

1. Introduction

1.1 INTRODUCTION

This book focuses on a particular type of entrepreneurship, called knowledge intensive entrepreneurship, shortened to 'KIE'. We start from the view that KIE phenomena can be found in many sectors such as low-tech industries, design firms, service firms and also in the traditionally studied areas like 'high-tech sectors' and 'academic spin-offs'. Naturally, the ideas presented here draw upon previous literature, not least within the field of technology-based ventures and academic entrepreneurship. However, existing studies primarily focus upon industries driven by opportunity creation in basic science and technology. This book goes beyond this to propose a new KIE creation model based on a richer understanding of the interactions between the KIE venture and the external environment for opportunities and knowledge.

One main message of this book is that entrepreneurship is a phenomenon that may be thought of as a structured and defined process, but also one involving uncertainty and risk due to the nature of knowledge involved. Concepts like uncertainty and risk mean that you don't know what will work or not. Will the idea sell and access financing? Will the technology work in the way you imagine? Is the creative idea something that can be realized in practice? Is anyone interested in purchasing and using the services? We know that many small firms will fail but a few succeed – for a shorter or longer period. One explanation may lie in the broader societal effects, which represent areas beyond the control of the individual or venture, and that is why the interactions between individuals, ventures (companies) and societal influences are of interest here. Our contributions are threefold in ways of interest to the readers.

This book first proposes a KIE creation model. This model structures our thinking and directs our attention to the key decision-points and processes. The KIE creation model provides a synthesis of the main phases and second-order variables. The model is applicable and useful for many purposes, including discussing societal impacts and the role of public policy, as well as managing companies.

The book also explains how this KIE creation model enables us to understand entrepreneurship as a structured and defined process, involving uncertainty in many dimensions. Planning is a useful tool. And yet entrepreneurship is also a process involving individuals, venture and societal influences. They create different domains of knowledge. Their interactions introduce the possibility to access resources and ideas but also introduce uncertainty, risk and the idea that ventures can fail.

Finally, our contribution is to apply the model and conceptualization of KIE to understanding the importance of different types of knowledge such as those found in low-tech industries, services and other areas of society like social entrepreneurship. Taken together, three types of knowledge relevant to KIE are: (1) scientific, technological and creative knowledge that leads to new ideas and opportunities; (2) market knowledge as related to the market and to customers and users; and (3) business knowledge as related to how to manage and structure internal firm processes. All three types of knowledge may involve uncertainty from the perspective of the KIE venture – what is known? Who wants potential products and services? And how can we organize to deliver it?

KIE is here defined as a particular type of start-up venture and phenomenon. We use the term ‘KIE venture’ for the company, business project or new organizational form created in this way as well as the concept of ‘KIE’ for the overall phenomenon and processes of this type of entrepreneurship. KIE phenomena reach beyond the mere establishment of a new venture, and have significant implications for societal growth and wealth creation. The KIE processes as we discuss them are highly dynamic with strong feedback loops between the individuals, the company and society.

Thirteen case studies can be found in the companion book, *How Entrepreneurs Do What They Do: Case Studies in Knowledge Intensive Entrepreneurship* (McKelvey and Lassen, 2013), also published by Edward Elgar. This book provides detailed information about specific firms and venture creation processes. The case studies cover many different kinds of firms and sectors, and they illustrate how and why KIEs develop and are managed over time. They discuss how new products and services are developed and often in situations where no customers already exist but instead where markets need to be formed. The case studies address very different types of firms, ranging from high-tech to low-tech to ones primarily providing services. Each case addresses specific questions and illustrates aspects of KIE phenomena.

Both books are relevant for many different kinds of readers, ranging from advanced students and practitioners such as venture capitalists, entrepreneurs and policy-makers, as well as for academics. The books

provide a platform for discussing how to stimulate successful entrepreneurship as starting firms or as stimulating the KIE phenomena. Our approach has major implications for what we should learn about entrepreneurship, why public policy may intervene and how to engage practically in venture creation, making the books directly relevant to the library market as well as many types of readers.

Taken together, the two books are thus useful for understanding the 'doing' of creating ventures through this type of entrepreneurship, as illustrated through the cases and empirical insights as well as the 'knowing' related to structuring our understanding, as found in the KIE creation model, based upon an underlying conceptual framework

Let us now shift focus to our approach to understanding KIE as relevant to business and society. The next section defines a set of propositions, or our claims about what is particularly important to understand about KIE; the following section introduces this book, in terms of our approach. Both sections constitute our main message. The final section contains a summary of each chapter in order to provide a road map for readers, laying out the main ideas and results.

1.2 ABOUT KNOWLEDGE INTENSIVE ENTREPRENEURSHIP

The following seven statements, or propositions, are what this book is about, and they are discussed in the subsequent chapters. They help summarize what we mean in saying that this book aims to provide empirical evidence and theoretical insights.

These seven propositions are a way of summarizing the main points in this book. They also help explain the processes and phenomena, and causality, of what are admittedly complex economic and societal processes. They help place the individual and the company within a broader societal context and thereby how societal impacts and public policy influence what happens.

Our propositions are:

1. *KIE ventures represent special forms of venture creation and they are different from other types of entrepreneurship. Partly, there is a definitional issue of focusing upon that subset of firms that uses various types of knowledge and innovation as the key competitive asset, regardless of industry. However, the special form of venture creations also focuses on the relationships that occur between KIE venture creation and context, during different business phases.*

2. *KIE is achieved through a series of decisions, which lead to the balancing of alternative logics between business planning and emergence of unexpected opportunities. A number of structures and variables are identifiable and must be considered when planning the development of a new company. These include elements within the company but also elements in the external ecosystem and environment. But the interpretation of such variables and how one acts upon them in a company will result in a variety of different outcomes. This underlies the evidence-based approach as well as the creative development of the venture.*
3. *Accessing inputs, which are resources and ideas, is crucial to starting the company. This phase refers to the processes and phenomena before the venture is created, but also takes up subjects like financing that remain relevant during later management phases. The emphasis is on how and why to use resources and ideas that are linked to the founder, or which can be transferred from the ecosystem and external environment to the venture. This focus on inputs reflects the fact that KIE ventures rarely come out of the blue. Indeed, the KIE venture often draws upon existing organizations, and this leads to many decisions about how and why to use resources and relationships to balance planning and emergent opportunities.*
4. *Significant differences exist between entrepreneurial management and general management. As one vital example, entrepreneurial management relies highly on the use of networks and emergence of access to resources. Therefore, management of KIE ventures requires a systemic understanding of processes and of the relationship between individual and context in order to design and carry out this type of entrepreneurship.*
5. *Evaluating the performance and outputs of KIE and KIE ventures requires a more nuanced understanding of how KIE can drive innovation, growth and societal development. There are different measurement techniques, and a handful of indicators are often used but may be poor indications of the performance and outputs of KIE. Moreover, at the level of KIE ventures and of society, the performance measures should include a dynamic and systemic element, as they often undergo dramatic shifts over time.*
6. *Our view is that design thinking can be developed and utilized to play an important role for the successful exploration and exploitation of KIE. Without this there is a lack of tools and techniques to manage tensions between creativity and order or structure. With*

this we can develop a systemic approach to shaping the thinking about venture creation and innovation for developing KIE ventures.

7. *A key issue is how and why to develop public policy and societal influences that are important for being able to explain, and stimulate, KIE processes and phenomena. The broader societal context explicitly affecting the development and formation of KIE ventures especially includes knowledge, markets, institutions and opportunities. Just as design thinking provides tools at the level of the KIE venture, public policy also has tools and recommendations about how to encourage and support this type of entrepreneurship.*

1.3 INTRODUCING THIS BOOK

Primarily, this book takes a managerial view on the process, running from opportunities, through strategies and internal management processes to outcomes and rewards for risk-taking behaviour. Thus, this book follows in the tradition of this field as outlined by Venkataraman (1997), among other authors and contributions, in understanding the nexus of enterprising individuals and valuable opportunities. However, this book pushes the analysis further than books on general entrepreneurship by our focus upon different types of knowledge and opportunities for interaction with society, and by introducing design thinking as a tool for managing these types of ventures.

The concept 'entrepreneurship' refers in a broader sense to KIE phenomena and processes. Research in entrepreneurship may well be a 'catch-all' term, and this type of research is carried out by scholars in many different disciplines (Davidsson et al., 2001). But what is interesting here is in what ways does the diversity of existing research help us develop an informed understanding of the processes?

Carlsson et al. (2012) provide a useful definition from our perspective, based upon a review of the major theoretical contributions in the field:

Entrepreneurship refers primarily to an economic function that is carried out, by individuals, entrepreneurs, acting independently and within organizations, to perceive and create new opportunities and to introduce their ideas into the market, under uncertainty, by making decisions about location, product design, resource use, institutions, and reward systems. The entrepreneurial activity and the entrepreneurial ventures are influenced by their socio-economic environment, and they result ultimately in economic growth and human welfare.

This definition comes from a scientific paper, which takes the approach of outlining the main contributions and synthesizing many diverse strands of research. The authors undertake this review in order to present a more coherent explanation of entrepreneurship and to identify areas for future research.

Our theoretical perspective is also in line with a process view. The modern view is that entrepreneurial processes and logic should be seen as a balancing act between business planning under rationality and the messy reality of running a business venture. What happens over time is the emergence of unexpected opportunities and events that lead to new problems and new thinking that the business must make decisions about, and address consequences during management phases.

We would like to stress that the process of creating a KIE venture as conceptualized here defines entrepreneurship as a creative process rather than rote learning. The KIE venture is designed in order to respond to one or more innovative opportunities and these opportunities can emerge from things such as new technology, new markets and new ways of using internal and external resources. Creativity in this sense means that the entrepreneur, or founder, and their team and organization will have to always be balancing new ideas and ways of doing things against existing routines, the notion of efficient structures and set organizational routines. This type of balancing between multiple objectives and shifts in direction seem inherent to the process of delivering upon the ideas to realize new products and services.

We now turn to the discussion of our broader starting points:

- Framing KIE phenomena as one way of solving grand societal challenges, including the concerns of young people and government, like social innovation, environment and similar large issues.
- Specifying an evidence-based approach to learning about, engaging in and evaluating KIE.

1.3.1 Framing KIE Phenomena as One Way to Solve Grand Societal Challenges

A first topic is how we frame KIE phenomena as one way to solve grand societal challenges. The importance of KIE in society and the economy is a broad and complex topic, not always with clear-cut answers.

This type of entrepreneurship represents more general impacts on society. The specific definitions used in this book allow us to expand our analysis beyond 'high-tech' or 'research and development (R&D) intensive' firms and sectors to also encompass low-tech firms and services as

well as social innovation and public service innovations. The concept thus represents a variety of business models and ways in which entrepreneurship takes place in society and the economy. Entrepreneurs need many types of knowledge and many different business models when they go about starting companies, selling products, licences and services, and thereby influencing society.

Thus, entrepreneurship takes on new importance in a knowledge economy because it serves as a key mechanism by which knowledge created in one organization becomes commercialized in a new enterprise.

Society faces grand societal challenges such as climate, ageing populations and the global use of current and future resources. These challenges were initially conceptualized as fairly long term, but the economic crisis in 2008 has also affected our ideas of 'development', and what public policy can do to affect unemployment, poverty and similar societal issues. Innovation and entrepreneurship are part of the solution through testing many ideas in an open manner.

These grand societal challenges are global, in the sense that people, organizations, non-governmental organizations (NGOs) and governments all over the world will have to deal with them. Yet how we find technologies, organizations and ways of working to reduce the problems will differ. Some solutions will be global, while other solutions will be local: some solutions will primarily involve business and others the government and public services; other solutions will involve civic society or the community.

The companion case study book suggests that there are many ways to organize the translation of opportunities and ideas into solutions that deliver innovations of use to society.

KIE will, in addressing these grand societal challenges, be one powerful organizational solution in bringing together people, resources and ideas in order to deliver things that society wants. There are related organizational solutions as well, such as large companies and social innovation run through non-profit or community means. This type of entrepreneurship does help introduce and stimulate dynamics in existing firms and sectors, often through novel technologies commercialized through a venture. There are also other ways, such as social entrepreneurship and base-of-the-pyramid or frugal innovation, which may be directly related to, or morph into, KIE ventures.

Empirical evidence suggests that KIE represents powerful mechanisms for growth and renewal. Some will succeed. Some will fail. Others will struggle along, with certain periods of success and other periods of failure. KIE ventures have therefore become the object of many policy-making

efforts in recent years. The main conclusions of research are that KIE ventures that survive tend to grow faster, and stimulate growth.

These processes and phenomena help stimulate economic growth and societal well-being (from an overall perspective), given their role in generating new jobs, productivity and growth. Studies reaching these conclusions focus upon the importance of mechanisms like academic spin-offs and corporate spin-offs as well as impacts upon the region and industry.

We argue that KIE ventures are not confined to high-tech or new sectors, and that public policy needs to be developed in terms of goals and instruments, to impact low-tech sectors, manufacturing and existing industries. Moreover, a main area for innovation and entrepreneurship in coming years is the public sector, which will likely rely upon a combination of business and social innovations. Naturally, the discussion of social well-being is a complex one, as is the concept of economic growth.

This broader perspective is necessary because a vital issue for students and researchers, as well as policy-makers, is how to capture the dynamic effects and value created for society through entrepreneurship. Related key issues are what types of venture creation should be stimulated, how knowledge is translated into value and what types of policy goals and instruments are effective. We will not answer all these questions, but this book can help the reader understand the processes and apply new solutions to real problems. Understanding the overall phenomena is a necessary prerequisite to stimulate firms to solve the challenges facing society. Hence, we suggest that public policy can make a better impact if there is an understanding of the key processes and special characteristics of KIE ventures in society and the economy.

1.3.2 Specifying an Evidence-based Approach

Even though we stress an evidence-based approach and systemic results, this does not mean that this book is a traditional academic book, written for other professors. Nor does it rely upon a linear process model, but instead relies upon a more complex set of variables in a feed-back system model. For anyone wondering about whether our results are valid and reliable – or wondering how to do their own study, such as in a thesis – we explain what we mean by an evidence-based approach.

Learning involves finding out what other people have discovered, and hence one focus here is the literature review and our proposed KIE creation model. It represents a map, or conceptual framework, based on

research results, because it can help identify concepts, processes, variables, cause and effects of venture creation, from a larger perspective.

Engaging in entrepreneurship requires doing and knowing. Both the entrepreneur and the reader interested in starting a firm will have to balance 'doing' and 'knowing'. By 'doing' we mean engaging practically in actual venture creation processes and by illustrations and case studies. Much of the knowledge relevant to one specific firm will be developed when the project developed and the firm was up and running. By 'knowing' we mean learning through specific empirical evidence and case studies as well as general knowledge and tools for evaluating processes and outcomes. Both 'doing' and 'knowing' are vital in helping the reader understand how and why they make good choices in practical action.

Then there is 'evaluating', which refers to being able to work with and identify productive processes of development like design thinking. Evaluating also refers to methods and techniques for evaluating performance and outcomes, generally using quantitative methods.

Thus, in talking about an evidence-based approach, this book draws on a vast academic literature, which tries to explain cause and effects and empirical process outcomes in a systematic way. If you only know what happened or was possible within a single case study interpreted by the practical entrepreneur, then you have no idea if the learning from that process can be applied to later ventures. These stories are important. They help us understand how the individual acted. Moreover, what is clear is that personal relationships (which are called networks and social capital) and experience matter, so that a person who has started a firm has valuable information useful to the next entrepreneur. However, we will not know if the founder happened to be skilful and lucky, and above all if there is similar learning to be had from other cases, industries and countries if we do not have more systematic evidence.

This book takes and uses an evidence-based approach to KIE ventures and this type of entrepreneurship. From the AEGIS project involving more than 30 partners, we use material developed through a survey across Europe as well as the more than 80 case studies that have been written. Material can be found on the AEGIS website <http://www.aegis-fp7.eu>.

Moreover, an evidence-base approach means that a substantial amount of scientific results have been condensed and synthesized here. Scientific results are generally published as peer-reviewed articles and books in order to check the validity and generalizability of the results (as well as guarantee an element of theoretical and/or empirical novelty). There is a particular way of working within sciences, including social sciences like

business and economics, to try to make sure the demonstration of causality and outcomes is valid across more than one case. Peer review is one method for trying to guarantee quality, and it is used on published work but evaluation by experts is also used in the selection of which scientific projects to fund.

Much of science is also about defining taxonomies and special cases where theories have been tested and are held to apply – or to be irrelevant. A good reading about how scientific theories enable prediction and better action is ‘Why hard-nosed executives should care about management theory’ (Christensen and Raynor, 2003).

The reason we point this out is that scientific results about KIE ventures and this type of entrepreneurship, as reported in this book, are based upon a vast body of knowledge. The conceptual framework and the KIE creation model can be seen as resulting from a systematic way of working to try to explain what we know about the world around us – as opposed to speculation, individual interpretations and the like.

The background information comes from a systemic literature on our topic, which we later refined and developed into the KIE creation model. The Appendix describes the process of how to conduct such a literature review in general – as well as our specific choices. The book contributes through a systematic review of what works and what doesn’t, and of what matters and what doesn’t matter to these types of business ventures, in order to facilitate evaluation.

But if you want to develop it into a new model, then such a review should also include a critical understanding. This means trying to identify major dimensions and variables, and what causes what. By having a critical approach to methods, data and techniques, the reader can further develop his or her own understanding and approaches to learning about, engaging in and evaluating this type of entrepreneurship.

Thus, we feel that we make an important contribution, which is to develop a synthesis of the main phases and second-order variables. Essentially, we translate the findings systematically into a comprehensive unified conceptual framework focused upon the topics addressed.

The reader may also wish to impact society, and systemic evidence is needed here as well. You have the opportunity for learning by developing competencies, skills and techniques about KIE set within a reflective, critical approach to what is knowledge. The idea is that this combination of theoretical understanding with practical insights also matters for society. It will help in stimulating economic growth and societal well-being, beyond starting a business venture per se.

In summary, we can generate knowledge about KIE phenomena, drawing on case studies as well as quantitative data and from both

empirical work and work that is primarily theoretical and conceptual. We synthesize and condense the results in a novel way in order to be able to say more about the processes, variables and outcomes of KIE ventures, seen as a business proposition.

STRUCTURE OF THIS BOOK

Chapter 2, entitled ‘The knowledge intensive entrepreneurship creation model’, defines the concept, addresses the special characteristics of KIE ventures and visualizes the model. The chapter explains our definition, which represents a novel concept, which can be useful to draw together research and also help structure decision-making. Taken together, three elements position our perspective and the type of entrepreneurship as different to the general entrepreneurship literature. Elements of our KIE creation model include a focus on:

- the specific role of different types of knowledge in entrepreneurship
- interactions between individuals and business ventures with the ecosystem and external context
- opportunities created and designed through these interactions with the ecosystem.

We define the processes and broader phenomena by explicit consideration of the main concepts, processes, variables, cause and effects, and by relating KIE ventures to a broader context (networks, innovation policy and public policy). This enables us to discuss the entrepreneur as well as the KIE venture and the ecosystem or external environment.

This definition then leads us to present the KIE creation model, which represents the underlying conceptual framework. The KIE creation model outlines three main phases of this type of entrepreneurship. These phases are: accessing resources and ideas; managing the venture; and assessing outputs and performance.

Chapter 3 is entitled ‘Accessing resources and ideas’. The chapter addresses the origins of, and important inputs to, KIE and relates this to the broader ecosystem and societal context. The chapter focuses upon the third proposition, related to how accessing resources and ideas occurs in relation to emerging opportunities for KIE ventures, and that this process unfolds over time.

There are clear reasons why we start by discussing business founding, inputs and resources rather than focusing on the internal processes of business plans. One such reason is that modern entrepreneurship

literature has found that the individual entrepreneur – or firm – relies upon inputs and resources from other actors in society, and we feel this is an interesting line of thought to further pursue. Moreover, the source, quality and type of inputs and resources tend to influence the success of these types of firms as much as the internal management processes functioning in the next phase.

We would like to point out that financing is vital but only one part of the understanding, and that different rounds of financing often play a key role, in changing the direction and even strategy of the firm. But the other issues may be as vital to understanding the firm.

Chapter 4 is entitled ‘Managing and developing the knowledge intensive entrepreneurship venture’. Having discussed the inputs of KIE, the chapter focuses on the processes of maturing and managing the KIE venture, highlighting different dimensions of the management and development of this type of venture, that are particularly important. The chapter also addresses the fourth proposition, related to what it means that significant differences exist between entrepreneurial management and general management. Many KIE ventures struggle when trying to prioritize different types of knowledge. So, for example, in high-tech sectors, they struggle between different visions of the importance of technological knowledge versus market knowledge, and the same processes can be found in service or creative industries, where there is a struggle with creative knowledge. Usually, this leads to a discussion of ‘maturing the venture’, by which we refer to the transformation processes the venture undergoes and how interplay between internal and external sources is created to affect growth. Moreover, in making these arguments, we also briefly touch upon the converse, namely that entrepreneurial thinking also matters for existing organizations when they are trying to build innovative structures.

Chapter 5, ‘Evaluating performance and outputs’, focuses upon the third phase of KIE, that is, the outputs and performance of KIE ventures. To make progress in this discussion, we argue that it is necessary to have a developed understanding of:

- measuring techniques
- four indicators and measurements of KIE
- dynamic and systemic effects.

The main focus is upon evaluating performance through indicators and measurements of KIE. We first consider the trade-offs between quantitative and qualitative measuring techniques. Then we focus upon four

indicators related to new firm formation, growth performance, patents, and knowledge creation.

In addition, this last issue of dynamic and systemic effects leads us to the discussion of evaluating the actual performance and outputs at the KIE venture and societal level. Related questions are: do these benefits only exist for the KIE venture created and the individual founder, or who becomes a millionaire? How and why does society benefit or carry the risks and costs? What types of effects should be expected and demanded by society? These are difficult but important issues, and the chapter will briefly introduce this overall discussion while the main focus is upon indicators and measurements.

Chapter 6 is entitled 'Design thinking as a tool for entrepreneurship'. We argue that design thinking plays an important role for the successful exploration and exploitation of KIE, and this is reflected throughout our discussions on how to navigate in the creation of KIE, and how different types of input to KIE enhance or decrease the likelihood of success.

Design thinking helps provide tools and techniques as part of a creative process. Starting a firm requires this combination of business inputs and resources, and many current authors use the concepts of opportunity recognition and mobilization to understand these processes. Therefore, in the specific case of KIE, opportunities can be seen as resulting from an emerging design process. Our concept of entrepreneurship is as a creative process, realizing the process and development of innovative opportunities in the context of a KIE venture.

Design thinking will be introduced in terms of a set of useful tools and techniques in this process of starting and developing a KIE venture. This is because it represents a way of thinking and working about how to deal with what you know and expect and can plan about, as well as how to deal with what you do not know, cannot predict and cannot plan about.

Chapter 7 is entitled 'Societal impacts of knowledge intensive entrepreneurship and the role of public policy'. The chapter concludes with critical reflections about the impacts of these processes and phenomena on public policy and society and thus addresses the sixth proposition about the broader impact of KIE on economic growth and social well-being, and how public policy can influence it. The broader context that we have defined as explicitly affecting the formation, management and performance of KIE ventures especially includes knowledge, markets, institutions and opportunities. Thus, the chapter also returns to our starting definition of entrepreneurship by providing novel insights related to public policy and society. Entrepreneurship is more than knowing how to build a company because it represents a line of thinking about how to shape business and society.

The Appendix proposes specific steps and goals for readers about how to undertake a literature review on similar topics. It includes a detailed overview of the methodology for our initial, systemic literature review, including an explanation of the choices we made. The Appendix also provides a detailed overview of the existing literature, including tables, which highlight the foci of existing empirical and theoretical studies.