

# The Services Dilemma

Productivity Sinkhole or Commoditization?

**Services Transformation and Professionalization:  
The Algorithmic Revolution and Empowered Human  
Value Creation**

Niels Christian Nielsen, Jonathan Murray and John Zysman



**THE SERVICES DILEMMA:**  
**PRODUCTIVITY SINKHOLE OR COMMODITIZATION?**



Niels Christian Nielsen  
Jonathan Murray · John Zysman

# THE SERVICES DILEMMA:

## PRODUCTIVITY SINKHOLE OR COMMODITIZATION?

Services Transformation and  
Professionalization:  
The Algorithmic Revolution and Empowered  
Human Value Creation

The Services Dilemma:  
Productivity Sinkhole or Commoditization?  
*Services Transformation and Professionalization:  
The Algorithmic Revolution and Empowered Human Value Creation*

ISBN 978-87-92359-10-0

© 2013 Jonathan Murray, Niels Christian Nielsen and John Zysman

Sats: Rosendahls – BookPartnerMedia

Tryk: Scandinavian Book

Produktion: Verve Books

Based on work in the SIM project at Teknologisk Institut and on work within the BRIE project on *Services, Cloud, and the Commoditization Trap*. Special contributions from Stu Feldman and Kenji Kushida.



# Table of Contents

<b>Preface</b> .....	7
<b>Chapter 1 Overview:</b>	
<b>The Services Transformation and the Algorithmic Revolution</b> .....	11
a. The Growth of Services: Services in Everything .....	12
b. The Professionalization of Services .....	14
c. ICT and Services: The Algorithmic Revolution .....	15
<b>Chapter 2 Globalization, Commoditization, and the Move to Services</b> .....	19
a. 20th Century Manufacturing, Act 1: From American Dominance to Japanese and European Challenges. ....	19
b. 20th Century Manufacturing, Act 2: The American Comeback and Opening Opportunities to New Entrants .....	20
c. Act 3: Services in Everything: The Threat of Commoditization leads to Services as a Strategic Answer. ....	22
<b>Chapter 3 The services challenge and professionalization.</b> .....	29
a. The Factors of Professionalization: The McKinsey Illustration .....	30
b. ISS – Professionalization: The Employee as Strategic Resource .....	32
c. Unimerco – Between Manufacturing and Services .....	36
<b>Chapter 4 The Algorithmic Revolution: Services beyond the Productivity Sinkhole</b> .....	47
a. Services as Productivity Sinkhole. ....	48
b. ICT turns Services into Production .....	49
c. Automated and Human-based Services .....	51
d. Hybrid Services: The Innovation Crossroads. ....	53
<b>Chapter 5 The Empowered Human Service</b> .....	59
a. The Services Dilemma .....	59
b. Automation as Stand-alone Strategy? .....	60
c. What does the Empowered Human Mean? .....	63
d. ‘Tacit Interactions’ and the Growth of Relationship Jobs. ....	65
e. The Transforming Relationships .....	67
f. Sharing Economy Companies .....	68
g. Navigating the Innovation Field .....	70

**Annex 1 Preliminary Thoughts and Observations:**

**What does this mean for Denmark? . . . . . 73**  
by Niels Christian Nielsen and John Zysman

1. The Composite Picture of National Productivity . . . . . 73

2. The Productivity of Home Market-focused Service Companies  
must be Improved . . . . . 80

    a. Some Lights in the Dark:. . . . . 80

*i. Operational services . . . . . 80*

*ii. Retail . . . . . 81*

*iii. Building and construction . . . . . 81*

*iv. Consulting, legal, accounting, etc. . . . . 81*

    b. Private Sector Procurement as Driver of Service Development . . . . 82

    c. Public Sector Procurement as Driver . . . . . 84

3. Public Sector Service Productivity . . . . . 85

4. So what is the Bottom Line for Denmark? . . . . . 90

**Annex 2 Cloud Computing:**

**Policy Challenges for a Globally Integrated Innovation,  
Production and Market Platform. . . . . 93**  
by Jonathan Murray and John Zysman

**Selected list of books and articles for further reading. . . . . 97**



# Preface

This white book on the transformation of services and on services innovation has been written as part of Niels Christian Nielsen's and John Zysman's function as international advisers to the Service Innovation Management (SIM) project, undertaken by the Danish Technological Institute (DTI) in collaboration with the Alexandra Institute. In part, it presents an overview of the framework of understanding of global economic dynamics and corporate strategic options, which informed the definition of the SIM project. In part, it reflects how some of the findings of the SIM project have expanded and revised that framework.

The SIM project has been funded by the Danish Ministry of Research, Innovation, and Education. It has been active from May 2011 through December 2012. More than a hundred Danish companies have taken part in service innovation activities within the project. International companies, as well as experts and researchers, Danish and international, have contributed.

We recommend that this white book, which is in English for international audiences, be used in Denmark in conjunction with the different case studies from the Danish companies' project activities that will be made available by DTI.

Some additional remarks should be made about this book:

It is not an academic book and it does not pretend to represent profound new insights. To the extent the authors and our circle of collaborators have contributed those, they are presented elsewhere as such. What we are trying to give in this book is an overview of the overall dynamics and the strategic options they present. We hope thereby to give business executives, policy decision makers, and the people who advice both groups, an easy and quick introduction. View and use the book as a written key note speech (albeit as such, a rather long one).

That is also why there are no footnotes and the list of literature is only an indicative guideline for further reading, not a list of references.

We do, however, need to say something about authorship:

The book has been directly written by Niels Christian Nielsen, Board Director of a number of U.S. and European companies, with Professor John Zysman and Jonathan Murray. John Zysman is Professor at the University of California, Berkeley. Jonathan Murray is CTO and EVP, Business Transformation at Warner Music; previously he had sixteen years in executive positions at Microsoft. Nielsen and Zysman have been international advisers to the SIM project throughout its duration, and they contributed some of the framework that led to the inception of the project. They have worked together and discussed issues of innovation, global industrial dynamics, technology and services for decades.

The specific framework and the strategic logic presented in the book are, however, not ours alone. It has been developed by a great number of people (if it had not been, it probably would not represent anything real). But more importantly, our understanding of the framework and the logic has been developed during intense discussions, work-processes, and joint writing at the Berkeley Roundtable on the International Economy, BRIE, on Services, Cloud, and the Commoditization Trap. Those discussions and writings included *Stuart Feldman*, VP, Engineering at Google, previously VP, Computer Science at IBM, and *Dr. Kenji Kushida*, Stanford University, previously University of California, Berkeley

Chapter 1 and the first half of chapter 2 have directly derived from work at BRIE. The distinction between human based, automated, and hybrid services has as well, though the specific form it takes in this book has evolved from the joint discussions. Jonathan Murray was the one who first pointed out the importance and the coincidence in time of the two articles from the 1960s by Baumol and Moore, respectively.

The comments on interlinking global crises in chapter 2 were very much crystallized during discussions at Huset Mandag Morgen in which the authors were involved.

The case story about ISS in chapter 3 is taken in part from official ISS publications, and came in part from contributions during SIM workshops and interviews by ISS's Søren Kongbak, Head of Group Services Excellence, Pernille Lützen, also Services Excellence, and David Brennan, Head of Group Human Resources.

The comments in chapter 5 about the sharing economy and new services business models are based on the contributions to the project by Lisa Gansky, serial entrepreneur and author of the MESH.

The case story about Unimerco is primarily based on direct insights by Niels Christian Nielsen during his more than 10 years tenure as a Board Director of the company.

Annex 1 was written by Niels Christian Nielsen and John Zysman. Annex 2 by Jonathan Murray and John Zysman.

Finally, we need to highlight contributions from the whole team involved in SIM, directly and indirectly. From DTI: Jane Wickman, Louise Hvid Jensen, Henriette Hall-Andersen, Knud Erik Hilding-Hamann, Hanne Shapiro, Erik Hallgreen, Hans Henrik Bruhn, Nicolai Søndergaard Laugesen, Charlotte Færch Lotz, Helle Greve Barslev, Pernille Løvengreen. From DEA, Mette Abrahamsen, and from the Alexandra Institute, Jeppe Spure Nielsen and Trine Plambech. Last, but certainly not least, Mads H. Odsgaard, who has managed the project at DTI. Collaboration with Mogens Bjerre and Stine Staffelt from CBS/SIMI has contributed, just as we have had help and input from ICDK (the Danish Innovation Centre in Silicon Valley).

Berkeley and Copenhagen, December 18, 2012

Niels Christian Nielsen  
Jonathan Murray  
John Zysman



## CHAPTER 1

# Overview: The Services Transformation and the Algorithmic Revolution

A fundamental, multi-tiered transformation of services is underway. It is so pervasive and of such scope that it entails a transformation of global competitive economics. First of all, it is part of a dynamic in the global economy, which not only adds to the relative growth of services, but leads to most businesses integrating a services component into their business model. Secondly, the very nature of services is being transformed, driven by developments in Information and Communications Technology (ICT) tools, the uses to which they are being put, and the networks on which they run. Finally, there is an emerging strategic challenge for services companies that are using ICT to address the classical productivity challenge in services, concerning the need to avoid commoditization.

The consequences of this fundamental transformation of services impact the nature and the distribution of jobs globally; they change the strategic requirements for success in all kinds of businesses and they pose significant new challenges for economic policy.

In this white book, we will map the entirety of the services transformation and its implication for services innovation. We will be discussing the strategic business choices that are being posed—in some core sections and case studies with a particular focus on smaller services companies—as well as some key public policy challenges.

In this opening chapter, we will start by giving a brief overview of the growth and professionalization of services and the driving dynamics. Partly we seek to set the context, and partly it is important for the following discussions to be clear about why services become an integrated part of the business model in virtually all sectors, way beyond traditional services. Against that background, the chapter will discuss the issue of services productivity and provide insight into how the ICT driven transformation of services changes that.

## a. The Growth of Services: Services in Everything

Let us start by taking an overview of the historical growth of services. As long as there have been organized societies there have been some services. Historically, services developed around some basic functions: personal (hair cutting, inns, security, servants, prostitutes); maintenance (crafts, cleaning); professional (legal, accounting, clerical, medical, teaching, religious); trade (merchants, retail, transportation); entertainment (musicians, poets, artists), and financial (banking). Compared to agriculture, extraction, and manufacturing the services were of secondary economic importance and impact, and the growth of a services sector was closely linked to the growth of towns and the urban population. The category of services was largely defined as a residual—everything that is not agriculture, resource extraction, and manufacturing.

The growth of services in the 20th century was quantitatively driven by five trends:

- Productivity of the primary sectors and material needs saturation: With the enormous growth of productivity in agriculture, extraction industries, and manufacturing, a much smaller proportion of the population could cover all basic material needs, and a higher proportion of the next level of demand would be for diverse services rather than additional material consumption.
- Reorganization (the bookkeeping error): When GM decides to have the windows in their plants cleaned by a contractor instead of an employee, then that job changes from a manufacturing job to a services job.
- Growth of the state and the public sector: One part of the demand for services was expressed in the steady growth of the state administration and public sector services in all developed countries throughout the 20th century—legislative, regulatory, infrastructure, and direct government services delivery: schools, hospitals, prisons, welfare institutions, etc.
- Increased female participation in the work force: As more women joined the work force during and after WWII and particularly from the 1960s forward, a vast amount of non-GDP female work in the homes was transformed into formal care services jobs outside the homes: child care, nursing, elder care, etc.
- Strategic outsourcing: As companies focus more on their core business and hence strategically outsource all functions that do not qualify as part of that core, a significant part of this outsourcing ends up being services functions, resulting in additional growth of services. Formally this looks like the reorganization driver, but it functions differently because it is not just moving a function off payroll; it is buying a qualitatively differentiated version of the function.

These five original drivers of services growth summarize the development up to the beginning of what we in this book discuss as the services transformation, which then becomes the sixth driver. In a globalized economy with hyper-competition and accelerated technology development, the fundamental changes of decomposition and recomposition of production—these are all described and analyzed in chapter 2—lead to a growing pressure of commoditization in all sectors and for all companies. The window of time within which a company can command premium prizes based on technology or business model leadership is narrowing, forcing all companies to seek new ways to avoid commoditization.

The dominant way of achieving this is best known from IBM's spectacular turnaround in the early 1990s when Lou Gerstner taught his elephant to dance. At this time, IBM had been the dominant IT supplier for decades, but shifts in technology and new aggressive competition was commoditizing its traditional products and undermining the profitability and capital position of the company at a life-threatening rate. Gerstner's response was to capitalize on the close strategic customer relationships that IBM had developed throughout its history, and to enhance these relations by converting from primarily a hardware and software provider into a services company that developed solutions to business problems with and for clients. These enhanced relationships proved more durable and were remarkably resilient in the face of the pressures of commoditization.

IBM's turnaround and conversion into a services company was an early, very visible, successful and publicized example of what became a dominant trend. Since the early 1990s, substantial numbers of companies in all sectors have turned into services companies or, at the very least, added a significant services component to their business models. The pressure of commoditization has enticed company after company to seek the relief inherent in the unique and resilient relations that can be developed as part of services delivery.

This migration of companies in all sectors towards including a services component in their business model is a major, sixth driver of the growth of services. All the sudden companies like IBM, HP, Dell, Cisco, GM, GE, Schlumberger, Waste Management, PG&E, Apple, and Caterpillar are all services companies. This makes services significantly more pervasive in the economy. It increases the political focus on services. And, not least of all, it leads to a market scrutiny of services businesses in terms of the financial and productivity performance measures long applied to manufacturing companies.

## b. The Professionalization of Services

There are two key components in how companies have dealt with the effects of this first part of the transformation. One is pursuing productivity through the application of ICT to the services delivery. The other one is the pursuit of a new level of professionalization of services, learning from the very best of established services companies—McKinsey, ISS, or Schlumberger. To avoid misunderstandings of terminology, we should clarify that we use the term ‘professionalization’ as it is used in sports when we talk about a professional as opposed an amateur, rather than how it is used in talk about the professions. For a complete picture we will discuss the main points of this move towards professionalization briefly here, and more in depth in chapter 3. What is involved in the move towards professionalization is a pursuit of focus and development. We consider six deeply interconnected and overlapping aspects of the services model:

- **Specialization:** All services companies are based on an area of specialization, which is hard or costly for the customer to do as well in-house. Growth and strength of the business depends on being focused on this specialization and developing competences and additional value propositions on that basis. Specialization in this sense powerfully facilitates and helps define the other factors of the professionalization model.
- **Independence:** For the customer it is often of value that the service provider is independent and external. For some services—auditing, recruiting—it is a defining characteristic of the service. In other cases, the value derives from saved opportunity cost or a broader access to markets or knowledge. This, of course, is a shift from administrative functions internal to the company to external relationships.
- **Strategic human resources:** Employees in internal service functions are often marginalized within the company. For the external service provider, the same people are core employees, who are recruited, trained, career developed, and incentivized to optimize the particular service. This becomes one of the key competitive advantages and development dimensions of a services company.
- **Efficiency:** A company that is specialized on delivering a service has the opportunity of optimizing all the involved processes and tools systematically. This is true about back office functions, logistics, and throughout the value chain all the way to actual service delivery methods.
- **Knowledge optimization and reuse:** Solving any given problem can be a one-off challenge for a company, whereas a service company specialized on that type of problem will have a wealth of experience and proven, documented solutions, enabling quality and confidence.
- **Relations and brand:** Services have a unique personal delivery aspect that can be the basis for longer-term relations and partnership with the client.



These relations become the core of the service company's brand, the implicit promise and the resulting resilience in the face of commoditization.

Professionalization of services in this sense was and is rare in many basic service businesses—from hairdressers, health care, and hospitality to consultants, insurance, and retail. Though the doctor and the accountant are professional in the sense of their profession, their businesses are not professionalized in terms of their business model and performance as signified by our use of the term professionalization. That kind of professionalization was spearheaded by a number of early leaders in different services sectors, from ISS and the Four Seasons to McKinsey and Schlumberger. Unlike these elite and pioneering companies, many of the original service companies tended to be privately owned and home market oriented and therefore under little external pressure to professionalize. What characterizes the first level of the services transformation—the move by companies in all sectors to avoid commoditization by integrating a services component into their business model—is that these companies are much more urgent in their pursuit of services professionalization. Many of them are already international corporations, publicly listed and under close performance scrutiny by the markets quarter by quarter. Since their services business is being measured by these established performance standards and subjected to the same scrutiny, they can typically not afford not to professionalize.

However, this only solves half their problem. Having migrated into services, they are still stuck with the classical weakness in any conventional services business: the fact that services are a sinkhole of productivity. This is where the second level of the services transformation—the algorithmic revolution—becomes the answer. Let us briefly consider what this means (before analyzing in depth in later chapters).

### c. ICT and Services: The Algorithmic Revolution

Many service processes can be reduced and described in algorithms. This means that ICT can be applied to automate the process. Once that happens, the very nature of services and their productivity is under transformation.

Early examples are many and by now so pervasive that it can be hard to remember the world before they happened. The ATM has replaced the bank teller for anyone in need of cash withdrawals from their bank. Now the replacement of cash by electronic payments (using cards, mobile phones, and electronic transfers from online banking) is beginning to make the ATM obsolete. Retail sale of recorded music was another early automation victim. Now it seems that video rentals, bookstores, and travel agencies are other service areas where human delivery is disappearing.

The actual digital transformation process has taken many forms. In some cases, an existing human service function has been automated, as illustrated by the example of the ATM. In other cases a new product has been made more valuable by becoming a portal for an automated service (a special case of adding a services component to your business model) as when Apple made the iPod into a portal to the online music service iTunes. In some very powerful cases new services have been created as algorithms as exemplified by Google's search engine that made a fully automated service of information search possible and attracted hundreds of millions of users who would "google" within a newly available universe of online information.

Some services have been created through ICT and are essentially fully automated. Other services are so personal and human in nature that they are very hard to reduce to algorithms and therefore remain relatively unaffected by the algorithmic revolution (hairdressers and psychotherapists come to mind). Most services, however, are deeply influenced and changed by ICT and elements of services transformation. Some service elements of banking have remained unchanged and fully based on human bankers, but the banking industry is vastly impacted by ICT and automation, from ATMs to advanced derivative financial products that could not even be conceived without sophisticated ICT tools.

The algorithmic revolution has resulted in two transformative developments in services:

- The classical services business model is transformed from a paradigm where a service was produced, delivered, and consumed in the same process, time, and place (only through simultaneous presence in the same place of both the hairdresser and the customer can the haircut be produced, delivered, and consumed) to a radically different paradigm where production of the service might be the joint work of hundreds of people in different places (think of several Google development teams working in different locations); delivery can be entirely disconnected from this production without involving any of the same people (sometimes involving no people at all); and consumption of the service can be done by thousands of people in multiple locations and at very different times. This transformation of paradigms obviously changes the very nature of services; what success in services requires and what innovation of services looks like. It also changes the economic and political importance of services.
- As a consequence, the productivity of services is transformed. The classical (Baumol) understanding of services is that they are the productivity sink-hole of the economy. Due to the one-on-one person to person nature of the services business model, there is basically no possible productivity growth. However, with the change of the business model, the productivity of ser-

vices is no longer locked, but can, in principle, be developed with the full power of Moore's law as it applies in ICT.

In other words, the services transformation consists of two interlocked dynamics. Commoditization forces more and more companies to include a services component in their business model, making services all pervasive, but also making the productivity problems of services into a general problem in our economies. ICT applied to services seems to offer a solution to this problem of productivity, while fundamentally changing the services business model.

The book will delve in some detail into both of these interlocked dynamics. Ultimately, it will conclude in a dilemma. While ICT applied to services seems to resolve the problem of services productivity, the very solution makes the original commoditization problem reappear. Whatever can be reduced to an algorithm and thereby automated, can also be copied and therefore will be commoditized.

The conclusion of the book is that this services dilemma is the key strategic challenge for services innovation.



## CHAPTER 2

# Globalization, Commoditization, and the Move to Services

In our view, globalization proceeded as a distinct set of national developments played out on a global stage. Many of these national developments were incubated within each economy before springing onto the global stage. This global stage was, of course, not a vacuum, but was shaped by broader forces of international political economy, such as the international trade regime. The shifting logics of production and services that unfolded during the 20th century and that shapes the competitive world we face today, grew out of this global stage.

### a. 20th Century Manufacturing, Act 1: From American Dominance to Japanese and European Challenges

Mass production and mass markets, epitomized by Henry Ford and the Model T automobile, grew out of the U.S. context in the early 20th century. The production system had roots in the late 19th century, but truly came of age with the mass-produced automobile. Managers designed systems from the top down, and assembly line workers operated in rigidly defined roles that matched the function of the machines to which they were assigned. This heralded an era of American dominance in manufacturing from the two World Wars, up through the 1960s.

Two main challenges arose to the U.S. production system in the 1970s and 1980s from Japan and Europe. From Japan's automobile industry, a new production system developed. This system, commonly known as "lean production" or simply the "Toyota system" of manufacturing enabled Toyota and others to offer greater variation in products and output levels, at far lower costs than traditional mass production. Moreover, by giving factory workers the ability to provide input on the assembly line, firms could achieve incremental production improvements on the run to achieve high quality. Worker feedback helped improve production processes and designs, while dense information exchanges with suppliers enabled low inventories and tight coordination. This production system was incubated within Japan during an international economic structure that allowed Japan to close its domestic markets to im-

ports, but access export markets—particularly the U.S. The Japanese government allowed fierce competition in the domestic market rather than choosing winner firms, and implemented a credible threat of incrementally removing import protection to prod domestic firms to improve their competitiveness. The outcome is best captured by the image of small, low-cost, high-quality Japanese cars pouring into the U.S. just as Americans were reeling from the first oil shock, with the Big Three U.S. automakers unable to quickly shift production to high quality smaller cars.

The European challenge came in the form of a variation of craft production, often labeled “flexible specialization” or “diversified quality production.” Using skilled workers and flexible machinery, particular areas in Germany and Italy were able to produce high-quality products more as short runs of semi-custom products rather than large volumes of standardized goods. They utilized horizontal connections among local networks to provide high-end products.

## **b. 20th Century Manufacturing, Act 2: The American Comeback and Opening Opportunities to New Entrants**

An American comeback ensued in the 1990s as U.S. producers reacted to the production challenges from Japan and Europe. Several developments converged to create a new production system that heralded an age of U.S. dominance in key areas of value creation.

First, the modularization of design and assembly of products shifted value from the final assembled product to its constituent elements. The paradigmatic example is the Personal Computer (PC), which evolved from competition among closed-box products to an open, modular product in which a series of competitive markets developed for each piece of the machine—core processors, hard disks, memory, and the operating system, for example. Each piece interfaced with each other through open, often de facto standards. Each constituent element became a marketplace, and the most prominent areas of value shifted to processors and the operating system. Intel and Microsoft with its Windows operating system emerged as the dominant firms in these areas, shaping the broader trajectories of PC development. We have labeled these competitive dynamics, which go beyond the firms themselves, as a production paradigm—“Wintelism.”

Second, production chains began to decompose across national boundaries, creating cross-national production networks. In a variety of industries, value chains broke apart into discrete pieces, many of which could be contracted out to independent producers. U.S. firms increasingly specialized in design, con-

tracting out the manufacturing to firms in Asia offering low per-unit production costs. Companies such as Cisco and Apple have minimal in-house manufacturing facilities, contracting with firms such as Flextronics and Foxconn to manufacture their products. Nike famously outsources virtually all of its production, mostly to Asia.

American firms spearheaded these new logics of value-creation as they sought solutions against the Japanese and European production capabilities. The domestic U.S. environment was one of progressing deregulation, combined with U.S.-led international agreements that created a more open international trade system.

Cross-national production networks, in turn, helped the meteoric rise of mostly Asian countries that took advantage of being able to enter Western (and Japanese) production networks. Several were able to rapidly climb the value ladder, beginning with manufacturing and shifting to higher-end products and services, such as South Korea (low-end to high-end products), Hong Kong (manufacturing to finance, a gateway to mainland China), Taiwan (light industry to computers and fabless semiconductor foundries), and Singapore (manufacturing to services and finance). The entry of China, as well as places like Vietnam, took full advantage of the decomposing production processes, moving people out of the countryside to work in factories plugged into global production processes. Some of these specialized industries dominate whole cities, and some factory areas have more than a million workers.

The creation of cross-national production networks was essentially the opening up of production networks to a diverse range of new firms. Even at the level of countries, places such as Ireland, Taiwan, and Israel found opportunities to insert themselves in particular niches along decomposed value chains. As firms gained experience and capital from their role in larger production networks, some began competing in the same markets on their own, rather than as OEM firms (original equipment manufacturer), who supplied equipment under another's brand name. Familiar examples are PC and component suppliers such as the Taiwanese firms Acer and Asus beginning to offer their own branded netbooks, laptops, and PCs. These firms in turn often moved beyond manufacturing. They turned into original design manufacturer (ODM) firms themselves, designing products to be handed off to manufacturers. As a result, Taiwan, for example, does little low-level manufacturing. That has been outsourced to mainland China, while Taiwan keeps the major portions of high and low-level design. In short, the opening of production networks to new firms ended up accelerating the commoditization of products and designs for everybody.

### c. Act 3: Services in Everything: The Threat of Commoditization leads to Services as a Strategic Answer

The growth of services in the 20th century—as we outlined the stages in chapter 1—was to some degrees parallel to these developments in manufacturing. Lean production and flexible specialization were accompanied with the kind of aggressive strategic outsourcing that, for example in the auto industry took the proportion of value-added done in-house at the main car manufacturers from 80 percent during Ford's prime down to 40, and in some cases even 20 percent. Many of the outsourced functions ended up as services organized within services companies.

The emergence of Wintelism turns the resulting decomposition of production into the value creating dominance of the strategic recomposers, who in many cases remained the designers and integrators of the end-product (the car), but who in other cases—as reflected in the name Wintelism—would be the developers and producers of key components as the microprocessor (Intel) and the operating system (Microsoft). There were many vantage points from which a competitor could make a bid to become the key recomposer, taking advantage of global decomposition and hence the availability of all components as commodities in the world market. This meant that new competitors could emerge from new sectors as well as from new geographies, and that the pressure on all companies from the threat of commoditization was growing constantly and dramatically.

Before we delve into how this resulted in an additional push towards services, let us look a bit more on some additional technological, economic, and global drivers:

#### Growth of Services: The Global Environment has Changed

- Hyper-competition: Supply exceeds demand
- Exponential rate of change in each of several interacting technologies: IT, Telecom, Materials, Transportation
- Global decomposition of production
- Commoditization
- The winners are the strategic recomposers
- All of these changes are being radicalized by the interconnected global crises (financial, climate, health, resources, poverty, education, security): Increased reallocation of work and wealth and need for innovation

The industry dynamics of decomposition and recomposition are partly driven, partly supplemented by three significant additional dynamics.

- The first one is a result of globalization and can be seen as global hyper-competition or as the persistent phenomenon of global over-supply. New national economies and new corporate entrants to the global mar-

kets offer new capacity to supply at a rate that is higher than the retirement of existing supply. The emergence of Hyundai and Kia or the new Chinese car manufacturers are not resulting in Renault or Chrysler disappearing

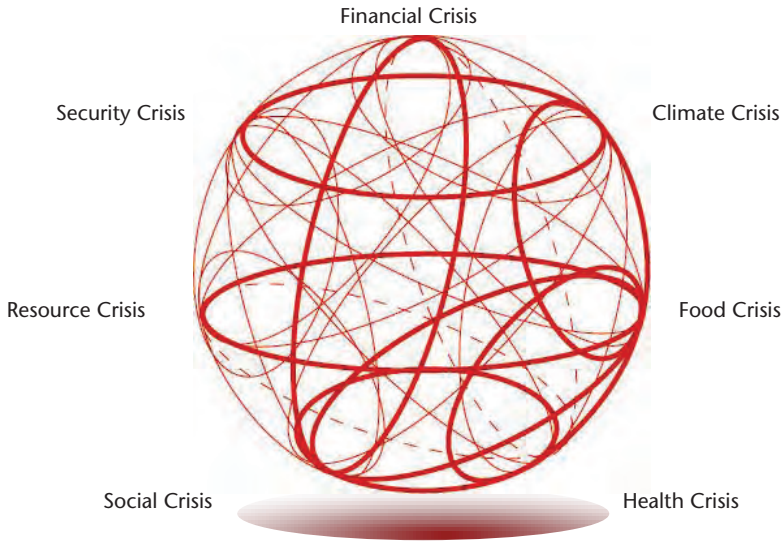


from the market, at least not at the same rate. The global capacity to supply is net growing more than effective global demand, which of course means that competitive pressures on all suppliers are growing.

- The second one is the accelerated rate of technology developments, not only in terms of ICT and its continued revolution as expressions of Moore's Law. Similar accelerated development and revolutionary changes are seen in materials technology, production technology (though highly dependent on developments in ICT), but also in biotech and energy technologies and even transportation. The combined effect of these many technology developments, and the fact that they interact and combine in unforeseen ways that lead to displacements, provides an environment of high unpredictability and accelerated change for companies, where keeping pace is hard; advantages are hard to defend and short-lived, and where tomorrow's hardest competitor is often unknown today.
- The third one is the impact on business and on market predictability by several severe, simultaneous, escalating, and interconnected global crises. Since 2008, the global financial crisis has captured much of the public and political attention. The financial crisis has in turn made the social crisis of unemployment, and especially global youth unemployment, much more severe, while a sustainable solution to the financial crisis is hard to imagine without a solution to employment. In part, the employment crisis is caused by a global crisis in education, while on the other hand youth unemployment is a significant contributor to our global security crisis and political instability. The climate crisis appears close to getting out of hand and already extreme weather around the globe is contributing to the financial crisis; to an impending, and in many places very real, food crisis, and to the catastrophic depletion of global fresh water resources, which in turn exacerbate the food crisis, as well as to a high degree the security and social crises, and obviously also some of the global health problems. Health is becoming a major part of global financial imbalances, and health and education are main components in the global social crisis. The resource crisis with growing scarcity and market volatility of many key raw materials leads to market and financial unpredictability and again to growing security risks. Each of these interconnected crises represents growing risk factors for every single company and every government while at the same time being mostly outside the control and even significant influence of individual companies and governments. Each of the crises represent a real risk of local, regional, and global events of disruptive or even catastrophic impact, and the interconnected complexity of all of them defines an extreme risk scenario for all longer term business decisions.

*This figure was a result of joint work at Monday Morning in 2008.*

### The Global Crises: Escalating, Complex, and Interconnected



The overall impact on business and business strategy is transformative. We are not only dealing with the industrial dynamic of decomposition and recomposition and the resulting commoditization trap. This dynamic is reinforced by globalization and the global overcapacity to supply with the resulting hyper-competition, and by the accelerated and often unpredictable development of technologies with not only the growing cost of keeping pace, but also the ever present risk of bypass, replacement, and sudden irrelevance. Finally, the interconnected global crises mean that businesses—as well as governments—are forced to deal with these challenges against a background of unpredictable, but overall growing, disruption risk. With this as an additional background—and the resulting increased sense of urgency—let us return to the challenge of commoditization.

As we saw in chapter 1 from the example of IBM, part of the answer to this challenge is a move towards services by all companies. The logic is simple and compelling. In a world where any product and any process can and will be copied or overtaken; where new entrants can find a point of competitive advantage by choosing a new position in the global value network and from there—at relatively low entry costs—find new ways to recompose the needed elements for a new value proposition that challenges the incumbent; where any technology advantage is short lived; where customer preference therefore

ends up depending on price, services seem to be the only safe haven. Services in the conventional case are based on a personal relationship. They are produced, delivered, and consumed in the same process, time, and place. The service provider and the client are both present at that moment. The service is perceived as a unique solution to the client's problem. Services often end up in long-term relationships: my banker, my hairdresser, my doctor all denote relations that might change, but where the assumption is long term mutual loyalty. IBM's strategic shift was intended to mimic this kind of loyalty in the move from my computer supplier (as long as they are competitive) to my solutions partner. The shift took IBM from delivery of hardware and software products—imminently threatened by commoditization—to a high value-added and relationship-intensive service and solutions partner.

At about the same time as IBM and ever since, many other companies made this strategic move. Clothing manufacturers and producers of luxury goods added an experience dimension and branded personal services to their products by establishing proprietary chains of high end retail stores: The Body Shop, Bang & Olufsen, GAP, Benetton, Armani, and Ecco are just some examples. Rolls Royce has moved from airplane engine manu-

facturer to a provider of air miles services. Kone went from being a producer of heavy harbor cranes to the provider of port management services. Xerox stopped selling photo copiers and became a document handling service provider.

There are a number of different ways of adding the service components. Some examples are:

- *“Wrapping” the product in branded experience and personal attention:* The many cases of products sold through dedicated retail outlets are good examples, from the Body Shop and Sephora to Apple and Lego stores.
- *Extending the product with service functionality:* GM's Onstar service is a prime example. GM vehicles are equipped with localization and communication technology that ensures the driver that ambulance, road assistance, or security services are on their way whenever an accident happens, just as the service gives easy access to information about nearest gas station, restaurants, or hotels. During some of the difficult years for the U.S. car industry, Onstar subscriptions added more to GM's bottom line than the actual car sales.

#### Growth of Services:

#### Commoditization becomes a Sixth Driver of Growth

- Global over-supply, technology development, and the decomposition of production expose all companies to relentless commoditization pressures.
- The window of competitive advantage is narrowing. Any codified asset can and will be copied.
- Part of the answer, in all cases, is to include a services component in the business model.
- This becomes the sixth and very powerful driver of services growth.
- And makes the quest for services innovation and productivity pervasive.

- *Offering a solutions service for which the product is a component:* IBM remains the classical example, but HP, Dell, Xerox, and many other companies have followed the same model, not all of them with equal success (adding a service component to your offering does not take away the need for good strategic positioning and good operational execution).
- *Integrating multiple products and services in one overall service:* Providing cleaning services to a building owner or selling alarm systems are examples of transactional and easily commoditized services and products. Delivering high-end integrated facility management services on a global scale to a global company constitutes a long-term partnership where both cleaning services and alarm systems are elements, but where competitors are few and the cost of changing provider is high.
- *A service as value adding integration platform for multiple providers:* An example is the local plumber who established a service for owners of summer houses that he would turn off water supply and in other ways prepare the summer houses for winter. By organizing other local suppliers—electricians, alarm and security companies, gardeners, carpenters, painters, masons, cleaners, retail stores—he was able to offer the owners the service of total maintenance and monitoring, including cleaning, stocking (with food and groceries), reception, etc., for renters.

Obviously, there are many more examples, just as there are cases of overlap between the examples given. The point is that in all cases, a service component added to or superseding an existing business model helps to avoid the commoditization trap.

#### Growth of Services

The sum total of the six drivers of services is that the quest for services productivity and services innovation is no longer a sector challenge. When GM, IBM, Walmart, AT&T, Goldman Sachs, Waste Management, McKinsey, Apple, Google, Caterpillar, Sutter Health, PG&E are all in the services business, not to mention the U.S. Government, services productivity and growth is a challenge for the overall economy.

There are still specific services characteristics that differentiate this challenge.

But first, services innovation can be understood as innovation in general, the differentiation notwithstanding.

While Wintelism, decomposition, and recomposition is the main story of industrial dynamics, the resulting need to avoid the commoditization trap makes this move towards adding services components to business models the sixth big driver of the growth of services. While the first five drivers of services growth each added new categories of services and service companies, this sixth driver makes, in

principle, all companies into at least partial services companies. This also means that the quest for professionalization, productivity, and innovation in services becomes part of the general quest for productivity in the economy and in any company.

In the next chapter, we will discuss how the migration of traditional product companies into services leads to a stronger and broader move towards the kind of professionalization of services which up to this point was found only in elite service companies such as McKinsey, ISS, and Four Seasons.

In chapter 4 we will see how service professionalization in itself is not sufficient to solve the problem of services as a productivity sink hole. The solution to this is found in the algorithmic revolution.



## CHAPTER 3

# The services challenge and professionalization

We have seen why and how an increasing number of companies respond to the commoditization challenge by adding a services component to their business model. IBM was a forerunner, but since IBM companies like Apple, HP, Caterpillar, Schlumberger, GE, GM, and many more have moved in the same direction. Danish examples would include NOVO, Coloplast, Vestas, Grundfos, Bestseller and many more.

One of the consequences when companies like these venture into services is that they are forced to pursue services with a higher level of professionalism than most pure play services companies. While many traditional services companies are privately held and have hibernated in the relative peace of fairly closed local markets, many of the new services companies are exposed to global competition from day one. And shareholders and markets that are used to seeing the rigors and the predictability of manufacturing performance cannot accept what is perceived as the sloppiness of performance in many conventional services firms, including what has been the norm across the board in many retail stores, financial services institutions, consulting companies, and operational services companies. As the need to escape the commoditization trap pushes many companies towards services, in effect this becomes a push of services towards a higher level of professionalization.

The model for this professionalization was found in the elite of the traditional services companies such as consultants McKinsey, off-shore services Schlumberger, hospitality's Four Seasons or in cleaning and facility management giant ISS. We highlighted these principles of professionalization briefly in our chapter 1 overview. In this chapter, we will take it more in depth. First, we will reiterate the six basic principles of professionalization, and illustrate them very briefly using McKinsey as example. Next, we will summarize how work along those six professionalization factors have allowed ISS to evolve into a global services giant with more than half a million employees. And finally we will take it closer to the intersection between a traditional product and manufacturing business model and a services model, using the much smaller Danish tooling company Unimerco as our example.

## a. The Factors of Professionalization: The McKinsey Illustration

Initially, we would like to add a bit of context to what is meant by the professionalization of the services business model by using McKinsey as an example. We will do this at a level of high generality and in no way claim to give a representation of the McKinsey strategy over time. The illustration only serves to show how a competitive and professionally disciplined services company can be perceived within the framework of the six factors.

- **Specialization:** All services companies are based on an area of specialization, which is hard or costly for the customer to do in-house. Growth and strength of the business depends on being focused on this specialization and developing competences and additional value propositions on that basis.
- *McKinsey offers independent strategy services based on strong analytics; insights from both sector-focused and functionally specialized practices; strategy frameworks and tools that have been developed based on large numbers of client engagements, and the work of highly talented and trained consulting teams with strong senior leadership. They thereby differentiate themselves from internal capabilities in the client organization as well as from most competitors.*
- **Independence:** For the customer, it is often of value that the service provider is independent and external. For some services—auditing, recruiting—it is a defining characteristic of the service. In other cases the value derives from saved opportunity cost or a broader access to markets or knowledge.
- *McKinsey will not be party to internal biases or interests and can—based on their independence—provide insights that have benefitted from work with other companies in the same industry as the client and companies from different industries with similar challenges. The independence is often a key reason for the client board and/or CEO to select their services.*
- **Strategic human resources:** Employees in internal service functions are often marginalized within their company. For the external service provider the same people are core employees, who are recruited, trained, career developed, and incentivized to optimize the particular service. This becomes one of the key competitive advantages and development dimensions of a services company.
- *McKinsey has early on perfected a model of attracting the very best talent directly from the leading universities; honing their talent through intense training and an apprentice based stretch career within the consulting pyramid with regular up-or-out decisions. Talent is attracted by the proposition of accelerated learning; of attractive salaries even at junior levels; of significant wealth creation for those who make it up in the pyramid, and carefully groomed outplacements (in attractive career positions with present or future client companies) for alumni who leave the firm.*



- Efficiency: A company that is specialized in delivering a service has the opportunity to optimize all the involved processes and tools systematically. This is true about back office functions, logistics and throughout the value chain all the way to actual delivery methods.
- *McKinsey has optimized its global organization and its finance systems to enable a seamless client offering of un-fettered and multi-faceted expertise and skills based on the one-firm concept (no sub-optimizing country offices and local P/L focused business units). The key systems to ensure client relations, talent development, and knowledge sharing are all finely honed.*
- Knowledge optimization and reuse: Solving any given problem can be a one-off challenge for a company, whereas a service company specialized on that type of problem will have a wealth of experience and proven and documented solutions, enabling quality and confidence
- *McKinsey often works with all major companies within a given industry (financial services, health care, pharmaceuticals, airlines, auto, retail, container shipping, etc.) and across these companies with all their key functions (strategy, finance, marketing, logistics, supply chain, R&D, etc.) and based on this can offer the client the systematically harvested knowledge across all of these engagements. Knowledge is both codified into proprietary tools, solution frameworks, and reusable datasets and into brand and reputation enhancing public thought-pieces.*
- Relations and brand: Services have a unique personal delivery aspect that can be the basis for longer-term relations and partnership with the client. These relations become the core of the service company's brand, the implicit promise and the resulting resilience in the face of commoditization.
- *McKinsey has built its business model on a system of senior relations that are carefully groomed during but also between client engagements. The alumni system is part of this relationship "machine." At the same time the organization and the pervasiveness of its client engagements are used to project a brand of McKinsey as elite, independent and qualified (and therefore the safe solution for a board or a CEO). Published thought-pieces, the McKinsey Quarterly, the Institute, and large public interest pro bono engagements help position the firm as beyond mercenary consulting.*

In many ways the systematic focus on all six professionalization factors was first embodied in McKinsey as the firm was creating strategy consulting as a highly profitable part of the services industry. At the same time, the tight integration and consistency of McKinsey's business model remains one of the best illustrations of how a services company can professionalize. Our next case will demonstrate how the components of a model that was first developed in a company where junior employees can make US\$ 100,000 and senior staff will make upwards of US\$ 2 million, can also be used to develop a global services company where many employees are paid less than US\$ 10 per hour.

## b. ISS – Professionalization: The Employee as Strategic Resource

ISS – International Services Systems – was founded as early as 1901 as a security services company and started its cleaning services business in 1934. Since then the company has evolved through a number of strategic growth phases, has gone public and has later de-listed, has diversified and globalized, has acquired and divested companies, and has grown to more than 500,000 employees today.

There is no simple way to use this many faceted history of ISS to illustrate one continuous case of the professionalization of a services company related to the six factors of professionalization. The long historical period as well as the size, geographic spread, and business diversity of the company is beyond what can be described as a few phases in a model.

Nevertheless, there are two very important points that can be made using ISS as the example. One is that ISS—in a line of business where the strategic importance of employees is often underestimated relative to what is the case in consulting or personal services—has created its success on a continued and consistent effort to develop its particular employees better than its customers and its competitors are able to. The other point is that this effort—as well as the overall success of ISS—has been possible because of ISS's ongoing focus on all six factors of professionalization, as evidenced by the history of the company as well as by its present business model and strategy.

Our case on ISS will therefore be split in two partial pictures of the company: A picture of a segment of the company's history from the appointment of Poul Andreassen as CEO (1966) during its growth until the 1990s with a main focus on the HR strategy, but with a subsidiary overview of the parallel development within the other professionalization factors. A second picture of the ISS Corporation's present business model and leadership principles as an exemplification of the professionalization factors as key for the development of even very large and global services companies.

### Picture 1: The Swan—Employees as Strategic Resource

*Phase 1: Cleaning as a Service.* During the first major expansion phase of ISS (this name was actually not adopted until 1968), the company's primary proposition to its customers was that ISS cleaning employees were tenured, well-known by the company, and trustworthy also when working without direct supervision in the offices, production or storage facilities, or retail stores of the customer. In the late 1960s with significant labor shortage, which made it difficult to recruit for marginal and low-paid job functions, this was a very strong value proposition, and it became the basis for significant growth for ISS. In

order to live up to the proposition, ISS invested a lot more in recruiting, selection, training, terms of employment, and leadership of its employees than normally seen in relation to people in unskilled cleaning jobs.

The other professionalization factors: ISS's *specialization factor* at this stage was very basic, that ISS can take over the customer company's cleaning and thereby remove a cause of daily concern and bother without making it more expensive in terms of direct costs. *Independence* becomes part of the value proposition because daily management in the customer company can transfer responsibility for a difficult category of employees (high attrition rates, unreliability) to an external party. *Efficiency* at this time was based on professional selection of cleaning materials and scale procurement advantages. *Optimization of knowledge* is seen in this selection of cleaning materials and tools and the related early development of methods and training programs. *Relations and brand* evolve as ISS—as indicated by the new corporate name, ISS—positions itself as the large and reliable company in the field that can deliver not only the promised stability in terms of employees, but also a local relationship manager with daily responsibility for delivery and for the relationship.

*Phase 2: Cleaning as Business Specialization.* In this second phase, ISS extends its promise, partly to create differentiation from other services businesses that on a local basis have started competing for cleaning contracts. Employee training is increased and the customer is—on top of reliability and spared problems—promised superior quality and efficiency of the cleaning operation. ISS includes its comprehensive experience base and its development of methods into the training programs offered to its employees.

The other professionalization factors: The *specialization factor* is stepped up by the claim that ISS can deliver cleaning better than the customer or the competitors can. *Independence* enables ISS to deliver programs and services that are not only defined based on the customer circumstance, but is enriched based on broader experiences and a systematically validated methodology. *Efficiency* is seen in the fact that the ISS solutions are materialized in specialized cleaning materials, methods and equipment produced according to ISS specifications (for example ISS spec cleaning trolleys). The full program is possible because of ISS's *optimization of knowledge* across its increasingly international engagements that results in better and/or cheaper services. *Relation and brand* is consolidated in the Swan logo and brand that expresses the ISS promise during this period.

*Phase 3: Your Customer's Customer.* In order to add further value for its customers and differentiate from the many, mainly smaller competitors, ISS continues to develop the competences of its employees. On top of the basic reliability and the cleaning specialist skills, ISS takes advantage of the existence of a

growing number of people who have been trained and had their career in its cleaning services business. ISS creates its own management school for these people at 'ISS University' and is increasingly able to staff larger customer relations with leaders from this school, who understand how to engage all employees in the delivery of the next level of the ISS value proposition: We are not only creating value for our customer, but ultimately for our customer's customer. In this ISS version of total quality management (TQM) cleaning services are differentiated by additional value creation and visibility, which is also expressed in a comprehensive and distinctive personnel uniform program. News and business media from around the world told the story of the Heathrow terminals where not least of all the recognizably uniformed ISS cleaners—trained and motivated to be helpful guides as well—contributed towards making the airport more friendly and easier to navigate for travelers.

The other professionalization factors: *Specialization* is moved a qualitative level up in this phase. ISS moves from saving the customer the trouble of handling a non-core activity, through a phase where the offer is technically enhanced, to this point where the value proposition to the customer is that because you are using us, your non-core activity actually ends up contributing positively to the value you, our customer, deliver to your own customer. *Independence* was a condition for getting to that point, but now ends up including the mutual dependence of a partnership. *Efficiency* is extended to include the resources it takes to economically get to this caliber of leadership resources. *Knowledge optimization* moves from technical to business to strategic knowledge. *Relations and brand* has now progressed to actual partnerships, as entailed in the explicitly branded uniform of the ISS employee within the customer organization.

The later phases: The globalized, differentiated and multi-specialized service corporation. These three earlier phases with their strategic focus on the employees as the key resource became the foundation for an accelerated development of ISS where the business model proves to be strong enough to support a global expansion. The starting point in cleaning leads to further specialization—examples are cleaning of airports, food processing plants, hospitals, and electronics companies—and where the cleaning service is expanded into facility management, maintenance, energy services, and catering, eventually consolidated as integrated facility services (IFS), which are now offered also as a global service for global corporations (including Novartis, Barclay's, and HP).

## **Picture 2: ISS – the global services giant. “The ISS Way”**

Still in 2012, the employees remain the key strategic resource in ISS. People management is highlighted as one of the four cornerstones of the ISS Way. “Our delivery is based on...our ability to recruit, develop and retain skilled and unskilled employees, and we are unique at leading and integrating our employees....We are excellent at leading our employees, so that we can deliver

excellent services....We mitigate risk and volatility transferred from our customers, applying leadership skills, HR and EHS policies, employee training, and labor legislation insights." The customer's satisfaction is founded in the competent employee, who is trained in clearly defined and operational service concepts. Leadership in ISS means to lead through "example, empowerment, by developing ourselves and others and by understanding that teamwork is the core of performance....People are the source of all our personal and business energy."

The other professionalization factors: Based on this continued and dominant focus on the employees as strategic resource, present day ISS remains strategically and in its business model structured around a persistent adherence to this direction, in terms of all six factors. In general terms this is clear in the strategic announcements of the company:

*Specialization:* "We create a simpler daily life for our customers by handling their non-core activities. We create and develop service portfolios that fulfill our customer's needs across services, and we base our services on well tested concepts, documented quality, and high volume." The corporation has built a global capability of local self-delivery of a well-defined set of services that are available for the customer separately or as an integrated offering. The specialization also represents deep knowledge about different industries, so that the service offering covers specific demands of comprehensive value for the customer. The global presence of ISS enables global services for global customers.

*Independence:* The fact that ISS is not an internal function for the customer enables ISS to "mitigate risk and volatility" for the customer. It also gives access to the deep industry insight that leads to increased value for the customer, because ISS can offer "the leading Customer Value Proposition per customer segment."

*Efficiency:* Right next to the focus on human resources, efficiency is the most important factor in ISS's success. ISS has stream-lined all back office functions to achieve scale advantages even in a global company with more than 500,000 employees. Corporate level management is performed by an unprecedented number of just 120 employees in corporate headquarters. ISS has optimized efficiency in all service concepts and deliveries and created "clearly defined and operational service concepts." Globally, "best practices and standard business processes" are implemented. "We deliver services through an efficient delivery system based on scale operations....Our service deliveries are based on high volume."

*Knowledge optimization:* The ISS business model is highly oriented towards the need to harvest, document, and re-use knowledge. This is true relative to the

challenges and the specialist knowledge needed in different industries: “Deep knowledge of various industries.” And it is the case in relation to the development of services that are based on “well tested concepts and documented quality....To obtain these benefits we share knowledge and best practices.” ISS always seeks to enhance its scale advantages and embed leading research in the services concepts that are implemented throughout the global organization.

*Relations and brand:* Though much in ISS is based on scale and system, the closeness to and the relationship with the customer are never compromised. “Our delivery is based on closeness to our customers....Our delivery system is based on scale operations with a clear customer contact.” The first cornerstone in the ISS Way is customer focus that leads to enduring partnerships. The global organization and all its scale advantages have to lead to a “global capacity of self-delivery.” ISS’s focus on the employees as strategic resource is based on the fact that only the employee can be the carrier of close relations, of the partnership with the customer. “Customer satisfaction is founded in the capable employee.” The brand promise of ISS is that the best knowledge, the best concepts, the most efficient processes are made available for the customer through a personal relationship with competent and dedicated employees, who ensure a “seamless integration of the services in the customer organization.”

These two pictures of ISS show us a professionalized services corporation that historically as well as in its present business model, based on the employees as key strategic resource, continues to optimize itself in terms of all six professionalization factors.

### c. Unimerco – Between Manufacturing and Services

Unimerco was founded in Denmark forty years ago, originally as an industrial tool wholesaler that expanded into tool maintenance services and into the development and manufacturing of advanced industrial tools and service offerings covering all tool-related demand. Unimerco had expanded globally with subsidiaries in Norway, Sweden, the UK, Germany, several Eastern European countries, the U.S. and China. In 2011 Unimerco—up to that time 100 percent owned by its employees—was acquired by Kyocera at unusually high multiples of earnings and revenue reflecting the value and uniqueness of its scalable technology-based service concepts. It is important to keep in mind that while Unimerco throughout its history performs at a world class level of professionalization, there is nothing in its origins that differentiates it from tens of thousands of other local services companies, and even at the date of its transaction with Kyocera it remained a small company of just six to seven hundred employees.

The strategic development of Unimerco can be described as a sequence of strategic positions, defined around a key specialized value proposition and consistently implemented across all the other professionalization factors. It is a remarkable exemplification of the strategic history of a company that spans products and services and eventually transforms both through technology as it seeks competitive advantage through consistent professionalization. We will give a brief outline of this history while highlighting the development at each stage as it pertains to each professionalization factor.

*We shall indicate the nature of each strategic phase in a figure that names the main strategic position in a headline, indicates more about the logic of this position in a brief subtext, then reiterates Unimerco value proposition or specialization factor, and finally indicates the company's development across the other five factors during the phase in a table. This format is shared for the 6 figures in this section on Unimerco.*

## Tool Wholesaler – Cutting Tools

Unimerco is a Danish Tool Wholesaler that competes through quality of service, good logistics, and superior procurement



### Cutting Tools

- specialist knowledge
- logistics
- procurements

Independence	Focus on human resources	Efficiency	Knowledge optimization	Relations and brand
The independent intermediary between the customer and international suppliers	Employees as owners  Reliability  Experienced tool specialists	Optimized value chain  Efficient logistics  Scale procurement  For the customer: Just-in-time	Unique knowledge from many customers in multiple industries  Consistently optimized portfolio of tools	Long-term relations with tool producers  Reliable customer service

Unimerco started as a wholesaler of cutting tools, initially for the many furniture companies in the surrounding local regions. In this role it was one of many, but differentiated its services by providing significant tool expertise, superior and reliable logistics, and, as it was growing, the bargaining power of scale procurement. Based on that value proposition the company understood that additional success required consistent work on its professionalization. The strength of its position as independent intermediary between the customer and international tool producing giants was highlighted. Its reliability and competence was founded on a human resources focus that developed loyal,

reliable, and competent employees. Logistics and supply chain efficiency was optimized on an ongoing basis. The individual customer benefitted from the knowledge harvested from Unimerco's many customer relations and from its interaction with tool suppliers. The reliability, efficiency, and these relations became the Unimerco brand.

Tool Service (Grinding, Renew)



The service is expanded with tool grinding. Over time Unimerco develops Renew, offering full tool maintenance services

- Cutting tools
- specialist knowledge
  - procurement
  - double utilization of logistics

Independence	Focus on human resources	Efficiency	Knowledge optimization	Relations and brand
Independent assurance of tool performance (vs internal uncertainty)	New dimension in tool competence: sales technicians and tool makers	Double utilization of logistics  Renew program  Improved selection of tools (life time cost)	Broad experience base on <ul style="list-style-type: none"><li>– Type of tool</li><li>– Utilization</li><li>– Production parameters</li><li>– Wear</li><li>– Cost</li></ul>	Guaranteeing customer quality and functionality of tools  Partnership with international producers of standard tools

The next step in Unimerco's strategic development was to extend the wholesale service into tool maintenance. This enhanced the value proposition that not only would Unimerco supply the best tools with reliable logistics, but the company would also undertake to maintain the tools (sharpening, grinding) and optimize tool lifetime and performance. The new offering took a distraction off the customers mind, having a competent partner take over an internal task where performance was at best tentative. In terms of human resources, it meant that Unimerco could add tool technicians with complementary skills to the traditional sales people, and Unimerco could develop the competences of these technicians way further than any single customer ever could. Efficiency was enhanced, primarily because logistics were utilized twice, delivering new tools and picking up and returning renewed tools. The knowledge proposition was enhanced by the new insights into the lifetime performance of tools, which improved selection of tools as well as Unimerco's competence as a partner for the tool producers. The relationship with customers was transformed from one of many transaction based sellers to a subscription oriented partnership.



## Advanced Special Tools (Development, Production, Maintenance: from blueprint to norm-database)



New materials and designs in industrial production require new special tools. Unimerco leverages its deep understanding of tools to develop and deliver these tools. International customers and growth in adjacent export markets (Norway, Sweden, Germany).

**The new special tools are almost impossible to develop for the customer and standard tools cannot do the task. Based on its understanding of tools Unimerco can position itself as a competent developer of these special tools that represent the top of the competence and specialization pyramid.**

Independence	Focus on human resources	Efficiency	Knowledge optimization	Relations and brand
Independence from the customer makes it possible to collaborate even with the customer's competitor, thereby enabling development of the necessary experience base.	Internally the company develops a tight sharing of knowledge among sales technicians, maintenance engineers, and tool developers.  Employees are empowered to share knowledge with customers as well as with producers of tooling machines.	The norm database enables high development efficiency  Efficient integration between standard solutions and specialist tools  Optimized communication between different internal functions.	After some years of special tool development, the company invests in transforming its database of hundreds of tool blueprints into a database of more granular tool construction norms  Enables significantly higher reuse.	The customers partner for tool solutions.  Knowledge partner of machine producers and suppliers of standard tools.

Dramatic changes in manufacturing—the revolution of new materials, all the changes in manufacturing processes and value chain that we described in chapter 2—opened a new opportunity for toolmakers, since the new materials and new processes increasingly required advanced special tools, which in many cases could not be developed by the manufacturer's in-house skills. Unimerco capitalized on the technical tool skills that had evolved out of its tool maintenance service and started to build a position as high-end developer of these new, advanced tools. In the early years, the marginal earnings on each new tool were limited since each project was unique and the business and solutions were hard to scale. The value for Unimerco came not least of all from the reputation and position at the very high end of the tool making industry, and the follow-on business that flowed from that.

Many strategic changes within the company were necessary in order to take this step and eventually make it a profitable business. Unimerco had to develop its independence so that it could work in close partnerships with several competing customers, because only thereby could Unimerco get the volume of exposure to specific categories of tool design challenges that would give the technical experience required to solve the challenges.

One difficulty was that the competences required in advanced tool making include complex and mostly tacit knowledge, which takes years to master. Unimerco therefore had to strengthen its already outstanding learning and knowledge sharing programs, and encourage not only knowledge sharing internally across all the different functions, but also externally with engineers in both customer and supplier companies. Unimerco made use of a plethora of means to enable and encourage this development: revolutionary changes in architecture to create better spaces for knowledge sharing; master-apprentice programs; extracurricular activities; the role of the company cafeteria; the Unimerco University, and many more. These programs have been described extensively by the media and in research, and they also resulted in Unimerco becoming the winner of the Great Place to Work competition. The fact that it takes so much time and effort to develop a top level advanced tool maker was also behind other strategic decisions: Unimerco made a commitment not to use lay-offs as a means to regulate capacity during downturns in the business cycle (“when these people are so hard to develop, we can’t afford to lose them just because of a temporary slowdown of business”). And Unimerco decided to make it possible for all employees to become co-owners of the company, making the mutual commitment between company and employee even stronger. When Kyocera acquired Unimerco, the selling shareholders included more than 80 percent of employees, and a majority of the company was owned by non-executive employees (which also meant that many employees were rewarded with significant liquidity events).

On the efficiency front, the company managed to achieve a very tight integration between special tools and standard tools, so that the proprietary maintenance of special tools frequently drove contracts to maintain standard tools with additional logistics optimization.

The serious lag in efficiency and earnings in the early stage of the venture into special tools was partially mitigated by a very important knowledge optimization effort. As the volume of special tools developed by Unimerco grew, so did its database of blueprints of all the unique designs. However, reuse of these blueprints was limited because each new tool tended to be different. The number of construction details in each blueprint was typically overwhelming. Unimerco therefore invested in a comprehensive re-segmentation of the database, so that each blueprint was separated into the norms for each detail. In-

stead of a database of unwieldy tool blueprints, Unimerco developed a norms database of construction details that were much easier to document and that could be reused as a modular alphabet in the spelling of new designs. The gains included faster design times, fewer errors, more re-use of knowledge, and a reduction in the development cost of special tools, which helped the earning margins of these high prestige projects.

In terms of brand, the strategic venture into advanced special tools built a reputation for Unimerco as a premier center of tool expertise, while building on and reinforcing its classical brand of reliability and competent partnership.

## Production Optimization



The competence on construction of advanced special tools becomes the base for establishing Unimerco in the UK and the U.S. Servicing the customer on all aspects of tool needs enables a service concept on total production optimization. Expansion in China and Eastern Europe.

**Unimerco's specialization is expanded by using the insights from all aspects of tool utilization, maintenance, and construction to build a service platform on the optimization of production and the total economy of the production process**

Independence	Focus on human resources	Efficiency	Knowledge optimization	Relations and brand
Optimization is based on the ability of the Unimerco engineer to view the the production process based on tool use as well as production lines and overall flow, and based on doing this in multiple companies. This is only possible with independence.	With this shift a group of sales and service engineers are converted into professional service consultant roles. Their competence is based on the tight integration and sharing of knowledge within Unimerco and with its suppliers and customers.	The logistics and maintenance functions as well as the production chain within Unimerco are streamlined to support the production optimization service as well.	Production optimization is possible based on accumulated knowledge and experience from many different companies about the interdependence among product, tool, and production. The service itself generates additional knowledge about these interdependencies.	Customer relations become continuous and multi-year and evolve into a committed partnership. The brand promise is extended to include the value of overall optimization beyond any specific Unimerco tools and services.

Unimerco's move up on the tool value pyramid as a developer of special tools became the basis for a global expansion of the company. From its start in Denmark early expansion had been into adjacent markets in Norway, Sweden, and Germany. Unimerco the toolmaker added subsidiaries in the UK, in Eastern Europe, the U.S. and in multiple locations in China. The next challenge was to develop a high-end service component to the value proposition, which would leverage the value not only of the manufactured products, the special tools,

but also of the lower-end services, wholesale and maintenance. Unimerco did this by offering the so-called Optimize service to its key customers, leveraging all of Unimerco’s accumulated knowledge on tool utilization, tool wear, tool maintenance, and tool design to advice the customers on how to optimize the overall flow and lifetime cost of production. Again, the data points enabling this service were harvested across multiple clients and industries by Unimerco as an independent service provider. The human resource challenge was to convert a number of Unimerco front engineers into roles similar to professional service consultants. This provided an efficiency and productivity challenge that would be addressed later in Unimerco’s strategic development. Optimize is in itself an impressive result of knowledge accumulation and conceptualization for a new form of re-use. For the select customers that became Optimize subscribers, the full scope of Unimerco’s offerings was integrated into one relationship.

**Total Tool Supplier  
(Special, Standard, Renew, Optimize)**



The global financial crisis of 2008 leads to a dramatic contraction of the market that hits all tool suppliers. Unimerco uses its position and financial strength to take over total delivery of tools to its customers, including high-volume, low-price standard tools.

**The position as optimizer of production is used as a spring board to take over whole sale contracts for standard tools, once again increasing utilization of existing relations, logistics, and enhancing procurement leverage.**

Independence	Focus on human resources	Efficiency	Knowledge optimization	Relations and brand
The customer gets its total tool use optimized in terms of quality and price through an alliance with an external partner that has scale, position, knowledge, and independent insight and bargaining power.	The owner within Unimerco of the customer relationship can build on the full competence and value chain position. This is reinforced through knowledge sharing, IT-systems, education and the incentive structures.	Mass procurement is integrated into Unimerco’s logistics and delivery system.	Domain- and customer knowledge are integrated.	The partnership relation is extended to include outsourcing of the customer’s mass procurement of tools.

This stage in Unimerco’s development is maybe not strictly an independent strategy phase, but it shows partly how a well-executed integrated services relationship becomes the basis for expansion, and how capital strength in times of crisis can be used to expand market position. During the 2008 financial crisis, Unimerco took advantage of its established relationships with large cus-

tomers and offered to take over also their supply of low-end standard tools. Unimerco guaranteed a certain level of reduction of standard tool prices over present suppliers, which for the customer meant not only cost savings, but also the convenience of one total supplier of all tools and tool services. Unimerco could squeeze out a large number of smaller local competitors, and got its returns from re-use of logistics and the advantage of a much larger procurement scale. Efficiency is gained by integration of large scale procurement into Unimerco's systems and by scale advantages in logistics and service operations. Knowledge re-use is gained by integrating Unimerco's diverse domain knowledge with its in depth knowledge of the customer.

### Selectr (Unimerco-knowledge plus the Norm Database lead to Scale Customization)



On the basis of Unimerco's norm database and the experience of developing thousands of special tools, 80 percent of customer special tool requests are reduced to parametric versions of documented standards. This development represents a new paradigm in the global tool industry and points towards accelerated global expansion.

**Unimerco's continued competence development and extension of its specialized expertise to all aspects of tools in production now enables the company to refocus its specialization in a unique position, where special tools and standard tools are defined within the same parametric space that is commanded by Unimerco's systems with integrated, automated production.**

Independence	Focus on human resources	Efficiency	Knowledge optimization	Relations and brand
Unimerco's unique knowledge is derived from all customers and all suppliers and codified in Unimerco's proprietary systems. Individual and special needs of the customer are met based on parameters and models derived from universal insights.	Unimerco's organization becomes a system of collective intelligence. The relationship manager documents the specific needs of the customer into Unimerco's Selectr system. This leads directly to purchase agreement and automated production data. Unimerco's top engineers develop additional parametric standards, and of course, the remaining few special cases.	Full system integration from need clarification, price determination, procurement contract, activation of production and delivery chain. Dramatic reduction of time and cost.	From standard solution to advanced special tools, all tool types are parametrically codified in the Unimerco system based on more than 10 years of accumulated solutions. Learning, new knowledge and new solutions are all based on this foundation, and Unimerco's employees activate their unique judgment and experience leveraged on this base system.	The relationship is now fully focused on the customer's needs, however, with a cost structure and delivery times equal to what is known from standard solutions with no customer accommodation.

If this aggressive market share step to become a total tool supplier was a minor strategic development, then the final phase we are describing in this overview of Unimerco's development was of ground breaking strategic significance. This development was also triggered by the financial crisis. Since Unimerco would not use lay-offs as a cyclical instrument, the downturn in the market meant that a number of employees were under-utilized. Unimerco's management decided to take this excess capacity as an opportunity to make a major push on a development that had long been seen as possible and attractive. At this time, the company had developed so many special tools and had been feeding its norm database of design details with such a richness of diverse tools, that it seemed possible to start defining patterns and standards within unique tools.

Several teams of Unimerco tool developers were allocated to work through all the special tools developed by Unimerco and sort them into categories and types, decide which was better when several different solutions had been used in designs for tools of similar functionality, and then reduce variations among similar tools into parametric versions of the same basic design. As these parametric designs were defined in the Unimerco system, a sales engineer could use the design as the basis for dialogue with customers whose special needs could be handled within the parametric variations. Once the customer agreed to a design, price would be automatically calculated. When the price was accepted, production data would be generated directly into machine programming. At the end of the strategic development effort, Unimerco's systems were able to handle 80 percent of what had hitherto been unique special tools as parametric variations of the newly defined standards, thereby making it possible to design and produce special tools as if they were standard tools.

For Unimerco this was not just the final solution to the problem of earnings margin on special tools. It also promised to generate a new level of productivity and competitiveness into the services proposition of the total tool supplier. And of course, it was a potential revolution of the tool industry globally.

Unimerco was able to make this breakthrough partly because of their consistent work on documentation of their tool solutions, and partly because of the number and variation of tools in their collective experience.

At this point the strategic story of Unimerco becomes illustrative of the building of a competitive services company: a start in a basic transactional service is extended to adjacent relational services. This is leveraged by products that ensure a high-end entry point with customers. And these again have value added by being enveloped in service. Throughout, all aspects of the business are honed in terms of professionalization, so that each new step in specialization and value proposition is based in consistent strategic development of human resources, relentless pursuit of efficiency, optimizing knowledge, and

driving the quality of relationships and brand promise. Eventually, the strategic development culminates in the combination of the achieved uniqueness and knowledge based relationship with automated and technology embedded productivity.

This last step in Unimerco's development is an outstanding example of how the algorithmic revolution is transforming services. That is the core theme of chapter 4.





## CHAPTER 4

# The Algorithmic Revolution: Services beyond the Productivity Sinkhole

The latest of Unimerco's strategic development steps that we described in chapter 3 exemplifies what is meant by the algorithmic revolution. Let us reiterate what Unimerco did, and understand it in somewhat more depth:

Unimerco had many years of experience from developing high-end special industrial tools. All the design and construction norms from all the many tools were carefully documented for re-use in Unimerco's norm database. Each design detail carefully translated into the relevant CNC (Computer Numerically Controlled) machine programming for the production of the tools. As part of Unimerco's professionalization and process efficiency, the back end systems were all seamlessly integrated—from technical specifications and pricing offer to the customer; over confirmed order and delivery commitments; to production planning, inventory management, quality and compliance assurance, and actual production; to delivery logistics and invoicing.

The missing link in this integrated and efficient machine was the design of the unique tool. Experience and the norm database helped, but at the end of the day, the actual design was the service of a highly skilled tooling engineer in close dialogue with production and product engineers from the customer organization. The only way to scale this process was by adding more tooling engineers, which was a cumbersome and slow process often involving many years of training with more experienced colleagues. Even though the resulting tools were expensive, their very uniqueness meant that the contribution margin to Unimerco's earnings was narrow at best. In some cases, the unique tool ended up as a loss leader for more profitable standard and scale and maintenance work.

The breakthrough for Unimerco happened when the slow down for the tooling sector during the 2008 financial crisis allowed the company to allocate a number of the very skilled tool engineers to systematically work through all the special tools Unimerco had ever developed. As described in the previous chapter, this resulted in reducing around 80 percent of all Unimerco's special tools into a much smaller number of generic tool designs, in relation to which the individual special tools could be described as parametric variations. This

meant that a process that originally required rare and expensive tool engineering skills and a time consuming unique development and production process, now could be reduced to a decision about which generic design corresponded with the customer's special needs and then determine through interaction with the customer which parametric values to specify. From that moment on, the underlying proprietary algorithm would not only automatically generate the price-data needed for the customer's decision, but generate the programs needed to run the CNC tooling machine.

Instead of a unique and time consuming and non-scalable human based service process, Unimerco is now able to deliver the same technical end-result in a manner that is semi-automated and makes the business model scalable. Unimerco can deliver to its customer's unique special tools at a cost (not always at a price—profit margins have gone up) that approaches the price of standard tools.

There is more to be learned from this Unimerco example, but before we dig deeper into that we need to take a closer look at the algorithmic revolution and the challenges it is trying to address.

### a. Services as Productivity Sinkhole

When IBM did its big strategic shift from a product to a solution services company in the early 1990s, it was seen in most ways as a significant success. A declining giant that had lost its 'above the competition' status and had had to downsize by a six-digit number of employees, came back on a path where a unique competitive position allowed renewed profitability and growth. However, the success was marked by an asterisk: As IBM became a services company productivity improvements started lagging, both by the standards the market was used to from IBM and the standards of the tech industry.

This is a well-known problem of services, originally described by the researcher W. J. Baumol in his 1967 article, "Macroeconomics of Unbalanced Growth." He predicts how the wealthy and highly developed economies will eventually be caught in a productivity trap because the rapid productivity gains in agriculture, resource extraction and manufacturing will release a growing proportion of the workforce from jobs in those sectors. The only place for that excess workforce to go is into services, and since services by the nature of their business value proposition—a person to person simultaneous production and consumption of the service—will be incapable of sustained and significant productivity gains, the overall economy will tend towards diminishing growth in productivity. This, argues Baumol, is particularly exemplified by the urban concentrations of services companies. The service sector is the productivity

sinkhole of the overall economy. It took four musicians twenty-five minutes to deliver a string quartet when Bach was alive, and it still does.

For IBM, one of the answers to the productivity problems of their services business model was sought through a large scale research program that has continued for more than a decade on services science. In 2011, the achievements of this program were celebrated by IBM as one of the 100 breakthrough contribu-

tions by IBM during its 100 year corporate history. In the posting announcing services science as one of the breakthroughs, IBM highlights that due to the services science contributions, from 2005 onwards, IBM has been able to achieve 13 percent or higher annual yield gains from the service business. How was that possible? Was Baumol wrong after all?

#### The Algorithmic Revolution: A Tale of Two Papers

- Baumol, W. J. 1967.  
"Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crises." *American Economic Review* 57, no. 3 (June 1967)
- Moore, G. E. 1965.  
"Cramming more components onto integrated circuits." *Electronics*, Volume 38, Number 8, April 19, 1965

## b. ICT turns Services into Production

The answer can be found in another article, ironically published two years before Baumol's original article, by Gordon E. Moore, the co-founder of Intel, "Cramming more Components unto Integrated Circuits," from 1965. This is the first formulation of what later became known as Moore's law that the processing and storage power of ICT will grow exponentially. For services, this applies whenever any function or process involved in a service can be reduced to an algorithm, because ICT can be applied to algorithms, and once ICT applies so does Moore's law rather than Baumol's. Part of the yield from IBM's services science efforts has been that significant parts of the process of developing, producing, and delivering services are automated by the application of ICT.

Before we discuss the implications of this in more depth, let us look at a few obvious examples that are part of everyday life for most of us.

When we need cash, we no longer go to the bank teller and make a withdrawal from a human being who delivers the personal service of verifying the holdings on our account and counting the cash we want to withdraw. For decades now, we have been able to insert our card in an ATM and receive the cash without any human inter-

#### The Algorithmic Revolution: Automated Services

- Google: automated information, search, etc.
- Banks: automated teller functions
- Telecoms: automated switchboards
- eBay: automated trade transactions
- Airlines: automated booking, ticketing, check-in, etc.
- Logistics: automated ordering, confirmation, tracking, and delivery information

vention. The same is true for airline bookings, ticketing, and check-in. Most people alive today do not even remember when phone calls were connected by a human operator, and those who do will only remember the human operators from placing complex international calls.

Whereas these examples are all about existing human-delivered services that were automated, during the latest fifteen years we have seen the appearance of numerous new services that have been defined and developed based on the functionalities of ICT systems, and that would never have existed in a comparable form as a human based service. Google, eBay, and Facebook are all examples of this. Services that are fully ICT automated in delivery and that could not be conceived in their form, functionality, reach, and efficiency as a human-based service.

#### The Algorithmic Revolution: Services Production

- Classical definition of services: Production, delivery, and consumption of service are completed person to person in the same time, place, and process
- After the algorithmic revolution: Services can be developed by one (or even several) group(s) of people in one time, place, and process; be produced by other groups of people (or no people at all) in a different time, place, and process; delivered by other people (or no people at all) in yet different times, places, and processes; to many different people in multiple places, at multiple times and very different processes.
- The algorithmic revolution not only changes the productivity of services, but also the basic business models and economics of services, and hence fundamentally the innovation challenge

This development quite fundamentally changes the rules of the game. The ICT-enabled services come to resemble industrial production—in some ways become a form of production—similar to manufacturing in that they can be capital-intensive systems that are built, with latent capacity acting as inventory. After the algorithmic revolution, services no longer adhere to the classical definition of

services. The paradigm where production, delivery, and consumption of a service are completed person to person in the same time, place, and process is no longer universally valid. Google users do not interact directly with any Google employees when they make use of a Google service. Of the twenty-some thousand Google employees very few are involved in delivering a direct person to person Google service. The development of the service is the work of thousands of developers situated in Mountain View and around the world. Production and delivery is automated and runs on the Google cloud, powered by hundreds of Google computing centers, each representing hundreds of millions U.S. dollars in capital investments. Use of the Google service is made by literally billions of people in whatever place, at whatever time and with whichever process suits them.

It is easy to see that Google—and all the other ICT-based or ICT-enabled services—make any characterization of services as the sinkhole of productivity obsolete. Replacing bank tellers by ATMs is a simple, but sizable improvement of productivity in retail banking services. Building a fully automated service like Google search is making information available for billions that millions of human librarians could never achieve.

The point is that it does not stop. Once key components and key processes of a service have been reduced to algorithms, Moore's law ensures exponential growth in productivity at some basic level (basic because the transformation of process performance into economic value is by no means trivial. In many cases it never materializes, which is a core issue of future services strategy as we will be discussing it later). Once the information on which most services are based has been digitized, Moore's law has a point of impact. The music service of performing the Bach string quartet is economically transformed when the performance is captured digitally and made available in countless copies on iTunes.

The algorithmic revolution, however, transforms more than the productivity equation of services. Just as we saw product and production companies turn towards services to avoid commoditization, we now see services companies turn into more capital intensive production companies in order to achieve the ICT based productivity shift of their service. This second shift is in many cases spearheaded by the original product companies—as, for example, Unimerco or IBM—that turned to services and then needed to enhance the productivity of that new service business. There is a very high component of ICT enabling of their services involved in the spectacular results that IBM achieved through their Services Science effort.

### c. Automated and Human-based Services

For obvious reasons, these transformations do not happen the same way or have the same impact across the different types of services. We have already exemplified the growth of new, fully automated services as Google search and eBay transactions. They obviously represent one end of a spectrum that—though emerging in a real sense only during the last 15 to 20 years—is growing with new companies and new services every single day. The number of new, fully automated services that are made available daily by the touch of a screen at Apple's and Android's App stores is counted in the hundreds, if not thousands.

At the opposite end of the spectrum we find the human services or the human delivered services. These are much more resistant to the algorithmic revolution, and they tend to still be ruled by Baumol to a high degree. There is as yet no algorithmic reduction of the work of the hairdresser, and the same is mostly true of work in the health sector, in hospitality, and in many professional services (lawyers, consultants).

#### Human or Automated Services: The Two Pure Forms

- **Human Services:** Hairdressers, Nurses, Doctors, Lawyers, Consultants. These services have tended to stick with the classical person to person services paradigm where production, delivery, and consumption coincide in time, place, and process. Baumol rules almost absolute. Productivity and innovation gains have been achieved through the six professionalization factors, when at all.
- **Automated Services:** Automation of existing services (bank tellers, switch board operators, travel agents, card dealers) or Technology Enabled new services (search, social networking, virtual universes – gaming, second life, etc). Person to person services paradigm is broken. Moore rules almost absolute. Productivity and innovation gains become a technology play. User contact and user driven innovation becomes a challenge.

Therefore human-delivered services are to a high degree where services remain the productivity sinkhole of the economy. Many companies still offer these services more or less as they have been delivered for ages, in part also because the nature of human services means that they are delivered very locally and thereby exempt from many of the globalized economy's levels of competition.

Three points need to be made in relation to this end of services:

- The fact that they remain mostly human based with no component of automation does not imply that there cannot be a very high degree of differentiation within the category in terms of both value added and professionalization. Even within the category of hair dressing we find a very large spread among companies, from the outright amateur (mother cutting the hair of her children in the kitchen), over a low-end basic service (a semi-skilled person with a few professional tools offering an adequate haircut at basic commodity prices), to very high end coiffure (highly specialized tools, shampoos, cures and colorings; luxurious visual and physical environment; spa like services; highly-trained staff with hair designer qualifications and branded experiences). The price range for a haircut is easily from \$10 to \$1,000. Similar spreads in price and value added can be found among lawyers and consultants, in restaurants and hotels, and in health services. The problem in terms of productivity is not the absence of significant value added among the high-end firms. Indeed companies like McKinsey are among the highest value add companies around. The problem is that the productivity cannot be continuously improved and that it is rare and difficult to scale at rates that are much higher than linear on a sustained basis. By far the most important way for these companies to pursue some productivity gains and competitive advantage is by systematically professionalizing themselves along the six factors that we discussed in the previous chapter.
- The fact that they remain human based does not mean that ICT and other technologies do not play an important and increasing role. Even though the primary human service offering of a restaurant is mostly unaffected—the work and the service interaction with the customer by the waiter, the chef, and the sommelier—the functioning and the business models of restaurants have still been dramatically impacted by important peripheral technologies such as reservation and procurement systems, customer rating systems, website presence, online coupons, etc. In consulting we see knowledge management systems; automated data mining and data heavy analyses of RoI, competitive landscapes and other quantitative offerings, or online systems for crowd sourcing and wisdom of crowd assessments of alternative new strategic choices, just to give a few examples. These ICT systems come on top of more traditional back office systems—accounting, inventory, procurement, payroll, and taxes—and lead to a situation where even

pure play human based services are situated in companies that are quite technology intensive.

- The next step in this logic of course is that even human based services do not remain unaffected by the algorithmic revolution. The highly personal human service of elder care is changing: Processes and aspects of the service are automated. Simple robots do cleaning and lifting functions. Systems of sensors replace human care takers at the task of monitoring health symptoms and the basic welfare of the elderly person. Computerized systems and game-like motivators take over the task of ensuring that the patient gets the right medication at the right time (actually eliminating one of the more severe causes of failed care). In the law profession, routine legal tasks are taken over by online self-help systems as LegalZoom and the like, which are mostly publicly available versions of some of the systems that had enabled productivity gains within the bigger and more professional law firms. The systems obviously do not eliminate the need for the human service, but they leverage that service and enable efficiencies and productivity gains. The elderly person in care still needs the qualified and caring nurse, but the productivity of that nurse is enhanced by the systems. In fact, by automating some of the more routine tasks the systems can allow the nurse more and more uninterrupted time for the real care needs.

This introduction of the algorithmic revolution into previously pure human based services bring us to the category of hybrid services, which increasingly is turning out to be the dynamic, economically, and competitively most important category of companies.

## d. Hybrid Services: The Innovation Crossroads

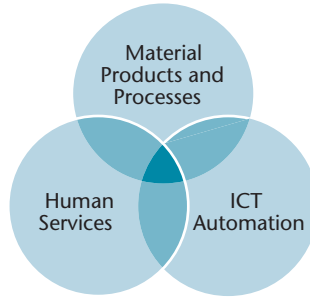
Our key argument here is that for all companies involved in the services transformation hybrid combinations of human based and automated services become a primary strategic focus area. For the many companies that have entered services as part of their quest to avoid commoditization, the hybrid spans from products, to services and to ICT automation.

### Human, Automated, and Hybrid Services: The Dynamic Field

Between the pure forms, hybrid services that combine human and automated service components represent a dynamic field of innovation and experimentation:

- Human services might be ultimately irreducible, but still need to seek ways out of the productivity hole: Sensors in health care will not replace nurses, but can eliminate trivial monitoring to free the nurse for more interactive and more qualified human care.
- Automated services will remain a growing field of technology development, productivity step functions and service reinvention, but the challenge of user relations and the value added of the irreducible relation will drive models involving human intervention: How can Google achieve next generation user insights without direct human relations?
- Manufacturing and primary sector companies and technology firms that venture into services to avoid commoditization will be forced from the outset to seek their solutions in the hybrid field. When IBM transformed itself into a consulting model, the challenge to overcome was not to be caught in the productivity trap of pure human consulting, hence the model evolved to a hybrid through services science.

## The Hybrid Innovation Crossroads



Let us follow the trajectory into this hybrid innovation crossroads from each of the starting company positions:

- From human services:* We have already seen and discussed the path from a human services starting position. This is clearly where the need for an answer to the challenge of being the productivity sinkhole is most pressing. It is also where built-in resistance to the application of ICT to the core elements of the service is strongest. To reduce elements of the nursing function to algorithms and automation is by many—patients, nurses and health system administrators—seen as dehumanizing and as a violation of the very ethos of the nursing profession. Or to take another example, not without an element of irony. The very champions of aggressive technology strategies when they are advising other companies, the management consultants, are the extreme laggards of moving forward in the algorithmic revolution when it comes to their own services business. None of the leading strategy consultants, McKinsey, Bain, BCG, are leaders in (partial) automation of their own core consulting services, and they get away with it because the same is true of the second-tier firms and of the sector's newcomers. It is easy to understand the hesitation, because the very human and personal nature of the service is the foundation of the resilient relationships that make services companies hard to displace by competitors and therefore relatively exempt from commoditization. For the high end human services firms—we have already looked at McKinsey as an example—who have been driving their professionalization all along, to endanger their relationships with clients would be to kill the goose with the golden eggs. The low-end human services firms that have barely professionalized at all are working at a level where they would not be capable of moving towards automation of their services even if they wanted to. Resistance and hesitation are great. Two factors have made it start happening anyway. First the fact that many of the companies come under severe competition from early movers among the human services companies, from



new entrants that come from the world of product companies, or from companies with a fully automated services business model, as we see when companies like LegalZoom take business away from conventional law firms. Second, the fact that macro technology development from the internet over mobile platforms and their world of apps to the cloud makes applicable technologies so available that it becomes clear that someone is going to take the opportunity. We shall see, however, that the resistance and hesitation of the human based services companies against automation becomes an important contributor to the next wave of services innovation after the algorithmic revolution. That will be the main topic of our next chapter.

- *From automated services:* There is an interesting dynamic by companies that were conceived as pure automation plays, which add human services dimensions to their business models. Many observers are surprised by this dynamic and consider it to be retroactive and fundamentally irrational. In our next chapter, we will see that it is neither retroactive nor irrational, but a necessary move in the services innovation logic. For now let us take an example. Amazon created an optimally automated service that originally replaced the book store and then growing parts of retail. When Amazon introduced their great device innovation, the Kindle eBook reader, they were on the path to also eliminate the logistics of the physical book. A reader could search among more than a million book titles directly from the Kindle and buy the selected book electronically with Amazon's one click function and seconds later have received a digital copy of the book wirelessly over Amazon's Whispernet, ready to read. Considering how seamless the integration of this fully automated experience was, many Kindle users were in for their biggest surprise when and if they encountered hardware problems with their Kindle device. They would call the Help number listed in the manual and expect the terrible service experience known from Dell or almost any other device company on the planet with countless links, automated and unhelpful voices, tens of minutes (if not hours) of wait time for each link and eventually connection with a call center operator that turns out to be discourteous and unable to solve the problem. Compared to those expectations, the Amazon Help service is a shock. After seconds of wait time a human voice is on the phone, kindly and precisely asking about your data and your problem, doing a first and informed diagnosis, deciding that this is an actual technology problem, and informing you that you will be transferred to a technology service engineer. You just have time to think "Oh no" before you are surprised again. This time you also get a real human on the line within seconds, and this person is also polite and friendly and has already received information about your data and your problem so that she can proceed directly to solution mode. If the solution turns out to be that you need a new device, you will receive that device on express delivery, and your service person will call you back shortly after you have received it to

make sure that the transfer of not only your library, but also your ongoing subscriptions has worked to your satisfaction. Superb human services by one of the early champions of fully automated! Has Jeff Bezos gone retroactive or irrational? Here is the real story. First of all, the service makes direct financial sense. The Kindle was never perceived as a device business for Amazon, but as a portal for selling more books. Everyday a Kindle is inactive is a day when books, magazines, and newspapers are not sold. In that way, it is a parallel story to Gillette's razor as a platform for selling blades. Secondly, the Kindle is one of many competing eReader platforms, which means that any hardware problem (especially if it is followed by a negative service experience) is the obvious trigger for a user to change to another platform, thus accelerating the kind of competition that leads to commoditization. Amazon not only neutralizes this potentially negative event, but by investing in turning it into a surprisingly positive human touch-point, they have managed to make a growing number of Kindle users into Kindle loyalists. Apple did the same thing when Steve Jobs insisted on establishing the Apple stores that became the high-end human service interface to the integrated and automated world of device portals to automated services—iPod to iTunes and iPhone and iPad to App stores and much more.

- *From product companies to human based services and further:* When product companies decide to turn to services, they do not always go directly to hybrid forms with a high component of ICT automated services. The very example we used to describe the move towards services, IBM in the early 1990s, originally overlaid their product business model with a services component that was predominantly traditional management consulting, a human based service. The same has been true for many other product companies; HP and Dell are obvious examples, but also the many product companies that have moved into services by adding life-cycle maintenance and product renewals to their offering. Examples here would be Vestas' service offering in relation to their wind turbines or the Unimerco case of adding the Renew labeled maintenance service to delivered industrial tools. The problem for product companies that add a human based services component to their model is that they are particularly vulnerable when hit by the productivity trap inherent in these services. Even when as successful as IBM was in the early years, the low ongoing productivity gains of their services business destroy the key performance metrics that the market has come to expect. That is why product companies that have added a human services component—as we saw in chapter 3—are forced to pursue professionalization much more aggressively than most pure services companies. And that is why an original move into a human based services model turns out to be an intermediary step. They cannot remain in the productivity sinkhole, so they have to apply ICT aggressively to their services and seek their own algorithmic revolution. In the case of IBM, that has come out of their Services

Science effort. That, by the way, has made them a pioneer in applying ICT automation at the very core of management consulting.

- *From product companies to hybrid services models:* Many more product companies go directly to hybrid services models when they integrate a services component in their business model. GM's Onstar service was and is based on the integration of positioning, monitoring, and communication technologies in GM's cars. Kone can sell port management services because the IT systems in their cranes represent the information hub of the port as a logistical system. If we compare Apple's move into services with IBM's—both clear successes—we will see the difference: IBM offered solution services in the form of management consulting as a way of pulling out of the commoditization trap, but later had to automate some of those services to come out of the productivity hole. Apple went directly from product to automated services. Apple's iPod is the prototypical success. As a portable music player, its design was superb. But the iPod as a product in and of itself was not entirely out of the reach of companies like Sony. What blew the competition away was the iPod's tight coupling to iTunes software, which was then integrated into an online music store. The value came in this last piece. iTunes made it easy for consumers to convert ("rip") their CDs into digital music, but the iTunes Music Store transformed digital music from the realm of pirated data into a marketplace—it was a game-changer. Apple also made the iPod, iPhone, and iPad into fashion statements, but it is hard to imagine that design alone without the service functionality would have produced anything nearly as spectacularly successful. When the iPod was introduced in the early 2000s, digital music players were quickly becoming commodities, and a stroll through electronics districts in Hong Kong revealed dozens of MP3 players by obscure Chinese companies, as well as better-known Korean firms such as Samsung. These competed mainly on price, which eroded quickly as larger capacity hard discs and solid-state memory capacity kept growing every few months. The iPod, however, kept its price level and still sold. Sony had the pieces—hardware design, manufacturing capabilities, and a record label—but was unable to leverage them in an enhanced services offering. We see Apple avoiding commoditization as well as bypassing the high-end competitor Sony by integrating the automated service proposition in their line of products. And we see Apple also outpacing successful IBM by being able to go much more directly towards hybrid rather than human based services.

These dynamics driving from all starting points in our services map identify the category of hybrid services as the true melting pot or crossroads of services innovation. Product companies that seek to avoid commoditization end and will be seeking their right strategic answers there. Fully automated services seem to be drawn in that direction in order to differentiate themselves. Finally, all the pure play human based services are increasingly finding themselves in

a situation where they can only keep pace in terms of productivity by starting to introduce ICT into their core service processes. There are still protected islands where pure human services survive without being exposed to the competition of companies with a much more aggressive productivity profile. Each of these islands, however, seems to be invaded: by companies from the product world that have productivity imperatives in their DNA and bring it with them into the world of services! By relatively new companies that have started around fully automated service models and now threaten the position of incumbent human services companies (from LegalZoom's threat to law firms to Uber's threat to taxi services)! And by the pervasive presence of the internet, mobile platform, app stores, and the cloud that make solutions to automation opportunities easy and inexpensive.

This leads to an uncompromising strategic conclusion for all service organizations regardless of their market position or traditional business model. The seemingly protected zones are falling. There is no longer room for services as a productivity sinkhole. For decades, if not centuries, manufacturing companies have been in a relentless pursuit of productivity. From now on, the same is true for any organization in the business of delivering services.

#### The Relentless Pursuit of Productivity

- After ICT and Moore's law have been unleashed at services, the drive to reduce existing service processes to algorithms and to use ICT to create and deliver new services is gaining momentum and will ultimately transform all business and societal functions.
- This transformation will determine the productivity development of economies, and will often be mistaken for services innovation as such.

For nations—and not the least for Denmark—this raises significant strategic challenges. There is no longer an excuse for leaving home market services—building and construction, retail, operational services, personal services, the so called professional services—as a “protected” sinkhole of

productivity. Ultimately, that will be a drain on the countries overall productivity and competitiveness. And by the exact same logic, there is no longer room to leave public sector services in the productivity sinkhole.

The imperatives of professionalization and of the algorithmic revolution cannot be ignored.

## CHAPTER 5

# The Empowered Human Service

Had this been another Silicon Valley and technology centric strategy book, it would have ended here. The conclusion would have been reached: Globalization and technology developments are exposing all companies to a constantly growing commoditization pressure. To escape this pressure, companies seek to introduce a service component into their business model. However, traditional services are a productivity sinkhole, so the price for escaping commoditization is a productivity problem. Even emulating the best services firms in term of systematic professionalization does not solve this problem. The real solution is ICT: Reducing services and service processes to algorithms makes automation of some processes and some services possible, thereby powering the productivity growth of services with Moore's law. We have escaped commoditization through services, and we have avoided the services productivity trap through ICT based automation. End of story.

### a. The Services Dilemma

Our examples in the previous chapter on the algorithmic revolution have given us a sense that the story and its logic are not quite that simple. What is it that makes Amazon introduce a very service-oriented human-based help desk for its Kindle customers? What is it that makes Apple invest heavily in reinventing retail, offering a service experience, entirely based on competent and service oriented employees, that matches the service level in traditional luxury goods stores? And what is it that makes the very best human based services companies resist turning (fully) towards technology solutions?

The answer is that the algorithmic revolution does not represent a final strategic solution. For any service company, and especially for companies that have turned to services to avoid commoditization of their products, the algorithmic revolution—partial or full automation through the application of ICT—is a strategically necessary step to avoid falling into the productivity trap. It is a necessary step, but it is not the end of the story. The moment services are turned into algorithms, they can and will be

#### The Services Dilemma

- To escape commoditization all companies must develop unique value propositions to their customers – ultimately a services business model component.
- To the extent the service component is heavily dependent on human relations (avoiding commoditization) the company will be caught in the productivity trap (Baumol).
- To the extent the services component is heavily leveraged by technology (winning productivity: Moore), the company will be caught in the commoditization trap.
- Solving this dilemma requires a new kind of services innovation.

copied, improved upon, and overtaken. Therefore, they will be commoditized! There is no final escape from what we have labeled the services dilemma.

Companies have to pursue a services component in their business model to avoid commoditization. To the extent this component is heavily human and relationship based, they will be caught in the commodity trap (Baumol). To the extent that the productivity trap is avoided by leveraging the service through technology (winning productivity—Moore), the company will once again be exposed to commoditization. The strategic challenge represented by this logic is a classical dilemma, and as with any dilemma, the only hope for a solution is grabbing it by both horns. There is no viable long-term services strategy pursuing only automation. And there is no long-term services strategy in only human-based services. The innovation space for services solutions is somewhere in the field between human-empowered technologies and technology-leveraged humans.

#### Ultimate Value Proposition: The Empowered Human

- The services dilemma appears as a choice with no winners: If services are based on human relations, the productivity sink hole will open. If they are automated, commoditization will hit again.
- The only answer is both: Grabbing the dilemma by its horns.
- This means aggressive pursuit of productivity through technology AND avoidance of commoditization through the identification of technology leveraged human value creation.
- Identifying the opportunities and the business models of this leveraged human role is the ultimate value proposition in services innovation.

In other words, productivity needs to be relentlessly pursued through the aggressive application of technology to services, and at the same time, commoditization must be kept at bay through the constant identification of areas for unique value-creating human services on top of leveraged technology.

Is the dilemma truly inescapable?

How do we navigate the innovation space? Let us address these questions one at a time.

## b. Automation as Stand-alone Strategy?

A counter argument would be that Google with their fully automated service does not seem to be under any immediate threat of commoditization. There are pressures on the company, but also an apparently unassailable position in search and very strong positions in adjacent and supporting businesses such as Gmail, maps, Android and YouTube. It is hard to see any company that threatens to dislocate Google from the leadership position in the core areas and from strong positions in the adjacent areas.

There is some validity to this argument. But there are also conditions that apply and that make it hard to claim a more general validity, beyond the example of Google and a few other companies and even in some ways for them.

- The first special condition is that there is a first or dominant mover and a “winner-takes-all” logic to the Google story. When Google launched their new search algorithm, they redefined search and reduced the predecessors in search such as Yahoo to ‘also ran’ status. In parallel, Google achieved first mover status in the online advertising market by developing the algorithms for targeted advertising and for measurable click-counts. This generated the revenue which enabled Google to outpace all potential competitors in terms of both continuous improvement of existing services and the aggressive development of new services that all contributed to more users and more advertising revenue. Google’s early mover advantage gave them a quasi-monopoly for their primary service, and their ability to generate cash flow out of this position enabled them to invest enough to defend, fortify, and expand that position. In that sense, it can be claimed that Google has moved almost beyond competition and for the time being, beyond the commoditization pressure. However, by the very nature of what created the position, this is something that can be achieved only by very few companies—a maximum of one company for each automated service area. At the present moment it can probably only be said of Google, Facebook, Twitter, eBay, and Amazon among the major players, and then maybe a few more narrow niche players, but their much smaller scale makes them significantly more exposed and vulnerable.
- The disconnect in Google’s business model between its end users and its sources of revenue is a second aspect of their relatively protected status that limits the probability of general exceptions from our claim that all automated businesses will be under threat of commoditization. Google’s users get the service for free. Google’s revenue comes almost exclusively from online advertising. Commoditization pressures on price for a given service hits both sooner and harder when the direct user has to pay directly for the service. A protected position can be maintained much longer when payment and decisions about spending money are kept separate from decisions about usage. This is important for our argument partly because it means that the relative protection from competition and commoditization is an even more reserved position, not only limited to the first movers, but also tending to be limited to those companies for whom usage and payment have been separated, i.e. the advertising based online business models.
- So far the advertising-based business model has been very dominant among the early successes in automated ICT services. That in itself becomes a limiting factor. Businesses such as Facebook and Google would in principle not need to be competitors. After all, their original services are quite different. Why did Google feel they had missed the boat in a serious way when Facebook broke through as a resounding success and why did Google—in spite of several failures—insist on developing a social media presence? They are

not competing in the same service area for the attention of users. But they are competing for overall share of users time spent online, because that is the key to who will win the competition about share of online advertising spending. For a while they have been able to all grow because global online advertising has been growing dramatically at the cost of print, stationary, and to some degree, TV advertising. Overall global advertising spending is not growing at very high rates, and the migration from other media to online is probably about to level off somewhat. In addition online itself is under attack from mobile, and many of the companies with strong revenue streams in online have so far not been equally successful in mobile. This means that the competition for revenue for example among Google, Facebook, and Twitter is head-to-head; it means that any expansion of Google's services will end up competing with other Google services; and it means that every new online service company will be competing for its slice of the pie at the cost of all the incumbents. Either the advertising-based business model will have to give, and so far there are no obvious replacements, or commoditization will hit even Google.

- This pressure is being reinforced by two mutually supporting attacks on the advertising based companies. From one vantage point politicians—particularly in Europe, but increasingly also in the U.S.—are reacting to consumer pressures and privacy advocates and beginning to impose limits on the online tracking of individuals, which is the very basis for the advertising revenue. And from another vantage point, competitors, who have been suffering during the apparent success of the advertising financed online service giants, are fighting back. Microsoft's recent announcement of the DNT—do not track—default option on all its platforms is the most significant example. While for once placing Microsoft among the “good guys,” the move will inevitably raise the pressure on all companies that cannot make a similar announcement without jeopardizing their business model. It would be obvious for companies like Apple to join the move and thereby put pressure on Google.

The conclusion is that it is, and might in the future be possible, for some dominant players in fully automated services to escape commoditization without leaving the fully automated platform. However, this will only be true for a few highly profitable, dominant early movers, and mostly in companies where the advertising model helps keep decisions about use separate from decisions about pay. Even for companies that have so far succeeded within the advertising based model, both inherent and external pressures on this model seem to make commoditization an imminent threat.



### c. What does the Empowered Human Mean?

As promised in the previous chapter, we will once again turn to our Unimerco case to draw final lessons from it. What happened to the human role when Unimerco semi-automated the design and production of what had until then been unique and special tools? Previously, the company would have a sales engineer with ownership of the customer relationship who would advise the customer on all tool deployments, about production optimization, about tool maintenance versus replacement, and about the mix of standard and special tools. He would be the customer's interface to Unimerco's delivery system and he would call on tool engineers to work with the customer when special tools were to be developed.

After semi-automation these roles change: The sales engineer is empowered and becomes even more valuable for the customer. Equipped with the parametric tool design system and as the face of Unimerco, he now represents even more of a one-stop-shop for the customer. He will do everything that he did before, but in up to 80 percent of the special needs cases, he will bring the customer to a solution, which will tend to be more robust, less costly, and delivered more quickly. The role of the tool engineer has changed even more: He will be spending one part of his time maintaining and optimizing the parametric tools design system, and training the sales engineers towards mastery of the system, not the least of which is recognizing the limits where the parameters will not reach. This role is undertaken in close collaboration with the other elite tool engineers at Unimerco. The other part of his time is spent with customers when new materials or the need for new functionalities require the development of what is still a special tool. In these situations he is allowed to spend more time and involve the expertise of colleagues, because each such situation is no longer seen as a one-off service that needs to make financial sense as such. Each customer opportunity where Unimerco can develop a tool that is outside the parameters of the existing tool design system is viewed as an opportunity to extend the system further, and therefore merits the investment of time and resources. The final part of his role is to continue building the database and the system, so that Unimerco remains the unchallenged leader in terms of mass-customization of advanced industrial tools. This implies close collaboration within the Unimerco community of tool engineers, and it implies that this community maintains close relations with leading tooling machine manufacturers, with customers, and with developments in materials technology and tool solutions.

Both human roles have been upgraded in terms of qualifications and in terms of decisive impact on and contributions to value creation and the future of Unimerco. Moreover, the number of sales engineers and tool engineers in Unimerco has been growing as fast as recruiting and training allows since Un-

imerco took the decisive automation step. The growth, of course, is possible because the productivity attained has allowed for a rapid gain of market share.

This is an example of the empowered human role. If automation is used to just eliminate the human employees, there will be no defenses against commoditization as competitors catch up or overtake the technology position. If the human employees are kept on board in an unchanged role, redundancies will create frustrations, cost overflow, and irrelevance of the human role. If the number of human employees is reduced and the remaining people are put in a role of subservient dependency on the technology, we get the ultimate negative in terms of customer (dis)satisfaction, where the customer actually gets to meet a human being but that person cannot (often perceived as will not) deliver service, often using the systems as excuse. As customers, we all too often find ourselves in that situation in relation to call centers, poorly run retail stores, so-called customer service functions of insurance companies, telecom operators, tech companies, airlines, banks, and public sector bureaucracies. We also know what to do if the market offers us alternative providers.

This is why the winning formula starts with leveraging technology by humans in an empowered service role.

We are only beginning to see the very good examples. Technology is beginning to be used in elder care to eliminate labor intensive human roles in cleaning (robots), monitoring (diverse sensor systems), dispensing medication (combined software, logistics, and motivation systems), lifting and mobility (intelligent power devices), and personal hygiene (bathrooms with intelligent robotics). For many elderly citizens, these developments are seen as valuable improvements, mostly because they enable many to stay in their home for an increasing number of years. From a social economy point of view that is significant because the cost of older citizens in their homes is so much lower than the cost of institutionalization. Additionally, it yields social value for each person in the form of continuing relations with neighbors, friends, and family. In terms of the elder care service, however, the decisive gains from the automation is when part of the eliminated human role—which to a high degree had been routine, repetitive, and not very personal—is reinvented and empowered as a true care professional role with time and ability to listen, with real therapeutic and training services, and as the ultimate feeling of security that there is always, non-intrusively, a caring and qualified human ready to step in when the systems do not meet all needs.

We have already looked at the examples of the Amazon Kindle Helpdesk and Apple stores. Some insurance companies have successfully automated as far as latest technology will allow, thereby taking their costs way down, and have then defined touch points where the customer is surprised by real human ser-

vice and an experience of assistance beyond expectations from their insurance company. In some cases encountered during the SIM project, the insurance companies were able to achieve this superior level of service through the right partnership with their service providers, as illustrated by the insurance company that retained its auto insurance customers against price competition by having qualified and empowered its auto repair service providers to become very effective solution providers for the customer: Quick help at the location of the accident, on the spot damage assessment and approval of claim, immediate provision of replacement vehicle, and much more. Or an example from public sector services: Tax in Denmark is probably the most automated tax system anywhere in the world, where all routine services are online and where, for example, most citizens can do their full tax returns and get a full calculation of their taxes just by accepting the automated reports. The normal quality and correctness of those reports is high. But when the systems give cause for doubt or questions, or if the citizen has an unusual situation, you are invited to call or contact the tax authorities directly. You are met by highly-qualified and service-oriented employees, who help you with your questions, and who can even give you a final and legally binding decision on issues in doubt, so that you can follow the advice and be certain that you will not be exposed to a counter-ruling at a later time.

But before we go to more examples, it will help us understand what is going on to look at the developments from some different angles.

#### **d. 'Tacit Interactions' and the Growth of Relationship Jobs**

Another way of gaining insights into the empowered human role in services is to look at some of the big trends among companies and in the labor market. What characterizes the empowered human role is that it is concentrated in the relationship based aspect of services. How do companies that have a strong focus on these relations and human-based interactions fare, and what is the relative role of jobs focused on relationships in the economy?

A study by strategy consultant McKinsey—reported in a 2006 article in the Financial Times by James Manyika, “The coming imperative for the world’s knowledge economy”—examined the performance of 8,000 global companies across several sectors. The study showed very little performance differential in terms of both top- and bottom-line, between laggards and leaders in companies dominated by the internal transformation processes. The same was true among companies where the main business was focused on optimizing classical external transactions. Manyika mentions the rapid spread of best practices and benchmarking as a reason for the low differential. Whatever companies

do to optimize well-understood transformation processes and well-understood transactions can and will be copied by their competitors. Whatever technologies applied to this optimization process will eventually be available to competitors as well. We are in the realm we discussed so far as the automation option, and the low, sustained spread in profitability found by McKinsey is commoditization at work.

### The New Logic of Value Creation

2006 McKinsey study of 8,000 global corporations documents changes in value creation:

- Internal process optimization: No lasting advantage
- External transaction optimization: No lasting advantage
- Optimizing tacit interactions: Significant and lasting advantage in growth and earnings

Confirmed by findings by the U.S. Bureau of Labor Statistics, showing that the number of jobs primarily involving tacit interactions is high (41%), growing, and growing in relative wage levels

The picture is very different among companies where the relative proportion of what McKinsey labels “tacit interactions”—in our terms, jobs focused on the human relationship side of services—is high. “When tacit interaction intensity increases from low (less than 14 percent) to high (greater than 62 percent) performance differentials between top and bottom quartile performing companies increases significantly.” The explanations offered by McKinsey in the study are centered on the fact that since these functions are hard to codify they are equally hard to copy and that this is doubly true of companies that successfully lead these tacit interactions and the human intensive relations they perform. The functions are dominated by human interactions—interactions that rely heavily on judgment and context. They are therefore hard, if not impossible to codify (hence the tacit label), and successful managerial practices in relation to tacit interactions are equally hard to copy. “In contrast to transformations and transactions, which can be mapped and codified, tacit interactions depend on complex mixtures of judgment, problem-solving, and information exchanges, often involving group behavior that is difficult to replicate.” They are fundamentally about human relations.

The U.S. Bureau of Labor Statistics provides data from their labor market census that reinforce the McKinsey conclusions. They show that the number of U.S. jobs concerned with tacit interactions (in McKinsey’s terminology) is large (41 percent of the workforce) and growing, and the salary level of these jobs is high and growing significantly above the national average.

This of course makes sense. Companies that have included a higher number of relationship oriented employees have the ability to differentiate themselves in a durable and lasting way in terms of growth and earnings. And employees in those kinds of jobs are growing in number, are well paid and have higher increases in pay than the average.

## e. The Transforming Relationships

Let us now look more closely at the nature of those shifting, human intensive relations that are growing so much in volume and strategic importance.

The first thing to notice is that for most companies, this is not a change in one or a few relations, but fundamental and interrelated changes in the nature of most or all the key relationships the company is involved in: relations among employees and between management and employees; relations between the company and its customers, suppliers, competitors, shareholders, and other stakeholders!

The Relationship Transformation							
	Employees	Customers	Suppliers	Competitors	Knowledge partners	Shareholder	Stakeholder
Traditional relationship	One to many control through hierarchy	One off market transaction by salespeople	Price driven control game by procurement people	Minimum direct contact – War game	Minimize use of external sources of knowledge	Anonymous mass to be handled through mass market communication	Not relevant
Trend	All relationships change from asymmetric, control-oriented, one-off to symmetric, continuous, rich on substance, partnership-oriented relationships.						
	No single relationship can be optimized without the other relationships being optimized as well						
New relationship	Employees as owners and partners	Close sharing of knowledge; long-term partnership	Supplier as source of knowledge; long-term partnership	Competitors as partners in networks of scope	Enhanced reliance on external knowledge partners	Intense investor relations	Responsible relations with all stake-holders

Most frequently there is a primary focus on a company's relations with its customers, since that is where the types of loyalties and longer-term partnerships that enable the escape from commoditization are directly developed. But the reality is that those relations cannot be changed unless all the other human-to-human relationships through which a company performs its business—relations with and among employees, relations with customers, suppliers, competitors, shareholders and stakeholders—are changed from the conventional, hierarchic, asymmetric, control-oriented, one-off transactional relationships to much more continuous, symmetrical, broader bandwidth, partnership-oriented relations. The nature of all these changed relations is exactly what James Manyika labels tacit interactions, so the growth of employees performing such interactions and the importance of those interactions for

company competitiveness is a direct reflection of the services transformation we are discussing. Even the most automated services company will have to develop all its human to human relations in this direction. In Google's case, it has always been clear in the way relations among employees are constituted and in leadership relations as well. Within the fabric of Google, there are many examples of these types of relations with competitors and partners. Google's experimental approach to new systems development incorporates many elements of relationship development with early users, and Google's access to the kinds of knowledge that are required for its effort to keep ahead in terms of automated systems is dependent on similar approaches. So even where the end user service relation remains automated, the relationship change has still happened across the other key relations and any bid to avoid commoditization even in the medium term rests on that.

## **f. Sharing Economy Companies**

During the SIM project the team has been working with Lisa Gansky, serial and successful Silicon Valley entrepreneur and author of "The MESH—how access trumps ownership," on business models and companies in the so-called sharing economy. What has become particularly interesting in the SIM context is that practically all the MESH companies are based on automated or semi-automated services platforms, while they are focused on new ways of monetizing mostly material assets. Yet at the same time, they all get a core component of their value proposition from the development of relationships.

Even though it is still too early to assess how pervasive and how transformational the trends towards a sharing economy will become, the principles involved are potential inspirations for many services companies struggling to find new ways of addressing the dilemma between productivity and commoditization, so we will give a brief overview of what is involved.

The basic starting point of the sharing economy is that everyone in our present economy is in a situation of owning assets that are only utilized a fraction of the time. Since underutilized assets are equal to waste, and since waste can be turned into value (for someone else), this situation is the potential basis for not only a much improved resource economy, but also for numerous business models. We can all have the use of more for the same money or we can make use of the same for less money and with a better resource economy. My car that I use less than 10 percent of the time can be rented by someone else when I don't need it. Instead of a lawnmower sitting in every single garage on the block, two for the whole block could easily cover the mowing needs of everyone. Since I am gone on business two days a week, my house could be the base for someone else doing business or visiting my home town for those days. I am busy and do not have the time to print, copy, and distribute the memo I have

prepared, but there are people around looking for employment, even if compiled out of a number of small ad hoc tasks. These very common asset and need configurations have become the basis for companies such as RelayRides, Toolshare, AirBnB, Taskrabbit, and many more. In San Francisco alone there are several hundred sharing economy companies, and some of them have already passed the billion dollar valuation bar.

Some would argue that there is nothing new in this situation. The rich heritage in Danish industrial history of cooperative companies is clearly an early example of sharing economy business models. There are, however, three distinctly new elements to the present wave, and all three are highly relevant to the discussion in this book:

- The first is that a large proportion of the sharing economy business models are about access to material assets. This means that we are either talking about product companies that add a value-creating utilization service to their product, or we are talking dedicated services companies that step in and offer that service on top of what was delivered by the product company. In the first case, the service provided will help the product company escape commoditization. In the second case, the service will put the product company under additional pressure, since the service ultimately creates a smaller market for the product. For that reason, no product company can afford to ignore sharing economy business models and opportunities. And in this sense, the sharing economy companies are part of the services transformation that we described and discussed in chapter 2, section c.
- The second is that the problem and the opportunity of under-utilized assets have existed for many years, but solutions were unwieldy and prohibitively unpractical until sufficiently good ICT systems became available at low cost. As long as car-sharing required a labor intensive logistical clearing house for time available on what cars where, and a time consuming huge central key board for exchange of keys to the available cars and clearance of necessary documents, it would never happen. But it becomes both practical and viable when an online exchange keeps track of availability and location of all cars in the system, payment and document clearances are simple, standardized electronic transactions, and the membership card of each service member with its embedded chip becomes the instant key to the contracted car for the duration of the lease. The same is true for all the new sharing economy business models, which means that they are not only a part of the services transformation, but they are even more a part of the algorithmic revolution. Sharing economy companies tend to be automated services on top of under-utilized material assets.

- The third element is the innovative ways that personal and long-term relations create loyalty and community around the shared economy service, and thereby make the automated systems resilient to commoditization. The shift from selling a product once and for all in a market transaction to selling access when needed already leads to a relationship. “We will be dealing with each other again and again,” is the underlying assumption. On top of this comes the need for trust: No one wants a reckless driver in their car. No one wants to rent a car that is poorly maintained, dirty, or maybe even dangerous. No one wants noisy, littering, thieving, or destructive renters in their home. No one wants to entrust an unreliable task rabbit to deliver their documents, take their children to music lessons, or pick-up some valuable merchandize. For those reasons, most sharing economy companies are based on some form of membership model, where there is partly some initial screening, partly a very consistent weeding out of members that fail to live up to the standards. Trust and vouching become important values. But it reaches further than that: When local communities end up sharing assets, they become closer knit as communities. Or it turns out that AirBnB renters make much more use of local community shops, facilities, and events than hotel guests, which means that they become community catalysts, just as their welcome into the community becomes an added value to their travel experience. The providers of an automated service also become orchestrators of membership relations, trust, and the building of communities.

On the one hand MESH companies are just emerging. On the other hand their business models and early successes contain lessons for product companies that need services to avoid commoditization; to services companies that need to enhance their ICT abilities and productivity; and—maybe most important—for companies with automated services about how to become resistant to commoditization by building human touch points, relations, and loyalties into their business model.

## g. Navigating the Innovation Field

We have seen how technology is continuously and radically changing the game. Procedures are automated: jobs, functions, and companies relocated or displaced. Production is modularized and services unbundled. As soon as computing or computerized tools have been applied to a process, the process will continue to change with the power of Moore’s law.

At the same time, this story is very much about human creativity, understanding, and value creation. Human knowledge is identified, codified, and embedded into software and tools. This is done by highly creative and skilled humans. Technology is used to enable new processes, products, and services. This is done by humans. Once technology tools are in place, humans expand their



application and scope, which often leads to new developments of tools and technology. First and foremost, every time a technology has been used to automate what was previously a human work process—displacing people—new value-creating functions, developed and executed by humans, seem to appear on top of the technology. The simple, big picture is that never has there been so much technology and so many human work processes automated, altered, and displaced as there is now. Never has the process of automation happened with a pace comparable to what we are seeing right now in all sectors and across the globe. Yet never have so many people been gainfully employed—in absolute numbers as well as in percentage of the population—as there are now.

On the one hand technology is changing the game. On the other hand, it is still fundamentally a human game that is changing. Let us delve deeper into what is happening.

In chapter 1 and 2, we came to understand how technology and globalization are driving decomposition—the modularization of production and the unbundling of services. One consequence of that dynamic—as we have followed it—is how companies in all sectors are forced to seek to avoid commoditization by somehow adding a services component to their business model. We have also seen how technology is transforming services, and thereby the nature of all these business models. We came to see that the addition of a services component to the business model does not bring companies to any lasting solution. Rather, they are still faced with a fundamental strategic dilemma. Either they transform their business by adding a human-based services model, thereby avoiding the commoditization trap while being caught in the conventional services productivity hole; or they seek the transformation by adding automated services with huge potential for productivity gains, but at the same time with a renewed risk of commoditization. Whatever can be automated can—and will—be copied. As companies are seeking their way out of the dilemma, we see strategies spread over a spectrum in terms of the services model they are pursuing. Some companies—mostly in sectors where the service delivered can be rendered in digital form—seek to invest their human talent in creating fully automated services. Google has been one of our examples. Others stick with fundamentals and deliver services that are still primarily based on an irreducible human component in delivery—from hairdressers to McKinsey consultants. And finally a growing number of companies seek new solutions towards the right mix between technology and humans, hybrid forms that seek to solve the dilemma by grabbing it by both horns, leveraging humans through technology and technology through human talent and understanding.

This is where the book has left us. The next steps—which are beyond the scope of this small book—will be to come to a better understanding of the nature of those dynamics and business imperatives that make the human factor keep

re-imposing itself. What is the nature of human value creation that it seems to be the only way out of commoditization, and what are the implications of that for strategy? We believe that many of the answers are being produced in practice every day by innovative companies and it is hugely enlightening to follow their efforts. However let us at this point end our book by summarizing some of the lessons that have become clear so far:

- In the globalized markets, it is impossible over time for a company to avoid commoditization without including a services—i.e. a relationship based—component in its business model;

### Services Innovation Defined

In conclusion this means that our definition of services innovation must include these aspects:

- Services innovation unfolds in all the forms of general innovation
- Services innovation is fundamentally dependent on professionalization
- The need for services innovation has become pervasive and more critical because commoditization drives all companies towards service components in business models
- A dominant form of services innovation is driven by the algorithmic revolution – transforming existing services, creating new services, and accelerating productivity
- The ultimate value proposition of services innovation is identifying and developing new and unique positions of technology-leveraged human services

- Services are exposed in terms of an inherent productivity hole, and only few and very exceptional (or very small) companies can survive a lapse in productivity;

- Therefore, all companies and organizations must relentlessly pursue an algorithmic revolution of their services processes;

- However, algorithms can and will be copied, improved, or bypassed.

This means that companies that rely only on automating their service offerings will once again be exposed to merciless commoditization;

- The way to escape that is to add an empowered human-based value added on top of the automated service;
- Candidate activities for these empowered human value added are located all the way across the scope of the company's relations; and
- The indicative formula for the decisive innovation field is between the human value-added technology and the technology-leveraged human.

We hope that our overview of the dynamics, trends, traps, dilemmas, and some of the successes will help at least some companies along the way in solving the services dilemma.

## ANNEX 1

# Preliminary Thoughts and Observations: What does this mean for Denmark?

*Niels Christian Nielsen and John Zysman*

The logic and dynamics we have covered in the white book so far are a story about how globalization and global technology drivers are captured within industry dynamics of decomposition, recomposition, commoditization, and a services transformation. This logic has ramifications for every single company that wants to succeed. Obviously it also has ramifications for nations and their competitiveness and for national policies related to productivity, innovation, competencies, and industrial structure.

This white book was written as part of the SIM project. The work on practical implications of the logic was done with Danish companies, and many of the discussions within the project were undertaken with Danish companies, industry leaders, and industry associations. This obviously has led the authors to make observations and to reflect on the 'so what' for Denmark of the described global dynamics. We have decided to include a brief summary of these reflections as an annex to the book and hope thereby to provide some food for thought to the ongoing Danish debate about productivity and innovation.

To avoid any misunderstandings, it needs to be stated explicitly that these observations, thoughts, and ideas are made by the authors personally. They are not the views of the SIM project team, the Teknologisk Institut, the Advisory Board of the SIM project, or any of its members.

## 1. The Composite Picture of National Productivity

In the present Danish debate, there is a tendency to focus on issues of productivity among the companies that are exporting or exposed to direct competition from imports. Though the pursuit of productivity needs to be relentless in all companies, this particular focus of the national debate is quite off target: Those companies are actually doing well in comparison with their global competitors in terms of productivity. Focusing on them is like whipping the horse that is already racing among the leaders, instead of concentrating on the horses that did not even start running yet. Many countries would wish they could take over the Danish portfolio of companies in this category, considering its

composition of elite companies in interesting and growing market niches as well as its resilience based on diversity. Let us name just a few of these elite companies: Arla, Lego, Jysk, Maersk, Velux, Novo, Grundfos, Danfoss, ISS, Carlsberg, Unimerco, Novozymes, Oticon, Bestseller, Ecco, Wivex, Coloplast, Rockwool, DONG, Falck, Vestas, and Lundbeck.

A recently published study by McKinsey Sweden and McKinsey Global Institute (MGI) on “Growth and Renewal in the Swedish Economy,” highlights how the overall Swedish productivity is the sum total of productivity in international businesses (exporting and import competing), which has been leading in Europe, and the productivity of home market businesses (mostly services), which is low, and public sector services, also low. Each of the three groupings is, on order of magnitude, one-third of the Swedish economy. MGI argues for Sweden that the international businesses must maintain their pace, but that they cannot be expected to do much more than that. The home market service businesses must be brought on a path of positive, unrelenting productivity growth, and so must the public sector services.

The same is true in Denmark.

About one-third of the economy is international businesses. About another third consists of home-market businesses: retail, building and construction, services, etc. And the last third of the economy consists of the public sector and its services. Productivity and innovation need to be relentlessly pursued throughout the whole economy, and for obvious reasons there is more to gain among the home market businesses and in the public sector. As a matter of fact, productivity gains in the lagging two-thirds is probably the best way to gain additional international competitiveness among the international businesses, since the other two-thirds of the economy significantly impact the international businesses in terms of overall cost and availability of enabling resources (qualified workforce), framework conditions (streamlined administrative systems), and infrastructure.

We will start with some observations and anecdotal evidence of opportunities and potential among the internationally competing Danish companies. After that we will discuss productivity and innovation among home-market businesses, and finally in the public sector.

Initially, we strongly urge that manufacturing and services should not be debated as distinct sectors. The debate should be about production in Denmark, and that—as we have shown in this book—is a discussion about both manufacturing and services and their inter-linkages. This, by the way, broadens the potential Danish upside in terms of both productivity and innovation. Let us point to some examples and observations:

- a. As we have seen the primary way for a product company to avoid commoditization is to include a service component in its business model. Our example in chapter 3 about Unimerco illustrates this in a very clear way. As a wholesaler and later as a producer of tools, Unimerco needed to envelope these products in professionally developed services in order to maintain its differentiation at every stage of its strategic development. Another example is Grundfos differentiating its pump products as constituent parts of water and energy services, enveloped in total performance service concepts. Or Bestseller and Ecco differentiating their products through branded retail services. For Danish companies as well as their global competitors, a service component is a prime avenue to avoid commoditization.
- b. An example of future potential among Danish companies working in this direction was given at a workshop within the SIM project by Velux CEO Jørgen Tang-Jensen. He was addressing a group of other Danish CEOs and disclosed that Velux has had the question of possible services initiatives on the table during their strategy discussions for at least 10 years. The company is convinced that sooner or later they will want or need to move in that direction. So far they have not been compelled, but this is because of their truly unique market position. Since they originally invented the category of industrially produced skylight windows, Velux started out with a market share of 100 percent. Today—more than half a century later—the market share remains as high as 75 percent. Commoditization is obviously not a short-term threat. Nevertheless, Velux keeps the services question actively on the table and part of corporate practices and experimentation. One component is to provide superior product life cycle services to customers as a natural part of Velux's premium position. Another component is to take active part in experimental and developmental activities, such as Teknologisk Institut's EnergyFlex Lab and House, and such as Velux's own effort of building six houses in different countries with different climate-conditions as Model Home 2020. A part of the insights gained from these activities is a deep understanding of how Velux's products integrate with other building components of the future house, which will be the knowledge base of future concept services. Velux is certainly one of the companies with the capabilities of becoming future systems integrators (recomposers) in the building area, thereby representing an interesting part of future Danish potential.
- c. Service concepts as the basis for systems integration or recomposition for a large number of components represent both a present weakness and a future potential for Danish manufacturing. At a meeting held during the SIM project, Anders Eldrup—in his capacity as chairman of the Copenhagen Cleantech Cluster—reported with some frustration about an experience with the mayor of Hong Kong. During a visit to Copenhagen the Hong Kong mayor and his team of experts had been impressed by the clean water in Copenhagen Harbor, and by the combination of water expertise and hundreds of water technologies, devices, systems, and solutions that com-

bined to produce this very spectacular result. Hong Kong wanted to buy a comparable result from Denmark. Anders Eldrup's frustration was caused by the fact that there is no Danish company capable of delivering such a solution and undertaking the associated risk of being the systems integrator. Lots of companies were ready to advise on a consulting basis, and lots of companies would sell components and technologies to the Chinese. These offerings were, of course, of limited or no relevance for Hong Kong and would at best be allowed as bidders in highly price-driven tenders. Small Danish companies with piece-meal components of the solution can survive in the protected home market, where public sector entities often undertake the systems integration (and almost always the integration risk) and where component manufacturers are therefore allowed to play. The same is somewhat true in the semi-protected EU procurements market, though its rules are strong drivers of commoditization. Globally, however, the absence of Danish systems integrators and recomposers—a role that would almost always be defined around a services model—means that Danish companies are either not given an opportunity, or they are given an opportunity on highly commoditized terms (which given the cost structure in Denmark is hardly an opportunity at all). Think of all the different areas where there are strong systems solutions in operation in Denmark: pre-school daycare centers, elder care, energy efficient buildings, waste systems, hospitals, tax systems, labor market training systems. Each one of those areas could be an opportunity for high value-added exports, if there were companies with capabilities and risk capacity to take the service providing systems integration role, and if public sector procurement would let them.

- d. One Danish company that we have observed during the SIM project, which from a very strong product foundation has moved in many of the directions discussed in the book, is Lego. The Lego product in itself is inspiring some of the highest levels of customer loyalty with a very strong brand, second to none in relation to perceived value for children. The brand itself is a very powerful protection against commoditization. In recent years the product experience is being extended with embedded ICT in some of the products and with online communities of different categories of Lego users and Lego co-developers. Additionally, Lego has added the Lego Education business unit, which is selling Lego educational kits and toolboxes, but increasingly also educational concepts utilizing those toolboxes. In collaboration with the Lego Foundation, model schools and model classrooms are established, and significant educational efforts are undertaken in developing countries, but also at home in Denmark and in the U.S. In California alone there are more than thirty Lego Creative Child daycare centers. All of these initiatives seem to be part of a Lego commitment to the quality of play and learning during childhood. From our outsider observations, it is not clear where and how far Lego is taking these initiatives, but the trend from products, to products enhanced and extended through ICT and services, and to poten-

tially major system integrating services solutions, holds interesting future promise for a large number of other producers of education and daycare solutions as well, should Lego choose to move further in that direction. That decision would probably be influenced by how Denmark chooses to operate and develop its daycare centers.

- e. Our participation in the SIM project has given a privileged access to a category of companies in Denmark that tend to be overlooked both from abroad (international observers know the companies, but do not realize that they are Danish) and in Denmark (Danes know them and take them for granted, but do not recognize their unique global position and capabilities): service companies like ISS. We have already described the consistent professionalization of ISS in chapter 3. Take a company that specializes initially in the most trivial of services, cleaning, and turns it into a global, integrated facilities management company that employs more than half a million people. This global company is practically without competition when customers—other global corporations—need to eliminate the internal risk of their global integrated facilities management, while still needing the task done with consistency and customer focus everywhere (your customer's customer) by someone who has a scaling machine as well as the ability to serve the particular customer relation. This is what ISS has done with a headquarters staff of 120 employees. The skills involved in doing that are quite unique, and have been shared over the years with other services companies of Danish origin such as Falck, G4S, Berendsen, and many more, creating a Danish corporate DNA of scaling services concepts. It is crucially important for the balance of the Danish debate not to forget the production and the value creation of these companies while focusing on the production of and the allocation of jobs within manufacturing companies.
- f. Finally, we need to point out to the Danes that there is a comparatively strong basis in Denmark for ICT-based and (semi-)automated services. The algorithmic revolution is probably doing as well in Denmark as anywhere outside Silicon Valley. Partly, Denmark shares the high ICT literacy of the Nordic countries that probably dates back to early leadership in mobile telephones generated around the NMT standard; then was propagated because of proactive unions that helped build a positive attitude towards experimentation with ICT in the workplace and user involvement in systems specifications; and later was strengthened by infrastructure investments in network capacity and in private and public sector initiatives around large systems solutions. All the public sector services enabled by the early adaptation of the CPR number (a system of personal identification numbers for all Danes) as a unique and consistent identifier, and all the private company and individual financial practices that were enabled by the early electronic payment system PBS (a pioneering system enabling electronic payment, which is now part of the merger that resulted in Nets), which since 1983 (introduction of the Dankort) has enabled a level of retail banking automa-

tion that has not yet been achieved in most other places, notably including the U.S. These pioneering positions today translate into highly automated public sector services (tax is the flagship example); high levels of e-business trading and online transactions as well as high usage of online games, services, and networks. And they have resulted in company based leadership in areas such as energy management apps, payment apps, communication (from Skype and on) to learning games and apps (Alinea, Area9, and Mingo-ville). It is hard to claim that Danish services in general are leading the algorithmic revolution. But it is equally hard to claim that they do not have excellent conditions for assuming leadership both in terms of user competence and preparedness and in terms of technology infrastructure and qualifications.

- g. Denmark could reinforce this relatively positive situation by creating a national or a Scandinavian initiative to increase how Danish companies take advantage of the cloud as a dynamic and enhanced utility and an innovation ecosystem (we have included Annex 2 to this book which gives a brief overview of what the cloud is and what it means for competitiveness and in terms of policy challenges). In one way, you can describe the cloud as the service and infrastructure that removes all scale barriers to entry for small companies and small economies in relation to the most strategic and most sophisticated ICT resources. Two issues could prevent Denmark from taking optimal advantage of this opportunity:
- The cloud infrastructure is fully dependent on scale and at the moment dominated by multinational (mostly American, but also some emerging Chinese) operators. Small companies and countries could choose not to care, but that means ownership, regulation, and legislation (privacy, security, censorship, data protection, taxation) over data and transactions are beyond their control. A group of smaller governments might decide to ensure themselves and their citizens and businesses against large country domination and misuse (the American PATRIOT Act comes to mind, even before contemplating possible Chinese practices) by creating a subset of the cloud within their national jurisdictions (there are technologically feasible and financially viable ways of doing this).
  - While the cloud is a leveler of opportunity by removing barriers to entry, there is a likely delay before small companies build the managerial capacity and understand how to make use of that advantage. Denmark could help bridge this delay by providing small Danish companies with an enabling service (the American agricultural extension service comes to mind as an illustrative analogy) that would enable them to accelerate their cloud-based algorithmic revolution.

The partial conclusion from these observations among internationally competing Danish companies is that both the starting point and the present trajectory hold high potential. To realize this potential is about much more than



cost: Just as global companies cannot avoid the threat of commoditization by cutting costs (though discipline on cost will always be needed in a competitive environment), Denmark cannot retain production jobs by removing social cost and regulation (though discipline on cost is always needed in a competitive environment). Solutions for countries as well as for companies are much more sophisticated responses to commoditization than a basic formula of adding services to products and manufacturing; achieving productivity in services through ICT, and once again avoiding commoditization by bringing the empowered human value creation into play. At this point in our reflections on what this all means for Denmark, our observations lead to a number of recommendations:

- There should not be a discussion about manufacturing as an isolated case, different from services. The very solution for manufacturing means turning partially into services;
- Many of the more successful Danish manufacturing companies are already showing the way, so that the problem is more about policy and policy debate;
- There is great additional potential if Denmark and Danish companies could find a way to add systems integration (recomposition) services to their component and products businesses;
- It is a problem that the role of systems integrator (and of taking the systems integrations risk) in many cases has tended to remain with the public sector in Denmark (a solution probably calls for public-private partnerships);
- There are unique Danish companies with high potential for undertaking the systems integration role in particular domains;
- Denmark has the advantage of companies within its business structures that have a proven track record of scaling services businesses into global powerhouses around service concepts;
- Though Denmark is not in a global leadership position in terms of the algorithmic revolution, all the constituent parts are there at a level that is second to none; and
- The proposed Danish cloud initiatives could help make a good ICT starting position even stronger.

Allocation of production is a big part of what nations are competing for. This should not be mistaken as an issue of manufacturing allocation. The winning formula requires a new kind of integration between services and manufacturing. As the Danish policy debate and Danish policy makers realize this, they will be faced with the additional obligation that the conditions for success in Denmark are comparatively good (opportunity and potential imply obligation).

## 2. The Productivity of Home Market-focused Service Companies must be Improved

As McKinsey argued for Sweden, the Danish economy falls in roughly three categories, each about one third of the total economy. What we have just discussed is mostly about the category of international businesses. The second third consists of all the home market oriented companies in building and construction, retail, basic operational and personal services plus the major part of the so-called professional services—law firms, consultants, accountants—and health services—dentists, psychologists, and physiotherapists. As mentioned throughout the book, most of these companies have not yet made any real progress in terms of consistent professionalization as defined in chapter 3, and only a few pioneers among them have entered the algorithmic revolution in a way that makes a real difference in their productivity.

The final third of the economy is the public sector and its services, which we will discuss later in section 3.

While the internationally competing companies are doing comparatively well in terms of productivity, the other two thirds of the Danish economy are typically lingering over the last several years with productivity growth around zero, and even negative in some years. That in part is the real productivity debate to have in Denmark if we want to solve our national productivity crisis. And it is, by the way, also the easiest way in the short-term of improving the productivity of the internationally competing companies, since the productivity sinkhole of the home-market services and some of the public sector services are the large passive drain on their development and cost structure.

To start with, it is no law of nature that the home market services have to be a zero productivity growth sinkhole. Let us look at some examples encountered during the SIM project:

### a. Some Lights in the Dark:

- i. *Operational services:* The example of the plumber who developed an integrated summer home maintenance and security service is an actual Danish company that worked with DTI developing the concept. Use of sensors and mobile phone apps as part of the service makes the company an early example of achieving both additional value added from the value proposition of the integrated service and better functionality as well as productivity from the use of ICT. The business model is definitely scalable, though the specific company has so far not grown beyond its regional market. Similar models are being contemplated by companies that have participated in workshops during the project, for exam-

ple by companies in different kinds of automobile maintenance and repair services.

- ii. *Retail*: Companies like Nemlig.com (a grocery delivery service), Års-tiderne (delivery of ecological food) and Skagen Food (delivery of semi-prepared, high-quality meals with a strong fish component) have all combined particular service concepts with online business models to make life easier for particular consumer profiles. Some provide the complete ingredients and easy to follow recipes of healthy meals. Others compete on regular delivery of all the grocery needs of a family, taking care of all logistics, including return of recyclable items. The systems make ordering, reordering, scheduling, and payment easy and convenient, and some of the companies are experimenting with additional personal home services on top of the deliveries.
- iii. *Building and construction*: This has long been one of the “hopeless” cases of low productivity. However, some breakthroughs seem to be close. One area is in energy services, where energy efficiency retrofitting of buildings has been as fragmented as all other parts of the construction sector. What we are beginning to see is the emergence of recomposers, who base their service offering on an understanding of the building as an energy system. From that understanding, they offer the right package of integrated components; they have carefully developed methodologies of retrofitting, with optimally trained operators, and by operating at scale, they are able to harvest advantages of procurement and logistics. Their services in some cases include financing (against a share in the energy savings), and they are beginning to offer life time energy management of the building with included energy performance sensors (increasingly linked to smart grid functionalities). Companies like these are bringing whole new levels of productivity and value adding to building and construction, and the countries where such companies first evolve are potential homes of future global successes.
- iv. *Consulting, legal, accounting, etc.*: We have noted how the very companies that advice their clients about the need for ICT-based productivity are among the slowest adapters of ICT in their own business. But a new generation of consulting and professional services companies is emerging with a different approach and the potential to revolutionize this category of services. One company that we encountered during the SIM project had taken its classical consulting insights into innovation and idea generation processes in client companies and embedded those insights in a software package that helps the client manage its internal (and in some cases external) idea generation, selection, qualification, and implementation processes. Even with the software, this is a challenging task for the internal organization, so the company not only sells the software, but also software enhanced and highly-leveraged human consulting services, which tend to be recurring as long as the client

keeps the software package in use. This is just one early example, but the number of small companies with emerging business models like this is quite impressive. We have seen other examples among law firms, accounting firms, market analytics companies, just as the number of apps and software packages that embed what was previously a service is growing and driving the trend.

In each of the selected categories we could have pointed to more examples, and we could have added examples from personal services, health services, and many more. Change is happening and both productivity and innovation will be gained. The issue for Denmark is whether it is happening in sufficient scale and scope to make the needed difference on the national productivity bottom line. If not, there are of course initiatives that can accelerate and stimulate the development. But during the SIM project, we have also seen examples of how other private sector companies and how the public sector as a buyer can contribute to drive the professionalization, productivity, and innovation process.

## **b. Private Sector Procurement as Driver of Service Development**

We have already noted that the missing productivity of many of the home market service companies limits the productivity of the larger export-oriented companies that make use of their services. One of the remarkable activities in SIM was a collaboration with global pump giant Grundfos about their service suppliers. The case is documented separately as a SIM case story, but it makes sense to note the highlights here.

Grundfos, as so many other first rate manufacturing companies, has worked for years on their product, component, and material process supply chain. Every single supplier has been through careful selection processes, has had to be part of Grundfos's quality programs, and has had to prove themselves in terms of ability to be an independent source of knowledge for Grundfos, and thereby a partner in innovation. Relationships have been carefully groomed so that Grundfos's supply chain—some would prefer to call it the supply network—is not only an ecosystem of companies enabling Grundfos to remain the global pump manufacturing leader in manufacturing efficiency, but also in terms of innovation, and all of it made possible by a unique network of personal relations.

While the need to do all that supply chain work by now is part of the corporate DNA of companies like Grundfos, the surprise experienced both by Grundfos executives and by the SIM project team was that Grundfos had never worked with or even thought about its service providers in a similar way. Service providers were not a strategic concern and were therefore never given the atten-

tion that had helped develop what was still considered the “primary” supply chain of Grundfos, all the material supply stuff. The consequence was that Grundfos’s service providers were kept at arm’s length by Grundfos with a primary procurement approach of price reduction. They were never seen as potential contributors to the competitive strength of Grundfos, and neither their productivity and quality, nor their innovation contributions, were seen as important.

As reported in the SIM case, early gains in professionalization, productivity, and innovation coming out of Grundfos’s joint project with service providers were significant, and both Grundfos and the service providers reported valuable progress. Grundfos intends to continue working with its service suppliers in the future, which—if the practice is adapted across more companies—can turn out to be quite important at a national level as well.

A similar potential was identified during the SIM project in the relation of insurance companies to their service suppliers. The relation that was explored was between insurance companies and the auto repair service suppliers. Not only have manufacturing companies been less focused on the potential of managing service suppliers; this turns out to be even truer for large services companies in relation to their service suppliers. Auto repair service providers are a key supplier group for insurance companies. When an insurance client encounters car damage, the repair shop will deliver the service on behalf of the insurance company. In the life cycle of an insurance client, that is a moment of truth: If the service is satisfactory the client will stay with the insurance provider. If not, it is one of the most frequent triggers for the client to go shopping for a new insurance company. In spite of the strategic importance of the service, insurance companies tend to treat their suppliers in very non-strategic ways, in most cases as a simple function of the insurance business cycle.

- During periods when the insurance industry is in cost control mode, they use the bargaining power of their scale to pressure the suppliers on price. Ultimately this approach carries all the same weaknesses as the classical procurement model in manufacturing:
  - Dissatisfied end customers (loss of clients for the insurance company);
  - Weaknesses in the underlying development of supplier productivity, quality, and innovation; and
  - Strained supplier relations.
- During periods when insurance companies are pursuing added market share, they will often transfer the buying power to the client (you choose repair shop and service, we pay). This removes the potential dynamic of the big buyer from the system:
  - The client becomes more satisfied;

- The overall cost gets higher;
- The insurance company loses supplier relations and potential bargaining power; and
- The overall cost gets higher.

In Denmark, as in most Western insurance markets, the incumbent insurance companies have been vacillating between these two approaches, and the cost has been sustained stagnation and no significant development of productivity among their service providers. Of course, a third way is possible, and would provide gains for the insurance companies, their suppliers and at a national level. In this approach, the insurance company would build a long-term partnership with its selected suppliers with the aim of creating both efficiencies and value for the end customer (the insurance client). The partnership includes shared data (and/or ICT systems), knowledge sharing, services innovation, and relentless optimization of the supply chain with the understanding that jointly identified productivity gains will be shared.

In principle, such an initiative is obvious, implementable, and promises a win-win outcome for all involved parties. However, there are structural disincentives at both ends. Since the big insurance companies all share the same suppliers, no company is willing to take the lead because competitors could gain a free rider advantage. Joint industry initiatives are met with hesitation because they could run into anti-trust and collusion problems. On the supplier side what appears initially as a positive proposition, in reality entails not just development of individual companies, but fairly significant structural optimization of the industry as a whole, which for quite a few individual companies would have brutal outcomes. This of course could easily be driven by the joint bargaining power of the dominant insurance companies, if they were capable of and allowed to take joint action.

To conclude, there is great potential for cost and innovation gains in large corporations if they were to work proactively with their service providers. And if they do, that would also become a significant driver of productivity and innovation in a lagging part of the Danish business universe.

### **c. Public Sector Procurement as Driver**

Just as the procurement of private sector corporations can be a driver of productivity among service providers, public sector procurement should be an equally important factor. During the SIM project there has been a joint effort with the Danish Road Directorate (Vejdirektoratet) to seek models and solutions towards this end (see more about this in the separate SIM Case report). Their initial interest in relation to their very large project calls for tender (for example in relation to the Femern Connection—the planned construction of a tunnel between East Denmark and Germany) was to align two opposing pro-

curement needs, on the one hand a need for relatively few suppliers in order to reduce contracting and management complexity, and on the other hand the need for a highly distributed structure of suppliers in order to have operating and execution capabilities across the country. Networks of bidding companies with a lead supplier fronting a group of other companies could potentially both meet this need and make the participating companies impose productivity and commitments to quality and innovation on each other.

The Directorate contributed significant insights to the SIM project. However, the active and driving procurements role did not materialize because of all the complications of public sector and EU procurement rules. We will discuss these rules in the next section as part of our discussion about productivity of public sector services.

At this point, let us just summarize this section on the productivity of the private, home market-oriented service sector:

- With the companies in this category representing on order of magnitude one-third of the Danish economy, the country cannot afford to leave it as a productivity sinkhole;
- There are important trends among many of the companies themselves to seek productivity and innovation by professionalizing and through ICT;
- Large private corporations have a self interest in partnering with their services suppliers on productivity and development, though there are also constraints;
- The public sector should be seeking the same kinds of partnerships with their suppliers as large private corporations, but procurement rules are an obstacle; and
- National policies should aggressively seek to eliminate these constraints and obstacles.

### 3. Public Sector Service Productivity

Just as Denmark cannot afford to leave the home market oriented private services as a productivity sinkhole in the economy, the productivity of public sector services—another third of the economy on order of magnitude—must also be addressed.

While the fundamental services transformation is well on its way globally in the professionalized end of the private services sector, very little has yet impacted the public sector services, definitely in the Western world.

There is room for a lot of discussion about the reasons for this, but the effect seems to be factual in Western Europe, Australia, Japan, and New Zealand as

well as in Canada and the U.S. While the private services sector shows positive and, in some parts of services, leading productivity gains, the public sector is performing with zero or negative productivity development.

It would be surprising if the explanation turned out to be the same in all countries, though some causes are likely to be the same.

Among those often mentioned in the debate are:

- No incentives for productivity growth and hence, no leadership focus in that direction and no measurements;
- A political focus on deniability and control (often driven by ad hoc reactions to media events). This in itself often leads to control systems that in and of themselves have a negative productivity effect while also creating a culture that is adverse to innovation;
- The kind of leadership inherent in pursuing the six professionalization factors seems adverse to the political focus;
- When major IT investments are decided procurement systems and some parts of the RFP culture tend to lead to “white elephant” projects rather than applications and implementations that ride the market and harvest the yields of Moore’s Law; and
- The regulation of public procurements have tended to prevent the public sector from building the kinds of strategic alliances and strategic sourcing which have driven a significant part of the private sector productivity growth (using an analogy from the automotive industry, they source like GM, not like Toyota).

These explanations are probably part of the story in most countries, though differences and different forms will apply depending on the specific political, historical, institutional, and economic conditions. There is, however, no doubt that the public sector services productivity problem is universal and systemic. Solutions that have worked in the private sector can provide inspiration, but are not likely to be directly transferable. However, from our general discussion on the services challenge, we can derive the headlines of what public sector service productivity will require:

- Optimize on the six professionalization factors—you cannot win in services without doing the basics right;
- Utilize ICT and systems aggressively to leverage the value proposition in all parts of the business model—this is the only way to avoid being sucked into the productivity hole; and
- Know exactly where to bring the unique human competences and relations into play, not doing what you would have humans do in services delivery



prior to the strategic introduction of ICT, but by contributing a higher level and irreplaceable judgment and relations based service.

Professionalization in relation to public sector services in Denmark means the specialization factor more than anything else. The discipline of all six factors is of course necessary. Independence takes its own particular meaning, linked to all the unique functions that only the public sector can undertake because they require a position outside the market, independent from any private interest and in a position to mediate and regulate. Human resources are as important in the public sector as in any company. Efficiency is highly called for, and though public organizations in Denmark have not been laggards in terms of implementing efficiency technologies and systems, counterproductive political control, reporting and documentation requirements have tended to make the systems time and resource consumers rather than savers. Knowledge re-use has proven as difficult—and as necessary—in the public sector as in any private company. Branding and relations have been truly difficult; relations can be hard to build against assumed authority independence. On all professionalization factors there is obviously much to do and much to gain. The reason we still highlight the specialization factor as the real key to progress is that choice of specialization is not only a positive statement and positive action about what you do to contribute value, but at least as much a clear statement, choice, and consequential action about what you do not do. When that is made clear, the substantive direction within all the other factors is clarified as well.

In Danish public sector tradition this aspect of professionalization has been—in the eyes of observers from outside Denmark—inexplicably difficult. In all countries numerous service needs are defined, regulated, and financed by government action. Once those decisions have been made, most countries will proceed to decide who should be the actual operators of the service. Only in Denmark (out of all the countries with a market economy tradition) the default has tended to be the public sector itself. This has made professionalization a victim, because there has been no real analysis about who is the right operator, and public sector institutions have been left with a blurry role of defining, regulating, controlling, operating, measuring, and evaluating most of their tasks with no clear separation of roles and authority. The reason specialization has to be highlighted as the most important of the professionalization factors for the public sector is that there will be no real professionalization without clarity on roles—what do we do and what do we not do. The fact that it also becomes important in terms of opening up significant market potential is something we will discuss in just a short while.

**ICT in the public sector—advanced position, some spectacular successes, but also setbacks:** The Danish government and the public sector are globally

among the leaders in digitization. The fundamentals were established early on in the form of unique individual identifiers for all citizens as well as for all legal operating units. Consistent strategies for digitization have been in place since the 1990s, and milestones such as the digital signature; digital payments and digitization of all documents and archives; shared access points and single points of entry; to now when all correspondence between the public sector, citizens, and businesses is digitized. Entire service areas have been digitized and ICT automated, from an early pioneering effort on the electronic research library to digital universities and national efforts to provide electronic learning games supplementing the teaching of the curriculum in most school subjects. ICT has by now been adapted as a core enabling technology in some public service areas, and there are specific action plans to drive this further in administration, education, and health care.

Denmark's overall level is among the global leaders, and there are several areas where the systems and their implementation are outright impressive and where their functioning—by international standards—is leading the pack. We have mentioned the tax systems. UNESCO highlights the Danish results in development and use of online and mobile learning programs as leading globally.

As should be expected, there is also a less positive side to the situation:

- We have already noted how systems that could be drivers of productivity instead have ended up being levers for counter-productive control and documentation requirements. There is an absolute need for change in this respect before the required productivity can be achieved;
- There has also been a tendency to do pilots and small scale experiments and never get to large scale implementation and use. In some cases this happens because of a lack of coordination among several players. In other cases there is aversion to the risk of large scale. Though experiments are necessary as part of the development processes, missing out on deployment is missing out on the productivity opportunity; and
- Finally, the number of oversized, multi-year proprietary development projects with endless delays and astronomical budget overflows is large enough to have become a standard joke in the media and in popular humor. What could have gained much in a more flexible and partnership-oriented procurement process by free-riding on the technology developments in the market, repeatedly ends up as project disasters of delays, outdated functionality, and budget overflows. The need for reform is obvious.

In conclusion the public sector and public sector services in Denmark are leading globally in terms of taking part in the algorithmic revolution. Some chang-

es are needed to unleash the real potential, most of it managerial and organizational in nature, and all of it possible if the political will is there.

**Getting the Specialization Factor Right: Strategic Outsourcing, Partnerships, and the Systems Integration Role:** We have approached this final item on public sector productivity from several vantage points already. When we looked at the overall global dynamics we noted the privileged and value creating role of the recomposers, the systems integrators. When we looked at the missing link for many Danish component producers, the capability and risk capacity to take the role of system integrator turned out to be the critical void, and we noted how that particular role in Denmark was played too often by the public sector, thereby keeping the capability outside the market and beyond the reach of private companies. Finally, as we explored professionalization of the public sector services it became clear that the specialization factor—the choice of the value creating role but also of what that role should not be—would be the crucial key to all aspects of professionalization.

This, however, is where the present regulation of public sector procurement (not the least of which includes the EU rules) becomes counterproductive and outright destructive for the overall productivity and innovation of the economy. The knowledge and risk sharing partnerships that are needed to strategically outsource systems integration at an operational level cannot thrive within the framework of a Ford or GM procurement system. In the post-Toyota, post-Wintelism era of the services transformation, relationships and partnerships are needed, not commoditization tenders and transactions. What is at stake is partly the professionalization, productivity, and innovation of public sector services, partly the unleashing of significant and globally scalable private sector potential for value creation. Denmark and Europe cannot afford not to realize this potential, and any politician who would speak the word innovation will have to be willing to tackle the present procurement regime head-on.

Much is happening already on this front in Denmark. Some of the Cleantech Cluster initiatives are pointing in the right direction. The emerging collaboration between the City of Copenhagen, the Capital Region, research institutions, Danish companies, and global IP giant Intellectual Ventures, with the aim of creating a global innovation ecosystem around elder care in Copenhagen is another great and hopeful example. Indeed, the government's recently announced innovation initiative seems to target this potential. Global growth opportunities in areas such as health services, elder care, water optimization, energy efficiency in buildings, daycare institutions, but for example, also knowledge-intensive and difficult operational service domains, such as hospital cleaning, could all be candidates and the basis for significant Danish export potential.

In conclusion, public sector productivity growth is within reach and possible in Denmark. There is great potential in terms of the quality and scope of the services delivered, in terms of the achieved levels of ICT leverage in those services, and in terms of the future and global growth potential inherent in many of the assumed systems integrations tasks. The obstacles tend to be self-imposed (in one crucial instance imposed by counterproductive EU regulation) and therefore removable:

- A politically driven regimen of control and (over-)documentation has to be aggressively purged from the systems;
- A tradition of doing too much in house, and thereby getting a weak specialization focus, can be overcome through disciplined professionalization and partnerships with private sector, recomposing providers of operational services. This will release significant innovation and international growth potential; and
- Existing—1960s or before—procurement rules must be fundamentally reformed.

If these obstacles are removed and a culture of innovation allowed, the public sector and its partnerships can become not only an additional driver of productivity in Denmark, but also a significant contributor of innovation and private sector growth potential.

This is so much more of a possibility, because the public sector has such excellent records in terms of again and again leveraging the human role. The introduction of learning games in schools enables the teacher to become even more of a resource for kids with additional needs. Sensor systems and robots in elder care have added more warmth to the hands. Tax system automation has made the tax assessor into a knowledgeable and service minded advisor for the citizen. Just as the Unimerco tools engineers used the systems and technology to leverage their own work to an even more qualified and relationship-dependent human value added, the same seems to be emerging from motivated and dedicated public service employees.

## 4. So what is the Bottom Line for Denmark?

We are convinced that these thoughts and observations about Denmark must conclude on a cautiously optimistic note. Cautious because it is a hard, competitive, and changing world where no one—no country, no company, or for that matter, no individual—has a simple and easy path to success. Risks and requirements are high. Optimistic because Denmark—as the cards are presently dealt—is sitting with a pretty good hand:

- The internationally competing companies are doing quite well. Their productivity is adequate and many of them are in interesting market segments and domains. They are moving along the trajectory of the services transformation, and are not laggards in terms of ICT;
- The home market services are presently a productivity sinkhole, but individual companies and service segments have started moving in the right direction, and an additional (self-interested) push from larger corporations and (reformed) public sector procurement can give a positive impact, which will benefit the sector as well as the overall performance of the economy;
- The public sector is also a productivity sinkhole. However, quality and scope of services are high, as is the ICT-adaptation level. Obstacles are self-imposed and therefore removable, though the values, cultures, and political reflexes that enforce them are ingrained and will require courage, determination, and persistence to overcome;
- The combination of sophisticated producers of products with services and companies with the DNA of being able to scale operational services concepts globally, that is represented in the existing business ecosystem has the capability of creating global growth out of public sector systems integration demand (if liberated from public sector operations and procurement rules); and
- Present level of ICT implementation and innovation and user literacy across all sectors can be further reinforced with a proactive cloud initiative and could make Denmark a leader in the algorithmic revolution.

If the indicated initiatives are taken and implemented successfully, we believe that Denmark can become one of the absolute national successes of the global economy characterized by the services transformation and the algorithmic revolution. The basic capabilities, conditions, and ingredients for success are there. The obvious weaknesses are such that they can be overcome by the corresponding strengths.

Most importantly, the tradition of Scandinavian leadership and the Danish labor market model give Denmark the possibility of winning on the forefront of the services dilemma, where the development of the empowered human value creation—leveraging systems and automation—is the key strategic imperative. Productivity is ultimately decided by what the human beings who are made redundant by technology end up doing. If they are also made redundant in a societal sense, or if they are pushed down into less qualified functions, then productivity is lost. If they are continually leveraged, empowered, and trained to do more ultimately human value-creating functions, then productivity is won.

Denmark has historically been as good as anyone at doing just that. This is not the time to lose that capability.



## ANNEX 2

# Cloud Computing: Policy Challenges for a Globally Integrated Innovation, Production and Market Platform

*Jonathan Murray and John Zysman<sup>1</sup>*

Summary: “Cloud computing” is much more than simply a new set of technologies and business models. It is rapidly emerging as the platform that will underpin the next generation of digital products and services. Cloud Computing is transforming how consumers, companies, and governments store information, how they process and exchange that information, and how they utilize computing power. Consequently, it opens a new set of policy discussions, while at the same time underlining the importance of old debates.

Discussions of policy in an era of “cloud computing” will continue the debate about classic questions: the terms of market access for services and the rules for privacy, security, IP and more. However, the cloud must be understood as at once a competitive service, a dynamic enhanced utility, an ICT infrastructure/platform and innovation ecosystem, a marketplace, and a production environment. The pervasive, disruptive multi-role character of cloud computing demands that a new array of vital questions be opened.

First, though, what exactly is cloud computing? Firms are marketing a wide variety of services as “Cloud Solutions,” leading—often deliberately—to some confusion. If broadly used to include all online services, the term loses meaning and risks obfuscating the critical policy issues at play.

Put simply, cloud computing delivers computing resources—data storage, computation and networking—to users at the time, to the location, and in the quantity they wish to consume, with costs based only on the resources used. In its simplest form, the cloud transforms computing resources from a capital expense to an operational expense. Users simply procure from providers the “amount of computing” they want without needing to invest in their own computing infrastructure.

---

1 ©BRIE and authors. Prepared for Transatlantic Policy Network: Transatlantic Week 2011/ Washington DC

Cloud computing depends on the ability to abstract applications and software platforms from the underlying physical hardware and computing resources on which they depend. As an example, a company storing customer data in Amazon's Elastic Cloud Service never needs to know—and is never informed about—on which physical server or servers the data is stored. This “virtualization” enables greater flexibility in how workloads are managed, and how data centers are constructed, since providers can dynamically add, remove, or modify hardware resources without having to reconfigure the services that depend on them. The use of virtualization is not new in the technology industry—having originated in the 1960s—but when combined with very sophisticated systems management software today's “cloud fabric” environments enable truly global scale computing environments.

Cloud computing changes the location of data processing or—more correctly—makes the location of data processing irrelevant—technically, if not in policy terms. In traditional models of computing, data and applications are local—usually running on a personal computer (PC) for consumers and in private data centers for firms. The location of data storage and application execution is pre-determined by the design of the system. With the Cloud model applications can be run—and data stored - anywhere within the global cloud environment—which may encompass many data centers in multiple physical locations. The execution and storage locations are no longer pre-determined by design but are now automated real-time decisions based on the availability of computing resources at any particular time.

The competitiveness of cloud computing service provision critically depends on providers' ability to build out capacity at a scale far greater than any individual user or firm could afford and to fully automate the allocation of these computing resources. Aggregate demand can then be amortized over this highly scalable—and automated—infrastructure and sold back to the user at a much lower—per unit resource—cost than users could provide themselves.

Cloud computing is, in our view, an “enhanced-dynamic” utility, having some characteristics of infrastructure and some of competitive service. Cloud computing is frequently referred to as a “utility” service, sharing many of the characteristics of other utilities such as contractual levels of availability, reliability, and consumption-based pricing. It is also ‘utility-like’ in the sense that cloud providers are large companies operating at a significant scale, serving small users as well as giant corporations. Yet, cloud computing does differ from traditional utilities in several critical respects. Cloud providers compete aggressively with differentiated service offerings, service levels, and technologies. Cloud services can be completely customized to the needs of the largest commercial users. Consequently, we have often referred to cloud computing as an “enhanced utility.”



But cloud computing is much more than just an enhanced utility. It is a utility that can be configured and customized depending on user needs. In a very real sense, cloud computing is—in our terminology—a dynamic utility.

Cloud computing is much more than simply a new set of technologies and business models. It is rapidly emerging as the platform that will underpin the next generation of digital products and services. Cloud computing is transforming how consumers, companies, and governments store information, how they process and exchange that information, and how they utilize computing power.

Cloud computing is also rapidly becoming a major source of product, service, and business process innovation and—importantly—is unique in being both the production environment and market platform for these innovations. It is this combination of roles—innovation ecosystem, production environment and marketplace—combined with the transnational nature of the platform itself that makes the cloud computing historically unique. This uniqueness poses significant challenges for pre-existing approaches to policy in a number of important areas.

For advanced industrial countries, cloud computing provides new opportunities for innovation and entrepreneurship, and promises substantial efficiency gains. The cloud platform also opens significant new global market opportunities for developed economy producers and technology suppliers. For developing countries, cloud services also open up new possibilities to enter international markets and find niches in global value networks but cloud also creates a number of very substantial challenges.

As with the previous computing platforms—mainframes, PCs, and networks of PCs—cloud computing is becoming a baseline for national and corporate IT infrastructure against which other forms of infrastructure and service delivery must be measured. In this respect, it is likely that cloud computing will become an important component of national critical infrastructure. Control of cloud infrastructure will matter to national governments.

Cloud computing offers unprecedented new levels of configurability for diverse groups of users. Services are dynamically configured to the needs of each user with a single unified, usually global-scaled, architecture. Cloud providers' scale and cost merits are available to all types of users, from individuals to multinational corporations. The tradeoff between the economic advantages of global scale infrastructure and the desire for governments to have policy influence over this critical market place, innovation, and production environment will tax policy makers and historic approaches to global market regulation.

Critical to cloud computing is the abstraction of end-user applications from the underlying hardware. Put simply, application software is not tied to any particular server or physical hardware; instead, it can utilize the massive scalability and resiliency of the underlying global-scale datacenters to deliver the same services to one user or several million users. In general, users do not know or care about where the data centers are or how they are configured. Policy makers will, however, care about where value is created and extracted in this global network.

The emergence of the cloud platform—which is at once innovation ecosystem, production environment and marketplace—will drive a convergence of policy making from each of these previously distinct domains. Prior policy norms focusing on free trade and open access to global markets will not be able to ignore the fact that national governments will care greatly about control over the innovation and production benefits of the cloud computing platform in addition to dependency issues for cloud-enabled critical infrastructure.

Resolving the tension between the economies that are home to the major global cloud providers and their desire to be free to sell cloud services around the world and the (justified) concerns of other economies to retain control over this important driver of economic growth will require significant creativity on the part of the global policy making community.

## SELECTED LIST OF BOOKS AND ARTICLES FOR FURTHER READING

### Additional articles from the BRIE program on 'Services, Cloud, and the Commoditization Trap'

- Zysman, John, Stuart Feldman, Jonathan Murray, Niels Christian Nielsen, Kenji E. Kushida. Forthcoming, 2013. "The Services Transformation: A New Logic of Value-Creation" in *The Third Globalization: Can Wealthy Nations Stay Rich in the Twenty First Century?* edited by John Zysman and Dan Breznitz. New York, NY: Oxford University Press.
- Zysman, John, Stuart Feldman, Jonathan Murray, Niels Christian Nielsen, Kenji E. Kushida. 2011. "The New Challenge to Economic Governance: The Digital Transformation of Services." in *Innovations in Public Governance*, edited by A.-V. Anttiroiko, Bailey, S. & Valkama, P. Amsterdam: IOS Press.
- Kushida, Kenji E. and John Zysman. 2009. "The Services Transformation and IT Network Regulation: The New Logic of Value Creation." *Review of Policy Research* 26(1-2).
- Kushida, Kenji E., Jonathan Murray, and John Zysman. 2012. "The Gathering Storm: Analyzing the Cloud Computing Ecosystem and Implications for Public Policy." *Communications and Strategies*. (85): 63-85.
- Jonathan Murray and John Zysman. 2011. *Cloud Computing: Policy Challenges for A Globally Integrated Innovation, Production and Market Platform*. TPN Transatlantic Weekly. July.
- Kushida, Kenji E., Jonathan Murray and John Zysman. 2011. "Diffusing the Cloud: Cloud Computing and Implications for Public Policy." *Journal of Industry, Competition and Trade* 11(3): 209-237.

### Other recommended books and articles

- Baumol, William J. "Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis." *American Economic Review* 57, (1967): 415-26.
- Berger, Suzanne, and MIT Industrial Performance Center: *How We Compete : What Companies around the World Are Doing to Make It in Today's Global Economy*. 1st ed. New York: Currency Doubleday, 2006.
- Bower, Martin: *Perspective on McKinsey*. McKinsey internal. (Can be found on second hand book websites).
- Chesbrough, Henry: *Open Services Innovation: Rethinking Your Business to Grow and Compete in a New Era*, Berkeley 2010.

- Cohen, Stephen S., and John Zysman. *Manufacturing Matters : The Myth of the Post-Industrial Economy*. New York: Basic Books, 1987.
- Dossani, Rafiq, and Martin Kenney. "Service Provision for the Global Economy: The Evolving Indian Experience." *Review of Policy Research* 26, no. 1-2 (2009): 77-104.
- Gansky, Lisa: *The Mesh - why the future of Business is Sharing*, Penguin 2011.
- Gerstner, Louis V.: *Who says Elephants can't Dance? Leading a great Enterprise through Dramatic Change*, Haper Collins 2002.
- Jorgenson, Dale W., Mun S. Ho, and Kevin J. Stiroh. *Productivity Volume 3: Information Technology and the American Growth Resurgence*. Cambridge, Mass. ; London: MIT Press, 2005.
- . "A Retrospective Look at the U.S. Productivity Growth Resurgence." *Journal of Economic Perspectives* 22, no. 1 (2008): 3-24.
- Levy, Steven: *In the Plex: How Google Thinks, Works, and Shapes our Lives*. Simon&Schuster, NY, 2011.
- Lunde, Niels: *Miraklet i Lego*. Jyllandposten Forlag 2012.
- Moore, Gordon. "Cramming More Components onto Integrated Circuits." *Electronics* 38, no. 8 (1965): 114-17.
- Ng, I; Porry, G; Smith, L; Manli, R; Briscoe, G: *Transitioning from Goods-Dominant to Service-Dominant Logic. Visualizing the Value Proposition of Rolls Royce*. Journal of Service Management (3) 2012.
- Ng, Irene: *Value and Worth: Creating New Markets in the Digital Economy*, London 2012.
- Nielsen, Niels Christian, and Maj Cecilie Nielsen. "Spoken-About Knowledge: Why It Takes Much More Than Knowledge Management to Manage Knowledge." In *How Revolutionary Was the Digital Revolution? National Responses, Market Transitions, and Global Technology in a Digital Era*, edited by John Zysman and Abraham Newman, 242-66. Stanford, CA: Stanford Business Press, 2006.
- Schultz, M; Klausen, K.K.; Bukh, P.N.; Stockholm, F; Hildebrandt, S; Lindhardt, M; Jenster, P: *Den Danske Ledelseskanon*. ISS. Mærsk. Lego. Gyldendal 2012.
- Shankar, Venkatesh, Leonard L. Berry, and Thomas Dotzel. "A Practical Guide to Combining Products and Services." *Harvard Business Review* (2009).
- Spohrer, Jim; Maglio, Paul P: *The Emergence of Service Science: Towards systematic service innovations to accelerate co-creation of value*. IBM Almaden Research Center.
- Triplett, Jack E., and Barry Bosworth. *Productivity in the U.S. Services Sector New Sources of Economic Growth*. Washington, D.C.: Brookings Institution Press, 2004.

- Triplett, Jack E., and Barry P. Bosworth. "'Baumol's Disease' Has Been Cured: It and Multifactor Productivity in US Services Industries." In *The New Economy and Beyond: Past, Present and Future*, edited by Dennis W. Jansen, 34-65. Cheltenham, UK ; Northampton, MA: Edward Elgar, 2006.
- . "Productivity in the Services Sector." 2000.
- Young, Laurie. *From Products to Services : Insight and Experience from Companies Which Have Embraced the Service Economy*. Chichester, England ; Hoboken, NJ: John Wiley & Sons, 2008.
- Zysman, John. "The 4th Service Transformation: The Algorithmic Revolution." *Communications of the ACM* 49, no. 7 (2006): 48.
- Zysman, John, and Abraham Newman, eds. *How Revolutionary Was the Digital Revolution? National Responses, Market Transitions, and Global Technology in a Digital Era*. Stanford, CA: Stanford Business Press, 2006.
- Zysman, John; Feldman, Stuart; Murray, Jonathan; Nielsen, Niels Christian; Kushida, Kenji: "Services with Everything: How ICT transformed Services from Sinkhole to Productivity Driver", BRIE Working Paper #187B, Berkeley 2010
- . "Epochs of Production: The Growth of Services and ICT Production Tools.

This book explains how and why more companies include a service component in their business model, and discusses the strategic challenges and opportunities that result.

Companies that expand into services have to professionalize their service model as exemplified by elite service companies such as McKinsey, ISS and Schlumberger. But in terms of the strategic challenges that is a first, necessary, but not sufficient step.

The move into services is driven by the need for companies to escape the threat of commoditization that is caused by globalized competition and accelerated technology development. But services expose companies to another threat, lagging productivity. Leveraging services with information and communication technology solves that threat by driving services productivity with the power of Moore's Law, changing the fundamental nature of the services business. However, any process that can be automated can and will be copied and will therefore once again be exposed to commoditization. This is where the services dilemma sets in: Companies move into services to avoid commoditization. If their service model is human-based, they will sink into the productivity hole. To get out of that they leverage with ICT and automate, which once again will expose them to commoditization.

The strategic solution is to grab the dilemma by its horns and do both: Relentlessly seek productivity through technology; and ambitiously add value to the technology through empowered human contributions.

The book offers company leaders pointers on how to navigate the choices posed by the dilemma.

In an annex the book discusses what this all means for Denmark and for Danish policy options.



**DANISH  
TECHNOLOGICAL  
INSTITUTE**



**ALEXANDRA  
INSTITUTE**

ISBN 978-87-92359-10-0



9 788792 359100