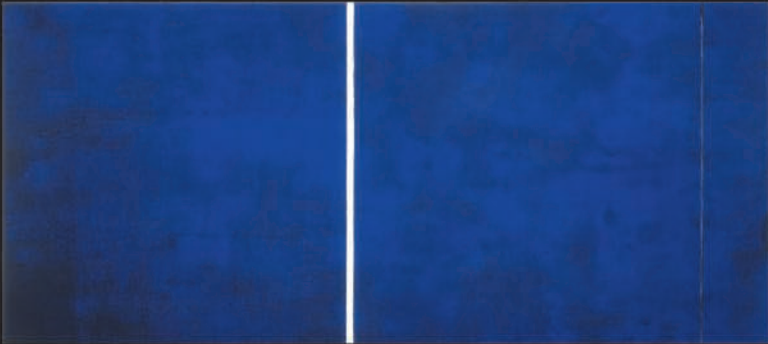


Making Sense of INTELLECTUAL CAPITAL



Designing a Method for
the Valuation of Intangibles

DANIEL ANDRIESSEN

Advance Praise for **Making Sense of Intellectual Capital:**

“Weaving a fascinating blend of sharp analysis and story telling, Andriessen describes the journey of a passionate group of experts pursuing one of the most challenging and elusive riddles in modern business—how do intangible resources create value for the firm? This insightful and sweeping exploration of both the underlying questions and their numerous proposed solutions from other contributors in the field offers a wonderfully lucid overview of a complex subject. Andriessen’s passion for methodologies that are coherent, rigorous and relevant is contagious. The Weightless Wealth Toolkit draws from the best available intangible valuation tools and methods but takes them to the next level, offering a powerful and original contribution. Whether you are new to the questions around intangibles or already well versed in the field, you will find this an indispensable reference and guide.”

—Verna Allee, author, *The Knowledge Evolution* and *The Future of Knowledge: Increasing Prosperity through Value Networks*

“Daniel Andriessen deftly walks the fine line between theory and practice. His book is academic enough to provide a fundamental contribution to the science and understanding of the valuation of intangibles. Yet it remains practical enough, with its candor and honesty, to allow for effective implementation of his methods and ideas, manifested in his Weightless Wealth Tool kit. It demonstrates that measurement is not enough, that valuation is paramount in leveraging intangibles for strategic benefit. **Making Sense of Intellectual Capital** is important reading for anyone who considers their intellectual capital to be strategic to their business.”

—Howard Deane, Chief Knowledge Officer, KMPG LLP, Canada

“A most insightful knowledge navigation book on valuing intangibles . . . Recommended reading for both practitioners and researchers.”

—Leif Edvinsson, The world’s first director of Intellectual Capital; The world’s first holder of a professorship on Intellectual Capital, University of Lund, Sweden, 1998 “Brain of the Year”

“In **Making Sense of Intellectual Capital**, Dr. Andriessen has produced one of the most synthesizing books on this important but challenging topic. This book provides a very valuable overview and evaluation of the managerial tools available to managers when it comes to better managing their intangible assets. I highly recommend this book to any manager of a firm that is charged with extracting value from its intangibles.”

—Göran Roos, Director, Intellectual Capital Services, London

“I strongly believe that **Making Sense of Intellectual Capital** will become *the* compass for the intellectual academic community and *the* comprehensive guide for practitioners in considering intangibles as the main resources to manage in the context of the knowledge economy. Andriessen is a perfect blend of an academic and a practitioner. As an academic he scientifically evaluates the 25 existing methods for managing and measuring intangibles. As a

practitioner he also offers in his book his own method for valuing intangibles together with some useful practical applications. Excellent. The book really makes sense in the emerging field of intellectual capital, which currently contains many different contributions of unequal quality and relevance. Andriessen has done a great job that will please both academics and practitioners. This is an inspiring book, mainly of academic nature but with very practical and powerful messages to improve the value of businesses. Andriessen really challenges the Intellectual Capital conventional wisdom with new approaches and contributions.”

—**José María Viedma**, President of Intellectual Capital Management Systems and Professor of Business Administration at Polytechnic University of Catalonia

Making Sense of Intellectual Capital

Designing a Method for the Valuation of Intangibles

Daniel Andriessen

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Preface and Acknowledgments

“The problem of a painting is physical and metaphysical, the same as I think life is physical and metaphysical.”

*Barnett Newman*¹

On November 21, 1997, a schizophrenic with a kitchen knife slashed Barnett Newman’s majestic work “Cathedral” in the Amsterdam Stedelijk Museum. Although this event hardly shocked the world, it did shock me. I had come to love the ultramarine painting, because the vivid blue appealed to my analytical mind, and the physical largeness of the abstract expressionist’s painting served as a metaphor for my—at that time, subconscious—ambition to tell my own story. Newman used color, composition, texture, and line to convey *meaning*, not a specific narrative, but a meaning that would be different for each onlooker. The meaning and the beauty of his painting are—like value—in the eye of the beholder. He saw the process of painting as physical and metaphysical, and the result as tangible and intangible: the tangible 8 × 18-foot painting and its intangible conveyance of ideas about the depth of feeling and thought. The schizophrenic not only destroyed a tangible painting, he also destroyed invaluable weightless wealth.

Exactly one year earlier, Professor René Tissen and I met for the first time. Less than two months later we formed KPMG’s Knowledge Advisory Services Group. We have made it into a successful group of advisors who work in the area of knowledge management and intangible resource valuation, without disavowing our passion for innovation. I thank René for being my colleague at KPMG, but even more I thank him for suggesting that I pursue my Ph.D. At first I thought the idea was ridiculous. I could not imagine myself spending four years in a dark room sitting behind my computer working on just one subject. In the end, other people helped to change my mind, and that changed my life. René, thank you for keeping your faith in me and defending me. You have been loyal to me, even after I—through my

¹ Source: <http://209.235.192.90/exhibitions/exhibits/newman/>

work as a Ph.D. graduate—discovered I am much more an academic (a philosopher) than a consultant.

Who were the people who changed my mind? Two of them are not aware of it. Arie van der Zwan and Mira Stol-Trip both work for the Ministry of Economic Affairs in The Netherlands. In 1998 they invited KPMG to participate in a pilot project for the valuation of intangible resources. I thank them for their vision, because they provided me with the perfect subject and case material for *Making Sense of Intellectual Capital*.

My brother Bart does know he helped to change my mind. In May 1999 we spent our holidays together in Provence, France. One night we had a conversation about what makes me “tick.” During our dialog, I discovered my ambition to work in academia; moreover, I recognized my ambition to gain entry into the academic world: a Ph.D. Bart, thank you for this enlightening moment.

After my holidays I went to see René and told him of my plan. He was delighted and suggested we ask Prof. Mathieu Weggeman to serve as a second supervisor. Mathieu, thank you very much for your support, your knowledge, and your thorough (sometimes ruthless) comments. That is exactly what a Ph.D. student needs.

Six months earlier, I had had the privilege of acting as the aid for Derk Daan Reneman when he defended his Ph.D. thesis at the Free University, Amsterdam. Derk has been a long-time friend and a great supporter of my Ph.D. work. I thank him for his persistent friendship, advice, and encouragement, and I am honored that he was willing to act as my aid at my viva voce.

In 2000, René and I published the predecessor of this book, a book called *Weightless Wealth*. *Weightless Wealth* proposes a method for the identification, assessment, and valuation of intangible resources, which is an earlier version of the method that I describe in this book, *Making Sense of Intellectual Capital*. I thank Jonathan Ellis for his help in writing *Weightless Wealth* and reviewing *Making Sense of Intellectual Capital*. His writing skills and craftsmanship are unprecedented.

Not long after we published *Weightless Wealth*, I met Leif Edvinsson for the first time. At my first visit to the McMaster World Congress on the Management of Intellectual Capital, Leif and I met again, and he gave me the nickname that I still use with pride: IC Challenger. Leif, thank you for your inspiration and for stimulating me to find my own destiny. Your book *Corporate Longitude* motivated me to create a job title that does not say what I do, but describes what I am good at. I am a *sensemaker*, and I help clarify, challenge, and create ideas.

I thank Prof. Nick Bontis and Prof. Christopher Bart who, together with their splendid team of students, organize each year the world's best conference on intellectual capital at McMaster University in Hamilton, Canada. Through your conferences I have found my community, my audience; and each visit convinces me all the more that I need to follow my academic ambition. Through you, I have met many friends from all over the world who I would like to thank for sharing with me a passion for the subject: Verna Allee, Ahmed Bounfour, Jay Chatzkel, James Falconer, Tua Haldin-Herrgard, Clive Holtham, Philippe Leliaert, Darius Mahdjoubi, Bernard Marr, José Maria Viedma Marti, Jan Mouritsen, Joe Peppard, Prof. Ante Pulic, Anna Rylander, and Herman Van den Berg, to name a few. I also would like to show appreciation for Göran Roos, at one time a dear colleague at KPMG, and one of the most inspiring and knowledgeable persons in the field.

A special thanks to my former team members who helped me to create the new method: Jan Blom, Inge van Gisbergen, and Martine Frijlink. I think we were an exceptional team. Each of you brought your unique personality and skills to bear. I also thank my KPMG colleagues Prof. Johan van Helleman, Prof. Willem Dercksen, and Mr. Guus Landheer, who guided us with their wisdom.

I also thank KPMG, a company in which almost everything is possible, that I served with honor for more than 12 years. The firm gave me the unique opportunity to set up a new unit in uncharted territory and to write a book (Tissen et al., 1998). In addition, it enabled me to work on my Ph.D. thesis in parallel with my regular work. A special thanks to the members of the Information Research Center, and especially to Jan Schepers. Without your help in tracing the literature, *Making Sense of Intellectual Capital* would not have been written. Thanks to Frank Lekanne Deprez, my direct colleague, who not only is a walking library, but most of the time happened to have the resources I needed in his possession. I also thank Karima Benaskar, who has been my faithful secretary for many years.

I am grateful for the cooperation of the companies that were willing to serve as guinea pigs for the new method. They did not know what they were getting into when they agreed to work with us, but they had faith that something useful would result (see Chapter 5).

In addition, I thank Karen Maloney of Butterworth-Heinemann. You were kind and brave enough to see through the academic nature of this book and recognize that it contains some very practical and powerful messages to improve the value of businesses.

During the past four years there have been times that I have neglected my duties as a father of two wonderful daughters. Fortunately¹⁷ there were relatives and friends available who understood my situa'

and were willing to offer help. Most especially I would like to thank my wonderful mother, Ank Andriessen–Collignon; my in-laws, Hans and Toos Leenders; our neighbors Dioné and Kees Bink; and my fantastic sister Liesbeth for taking care of the children when I was busy writing in the attic.

Lastly, I must thank the three most important people in my life. I express gratitude to my wife, Marian, and to my daughters, Carlijn and Mirthe, for their love, support, and understanding. You provided me with the perfect environment in which to write *Making Sense of Intellectual Capital*. I am sorry for the times I may have placed a heavy burden on you with my ambition. I am grateful and I love you.

Daniel Andriessen
Leiderdorp, The Netherlands
October 2003

Objective: Valuation and Measurement in the Intangible Economy

1

“And so: he rejected the left horn. Quality is not objective, he said. It doesn’t reside in the material world.

Then: he rejected the right horn: Quality is not subjective, he said. It doesn’t reside merely in the mind.

And finally: Phaedrus, following a path that to his knowledge had never been taken before in the history of Western thought, went straight between the horns of the subjectivity–objectivity dilemma and said Quality is neither part of mind, nor is it a part of matter. It is a third entity which is independent of the two.”

Robert M. Pirsig (1975)

On June 26, 1997, a Dutch member of parliament, Mrs. Voûté–Droste of the Liberal party, petitioned a motion to ask the government for a policy document on intangible resources. The event that triggered this motion was the so-called *techno-lease scandal*. From the beginning of the 1990s, Dutch companies like Philips, DAF trucks, Fokker, and several others were allowed to use this sale and “leaseback” construction to improve their liquidity. Knowledge—mostly in the form of patents—was sold to the Dutch Rabobank and was leased back, leading to considerable tax benefits for the bank and direct cash for the companies. This construction became a political scandal when calculations showed a loss of tax returns of several hundred million Dutch guilders. Voûté–Droste wanted to know the legal possibilities for Dutch companies to capitalize on intangible resources and to what extent these possibilities were used in practice.

On January 21, 1998, the Dutch Minister of Economic Affairs, Hans Wijers, sent a letter to parliament regarding the matter (Ministry

of Economic Affairs, 1998a). The letter described the limitations by current rules and regulations on the capitalization of intangible resources. In addition, it provided an overview of the motives found in the corporate world to use or not to use these legal possibilities. It concluded by stating that in The Netherlands “there seems to be some reluctance to use the existing possibilities. This may partly be due to an attitude of risk avoidance on the part of Dutch auditors and partly because of auditors, companies and investors being unacquainted with alternative possibilities” (translated by D. Andriessen; Ministry of Economic Affairs, 1998a, p. 9). The letter then announced a pilot project to allow accounting firms to experiment with new methods for creating transparency in intangible resources.

This letter triggered a chain of events. It led to studies by KPMG, Ernst & Young, PricewaterhouseCoopers, and Walgemoed; an Organisation for Economic Co-operation and Development (OECD) conference in Amsterdam in 1999 on measuring and reporting intellectual capital; a report by the Dutch Ministry of Economic Affairs (1999); and several master’s theses. It contributed to the awareness within The Netherlands of the growing importance of intangible resources and it stimulated the search for new methods to help manage, measure, and report this weightless wealth. And it resulted in my first introduction to the *intangible* perspective.

A new use of words creates a new perspective on reality. The viewpoint of intangible resources is such a new perspective. It comes with a motley collection of concepts and phrases like *immaterial assets*, *knowledge-based assets*, *tacit knowledge*, *know-how*, and *intangible assets*. Taking part in the discussion means entering a world full of metaphors, analogies, and figures of speech: There is intellectual *capital* (Edvinsson and Malone, 1997), there are intellectual capital *stocks* and *flows* (Roos and Roos, 1997), and there is knowledge that *travels and changes* in organizations (Bontis, 2002).

As we know from Morgan (1986), metaphors can be powerful tools to help understand complex and paradoxical phenomena like organizations, which can be understood in many different ways: “The use of metaphor implies a way of thinking and a way of seeing that pervade how we understand our world generally” (Morgan, 1986, p. 12). Yet, it is fascinating to see how both academics and practitioners use this new language of intangibles to describe the social world of business as if it were as real as the physical world of everyday life. They sometimes seem to forget they are constructing a social reality, a reconstruction that may or may not be fruitful in explaining and/or improving business performance. This has been a main trigger for this book, which presents a quest for the usefulness of the intangible perspective in

improving business performance. I wanted to learn to make sense of intellectual capital and its value.

This book describes my journey into the land of the intangible. The purpose of the journey was to discover new ways to value intangible resources through thorough yet practical research. In this chapter I describe this new intangible perspective, I show that the intangible perspective is able to expose and explain drastic changes in the way the economy and businesses perform, and I indicate that the intangible perspective allows for the definition of specific problems and corresponding solutions. One of these problems is the problem of valuation: How can we put a value on an intangible? I explain the nature of value and valuation, and the differences between a financial valuation, a value measurement, and a value assessment.

I then continue by describing the road map of the journey: the research and design objective, as well as the design problem of my research. I explore the valuation of intellectual capital with my own two feet in the mud. I do not simply criticize the valuation methods others have developed, but experience in practice how difficult it is to design a proper method for the valuation of intangible resources. My ambition was even bigger. I wanted my research to be relevant to practice *and* to science. To achieve this I used a special research methodology that enables the researcher to work according to scientific standards, yet come up with practical results that help improve businesses. This methodology is called *management research practiced as a design science*. But first let us look at businesses from a new perspective.

The Intangible Perspective

The intangible perspective is a resource-based perspective that looks at the economy or at an individual company as a combination of stocks, flows, and transformations of resources. These resources can be tangible, financial, or intangible. The intangible perspective focuses on resources that are not material, and highlights the growing importance in the economy and in companies of this hidden wealth. This perspective brings to light drastic changes that have occurred in the economy during the last 50 years. I briefly describe the history and nature of these changes and the drivers that cause them. I then introduce the intellectual capital community, a group of practitioners and scientists that has helped to promote the intangible perspective and provide tools for valuing and measuring intangible resources.

The Transformation of the Economy

Drucker (1993) calls the change intangibles have induced a process of transformation—a rearrangement of society, its world view, and its basic values. This process has created a society in which the primary resource is knowledge, which he calls the *postcapitalist* or *knowledge society*. In this society, value is created not by the allocation of capital or labor but by productivity and innovation. The leading social group in this society is the knowledge workers, which are comprised of three types: knowledge executives who know how to allocate knowledge to productive use, knowledge professionals, and knowledge employees.

According to Drucker (1993) and Weggeman (1997b) there are three phases in the development toward the intangible economy. The first phase was the Industrial Revolution (1750–1880), during which companies used knowledge to produce tools and products. The second phase was the Production Revolution (1880–1945), during which companies used knowledge to improve labor processes. The third and last phase is the Management Revolution (1945–the present), during which organizations use knowledge to improve knowledge. Managers have become responsible for the application and performance of knowledge.

Seven Characteristics of the Intangible Economy

The intangible economy has seven characteristics that make it fundamentally different from the agricultural and industrial economy. First, knowledge replaces labor and capital as a fundamental resource in production (Stewart, 1997; Weggeman, 1997b), and intangibles like brands create a substantial part of the added value of companies. Nakamura (2003) estimates that private US firms invested at least \$1 trillion in intangibles in the year 2000. Gross intangible investments have risen from 3.8% of the Gross Domestic Product (GDP) in 1953 to 9.7% in 2000. Studies have shown the importance of intangibles on future profitability and equity market values of firms. Lev and Sougiannis (1996) have shown the importance of research and development (R&D) capital. Barth et al. (2003) proved there is a correlation between the value of brands and stock returns. Zucker et al. (2003) found that intellectual capital allows biotech enterprises to capture supernormal economic returns. Hall et al. (2001) and Deng et al. (2003) found that the number of patents is associated positively with market value. Seethamraju (2003) shows that the value of new trademarks is associated with the market value of firms. All this

evidence proves intangibles are of growing importance for wealth creation.

Second, the knowledge content of products and services is growing rapidly. According to Stewart (1997), the value of the electronic content of a car is more than that of steel. In addition, not only products become more knowledge intensive. Business processes do as well (Jacobs, 1999). Process innovation has become as important as product innovation.

Third, the intangible economy is an economy in which services are as important as products. Not only do products get more knowledge intensive, knowledge itself has become an important product, as shown by the rise of the services industry (Tissen et al., 1998).

Fourth, it is an economy in which the economic laws are different. Lev (2001) explains why the economics of intangibles is different from the economics of physical and financial assets:

1. Intangibles are nonrival assets. They can be deployed at the same time in multiple uses. Although an airplane can be used during a given time period on one route only, its reservations system can serve, at the same time, a potentially unlimited number of customers.
2. In general, intangibles are characterized by large, fixed costs and minimal marginal costs. The development of a software program often requires heavy investment, but distributing and selling it costs very little. Therefore, intangibles are often characterized by increasing returns of scale instead of decreasing returns.
3. Intangibles often profit from network effects. For example, the usefulness of a computer operating system increases with the number of users.
4. At the same time it is often difficult to secure ownership of intangibles, as the widespread violation of copyright law shows. As a result, others may benefit from intangible investments.
5. Innovations in intangibles are often highly risky. R&D, training, and acquiring technologies are often the first steps in the development of new products and services, and therefore have more risk than investments in the later stages of the development process.
6. Often, there is no market for intangibles. They cannot be traded. Markets provide information about the value of goods and services, and this is vital to optimal resource allocation.

The result is that in many industries the traditional economic law of diminishing returns is no longer valid (Arthur, 1996). The assumption

behind this law is that companies that are ahead eventually run into limitations, so that equilibrium of prices and market shares is reached. This law no longer holds true. In many sectors, a law of increasing returns has replaced it. Companies that go ahead get farther ahead because of mechanisms of positive feedback.

Fifth, in the intangible economy the concept of ownership of resources has changed. Because knowledge mainly resides in the heads of employees, companies no longer own their most important resource (Weggeman, 1997a). Explicit knowledge can be owned through intellectual property rights, but the enforcement of those rights is becoming difficult. And because knowledge is a nonrival good, it must be appropriated to prevent direct spillover effects to competitors (Soete and Ter Weel, 1999).

Sixth, the intangible economy is an economy in which the characteristics of labor have changed. We have witnessed the rise of the knowledge professional (Tissen et al., 1998). Knowledge workers create most of the value added in companies (Stewart, 1997). They use hardly any physical strength or manual dexterity (Weggeman, 1997a).

Seventh, and lastly, as a result, organizations have changed. The management of intangible resources is fundamentally different from the management of tangible or financial resources. Knowledge is productive only if it is applied to make a difference. Furthermore, it must be clearly focused. It requires the systematic exploitation of opportunities for change and the management of time: the balancing of the long term with the short term (Drucker, 1993). The management of knowledge professionals is more difficult than the management of other employees (Tissen et al., 1998). Weggeman (1992) states that companies cannot control professionals using regulations, procedures, and information systems because they require a natural freedom. More irritatingly, they consider their way of working to be unique. Professionals call for professional organizations with flat hierarchical structures, with managers that facilitate people instead of controlling them, and with professionals that are committed to a team and a task. Organizations have transformed themselves into knowledge companies that handle enormous amounts of information, often diverged from the flow of goods and tangible resources (Stewart, 1997). Knowledge companies are companies that show a limited amount of assets on the balance sheet relative to the added value they produce, because they use less-tangible assets and because they have stripped their balance sheet of fixed assets. According to Lekanne Deprez and Tissen (2002), this process has led to the development of zero-space organizations that are virtual and that use networks to create added value. Knowledge companies also apply different

strategies. They no longer compete over minimizing transaction costs but over “shaping and reshaping clusters of assets in the distinct and unique combinations needed to serve ever-changing customer needs” (Teece, 2000, p. 29).

Drivers of the Intangible Economy

The major driver behind the rise of the intangible economy is the combination of three trends into one major discontinuity. The first economic trend is globalization (Hand and Lev, 2003; Houghton and Sheenan, 2000; Weggeman, 1997a,b). There is an increasing interdependence of international flows of goods and services, direct investment, technology, and capital transfers. Competition is becoming increasingly global. As a result, product life cycles are shortened and companies need to minimize costs. They also need to shorten the time-to-market. New products and services require a constant stream of innovation and state-of-the-art knowledge. Companies need to compete by constantly producing new services and products that have more functionality, service, aesthetics, sustainability, and brand recognition (Weggeman, 1997b). If competition can come from anywhere, it becomes increasingly important for companies to be unique. Uniqueness does not come from tangible assets but from proprietary knowledge, special skills, an exclusive way of doing business, and a distinctive image created through “branding.”

The second economic trend is the far-reaching deregulation in key economic sectors such as telecommunications, transportation, energy, and financial services (Hand and Lev, 2003; Teece, 2000). Tariff and nontariff barriers have been lowered. Final goods, intermediate goods, services, and resources can flow globally with more freedom than ever before.

The third trend is the exponential growth of technological change, especially the emergence of new information and communication technologies (ICTs). This has resulted in a decline in the price of information processing, in a conversion of communication and computing, and in the rapid growth in international electronic networking (Soete and Ter Weel, 1999). ICT has enabled the global access of information and knowledge.

We can conclude that the intangible perspective is able to expose and explain drastic changes in the way the economy, individual companies, and individuals behave. However, is the intangible perspective also capable of identifying new organizational problems and offering new solutions for management? The intellectual capital community claims that it can.

The Intellectual Capital Community

The intangible perspective allows us to look at companies differently. Chapter 3 describes how various disciplines use this perspective to create a new view of organizations. This new view makes us see things differently and notice different things. It allows for new ways of diagnosing organizations and defining new problems. It also helps in developing new solutions to those problems. The intellectual capital community especially has promoted this perspective, raising the awareness about the importance of intangibles among practitioners as well as academics.

Hudson (1993) quotes the economist Galbraith as the first to use the term *intellectual capital* as early as 1969. Stewart (2001a) claims it dates back at least to 1958. Sullivan (2000) starts his history of the intellectual capital movement with the work of Itami, who in 1980 published a book called *Mobilising Invisible Assets* in Japanese. In the 1980s, the problem of measuring knowledge was addressed on a broader scale by a group of Swedish companies, which Sveiby (2001) calls *the Konrad track*. This group consisted of managers who used primarily nonfinancial indicators to monitor and report intangibles. Sveiby reported their methods in 1989 (Sveiby et al., 1989). The group was called *Konrad* because they met for the first time on November 12, 1987, which is Konrad Day in the Swedish calendar.

The first appearance in the popular press of the term *intellectual capital* was in an article by Stewart (1991) in *Fortune* called "Brainpower." During that same year, Skandia AFS, a Swedish insurance company, appointed Edvinsson as the world's first director of intellectual capital (Edvinsson, 2002a). Later, Stewart (1994) published another article on intellectual capital. A year after that, the first meeting of the Intellectual Capital Management (ICM) gathering took place. Sullivan, Petrash, and Edvinsson brought together people from eight different companies who were all engaged in actively extracting value from their intangible assets (Sullivan, 2000). This meeting boosted the thinking on intellectual capital measurement and knowledge management. Sullivan (2000) wrote: "Representatives involved in this meeting felt as if they had found long-lost relatives. Each had been operating in a vacuum without knowing there were others trying to deal with the same problems" (p. 16). Each of the originators of the ICM gathering would become a well-known author and thought leader in the field.

In 1995, Skandia (1995) presented the first public report on intellectual capital. In 1997, intellectual capital hit the publishing trail

(Edvinsson, 2002a) with the publication of three different books, each entitled *Intellectual Capital* (Edvinsson and Malone, 1997; Roos et al., 1997; Stewart, 1997), as well as a new book by Sveiby (1997). These publications helped to create a large community of both academics and practitioners in the field. From that moment on, there was an explosion of activity, as shown by the overview of literature by Bontis (2002) and Petty and Guthrie (2000).

The questions raised by the intellectual capital community are analogous to the questions often asked about tangible and financial resources: How can we improve the management of intangible resources (Roos et al., 1997; Stewart, 1997)? How can we improve their utilization (Bontis, 2002)? How can we decide whether to invest further in developing an intangible (Sullivan, 1998a)? How can we make better resource allocation decisions (Edvinsson, 2002a)? How can we get information on whether our investments have been productive (Pike and Roos, 2000)? How can we measure intangible resources (Luu et al., 2001; M'Pherson and Pike, 2001a,b)? What is the value of intangible resources (Edvinsson and Malone, 1997; Stewart, 1997)? How should we report intangible resources (Sveiby et al., 1989)?

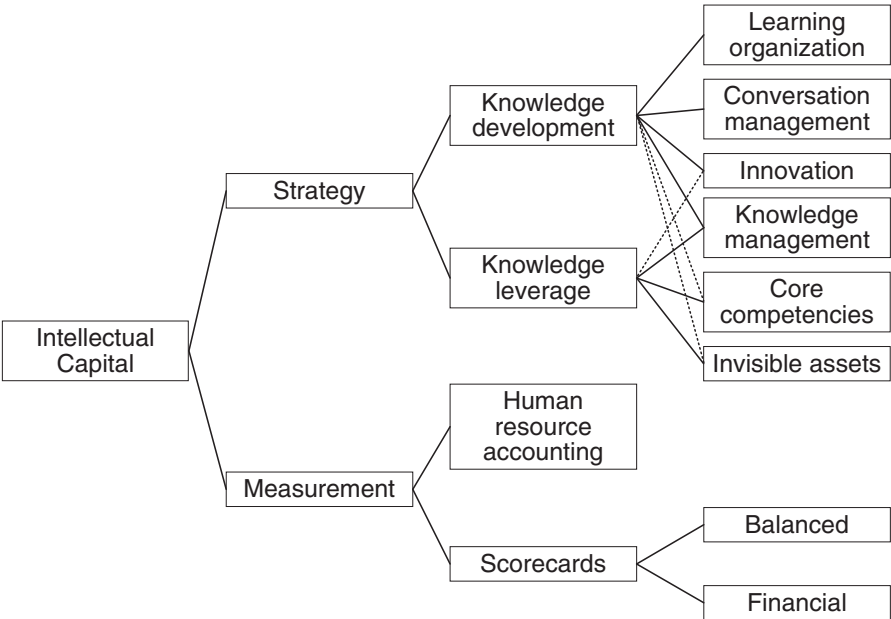
According to Roos et al. (1997), we can trace the theoretical roots of intellectual capital to two different streams of thought. The first one studies the development and leverage of knowledge. The second one focuses on the development of new information systems that measure the value of knowledge (Figure 1.1).

Over the years, the measurement stream has intrigued me, and I decided to make it the subject of this book. Tissen, Lekanne Deprez, and I (1998, 2000) have covered the other stream in two earlier publications.

Especially within the intellectual capital community, authors seem to be obsessed with the need for measurement. It really is fascinating. The measurement of intangible resources is justified using phrases like “what gets measured gets managed” (Luu et al., 2001); “what you can measure, you can manage and what you want to manage, you need to measure” (Roos et al., 1997); and “in order to manage value creation we need to measure it” (Pulic, 2000b). What is this obsession? Why create a list of 191 indicators of intellectual capital (Liebowitz and Suen, 2000)? Why include more than 160 indicators in an intellectual capital navigator (Edvinsson and Malone, 1997)? Why try to add apples and oranges to create one overall indicator for the value of intellectual capital (Bounfour, 2002; M'Pherson and Pike, 2001a,b; Pike and Roos, 2000; Roos et al., 1997)? I could not make any sense of it.

Figure 1.1

Conceptual roots of intellectual capital (Roos et al., 1997)



Many of the methods available to measure the value of intangible resources seem to be a solution in search of a cause. (Appendix A contains a description of a sample of 25 methods found in the literature.) To make sense of all the proposed solutions, I decided to study them a little deeper. What are some of the problems that authors try to solve with their methods? What is the underlying problem definition? How robust and useful are these methods?

As we see in Chapter 3, it is possible to group the problem definitions associated with the methods into three categories. The first group focuses on solving internal management problems. This ranges from methods to improve the management of intangibles to ways to progress strategic decision making. The second group concentrates on methods to improve the external reporting of companies. This includes ways to provide additional insight into investments in intangibles, and methods for reporting the financial value of intangibles. The third group of problems relates to transactional or statutory motives for valuation—for example, determining a price for an intangible that will be sold or estimating the value of elements of goodwill when conducting an impairment test.

But I did not only want to study the work of others, I wanted to learn from my own mistakes, too. During the last five years I have developed, together with a team from KPMG, my own method for the valuation of intangible resources. As it turned out, we too have been searching for a cause. This book describes this quest for a new method, from initial conception to its testing at six companies. It describes the brilliant ideas we had and the big mistakes we made. It reconstructs our path from requirements, to design, and to implementation and evaluation. It records what we learned and what we still need to learn.

Valuation and Measurement of Intangibles

I have characterized the exploration of methods for the valuation of intangible resources as a search for the Holy Grail (Andriessen, 2002b). Before we can engage in such a quest, we need to know what we are looking for. What is the nature of value, what do we mean by valuation, and what types of methods for valuation exist?

Value

Nowadays we think about money when we talk about value, but according to Crosby (1997), it was only during the Middle Ages that money developed as a means of quantifying value. Value closely relates to the concept of “values.” According to Trompenaars and Hampden–Turner (1997), values determine the definition of good and bad, as opposed to norms that reflect the mutual sense a group has of what is right and wrong. A value reflects the concept an individual or group has regarding what is desired. It serves as a criterion to determine a choice from existing alternatives.

Following the *Longman Dictionary of Contemporary English* (Proctor, 1978) as well as Trompenaars and Hampden–Turner (1997), I define value as *the degree of usefulness or desirability of something, especially in comparison with other things*. I use the term *usefulness* to emphasize the utilitarian purpose of valuation. This is in line with Rescher’s (1969) value theory. He states that values are inherently benefit oriented. People engage in valuation “to determine the extent to which the benefits accruing from realization of some values are provided by the items at issue” (pp. 61–62). However, usefulness is not the only aspect of value. Things can be valuable because they are beautiful, pleasing, or in other ways desirable, which is why I included the term *desirability* in the definition. Usefulness and

desirability are not mutually exclusive. Things can be desirable because they are useful.

According to Rescher (1969), two questions dominate the discussion about value: (1) Is value a property or is it a relationship linking the item at issue with the valuing subject in some special way? Is it strictly personal or does it have an objective grounding?¹ (2) Is value something to be apprehended only in subjective experience or can it be based on specifiable criteria, the satisfaction of which can be determined by objective examination?

I agree with Rescher (1969) when he states that value is not a property inherent in the item at issue. It depends on the subject's view of usefulness or desirability. In that respect, "value is in the eye of the beholder." Therefore, valuation requires implicit or explicit criteria, or yardsticks for usefulness or desirability. During the Middle Ages, things developed a price, which allowed for the comparison of the usefulness or desirability of any item against any other item. When we use money as a measure of value, it acts as a relative criterion that allows for comparing the usefulness or desirability of things that are very different in nature. This means that when we do *not* use money as a criterion, other criteria or yardsticks need to be present to allow for a valuation.

With respect to the second question, I tend to disagree with Rescher (1969). He states that because valuation is based on criteria, value has an objective basis and can be assessed by impersonal standards or criteria that can be taught to an evaluator through training. The problem is that those criteria may "take account of objective features of the items that are being evaluated" (Rescher, 1969, p. 56), but they may also take account of *unobservable* features of these items. The question is whether all implicit criteria people use in their valuations can be made explicit and can be unraveled into observable criteria. I believe this is often not the case. We cannot always translate value into observable criteria. Some valuations are personal assessments that we cannot make explicit.

Valuation

Rescher (1969) describes valuation (he uses the term *evaluation*) as "a comparative assessment or measurement of something with respect to its embodiment of a certain value" (p. 61). Rescher (1969) describes the importance of values for valuation as follows:

¹ This is the same question Phaedrus asked himself with respect to quality in Robert Pirsig's novel *Zen and the Art of Motorcycle Maintenance* (Pirsig, 1975).

Whenever valuation takes place, in any of its diverse forms . . . values must enter in. It is true that when somebody is grading apples, say, or peaches, he may never make overt reference to any values. But if the procedure were not guided by the no doubt unspoken but nevertheless real involvement with such values as palatability and nourishment, we would be dealing with classification or measurement and not with grading and valuation (p. 71).

Furthermore, he states that any valuation makes use of a *value scale*, reflecting the fact that this value is found to be present in a particular case to varying degrees. This value scale can be an ordinal scale that reflects the varying degrees of value but does not show us the interval between the positions on the scale. Rescher (1969, p. 63) gives the example of a value scale for patriotism that is of an ordinal nature: disloyal → unpatriotic → indifferently patriotic → patriotic → superpatriotic.

A value scale can also be a cardinal scale. Such a scale is of an interval or ratio level (Swanborn, 1981). With regard to an interval level, the interval between the varying degrees of value is known, whereas on a ratio level it is also known what constitutes zero value. We can represent cardinal scales numerically. The advantage of using money as the denominator of value is that it creates a value scale at the ratio level that allows for mathematical transformations.

Four Ways to Determine Value

Valuation requires an object to be valued, a framework for the valuation, and a criterion that reflects the usefulness or desirability of the object. Now we have several options. We can define the criterion of value in monetary terms, in which case the method to determine value is a *financial valuation method*. Or we can use a non-monetary criterion and translate it into observable phenomena, which I term a *value measurement method*. If the criterion cannot be translated into observable phenomena but instead depends on personal judgment by the evaluator, then I call the method a *value assessment method*.

If the framework does not include a criterion for value but does involve a metrical scale that relates to an observable phenomenon, then I call the method a *measurement method*. Strictly speaking, a measurement method is not a method for valuation, but as we shall see in Chapter 3, this type of method is often used within the intellectual capital community. Swanborn (1981) defines measurement as

the process of assigning scaled numbers to items in such a way that the relationships that exist in reality between the possible states of a variable are reflected in the relationships between the numbers on the scale. Measurement methods do not use value scales, but use measurement scales instead.

Measurement has been an important element of management and business ever since the Egyptians used mathematics in their book-keeping more than 3,700 years ago. Italian merchants in the 12th century already knew that good books kept them from “chaos, a confusion of Babel” (Crosby, 1997, p. 203). These merchants started experimenting with double-entry techniques. Two centuries later, in 1494, the Italian mathematician Lucia Pacioli supplied, in print, for the first time a clear, simple explanation of the technique as part of his *Summa de arithmetica geometria proportioni et proportionalità*. Current accounting is still based on these principles. We can trace the origins of nonfinancial measurement as a management method back to the French *tableau de bord*, a measurement tool that dates back to 1932 (Nørreklit, 2000). Another example is the work of the high-level task force on key corporate performance measures installed at General Electric in 1951 (Nørreklit, 2000). During the 1980s, the total quality management movement introduced various quality measures, and in the beginning of the 1990s, measures of customer satisfaction were introduced. In 1992, Kaplan and Norton (1992) published their famous article on the *balanced scorecard*.

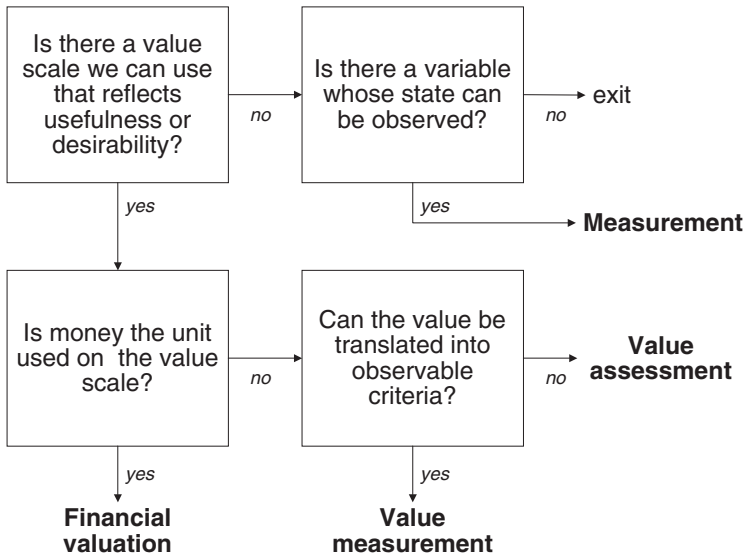
In literature, we find all four methods for the valuation of intangibles. The *intangible scorecard* by Gu and Lev (2002) is an example of a financial valuation method. M’Pherson’s *inclusive value methodology* (M’Pherson and Pike, 2001a,b) is an example of a value measurement method. The *intellectual capital benchmarking system* of Viedma (1999; 2001a,b; 2002) is a method used to perform a value assessment. In addition, some proposed methods for the valuation of intangible resources are merely measurement methods, because they do not include values. An example is the *Skandia navigator* (Edvinsson and Malone, 1997).

Making Sense of Intellectual Capital looks at all four types of methods, which I summarize as methods for the valuation or measurement of intangible resources. Figure 1.2 shows the relationship between financial valuation, value measurement, value assessment, and measurement.

The decisive factors are the use of values as criteria, the use of money as the denominator of value, and the observability of the criteria or measured variable.

Figure 1.2

Financial valuation, value measurement, value assessment, and measurement



Objective and Problem

I wanted to design and test a method for the valuation of intangible resources to learn to make sense of the valuation of intangibles. Because I wanted to design and test the method in a scientific way, I decided to base my research methodology on the approach of management research practiced as a design science (Van Aken, 2000). This type of management research is not often practiced and has met with a lot of skepticism within the scientific community. Yet it is unique in the sense that its intention is to help businesses perform better and create scientific knowledge concomitantly. To help develop and promote this methodology, I decided to make acquiring knowledge about this type of management research my second objective. This section describes the fundamentals of my research journey: the objectives of the research, the problems it addressed, as well as its scientific and practical relevance.

My Objectives

My main motivation for my research was to contribute to the scientific body of knowledge of the intellectual capital community.

According to Bontis (2002), this field is in its embryonic stage. He states that the real problem with intellectual capital lies in its measurement (Bontis, 2002). Not only is there confusion about terminology (Bontis, 2001), there are many methods available for financial valuation, value measurement, value assessment, and measurement, and their purposes, strengths, and weaknesses are unclear.

The primary research objective of my research was to contribute to the intellectual capital community by developing knowledge about the valuation of intangible resources. I decided to describe this *research objective* as follows: *To develop knowledge about the valuation of intangible resources, especially about the characteristics and purposes of valuation and the use of valuation methods.*

I developed this knowledge by studying existing literature and by designing and testing a new method for the financial valuation of intangible resources. I deeply believe people learn most when they make mistakes by trying to put theory into practice. My research included a review of 25 existing methods. For each method I analyzed its purpose, strengths, and weaknesses. The results are presented in Chapter 3 and in Appendix A. Chapters 4 through 6 describe the design, testing, and lessons learned of my method, called the *weightless wealth tool kit*. The complete tool kit is contained in Appendix B.

This brings us to the second objective of my research, which was to contribute to the repertoire of intellectual capital methods by designing and testing a method for the valuation of intangible resources. From the literature review it became clear to me that each existing method has its strengths and weaknesses, and that there was room for improvement. I therefore decided to design a method that not only works in the described cases but also works for other cases. The objective of the research was to devise an object and realization design for such a valuation method that had been tested in practice. I described this *design objective* of the research as follows: *To develop and test a method for the valuation of the intangible resources of an organization, and a plan for its implementation.*

A major motivation for this study was my concern about the rigor and relevance of academic intellectual capital research. Academic research in the field of intellectual capital focuses too much on rigor and not enough on relevance. This is probably an overreaction to the fact that "Intellectual Capital research has primarily evolved from the desires of practitioners" (Bontis, 2002, p. 623). On the other hand, there is plenty of practical development of methods that lack proper testing. I wanted to contribute to the reconciliation of the dilemma of rigor versus relevance in intellectual capital research. Therefore, my

secondary research objective was to contribute to the methodology of intellectual capital research.

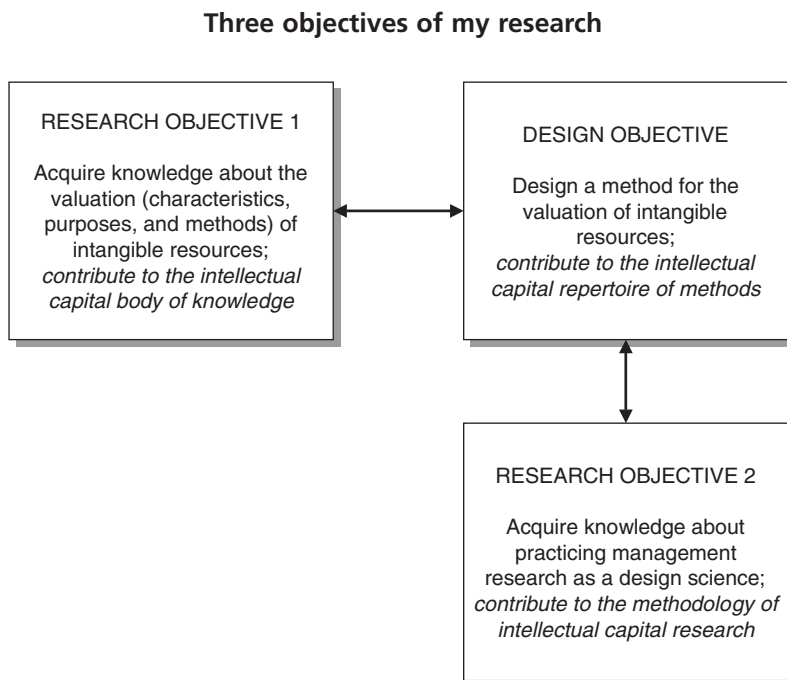
I wanted this contribution to be threefold. First, I wanted to develop further and to codify the various steps of this new methodology of intellectual capital research practiced as a design science. Second, following Weggeman (1995), I wanted to demonstrate that practicing intellectual capital research as a design science can lead to useful results. Third, I wanted to highlight some of the limitations of this methodology and provide suggestions for improvement. I decided to describe this *secondary research objective* as the following: *To develop knowledge about the methodology of intellectual capital research practiced as a design science, its process, its results, and its limitations.*

My objectives are summarized in Figure 1.3.

Problem

Every research project starts with a question. My research started with the following design problem: How can we determine the value

Figure 1.3



of the intangible resources of an organization in such a way that this information helps to solve organizational problems?

In scientific research it is important to define clearly the key concepts one uses (a glossary of terms is included at the end of this book). I define the key concepts of the problem definition as follows:

<i>Value</i>	The degree of usefulness or desirability of something, especially in comparison with other things
<i>Intangible resources</i>	Nonmonetary resources without physical substance that in combination are able to produce future benefits for an organization
<i>Organization</i>	A group of people involved in a network of subjectively shared meanings that are sustained through the development and use of common language and everyday social interaction, producing goods and/or services by combining financial, tangible, and intangible resources
<i>Organizational problems</i>	Problems of internal management, external reporting, and/or transactional and statutory-related problems
<i>Method</i>	A consistent set of steps to achieve a certain goal
<i>Valuation</i>	A comparative assessment or measurement of something with respect to its embodiment of a certain value
<i>Implementation</i>	The realization of a designed method through a series of interventions

The *practical* relevance of the research lies in the development of a practical method that can help reduce a manager's uncertainty with regard to the value of the company's intangible resources. I wanted to help managers define the problem they intend to solve and help them choose the right tool for the job (see also Andriessen [2002a]). As mentioned previously, there are a number of methods for the valuation of intangibles, the purpose of which is unclear (see Chapter 3). Part of the *scientific* relevance of my research is to clarify the purpose of measuring the value of intangible resources. Why should we want to engage in such an exercise? What is the exact problem we are trying to solve? However, I discovered that defining the right

problem to solve turned out to be one of the biggest challenges of my quest.

To make the research manageable, I broke down the design problem into 11 subproblems:

1. What methodology should we use to design a management method in a scientific way?
2. What can we learn from existing methods for the valuation or measurement of intangible resources with respect to the way they define the subject under investigation, the company problems they try to solve, and the quality of the method?
3. How can we define and identify intangible resources?
4. What are the requirements for a new method for the valuation of intangible resources?
5. What is the initial object and realization design of a new method that meets these requirements?
6. What can we learn from implementing the design with respect to the success of the method in solving problems?
7. What changes can we make to the object and realization design to make them more successful?
8. What are the strengths and weaknesses of the new method and how successful is it in solving company problems?
9. How can we improve the method further?
10. What can we learn from the design, implementation, and testing of the method about the valuation of intangible resources and its purposes, limitations, and usefulness?
11. What can we learn from the design, implementation, and testing of the method about the methodology of management research practiced as a design science, its process, its results, and its limitations?

Methodology

A research methodology is a set of rules about the process of scientific inquiry. The choice of methodology depends on the type of research question and the characteristics of the phenomena under investigation (Biemans and Van der Meer-Kooistra, 1994). My research question was a design problem that involved the testing of a draft design of a new management method. This is an example of management research practiced as a design science. In the following section I introduce this type of management research and describe the methodology I used for testing my design.

Practicing Management Research as a Design Science

Management research is the scientific discipline of studying organizations, their environment, and the way they are or ought to be managed. In Chapter 2 I explain that this discipline is scientific and can be practiced in two ways. It can be practiced as an *explanatory science*, studying organizations with the intention of describing, explaining, and predicting their performance. Alternatively, it can be practiced as a *design science*, developing methods to improve the performance of organizations. Both can be done in a scientific way, provided the scientist follows a set of scientific rules (see Chapter 2).

The scientific nature of management research has been the subject of huge debates within the discipline (see the special issue of *Bedrijfskunde* on methodology [1994, 1996] and Van Aken [2000]). The primary debate focuses on the relevance of management theory as developed by the academic community, as well as the rigor of many management theories presented in popular management literature. Having been a practitioner myself for more than 12 years, I see the need for relevant management research. In my work as a practitioner as well as in my work as an academic, I consider it important to help improve the management of organizations. My research is an example of intellectual capital research, which is part of the broader category of management research. In this book I use both terms interchangeably.

Using the Developing Multiple Case Study Method

The testing of the design of a new method for the valuation of intangible resources involved many variables. I was able to control some of them, like the quality of the object and realization design. However, I was not able to control others. Empirical case study research is appropriate for testing hypotheses that have many variables interacting in complex patterns (Biemans and Van der Meer-Kooistra, 1994). However, in empirical research, the application of case studies is limited to situations in which the researcher does not manipulate the independent variables. If it is the intention of the researcher to manipulate variables deliberately, then the appropriate research design is the experiment.

According to Swanborn (1981), during an experiment the researcher should have extensive control over most of the variables. In addition, the allocation of the different values of the independent variables to the group under investigation and the control group should be random. My research had characteristics of an experiment because it was my intent to manipulate variables like the object and realization design. However, my research was not an experiment in the empirical

sense, because there was no control group and it turned out to be impossible to control all variables involved.

Van Aken (2000) has extended the use of the term *case study research* to the design sciences. In the design sciences, variables do get manipulated to test technological rules: “The typical research design to study and test technological rules is the multiple case: a series of problems of the same class is solved, each by applying the problem-solving cycle. Design knowledge is built up through the reflective cycle: choosing a case, planning and implementing interventions (on the basis of the problem-solving cycle), reflecting on the results and developing design knowledge to be tested and refined in subsequent cases” (Van Aken, 2000, p. 8).

I followed Van Aken and used *developing multiple case studies* as my methodology. I refined the weightless wealth tool kit as a result of the design knowledge generated from previous cases. This is opposed to the *inventorying multiple case study* methodology, in which the researcher tests the *same* method several times in different cases. When I applied subsequent versions of the method, I got more and more indications and contraindications for the use of the method. In the ideal situation, the method should no longer need adjustments after being tested in x number of cases. At that point it should be clear in what context it can be used, and provisions should be built into the method that allow the user to adjust it to local circumstances. Van Aken (2000) calls this state *theoretical saturation*. My team and I created an initial draft of the method in September 1998 (see Chapter 4) and tested it at Bank Ltd. (see Chapter 5). We used experiences from that test to improve the method. A second test took place at Electro Ltd. To test and develop the method further, we repeated this sequence four times. Testing took place at Automotive Ltd., Logistic Services BU, Professional Services LLP, and Consulting Department (see Chapter 5). As you will see, we did not reach the point of theoretical saturation, but we learned a lot.

Before delving into the specifics of my methodology, and the process I followed to develop it, I present a brief overview of the structure of this book in the next section to assist you in understanding what is to come.

Structure of the Book

In Chapter 2 I refine the methodology of practicing management research as a design science, addressing subproblem 1. This methodology is based on my personal assumptions about the way people view

the world, and try to make sense of it. I describe these epistemological postulations and the way they influence my view on scientific research. I show that there are an infinite number of views on the social world that can be equally valid. The task of management research is to test these views and determine whether they are valid in explaining or improving management and organizations. I describe the steps I took and the rules I followed to practice management research as a design science. You will learn that the social reality of organizations is not carved in stone, unlike the physical reality of the outside world. Instead, organizations can be viewed and described in numerous ways. You will learn how to select from these multiple views in a scientific way. If you are a management researcher, you can learn how to practice management research in a way that is scientifically sound and yet produces clear and immediate benefits for businesses. If you are a manager, you can learn to apply multiple perspectives to your own organization.

Chapter 3 addresses subproblems 2 and 3. It looks at 25 different methods already available to value or measure intangibles to learn from them. Each one of these methods uses a different definition of intangible resources, by using terms like *intellectual capital*, *knowledge-based assets*, and *intangible assets*. I explain the differences between these concepts and present the definition of intangible resources that I used. Furthermore, I describe 19 different motives for putting a value on intangibles. This demonstrates that to develop or select a specific method, you should first define the organizational problem you wish to solve. Finally, I look at the solutions proposed. Some of the methods are not rigorous or—despite their intention—do not value intangibles. Others are useful for very specific purposes. I present a comprehensive overview of the most important methods available, and you will learn to define better your own motive for valuing intangible resources and pick the method that suits your problem best.

In Chapter 4, I describe how my team and I developed an initial draft of the weightless wealth tool kit. I prepared this draft as part of a project commissioned by the Dutch Ministry of Economic Affairs. This chapter shows the steps we took in developing the new method by describing the various phases of the project. It describes the requirements for the new method as well as the initial object and realization design, thereby addressing subproblems 3 to 5. You will learn how a major consulting assignment can take place, and will learn some of the common mistakes made by consultants. In addition, this chapter teaches how to define the requirements for a valuation method that is tailored to your needs.

I tested this design at six companies. I describe these tests in Chapter 5, solving subproblems 6 and 7. Each case description presents the context and problem definition we encountered. These often led to specific requirements for the design of the method. I describe the specific design and present how it was implemented. I reflect on the outcome of the method, which led to modification. This adjusted method was used in a subsequent case. This chapter demonstrates some of the difficulties one encounters when trying to implement a method for the valuation of intangible resources, including the lack of sponsorship for the initiative, lack of priority and a shortage of time, missing data, and a lack of implementation skills on the part of the consultants. This is really enlightening stuff.

In Chapter 6, I address subproblems 8 through 11. I summarize the lessons I learned from designing and testing the weightless wealth tool kit. I list the strengths and weaknesses of the method, and describe indications and contraindications for its use. This includes recommendations for the improvement of the method. Furthermore, I describe the hard lessons I learned about practicing management research as a design science. Lastly, I highlight the implications for the intellectual capital community and its attempt to put a value on intangible resources. This summarizes some of the challenges encountered when designing or implementing a method for the valuation of intangible resources. If you are a researcher, you can learn more about how to conduct scientific management research with direct practical relevance. If you are a manager, you can use the findings to judge whether my weightless wealth tool kit is a useful tool for your organization. If it is not, you can learn some of the pitfalls and tricks to select and implement any of the other tools available on the market.

Now let's start our quest by looking at the more fundamental questions of life, reality and truth, introduced by Pippi Longstocking.

Methodology: The Science of Designing Practical Methods

2

“What did you discover, anyway, Pippi?”

“A new word,” said Pippi and looked at Tommy and Annika as if she had just this minute noticed them. “A brand new word.”

“What kind of word?” said Tommy.

“A wonderful word,” said Pippi. “One of the best I’ve ever heard.”

“Say it then,” said Annika.

“Spink,” said Pippi triumphantly.

“Spink,” repeated Tommy. “What does that mean?”

“If I only knew!” said Pippi. “The only thing I know is that it doesn’t mean vacuum cleaner.”

Tommy and Annika thought for a while. Finally Annika said, “But if you don’t know what it means, then it can’t be of any use.”

“That’s what bothers me,” said Pippi.

“Who really decided in the beginning what all the words should mean?” Tommy wondered.

“Probably a bunch of old professors,” said Pippi.

Astrid Lindgren (1977)

In May 2000, my colleagues at KPMG and I were preparing a conference on new ways of doing business in a new economy. In one of the meetings we discussed the themes we wanted to address, until my colleague Steven, who was the chairman for the conference, said, “Now I am utterly confused. We are talking about the current economy as ‘new economy,’ ‘knowledge economy,’ ‘intangible economy,’ and ‘network economy.’ Which one is it?!”

The fact is that all these descriptions of the economic world are probably right. How can that be? How is it possible that we can

describe the same phenomena in very different ways? What does this imply for the scientific search for truth? When can we say something is true? I address these questions in this chapter, which presents the foundation for the research methodology I used in my research. The main thing that distinguishes science from practical, everyday work is the rigor of its methodology. This justifies a dedicated chapter on the epistemological fundamentals and methodology of my research.

Practicing science is like building a house. A strong foundation is needed to support claims and conclusions. In the case of my study, this foundation consists of four layers. First, science is about trying to make sense of the world in a rigorous way. I clarify my assumptions about the way this process of “sense making” works. Second, science aims to produce knowledge that is valid and/or successful. I clarify and support this distinction. Third, management research is a special branch of science that is involved in the study of how organizations are designed, how they function, and how they are managed. I explain why management research is a science, by specifying the scientific rules this discipline needs to follow. And fourth, I elaborate on the scientific methodology that I used in my study.

Making Sense of the Social World

It was my intention to generate knowledge. This section explains how people generate knowledge by making sense of the world. I first describe how people make sense by using distinctions. These distinctions guide the way we view the world. I then show how people choose the particular distinctions they use. Finally, I argue that making sense of the social world is different from making sense of the physical world.

Distinctions Make Sense

If we return to the example of my colleague Steven regarding the nature of the changing economy, we may wonder how it is possible that different descriptions fit the same economic world. Yet, it happens all the time. With language, we create distinctions with regard to the world that give us insight, allow us to make predictions, and create the foundation for our actions. This is a process I call *sense making*. People constantly try to make sense of the world by means of interpretation: the process of making distinctions with words and their rules for use. As Maturana and Varela (1987) phrase it:

The act of indicating any being, object, thing, or unity involves making an act of *distinction* which distinguishes what has been indicated as separate from its background. Each time we refer to anything explicitly or implicitly, we are specifying a *criterion of distinction*, which indicates what we are talking about and specifies its properties as being, unity, or object. This is a commonplace situation and not unique: We are necessarily and permanently immersed in it. (p. 40)

Therefore, when we refer to the economy as a *knowledge economy*, we make an act of distinction by distinguishing between economies in which knowledge plays a vital role and economies in which this is not so much the case (like in an agricultural economy).

The World Doesn't Speak

This process of making distinctions can be understood as a two-way process. We interpret phenomena based on previously gained knowledge and experiences embedded in their frame of reference. At the same time, this frame helps us to construct the phenomena we observe. Von Krogh and Roos (1995) say: "The world is brought forth in language. Still, we do not first have a language and then name things with it. Rather, the world and language shape one another" (p. 53). For example, once we chose to describe the current state of the economy as the "knowledge economy," we start to notice specific phenomena, like the knowledge intensity of companies and products, and the rise of the knowledge professional (Tissen et al., 1998). These phenomena do not exist in reality independent of us, but we bring them to light through the words we chose to use. If we choose different words, like *network economy*, we will notice other things, like the growing importance of alliances and partnerships.

Observation of the world is not a passive activity. There is no such thing as an objective reality that speaks out on its own and only needs to be observed. Instead, the only way we can observe reality is by actively using language to create distinctions that separate one array of phenomena from another. Our distinctions guide our observations. The American philosopher Rorty (1989) explains: "The world does not speak. Only we do. The world can, once we have programmed ourselves with a language, cause us to hold beliefs. But it cannot propose a language for us to speak. Only human beings can do that" (p. 4). As a result, when trying to make sense of the world, we do not try to create a representation or picture of the world in our mind. Von Krogh and Roos (1995) add to this: "In fact, the human mind does not

represent the world. Rather, it brings forth, or forms the world as a domain of distinctions that are inseparable from the structure of the cognitive system” (p. 53).

We Know According to the Way We Are and the Way We Feel

The making of new distinctions is guided by previously gained knowledge and experiences. “Knowledge enables distinction making and distinctions, in turn, enable (the development of) knowledge” (Von Krogh and Roos, 1995, p. 54). This process already starts when babies are born and are being taught to distinguish between light and dark, hot and cold, up and down, good and bad.

This process of sense making is unique for every individual because every person is unique with regard to the knowledge and experiences gained in life. This is why we often have a hard time understanding each other. In communication, we constantly interpret what is being said by referring to our own domain of distinctions—our personal tradition of previously gained knowledge and experienced feelings. Because this legacy is different from that of any other person, we know we will never have exactly the same insight as the people with whom we communicate. Fortunately, people who share the same culture, organization, or profession often have similar frames of reference. Luhmann (as cited by Reneman, 1998) calls this *Sinn*, a German word describing what makes sense to a system and what does not, and that manifests itself in collective world views, frames of reference, norms, and roles. Von Krogh and Roos (1995) refer to this as *rules*: “The use of words follows certain history-dependent rules that are specific to an institutional setting. Such rules are created and recreated in languaging and form the basis for the social system’s knowledge of the world” (p. 99). Communication is possible because of these rules, but the rules do not guarantee that people will understand each other.

A person’s choice for using a particular set of distinctions is influenced by cultural background, upbringing, education, and experiences. “Everything said is said from a tradition,” says Varela (1979, p. 268). That is why a remark or statement often tells us as much about the person who made it as it does about the phenomenon to which it refers. A person’s choice for a particular set of distinctions is often not a purely rational one, but is based on intuition (That word doesn’t feel good), normative preferences (I don’t like that word), sense of beauty (This distinction produces a nice symmetrical matrix), or goal orientation (Raising attention to this phenomenon is not in my interest). In addition, the array of connotations of a particular set of words plays an important role in selecting them.

For example, in our discussion about the themes for the conference, participants objected to the phrase *new economy*. Some disliked it because it reminded them of commercials for laundry detergent (“NEW! Washes whiter!”). Others felt the distinction between new and old does not create additional insight, other than that the new economy is different from the old one. However, although the additional insight generated by the phrase *new economy* is limited, the impact of the positive connotation of the word *new* on economic life has been enormous. New = better. This must have been one of the reasons why the term *new economy* became popular in 1997. Politicians like former vice-president Al Gore like influential connotations. This is why Gore used the phrase *new economy* to his own benefit. The phrase then led to the distinction between old-economy and new-economy companies, and the “old” ones—like chemical companies or steel manufacturers—felt they had to show their shareholders they were not old-fashioned and could invest in new-economy activities like the Internet. New-economy companies—like Internet startups—benefited from the positive connotation of the word *new* and had no trouble attracting capital. So the simple use of the phrase *new economy* started a battle between the old and the new that generated billions of dollars in investments in information technology and resulted in additional economic growth. Fortunately, or unfortunately, the tide turned. After the crash of the NASDAQ in 2001, the phrase *new economy* acquired a negative connotation and became synonymous with the Internet bubble.

The Social World Does Not Sit Still

So far I have used the phrase *the world* when talking about the phenomena to which a set of distinctions refers. However, we need to differentiate between making distinctions about the physical world and the social world. These worlds are very dissimilar. The biggest difference is that the social world does not exist in the same way as the physical world.

Natural scientists often complain about the lack of scientific rigor in the social sciences. An example is the debate between the members of the Royal Swedish Academy of Sciences about the status of the Nobel Prize for Economics. This debate has continued ever since the prize was established in 1968. A majority of natural scientists has little appreciation for economic science. Economic science is not scientific enough, economic ideas are subject to fashion, there is no clear scientific progress, and a body of knowledge agreed to by everybody hardly exists (Nasar, 1999). However, the kind of scientific progress that exists in natural sciences is impossible in social sciences. Social sciences

study an object that does not sit still when being observed, as the physical world does.¹ The object under investigation is the social world: the array of nonphysical phenomena produced by interacting human beings constantly involved in a process of sense making. Sense-making processes, intuition, and feelings guide the behavior of human beings. This process of sense making is unique within every individual. Therefore, the social world does not behave according to general laws, and the interpretation of its behavior is a problem of *equivocality* (Weick, 1995).

Furthermore, human beings continuously recreate the social world. The social world, as such, does not exist. It is created continuously through sense making, communication, and action. It can take almost any shape, depending on how one chooses to look at it. Van Aken (1996) phrases this as follows: “The social world ontologically is the accumulation of people’s internalized images of that world” (p. 16, translated by D. Andriessen). Humankind is constructing the social world, putting sense-making systems layer upon layer. These layers include the sense-making systems of economics, law, science, and religion. These systems determine the way we think and act.

Consequently, the social world can be described by an almost infinite number of sets of distinctions, as the history of the social sciences has proved. This is not caused by the immaturity of the social sciences but by the characteristics of its object of study. In the social sciences, including management research, researchers need to construct the phenomena under investigation before they can study them. Social scientists first need to create the social world using certain distinctions. The social world does not exist without them.² Which distinctions they decide to

¹ Or seems to do so. Quantum theory argues that the physical world changes as it is being observed.

² This is why the parable of “the blind men and the elephant” (Morgan, 1986) is not a good metaphor. This poem, written by the American poet John Godfrey Saxe (1816–1887), is based on a fable that was told in India many years ago. It tells the story of six blind men of Indostan who encounter an elephant. Each one feels something different, but together they get a reasonable picture of the beast. Morgan (1986) and De Caluwé and Vermaak (1999) use this poem to stress the importance of using multiple perspectives when looking at organizations. However, although an elephant exists in the physical world, with or without human beings being present, organizations do not. Organizations are social constructions, created every time somebody refers to them in a certain way. They are not like elephants, with a fixed shape that merely needs to be defined. Instead, their shape can have any form, depending on how we wish to look at them. This is where the metaphor falls short. The metaphor of the blind men gives the illusion that, if one were to look at organizations from enough different angles, one would see the whole thing. However, the whole thing does not exist.

use depends on personal history, predilection, and context. In response to the critique of the natural scientists, one can argue that practicing social science is more difficult than natural science, because social scientists first need to construct reality before they can study it.

Social scientists who study the social world encounter even more problems. First, almost any direct observation technique used by these scientists will alter the social world.³ For example, the use of a questionnaire triggers a process of sense making with the interviewee and thereby alters the social world. Second, any social system under investigation is in continuous interaction with its environment. The system and its context are interwoven. Therefore, when scientists study causal relationships in the social world, it is difficult for them to separate the context variables from the variables under investigation.

Social Science

This section describes the way social sciences make sense. I explain two ways of practicing science by making a distinction between explanatory sciences and design sciences. Each type of science uses a different approach to testing propositions. The approaches can complement each other in a fruitful way. I then argue that a social scientist needs to choose carefully the correct test when testing propositions and apply a specific set of scientific rules when doing so.

Anything Goes?

If we continuously shape the world as we experience it by selecting our own preferred distinctions in a rather subjective way, does that mean that “anything goes” (Feyerabend, 1993)? Is any set of distinctions as good as any other? Obviously, this is not the case. However, how can we decide which set of distinctions is better? The answer depends on the purpose for which we want to use the distinctions. In science, we can use distinctions for two rather distinct purposes⁴ (based on Van Aken [2000]): First, we can use a set of distinctions to create theories that describe, explain, and predict the world. This is the purpose of the *explanatory sciences*, such as the physical sciences and

³ Except when they use unobtrusive measures of precipitated behavior.

⁴ A set of distinctions can also be used to build systems of propositions that are “empirically void” but internally logical and consistent. This is what is happening in the *formal sciences* like mathematics. This application is not relevant for the purpose of this study (Van Aken, 2000, p. 5).

major sections of the social sciences. Second, we can make use of the same set of distinctions to diagnose a situation, define the problem, and design practical methods to improve the situation. This is the purpose of the *design sciences*, such as the engineering sciences, medical science, and modern psychotherapy.

We can use a particular set of distinctions to various degrees for either one of the two purposes (or for both at the same time). We can use a set of distinctions to create *empirical propositions* that *describe, explain, or predict* the world. In addition, we can apply the same set to create *practical propositions* that *diagnose situations, define problems, or offer practical methods and solutions* to improve the world. The extent to which a set of distinctions is able to produce propositions for descriptions, explanations, and predictions, I call the *empirical claim* of that set. The extent to which a set of distinctions is able to produce propositions to diagnose a situation, define a problem, and design practical methods, I call the *practical claim* of that set.

It is important to notice that a set of distinctions can serve both claims at the same time and to various degrees. Take, for example, the phrase *knowledge economy*. It creates the distinction between knowledge economies and nonknowledge economies. We can use this distinction to make an *empirical proposition*, claiming that today's economy is more knowledge intensive than previous economies (description), because of developments in technology, customer demands, and complexity (explanation) (Tissen et al., 2000). If these factors continue to grow, the knowledge intensity of the economy will continue to increase (prediction).

We can use the same distinction between knowledge economies and nonknowledge economies to create a *practical proposition*, claiming that the main driver of the economy is knowledge and when there is a lack of knowledge in organizations (diagnosis, problem definition), companies need to invest in innovation and knowledge management (solution). It is important to note that the empirical or practical claim of a set of distinctions is not related to whether a claim has been tested in practice. Untested empirical or practical claims are hypotheses. Falsified empirical or practical claims are claims that have turned out to be untrue. With the division between empirical and practical claims, we can show that it is possible to use a set of distinctions to create several kinds of propositions (Figure 2.1).

First, if a set of distinctions allows us to make an empirical claim, then we can use it to describe a situation and create an *empirical theory* that, with the help of causal relationships, provides explanations and predictions. Second, if a set of distinctions allows us to make a practical claim, then we can use it to diagnose a situation and design