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# **DEVELOPING A SUCCESSFUL INFORMATION AND COMMUNICATION TECHNOLOGY INDUSTRY: THE ROLE OF VENTURE CAPITAL, KNOWLEDGE, AND THE GOVERNMENT**

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## **Abstract**

Study of the factors that have led to the development of a flourishing information and communication technology (ICT) industry is often based on the Silicon Valley development in the U.S. Given the globalization of the ICT industry, there is a need to understand the factors which contribute to the development of a successful ICT industry and to determine whether a generic model can be used to gain a better understanding of the forces that shape ICT development in other regions of the world. This study examines the phenomenal growth of the Israeli ICT industry in recent years, growth that is referred to as the “New Silicon Valley.” A generic model for the development of ICT industry is presented. We use the model to compare the development of the Israeli ICT industry with that of Silicon Valley and with the current state of the Dutch ICT industry. The results indicate that the model holds for both (historical) review of the development of Silicon Valley and for the current state of the Dutch ICT industry. The implications of the findings are discussed.

**Keywords:** Information technology (IT), information and communication technology (ICT), knowledge base, venture capital, Silicon Valley.

## **1. INTRODUCTION**

During the past few years, there has been a phenomenal growth of the information and communication technology (ICT) industry in Israel. With a growth rate of 13.2%, and revenue of \$7 billion (1996), of which approximately 70% is export, the Israeli ICT industry has become an important contributor to the success and growth of the Israeli economy in recent years. This growth is characterized by a flood of start-ups, many of which reach the initial public offering (IPO) stage, by a dynamic venture capital (VC) market—more than 50 venture capital funds worth of \$600 million, and IPOs, mainly on the U.S. NYSE and NASDAQ exchanges. The number of Israeli ICT companies listed in NASDAQ takes second place (after Canada) in terms of foreign IPOs.

In 1996, there were 18 Israeli IPOs worth \$678 million in the U.S., which is the highest level for a foreign country in that year. These are high figures for a country with population of 5 million and with a GNP of \$95.8 billion.

The professional press and leading news magazines have referred to the Israeli ICT as the “New Silicon Valley.” Some examples from the Israeli ICT industry are the design of the multimedia extensions to Intel’s Pentium processor (the Pentium MMX) by Intel’s Israel design center, Internet Firewall security software by CheckPoint, Internet Telephony by VocalTech, and ICQ, Internet real-time chat by Mirabilis. We will provide a brief history of the Silicon Valley, in order to understand what ‘Silicon Valley’ represents, and to see if the development of the Israeli ICT industry was based on the Silicon Valley model. Based on our study of the growth of the Israeli ICT industry and its historical background, we present a generic model that describes the forces that shape the development of the Israeli ICT industry. We use this model to examine (in retrospect) the development of Silicon Valley and the current state of the Dutch ICT industry.

## **1.1 Research Method**

The purpose of this research was to study and describe the forces that shape the development of a successful information and communication technology industry. The phenomenal growth of the Israeli ICT industry in recent years has provided an opportunity for such a study.

The empirical material for this research was collected using archival research: articles, reports, WWW resources, news magazines, and interviews. The study of the development of the Israeli ICT industry is an interpretive case study at a country level. This study is an attempt to understand the phenomenal growth of the Israeli ICT industry in the past few years. In a sense, this is a study of the (short) history of the ICT industry in Israel.

According to the historian Schumpeter, “A study of history is necessary to provide a temporal and contextual meaning for each of the four forms of knowledge: 1) empirical data observations and facts, 2) theories and paradigms, 3) ethics, and 4) history.” As noted by (Mason, McKenney and Copeland 1997), most contemporary MIS research addresses the first two. This study addresses both (1) and (4).

This study contributes to the body of knowledge in the area of information and communication technology, in particular in regard to a national ICT policy and the forces that shape the development of the information and communication technology industry. We believe that the results of this study will be of interest to ICT researchers studying national ICT policy and of relevance to countries interested in developing their ICT industry.

## **1.2 Venture Capital**

Venture capital is the financial investment and managerial support of a fast growing start-up company that shows a potential to reach a dominant market position. Venture capital investment in the ICT industry is an investment in a product, rather in a company. Venture capital investment is a high-risk investment done in the early stage of the life cycle of a start up. The attraction of early stage venture capital investment in an ICT start-up is based on the market potential of the product developed, and on a developed initial public offering market in which the return on investment and potential profit can be realized.

Table 1 illustrates the life cycle of a start-up and the phases in which venture capital is required in a typical ICT start-up. The product development phase, the introduction of the product in the market and the set up of sales and distribution are the phases in need of venture capital.

One of the first venture capital investments in ICT dates back to 1909. Stanford University President David Starr Jordan put up the first important venture capital of \$500 for work on Lee deForrest’s audion tube, which could amplify an electrical signal within its airless confines (McCormick 1996). One example from the early days of Silicon Valley is Intel Corp., established with the help of venture capital. A milestone in the development of venture capital market for the ICT industry was on December

**Table 1. The Need for Venture Capital During the Early Stage**

<i>Phase</i>	<i>Characteristic</i>	<i>Venture Capital</i>
Seed	Idea	-
Start-up	Product development	+
First phase	Product brought to the market	+
Second phase	Sales & distribution begins based on references	+
Third phase	Growth of the start-up into a company	-/+
Forth phase	IPO, Acquisition	-

1980, when Apple Computers went public with an initial public offering of 4.6 million shares of Apple common stock, at a price of \$22 per share. Every share is bought within minutes of the offering, making this the largest public offering since Ford went public in 1956. A recent IPO that also made history took place in August 1995. Netscape Corp., then a 16-month-old company that developed Internet Browser software, went public. Netscape issued 5 million shares to the public, and kept another 33 million for executives and venture capitalists. The August 10, 1995, closing price left the company with a market valuation of \$1.96 billion. It was the biggest IPO in history.

The importance of initial financing and managerial support of a start-up company, and the success of many start-up companies, led to the development of a professional venture capital industry as part of the established financing industry. Studies on venture capital that have appeared in recent literature include Barry et al. (1990) on the role of venture capital in the creation of public companies; Bhide (1992) discusses the financial support of a start-up, and the strategy used by successful entrepreneurs (Bhide 1994), while Sharp (1987) discusses the strategy from the venture capitalist view point. MacMillan, Zemann and Subbanarasimha (1987) present the factors that make a successful venture screening process.

## **2. THE ISRAELI ICT INDUSTRY: HISTORICAL PERSPECTIVE**

The ICT industry in Israel has its roots in the 1950s. It was mainly a military-oriented industry supported by the government. During the 1960s and 1970s, veterans of the early military-oriented ICT industry started small companies, privately financed, that were based on the knowledge gained through military products. These companies formed the basis for a civilian-oriented ICT sector.

The real push to establish an independent ICT industry came after the Six Day War in 1967. As a result of the war, the French—the main supplier of the Israeli Army—announced an embargo on military equipment, while western companies complying with the Arab boycott put Israel on their “black list” as a business partner. The result was a need to establish an independent ICT industry as part of the Israeli defense industry. This defense industry became one of the important sources of the current ICT industry. In retrospect, one can say that the two initiatives taken to damage Israel’s military capability have proven to be the sources of its current ICT success.

The next phase in the development of the ICT industry was in the late 1970s. The small number of established ICT companies had begun to support spin-offs that developed commercial products based on the military technology. An important step in establishing the ICT industry in the 1980s was the beginning of cooperation with world-leading ICT companies. The cooperation was in the form of R&D centers. Companies such as IBM, Intel, Motorola, and National Semiconductors established R&D centers in Israel. The government supported these initiatives with tax incentive programs.

### **2.1 The Venture Capital Market: A Short History**

In the 1980s, the ICT industry took the initiative in setting up a venture capital fund to support start-ups in the form of spin-off companies. The fund—the Athena fund—was established in 1985, but it soon became clear that there was a lack of venture

**Table 2. The Israeli ICT Industry: Historical Perspective**

Year	Characteristics / events
1950s	<ul style="list-style-type: none"> <li>• Government initiated ICT companies</li> </ul>
1967	<ul style="list-style-type: none"> <li>• Six Day War—French embargo and Arab Boycott lead to the beginning of the Israel Military Industry</li> </ul>
1970s	<ul style="list-style-type: none"> <li>• Spin-offs from established ICT companies lead to new start-ups</li> </ul>
1980s	<ul style="list-style-type: none"> <li>• The start of large military projects (fighter jet Lavi, Merkava Tank) leads to ICT developments</li> <li>• Foreign ICT companies start cooperation and R&amp;D activities: Intel, IBM, Motorola, National Semiconductors</li> <li>• Veterans of the defense industry start commercially-oriented ICT companies</li> <li>• First IPOs of Israeli companies in NASDAQ</li> <li>• Established ICT companies set up the first venture capital fund</li> </ul>
1990s	<ul style="list-style-type: none"> <li>• Large scale operation of foreign ICT companies, and entry of new companies (Microsoft, SUN Microsystems, Oracle)</li> <li>• Absorption of 700,000 emigrants from the former Soviet Union, most of whom have a college/university education</li> <li>• Peace process starts</li> <li>• Government supported venture fund (the Yozma fund)</li> <li>• Foreign venture capital firms start operation in Israel</li> <li>• Successful IPOs of Israeli companies in NASDAQ</li> </ul>

capital expertise to support ICT start-ups. The pace of the development of the ICT industry received a boost in the 1990s with the start of the peace process between Israel and the Palestinians, as well as the absorption of about 700,000 Jewish emigrants from the former Soviet Union, most of whom have a high level of education. At the same period in time, the U.S. companies active in Israel extended their activities while new companies from the U.S., Japan, and Europe were to follow (Microsoft, Oracle, Sun, Siemens) and establish joint R&D and production operations. In 1991, the Israeli government had initiated a list of programs to stimulate the ICT industry by creating a financial base that would attract foreign investors as well as ICT companies.

The first step in the creation of the venture capital market was the setting up of the Yozma<sup>1</sup> venture capital fund. The government provided up to 40%, amounting to a maximum of \$20 million, as well as co-investment in any venture capital fund with the possibility for the private investors to take the government part over after a few years at a convenient price. The Yozma program was established with clear a objective focused on creating an internationally oriented venture capital market for the support of the ICT industry. The program attracted foreign investors, facilitated the creation of an international network of venture capital and ICT firms, and provided support for start-ups in capital and in finding strategic partners.

The government had initially allocated \$100 million. This amount was used to set up 10 venture capital funds worth \$200 million. In four of these, the major investors are U.S. venture capital firms and in one the major investor is a Dutch venture capital firm. In addition to setting up venture capital funds, the Yozma fund has directly invested in ICT start-up.

This fund become operational in 1993, and was the beginning of the successful venture capital market in Israel. The Yozma fund had become so successful that there was market interest in taking it over, which the government did as part of its privatization program. Today there are more than 50 venture capital funds with total worth of \$600 million.

The success of establishing a venture capital market in Israel is supported by a recent market research by VentureOne (Globes 1997) covering 600 venture capital firms in the U.S. managing more than \$25 million. U.S. venture capital firms show more interest in investing in Israel than any other country (outside the U.S.) in the world: 19% of the largest U.S. venture firms show

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<sup>1</sup>Yozma – entrepreneurship in Hebrew

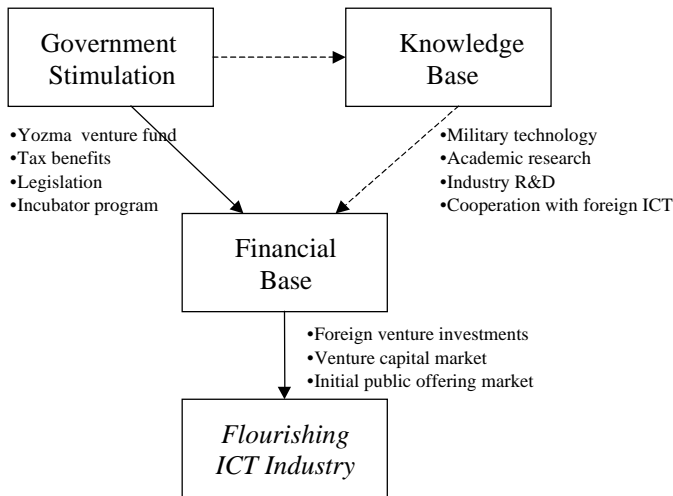


Figure 1. The Israeli ICT Model

an interest in foreign corporations, 7.7% of them selected Israel as a primary interest while the UK was a secondary interest mentioned by 4.5%. One out of five U.S. venture capital firms is interested in investing in Israeli ICT, one out of seven has already invested in Israeli ICT.

## 2.2 The Israeli ICT Model

In our study, of the development of the Israeli ICT industry, we have identified three important factors that had contributed to the creation of a flourishing ICT industry in Israel. They comprise of *knowledge base*, *financial base*, and *government involvement* that actively stimulated both. We have formulated the roles and the relationships between these three factors in a model (Figure 1), that can help us understand the growth of the ICT industry in Israel.

## 2.3 Government Stimulation

The Israeli government placed support of the ICT industry high on its priority list and played an active role in this support. In particular, the government played an essential role in initiating the financial base. By recognizing the importance of the ICT industry, and that a lack of financial base is an inhibitor, it initiated a list of programs that eventually led to the establishment the financial base for the Israeli ICT industry. In a relatively short time period, between 1985 and 1993, a financial basis in the form of a strong internationally-oriented venture capital market was created. Once in place and operational, the government executed its “exit” strategy as part of its privatization program.

There have been tax incentives programs to support R&D centers, stimulation programs to support start-ups, and legislation to attract foreign investors and world leading ICT companies. The example of Intel Corp. illustrates this: Intel began operating in Israel in the 1980s out of a small design center. Based on their positive experience, Intel decided to build a fabrication facility (FAB-8), which was Intel’s first fabrication facility outside the U.S. The success of FAB-8, and the need for additional production capabilities, resulted in building a second fabrication facility in Israel with an investment of \$1.2 billion. This effort was supported by special legislation.

The *incubator program* set up by the government is aimed at supporting the early stage of start-ups. An *incubator* is a financial and administrative environment in which an entrepreneur can work on an idea up to the prototype stage. At the prototype stage he is brought in contact with venture capital investors and is taken through the usual screening process (MacMillan, Zemann and Subbanarasimha 1987). This program was particularly popular among the Soviet emigrants at that time. The incubator effect is also used by established ICT companies to support spin-offs. At present, there are about 26 incubators located in high-tech parks throughout Israel.

The strategy of the government has been to stimulate and support the initialization phases of the various programs and then exit, leaving market forces to take over.

## 2.4 Knowledge Base

Government stimulation alone could not lead to a successful ICT industry. There had to be a mature knowledge base on which the ICT industry could be established. In the case of Israel, the knowledge base has been build on since the 1950s, initially to support military technology, later using that technology for commercial products, and eventually leading to a commercially-

oriented ICT industry. Both academic and industry R&D have created this knowledge base. In Israel, about 135 per 10,000 workers are involved in R&D, compared to 70 per 10,000 in the U.S. and 65 per 10,000 in Japan. This could explain the large number of ICT companies from the U.S., Europe and Japan that have established R&D centers in Israel or that work in cooperation with Israeli companies. These joint ventures provided Israeli ICT industry access to state-of-the-art technology and have played an important role in extending the knowledge base in recent years. The existence of a knowledge base was one of the arguments used by the government to attract foreign investors and ICT companies to Israel, thus having an indirect role in creating the financial base.

## **2.5 Financial Base**

The financial base, which has been established in a relatively short time period, has become an active venture capital market with more than 50 venture capital funds and a strong IPO market—namely the NASDAQ exchange. The acceptance of the Israeli ICT companies in the U.S. exchanges has provided foreign venture capital investors the important exit possibility in which they can realize return on investment. The pace of the growth of the Israeli ICT industry increased significantly once the venture capital market had been established.

## **3. THE DUTCH ICT INDUSTRY AND VENTURE CAPITAL MARKET**

The Netherlands is a country traditionally oriented on commerce and services. Due to its geographical location and the excellent infrastructure, The Netherlands has become an attractive “main port to Europe” for many multinationals from the U.S. and Asia. Rotterdam is the world’s largest port and Schiphol is Europe forth largest airport. Based on its geographical location, the Dutch government has given commerce high priority and has therefore invested in the development of an excellent infrastructure.

The Dutch ICT industry has followed that tradition and is a service orientated industry. Selection and implementation of ICT products and system integration are its main activities. The Dutch ICT industry has been growing in number of companies, size of the companies, and international expansion (mainly in Europe) via take-overs, alliances and joint ventures. The number of ICT start-ups and ICT successes however, is limited (van Wijngaarden 1995). Examples such as the BAAN Company and ASM Lithography are exceptions.

### **3.1 Government Support**

The Dutch government did not play an active role in stimulating ICT industry up until recently. Government support was given to building the “main port to Europe” infrastructure. In the past two years there has been a change initiated by the Ministry of Economic Affairs. The Ministry has initiated stimulation programs<sup>2</sup> to “encourage the creation on new quality ICT companies” and “alleviate the financing constraints for ICT entrepreneurs.” These initiatives, however, have not become a high government priority yet.

### **3.2 Knowledge Base**

There is no doubt about the existence of a knowledge base: universities, research institutes, industry R&D, and an established ICT industry had created a strong knowledge base. The knowledge base is mainly used by the established ICT industry. The phenomenon of spin-offs from these companies is almost nonexistent and most graduates join the established ICT industry.

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<sup>2</sup>[www.twinning.com](http://www.twinning.com)

### **3.3 Financial Base**

Although the Dutch venture capital market is one of the most active in Europe, the focus of the Dutch venture capital firms is mature companies that need financing for growth, management buy-out, and IPO. The traditional financial establishment is most reluctant to financing high-risk ICT start-ups. The Dutch investors prefer to invest in the later (third or fourth) phase of a start-up cycle, rather than in the early stage in which the venture capital is most required. There are about five active venture capital funds in The Netherlands. The Dutch venture firms are passive investors, which focus on financing and are not involved in management support or in refocusing of start-ups from technology to a market and customer orientation. The investment in start-ups or early stage is limited—84% of the venture firms invest in mature companies.<sup>3</sup> The Dutch venture capital market has gone through a process in which middle size venture firms merged to form a large venture capital and small venture firms have disappeared. While better positioned to support mature companies, such a structure of the venture capital market does not provide many possibilities for start-ups that are in need of support in the early stage. This venture capital market is generalized, lacking specialization. There is lack of expertise in analyzing start-ups, and in particular ICT start-ups. The Dutch government does not play an active role in stimulating high-risk ICT start-ups.

The climate of the Dutch venture capital market is not one of stimulating ICT entrepreneurship and does not provide the financial base required to support an ICT industry similar to that of Israel.

## **4. SILICON VALLEY: A BRIEF HISTORY**

The phrase “Silicon Valley” first appeared in 1971 in a series of articles that journalist Don C. Hoefler wrote for *Electronic News*, a weekly industry paper. Hoefler was choosing a name for an article about the semiconductor industry that he was writing for *Electronic News*. Ralph Vaerst, then president of Ion Equipment, suggested Silicon Valley. Hoefler named his article, “Silicon Valley U.S.A.”<sup>4</sup>

About 40 years ago Stanford University leased part of their land to high-tech companies for 99 years to solve financial problems they had at the time. With the establishment of the Stanford Industrial Park in the mid 1950s, the very character of Silicon Valley as a conglomeration of interrelated, interbred ICT companies took hold. A quarter of century later, this decision was called Silicon Valley’s starting point. It was Stanford University professor of electrical engineering Frederick Terman who encouraged his students to work for local companies and to start businesses of their own, rather than being lured back east to the dead end attraction of safe, “establishment” companies there.<sup>5</sup>

World War II saw the introduction of the U.S. government as a major supporter of emerging technology. California received almost \$40 million in new plants and defense contracts.

Throughout the 1950s, electronics companies such as General Electric and Sylvania were joined by Westinghouse Electric and Ford Philco in establishing facilities in Palo Alto and neighboring cities. IBM established a huge research center in San Jose.

There are now about 4,000 ICT-related companies located in the Silicon Valley area, which generate approximately \$200 billion in ICT-related revenues. The venture capital market has grown to about 700 venture firms managing about \$10 billion.

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<sup>3</sup>Venture Capital Guide 1996, Nederlandse Vereniging van Participatiemaatschappijen (Dutch Society for Venture Capitalists).

<sup>4</sup>[www-forum.stanford.edu/history/history.html](http://www-forum.stanford.edu/history/history.html)

<sup>5</sup>Among two of the students to follow his advice were William Hewlett and David Packard, the founders of Hewlett-Packard.



## 5. IS THE ISRAELI ICT MODEL A GENERIC ONE?

Is the model that we used to describe the Israeli ICT industry generic and can be used to study the ICT industries in other countries? To answer this, we have reviewed the development of Silicon Valley, we have studied the Dutch ICT industry, and examined studies of Taiwan's computer industry (Kraemer et al. 1996), the national technology policy and computer and software production in Asia-Pacific countries (Dedrick, Goodman and Kraemer 1995; Dedrick and Kraemer 1995), and a study of the IT industry in Bangalore India (Madon 1997).

### 5.1 The ICT Model and Silicon Valley

Using our model, we can point out both the similarities and the differences between Silicon Valley and the "New Silicon Valley." Academic research and industry R&D established the *knowledge base* required for the development of the ICT industry in the Silicon Valley. The incubator programs and the high-tech parks in Israel are modeled after Stanford Industrial Park, the basis for Silicon Valley.

Established ICT companies and the traditional financial establishment initially provided the *financial base* for Silicon Valley. The venture capital industry in its current state emerged and developed parallel to the growth of the ICT industry in Silicon Valley. This knowledge and experience was used to establish the financial base for the Israeli ICT, and explains the short time span required for the establishment of the financial base for the Israeli ICT industry. The majority of the most active venture firms and ICT companies in Israel came from Silicon Valley or have Silicon Valley experience.

*Government support* for Silicon Valley occurred at two levels: the first was early on during the initial phase, in which the government directly supported emerging technologies by means of a \$40 million investment following World War II. The second level was legislation and regulation that created a favorable economic climate for the support of start-ups.

### 5.2 The ICT Model and the Dutch ICT Industry

Based on our study of the Dutch ICT industry, the following questions can be asked: How is it that the number of start-ups in The Netherlands is so much lower in comparison with Israel? Why are ICT successes (like the BAAN Company and ASM Lithography) the exceptions? Can we use our model to explain the differences?

Although no doubt exists regarding the foundation of the knowledge base in The Netherlands—universities, research institutes and high tech companies—they are not directly involved in nor do they stimulate new start-up initiatives from this knowledge base. It is common practice for graduates to seek employment with established companies rather than to join start-ups or set up a new company.

We can point out two major differences between The Netherlands and Israel that can explain the difference between the Dutch and the Israeli ICT industries. In The Netherlands there is (1) a lack of venture capital market for the early phases of start-ups and (2) a lack of active government stimulation.

The lack of a venture capital market is a major inhibitor. In Table 3, we compare the financing possibilities for the different stages of an ICT start-up in Israel, The Netherlands, and Silicon Valley. There is a clear shortage in support for early stage start-ups in The Netherlands. Venture capital market means that there is both supply of funds and an IPO market, which is essential for venture capital investors. The IPO market need not be a local stock exchange: the Israeli ICT industry is using NASDAQ as its main IPO market.

The second difference is the participation of the government. In the Israeli model, the government has placed the ICT industry, and in particular creating the financial base, high on the priority list and has taken an active role as a stimulator in the creation of a venture capital market. The Dutch government has taken some initial steps in this direction in the form of the stimulation

**Table 3. Financial Possibilities of a Start-up in The Netherlands, Israel, and the U.S.**

Phase	The Netherlands	Israel	Silicon Valley
Seed	Limited government fund	VC and Incubator program	Mature, large VC market (about 700 funds)
Start-up	Limited (only five VC funds)	VC funds (> 50)	Mature, large VC market (about 700 funds)
First	Limited (only five VC funds)	VC funds (> 50)	Mature, large VC market (about 700 funds)
Second	Limited (only five VC funds)	VC funds (> 50)	Mature, large VC market (about 700 funds)
Third	Corporate VC, IPO (AEX, NASDAQ)/acquisition	IPO (NASDAQ, London, EASDAQ, TAS)	IPO (NASDAQ, NYSE)
Forth	Corporate VC, IPO (AEX, NASDAQ)/acquisition	IPO (NASDAQ, London, EASDAQ, TAS)	IPO (NASDAQ, NYSE)

funds initiative by the Ministry of Economic Affairs, but the subject is not a government priority. Without government stimulation, private investors and companies in The Netherlands will be reluctant to invest in high risk ICT start-ups, which typifies the situation at present.

We did not examine the differences in culture between the countries in our study and the impact of these differences on our model. Cross-cultural study of IT use and acceptance, has been a feature of the technology acceptance model (TAM) studies (Cooper 1994; Davis 1989; Straub, Keil and Brenner 1997). This model is used by IS researchers to understand the impact of cultural differences on IT use and adoption. It would be premature to conclude that the model we have presented is applicable without taking into consideration these cultural differences. The ability to successfully implement the model in different countries may depend on tailoring the specific programs to support each of the three model parameters, taking into consideration each country’s cultural dimension (Hofstede 1980).

### 5.3 The ICT Model and Related Studies

The study of Taiwan’s computer industry attributes its success to a coordinated government strategy to support private entrepreneurship by a large number of small companies. Taiwan’s computer industry success is despite little previous experience in high-tech industry—lack of a knowledge base. A strategy of “fast follower” rather than a strategy of developing innovative products compensates for the lack of a knowledge base. The study of the effect of a national technology policy in promoting the production of computers and software in Asia-Pacific countries attributes the level of production to (1) human resources—scientists and engineers, (2) the presence of complementary industries, particularly electronics, and (3) expenditures on R&D. The first two relate to a knowledge base and the third to government support. The study of the IT industry development in Bangalore, India, reveals that an asymmetry exists between those who can participate in the IT industry growth and those who cannot. This asymmetry, which stems from the local socioeconomic context, can affect the success and growth of the IT industry. A recent development in Bangalore is the move from a “off-shore” software factory to developing innovative software “made in India.” The main obstacle to this development is a lack of venture capital to support start-ups during the early stage.

## 6. SUMMARY

Although this study has limitations, in that we did not examine the cultural differences that influence the development of the ICT industry, it does represent a contribution to ICT research. We have presented a generic model for the development of a successful ICT industry based on our study of the Israeli ICT industry. The development of a successful ICT industry requires a *knowledge base*, *financial base*, and *government support*. The government’s role is particularly important in supporting the financial base. Once the financial base is established, a mature venture capital market comes into existence and the government can thus exit and let market forces be the driving forces.

Using our model, we can outline the similarities and differences between the recent growth of the Israeli ICT industry and the development of the ICT industry in Silicon Valley. Using the model in our study of the Dutch ICT sector, we can attribute the differences between the Israeli and Dutch ICT start-ups to two of the model elements: lack of a venture capital market that aimed at supporting companies in the early stage and lack of government stimulation.

We believe that countries desiring to establish a growing ICT industry can use the model presented in this article. In particular, we believe that this model can be used to support ICT industry in developing countries with a strong knowledge base. The application of this model in those countries stipulates that government stimulation initiatives, in particular toward the creation of the financial base, should be developed and tailored specifically for the economic and political situation, as well as the cultural dimensions of the country.

The ICT industry is a truly global industry that can attract foreign venture and that could ally with foreign IPO markets providing the government support is in place. In countries with a strong knowledge base, venture capital market is particularly important in helping to make the transition from an internal technology focus to a commercial, market focus. A successful ICT industry in these countries can contribute to economic growth and stability.

The globalization of the ICT industry requires additional study of the impact of cultural differences between the countries on our model. Such a study will contribute to the applicability and successful adoption of the model in different countries.

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