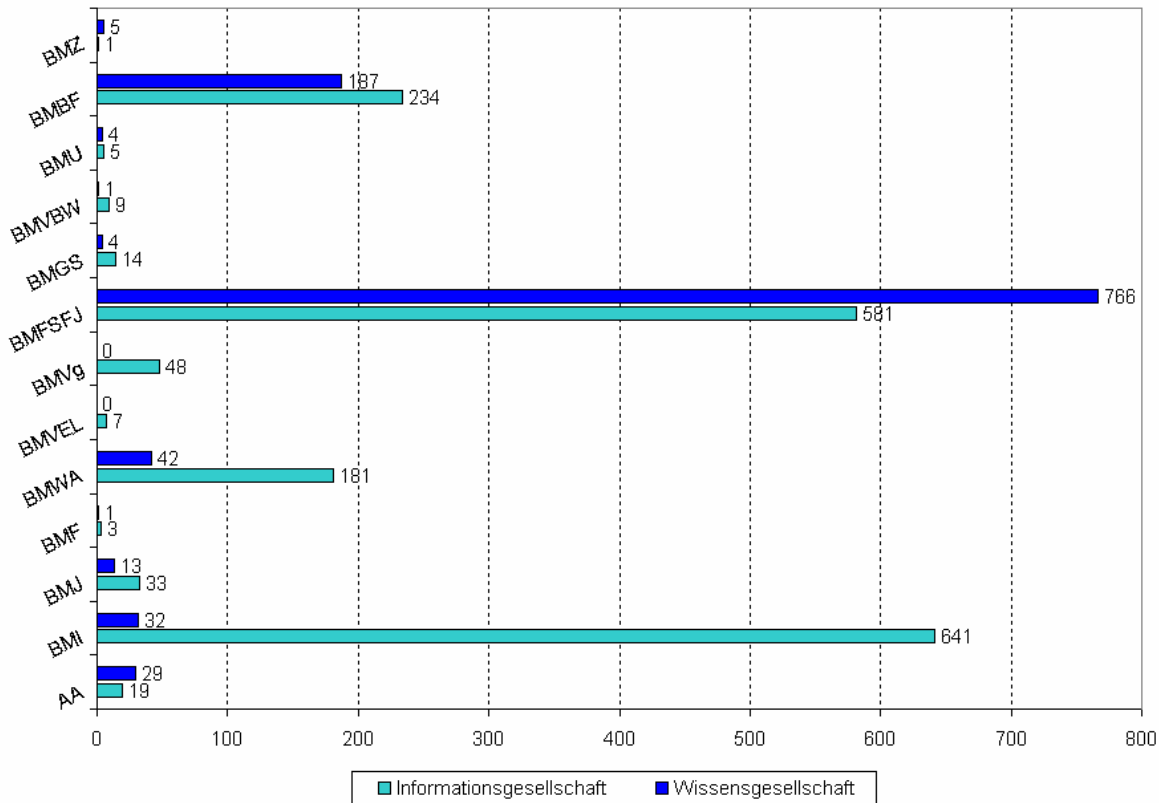
<sup>20</sup> Organization of Economic Cooperation and Development (OECD) (1996). *The Knowledge-based Economy in 1996: Science, Technology and Industry Outlook*. Paris, Organization of Economic Cooperation and Development (OECD).

<sup>21</sup> APEC Economic Committee (2000), *Towards Knowledge Based Economies in APEC*, APEC Secretariat.



one has to bear in mind, that such a search can only give a very rough impression, on the frequency in which the two terms are used.

**Table: Terminological Preferences in Federal Ministries of Germany**



Source: Compiled from German government website data on 25 May 2005 by the author.

Apart of the Federal Ministry for Families, Seniors, Women and Youth (BMFSFJ) all other ministries choose to use the term 'information society' more often than 'knowledge society'. Nevertheless, only two ministries (BMVEL, BMVg) do not use the term 'knowledge society' at all. The findings of this surface-scratching search are also confirmed when looking at the major action programmes of the German Government focussing on the creation of an information society. All major action programmes bear the term 'information society' in their titles, but nevertheless organised the Federal Ministry of Education and Research a conference with the title "Europe on the way of becoming a knowledge society" in 2002. Furthermore, decided the political think tank of the Green Party, Heinrich-Böll-Stiftung to establish a whole research field under the concept 'knowledge society', not 'information society'<sup>22</sup>, just to name two examples.

The Head of the Department "Conceptual Questions and International Matters concerning the Information Society" (Referat "Grundsatzfragen und internationale Angelegenheiten der Informationsgesellschaft") in the Federal Ministry of Economics and Labour, overseeing the

<sup>22</sup> See: <http://www.wissensgesellschaft.org/>

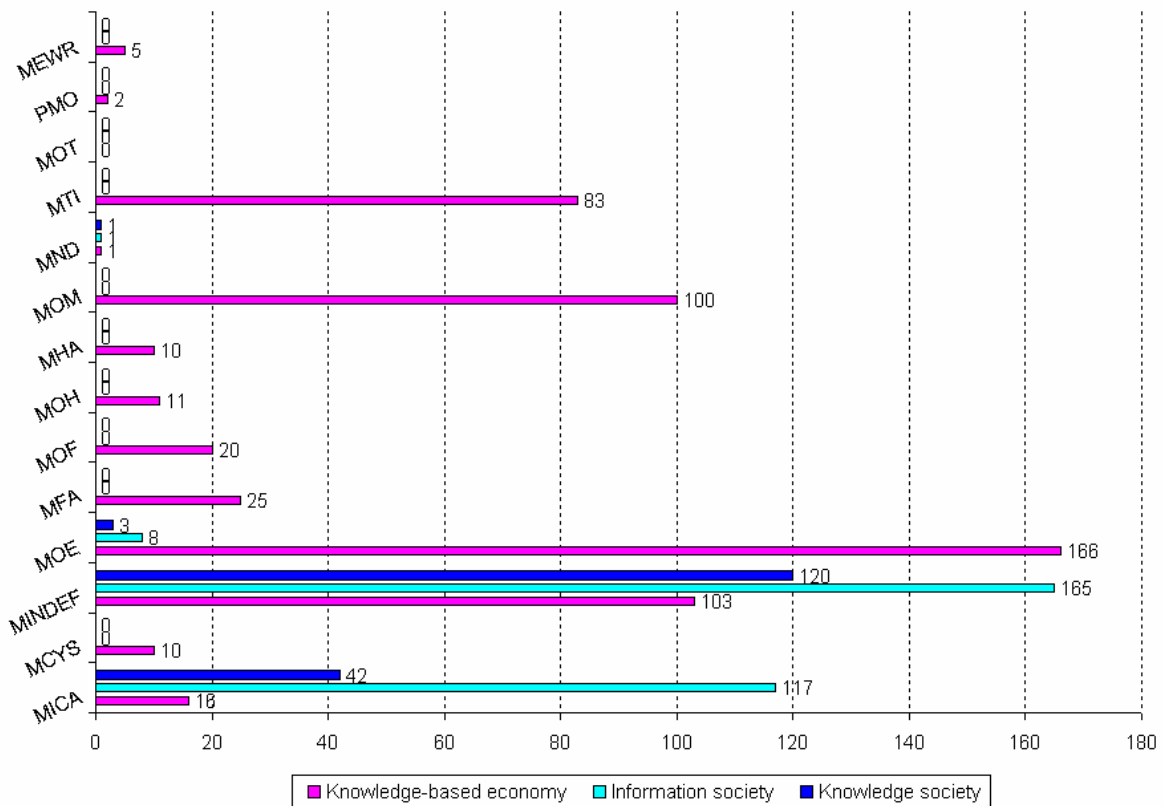
activities of the Federal Government concerning the information society Germany, explains the ambivalent use of the two terms ‘information/knowledge society’ as follows:

“The term ‘knowledge society’ is surely the more comprehensive term. One can argue about the exact meaning and this is not unimportant. (...) But [the ministry] takes the more pragmatic approach and says, until now, the term ‘information society’ is more commonly used. Everyone understands it everywhere. One could also say ‘information and knowledge society’ and in longer explanations, we always use the term ‘knowledge society’ as well. But we see it rather from the pragmatic side and say ‘information society’, everyone understands that.” (Translation by the author.)

## 4.2. Singapore

In Singapore, the same search as conducted on the websites of the Ministries of the Federal Government in Germany, was also conducted on the websites of the Singaporean Ministries, extended by the term “knowledge-based economy”. As above, the frequency of usage illustrated by this search offers only a sketchy insight.

**Table: Terminological Preferences in Singaporean Ministries**



Source: Compiled from Singapore government website data on 25 May 2005 by the author.

Interestingly, the Ministry of Information, Communications and the Arts as well as the Ministry of Defence seem to use the term ‘information society’ more frequently than the term

'knowledge-based economy'. Nevertheless, all other ministries show a clear preference to the term 'knowledge-based economy'.

Looking at government programmes fostering the creation of a knowledge-based economy, information/knowledge society, one has to state the following. The Singaporean government and its administration does not have a single major action plan which bears the term 'knowledge-based economy' or 'information/knowledge society' in its title. This is not to say that the Singaporean government does not have action plans focussing on the creation of a knowledge-based economy. The opposite is the case. The Singaporean government was after Japan one of the first governments embarking on the step-by-step creation of a knowledge-based economy, information/knowledge society. Yet, each action plan focussed on concrete, sectoral aspects, such as on the further development of the information and communication infrastructure, the development of a borderless library system, as well as in more recent years, the fostering of an art and heritage scene in order to raise the level of creativity in Singapore society. Most of these action plans state on the pages 1 to 5 their contribution to the Singaporean knowledge-based economy, but they do not carry the term 'knowledge-based economy' in their titles.

The Chairman of A\*Star and Co-Chairman of the Economic Development Board explains the use of the term 'knowledge-based economy' rather than 'information or knowledge society' as follows:

"If I have a n economy and people have good jobs, you can do anything you like. Society derives from there. Economy is key to any society. When people are hungry, there is no society, there is no culture, there is no poetry, and there is no building. So you start with economics. When people are economically employed and active, the rest will come."

The Chief Executive of the National Library Board explains the preference of the term 'knowledge-based economy' as follows:

"In Singapore everything is driven by economics. The knowledge society is the long-term goal, yet at the moment we still focus on the KBE. The KBE plugs you and the Singaporean market directly into a global system, the international market. The knowledge society is far more inward looking. Also it is harder to grasp. The KBE is easier to be defined and grasped."

## 5. State Activities to create a German Information Society

In 1972, the Federal Ministry of Education and Science of Germany publishes the German translation of the Japanese report "Japan's Technological Strategy"<sup>23</sup>, which emphasises the importance of creating an information society in Japan. Hence, the activities of other countries in this field were monitored as well as this topic was indeed of relevance to the German politics at that time. Nevertheless, only with the beginning of the 1980s, the term 'information society' advances into the political sphere of Germany and is overshadowed until the beginning of the 90s<sup>24</sup> by discussions on cable television, the privatisation of the broadcasting services and the cabling of the whole republic, which is emphasised by the first

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<sup>23</sup> Bundesminister für Bildung und Wissenschaft (1972). Japans Technologische Strategie - Wiedergabe und Kommentar einer Studie des Ausschusses für technologischen Fortschritt des japanischen Wirtschaftsrates. Bonn, Bundesministerium für Bildung und Wissenschaft.

<sup>24</sup> See also: Hamburger Erklärung zur Informationsgesellschaft ([http://langlab.uta.edu/scottweb/cybergermania/h\\_e\\_i.html](http://langlab.uta.edu/scottweb/cybergermania/h_e_i.html))

Commission on the Extension of the technical Communication Systems (Kommission für den Ausbau des technischen Kommunikationssystems) in 1975.<sup>25</sup> With the development of the interactive videotex, the concept of an information society becomes increasingly present in public and political discourse. In 1981, the expert commission "New Media"<sup>26</sup> of the state Baden-Württemberg discusses the consequences of the new media technologies on our everyday life. In 1983, again financed by the state government of Baden-Württemberg, the expert commission on the "Future Perspectives of societal Development"<sup>27</sup> discusses the path into an information society out of three perspectives: the social sciences, the informatics and computer technology as well as the educational sciences and pedagogy. These commissions are followed by several expert commissions on the topic information society, some actually using the term, emphasising its connotation of progress and economic development, others avoiding the term as a catchword without substance.<sup>28</sup> On the level of the Federal Government the term is next used in 1996 by the Technologierat of the Federal Government in its report "Info 2 000: Germany's Way into the Information Society".<sup>29</sup> This report is followed up by a progress report one year later.<sup>30</sup> While this report is the first report of the Federal Government emphasising the term and concept of an information society, it can be criticised, that it on the one side does not reflect the theoretical discussion since Bell, on the other side does not do justice to the social reality of Germany with increasing, structural unemployment, financial deficits of the public as well as decreasing economic growth.<sup>31</sup> Nevertheless, this report encourages the German Bundestag to the forming of the cross-fractional Enquete-Commission "Future of the Media in Economy and Society - Germany's Way to the Information Society" on December, 5<sup>th</sup> 1995. It is the aim of this commission to analyse the political consequences that arise from the usage of information and communication technologies, to make use of the chances and restrict risks arising in the information society. Unfortunately, the final report<sup>32</sup>, which is published in 1998 just before the end of the legislative period, does not offer a stringent conclusion but is full of antagonisms between the different political fractions. In the following election campaign it is used by each political party differently and seems to be forgotten completely later on. As described by Klumpp<sup>33</sup>, the outcomes, meaning the final reports of most commissions concerning the information society Germany, were drowned by everyday politics, which reflects the (un-)importance of the topic to German politicians and their actions. In 1999, the Federal Cabinet assigns the Federal Ministry for Economics and

<sup>25</sup> Kübler, H.-D. (2005). *Mythos Wissensgesellschaft - Gesellschaftlicher Wandel zwischen Information, Medien und Wissen. Eine Einführung.* Wiesbaden, VS Verlag für Sozialwissenschaften.

Kleinsteuber, H. J. (2003). *Abschied vom Konzept Informationsgesellschaft? Next Generation Information Society? - Notwendigkeit einer Neuorientierung.* D. Klumpp, H. Kubicek and A. Roßnagel. Mössingen-Talheim, Talheimer Verlag.

<sup>26</sup> Expertenkommission Neue Medien – EKM Baden-Württemberg (1981): Abschlussbericht. 3 Bde. Stuttgart.

<sup>27</sup> Kommission "Zukunftsperspektiven gesellschaftlicher Entwicklungen" (1983). Abschlussbericht. Stuttgart, erstellt im Auftrag der Landesregierung von Baden-Württemberg.

<sup>28</sup> Kübler, 2005.

<sup>29</sup> Bundesministerium für Wirtschaft (BMWi) (1996). *Info 2000 - Deutschlands Weg in die Informationsgesellschaft - Bericht der Bundesregierung.* Bonn, Bundesministerium für Wirtschaft.

<sup>30</sup> Bundesministerium für Wirtschaft (BMWi) (1997). *Info 2000 - Deutschlands Weg in die Informationsgesellschaft - Fortschrittsbericht der Bundesregierung.* Bonn, Bundesministerium für Wirtschaft.

<sup>31</sup> Kleinsteuber, H. J. (1997). "Informationsgesellschaft: Entstehung und Wandlung eines politischen Leitbegriffs der neunziger Jahre." *Gegenwartskunde* 1: 41-52.

<sup>32</sup> Deutscher Bundestag (13. Wahlperiode (22.08.1998)). *Schlussbericht der Enquete-Kommission "Zukunft der Medien in Wirtschaft und Gesellschaft - Deutschlands Weg in die Informationsgesellschaft.* (Buchfassung: Bonn 1998), Drucksache 13/11004.

<sup>33</sup> Klumpp, D. (2003). *Informationsgesellschaft - nur eine "symbolische" Diskussion? Next Generation Information Society? - Notwendigkeit einer Neuorientierung.* D. Klumpp, H. Kubicek and A. Roßnagel. Mössingen-Talheim, Talheimer Verlag.

Technology as well as the Federal Ministry for Education and Research with the task to conceptualize the action program “Innovation and Jobs in the Information Society of the 21<sup>st</sup> Century”<sup>34</sup> as an all embracing strategy for the German information society until 2005. This action programme is followed up in March 2002 by a progress report<sup>35</sup>. Closely connected to this action programme and its progress report is the eGovernment project of the Federal Government. BundOnline, launched in 2000, is focusing on making all internet-applicable services of the Federal Government online available. Yet, this requires German citizens to be connected and go online. This awareness leads to the 10-point-programm “Internet for Everyone – 10 Steps on the Way into an Information Society”, introduced by Chancellor Gerhard Schroeder in September 2000 at a congress of the private-public-partnership initiative D21. The program “Internet for Everyone” concentrates on the equipping of public institutions such as schools, libraries, administrative bodies with free internet access for the public as well as the offering of computer and internet courses for all groups of society in public educational institutions. Shortly after publishing the progress report to the action programme of 1999, the Federal Government embarks onto the information campaign “Germany spells itself with .de” aiming at complementing BundOnline by summarising the online services of the states and communes on one internet portal ([www.deutschland.de](http://www.deutschland.de)). In 2003, the current action programme of the Federal Government “Information Society Germany 2006”<sup>36</sup> is published. Once again the Federal Ministry of Economics and Labor as well as the Federal Ministry of Education and Research analyse their activities of the past years and emphasise the following four areas for future engagement: (1) Digital Economy for Growth and Competitiveness, (2) Education, Research and Equal Opportunities, (3) eGovernment, Security and Trust in the Internet, (4) eHealth. In comparison with the preceding action programmes, this is rather a collection of separate initiatives and activities; it is not an all embracing concept for future politics.

Subsuming the results of these government commissions, one can state, that the dissents concerning details increasingly blurred the final aims of creating an information society in the German Government debate. While in the 1970s the topic of the information society stood for modernity and as such appeared to communicate an attractive image for the parties aiming for it, the topic lost its attractiveness in the 1980s. With the boom of e-commerce and internet economy, the topic gained again attractiveness in the 1990s. Subsumed under the formerly only rarely used catchwords such as information society, e-society, information or IT-economy German politicians revived the concepts, imitating their US-American colleagues. Yet, with the explosion of the internet bubble and hence the end of the internet hype, one can observe the spread of a great tiredness regarding this topic within the German government, administration and academia.

## 6. State Activities to create a Singaporean Knowledge-based Economy

In 1969, the Government of Singapore requested the United Nations Development Programme (UNDP) to provide assistance in expanding the activities of the National

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<sup>34</sup> Bundesministerium für Wirtschaft und Technologie (BMWi) and Bundesministerium für Bildung und Forschung (BMBF) (1999). Innovation und Arbeitsplätze in der Informationsgesellschaft des 21. Jahrhunderts - Aktionsprogramm der Bundesregierung. Berlin/Bonn, BMWT, BMBF.

<sup>35</sup> Bundesministerium für Wirtschaft und Technologie (BMWi) and Bundesministerium für Bildung und Forschung (BMBF) (2002). Informationsgesellschaft Deutschland - Innovation und Arbeitsplätze in der Informationsgesellschaft des 21. Jahrhunderts - Fortschrittsbericht zum Aktionsprogramm der Bundesregierung. Berlin/Bonn, BMWT, BMBF.

<sup>36</sup> Bundesministerium für Wirtschaft und Arbeit (BMA) and Bundesministerium für Bildung und Forschung (BMBF) (2003). Informationsgesellschaft Deutschland 2006 - Aktionsprogramm der Bundesregierung. Berlin

Productivity Centre (NPC). The UNDP report recommended that the Government formulates a national computer policy and makes arrangements with the administration to facilitate electronic data processing (EDP) systems that would improve service to the public. Nevertheless, the recommendations of UNDP were not followed. Singapore had reached independence only four years ago (1965) and computers seemed to be a rather cost intensive sector. Instead, Singapore Government chose to follow the path taken by Japan focussing on the labour intensive electronics industry. In the beginning of 1980, then Minister of Trade and Industry, Goh Chok Tong appointed a Committee to study, how the government should go about developing Singapore into a regional centre for computer software development and services. Two teams of the committee, headed by Dr. Tony Tan, Minister of Education, visited Hong Kong and the USA for studying computer installations there. The final report<sup>37</sup> was submitted to the Government in October 1980. It recommended focusing on developing manpower skilled in computer programming. In 1981, the Government set up the National Computer Board (NCB), a statutory board of the Government, subordinated to the Ministry of Finance, in order to implement the plan. The founding of NCB resulted in heavily promoting the use of computers in the government, schools and businesses as well as the setting up of computer science as university and polytechnic courses. In order to computerize the public service the Civil Service Computerization Programme was launched.<sup>38</sup>

In 1985, the Government set up a working committee made up of officials from the Singapore Telecoms, Economic Development Board (EDB) Institute of Systems Science (ISS) and the NCB to produce a National Information Technology (IT) Plan.<sup>39</sup> This plan reflected the shift from mere computerization to IT by adding the elements of telecommunications and office systems. Compared to the national computerization policy offered by the plan for computerization from 1981, the National IT Plan from 1985 offered an integrated IT policy for the next five years. Main aims of the plan were the further development and spread of Teleview, the convergence of telecommunications and computer technology to improve business transactions, the implementation of an island-wide integrated services digital network (ISDN), as well as the development of applications such as a trade documentation system named TradeNet, MediNet for the medical industry and LawNet for the law industry. In the field of manpower training the emphasis moved away from learning programming skills to learning application software. In late 1990, together with the handover of the Prime Minister's position from Lee Kuan Yew to Goh Chok Tong, a document entitled "The Next Lap"<sup>40</sup> was published. The Next Lap was a government document, meaning to describe the hopes and aspirations of a new generation of Singaporeans. Right after The Next Lap was published, work started on the IT 2000 Vision, beginning 1991, coordinated by NCB. Central to "IT 2000: A Vision of an Intelligent Island"<sup>41</sup> was the creation of a National Information Infrastructure (NII), which should link computers in every home, office, school and factory. Teleview was still seen as future technology by the Singaporean Government and further developed. Nevertheless, the World Wide Web became increasingly interesting and was made available to the public in 1994 by Singapore's first public Internet service provider named SingNet. In 1996, Singapore ONE Network for Everyone was launched, which offered services like video-conferencing, high-

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<sup>37</sup> Committee on National Computerization (1980). Report on National Computerization. Singapore.

<sup>38</sup> National Computer Board (1997). Connected government : using IT in the Singapore civil service. Singapore, National Computer Board.

<sup>39</sup> National IT Plan Working Committee (1985). National IT Plan: A Strategic Framework. Singapore, National IT Plan Working Committee.

<sup>40</sup> Singapore Professional Centre (1991). The Next Lap Together. Singapore, JM Publishers.

<sup>41</sup> National Computer Board (1992). A Vision of an Intelligent Island: The IT2000 Report. Singapore, National Computer Board Singapore.

speed Internet, teleshopping, entertainment and electronic libraries to its users. With increasing internet subscribers, the Government of Singapore was faced with the question of censoring the internet, but had to realise after years of battle, that the World Wide Web cannot be effectively censored. Hence, Singapore ONE was the attempt of providing Singaporean citizens with internet and at the same time “creating an internal system which bonds people to the neighbourhood, schools, clubs and local community”, as mentioned by the Government official George Yeo in 1995.<sup>42</sup>

But besides the focus on building the informational and communicational infrastructure, the recession in 1985 also led to the increasing awareness that Singapore's economy had to diversify, create local substance and content, in order to yield sustainable future development and move up the value-chain. This awareness led to the formation of the National Science and Technology Board (NSTB) in 1991, which later was renamed into A\*Star. Until today, it is the task of A\*Star to promote and further local development of science and technology by conducting research and development mainly in the fields of life-and bioscience.<sup>43</sup> Additional to this highly specialised R&D-development, the Government also identified the need to raise the general level of education of Singapore's population. In order to do so, the Government published the action plan “Library 2000”<sup>44</sup> in 1994 and – in 1995 – formed the National Library Board (NLB) to implement the plan. The aim was the massive expansion and upgrading of the public library system in order to bring the library closer to the people.<sup>45</sup>

The infrastructural development was further planned and implemented by a master plan entitled “Infocomm21”<sup>46</sup>, published in 2000. This Master Plan is made up of several major initiatives, aimed at developing Singapore into a leading infocomm hub in the region. To realise that vision, the plan focuses at developing Singapore into a key player in the provision of telecommunications services, e-business transactions and distribution of digital goods and services in Asia. At the same time, the Government is still aiming for a diversification of Singapore's economy and embarks in 2002 into the development of creative industries<sup>47</sup> as an economic sector. This is established and formulated in the Creative Industries Development Strategy<sup>48</sup>, published by the Ministry of Information, Communications and the Arts under Tan Chin Nam. Including the aim of developing creative industries into the activities of the Infocomm Development Authority (IDA), a merger of the National Computer Board and the Singapore Telecommunication Authority, in 2003, IDA

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<sup>42</sup> Straits Times, 26 May 1995.

<sup>43</sup> Toh, M.-H., H. C. Tang, et al. (2002). Mapping Singapore's Knowledge-Based Economy. Singapore, Economics Division, Ministry of Trade and Industry.

<sup>44</sup> Library 2000 Review Committee (1994). Library 2000: Investing In A Learning Nation. Singapore, Ministry of Information and The Arts.

<sup>45</sup> Hallowell, R., C.-I. Knoop, et al. (2001). Transforming Singapore's Public Libraries. Boston, Harvard Business School.

<sup>46</sup> Infocomm Development Authority (2000). Infocomm21 - Singapore: Where the Digital Future is. Singapore, Infocomm Development Authority. Downloadable under: [http://www.ida.gov.sg/idaweb/doc/download/I2250/WHAT\\_IS\\_INFOCOMM21.pdf](http://www.ida.gov.sg/idaweb/doc/download/I2250/WHAT_IS_INFOCOMM21.pdf)

<sup>47</sup> According to the Economic Review Committee Report, ‘Creative Industries Development Strategy’ Singapore, “creative industries” can be defined as “those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property.” This definition is borrowed from the UK Creative Industries Taskforce, Creative Industries Mapping Document, November 1998. For further information on the definition of the Singaporean government of creative industries, see Toh, M.-H., A. Choo, et al. (2003). Economic Contributions of Singapore's Creative Industries. Singapore, Ministry of Information, Communication and the Arts. Downloadable under: <http://www.mita.gov.sg/MTI%20Creative%20Industries.pdf>.

<sup>48</sup> Economic Review Committee and Workgroup on Creative Industries (2002). Creative Industries Development Strategy. Singapore, Ministry of Trade and Industry.

publishes its current master plan, entitled “Connected Singapore”.<sup>49</sup> Connected Singapore is a fine-tune of Infocomm21, emphasising the role of information and communication technologies in developing creative industry sectors such as design and the arts. The master plan includes four strategies: (1) Infocomm for Connectivity, Creativity & Collaboration, (2) Digital Exchange, (3) Engine of Growth, (4) Agent for Change. Strategy 1 emphasises the development of computer applications by everyone for work, play, lifestyle and learning. Strategy 2 focuses on developing Singapore as a leading global digital distribution and trading centre with hub status in the region. Strategy 3 aims to grow new economic activities and create jobs in the infocomm sector by encouraging the local development of technology and capitalising Singapore’s hub status by establishing strong links into the region. Strategy 4 focuses at assisting businesses and government agencies in using information and communication technologies for higher efficiency and productivity. The most current master plan published by Singapore Government is entitled “L2010”<sup>50</sup>, the “L” referring to “Library”. L2010 was published in July 2005 by the National Library Board focussing on developing public libraries into the third most important place in the lives of Singaporeans. Third most important besides home and work. Public libraries shall no longer just be centres of knowledge transfer, for life styling and spending leisure time. In stead, public libraries shall emerge as centres of discussion, interaction, cooperation; centres of social capital production. Social capital is identified by the Singaporean Government as the key to innovation, which is required for Singapore’s economic survival. That social capital is closely connected to critical thinking, and innovation to change, is taken into account and accepted. As long as change is necessary in order to survive economically as well as – in the case of the People’s Action Party (PAP), the ruling party – politically, it is accepted.

In Singapore, three phases of government engagement and activism can be identified. While in the late 1970s and all of the 80s, Singapore’s government embarked on building an island-wide information and telecommunication infrastructure and developing IT-application for a knowledge-based economy, in the 90s, the focus moved to additionally increasing investments in R&D. In recent years, these two focal areas were further extended by the aim to develop creative industries, investing heavily in the arts and library scenes of Singapore as well as changing school and university curricula with the aim of fostering creativity. This creativity, defined by Singapore Government, is hoped to result in innovative ideas that can be translated into economically viable inventions. All three phases of government engagement and activism are hoped to contribute to the development of a knowledge-based economy of Singapore; all three phases were embedded into the vision of an ‘intelligent island’, a Singaporean knowledge-based economy.

## 7. Analysis: A Four-Model-World

Provided that it is true that we are moving into a time where all kinds of knowledge become increasingly the basis for economic, political and social prosperity, knowledge production and dissemination becomes crucial to further development. The role of the state in this process is important but at the same time restricted. Governments can build legal as well as ICT infrastructures that enable knowledge dissemination effectively. Furthermore, certain politics of knowledge production within each country might foster knowledge production in

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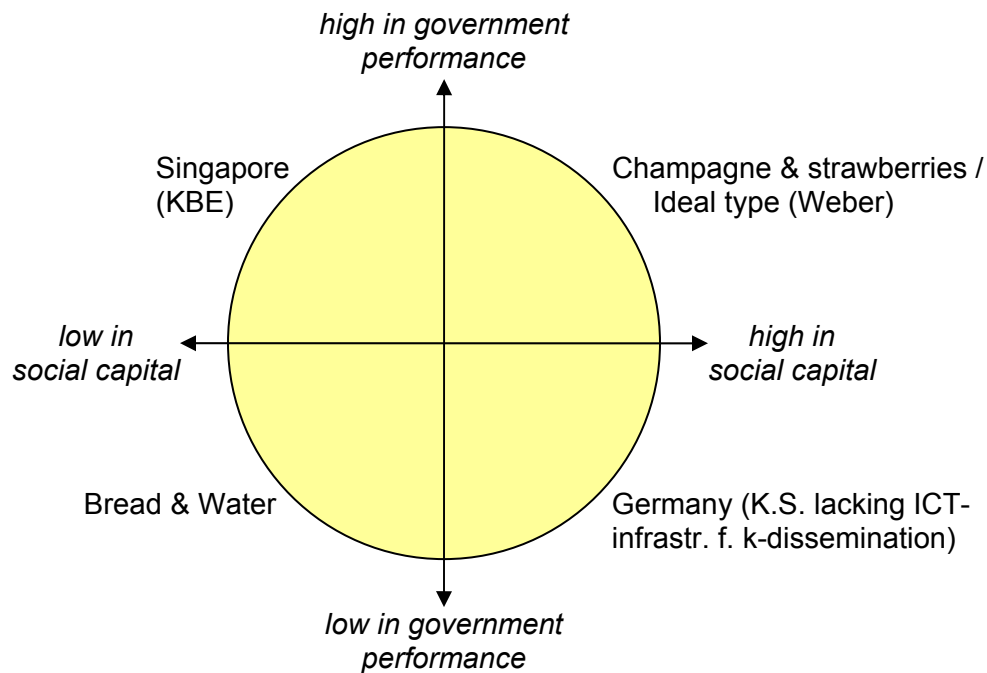
<sup>49</sup> Infocomm Development Authority (2003). Connected Singapore - A New Blueprint for Infocomm Development. Singapore, Infocomm Development Authority. Downloadable under: [http://www.ida.gov.sg/idaweb/doc/download/I2235/Connected\\_Singapore.pdf](http://www.ida.gov.sg/idaweb/doc/download/I2235/Connected_Singapore.pdf)

<sup>50</sup> National Library Board (2005). L2010 - Our Vision for the Future (Overview). Singapore, National Library Board.



certain or all sectors, others don't. But if there is only little knowledge production taking place, governments – of course – are not able to force people to be creative, to have ideas and to produce knowledge. Hence, the following four-model-world can be drawn:

**Graphic: Four-Model-World**



Source: A.K. Hornidge

The optimum, the most successful knowledge society in the “knowledge age” will have to be a highly performing society, meaning high in social capital, creativity, and innovation as well as high in government performance in all aspects concerning the creation and sustenance of a knowledge society. Neither Singapore, nor Germany can offer this. Possibly there is no country, which can offer both. Opposite to the optimum lies a country which is low in society, as well as low in government performance.

Singapore can be classified as low in society, creativity, and innovation, but therefore high in government performance regarding the planning for a knowledge-based economy. On the contrary, Germany can be seen as high in society, creativity, and innovation but low in government performance towards an information society.

## 8. Conclusion

The above hopes to offer an insight into how two national governments approach the construction of a KBE, knowledge/ information society. Looking at one highly centralised state – Singapore – and one much bigger, decentrally organised, federal state – Germany –, I aim to show the advantages and disadvantages of both systems in creating a KBE, knowledge/information society. I argue, that the definition of which kind of knowledge is seen as valuable and support worthy, dominant in one society, determines what kind of KBE, information/knowledge society is created. If knowledge generally has to be applicable and lead to financial profit within a limited time frame, sectors such as science and engineering will receive main attention. This might be helpful for a KBE, but does not lead to

a knowledge society, if you regard a knowledge society as a society in which any kind of knowledge can be produced, taken up and developed further by potentially every member of society. A knowledge society requires a more egalitarian definition of knowledge, meaning that any kind of knowledge is generally regarded as positive.

National governments are in the position to create a legal as well as an information and communication infrastructure that will support the development of a KBE. Yet, it is much more difficult to create the infrastructure for a knowledge society, which requires knowledge production in all academic fields, ideas and the possibility to develop ideas further. The investment into research and development in sectors such as science and technology is necessary. But above these sectors, the development of arts, social sciences, law and business are just as important, if not even more important. Knowledge with substance, ideas that will develop economy and society on a long-term basis require the input of different sectors in order to inspire the creativity of the people. It requires the freedom to think freely and critically. In this aspect, Germany still has a slight advantage over Singapore, while Singapore clearly shows an advantage in the information and communication infrastructure as well as the high effectiveness of the public administration approaching the development of all kinds of different sectors/clusters contributing to a KBE as well as to a knowledge/information society.

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