1. Innovation, entrepreneurship and culture, a matter of interaction between technology, progress and economic growth? An introduction

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Not all technological innovations lead to start-ups, whereas an estimated 75 per cent of the new employment is created there. This is a global phenomenon. Why are there no more entrepreneurial successes? Are innovators just too technology driven, so that they forget about the market for their ideas? *Failing to prepare for the market, is preparing to fail your business.* Or are innovators predominantly hidden in research and development (R&D) laboratories of large multinational corporations (MNCs), so that the market perspective is too far away? With all of the activities surrounding technological spin-offs geared to foster entrepreneurial spirit, why is it that so many technology companies fail to sustain this spirit? Could it be that a *special* or certain mindset is needed at the individual level for entrepreneurs and/or a certain organizational culture for entrepreneurial firms? If so, what elements make up that culture? Are you assisted by your national culture (NC) background, your previous corporate culture (CC) experience or your professional culture (PC) (c.f., *once an engineer, always an engineer*) or a combination of all these? Furthermore, are these issues related to high levels of innovation, the development of technology, (social) progress and economic growth, and, if so, how are they related?

This book discusses these questions and more, and attempts to answer some of them: *Une mer à boire* indeed, but basically rests with the question, *what culture is necessary to create new enterprises out of promising technological ideas and to what extent is that a matter of an interaction between technology, economic growth, and social progress?*

So you get an innovative idea, you decide to become an entrepreneur, but not all innovation leads to successful venture creation; in fact, many of them fail. How does the entrepreneur learn more quickly from his/her mistakes? To initiate the creation of new venture, you may need a special culture, climate or mindset. Underneath this progress there are interactions

going on which can be symbolized in the iceberg metaphor which is also used for the hard facts of structure and the *soft* ones of culture (see Mintzberg, 1979; Ulijn and Kumar, 2000; Ulijn and St. Amant, 2001). Technology and (economic/financial) growth related to structure are in the visible top of the iceberg: progress related to society and culture are in the bottom below sea level and may have a larger impact than expected.

How can this interaction between technology innovation, entrepreneurship and culture be researched? Even defining the terms is problematic. Innovation, entrepreneurship and culture are studied in many disciplines and hence lead to many conceptualizations, including economic, sociological and psychological approaches. In addition, culture draws less from economics, but more from anthropology and linguistics (discourse studies), which are seldom applied to innovation or entrepreneurship. Organization and management studies seem to be the ideal interdisciplinary meeting place for all this. Furthermore, one may say that culture is a relative old research topic and entrepreneurship a relative new field of scientific investigation with all its problems of delineation, scope, paradigmata for theorizing, model design and testing, etc. Although the ambitions of this book are high, in that it attempts to bring together these three areas, instead of ending the discussion by answering all the questions, we extend the discourse by posing even more questions to be explored in future research.

1. INNOVATION

The problem with exposing new concepts to scientific analysis is that they cannot easily be made directly applicable in model building and theory development. Cumming's (1998) historical overview of definitions of innovation demonstrates well that there is a long way from Zuckerman's definition of a series of technical, industrial and commercial steps (see Robertson, 1974) via Kuhn stressing creativity that shapes something into products and services, and the belief that invention only becomes innovation if it succeeds in the marketplace. Creativity is an important element anyway of innovation management (see Euram Conference, 2002). Ulijn and Weggeman (2001) also reviewed some definitions within the framework of innovation management, but the bare minimum would be:

Innovation is creating something new and implementing it successfully at a market.

Innovation deals with processes, products and services and technology. As Wheelwright and Clark still view it (discussed by Ulijn and Weggeman, 2001), and as confirmed by Cummings (1998), the innovation management

process is still often regarded as a linear and continuous process: the R&D department has an idea, throws it over the wall to the design group and manufacturing department and marketing/sales only get interested if and when they believe there is a market for it. However, reality may be a bit different, as demonstrated in recent design studies reviewed by Van Luxemburg, Ulijn and Amare (2002). Furthermore Delinchant et al. (2002) revealed that there is a growing cooperation between the design function and the R&D department of the supplier and/or of the customer. Innovation, therefore, may be seen as resulting from collective efforts including both the business internal and external actors working more in cyclical loops of improvement rather than in a mere linear process. This would suggest that innovation can be a slow incremental or almost natural/evolutionary process (see Fujimoto, Chapter 10 in this book), or a revolutionary process. Vanhaverbeke and Kirschbaum (2002) illustrated this with the DSM (De Staatsmijnen) case, a Netherlands (NL) based mining and petrochemical company developing into the nutri- and pharmaceutical sector using nano-molecular technology. This transformation required radical innovation and organizational change rather than incremental innovation.

Scholars ranging from economics to sociology are currently interested in the role of government in assessing and fostering innovation. In addition, organizational and management scientists, marketers, engineers and others are interested in how to manage innovation and technology in an effort to determine the best way to manage innovation. Given the interest in this topic, we will briefly discuss both innovation policy and management. What can governments do?

In his survey of innovation studies in the twenty-first century, Smits (2001) lists a couple of problem spots for innovation. For example, small and medium sized enterprises (SMEs) find it difficult to transform knowledge into successful products and services, and a high number of high-tech firms in life sciences and information, communication and technology companies (ICT) have difficulty in getting full value from their innovations. An analysis of the decision-making process in this area could be helpful to businesses in developing a strategic innovation management process. Mairesse and Mohnen (2002) indicate for seven European countries that there is not a one-to-one correspondence between the innovativeness of a country and the observed innovation intensity, in other words, between what is possible and what happens in reality. Some countries do much better than predicted (NL and Ireland), others do not do as well (Belgium). The statistics in surveys often do not tell the entire story, because the countries concerned are not selected randomly. Also, the interpretation of the survey results is less than straightforward. For example, what does it mean if Germany is the champion of observed innovation intensity (43.8 v. a

European intensity of 34.7). In this case the innovativeness rank predicts exactly the innovation intensity rank, but other numbers show (see Table 9.1 in Ulijn and Fayolle, Chapter 9, and Hofstede et al., Chapter 8 in this book) that the percentage of self-employed people and new start-ups in Germany is comparatively low compared with Japan, the USA, France and NL. However, sometimes a country study can at least guide the innovation policy of a local government and explore critical success factors in organizing firms, as Sharif and Chan show in Chapter 2 of this book. Accordingly, it also seems that the European Union (EU), is able through its extensive Eurostat service to create a comprehensive and meaningful statistic called the innovation scoreboard (*Innovation and Technology Transfer*, 2001a).

One major concern of this unique supranational economic community has been how to turn R&D investments into new jobs. One can say that scientometrics is one indirect means, as Chapter 4 by Frenken and Leydesdorff in this book illuminates. But how can this lead to a higher innovation performance, expressed in the number of start-ups etc?

The Eurostat statisticians have concluded that Western Europe (UK, NL and Germany) is losing momentum, Southern European countries such as Greece and Spain are catching up and that the Nordic countries and Ireland are moving ahead, whereas Portugal is falling further behind, with the remaining member states taking intermediate positions in this innovation scoreboard. Their conclusion is that the trend for the entire EU is favourable, showing an improvement over the last five years in seven indicators, a minimal increase in one and a decrease in three (public R&D, business R&D and the share of manufacturing value-added from high-tech sectors). What does it mean for future entrepreneurship development?

Europe is becoming more and more a union of regional economies instead of national ones. Within the 15 top regions/provinces Oberbayern (Germany), Uusimaa (Finland) and Noord Brabant (NL) at the higher end and Ile de France and Oberpfalz (Germany) at the lower end. Of course, this can be the effect of the MNC R&D laboratories as from Siemens/BMW (Munich, Oberbayern), Philips (Eindhoven, Noord Brabant) or Nokia (Helsinki, Uusimaa). The Netherlands and Germany seem to score better regionally than nationally here. The Southern European countries are not represented in the July 2002 issue of the above source. European Union policy-makers hope to reduce these differences by developing internal and external networks of cooperation. Perhaps some regions act more as engines of innovation and entrepreneurship than other regions?

Once governments have created the right policy in which innovation might lead to new business, how do you increase the innovation performance of SMEs in the ICT and biotech sectors, for instance? Darsoe (2001) presents, on the basis of some Danish biotechnology firm cases, a few

guidelines to foster creativity and innovation through communication and cooperation. The building sector where ICT is still underused might be a case in point for innovating SMEs. Chapter 3, by Baark, exemplifies to what extent the knowledge conversion process between the different actors shape innovation as a social and cultural process through engineering consultancy. How does innovativeness relate to entrepreneurship?

One may conclude, for instance, from Davidsson (see Fayolle, 2002) that innovation and entrepreneurship have creativity (and communication to develop it) in common, and that in most technology-based entrepreneurship a high degree of innovativeness is required. A study by Utsch and Rauch (2000) among 201 entrepreneurs from West and East Germany pointed to innovativeness as a mediator between achievement orientation and venture performance, while initiative was not. So, is the level of initiating behaviour related to German entrepreneurial culture? Does taking the initiative disrupt routine and standard processes too much? Chapter 7 by Legardeur, Boujut and Tiger signals a paradox of innovation in a routine design process in a French case, which might need entrepreneurship.

2. ENTREPRENEURSHIP

As with innovation, defining entrepreneurship is also problematic, which is well reflected by a recent European research conference on the matter (Fayolle, 2002). From a large overview of definitions presented at that conference (by Davidsson) we distil a common core:

Entrepreneurship is a process of exploiting opportunities that exist in the environment or that are created through innovation in an attempt to create value. It often includes the creation and management of new business ventures by an individual or a team.

There are elements in the concept of entrepreneurship that derive from the economic and social context and from behaviour (is it innate or learned?). There is a link with creativity and innovation (see previous section), with new markets, products, processes and technology. Entrepreneurship involves competitive actions to win the market, involves acting to exploit opportunities and involves actors to bear risks. Economics is needed to study the market process, psychology to study the motivation and sociology, management science, and organizational behaviour to study the innovation aspect of entrepreneurship. The concept of an entrepreneur, however, is much older than that of innovation or innovator. In his comprehensive review of more than 30 definitions, Gartner (1989, p. 57) goes back to the one by Britain's J.A. Say (1816):

The agent who unites all means of production and who finds in the value of the products ... the reestablishment of the entire capital he employs, and the value of the wages, the interest and the rent which he pays, as well as the profits belonging to himself.

This is a normative definition: what an entrepreneur should do, but it is surprising that after the Second World War the more empirical definitions take over (22 out of the total), starting with the distinction with the manager (still a normative one with Hartman, 1959, and an empirical one with Litzinger, 1965). It seems as if by then a distinction between the more daily operations management and the rather innovation-based entrepreneurship was born. In the same piece Gartner concludes that 'Who is an entrepreneur?' is the wrong question; one should no longer verify (personality) traits (innate or learned) to predict what this person should do to make an enterprise a success, but study what the entrepreneur is actually doing.

Why is innovative entrepreneurship so important around the world? One answer is that it commercializes public knowledge and it contributes to productivity and employment growth. The concept of entrepreneurship is not only limited to small business development (Cummings, 1998; Pinchot, 1985; Thornberry, 2001). Vanhaverbeke and Kirschbaum (2002) concluded, based upon the study by Roberts and Berry (1985), that business as usual would only lead to incremental innovations, but that radical technological innovations in a strongly R&D driven business require strategic corporate entrepreneurship in order to succeed. This would also include spin ins/acquisitions and, in our opinion also spin-outs/sales of companies/start-ups. Entrepreneurship and/or intrapreneurship are also needed in large firms to sustain innovation management. The Legardeur, Boujut and Tiger study in Chapter 7 demonstrates that the production of a unique composite fibre-reinforced material, sheet molding compound (SMC), could lead to a paradox of innovation in a routine design process in the French automotive sector. Entrepreneurship is needed to break away from routine. The concept of the skunk works outlined and exemplified in Chapter 6 by Brown might be seen as another way to stimulate intrapreneurship/entrepreneurship and out-of-the-box thinking in an existing firm.

Based upon Gartner (1985; 1989), Bruyat and Julien (2001) and Fayolle and Bruyat (Fayolle, 2002), Fayolle tried to develop a conceptual framework and a field of research to study the foundation and the development of innovative business processes. After an outline of the paradigm context (including Bachelard, Feyerabend, Kuhn and Popper) and a philosophical perspective, Kyrö and Kansikas (Fayolle, 2002) review 337 refereed journal articles from 1999 and 2000 in the field of entrepreneurship. They concluded that this field is strongly US based once more, with 12 top journals publishing about it. Apart from a variety of qualitative and quantitative

research methods, the studies can be distributed over (by order of decreasing importance) the firm, the business, the relation between the individual and the business, between the firm and the economy, and between the individual and the firm. Other targets such as links between society, economy and individual got far less attention. Chapter 5 by Te Velde fills a little gap here in a historical/conceptual sketch of true entrepreneurship based upon Schumpeter's theory of economic development.

Another gap is the study of entrepreneurial behaviour as a (strict) psychological phenomenon. Although Kyrö and Kansikas (2002) concluded there was a nice balance of quantitative/statistical and qualitative studies, it is difficult to isolate the more rigorous experimental or clinical psychological approaches in this comprehensive survey and that of Shane (2002). Another recent critical perspective on business and management, however, presenting a published journal article by Kreuger (2002) and the conference by Fayolle (2002), addressed both the process and the psychology of individual entrepreneurship. Addressing such questions as 'Are women more successful than men as entrepreneurs?' and notwithstanding the social context factor which might not always be very beneficial to female entrepreneurs, Gundry, Ben-Yoseph and Posig (2002) could ascertain a dramatic increase of women-owned businesses worldwide: one-quarter to one-third of all businesses in the formal economy are headed by women. They have to cope with discrimination, prejudices and certain skill deficiencies (c.f., financial competency; for details see Hisrich et al., 1997), but at the same time demonstrate successful management styles such as open communication and participative decision-making. In a comparison of the USA and Central (Poland) and Eastern Europe (Romania), family and culture appeared to have a large impact on the rate of female start-ups. Cromie (2000) found a significant difference between reasons given by men and women to establish an enterprise, relating to career dissatisfaction and child-rearing: a mother can more easily work at home for her own enterprise where she seems to care less about making money than men. The sample of entrepreneurs studied in West and East Germany had autonomy, job dissatisfaction and achievement in common as the top three motives to be self-employed (see also Hofstede et al., Chapter 8). This helps confirm that traits research here is less important than the study of actual motives and behaviour. In this sense the clinical observations by Kets de Vries (1996) are unique: the entrepreneur on the couch. Such psychoanalyses might explain, why so many (high-tech) start-ups fail (50 per cent within 10 years according to a recent Dutch study). A need for control, a sense of distrust, a desire for applause and resorting to primitive defensive mechanisms, such as splitting, projection, denial and a flight into action (manic defence) seems to be quite common among entrepreneurs. How can they be helped?

Different actors might be available at the local, state and global (government) levels. In a US/EU comparison Fonseca, Lopez García and Pissaride (2001) found not only more high-tech start-ups in the USA, but also start-ups in the area of financial and communal service, which is normally the domain of governmental concern/action in the EU. In an index of start-up costs expressed by the number of regulations and weeks needed to set up a company (see also Ulijn and Fayolle, Chapter 9 in this book), they found only Denmark and the UK ranked lower than the USA. All other EU members ranked higher, with Spain, Germany and Italy having the highest start-up costs.

It also appears that large MNCs may gain by helping small start-ups and SMEs. There is some contradiction here. On the one hand, Jones (2001) demonstrates a growing internationalization trend of small high-tech firms: think local, act global. Is this only for general management and not innovation management? On the other hand, Acs, Marck and Yeung (2001) strongly recommended that SMEs leave the international innovation to MNCs and share the international direct exporting profits with them instead. Does this imply that there is a critical mass of R&D required for innovation? Van Luxemburg, Ulijn and Amore (2002) showed some Dutch cases that seem to point in that direction. An international entrepreneurial orientation of SMEs is definitely required in any case, for which Knight (2001) gives a strategic model. International comparative entrepreneurship studies, such as the ones by Dana for Pacific Asia (1999) and China (see also Shi, 1998), the Central Asian Republics, Myanmar and the Nations of former Indochine Française (Dona, 2002) might facilitate the global learning in this area. International entrepreneurship and innovation seem to warrant further investigation.

What can academia do to help start-ups? Apart from indirect stimulation (research) technology-based entrepreneurship can be stimulated directly through education and incubators. The work by Birley and MacMillan (1997) and Birley (1998) at Imperial College, London, might be a case in point here. In a recent survey of (university) incubators EU-wide (*Innovation and Technology Transfer*, 2002b), the UK, Germany and Italy rank among the highest density of SMEs, with a corresponding number of incubators in this decreasing order: Germany, the UK and Italy. Most of the businesses in these university-based incubators were in the field of software development, computer technology, and e-business and biotechnology. Fayolle's work (2000) showed that engineers are seldom entrepreneurs; perhaps they lack the critical mass skills and competencies needed. In this sense high-tech incubators can be a big help. Additionally, entrepreneurship education as part of technology management and industrial engineering curricula can provide some of the missing skills and competencies technologists need to increase their chance of entrepreneurial success.

In sum, the creation of economic value through the entrepreneurial and/or venturing process is quite complex. Furthermore, the results seem to vary greatly across countries. This may not have been surprising in the past when education (skills, competencies, capital, etc.) was not readily available to some parts of the globe; however, given that this has changed substantially, especially in Europe, these differences still persist. Given this, it appears that national differences (that is, culture) has a powerful effect on the process of creating innovative and entrepreneurial people and firms.

3. CULTURE (NATIONAL CULTURE, CORPORATE CULTURE AND PROFESSIONAL CULTURE)

Not all innovative people are entrepreneurial, it seems a special mindset (and environment) may be required for this. Within the framework of managing high technology and innovation, Levy (1998) outlined how to create an organizationwide culture of innovation and intrapreneurship/entrepreneurship through identifying and encouraging champions and entrepreneurs and using different management methods, such as high management involvement, listening to the customer and entrepreneurial greenhouses. But what is innovation and entrepreneurial culture? A comprehensive recent handbook on entrepreneurship such as the one by Shane (2002) does not deal with psychology or culture, which is amazing given some breakthrough studies by Shane earlier in his career about innovation culture (1992; 1995; 1997; Shane, Venkataraman and MacMillan, 1995).

The link between culture and economics has generally not been very well studied. Lavoie and Chamlee-Wright (2000) for instance talked about the development, representation and morality of business, but do not use any recent cultural theories. Culture can be seen, of course, as a selling item in the domain of music, theatre, films, literature or artefacts (see Gray, 1998), but this represents only the outer layer of the onion of culture, which is the explicit expression of deeper norms, values, beliefs, attitudes, perceptions and implicit assumptions. In the Netherlands, however, it was surprising that recently the Minister of Economic Affairs organized a national values committee to stop society from further cultural degeneration. Is this the best way to close the gap between innovation, entrepreneurship and economic growth?

If innovation and entrepreneurship are related concepts, it is important to make the connection also at the cultural level. In line with the earlier study by Ulijn and Weggeman (2001) and Ulijn and Fayolle (Chapter 9 in this volume), the various authors in this book handle culture at three different levels: national culture, corporate culture and professional culture.

Moreover, the link between culture and psychology will be discussed to relate innovation and entrepreneurship to each other not only at the group level, but also at the individual level. Both need cooperation and teamwork. Innovation and entrepreneurial culture would then be, to follow up Hofstede's definition of culture, the programming of the mind of innovators and entrepreneurs. What is the overlap?

National Culture (NC)

Innovation and entrepreneurship is an interesting subject to compare across national borders, but what, if anything, can countries learn from each other? We look here at NC from a business perspective, as is suggested by Crane (2000) who looked at business culture in Germany, France, Spain, the UK, NL, Sweden, Switzerland, Hungary and Russia, with views from the USA, India and Japan. He concluded that there seems to be a European business culture encompassing all, as there is in North America, the Middle East, Asia and Africa (although drawing strict lines between them may sometimes be difficult). Different chapters in this book deal with innovation and/or entrepreneurship with a national culture perspective, including the EU (Chapters 4, 8 and 9), Hong Kong (Chapters 2 and 3) and Japan (Chapter 10), and a comparison with the USA (Chapters 4 and 8). Hofstede et al. (Chapter 8) includes other Anglo-Saxon countries, such as Canada, New Zealand and Australia. The recent Valence conference referred to earlier (Fayolle, 2002) expanded outside the EU member states, with contributions about entrepreneurship from Norway (Ofstedal, Amo), Estonia (Sepp and Hankov), Bulgaria (Kolarov), Russia (Iakovleva) and Tunisia (Zghal and others). With the previously mentioned coverage of Asian and Pacific countries by Dana, a comprehensive global set of studies is available, except perhaps for Africa and Latin America.

The most recent South American survey by Lenartowicz and Johnson (2002) used the introspective Rokeach Value Survey (Rokeach, 1973; Schwartz and Bilsky, 1990) and covered 12 Latin American countries, finding some variable pertinent for both innovation (see Ulijn and Weggeman, 2001, for an independent study on innovation drive) and entrepreneurship. In general there is some homogeneity across the NC borders of Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Puerto Rico, Uruguay and Venezuela, but one should caution against the 'Latino' or 'Hispanic' stereotype. Retail managers in those countries were shown, as measured by personality indicators, to be ambitious, capable and courageous: Bolivia and Brazil rank highly there, which is promising for an emerging market. Moreover, the two economic powerhouses, Brazil and Mexico, might differ because of the difference in

language: Portuguese v. Spanish. One should not overgeneralize and stereotype based upon false assumptions with respect to innovation and entrepreneurship.

While we are most concerned with national difference with respect to culture here, we recognize that there are important within-country variations related to regions and ethnic groups, as suggested above because of differences in number of patents and by a recent study by Van den Tillaart (2001) on entrepreneurship. For example, 9.2 per cent of all Dutch SMEs are run by immigrant entrepreneurs, such as Turks, Surinamese and Moroccans (in this order), mostly in services (restaurants, retail, automation and public relations).

Professional Culture (PC)

An individual's extensive education and subsequent career may have a significant impact on the processes of innovation and entrepreneurship. Looking at engineers and marketers one can often see these professional culture differences. For example, there is evidence, especially anecdotal evidence, that many engineers and engineering firms have difficulty understanding market needs. This *difficulty* may be deeply rooted, stemming from the education, training and career professional socialization that engineers (and other professionals for that matter) go through. Kunda (1992) proposed to engineers a new culture to make a bridge in the high-tech corporation (see for a thorough discussion, Martin, 2002). Within the development of a start-up company a unique orientation towards one PC might decrease to benefit more differentiation eventually via an integrative stage of PCs as an intermediate step. Ulijn, Nagel and Tan (2001) and Fayolle, Ulijn and Nagel (2002) concluded that Dutch engineers are quicker to accept the other PC of marketing than their German or French peers. It is even a general trend that high-tech venture starters often focus too much on their technological innovation and not enough on the market: a conflict of PCs? The Baark and Legardeur, Boujut and Tiger chapters (3 and 7) reflect on these issues in both Hong Kong and France. More cooperation is needed between the different professions and their cultures involved in a start-up process, not only engineers, but also marketers, lawyers, bankers and other financial specialists. Furthermore, there are preliminary indications that there may even be differences in professional culture across national cultures and, to complicate matters even more, these may interact in unexpected ways.

Corporate Culture (CC)

Are some corporations more innovative than others? Yes. Certainly Ulijn and Weggeman (2001), Shane (1992; 1995; 1997; 2002), Shane, Venkataraman and MacMillan (1995), Shane and Venkataraman (2000), Nakata and Sivakumar (1996) and Ulijn et al. (in press) outline, on the basis of different dimensions linking CC to NC in corporate alliances that this is the case. The skunk works culture presented in Brown's chapter (6) in this book makes a link to intrapreneurship. Because there has already been so much research produced in the areas of corporate culture, we believe that there is not too much that we can add. However, there has been little work that examines the interaction of CC, with both PC and NC. And how these three concepts relate to the development of innovation and entrepreneurship is a new concept that we begin to discuss in this chapter and is picked up by some of the other authors in following chapters.

Culture and Psychology

Is there a relationship with culture and behaviour with respect to innovation and entrepreneurship, and can the field of psychology inform the issue? Montalvo (2001) tried to predict through a social psychological meta-theory applied to decision-making on the basis of attitudes and beliefs. To what extent would the model he proposed change the individual behaviour of innovators? In general it has been a problem to distinguish culture and personality in innovative and entrepreneurial behaviour. Issues such as creativity, attitudes (Eagly and Chaiken, 1993), perceptions and cognitive schemata are studied in both, as the latter relates to knowledge management in an intrapreneurial context (Oftedal, in Fayolle, 2002). Is the concept of entrepreneurial spirit that leads to cognitive biases a matter of culture or personality? Is what Cavusgil and Godiwalla (1982) defined, and what Hart, Webb and Jones (1994) discussed within the framework of internationalization and export decision-making as psychic distance, in actuality a matter of cultural distance? How can it be measured? In general, there is an underlying comparison to geographical distance (i.e., the farther away the more different and difficult). In contrast, what is very near and expected to be similar, can be very different both within a multicultural society and between border countries, such as NL and Belgium, NL and Germany (see the data by Hofstede et al. in Chapter 8). What does this mean for the NC dimension of innovation and entrepreneurship?

Although it is very difficult to disentangle culture and psychology here, entrepreneurship has some personality aspects that seem rather psychological in nature (see for an overview Frank et al., in Fayolle, 2002).

Intuition is another aspect of entrepreneurial behaviour (see Frese, Chell and Klandt, 2000). Opportunities may involve dual processing by the entrepreneur: cognitive v. associative with a risk of false attributions (Chaiken and Trope, 1998). For example, an entrepreneur might not be a systematic information processor, the gut feeling counts for more. Gender might be another combined psychological and cultural aspect of entrepreneurial success (see Section 2 in this chapter). Moreover, a cross-cultural comparison of personality indicators for innovation and entrepreneurship is another blend of culture and psychology. The collection of papers by Frese, Chell and Klandt (2000) listed personality predictors of success and entrepreneurial behaviour including the transition to the social psychology of groups. How important is it to team up in innovation and entrepreneurship?

Group/network/cooperation/conflict

The fact that strong individualism fosters creativity and innovation in its first stage (Ulijn and Weggeman, 2001, and the research they refer to) and that start-ups very often consist of smart individuals who have an idea 'to create value', might lead to the idea that sharing and teaming up with another person with complementary skills is the surest path to success. However, some entrepreneurs want to remain autonomous as much as possible. Within the EU, Ulijn and Fayolle (Chapter 9) evidence, at least within and among French, Dutch and German engineers, that cooperation between engineers needs to be encouraged strongly in high-tech start-ups. The need of a high collectivism and teamwork in the implementation of an innovation and the success of cooperative start-ups at Imperial College in London (see Birley, 1998; Birley and MacMillan, 1997), for instance, supports this recommendation.

The finding by Bond and Hofstede (1989) that the gross domestic product (GDP) in the West would correlate with a high individualism and in Far East Asian countries with long-term orientation (LTO or the Confucian Dynamism Index) was quite striking. That high LTO was often related to high collectivism and power distance seems to create a natural environment for a radical implementation of an innovation, as the Japanese example showed a couple of years ago. In parallel, it was a plausible development that the breakthrough work by Hofstede was coupled with a serious methodological update on innovation in culture theory from social psychology by Schwartz (1994). Hofstede et al. went beyond the individualism/collectivism dilemma as discussed above within the framework of innovation and entrepreneurship in this book. While the initial steps of business creation involve often the individuals, generally a group, or at least

cooperation among a few individuals, is needed for success, especially in high-tech based entrepreneurship.

It comes as no surprise that, in particular, Western authors such as Kanter (2000) make a strong plea on the basis of examples for collaborative methods to build a culture of innovation, such as networks, cross-boundary teams, supply-chain partnerships and strategic alliances (SAs). In particular social networks help entrepreneurship (Aldrich and Zimmer, 1986), since family, friends and fools are often the initial investors in new business ventures. Networks can also be important for opportunity identification and in the internationalization of the venture (see Dana, 2001). A strong interpersonal trust (Dibben, 2000) and commitment is required for cooperating in the entrepreneurial venture. Even among start-ups strategic alliances can stimulate an innovation culture, as Park, Chen and Gallagher (2002) have demonstrated.

Just a good technological idea is not enough. Success depends again on, among other things, cultural fit, a key but routinely neglected source of failure. It is important to spot such cultural sources in time and, once they occur, to solve them by the correct conflict management styles. In the Chinese culture, where networks (through *guanxi*) are the most natural things to do (see Gesteland and Seyk, 2002, for the pros and cons of the different options, such as joint ventures), team conflict could mostly be avoided to preserve harmony and face. The book by Selmer (1998) contains several chapters on partnership management to handle such situations on the basis of American–Chinese joint ventures both intra- and inter-culturally. How can an innovation and entrepreneurial culture handle all this?

Innovation and Entrepreneurial Culture

It appears that the commonalities between innovative and entrepreneurial spirit can override the differences between organizational differences. Cooperation between European start-ups seems to be a key to it (Ulijn and Fayolle, Chapter 9 in this book) and the EU supports this (see the different issues of *Innovation and Technology Transfer*). Increased mobility of innovative and entrepreneurial engineers and scientists within the EU is needed to avoid a further brain drain to the USA (Ulijn and Gould, 2002). If it can be shown that there is a correlation between mobility and innovation, how would that put pressure on EU policy-makers? The chapters by Hofstede et al. (8), Sharif and Chan (2), Baark (3) and Fujimoto (10) also show how different firms, sectors and countries can learn from each other here. It seems as if a strong innovation and entrepreneurial drive is needed as a basic cultural dimension intersecting NC, PC and CC. Apart from creativity, empathy and persistence, this drive seems to be one of the key charac-

teristics of the successful entrepreneur starting up (Waasdorp, 2002). It often requires technology-based innovation and entrepreneurship to make substantial social progress and/or economic growth. We briefly discuss these issues over the next few sections.

4. TECHNOLOGY

Advances in technology lead to many innovations and new enterprises. Nobody would deny that. But compared to other sectors, technology-based entrepreneurship seems still to be ripe for investigation. Given its importance to social progress and economic growth, how can more technology-based business creation be encouraged? This is a question with which many are struggling. In a recent study, only 28 per cent of the top 110 fastest growing companies in the Netherlands, appeared to be high tech in recent years, with only 13 per cent of those top 110 in the industrial sector (Waasdorp, 2001). Is this just a Dutch phenomenon? How does it relate to low and medium technology or even biotechnology? The Dutch seems to lag behind in some sectors, such as biotechnology, which is strongly dominated by the USA, Denmark (DK) and the UK. Even in the field of environmental technology, where the Dutch invented the windmills in the seventeenth century, DK is now the leader in producing equipment for wind energy. Edquist, Hommen and McKelvey (2001) adapted Organization for Economic Cooperation and Development (OECD) data from 1996 to show the higher the technology, the more employment there is. Is that still true, and could the job rate be higher, if there is more technology-based entrepreneurship? Fayolle (2002) indicated that in France only 2 per cent of the engineers create high-tech businesses. Therefore, it seems there is a gap between (potential) technological innovation created by engineers and the attempts to exploit those technologies. Why does this gap exist and how can it be closed?

Technology goes more quickly beyond national borders than anything else. For example, ICT is an important source of innovation with a strong impact on human communication (Ulijn, Vogel and Bemelmans, 2002) and negotiation (Ulijn and Kersten/Tjosvold, 2004). Everybody wants to have the most advanced technology, but on the innovation side it is still very much a one-way transfer from West to East or North to South. A study by Shi (1998) shows for the tape recorder sector that Chinese recipients of imported technology were able in 61.3 per cent of cases to do new product development assisted by local organizations as a result of a technology transfer project with a non-Chinese firm. For 90.3 per cent the localization rate was 80 to 100 per cent. Sixty-four per cent reported that they were not imitating

the imported equipment, but 96.8 per cent confessed that there was no innovation at all based upon the imported technology. Why in a country with radical innovations in the past, such as the clock, the compass and gunpowder (fireworks), is there not more high-tech entrepreneurship? Innovation is available in many Chinese sectors (Du and Farley, 2001), but technology transfer from outside China does not seem to lead to much learning in the sense of start-ups (Warner, 2000). Or is it just a matter of time?

Technological innovation is directly related to economic performance in countries such as the USA, Japan, Germany, France, the UK and Scandinavia, but seldom to emerging economies, as Steil, Victor and Nelson (2002) indicated. That study covered a wide range of sectors, where technological innovations take place: the Internet, computers and semiconductors, banking and financial intermediation, securities trading, venture capital, pharmaceutical and agricultural biotechnology, electrical power and automobiles. For the European context the book by Jones-Evans and Klofsten (1997) concluded that technology-based small firms become increasingly important for future European industrial employment, and technologically innovative SMEs contribute largely to wealth creation. Multinational companies seem to require more radical technical innovations than they can produce themselves. Apparently SMEs and high-tech start-ups seem to be better able to innovate radically than MNCs, especially if they are helped to do so by the larger firms. How can cooperation between MNCs and SMEs in the area of innovation be encouraged?

One of the roadblocks may be that SMEs traditionally are less internationally orientated than MNCs. If MNCs set up a research agenda for cross-border innovation as suggested by the study by Zander and Sölvell (2000), they could include SMEs to facilitate the international technology transfer needed. Yli-Renko, Autio and Tontti (2002) demonstrated clearly that the international sales growth of technology-based new firms was strongly correlated with internal social capital and knowledge intensity. He further found that management contacts led to significant correlations with foreign market knowledge, geographical diversity and entry mode experience. In addition, one of the strongest correlations was between customer involvement and foreign market knowledge. So one lesson for SMEs could be: become the supplier of MNCs and they will give you more opportunities to innovate internationally. How can culture play a role?

One cultural layer in this is often overlooked: that of the PC of the different fields of expertise involved within MNCs, SMEs and start-ups and across sector borders. Legardeur, Boujut and Tiger (Chapter 7) give the example of design cooperation within the automotive sector where different competencies and PCs have to match. Dr J. Mena de Matos, director of the European Design Centre in Eindhoven (NL) indicated that in a project

between seven countries the biggest misunderstanding turned out to be across disciplines, not across national borders (*Innovation and Technology Transfer*, 2001b). Engineers no matter where they came from, saw things in much the same way. Technology appeared to be a unifying factor once more. So the view of economists on technology might be a bit biased. Multinational companies can help high-tech start-ups with their R&D potential and share in the profits of such cooperation. More research is needed to look at how professional cultures affect the innovation process. One hopeful outcome of this research can be the identification of innovation process bottlenecks. The elimination of these problem areas could facilitate innovation and entrepreneurship, especially in MNC/SME joint projects. What additionally can be done to foster international cooperation?

From different sources (Steil, Victor and Nelson, 2002; Ulijn and Gould, 2002) one gets the impression with respect to the innovative and entrepreneurial engineer that the USA still ranks ahead of the EU. One reason for this is the freedom the American workforce has to follow opportunities. The mobility of EU citizens (even within their own countries) is very poor. There might be one exception, Germany, which attracts the most immigrants from other EU member states (25 per cent in 2001) apart from Turks (28 per cent) and 15 per cent from the former Yugoslavia out of a total of 7.7 million foreigners. Steil, Victor and Nelson (2002) showed for Germany that the foreign students are attracted equally to science and engineering and humanities and social sciences.

In general there is a brain drain from new member states in Central and Eastern Europe to the EU and the USA. This amounts to a substantial transfer of human capital, because much of the science and engineering education investment is often done in the home country. Similar trends are to be observed in South Africa and China. The USA remains more popular than Europe. One reason might reside in the following slogan uttered by a Dutch European Parliament member.

The EU is very good in investing euros into R&D, but when does R&D return those euros by new employment, new businesses as a part of the internal market?

Cross-border cooperation and integration goes slowly (but surely) through Euroregion developments. More recent development also include some countries in Central Europe, such as the virtual incubator of new firms in the border region of Austria, Hungary and Slovakia (see *Innovation and Technology Transfer*, 2002b) and the Phare programme for an infrastructure for economic and social cohesion.

What is true for the EU, may be even more true for the East. Russian engineers, for example, can be very inventive, as the recent Cybiko example shows: a hand-held computer which displays an awesome multifunctionality

(www.cybikoxtre.me.com), with Taiwanese manufacturing and American marketing. Why can Russian entrepreneurs do all three? Should they? A careful analysis of five entrepreneurial ventures in Russia by Puffer and McCarthy (2001) may have indicated why. They have to navigate through a hostile maze of a political, economic and legal nature. They have to be opportunistic and optimistic and are seen as *different* from other Russians who might envy their success and see the entrepreneur's profit as their own loss (see also Iakovleva, in Fayolle, 2002). So, how do we create a new entrepreneurial spirit for engineers in Russia and in the rest of Europe?

A final reason for the gap between technological innovation, entrepreneurship and the low rate of high-tech venture creation might be the perceived risk involved and the fear of failure. Risk is strongly related to the Hofstedian dimension of uncertainty avoidance, which normally has to be low in the initial stage of innovation and entrepreneurship but should become higher towards the implementation into the market to avoid unnecessary risks (Nakata and Sivakumar, 1996). The innovator in a big firm probably takes less risks than the high-tech venture creator. This is not the place to review the extensive literature on strategic and technological risk perception in entrepreneurial ventures (see Forlani and Mullins, 2000; Busenitz, 1999; Hauptman and Roberts, 1987). We will just summarize some of the general entrepreneurship characteristics touched upon so far and try to relate them to technology entrepreneurship.

Entrepreneurs tend to be individuals with high motivation, risk-taking and proactive behaviour, who seek to create value for themselves and their customers by exploiting innovations, by exploiting opportunities and perhaps by creating new ventures. If they are engineers dealing with innovative technology, they may rely heavily on their formal education and previous experience to help them. The business environment for high-tech venture is usually dynamic/turbulent, heterogeneous and hostile. Success for these ventures often depends on the organizational systems, the strength of the innovation and marketing. As we have stated before, technology-based ventures seem to need a high degree of internal cooperation, perhaps because of the complexity involved. In a very comprehensive book, Diben (2000) proposed a model of cooperation for the entrepreneurial venture backed up by types of trust in the entrepreneur's interaction with the different actors: (1) dependence (outside), (2) familiarity (both in- and outside), (3) comprehensible situational cue (both inside and outside), and (4) faith (outside). The idea is that trust can facilitate coordination and cooperation in the innovation and venturing process.

With such a high number of uncontrollable factors, augmented with the ever-changing technological perspective for the engineer, there are a lot of risks involved. Entrepreneurs have a generally high-risk propensity, but

they do not view themselves as risk-takers. To reduce risks they use more heuristics in their decision-making than innovation managers in big firms. In this context, biases and heuristics are decision rules, simplifying strategies, cognitive mechanisms, and subjective opinions in uncertain and complex situations (see Busenitz, 1999; Kahneman, Slavic and Tversky, 1982). If risks are not taken well and trust has been betrayed, a start-up might fail. What happens then? Waasdorp (2002) quoted from EU sources the results of an EU–US comparison among business managers on the stigma of failure. What is the relationship between the following:

1. One should not start a business, if there is a risk it might fail.
2. Someone who has failed should be given a second chance.

Two extremes show up. Dutch, Austrian and German business managers would say: ‘Don’t even try to start your own business, if there is a risk to fail.’ Irish, American and British peers would say: ‘If you fail, just try it again.’ Brown’s skunk works concept (Chapter 6) certainly helps to convert an obvious failure into a new sign of hope: one should learn from his/her mistakes. In this light it is significant that Dutch bankruptcy law, which dates from the late nineteenth century, recently changed to make trying again easier for the entrepreneur (www.ez.nl/faillissementswet).

All in all, technology and entrepreneurship is still a challenging relationship, which this book can only partly cover (see also Butler, 2001, and Phan, 2000, for more specific studies, including the field of e-commerce). Highly mobile, innovative and entrepreneurial engineers should be encouraged in MNCs, SMEs and start-ups to cooperate across industrial and country borders, to trust new ventures and to take risks. When you fail in start-ups in any part of the world, you should be able to just try it again. How strong is the link between innovation and entrepreneurship as an indicator of economic growth and to what extent is this link seen as social progress? An answer to those questions in the next sections might fuel the need for a true global innovative and entrepreneurial culture.

5. ECONOMIC GROWTH

Is Progress Synonymous with Economic Growth and is it Fostered by any Technological Development?

The economic growth engine that has innovation and entrepreneurship at its root, can be responsible for wealth creation, wealth redistribution and employment. It can also create substantial value for the customers as well.

In addition, economic growth can be a source of foreign direct investment, development of a country's infrastructure, a strong tax base, etc. It can even lead to the development of a country's art and culture. However, *can* is the operative word. Although economic growth and (social) progress can go hand in hand, it would be naïve of us to think that progress and economic growth are synonymous; but others continue to make that mistake. Growth can certainly help society progress, but it does not guarantee it, especially social progress that is evenly distributed across the population. Innovation, entrepreneurship and growth just provide the potential for social progress. The system of government and the strength and will of the people are largely responsible for whether or not economic growth is translated to social progress.

6. (SOCIAL) PROGRESS

What is Progress with Respect to Innovation and Entrepreneurship?

One of the first things that comes to mind is that much of the world's innovation comes from the developed countries, while social injustice, unequal wealth distribution, etc. is generally relegated to the less innovative parts of the world. Is this a coincidence? There are entrepreneurs all over the world, even in the poorest regions, but some of them seem to be better connected for technological innovation than others. Could this be one of the reasons?

Do national culture, innovation and entrepreneurship interact in a way that affects social progress? Kolarov's case study of an innovative Bulgarian firm (in Fayolle, 2002) confirms the low to middle individualism of former communist countries (Romania, Serbia, Slovenia, Croatia, Russia, Bulgaria, Hungary, the Czech Republic and Poland in increasing order), the rest of Europe being more individualistic (IND). Is this because of the former communist/capitalist distinction or does it date back to (Slavic) tribal cultures? Kolarov concluded that the innovative culture in these countries implied loyalty, tradition, internal support, family environment teamwork, respect for seniority and formal structure. The collectivism of Central/Eastern European and Asian countries may even assist innovative entrepreneurship, given a stable social cohesion.

The EU has programmes to support such social cohesion. It is clear that an equal balance of innovation and entrepreneurship across country and regional borders could contribute to social progress and justice. The ideas of sustainable entrepreneurship and environmental and social responsibility are a part of social progress. The position of the Scandinavian countries is very peculiar in this respect. They are small, but rich, economies and are

also very democratic and generally philanthropic. What is their position in the East–West and North–South social progress scale? The national culture research by Hofstede evidences a lot of similarities between Scandinavian countries such as Sweden, Norway, Denmark and Finland and NL (non-Scandinavian). All those countries share a low power distance (PWD), uncertainty avoidance index (UAI) and masculinity (MAS), and a high individualism.

Looking at the sources Waasdorp (2001) quoted, Finland is the only country with a strong correlation between innovation and start-ups; all the others have a weaker correlation, with Norway having the lowest. When it comes to risk and failure the Nordic countries seem to favour risk and failure avoidance with the exception again of Finland, Denmark and NL. Why is this?

Bjerke (1999) compared American, Arab, Chinese, Japanese and Scandinavian (only Denmark, Sweden and Norway) cultures. The USA with the highest innovation and start-up relationship, displayed a culture where (social) progress and (economic) growth are almost synonyms and the role of the company is to promote personal goals, while in Europe companies would pursue rather societal goals. Bjerke used some of the above Hofstedian dimensions, such as PWD and UAI (important for innovation and entrepreneurship) and related them in one model to attitudes towards time and environment, people relations, expressed through communication, measure of success, attitude to trust, aims, skills wanted and societal orientation and, finally, to problem-solving and attitude to change. In particular, the interaction between social and time orientations between the above five culture groups and the PWD–skills interaction (both very relevant for converting innovation into entrepreneurship) may give insight into why Scandinavian countries may lag behind the USA in innovation and start-ups. Scandinavian countries have a long-term/individual orientation; they are *learners* (see Lundval, 2002). The Americans have an orientation towards the future, but are short-term/individual (opportunists), the Chinese believe in reputation, with a short-term/group orientation, whereas Japanese and Arabs believe in dominance: a long-term group orientation. Both the Japanese and Scandinavians share a desire for equality among people, while Americans prefer equal systems skills. Finally, Arabs are loyalists, because they have unequal systems skills, while the Chinese are adapters, because of their unequal people skills.

As a conclusion Bjerke stated that the US system be considered a *shareholders' capitalism*. The Scandinavian countries' system cherishes *stakeholders' capitalism*, which bears a responsibility to contribute to a social cohesion. However, this *socialist* attitude does not seem to be very beneficial for the start-up rate.

Finally, one other dimension might be relevant in this social progress discussion linked to innovation and entrepreneurship: a low MAS or high femininity in the Scandinavian countries in the broad sense. This implies a high degree of empathy, affiliation, open communication and participative decision-making (see Gundry, Ben-Yoseph and Posig, 2002) which men in 'feminine' societies also display. It comes as no surprise, then, that 4200 female Swedish entrepreneurs did not underperform at all compared to their male peers (Du Rietz and Henrekson, 2000). Birley (1998) found that there are far more psychological and demographical similarities between women and men entrepreneurs than earlier research suggested. The number of minority female start-ups is increasing: by 1996, 13 per cent of women-owned businesses in the USA were owned by women of colour (Gundry, Ben-Yoseph and Posig, 2002; and see Inman, 2000 for a further overview). It should be obvious that women have to play an important role in social progress. Although female entrepreneurs may underachieve more in some areas such as international entrepreneurship, perhaps it is because of their (over)dependence on family capital (Gundry, Ben-Yoseph and Posig, 2002.).

In sum, innovation and entrepreneurship play a significant role in the economic growth of a country. In fact, innovation and entrepreneurship may be the most important factors that drive the process of economic development. However, while ultimately economic development is vital for the advancement of a country, we cannot confuse economic growth with social progress. Although both economic growth and social progress vary across countries and are related to particular details such as national culture, history, tradition and so on, social progress is also affected by things such as wealth distribution, individual/human rights, equalization of gender rights, which are not directly affected by economic growth.

7. SUMMARIES OF CHAPTERS

We would like to acknowledge here the first international ECIS Conference (Eindhoven Universities of Technology, NL) held in September 2001 from which we invited some of the authors of the best papers to adapt them as chapters in our book.

Innovation

Chapter 2. Sharif, Naubahar (Cornell University, USA) and Ivy Chan (National University of Singapore), 'Conceptualizing innovation management and culture in the Hong Kong Special Administrative Region

(HKSAR): an exploratory study of organization-specific critical success factors’.

Sharif and Chan attempt to identify the building blocks at the organizational level that may contribute to national innovativeness using Hong Kong as setting and the concept of a National System of Innovation as a framework.

In summary, the chapter theorizes that organizations’ learning initiatives, rooted in management culture and their staff’s individual learning styles, are positively related with internal cooperation. Innovators and creative thinkers should be encouraged. They also posit that there are a few other activities which if an organization were to engage in, would foster the requisite culture necessary for innovation. In addition, they argue that organizations that have active relationships with other organizations contribute towards development in a macro-culture of national innovativeness. Next, they discuss how and why the government has a key role to play in the development of national innovativeness in the areas of SME policy as well as knowledge dissemination and distribution. Ultimately, they conclude that while firms are at the center of the innovation process, the development of national innovativeness is dependent on many factors that can vary across country, networking and collaboration among organizations seems to be the most important.

Chapter 3. Baark, Erik (University of Science and Technology, Hong Kong), ‘Knowledge management, institutions and professional cultures in engineering consulting services: the case of Hong Kong’.

Baark explores the context of innovation in engineering consultancy, again using Hong Kong as the setting. He accomplishes this by examining key contingencies shaping innovation processes based on a taxonomy of four major dimensions of engineering consultancy business: professional culture, institutional framework, knowledge creation and information technology infrastructure.

His findings suggest that the professional culture of engineering consultancy in Hong Kong, has attempted to distance itself from the questionable practices of some local Hong Kong contractors and subcontracting entrepreneurs. As a result the professional engineering culture has maintained its Anglo-American roots and traditions of professional autonomy and ethics, and thereby has established a framework that seeks to maintain international standards for quality of services and innovation.

In addition, trends in the institutional framework of engineering consultancy in Hong Kong, like a greater complexity of project-based services, new procurement approaches and building codes, have tended to constrain innovative efforts of engineering consultants.

Baark links knowledge creation and accumulation in engineering consulting with innovation in the field and describes how important specially crafted knowledge management systems are key success factors for engineering consultant firms. He ends the chapter by pointing to the expanding information technology infrastructure for engineering consultancy firms in Hong Kong, and suggests that in the growing technology infrastructure there exist unexploited opportunities for firms, especially smaller firms, to innovate.

Chapter 4. Frenken, Koen (Utrecht University, NL) and Loet Leydesdorff (University of Amsterdam, NL), 'Scientometrics and the evaluation of European integration'.

Frenken and Leydesdorff, confront the issue of European integration. At the root of this issue are the fundamental questions of the existence of a European union and how well the European Union is doing against its primary objective. The lens through which they examine this issue is scientific research. More specifically, they use scientometrics to determine quantitatively the level of integration of the European science system. As a result, issues such as collaborative research efforts, national science policy, national culture and professional culture are discussed.

But, as with most of the chapters in this book, this chapter is intended to facilitate, supplement and encourage discussion rather than to definitively answer questions regarding whether or not European integration *exists in the sciences*.

Entrepreneurship

Chapter 5. Te Velde, Robbin (Delft University of Technology, NL), 'Schumpeter's theory of economic development revisited'.

Te Velde tackles the legendary Schumpeter but, unlike the vast majority of researchers that often cite him, Te Velde has read both his early works and his later works in great detail. As a result, he can make the bold claim that Schumpeter was consistent throughout his career with respect to his views on economic development and the entrepreneur as the central agent for technological and economic change. Te Velde states that Schumpeter's theory of economic development not only rightfully puts the activities of the individual entrepreneur at the centre of the analysis, but that the theory is not just a treatise on entrepreneurial activity, but rather a *general* theory of economic development.

Te Velde spends most of the rest of the chapter describing the Schumpeterian entrepreneur in detail, in context and in light of today's economy, which is very interesting given that Schumpeter first wrote about it over 90 years ago. He concludes by outlining the characteristics of this

special entrepreneur. He then calls to whoever is listening (governments?) to provide the environments so they can multiply.

Chapter 6. Brown, Terrence E. (Royal Institute of Technology and the Stockholm School of Entrepreneurship, Sweden) ‘Skunk works: a sign of failure, a sign of hope?’

Co-editor Brown focuses on a special type of administrative innovation, new product development and organizational culture. As we move to even more dynamic business environments, he states that it has become increasingly important for business to be innovative, not just to gain a competitive advantage, but to survive. As a result, organizing for innovation has become a key business objective. Of the many organizational innovations to emerge, one of the most well known is the skunk works.

The evidence, at least anecdotally, is that great innovations are often the result. However, this chapter begins by taking a slightly different view. Influenced by the perspective of Schrage (1999) this chapter takes the view that the creation of a skunk works is often a signal of management dysfunction. The formation of a skunk works is a signal that the regular organization’s structure, systems, process, etc. are no longer able to handle innovation or radical change, so, as a result, must form a new, separate organization, built on exclusivity, in order to be innovative. Furthermore, not only does the creation of a skunk works signal management dysfunction, but also may even accelerate the dysfunction.

However, the chapter does not stop there. The skunk works concept and practice is actually confused, complex and misunderstood. As a result, this chapter attempts to begin to define, clarify and structure the concept. This results in the creation of the skunk works matrix, the research activity continuums and group of key success factors. Ultimately, it seems that the skunk works-like programmes that are the most effective are those that create the most value for the organization as a whole. To create this value there is a greater emphasis on development rather than research. Furthermore, this development is product development and, as a result, has a strong emphasis on the market. Despite the fact that many skunk works-like programmes are created under less than ideal circumstances, for less than ideal reasons, the use of skunk works of all types by large corporations seem to be accelerating. Therefore, it is a ripe area for further research. This chapter raises more questions than it answers and by that helps in spurring the dialogue.

Chapter 7. Legardeur, Jrmy (Laboratoire LIPSI, Bidart and Laboratoire 35, Grenoble, France), Jean Franois Boujut (Laboratoire GILCO and Laboratoire 35, Grenoble, France) and Henri Tiger (Laboratoire CRISTO,

Grenoble, France), 'Entrepreneurship and the design process: the paradox of innovation in a routine design process'.

Legardeur, Boujut and Tiger present an empirical study based on the development of design process. More specifically, it is about how knowledge, learning, and entrepreneurial competence come together to create innovation in the design process. The authors found that there are considerable problems and complexity for the innovative process within a highly constrained environment.

The result of their analysis calls for a rethinking of the roles, competencies and actors required to innovate the design process. Furthermore, the problem of product and process integration is highlighted through questioning the role of external suppliers in the early design phases.

Culture

Chapter 8. Hofstede, Geert, Niels G. Noorderhaven (both Tilburg University, NL), A. Roy Thurik, Alexander R.M. Wennekers, Ralph E. Wildeman (Erasmus University, NL) and Lorraine M. Uhlaner (Eastern Michigan University, USA), 'Culture's role in entrepreneurship: self-employment out of dissatisfaction'.

Hofstede, Noorderhaven, Thurik, Uhlaner and Wennekers and Wildeman examine in depth the influence of cultural, economic and psychological attitudinal variables on differences in the level of entrepreneurship in more than 20 Western nations and Japan, for the period 1974–94.

After integrating data on entrepreneurial and economic variables with data on cultural variables, their results showed that, across nations, dissatisfaction with society and with life in general are the main determinants of the level of entrepreneurship. Specifically, countries where people are less satisfied have more self-employed individuals. Furthermore, these are the same countries that have a larger power distance, stronger uncertainty avoidance, more bureaucracy and corruption, and which are relatively poor.

Next the authors test a model that predicts the level of entrepreneurship using economic and dissatisfaction variables. Among the many results was support for the conclusion that dissatisfaction with life and with society are key determinants of the level of entrepreneurship across nations. At the end of the chapter, by using the well-known Hofstede indices of national culture, they demonstrate that culture seems to serve as an important moderator variable in relationships between economic factors and level of entrepreneurship.

Chapter 9. Ulijn, Jan (Eindhoven University of Technology, NL) and Alain Fayolle (INP Grenoble–ESISAR, EPI, France), 'Towards cooperation

between European start-ups: the position of the French, Dutch and German entrepreneurial and innovative engineer’.

Co-editors Ulijn and Fayolle explore directly the issues of innovation, entrepreneurship and culture. While the chapter certainly raises more questions than it can answer, the authors try to develop a model of the entrepreneurial and innovative European engineer and his/her interaction with the environment through networks and cooperation. This is backed up with some answers to eight research questions related to data about the entrepreneur’s economic environment, the rate of self-employment and some of its difficulties, and the possible effect of national culture on willingness to start a new venture in France, the Netherlands and Germany. Moreover, the research on which this chapter was based examines how national culture and professional culture and differences affect how engineers, innovators and entrepreneurship collaborate.

The authors go further by attempting to address the question of how to foster cooperation between European start-ups for a better enterprising and innovative culture. In this effort they address issues such as mobility and immigration. Because of the problems of cross-functional communications, it seems there are new virtual borders preventing cooperation that might lead to venture creation. As a result, the authors present a summarizing model of a new cultural identity of Europe based upon entrepreneurship, innovation and mobility using the onion culture metaphor by Hofstede (1991) and Schein (1991) to increase the mobility of the European engineer (Ulijn and Gould, 2002). In the end the authors believe that a new culture is needed to foster the cooperation between high, low and other technology start-ups to facilitate a truly European technology entrepreneurship.

10. Fujimoto, Takahiro (Tokyo and Harvard Universities, Japan and USA), ‘Multi-path system emergence: an evolutionary framework to analyse process innovation’.

In the final chapter Fujimoto examines long-term process innovation that creates a new and competitive manufacturing system. Fujimoto posits that one of the key questions in process innovation is whether manufacturing routines are pre-planned or do they emerge dynamically? With this in mind he proposes a kind of evolutionary framework that may be applicable to an artificial system that he believes is *ex post* rational: for example, a manufacturing system of Toyota Motor. By evolutionary framework he means a ‘dynamic perspective that separately explains an observed system’s survival (i.e., the functional logic) and its formation (i.e., the genetic logic)’. In addition to this, Fujimoto attempts to add two new main concepts to the existing evolutionary framework to innovations – *multi-path system emergence* and *evolutionary learning capability*.

In the end Fujimoto presents an intriguing challenge to the so-called rational manager and management. While most decision-makers assume that most processes are rational, Fujimoto's lesson to managers is that they should not assume rational plans always solve those (rational) problems. Furthermore, given the actual process of system change is generally emergent, successful companies must develop an organizational culture of *preparedness*, if they intend to be successful in the future.

8. DISCUSSION OF THE INTERACTION BETWEEN THE SIX KEY ELEMENTS OF THE BOOK

So far we have tackled interactions between the Innovation (I), Entrepreneurship (E) and Culture (C) on the one hand, and Technology (T), Growth (G) and Progress (P) on the other. This section attempts to give a brief overview of all (see Table 1.1).

Most of our chapters deal with both innovation and entrepreneurship, the more innovation-based studies by Frenken and Leydesdorf and Fujimoto are not very explicit on entrepreneurship. Innovation is linked to learning (Sharif and Chan), Baark (knowledge management), science-based (Frenken and Leydesdorf), related to the design process (Legardeur, Boujut and Tiger) or process innovation (Fujimoto). The chapters by Te Velde and Brown deal basically with entrepreneurship/intrapreneurship. Entrepreneurship comes back in SME (Sharif and Chan) and services contexts (Baark); it links up to intrapreneurship (Brown) or is needed to innovate routines (Legardeur, Boujut and Tiger). Both innovation and entrepreneurship are often technology related (see Sections 4 and 5).

Do our chapters discuss the link between technology and economic growth? In this book a wide variety of technologies are discussed including R&D (Sharif and Chan), engineering consulting and construction sectors (Baark), IT (Te Velde), aviation technology (Brown), sheet molding compounds and the automotive sector (Legardeur, Boujut and Tiger, and Fujimoto). The link with (economic) growth is explicit in Hofstede et al. and Ulijn and Fayolle who use features such as GDP, population density and labour productivity. This link with growth is less direct in Sharif and Chan (SME policy) and Frenken and Leydesdorff (long-term EU success). The advancement of technology brings about uncertainty and change. The best practices model by the EU (see *Innovation and Technology Transfer*, 2001b) covered well many managerial and techno-organizational aspects, including participation, structural and labour components, and a commitment to change for effective knowledge and innovation management. The study by Shenhar (2001) in 26 high-tech case projects in the USA pinpoints

well that the intensity of communication tends to increase with technological uncertainty to achieve such cultural change towards more innovation and entrepreneurship. Brown, Legardeur, Boujut and Tiger, and Ulijn and Fayolle suggest clearly the need for such change.

Both innovation and entrepreneurship can create employment, but engineers could be more active start-ups than their culture seems to allow, as we have concluded so far in this chapter. Employment as part of social economics and the transition to innovation and entrepreneurship as part of social progress is obvious; everybody wants to be employed, but self-employment is another story as Hofstede et al. (with the share of female labour) imply. A comparison between the USA and Japan would be interesting here. In both countries long-term growth and progress seem to be synonymous, but the social context would be more flexible and open in the USA, whereas in Japan there is greater restraint (see Steil, Victor and Nelson, 2002), where the entire country seems to go for the type of innovation for which Fujimoto suggests a neo-Darwinian evolution which is not incremental or radical. In addition, on the basis of their further analysis Steil, Victor and Nelson (2002) recommended that Germany be more open and market flexible, and enter newly emerging fields of technology, such as biotechnology and software, with sufficient vigour to actually establish a leading position. They suggested to the French government a devolution of power and wealth to give public operators in innovation and entrepreneurship more freedom to set their own long-term strategies within a coherent subsidy scheme, instead of piling up often small and scattered financial injections.

As we have seen so far, innovation does not lead automatically to entrepreneurship; a special innovation and/or entrepreneurial culture needs to be developed as suggested in the Ulijn and Fayolle chapter (9). The growth/progress dynamics can be enforced by a cultural change, as conceptualized by Gagliardi (1986), who proposes an incremental model to go from old to new idealizations through insertion of new values to be reconciled with the old ones through stabilization, cohesion, organizational efficiency, collective experience of success and, ultimately, consolidation of new experiences. Countries, corporations and professionals can learn from each other across borders, and not only in the more traditional North–South or West–East direction, as the study on Russian entrepreneurship by Puffer and McCarthy (2001) might suggest. Weber (1958) explained the strong Western entrepreneurial behaviour by using the Protestant work ethic, but is it so different from the Muslim ethics in Arab countries such as Tunisia where an analysis of the exceptional entrepreneurship of the Sfax region (see Zghal, in Fayolle, 2002) could not be explained by geographical reasons alone? The right psychological mindset and a favourable social environment are important for start-ups. The Chinese Confucian ethic as

Table 1.1 Which chapters cover which elements of the book title?

Chapters and elements	Innovation (I)	Entrepreneurship (E)	Culture: NC-CC-PC	Technology (T)	Progress (P)	Economic growth (EG)	Interaction? Comments
<i>Innovation</i>							
2. Sharif/Chan	++ Learning	SME	NC: Hong Kong management culture	R&D	National innovativeness	SME policy	±
3. Baark	Knowledge management	Services	PC: Engineering, NC: Hong Kong	Engineering consulting, construction sector	Colonial past IT infrastructure	NA	±
4. Frenken/Leydesdorff	Science-based	NA	EU (several countries), USA, Japan	Scientometrics	+	Long-term EU success	+
<i>Entrepreneurship</i>							
5. Te Velde	+	++	Claim on universality	+ IT	Is culture also gradual?	+	+
6. Brown	+	+ Intrapreneur?	CC: Skunk works shows a counterculture	+ Aviation technology	Probably	NA	+
7. Legardeur/Boujut/Tiger	Design process	Needed to innovate routines	PC: from steel to SMC	Sheet molding compound (SMC)	NA	NA	Theory-based case study

Culture							
8. Hofstede et al.	+	++	NC: EU, Jap, USA, Can., NZ, Austria	?	Female labour share employment	Link with GDP, pop. density	Strong empirical study
9. Ulijn/Fayolle	+	++	EU (Fr, NL, DK)	Positions of engineers	Employment	Link with GDP, labour productivity	Some empirical test of a model of an enterprise + innovation
10. Fujimoto	Evolutionary	NA	CC: Japan	Manufacturing	NA	NA	+

exemplified in the LTO dimension of Hofstede in Section 4 is another case in point.

Although innovation and entrepreneurial culture have much in common, there is one exception: the nature of cooperation. As Cottam, Ensor and Band (2001) indicate in their benchmark study of strategic commitment to innovation, within existing firms strong cross-functional teams are necessary. Within start-ups there is insufficient cooperation because of their minimal size, and joint ventures between start-ups are not easy because of a lack of the trust which would be required to share a smart technological idea or a niche in the market (see Ulijn and Fayolle, Chapter 9). Between existing firms cooperation is often achieved by networking and alliancing, which requires the mostly overlooked cultural fit (see Steensma, Weaver and Dickson, 2000, Ulijn, Duysters, Schaetzlein and Remer, *in press*). Some aspects of the Chinese *guanxi* concept might be very useful here (Wong and Leung, 2001), in particular the ones related to entrepreneurship, empathy, commitment and synergy. In sum, most of our 10 chapters pay attention to the interaction between some of the six elements. In most of them there is a blend of conceptualization, empirical studies and, even, case studies. What remains still to be studied?

9. CONCLUSION

When you come to the conclusion section of a chapter or book as a reader, you expect the authors to succinctly summarize and highlight the major points of the preceding text and perhaps give some insightful and witty comments as they wrap up. When you come to the conclusion section as an author, you expect cogently to summarize the major points and wrap it up in a nice and tidy way. However, authors also know that this is not always possible. Some chapters do not easily lend themselves to tidy packages; this is one such chapter.

In this chapter we have made many statements about innovation, entrepreneurship, culture (at three levels), technology, social progress and economic growth. We have made a strong case that they are all important and are all related (and perhaps even interact, moderate and/or mediate each other). It is a complex and messy mix, but one that is important to investigate further. Although there have been volumes of research separately (and perhaps in dyads or triads) on many of these topics, much more work needs to be done at the conceptual level, at the methodological level, from an academic perspective and from a practical perspective.

Our primary purpose in this book is to open, push and continue the debate. We do this by posing many more questions than we attempt or

even dare to answer. So, in the end, where does that leave us? (A last, final question.)

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