

Design of an information system that connects
retail banks and customers

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Chapter 1

Introduction

1.1 The background

This work is the result of a collaboration between the Swedish *start-up* company Skyforge Financial Solutions AB¹ –from now it will be called Skyforge– and the researcher. Both are interested in the economical and financial topics, and both share an IT background. Therefore there is a common point of view from where a partnership can start.

On one side Skyforge is developing a new web product called MyBudget and it is designing a business model around it. On the other side the researcher, after having acquired new analysis tools in his experience as exchange student in Lund University, is interested in an examination of the *Homo economicus* in the modern world. Homo economicus, or Economic human, is the concept in some economic theories of humans as rational and broadly self-interested actors who have the ability to make judgments towards their subjectively defined ends.

The first contact happened in a Pecha Kucha Night in Malmö on 22th October 2008² (the poster of the event is presented in figure 1.1). Pecha Kucha³ is a presentation format where 20 images are shown, each for 20 seconds. Most people use Pecha Kucha Night to present their latest creative project or works. The keywords for Pecha Kucha Malmö⁴ are Design, Culture, Entrepreneurship, Technology and Sustainability, but anyone who has ideas, projects or knowledge he wants to share is welcome to participate and inspire.

In March 2009 several meetings have been realized to specify better the work and the direction of the results. A research draft has been defined about an analysis of the spending and saving behavior of banks' customers, and about how this analysis could be interesting for the retail banks environment. Consequently the main business valuable software components has been designed for MyBudget 2.0, the major version of Skyforge main product.

¹www.skyforge.se

²<http://babelmalmo.se/scenkonst/081022>

³www.pecha-kucha.org

⁴www.pecha-kucha.se/malmo/



Figure 1.1: Poster of the Pecha Kucha Night in Malmö on 22th October 2008

1.2 The firm



Figure 1.2: Skyforge logo

From *Skyforge Financial Solutions AB's* (2010) website:

“Skyforge is an IT startup founded in 2008, based at Minc⁵ in Malmö, Sweden. We build things that make the world better, easier to understand and more fun to be in.

We are good at money, in fact, we help people plan their money. We help them keep track of where money goes, how much can and should be saved,

⁵www.minc.se

see what the future will look like, plan loans and so on.

We are also good at developing software. Our main product, MyBudget, is a platform for economic planning, enabling our end users to keep track of their money via a powerful web application, on their mobile devices and via widgets built into their internet banks.”



Figure 1.3: The IDEON area

The company started in Spring 2008 inside the VentureLab⁶ project and it found place in the IDEON Science Park⁷ situated in Lund. The founders are Alex Esser (CEO), Jacob Hansson and Niklas Silfverström.

It showed very quickly its value and in 2008 it won two prizes for the best business idea in Venture Cup Syd⁸. In 2009 Skyforge receives an investment of 2 millions Swedish Kronas (approximately 200 thousands Euros) from Sparbanksstiftelsen Skåne Riskkapitalstiftelse⁹ (a venture capital foundation born from the Swedish bank Sparbank and operating in the Scania region). Therefore in January 2009 it became a limited company and Sparbanksstiftelsen Skåne Riskkapitalstiftelse is its biggest investor.

In 2010 Skyforge is a company located in Minc Incubator¹⁰ in Malmö. In May 2010

⁶www.venturelab.lu.se

⁷www.ideon.se

⁸www.venturecup.se/sw6103.asp

⁹<http://riskkapitalstiftelsen.sparbanksstiftelsenskane.se>

¹⁰www.minc.se/incubator.aspx



Figure 1.4: VentureLab and Venture Cup logos



Figure 1.5: The MINC building

Skyforge qualified at the 5th place¹¹ of the top 25 Sweden's best web entrepreneurs by the Internetworld magazine.

Skyforge received many publications in the Swedish news media, like in Svenska Dagbladet¹² and in Metro International¹³

Recently the company is extending the market borders to the Northern Europe.

¹¹<http://internetworld.idg.se/2.1006/1.316995/>

¹²<http://blogg.svd.se/utvecklingsblogg?id=13330>

¹³www.metro.se/2009/12/02/42274/banker-satter-stopp-for-smarta-budget/



Figure 1.6: Skyforge team on Metro newspaper, 11 June 2010

1.3 The researcher

Alessandro Distaso is a Master student in Computer Engineering from the University of Padua. The main courses that shaped his background are:

- Business Administration and Organization
- IT Corporation Management, with group thesis: “The Motorola Mobile Crisis”
- Quality Engineering, about ISO 9001:2000 and total quality management
- Software Engineering #1
- Software Engineering #2, with group thesis: “Software Selection: Enterprise Application Integration for messaging”
- Artificial Intelligence, with personal study of paper: “Flexible Abstraction Heuristics for Optimal Sequential Planning” - ICAPS-2007 Best Research Paper Award

- Distributed Systems, with personal study of paper: “Sequential Decision Making in Parallel Two- Sided Economic Search” - AAMAS 2007



Figure 1.7: The researcher

From August 2008 to June 2009 he spent two semesters as an exchange student at Lund University under the School of Economics and Management and in the Department of Informatics. His background has been consolidated by the following courses:

- Strategic Management and Information Systems

The course aims to help participants respond to the challenges of the information revolution. How will advances in information technology affect competition and the sources of competitive advantage? What strategies should a company pursue to exploit the technology? What are the implications of actions that competitors may already have taken? Of the many opportunities for investment in information technology, which are the most urgent? To answer these questions, one must first understand that information technology is more than just computers. Today, information technology must be conceived of broadly to encompass the information that business creates and uses, as well as a wide spectrum of increasingly convergent and linked technologies that process information. In addition to computers, then, data recognition equipment, communications technologies, factory automation, and other hardware and services are involved.

- Decision Support Systems

The course establishes a foundation for understanding and analyzing information and information systems in organisations. It also provides an overview of technical and organisational aspects of decision support systems (DSS), including individual, group and organisational DSS as well as executive information systems (EIS). Management of DSS and EIS within the end-user computing environment is also discussed. The course covers more recent technologies, e.g. Data Warehouse / Data Mining, and OLAP-technologies. The course is design-oriented and emphasises conceptual foundations of DSS and EIS, but DSS software reviews, demonstrations, laboratory lessons and case examples are also included.

- Design of Business Rules Systems

In this course the student learns about: how BR connects to Business Models, how to find and formulate BR; how to transform BR to automated decision making; how to separate BR from normal production code in software systems; how to implement a stand-alone BR component using the Visual Rules BRMS; how to quality test BR. Finally, the student will reflect upon this process from a knowledge and learning perspective.

- Business Intelligence and Security

The objectives are to provide the student with theoretical knowledge regarding issues related to business intelligence. The topics covered are general industry analysis, competitor analysis, corporate intelligence systems and issues related to knowledge transfer within an organization.

Personal reflections brought the researcher to ask if all the customers are acting as *Economical man*, could it improve the economic system? Are there technologies that will make it possible? His specific background can be used as foundation for this thesis research.

1.4 The research work

The research work lasted from October 2009 to June 2010. More than half of the time has been necessary to find, understand and then choose the most relevant topics. Around 2000 papers (that correspond to more than 1.7 GBytes of files) have been found in the first round of research. The following refinement shrank the research and later the study has been limited to around 70 papers (around 100 MBytes of files). It has been retained necessary to distribute the analysis to a wide range of topics to better understand and present the value of the tool. The second part of the time has been dedicated to the study of the topics and to design the product.

Appropriate citations have been done through all the work using the *Harvard system of referencing*¹⁴. When a single work is extensively presented, as a writing style choice, the authors' names are presented just in the beginning of the first relative paragraph, instead of continuously referring to the author and possibly breaking the attention of the reader.

This work provides advantages to different actors. For the firm, it presents a guideline to understand which direction to take in the development of its main product. Moreover this document presents in detail all the theoretical aspects behind the conception of the product that can help to demonstrate the validity of the product idea to the firm's clients and to the firm's investors. This work presents also some specific surveys that can help the firm to understand better the banks' market and the banks' customers. This information can definitely help in taking better strategic decisions. The firm can be more interested in evaluating the chapters from 3 to 9.

¹⁴<http://libweb.anglia.ac.uk/referencing/harvard.htm>

For the scientific research, the work represents a proof of concept about how information systems design can help companies to develop better products. The product analyzed represents a novelty, and an analysis of business needs and technology is provided. Moreover discussions can start on which consequences a similar prototype can give to the modern economic system. The comparison between the theoretical framework of chapter 2, the design process in the chapter 3 and prototype described in chapter 8 can bring new knowledge on the IS design process.

Eventually it can be interesting to evaluate how the the connection has been realized between the researcher and the firm. It can be a format reproducible in other occasions to promote the connection between the firms' world and the university. Moreover it can be used to promote specifically the information systems design practices that need usually a dynamic and receptive people and environment to have the chance to be practiced.

Chapter 2

Information systems design theory

2.1 Design science research overview

When a new prototype has to be created at its best, it is possible to rely on a personal creativity and genius, or on a continuous process of trial and error. Unfortunately this cannot explain if the prototype design is good enough. One can wonder if there is then a “certified” way to conduct a design process and the answer is in the **design science**.

Design is the core of many disciplines like architecture, engineering, computer science, software engineering, media and art design, and information systems.

From Hevner and Chatterjee (2010a):

“In the same way that industrial designers have shaped our everyday life through object that they design for our offices and for our homes, software interaction design is shaping our life with interactive technologies - computers, telecommunications, mobile phones and virtual worlds. If I were to sum up this in one sentence, I would say that it’s about shaping our everyday life through digital artifacts - for work, for play, and for entertainment.”

Gillian Crampton Smith, interview of January 30, 2002

In this thesis it is important to understand what is design and what it involves when related to information systems. “Understanding the principles and foundations is the first step to ensure that you know when you are doing great design work.” (Hevner and Chatterjee, 2010a). The main motivation is not just to create beautiful artifact, but to give values to the users of the IT prototype.

This chapter wants to formalize how the thesis evolved using methods, processes and requirements from the design science research. Design science principles are the bases for the general requirements of the company and researcher’s choices. This can guarantee the quality of the solution.

The formulation of a common design theory has been defined just recently by the design science research. The first milestone has been published in 1992 and then refined in Walls, Widermeyer and Sawy (2004). Subsequently Herbert Simon published his fundamental work *The Science of Artificial* in 1996 that finally gave relevance to design as a science instead of a craft work. Other interpretations of the topic have been published by Iversen, Mathiassen and Nielsen (2004) and Hevner, March, Park and Ram (2004). The research has been continued by Venable (2006b) and Venable (2006a) and more recently by Gregor and Jones (2007) and Gregor (2009).

Lastly Hevner and Chatterjee (2010a), Hevner and Chatterjee (2010b) and their book can be considered the practitioner's reference. Their work summarizes the information systems design research and it presents the knowledge in a form that can be used in practice. They say that "design in information systems deals with building software artifacts which solves a human problem" in an efficient way and giving utility to the users. The research will find a method that systematically will help in solving the problem. Hevner and Chatterjee define **design science research** (DSR) as:

"It is a thing or process by which a designer answers questions relevant to human problems, thereby contributing new knowledge to add to body of scientific evidence and new knowledge creation. The artifact is both useful and fundamental in understanding that problem."

The term *artifact* suggests something artificial or constructed on purpose by humans to solve a problem.

The **first principle** of DSR is:

"The fundamental principle of design science research is that knowledge and understanding of a design problem and its solution are acquired in the building and application of an artifact."

Lee (2001) as cited in Hevner and Chatterjee (2010a), defines the peculiarity of the design in information systems:

"Research in the information systems field examines more than just the technological system, or just the social system, or even the two side by side; in addition, it investigates the phenomenon that emerges when the two interact."

2.2 Design science in information systems research

Hevner et al. (2004) and Hevner and Chatterjee (2010b) give a good overview on how to conduct the research. Organizations implement information systems to improve their effectiveness and efficiency. The creation of an information system deals with the characteristics of the organizations, features of preexistent information systems, people, work environments, development and implementation methodologies and the special features

that will improve the current situation. It is up to the IS researcher to promote and use the knowledge that will drive in the improvement process.

Information systems research is based on two important topics: behavioral science and design science. **Behavioral science paradigm** conducts research on human or organizational behavior. It is based on natural science research methods. It explains or predict human or organizational phenomena related from the conception of an information system to the usage and the implementation. **Design science paradigm** studies innovative artifacts that can solve human or organizational problems. It is based on engineering and sciences of the artificial. It resembles the *problem-solving paradigm*. The goal is to create innovations like practices, technology and products that will make possible and even improve what is described by the behavioral science. The creation of those artifacts is based on natural laws, known as **kernel theories**, that are used, modified, tested by the researcher and his problem solving capabilities, intuition and creativity.

Technology and behavior are inseparable. They are two sides of the same coin, like truth and utility, or justified theory and artifacts that are effective. Both the paradigms have the same importance in the IS research because they can together explain and solve the relationships between the three main actors: people, organizations and technology.

The theories aim to predict behaviors, usefulness and impact when people or organizations interact with the the artifact. “Design science creates and evaluates IT artifacts intended to solve identified organizational problems” (Hevner et al., 2004). Those artifacts can be software, formal logic, rigorous mathematics and informal natural language descriptions. A design can be analyzed by quantitative and qualitative methods.

It is possible to design a framework for the information systems research. Figure 2.1 gives a maps of the interactions between the main subjects of the information systems research and their relative interdependent activities. If information technologies are perceived as enablers of business strategy and organizational infrastructure, then the cutting-edge IT systems can permit the organizations to reorganize the way they do business in an efficient and effective way.

In this context design is defined as a process and a product. The **design process** is a series of activities that allow to produce a design artifact, that is the innovative product. The evaluation of the **product** will permit to improve it and to better understand the problem. The **build-and-evaluate** loop is repeated numerous times before the release of the final artifact.

The artifacts are:

- *constructs*, as vocabulary and symbols. They provide the language in which problems and solutions are defined and communicated.
- *models*, as abstractions and representations. They use constructs to represent real world situation, that is the design problem and its solution space.
- *methods*, as algorithms and practices. They provide guidance on how to solve problems, that is how to search the solution space.

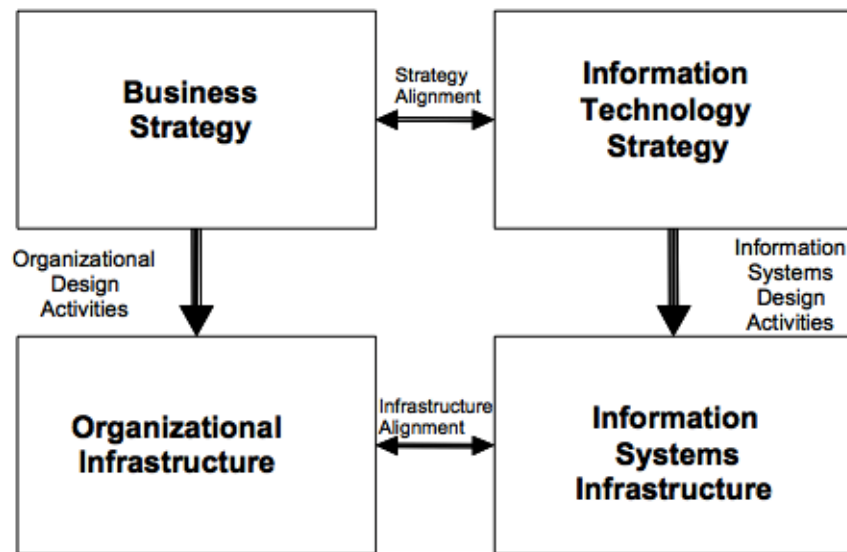


Figure 2.1: Organizational design and information systems design activities, from Hevner et al. (2004)

- *instantiations*, as implemented and prototype systems. They show that constructs, models or methods can be implemented in a working system. They also enable the researcher to learn about the real world.

Innovative artifacts are built to give solutions to unsolved problems. Figure 2.2 presents the framework for conducting an information systems research.

The **environment** defines the problem space where the behavior of people and organizations take place. Existing or planned technologies are taken in consideration as well. All the business needs and any information technologies correlate in this section. The goals are evaluated on the organizational values, as strategies, structure, culture and existing business processes. It is important then to frame research activities to address business needs.

The **IS research** is represented by a loop where behavioral science and design science work together. The former gives development and justification of the theories related to the business needs. The latter gives building and evaluation of the artifacts that will fulfill the business needs. It is a loop where truth and utility mix together. “Truth inform design and utility informs theory”.

The **knowledge base** contains foundations, methodologies, theories, frameworks, constructs and everything on which has been conducted a scientific research. Applying this existing knowledge gives rigor to the design research.

It is important to distinguish routine design from design research. The first is the application of existing knowledge to common well-known organizational problems. The last instead tries to give solutions to unsolved problems in a effective and efficient way. The most important difference is that design research gives contribution to knowledge

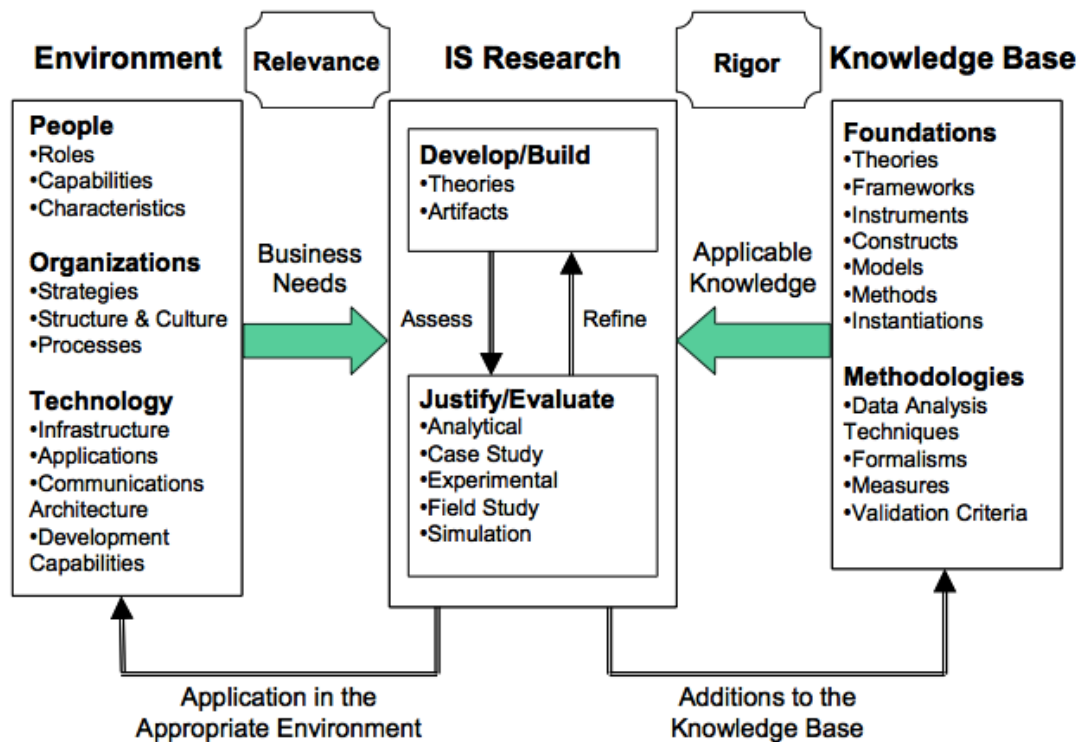


Figure 2.2: Information system research framework, from Hevner et al. (2004)

base.

Sometimes there is no knowledge that can help to solve the problems. It will do it a research process based on creativity and trial-and-error action. When a result of this process is available, it will be introduced into the knowledge base and so it will become a best practice.

As Hevner et al. (2004) say, design-science research in information systems deals with *wicked problems*:

- unstable requirements and constraints based upon ill-defined environmental contexts
- complex interactions among subcomponents of the problem and its solution
- inherent flexibility to change design processes as well as design artifacts
- a critical dependence upon human cognitive abilities (e.g. creativity) to produce effective solutions
- a critical dependence upon human social abilities (e.g. teamwork) to produce effective solutions

Technological advances are the result of innovative, creative design science processes.

Guideline	Description
Guideline 1: Design as an Artifact	Design-science research must produce a viable artifact in the form of a construct, a model, a method, or an instantiation.
Guideline 2: Problem Relevance	The objective of design-science research is to develop technology-based solutions to important and relevant business problems.
Guideline 3: Design Evaluation	The utility, quality, and efficacy of a design artifact must be rigorously demonstrated via well-executed evaluation methods.
Guideline 4: Research Contributions	Effective design-science research must provide clear and verifiable contributions in the areas of the design artifact, design foundations, and/or design methodologies.
Guideline 5: Research Rigor	Design-science research relies upon the application of rigorous methods in both the construction and evaluation of the design artifact.
Guideline 6: Design as a Search Process	The search for an effective artifact requires utilizing available means to reach desired ends while satisfying laws in the problem environment.
Guideline 7: Communication of Research	Design-science research must be presented effectively both to technology-oriented as well as management-oriented audiences.

Table 2.1: Design-science research guidelines, from Hevner et al. (2004)

2.3 Guidelines for information systems research

Design science is based on the problem solving process. The characteristic of this science is that the knowledge and the comprehension of the design problem and the relative solution can not be acquired *a-priori*, but building and testing the artifact will collect the experience that will help to find the best solution.

As Hevner et al. (2004) say, “design-science research requires the creation of an innovative, purposeful artifact (Guideline 1) for a specified problem domain (Guideline 2)”. The evaluation of the artifact (Guideline 3) will verify if the purpose has been accomplish. Novelty is part of the research outcome because the artifact has to find a solution to an unsolved problem or give an improvement in the efficiency of effectiveness (Guideline 4). The artifact must be well defined and coherent with all the problematics that surround it (Guideline 5). The design itself includes a search process that will help to define better the problem (Guideline 6). Finally the result must be communicated in a formal way (Guideline 7). Table 2.1 is a summary of them. Hevner et al. (2004) advise **not to use mechanically the guidelines**. The researchers have to exploit their own creative skills and judgment on how to consider them.

Guideline 1: Design as an Artifact. The outcome of a design-science research is an IT artifact that is able to solve people’s and organizational problems. An artifact is represented by its instantiation, constructs, models and methods for the development and for the use of the information systems. All of those features have the same importance

in the project. An artifact is seen with the same importance of the other entities in the system like people and organizational context with the goal of satisfying business needs. The artifact has to fit with the environment to guarantee success. Design-science artifacts are not, often, complete information systems. In fact artifacts are mostly innovations that unleash ideas, practices and technologies, allowing the use of information systems to be effective and efficient. Artifact constructs provide the symbols and terms to define the environment. They will make possible to design models of the system. Simon says in his book *The Sciences of the Artificial* that “solving a problem simply means representing it so as to make the solution transparent”. Design research considers products and processes. The artifact instantiation shows that the design process and the designed product are possible. It gives a proof by construction.

Guideline 2: Problem Relevance. “The objective of research in information systems is to acquire knowledge and understanding that enable the development and implementation of technology-based solutions to previous unsolved and important business problems” (Hevner et al., 2004). In this process behavioral science and design science inform and challenge the other. The problem is the distance between the goal and the current situation. The problem solving is the search process to arrive to the goal overcoming the system constraints. Business problems and opportunities are connected with the problem of increasing incomes or decreasing costs. The business processes that aim to those goals are significantly helped by a good design of information systems. The interaction between people, organizations and information technology is the proof of the relevance of the information system problem with respect to the constituent community, composed by practitioners who work with information systems and technologies that enable the development and implementation.

Guideline 3: Design Evaluation. Evaluation methods must demonstrate the utility, the quality and the efficacy of the design artifact. The evaluation is based on the business requirements, including the integration of the artifact in the current IT related to the business. Functionality, completeness, consistency, accuracy, performance, reliability, usability fitness with the organization are possible metrics. The evaluation is an important process because it collects important information that could help in the design and construction process. “A design artifact is complete and effective when it satisfies the requirements and the constraints of the problem it was meant to solve” (Hevner et al., 2004). Knowledge base suggests some methodologies in table 2.2. Those methods have to be selected appropriately with the artifact and the metrics. Not to forget that design has a style. There are always different forms and features that satisfy the designer and the user. “Good designers bring an element of style to their work” (Norman (1988) in Hevner et al. (2004)).

Guideline 4: Research Contributions. The design science contributions to the research are based on novelty, generality and significance of the artifact. The first contribution is the artifact itself because it enables the solution of unsolved problems. It gives contribution to the environment (people, organizations and technology). The second is all the group of constructs, models, methods or instantiations that will improve the knowledge base. The third is the development and use of the evaluation methods and

1. Observational	Case Study: Study artifact in depth in business environment
	Field Study: Monitor use of artifact in multiple projects
2. Analytical	Static Analysis: Examine structure of artifact for static qualities (e.g., complexity)
	Architecture Analysis: Study fit of artifact into technical IS architecture
	Optimization: Demonstrate inherent optimal properties of artifact or provide optimality bounds on artifact behavior
	Dynamic Analysis: Study artifact in use for dynamic qualities (e.g., performance)
3. Experimental	Controlled Experiment: Study artifact in controlled environment for qualities (e.g., usability)
	Simulation – Execute artifact with artificial data
4. Testing	Functional (Black Box) Testing: Execute artifact interfaces to discover failures and identify defects
	Structural (White Box) Testing: Perform coverage testing of some metric (e.g., execution paths) in the artifact implementation
5. Descriptive	Informed Argument: Use information from the knowledge base (e.g., relevant research) to build a convincing argument for the artifact's utility
	Scenarios: Construct detailed scenarios around the artifact to demonstrate its utility

Table 2.2: Design evaluation methods, from Hevner et al. (2004)

metrics. However the researcher must show a contribution to the business environment, solving an important unsolved problem.

Guideline 5: Research Rigor. The researcher has to be driven by the rigor to conduct a relevant design research. This have to be applied in the construction and evaluation process. The use of knowledge base is a guarantee for the rigor. “Success is predicted on the researcher’s skilled selection of appropriate techniques to develop or construct theory or artifact, and the selection of appropriate means to justify the theory or evaluate the artifact” (Hevner et al., 2004).

Guideline 6: Design as a Search Process. “Design is a search process to discover an effective solution to a problem”. Abstraction and representation of actions and resource available, goals and constrains and uncontrollable forces of the environment are the bases of design science. Those are factors dependent only to the problem and the environment. Creativity and innovation are important parts of the process. It is possible to simplify the problem by selecting a subset of elements or it is possible to decompose the problem in simpler subproblems. “The design task involves the creation, utilization and assessment of heuristics search strategies”.

Guideline 7: Communication of Research. The design-science research will be presented to people in the IT organization and to business men. It is important then to speak to the technology oriented people with enough detail to make possible the construction of the artifact. Management-oriented people need enough detail to

understand if that artifact can be useful inside the organization and if it could be better to buy it or spend internal human resources to build it.

2.4 Design science research cycles

Based on the work in Hevner and Chatterjee (2010b), it is possible to locate three design science research cycles in any design project as figure 2.3 shows:

- the relevance cycle
- the rigor cycle
- the design cycle

Those cycles have to be clearly present in a design science research project.

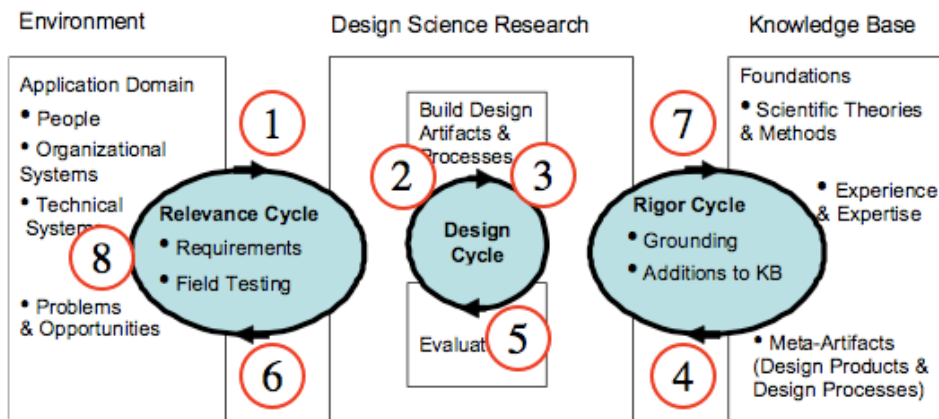


Figure 2.3: Design science research cycles, from Hevner and Chatterjee (2010b)

The relevance cycle. For a good design science research it is good to start with finding problems and possibilities in the artifact environment. The relevance cycle then starts the design research providing both requirements and acceptance criteria. Practical testing will decide if more iterations are needed to improve the design.

The rigor cycle. The knowledge base on which design research can rely is made by scientific theories and engineering methods. The knowledge base contains also:

- the experience and the expertise that define the state of the art in the application domain of the research
- the existing artifacts and processes found in the application domain

It is up to the researcher to find and reference in his work with the knowledge base so that it is possible to guarantee that the design is innovative. It is important to identify the sources and the amount of rigor depending on type of design research. “To

insist that all design decisions and design processes be based on grounded behavioral or mathematical theories may not be appropriate or even feasible for a truly cutting-edge design artifact. Rigor is based on the researcher's skilled selection and application of the appropriate theories and methods for constructing and evaluating the artifact." Design science research is based on existing ideas taken from the knowledge base but creativity in the design solution can be inspired by many different sources.

The design cycle. This is the core of the design research. It is an ongoing iteration between the construction of the artifact and its evaluation with all the information acquired by the process. This permits to create design alternatives and evaluate them until a good enough solution is found. The requirements are taken from the relevance cycle and the evaluation theories are taken from the rigor cycle. In the design cycle it is important to balance the efforts between the construction and the evaluation processes.

2.5 Checklist for design science research

It is possible to answer the following checklist (Hevner and Chatterjee, 2010b) to evaluate and assess the progress of a design research project. It relates with the research cycles and in fact each question represents a numbered step in the cycles of figure 2.3.

1. What is the research question (design requirements)?
2. What is the artifact? How is the artifact represented?
3. What design processes (search heuristics) will be used to build the artifact?
4. How are the artifact and the design processes grounded by the knowledge base? What, if any, theories support the artifact design and the design process?
5. What evaluations are performed during internal design cycles? What design improvements are identified during each design cycle?
6. How is the artifact introduced into the application environment and how is it field tested? What metrics are used to demonstrate artifact utility and improvement over previous artifacts?
7. What new knowledge is added to the knowledge base and in what form (e.g. peer-reviewed literature, meta-artifacts, new theory, new method)?
8. Has the research question been satisfactorily addressed?

This work tries to answer those questions.

Chapter 3

Design research for MyBudget

3.1 Research question and design requirements

The first two weeks were dedicated to consolidate the requirements. Several meetings have taken place with the CEO. A precise profile of the business strategy and requirements has been drawn. Technical information was retrieved from some interviews with the IT employees. The meetings were performed always with the use of a whiteboard that can support the collaboration and can help the sharing of knowledge.

Skyforge is a *start-up* firm born to realize the product MyBudget. It is composed and owned by three self-motivated employees, in a collaboration with a venture capitalist. Alex Esser, with a background of business administration, is the CEO, and Jacob Hansson and Niklas Silfverström are responsible for the technical part, sharing high skills in programming, web developing and systems administration. MyBudget is a software designed to help common people to organize their own budget. Skyforge believes that this will help to improve their financial status.

As *business strategy*, Skyforge considers MyBudget as a tool for the banking industry and therefore the retail banks are the clients of Skyforge. The product is conceived to be used by the retail banks' customers (no corporate customers) and it helps to check and organize their current financial situation. The retail banks can buy a personalized version of MyBudget and they can give this as a service to their customers. This tool can represent an *added value* for the banks. In fact the banks' customers can consider it valuable because it represents for them a useful budgeting service. On the other hand the banks can retain it valuable because it is a useful technology for their customers, it is not yet available in mostly any retail banks and this can help the bank to differentiate itself from the general retail market. A bank that decides to get this tool, can preserve more likely its retail customers and it can even promote all the budget-sensible customers to switch from another bank to the bank with MyBudget technology.

Skyforge is a Swedish company and it considers Sweden as its first market. The location of the firm in the Øresund Region¹ can give relevance to Denmark as the second

¹www.oresund.org

market. For a further evolution of the business, it is possible to consider all the Nordic countries, like Norway or Finland, and the Northern Europe as well.

MyBudget is not the only software that permits to make budgeting easily. There is an entire class of vendors available, called *personal finance management software*, that operate in different countries in the world, with different business strategies and different features of the tools. Skyforge refers to Mint² as the “best in class” that presents the usability and the best practices that MyBudget has. However what makes MyBudget different from all the other tools and the other vendors, is that it runs on a web interface, it is hosted directly in the internet banking website inside the bank web application, and the banks (and not to the consumers) are charged for the usage of MyBudget.

When the design research started, the first version of **MyBudget** was not yet released, therefore it has been agreed how the MyBudget service will appear after the first release. MyBudget 1.0 has been defined as a graphical tool that helps to visualize the expenses done, for example, by credit card. It has a flexible web interface that can be integrated with the graphics and functionalities of any internet banking website. It provides a technology that permits auto-categorization of all the expenses, based on how the user categorized the same expenses in previous attempts. It considers the user choice and, for example, in which shop he has spent the money. The usability of the tool is very high and *drag-and-drop* is the key technology to make easier the organization of the expenses. From a list of bank transactions, the customer just drags the selected transaction into a category and MyBudget saves the choice. The software extracts the spending information from the bank’s transactions and then organizes it graphically. The transactions can be produced by the user’s spending behavior, for example using credit card or debit card. In conditions of cash payment, the customer can register manually the transaction in the category he thinks appropriate.

In the beginning, Skyforge checked the feasibility of MyBudget and a prototype was implemented in PHP. Then, in the production stage, it has been decided to switch to JAVA because it is retained the banking industry standard. Consequently, as it follows from Skyforge’s business strategy, it is easier to integrate MyBudget in any bank’s information system environment since they share the same technology platform. MyBudget is designed to be a web interface and therefore the recent web technology AJAX has been selected to improve the web interactivity. This brings several advantages to make faster the interaction with the graphic interface and it reduces the bandwidth needed to transfer the information. There is further plan to configure it also for mobile platforms like Android or iPhone.

The **main goal of this research work** is to design a new major version of MyBudget. MyBudget 2.0 is a software that integrates all the functionalities of MyBudget 1.0 and it expands its values with more features. The improvements can be in the processes, in the technologies, in the core features of the product and/or they can be minor improvements. It is possible to consider banks’ core business processes as loans and saving management. Skyforge has given no specific requirements relative to the customers or to the banks, apart from focusing more on the Scandinavian retail market. The firm

²www.mint.com

retained that the *savings* management can be considered a priority for the banks and it has been evaluated interesting to provide forecast of the spending behavior, for example, for the next month. Moreover Skyforge showed interest in the background of the researcher, specifically in Decision Support System and Business Intelligence. So it will be interesting to see how this knowledge can apply to a personal finance management application.

As result of the preliminary meetings, the researcher and the firm concluded together that it can be useful and respectful of the business strategy to use a "win-win" research vision, where the improvements introduced in MyBudget 2.0 have to give more value to both banks and customers. Both of them have to receive more information and then more advantages using MyBudget 2.0. This requirement is considered as a consequence of the business model. Skyforge sells the tool to the banks, therefore MyBudget has to satisfy the banks' interests. On the other side the tool aims to help the banks' customers, therefore they have to feel interested in the tool and this has to satisfy all their budgeting requirements. Skyforge will build the technology for MyBudget 2.0.

As a result of all the meetings with the researcher, Skyforge updated the definition of MyBudget in 2010 in its website³ as:

"A platform for personal economic planning that integrates into existing internet banks. MyBudget allows end users to keep track of their money with minimum hassle, it lets the user set up budgets and savings goals, calculate loans and see economic forecasts.

MyBudget is easy to use, it has been developed together with interaction design experts to make everyone understand it and it has been built ground up to do the work for the user.

MyBudget is clever, it learns how users want their expenses categorized and automates that, leaving time for the users to drink chai tea instead.

MyBudget is versatile, it can be modified to almost any graphical requirements, allowing seamless integration into existing e-banking solutions. It can be delivered as a stand alone web application, as separated web widgets, or as a mobile application."

3.2 Design processes and preliminary evaluations

Figure 2.1 is the guideline to conduct the design processes. The main **Business Strategy** of Skyforge is selling MyBudget 2.0 software to retail banks. The banks that can provide the MyBudget 2.0 service to their client, provides an added value service that can have multiple consequences. First, it helps their customers to better manage their money. Second, since it can satisfy more customers' needs, therefore it represents an value-added service that helps the banks to preserve their customers from migrating to other banks or solutions. The *win-win* strategy is used to develop those values between banks and customers.

³www.skyforge.se/pages/products.html

As a *second step*, Organizational Design Activities and Strategy Alignment are the processes that allow to deduct **Organizational Infrastructure** and **Information Technology Strategy** coherent to the Business Strategy. However the design of the Organizational Infrastructure has not been specified in the Skyforge's requirements.

From this level of analysis, it is possible to design the final **Information Systems Infrastructure**, that can be considered the main product of this work. Its design is guided by the *Information Systems Design Activities* and *Infrastructure Alignment*. The former uses the requirements drawn from the Information Technology Strategy to support the design of the technologies. In the MyBudget case, it is interesting to understand which *processes* and *technologies* can produce the relevant information for the banks and the customers. The latter uses the Organizational Infrastructure to support the design of the Information Systems Infrastructure. In the MyBudget case, it is interesting to understand which *processes*, *technologies* and *values* Skyforge has to comply to, in order to demonstrate to be an interesting partner for banks and customers. It is important to design a way to integrate those values in the technology.

It is possible to perform two main **Strategy Alignment processes**. The **first** follows from the "give utility" requirement: find and understand which utility there is in the usage of a budgeting tool for the users, i.e. the banks and the customers. It is possible to deduct what "utility" means for each of them only if there is a clear profile of the two users and the environment between them. Therefore research on these general characteristics has to be performed.

The **second** comes from the essence of the software: the customers' budgeting process. Since it is the core functionality of the tool, it is important to produce a clear representation of it and to understand which information and which values it can provide to the banks and to the customers. It is important then to search the *best practices* related to budgeting practices because they can provide a *competitive advantage* in the market. *Budgeting for consumers* is not a consolidated subject and it is possible to find just empirical guidelines. The researcher decided then to search and borrow the best practices for money management directly from the corporate environment that invented them and is practicing them every day.

It is possible then to deduct a parallelism between consumer and business world: how the firms pay attention to manage correctly their money to preserve and improve their financial and wealth status, then it is possible that a retail consumer can be interested to manage his own money in the same accurate way. The principle behind this is that money are a limited resource *independently* if it is referred to a firm or a consumer. The business environment uses budget management practices since nearly its conception, so it can be safely considered as a provider of the best practices. It is important to understand how it is possible to import successfully business budgeting practices into the consumer environment.

For those two design processes it follows that the main entities of the design are:

- the bank
- the customer

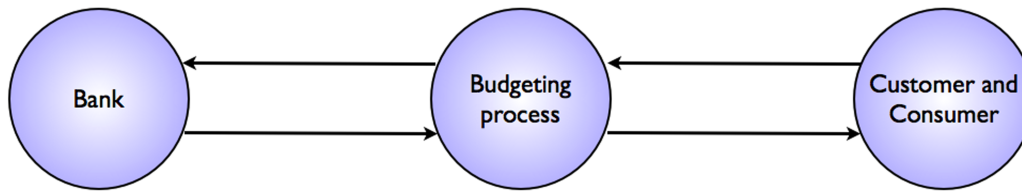


Figure 3.1: General schema

- the budget

It is possible to deduct the schema in figure 3.1 from the business strategy. The budgeting process is the central feature of the software as it is considered in the business requirements. A further interpretation of MyBudget 2.0 can evaluate the budgeting tool as a **bridge** that gives values to the banks and their customers. The simplest and the most important good that this virtual bridge can carry in a banking industry environment is *information*. Therefore it is important to understand which type of information is interesting to the banks and which one to the customers. It is important to exploit all the capabilities of the tool, leaving nothing unintended. Since the budgeting process is the core of the tool, the major part of the information can come from it. So it is possible to consider the budgeting process as the *first source* of information.

MyBudget can be more interesting if it can provide some analysis tools to help customers to analyze their own spending behavior and be aware of their own spending style. It can be interesting to find a way to decode and transfer the information of which spending styles to the bank, to help them to better understand their own customers.

3.3 The artifacts and their representations

Skyforge has given no specific or strict limits on the research. It is not required to produce any working software, so no code neither an application will be developed. The borders of the research can remain in the theoretical side, it is important to produce sketches, graphics, analyses and descriptions to better communicate the new knowledge acquired in the research, to better explain the new design and finally to evaluate how Skyforge can implement it. The thesis can be considered as an analysis between business and IT that is applied to a selection of topics considered more relevant for the goal. It can be considered also a general scientific consultancy that can inspire innovation. The thesis can be used for the venture capitalists to let them better understand the value of the product. Therefore Skyforge can receive more attention from them. During the research time, some sketches have been drawn together with Skyforge to test the understanding of the product and the direction in the research.

Several **artifacts** will be created to support the process of the information system design. Many vocabulary *constructs* will be taken for the general theories and introduced in the work to better explain the internal design processes. The following *models* will be used to *evaluate* the final software design:

- a retail banks profile (at least in Scandinavia)
- a consumers profile
- a retail banks utility
- a consumers utility

The following *methods* will be used as internal processes of the software:

- firms' budget management process best practices
- consumers' budget management process deducted from the firms' ones

The following *models* will be used as products of the software:

- information relevant to consumers that can satisfy their utility
- information relevant to retail banks that can satisfy their utility
- information extracted from the budget management process

No specific *instantiations* are required.

Some insights can be extracted from the requirements and the preliminary design processes. It can be interesting to find which functionalities can be a novelties in the budgeting products market to make MyBudget unique in the market. It transfers information as the main good. For the customers, it seems reasonable that the main information that can be derived by the usage of the tool, is:

- how they spend their money
- how they can achieve their purchases goals (e.g. buy a computer or a new car)
- how they can organize their savings
- how they can return their loans

For the banks, it seems reasonable that the main information that can be derived by the usage, is:

- understand how the customers spend their money. This will provide another parameter to the customer segmentation process
- understand if there are any problems in the loans return process
- improve the bank's cash management process, by using the information on how the customer is saving his money
- it will give incentives to use credit card or debit card. In any case, it will incentive the usage of any payment system of that single bank.

3.4 The personal finance management software market

There are companies in different countries, with different features and different business models. It is important to see how different vendors have implemented their solution in the *personal finance management software* industry. This permits to have a general overview of the market and it helps to understand which direction to take for designing the MyBudget 2.0 as a “best in class”.

The main actors are:

- **Bank of America - CashPro Online.** It’s an on-line treasury management system launched in November 2009. From the BoA website⁴, CashPro Online “will provide a single point of access to global treasury, debt, cash management, investments, trade finance, foreign exchange services and other financial capabilities.” Website: <https://cashproonline.bankofamerica.com>
- **Mint.** It is one of the American biggest web competitor and it has been inspired by Quicken. It is a company not connected to any bank. It provides tools to extract on line the customer transactions directly from any American internet banking website. It provides numerous hints on saving or investing money or even on buying car. The business model is to take a percentage on the buying process from the seller. It’s a free of charge for the Mint customers. It is one of the most complete service around the budgeting concept. It has an automatic category system. It helps to check customer’s investments, it helps to match them to relevant market indices and it suggests also how to fix the debt. It has a very secure image having a partnership with VeriSign and TRUSTe. It provides also an alert system via email or sms. A lot of graphs and it is available on iPhone and Android. Intuit Inc completed the acquisition of competitor Mint.com on 2nd November 2009. Website: www.mint.com
- **Quicken.** Intuit, Inc develops this personal management software. It runs on Windows and Macintosh systems but it is available an on-line version as well. Mint will be the on-line version. Website: www.quicken.com
- **Yodlee.** The company started in 1999 by a professor at the University of California, San Diego. It provides its categorization engine to others operators as Mint and to banks. It provides its own personal financial management tools with email and mobile alerts and general budgeting features. Website: www.yodlee.com
- **Wesabe.** It has the same common feature of the web personal management software plus they provide a service to communicate with other people about how to reach the personal goals. It runs via web or on mobile phone either as special operative system option like Windows Vista Gadget and Macintosh Dashboard Widget. Website: www.wesabe.com

⁴<http://mediaroom.bankofamerica.com/phoenix.zhtml?c=234503&p=RssLanding&cat=news&id=1390291>

- **Geezeo.** It presents again the same web personal management software paradigm, plus a community service. Website: www.geezeo.com
- **Mvelopes.** It has one of the best video presentation⁵. It presents not only the feature of the product, but also the whole picture of how the tool can affect the life of the users. They provide all the personal finance paradigm plus an “Unlimited Live Customer Support” 24 hours a day, 5 days a week. Website: www.mvelopes.com
- **Discover Card.** It a credit card issued by Discover Bank. They provide a “Spend Analyzer” web interface, so that their customers can analyze their spending behavior. A nice demo is present here⁶. Website: www.discovercard.com
- **Skillsthatclick.** It is “a financial situation simulator used to educate youth about the results of financial decision. Members will be taught about the responsibilities of managing money and about establishing good credit and other financial skills.” It possible to use it as an interface to your own bank account. Website: www.skillsthatclick.com

There are also personal financial tools dedicated to the Swedish market. For example:

- **Överblick.** It follows the standard paradigm of personal finance software. It permits to track all the contracts connected for example to the house, like electricity or internet. It helps to manage the termination deadlines and costs. Moreover there is a section dedicated to track any business collaborations. Website: www.overblick.se
- **Utdraget.** It is a basic tool and it requires more computer skills. Website: www.utdraget.se

There are a lot of personal finance applications and those selected are just the most representative⁷.

From all those examples, it is possible to list all the possible features to design a personal finance application:

- web service
- mobile support
- graphs
- some trustable acknowledgements, as VeriSign or McAfee SECURE

⁵<http://www.mvelopes.com/quick-tour/quicktour3/index.php>

⁶<http://www.discovercard.com/spendanalyzer/demo/>

⁷It is possible to find an approximative list here:

- http://en.wikipedia.org/wiki/Comparison_of_personal_financial_management_software
- http://en.wikipedia.org/wiki/Category:Personal_finance_websites

- alerts, as email or sms
- community support
- expert support

There are different business models:

- customers have to pay a fixed quote
- free for customers, and the suppliers are charged
- it is sold as an option of the main credit card core business

This suggests that there are common features that a personal finance management software must have but there is no one consolidate business strategy to make it profitable. More companies are experimenting in their way.

In the personal financial management industry there are not only vendors. There are some private or institutional organizations that are active and aim to spread financial knowledge. They have teaching programs for example in the school, they are consumer associations or they are organizations that make survey on the financial knowledge capabilities of the consumers. For example it is possible to cite:

- **IGFE - International Gateway for Financial Education.** The Gateway serves as global clearinghouse on financial education, providing access to a comprehensive range of information, data, resources, research and news on financial education issues and programmes around the globe. The Gateway was developed as part of the OECD Project on Financial Education. Website: www.financial-education.org
- **MyMoney.** It is brought to you by 20 agencies and bureaus of the U.S. Federal government that work on improving financial literacy and education. It is a central place for unbiased, reliable information and materials on financial topics of interest to you. Website: www.mymoney.gov
- **MoneyMadedclear.** It is brought by the British Consumer Financial Education Body (CFEB). It gives impartial information and guidance about money to help work out what's right for the consumer. Website: www.moneymadedclear.org.uk
- **Understanding Money.** It has been created by the Financial Literacy Foundation which was established by the Australian Government in June 2005 to give all Australians the opportunity to increase their financial knowledge and better manage their money. There are complete guidelines and software tools for better budgeting. Website: www.understandingmoney.gov.au
- **MoneySENSE.** It is a Singapore financial education programme launched on 16 October 2003. MoneySENSE brings together industry and public sector initiatives to enhance the basic financial literacy of consumers. Its program covers 3 tiers of financial literacy:

- Basic Money Management - which covers skills in budgeting and saving, and provides tips on the responsible use of credit
- Financial Planning - to equip Singaporeans with the skills and knowledge to plan for their long-term financial needs
- Investment Know-How - which imparts knowledge about the different investment products and skills for investing

Website: www.moneysense.gov.sg

- **Konsumentverket.** It is the Swedish Consumer Agency. It is possible to find information about how to get personal advice from the local consumer adviser or budget and debt adviser. In addition, it explains the product safety and how to get some good advice when consumer has financial problems. There are a specific budgeting guidelines and a budgeting web tool here:
www.konsumentverket.se/privatekonomi/Budget/

3.5 Search heuristics

The **search process** in the knowledge base started in the beginning of November 2009. Current scientific literature publications are considered the only source of research because they can be retained a reliable knowledge. An iterative and incremental research strategy has been used. So each topic has been founded, deepened and confronted with all the others, checking continuously if it matches the scope of the research. The design and the search processes are intertwined each other. The former gives the input for the latter, and the latter gives the answers for the former that actually represents the input of the design process. In this way it is also possible to elicit any possible name of researcher or research group strongly related to the scope of the thesis. Following their names and their research will provide the state of the art about those topics.

The complexity of the information systems design requirements explains the importance of having a good coverage of the topics to better design the tool that involves a long investment of time. This can allow to get enough knowledge and to perform a certain number of *build-and-evaluate* cycles that helps to better understand the product and the strategies. Longer windows of time for searching the knowledge permit to have more chances to catch also brand new material just published that can improve the knowledge. For example the fundamental paper of Homburg, Koschate and Totzek (2010) has been published three months after the beginning of the research in January 2010. Therefore it has been important to continuously search for all the topics to check if there are updates in the knowledge base.

In the first stage it has been used the literature search engine, typing the most relevant keywords (for example “bank customer intelligence”). This helped to grab some basic knowledge about the main three elements in the scope (the bank, the customer and the budgeting process). It is possible understand and refine the most important topics. Moreover it is important to evaluate if the keyword used is the correct one for the scope

of the research and if there are similar keywords that consider the same meaning that can be used as well. For example what can be defined from a customer point of view as “internet banking” is actually seen as “self-service” by the bank. A query with the right keyword makes possible to select the papers that take in consideration the corresponding point of view. Moreover the customer himself has a two roles: he is a customer for the bank but he is also a consumer in the general market.

It is important to know that the “key-based” research can give some troubles as well. For example the keywords “CRM” and “Customer Relationship Management” can give different topics whether they match or not the title or the tags of the paper. The results are dependent also on the search engine features (search by title, by author, etc. . .) and how the publisher has been categorized the papers. Moreover it is always important not to rely just on the title, but to read at least the abstract to have a clear image of what exactly is the target of the paper.

The search process is based on the three main entities:

- the bank
- customer
- the budgeting process

The first stage of research was based on these keywords:

- homo economicus
- budgeting
- bank loans
- financial planning
- personal finance
- relationship banking
- mortgages
- economic crisis
- budget management
- bank technology
- customer intelligence
- CRM
- data mining
- self-service

- consumer-driven
- information symmetry / asymmetry
- supply chain management
- forecasting
- credit card
- security / trust
- customer segmentation
- Basel II
- Baltic crisis
- credit crunch
- SaaS – Software as a Service
- SOA
- customer buying behavior

In parallel with the research in the rigorous knowledge base, a continuous update of the economic and financial topics in the newspaper has given an important payback for the quality of the thesis. In fact on January 2010, the most important Italian national daily business newspaper “Il Sole 24 Ore” published an inspiring article titled (originally in Italian): “Consob: here is how to protect the savers from irrationality”⁸. It is a review of an article (Linciano, 2010) titled “Cognitive errors and instability of preferences in investment decisions of retail investors. The policy indications of behavioral economics” just published by CONSOB, the Italian Securities and Exchange Commission, the government authority of Italy responsible for regulating the Italian securities market. The article published by Il Sole 24 Ore cited also another publication relative to irrationality and behavioral economics from the FSA - Financial services authority (de Meza, Irlenbusch and Reyniers, 2008). Those articles suggest to consider one of the most important scientific topic of nowadays: **behavioral economics**.

The topic appeared immediately of interest because it is a scientific research that considers retail banks’ customers, the irrational aspect of economic decisions and it considers customers as savers. This exactly matches the framework of the thesis. Behavioral economics is a science branch that started around 1980s and nowadays it began to be actively considered. Many many behavioral economists are enrolled now in the current Barack Obama’s administration:

⁸www.ilsole24ore.com/art/SoleOnline4/Finanza%20e%20Mercati/2010/01/consob-studio-finanza_comportamentale-investitori_retail.shtml

- Richard Thaler, that collaborated with Obama's presidential campaign and now he is consulting regularly with Obama's top economic adviser Austan Goolsbee. He is recently cited also by the current British Prime Minister David Cameron⁹. He is consider the father of the political philosophy *libertarian paternalism*. He collaborated with the Israeli-American psychologist and Nobel laureate Daniel Kahneman
- Cass R. Sunstein, that is the current Administrator of the White House Office of Information and Regulatory Affairs.
- Dan Ariely, that is an Israeli professor of behavioral economics and he is currently the head of the eRationality research group at the MIT Media Lab.

Apparently these professors and others are part of the Consortium of Behavioral Scientists, that is working for the Obama's administration¹⁰. These examples explain how modern and interesting is the topic.

A first stage of research resulted in around 2000 papers, that corresponded to more than 1.7 GBytes of files. They comprehended papers published in scientific journals and in a minor part in publications in specific technical newspapers like American Banker¹¹. Therefore some **selection policies** had to be taken. As major refinement, it has been given priority to papers that have been published between 2007 and 2010, or written by well-known authors (for example Michael E. Porter), or published by well-known journals (for example Decision Support Systems). However the possible publications are always numerous and it is not always possible to know, for example, all the authors.

It has been chosen then to give a coarse-grained evaluation of each paper based on the **ERA 2010 Ranked Journal List**¹² provided by the Australian Research Council. The Excellence in Research for Australia (ERA) initiative assesses research quality within Australia's higher education institutions using a combination of indicators and expert review by committees comprising experienced, internationally-recognised experts. ERA uses leading researchers to evaluate research in eight discipline clusters. ERA will detail areas within institutions and disciplines that are internationally competitive, as well as point to emerging areas where there are opportunities for development and further investment. The ERA Ranked Journal List gives an evaluation on the single journal that can be a quality rating of A*, A, B or C. The higher the rating, more probabilities there are that the journal can provide high quality knowledge. In this research many papers come from journals of A or A* rating.

The continuous process of build-and-evaluation and this refinement shrank the research and later the study have been limited to around 70 papers, i.e. around 100 MBytes of files. There are several reasons why a paper can be retained interesting. Some of them are interesting for the outcomes of the research presented, some for the analysis process used, some present a good introduction of a general topic. Some schemas have been drawn to organize them. The main attributes are: publication journal, research

⁹http://business.timesonline.co.uk/tol/business/career_and_jobs/article4330267.ece

¹⁰www.time.com/time/magazine/article/0,9171,1889153-1,00.html

¹¹www.americanbanker.com/

¹²www.arc.gov.au/era/era_journal_list.htm

group authors and topic (if it relevant to the bank, to the customer, to the budgeting process or to the technology).

3.6 Research and authors that support the artifacts

The result of the first stage of research are a series of research centers, scientific researchers and main general topics that can guide and guarantee that the information taken from their work is as much as possible accurate.

Dan Ariely can be considered one of the most important researcher relative to this thesis. He is the James B. Duke Professor of Psychology and Behavioral Economics at Duke University, where he holds appointments at the Fuqua School of Business, the Center for Cognitive Neuroscience, the School of Medicine, and the department of Economics. He is also a founding member of the Center for Advanced Hindsight. Dan Ariely earned a bachelor's degree in psychology from Tel Aviv University, his master's and doctorate degrees in cognitive psychology from the University of North Carolina, and a doctorate in Business Administration from Duke University. His research has been published in leading psychology, economics, and business journals, and has been featured occasionally in the popular press.

He is currently the chief of the *eRationality*¹³ group research, a part of *Center for Future Banking* from Massachusetts Institute of Technology. The eRationality group studies ways in which human decision processes deviate from the expected rational prescriptions. It investigates (and practices) semi rationality, bounded rationality, and just plain irrationality. Its long-term goal is to create new environments: physical and digital, in which tools are implemented to overcome irrationality-based behaviors in order to ultimately increase welfare and maximize happiness.

The main research project called **MIT Center for Future Banking**¹⁴ is in collaboration with Bank of America¹⁵. "The MIT Media Laboratory and Bank of America today [March 31, 2008] announced the creation of the Center for Future Banking, a five-year collaboration to which Bank of America has committed \$3-5 million annually." The Center will explore new ideas in banking by inventing technologies that reveal and leverage insights across a wide range of physical and social scales, from one-on-one customer interactions to global transactions. Researchers will address such questions as: "How can every customer be empowered with the knowledge and tools to take better control of their financial futures?" "How will banking interactions evolve as a customer's physical and virtual worlds become completely intertwined?" and "How will social networks and mobile platforms transform customers' banking experiences, making it easier, more convenient, and better integrated with their daily lives?"

Within this project, **Concrete Budgeting** is a specific research under the guide of Dan Ariely for creating a software that implements the knowledge from behavioral

¹³<http://erationality.media.mit.edu/>

¹⁴<http://cfb.media.mit.edu/research>

¹⁵<http://web.mit.edu/newsoffice/2008/banking-0331.html>

economics. The first important document is the Caballero's (2008) master thesis. Consequently it came the Krumme, Lee and Ross's (2009) publication.

In the scope of the thesis it can be interesting to cite as well the *MIT Laboratory for Financial Engineering (LFE)*¹⁶. The principal focus of the LFE is the quantitative analysis of financial markets using mathematical, statistical, and computational models. The goal of LFE is not only to spur advances in financial engineering, but also to develop better ways to teach students and executives how to apply financial technology in corporate settings.

Dan Ariely published many articles in collaboration with George Loewenstein and Drazen Prelec. **George Loewenstein** is the Herbert A. Simon Professor of Economics and Psychology in the Social and Decision Sciences Department at *Carnegie Mellon University* and director of the *Center for Behavioral Decision Research*. He is a leader in the fields of behavioural economics and neuroeconomics. His primary research focus is on intertemporal choice—decisions involving trade-offs between costs and benefits occurring at different points in time. Because most decisions have consequences that are distributed over time, the applications of intertemporal choice are numerous (e.g. saving behavior, consumer choice, labor supply).

Drazen Prelec has been a member of the MIT faculty since 1991, and presently holds appointments in the Sloan School, the Economics Department, and the Department of Brain and Cognitive Sciences. He received his Ph.D. in experimental psychology and AB in applied mathematics from Harvard University. Drazen Prelec's research deals with the psychology and neuroscience of decision making (behavioral economics and neuroeconomics; risky choice, time discounting, self-control, consumer behavior). He works both on the development of normative decision theory and the exploration of the empirical failures of that theory, using behavioral and fMRI methods. He participated to the Economics of Behaviour and Decision Making seminar in Westminster Business School and London Business School.

Thomas Davenport is an American academic and author specializing in business process innovation and knowledge management. He is currently the President's Distinguished Professor in Information Technology and Management at Babson College and Director of Research for Babson Executive Education and leads sponsored research programs on analytics, knowledge management, process management, and innovation. Davenport has written, coauthored, or edited eleven other books, including the first books on business process reengineering and achieving value from enterprise systems, and the best seller, *Working Knowledge* (Davenport and Prusak 2000), on knowledge management. He has written more than one hundred articles for such publications as *Harvard Business Review*, *MIT Sloan Management Review*, *California Management Review*, the *Financial Times*, and many other publications. *Competing on Analytics : The New Science of Winning* is one of his last books. He argues that the frontier for using data to make decisions has shifted dramatically. Certain high-performing enterprises are now building their competitive strategies around data-driven insights that in turn generate impressive business results. Their secret weapon? Analytics: sophisticated

¹⁶<http://mitsloan.mit.edu/lfe/>

quantitative and statistical analysis and predictive modeling. Exemplars of analytics are using new tools to identify their most profitable customers and offer them the right price, to accelerate product innovation, to optimize supply chains, and to identify the true drivers of financial performance. A wealth of examples—from organizations as diverse as Amazon, Barclay's, Capital One, Harrah's, Procter & Gamble, Wachovia, and the Boston Red Sox—illuminate how to leverage the power of analytics.

Jørn Flohr Nielsen is an Associate Professor at the Department of Management, School of Economics and Management, University of Aarhus, Denmark. His most interesting role for this thesis is as coordinator of the international research project “Market Orientation, Information Technology and Organization in Nordic Banking”, in collaboration with Norwegian School of Management (BI), Swedish School of Economics and Business Administration, Vasa, Finland, and Umeå School of Business and Economics, Umeå University, Sweden. He helped to have a more precise view of the banks in Scandinavia and their relation with the technology.

Alan Hevner is an Eminent Scholar and Professor in the Information Systems and Decision Sciences Department in the College of Business at the University of South Florida. He holds the Citigroup/Hidden River Chair of Distributed Technology. Dr. Hevner's areas of research interest include information systems development, software engineering, distributed database systems, health care information systems and telecommunications. He has published more than one hundred and fifty research papers on these topics and has consulted for several Fortune 500 companies. Dr. Hevner has a Ph.D. in Computer Science from Purdue University. He has held faculty positions at the University of Maryland and the University of Minnesota. Dr. Hevner is a member of ACM, IEEE, AIS and INFORMS. He recently completed a two-year assignment as a Program Manager at the U.S. National Science Foundation. He is one of the most important reference for Information System Design science.

Beyond Budgeting Roundtable (BBRT) has been established to find steering mechanisms that could replace budgeting and help to make organizations more adaptive to change. It was set up in response to growing dissatisfaction, indeed frustration, with traditional budgeting. Accordingly, in late 1997 the Beyond Budgeting Round Table (BBRT) was set up. Thirty-three companies joined in 1998 to find out how companies had replaced budgeting and whether this alternative model was really different (and better). Since then over sixty companies in total have joined the BBRT and funded the research. It studied many organizations that have changed their management models and built organizations that are not only more responsive, innovative and ethical but also operate with lower costs and consistently beat their peers on a wide range of indicators (what we call ‘beyond budgeting’ organizations). When we looked at the common threads we saw that their leaders had adopted a clear set of guiding principles underpinned by innovative management processes. These two elements were in harmony with each other and were in stark contrast to the traditional ‘command and control’ model that most organizations still use today. While many of our early cases had visionary leaders with deeply held beliefs who had implemented these models from the inception of the business, others had brought in such leaders to turnaround their failing organizations.

Michael Porter is a leading authority on competitive strategy, the competitiveness and economic development of nations, states, and regions, and the application of competitive principles to social problems such as health care, the environment, and corporate responsibility. Porter is generally recognized as the father of the modern strategy field, as has been identified in a variety of rankings and surveys as the world's most influential thinker on management and competitiveness. He is the Bishop William Lawrence University Professor, based at Harvard Business School. A University professorship is the highest professional recognition that can be awarded to a Harvard faculty member. In 2001, Harvard Business School and Harvard University jointly created the Institute for Strategy and Competitiveness, dedicated to furthering Professor Porter's work.

Abraham Maslow was an American psychologist. He is noted for his conceptualization of a "hierarchy of human needs", and is considered the founder of humanistic psychology.

The following chapters presents in detail what has been found in the knowledge base relative to the structure of the structure found in the design processes.

Chapter 4

Retail banks

4.1 What is a bank

From *Encyclopedia Britannica*, a bank is:

“an institution that deals in money and its substitutes and provides other money-related services. In its role as a financial intermediary, a bank accepts deposits and makes loans. It derives a profit from the difference between the costs (including interest payments) of attracting and servicing deposits and the income it receives through interest charged to borrowers or earned through securities. Many banks provide related services such as financial management and products such as mutual funds and credit cards. Some bank liabilities also serve as money—that is, as generally accepted means of payment and exchange.”

The main practices of a bank are borrowing and lending. Those operations must be based on a capital, as in other businesses. Banks use the funds obtained through deposits and, as a precaution, maintain capital and reserve account to protect against losses on their loans and investments, and to provide for unanticipated cash withdrawals. Genuine banks are distinguished from other kinds of financial intermediaries by the readily transferable or “spendable” nature of at least some of their liabilities (also known as IOUs — I own you), which allows those liabilities to serve as means of exchange—that is, as money.

Banks’ activities can be divided into:

- **retail banking**, dealing directly with individuals and small businesses
- **business banking**, providing services to mid-market businesses
- **corporate banking**, directed at large business entities
- **private banking**, providing wealth management services to high net worth individuals and families

- **investment banking**, relating to activities on the financial markets

There are different types of *retail banks*. **Commercial banks** are typically private-sector profit-oriented firms. They accept deposits from the general public and make various kinds of loans (including commercial, consumer, and real-estate loans) to individuals and businesses and, in some instances, to governments. **Community banks** are locally operated financial institutions that empower employees to make local decisions to serve their customers and the partners. **Community development banks** are regulated banks that provide financial services and credit to under-served markets or populations. **Postal savings banks** are savings banks associated with national postal systems. **Private banks** are banks that manage the assets of high net worth individuals. **Offshore banks** are banks located in jurisdictions with low taxation and regulation. Many offshore banks are essentially private banks. **Savings banks** in Europe take their roots in the 19th or sometimes even 18th century. Their original objective was to provide easily accessible savings products to all strata of the population. In some countries, savings banks were created on public initiative; in others, socially committed individuals created foundations to put in place the necessary infrastructure. Nowadays, European savings banks have kept their focus on retail banking: payments, savings products, credits and insurances for individuals or small and medium-sized enterprises. Apart from this retail focus, they also differ from commercial banks by their broadly decentralised distribution network, providing local and regional outreach—and by their socially responsible approach to business and society. **Building societies** and **Landesbanks** are institutions that conduct retail banking. **Ethical banks** are banks that prioritize the transparency of all operations and make only what they consider to be socially-responsible investments.

There are different types of *investment banks*. **Investment banks** “underwrite” (guarantee the sale of) stock and bond issues, trade for their own accounts, make markets, and advise corporations on capital market activities such as mergers and acquisitions. **Merchant banks** were traditionally banks engaged in trade finance. The modern definition, however, refers to banks which provide capital to firms in the form of shares rather than loans. Unlike venture capital firms, they tend not to invest in new companies.

When a bank is involved in both commercial activities and investment activities, then it is called **universal bank**, more commonly known as financial services companies. It engages in several of these activities. These big banks are very diversified groups that, among other services, also distribute insurance—hence the term *bancassurance*, a word combining “banque or bank” and “assurance”, signifying that both banking and insurance are provided by the same corporate entity.

Most banks are profit-making, private enterprises. However, some are *owned by government*, or are *non-profit organizations*. **Central banks** are public-sector institutions that deal mainly with their sponsoring national governments, with commercial banks, and with each other. Besides accepting deposits from and extending credit to these clients, central banks also issue paper currency and are responsible for regulating commercial banks and national money stocks. **Islamic banks** adhere to the concepts of Islamic law. This form of banking revolves around several well-established principles

based on Islamic canons. All banking activities must avoid interest, a concept that is forbidden in Islam. Instead, the bank earns profit (markup) and fees on the financing facilities that it extends to customers.

Bank loans, which are available to businesses of all types and sizes, represent one of the most important sources of commercial funding throughout the industrialized world. Although all banks make loans, their lending practices differ, depending on the areas in which they specialize. Commercial loans, which can cover time frames ranging from a few weeks to a decade or more, are made to all kinds of businesses and represent a very important part of commercial banking worldwide. Some commercial banks devote an even greater share of their lending to real-estate financing (through mortgages and home-equity loans) or to direct consumer loans (such as personal and automobile loans). Others specialize in particular areas, such as agricultural loans or construction loans. As a general business practice, most banks do not restrict themselves to lending but acquire and hold other assets, such as government and corporate securities and foreign exchange (that is, cash or securities denominated in foreign currency units).

The main resource of a modern bank is borrowed money (that is, deposits), which the bank loans out as profitably as is prudent. Banks also hold cash reserves for interbank settlements as well as to provide depositors with cash on demand, thereby maintaining a “safe” ratio of cash to deposits. The safe cash-to-assets ratio may be established by convention or by statute. If a minimum cash ratio is required by law, a portion of a bank’s assets is in effect frozen and not available to meet sudden demands for cash from the bank’s customers (though the requirement can be enforced in such a way as to allow banks to dip into required reserves on occasion, e.g., by substituting “lagged” for “contemporaneous” reserve accounting). To provide more flexibility, required ratios are frequently based on the average of cash holdings over a specified period, such as a week or a month.

Contemporary banks face a wide variety of risks. In addition to liquidity risk, they include credit risk (the risk that borrowers will fail to repay their loans on schedule), interest-rate risk (the risk that market interest rates will rise relative to rates being earned on outstanding long-term loans), market risk (the risk of suffering losses in connection with asset and liability trading), foreign-exchange risk (the risk of a foreign currency in which loans have been made being devalued during the loans’ duration), and sovereign risk (the risk that a government will default on its debt).

For most developed countries the late 20th century was marked by a notable easing of regulations and restrictions in the banking industry. In the United States, for example, many regulations had originated in response to problems experienced during the Great Depression, especially in 1933, when the federal government closed the country’s banks and permitted only those deemed solvent to reopen. By the end of the century the risk of widespread economic failure, such as that experienced in the Great Depression, had grown increasingly unlikely. Banking remains a heavily regulated business, however. Contemporary bank regulations are intended to limit bank failures and to protect bank depositors from losses stemming from such failures. Numerous other regulations apply to concerns such as the privacy of bank customers, fair lending practices, and the prevention

of money laundering.

Bank capital protects bank depositors from losses by treating bank shareholders as “residual claimants” who risk losing their equity share if a bank is unable to honour its commitments to depositors. One means of ensuring an adequate capital cushion for banks has been the imposition of minimum capital standards in tandem with the establishment of required capital-to-asset ratios, which vary depending upon a bank’s exposure to various risks.

The most important step in this direction was the Basel Accord, which was implemented in stages by the Group of Ten countries (also known as G-10, a group of industrialized countries that began in 1988 to strive for cooperation in monetary and economic policies; in the early 21st century, the G-10 had 11 member countries). The accord established an 8 percent capital-to-asset ratio target, with bank assets weighted according to the risk of loss; weights range from zero (for top-rated government securities) to one (for some corporate bonds).

Banks offer many different channels to access their banking and other services:

- *branch*: a retail location
- *ATM*: a machine that dispenses cash and sometimes takes deposits without the need for a human bank teller. Some ATMs provide additional services. It is also known as Bancomat
- *mail*: most banks accept check deposits via mail and use mail to communicate to their customers, e.g. by sending out statements
- *telephone banking*: a service which allows its customers to perform transactions over the telephone without speaking to a human
- *online banking*: a term used for performing transactions, payments etc. over the Internet
- *mobile banking*: a method of using one’s mobile phone to conduct banking transactions
- *video banking*: a term used for performing banking transactions or professional banking consultations via a remote video and audio connection. Video banking can be performed via purpose built banking transaction machines (similar to an Automated teller machine), or via a videoconference enabled bank branch.

Das and Nanda (1999) present a recent modelling framework for analyzing the structure of the bank industry. The specialization of banking activities is based on the functions performed by the banks for the delivering of financial services. Financial services can be categorized on two criteria:

- the degree of relationship specific information between client and bank required to render the service

- the degree to which the exact value of the service provided is verifiable by a third part.

Das and Nanda (1999) consider then two categories of bank functions:

- *relationship banking*: the degree of relationship specificity is high and the value of throughput of the relationship is easily verifiable (commercial banking)
- *deal/transaction banking*: the degree of relationship specificity of information is lower and the value of the deal to the client is less readily measurable (investment banking)

Commercial banking activities involve longer-term relationships with ex-post pay-offs and low levels of specialization. *Investment banking activities* involve short-term relationships with ex-ante payments and high levels of specialization.

To explain the two categories of bank functions it possible to use some examples. *Commercial lending*, as an example of commercial banking, is performed through long-term relationships with clients. The bank's compensation is fixed to the delivery of the service. The considered loan is a revolving credit facility for a firm with seasonal working capital needs. At the beginning of the relationship, the bank invests in structuring the deal and performs a credit analysis. The client usually agrees to a long term relationship by paying a commitment fee on the size of the credit line for the period of the loan. If there is no loan commitment, the client could have the incentive to terminate the revolver at any time and take the structure to another bank, which can sustain the client with the efforts of the first bank, since it has the benefits of a trained client, more credit history and a signal of prior due diligence efforts by another reputable bank.

On the other hand, the commercial bank performs an analysis of the client's needs and structures the best level of revolving commitment it should make. Overestimation of the size of the revolver is costly for both the bank and the client. The bank could prepare funds that will never be utilized and the client would pay commitment fees on a larger amount. Underestimation of the size of the loan is also costly. In this case the client should search for more funds and the business of the bank would be reduced. Therefore a bank is compensated ex-post for its performance: a bad job of structuring the deal can involve poor results for both bank and client and vice versa.

Merger and acquisition is an example of investment banking. The M&A transaction is usually performed in a short-term contract and the compensation is negotiated ex-ante as a fixed fees. The investment bank performs a detailed analysis of the best deal structure, and in the meanwhile it learns deal-making skills, it obtains insight into industry dynamics, and it builds a valuable reputation. When the transaction is completed the client is free to obtain another treatment by another different bank.

The first criterion, **relationship specificity**, explains which amount of bank's skills are part of the relationship. It drives the length of the banking relationship. In a commercial lending transaction, the bank makes a substantial investment up front in understanding the credit-worthiness of the borrower. This resolves the *high degree of information asymmetry* that exists in the beginning. The resources invested by

the bank in building the relationship are intrinsic to the relationship and therefore not exploitable. In absence of long-term commitment from the client, a commercial lending transaction could be too costly. The investment is undertaken only because the bank obtains a long-term relationship with the client, who precommits to the relationship by paying a loan commitment fee.

M&A advisory is short-term and it is based on a *high degree of public information*. The payoffs from a successful deal covers the costs to the bank in a one-shot transaction. The skills developed by the banker, like M&A valuation methodology, are fungible therefore extrinsic to the relationship. Future transaction of similar nature can be performed by different banks.

The second criterion, **consequence verifiability**, considers how is possible to evaluate the outcomes of the relationship. In a lending relationship the amount of loan usage each year is easily quantifiable. In a M&A deal the value brought to the relationship is difficult to verify.

Das and Nanda (1999) demonstrated that the relationship specificity determines the length of the relationship. When a bank builds skills specific to the client, it will only be interested in doing so if assured a long term relationship. Therefore commercial lending transactions are longer term than M&A deals. Moreover consequence verifiability determines how the providers of financial services are rewarded for their services. In M&A deals, since the output level is not easy to quantify, payment is based not on realized but on expected contribution to the deals. Since the throughput of a commercial lending transaction is easy to measure, commercial banks are paid for their throughput.

Das and Nanda's (1999) model demonstrates that length of relationship and nature of compensation determine together the extent of specialization that the bank will develop. The classic problems of hold-up and opportunism come into play in offering banking services. When relationship specificity is high, and transactions are ex-post verifiable, as in commercial banking, there are incentives for the client to be opportunistic after the bank as invested in the relationship. This leads to long-term relationships in commercial banking and under-specialization by the bank, since it wishes to minimize the costs of ex-post opportunism. On the other hand, when relationship specificity is low, and the deal is not easily quantified ex-post, as in investment banking, the investment bank can hold up performance after obtaining the deal. This leads to short term contracts, and over-specialization by the bank.

Banks choose an optimal position on the relationship/transaction dimension as a consequence of the functional nature of the various banking transaction undertaken.

4.2 Banking in Europe

Goddard et al. (2007) present how in the last 20 years the European banking industry has been modified by globalization, technological change, deregulation and European integration. Table 4.1 shows some structural indicators of the EU15 – the 15 pre-2004 EU member states. It can be noticed that between 1985 and 2004 the total number of banks fell from 12.315 to 7.300. On the other side in the same period the total assets

Country	Number of banks			Assets (billion euros)			Number of branches			Employees ('000s)			Concentration (CR5)		
	1985	1995	2004	1985	1995	2004	1985	1995	2004	1985	1995	2004	1985	1995	2004
Austria	1406	1041	796	–	–	635.3	–	–	4360	–	–	73	–	39	43.8
Belgium	120	143	104	285.9	589.4	914.4	8207	7668	4837	71	77	71	48	54	84.3
Denmark	259	202	202	96.3	125.5	607.1	3411	2215	2021	52	47	44	61	72	67.0
Finland	498	381	364	–	–	212.4	–	1612	1585	–	31	25	–	70.6	82.7
France	1952	1469	897	1348.8	2513.7	4415.5	25,782	26,606	26,370	449	408	425	46	41.3	44.7
Germany	4739	3785	2148	1495.1	3584.1	6584.4	39,925	44,012	45,505	591	724	712	–	16.7	22.1
Greece	41	53	62	69.2	94.0	230.5	1815	2417	3403	27	54	59	80.6	75.7	65.0
Ireland	42	56	80	21.0	45.8	722.5	–	808	909	–	–	36	47.5	44.4	43.9
Italy	1101	970	801	546.8	1070.5	2275.7	13,033	20,839	30,946	319	337	337	–	32.4	26.0
Luxembourg	177	220	169	169.8	445.5	695.1	120	224	253	10	19	23	26.8	21.2	29.7
Netherlands	178	102	461	226.7	650.0	1677.6	6868	6729	3649	92	111	115	72.9	76.1	84.0
Portugal	226	233	200	38.0	116.3	345.4	1494	3401	5408	59	60	53	61	74	66.5
Spain	364	506	346	311.3	696.3	1717.4	32,503	36,405	40,621	244	249	246	35.1	47.3	41.9
Sweden	598	249	222	–	–	582.9	–	–	2034	–	–	39	–	86.5	54.4
UK	772	564	413	1293.6	1999.5	6970	22,224	17,522	14,001	350	383	511	–	28.3	34.5

Table 4.1: Structural indicators for EU15 banking sectors, from Goddard et al. (2007)

of the banking sectors increased dramatically. This growth reflects the effectiveness of deregulation and the single market program in bringing about the end of “repressed” banking systems. Moreover the total EU15 banking sector employment rose by around 10-15%.

A tendency towards deconcentration in traditional loans business may have been offset by a tendency towards increased concentration in non-traditional banking business. These trends reflect a process of structural change in European banking that is considerably more complex than what is deductible from the raw data. As an example, the integration and liberalization of European financial markets and payment systems has given strong pressure on the banks’ traditional lines and business. In response to this growing competition, banks have diversified into non-interest earning activities as insurance and mutual funds sales, private banking and asset management. On the other hand insurance companies and investment and pension funds have grown, as household savings have been moved away from banks and toward alternative savings and investment products. Non-bank institutions such as supermarkets and telecommunications firms now compete in financial service markets. Banks have re-engineered value chains through securitization of their loan portfolios. As result of financial innovation, banks offer more products and services than ever before, and conduct a growing proportion of their business off-balance sheet. Therefore the distinction between banks and non-bank financial intermediaries has become increasingly blurred. Moreover the market share of foreign banks have increased in many European countries.

Table 4.2 makes a summary of the key legislative changes since the late-1970s at the EU level that have contributed towards the integration of European banking and financial markets. Despite a sustained legislative drive at the EU level toward the integration of financial markets, significant barriers to the integration of banking markets still exist. The process of integration has advanced further in wholesale than in retail banking. Barrier that may be particularly onerous in retail banking include:

- issues of consumer trust and confidence, causing depositors to prefer local or na-

1977	First Banking Directive. Removed obstacles to the provision of services and establishment of branches across the borders of EU member states. Harmonized rules for bank licensing. Established EU-wide supervisory arrangements
1988	Basle Capital Adequacy Regulation (Basle I). Minimum capital adequacy requirements for banks (8% ratio). Capital definitions: Tier 1 (equity); Tier 2 (near-equity). Risk-weightings based on credit risk for bank business
1988	Directive on Liberalization of Capital Flows. Free cross-border capital flows, with safeguards for countries with balance of payments problems
1989	Second Banking Directive. Single EU banking licence. Principles of home country control (home regulators have ultimate supervisory authority for the foreign activity of their banks) and mutual recognition (EU bank regulators recognise equivalence of their regulations). Passed in conjunction with the Own Funds and Solvency Directives, incorporating capital adequacy requirements similar to Basle I into EU law
1992	Large Exposures Directive. Banks should not commit more than 25% of their own funds to a single investment. Total resources allocated to a single investment should not exceed 800% of own funds
1993	Investment Services Directive. Legislative framework for investment firms and securities markets, providing for a single passport for investment services
1994	Directive on Deposit Guarantee Schemes. Minimum guaranteed investor protection in the event of bank failure
1999	Financial Services Action Plan (FSAP). Legislative framework for the Single Market in financial services
2000	Consolidated Banking Directive. Consolidation of previous banking regulation
2000	Directive on e-money. Access by non-credit institutions to the business of e-money issuance. Harmonised rules/standards relating to payments by mobile telephone, transport cards, and Basle payment facilities
2001	Directive on the Reorganisation and Winding-Up of Credit Institutions. Recognition throughout EU of reorganisation measures/winding-up proceedings by the home state of an EU credit institution
2001	Regulation on the European Company Statute. Standard rules for company formation throughout the EU
2002	Financial Conglomerates Directive. Supervision framework for a group of financial entities engaged in cross-sectoral activities (banking, insurance, securities)
2004	New EU Takeover Directive. Common framework for cross-border takeover bids
2005–2010	White paper on Financial Services Policy. Plan to implement outstanding FSAP measures, consolidation/convergence of financial services regulation and supervision
2006–2008	Capital Requirements Directive. Updates Basle I and incorporates the measures suggest in the <i>International Convergence of Capital Measurement and Capital Standards</i> (Basle II). Improved consistency of international capital regulations. Improved risk-sensitivity of regulatory capital. Promotion of improved risk-management practices among international banks

Table 4.2: Legislation impacting on the EU banking and financial sectors, from Goddard et al. (2007)

tional banks to foreign banks

- a local bank's access to private information about a borrower's creditworthiness, which creates a rent that is unavailable to competing foreign banks
- bundling of financial services, enabling banks to charge different prices for each component of the bundle in different markets

The process of European integration may have implication for the stability of the banking system. Prior to integration, the performance of banks is likely to be positively correlated with the business cycle in the domestic economy. In an European integrated bank, the risk coming from a specific country is balanced with the activities spread across different countries. On the other hand, increased business cycle synchronicity within an integrated EU can reduce or eliminate this geographical diversification benefit.

The procyclical characteristic of banking business may be enhanced by a tendency for financial institution to lend excessively during economic upturns and to adopt over-cautious lending standards during downturns. Theoretical explanations for such behavior are based on **information asymmetries** that vary with the business cycle, including disaster myopia, herd behavior, agency, institutional memory and collateral. An implication is that borrowers' access to external finance also varies procyclically. Therefore an element of reverse causality is possible: procyclical movements in banking lending, capital and loan-loss provisioning may tend to amplify real economic fluctuations.

Many of the most successful European banks have responded to the changing environment by expanding significantly, either through internally generated growth or through merger and acquisition. The growth has enabled banks to realize scale and scope economies, reduce labour and other variable costs, and reduce or eliminate operational inefficiencies. Since the competitive pressure caused a decrease of earnings streams relative to costs, many banks have focused on achieving growth from other, non-interest income sources, such as bancassurance and off-balance sheet business, which generates fee and commission income. Non-interest income as a proportion of total income for EU banks increased from 28,3% in 1992 to 40,0% in 2003. Large diversified banking groups typically earn around 50% of their income from non-interest activities.

The impact of an increase in market size on the growth of individual firms depends on industry product and technological characteristics. It possible to consider an *horizontal* or a *vertical* product differentiation. In the former case, it implies that products or services are of the same or similar quality, but offer different combination of characteristics which may be valued differently by different customers. In the latter case, it implies that products or services differs from another in terms of quality, and therefore in terms of price. If products are homogenous or horizontally differentiated and sunk costs are exogenous, an expansion in market size encourages entry and leads to deconcentration and a fragmented industry structure. If products are vertically differentiated and sunk costs are endogenous, incumbent firms tend to increase their (discretionary) sunk cost expenditures on advertising, branch expansion, technology and financial innovation, leading to an increase in the minimum efficient scale. The tendency towards

fragmentation as the market expands is offset by a competitive escalation in endogenous sunk cost expenditure.

The potential for management strategy to influence performance may be high if there is scope for vertical product differentiation and certain types of discretionary sunk cost expenditure. For banking, investment in **information technology** can represent a major form of endogenous sunk cost competition. Specific forms of vertical differentiation can have impact on competition. For example, bank's customers could be ready to pay a premium considering several "quality" attributes as bank's capital ratio, loan-loss provisions, size and branch network.

The consolidation has contributed significantly to the reduction in the number of banks operating in the EU15, as reported in table 4.1. It is possible to count 1025 mergers involving one or more banks located within the EEA – European Economic Area, comprising the EU15 plus Norway, Iceland and Liechtenstein. Cross-border bank mergers have been relatively uncommon within Europe.

Relationship banking is the provision of financial services repeatedly to the same customer. Switching costs for bank customers represent an important source of rents for banks, and an important motive for the development of relationship (as opposed to transaction) banking. Switching costs include search costs and "shoe-leather costs" (the time and effort required to open a new account, transfer the funds and close the old account), and informational costs arising from the **private information** that is available to the borrower's current bank, but not to that bank's competitors. The size of the lending bank's *informational advantage* may depend on borrower characteristics. For example, new firms are harder to screen than established firms or it may be difficult to assess the probability of default for a firm with a high proportion of intangible assets. Over time, however, the current bank's investment in the acquisition of information may create a hold-up or asset specificity problem: an incentive for either party to act opportunistically in an effort to appropriate a larger proportion of the rent when the contract is renewed.

The competition between financial service providers affects in different ways the propensity for banks to engage in **relationship lending** (with screening of borrowers) or **transaction lending** (without screening). Banks can trade-off between borrower quality (enhanced by screening leading to the development of relationship lending), and market share (most easily achieved through transaction lending). The effect of competition between banks on the incentive to screen is ambiguous. An increase in competition, by reducing the number of loan applicant per bank, increases the adverse selection problem and increases the incentive to screen. However, with more banks there is more incentive for any bank to defect from the screening equilibrium, and pursue market share rather than borrower quality. This may result in a *prisoner's dilemma*, in which all banks defect and switch from relationship to transaction lending.

It is possible to distinguish between inter-bank competition for loans, and capital market competition (from investment banks and mutual funds). Inter-bank competition reduces the profitability of transaction lending by more than that of relationship lending. Therefore there is a substitution effect, from transaction to relationship lending.

However, because there are more banks, the benefit each bank gains from investment in the knowledge required to screen effectively is diminished, so the rent per unit of relationship lending decreases as the volume increases. Capital market competition is assumed to reduce the number of banks, and therefore has diametrically opposite effect: the volume of relationship lending decreases but the unit rent increases.

In the empirical literature on relationship banking costs and collateral requirements incurred by German small- to medium-sized enterprises (SMEs) when raising external finance, are lower for SMEs with long-lasting single borrowing relationships. Borrowers with multiple bank relationships are less profitable than those that borrow predominantly from one bank. The likelihood of switching from a single to a multiple banking relationship increases with the duration of the former. In fact single relationships become harder to manage as their duration increases, due to hold-up problem.

It is possible to achieve cost savings in two ways:

- first, by selecting the optima firm size and product mix, or in other words exploiting economies of scale and scope
- second, by maximizing operational or productive efficiency.

There are two aspects to operational efficiency:

- technical efficiency: it involves avoiding waste by achieving the maximum possible output from a given set of inputs
- economical efficiency: it involves selecting the cost-effective combination of inputs given a prevailing set of input prices.

Early research on cost structure and operational efficiency in European banking, based on data up to the mid-1980s, found evidence of opportunities for smaller banks to achieve average cost saving through the exploitation of economies of scale, but no such opportunities for larger banks. Recently, however, evidence of increasing returns to scale at the upper end of the size distribution has been reported. A widely reported empirical regularity is that the potential for achieving average cost savings by reducing or eliminating operational inefficiencies is greater than the potential for doing so by realizing economies of scale. Typically, average operational inefficiency scores of between 20% and 30% are reported. In other words, the average costs of the average bank are up to 30% higher than those of the best-practice bank, and a cost saving of this order could be achieved by emulating best practice. Most studies that report evidence of increasing returns to scale suggest average cost tends to decline quite gently as a scale increases. Even according to the most optimistic estimates, an increase in scale of 100% (a doubling size) would not be expected to reduce average cost by more than 5%.

The coverage of the operational efficiency literature has been extended to the measurement of performance relative to a best-practice profit function. Output quantities and input prices are exogenous, and the bank seeks to minimize the cost of producing its given mix of outputs. In a standard profit function, input prices and output prices

are exogenous but output quantities are endogenous, making revenues, as well costs, a decision variable.

Financial services liberalization, the intensification of competition, and an increased emphasis on shareholder value may have contributed to the problem of financial exclusion in recent years, with many profit-oriented banks tending to focus attention increasingly on their wealthier customers (flight to quality). In many European countries it has been left to specialized financial institution such as saving banks, cooperative banks and other “proximity banks” to offer specific products for otherwise excluded households and small firms.

Technological change on banking include innovations that reduce costs associated with the collection, storage, processing and transmission of information, or transform the means whereby customers gain access to banking services and products. Significant innovations to delivery systems include automated teller machines (ATMs), electronic funds transfer at the point of sale (EFTPOS), telephone banking, internet banking and e-money. Major changes to bank’s internal systems, such as **customer relationship management** systems, business management technologies, core processing technologies and various support and integration technologies have also impacted positively on performance and profitability. From parametric estimates based on 1989-1996 data for 15 European countries, it has been found that the annual rate of reduction of costs attributable to technological change was more than 3%. In a study that compares parametric and non-parametric technological change measures using 1994-2000 data on large banks from five EU countries, productivity gains were driven predominantly by technological change (shifts in the position of the best-practice cost frontier), and not by catch-up on the part of inefficient banks.

In recent years and in most countries, *monetary policy* has replaced *fiscal policy* as the principal tool of macroeconomic policy for the stabilization of output and inflation. However, precise identification of the ways in which monetary policy influences the economy has proven to be difficult task. They have been recognized:

- an interest rate channel
- an asset price channel
- an exchange rate channel for the transmission of monetary policy changes.

In the banking literature a further channel has been recognized: the *credit channel*. According to Bernanke and Gertler, however, this is more accurately interpreted not as a separate channel in its now right, but rather as a set of frictions in financial markets, which tend to complement and amplify the conventional interest rate effect. The idea is that monetary policy operates on the “external finance premium”: the difference between the cost to firms of raising finance externally through equity or deb, or internally through retained profits. The premium exists due to **information asymmetries** in credit markets, giving rise to adverse selection and moral hazard effects, and raising evaluation and monitoring costs for lenders. Adverse selection because borrowers know their true creditworthiness better than lenders, and moral hazard due to distortions in

borrower behavior. A tightening of monetary policy raises the external finance premium, and may affect bank lending through either a *demand-side* (balance sheet channel) or a *supply-side* (bank lending channel) effect. On the **demand side**, borrowers' interest expenses are increased and the value of their collateral is reduced, making external finance more costly. On the **supply side**, as liquidity is drained from the banking system through open market operations by the central bank, banks are forced to reduce their lending because they are starved of funds.

Although the importance of the supply-side (bank lending channel) effect may have diminished over time due to developments such as deregulation and financial innovation, which have reduced bank's dependence on deposits as a source of finance, quantification of the relative importance of the balance sheet channel and the bank lending is a difficult empirical task. So too is direct measurement of the external finance premium. For the US, an increase in interest rates tends to have different effects for different banks: for example, lending by smaller banks and relatively illiquid or undercapitalized banks tends to be more sensitive to interest rate movements. For Europe, a bank's liquidity, but not its size or capitalization, is important in determining the adjustment in its lending when interest rates change.

4.3 Consumer friendly financial services

Samli and Frohlich (1993) present an analysis about efficiency and effectiveness in the bank sector related to its consumers. Banks and other financial institutions are having an identity crisis in terms of their role, position and service. Moreover they have difficulties in identifying their role with the consumer and this can result in a loss of profits. There is much confusion about what are the most important factors in banking relationships.

Banks are using computers and other technologies and this can result in losing touch with their consumers' needs. It is possible to identify the beginning of this loss of touch around 1983 (in USA), when many large banks were closing local offices or reducing staffs to save money. In the same period new community banks opened and grew thanks to their consumer personal service, when instead at the time the leading experts were predicting technologies as home banking to be the feature of banking. The *depersonalization process* of the larger banks and many of the smaller banks results in consumer insensitivity and then it costs the industry.

There are three possibilities for lowering operating costs and they are mostly related to bottom line:

- eliminate self-service products
- reduce service standards for customers
- reduce teller-related expenses

However those options can be found unacceptable in terms of image, customer satisfaction levels and long term business goals. In the end, bottom line aspects, which are efficiency driven, are replacing long term effectiveness. **Consumer sensitivity**, the

raison d'être for the banking sector, is needed to provide particular guidance for the industry to become both *efficient* and *effective*. Kranz, cited in Samli and Frohlich (1993), says that "...equivalent to achieve this optimum symmetry is the application of advanced technology that *supports* both *internal* operations and *external* customer relations".

There is an inherent *strategic management trap* in services and service production. A service firm facing financial problems or increasing competition, responds through using internal efficiency measures which often influence personnel resulting in a deteriorating service quality and unsatisfied customers, thus decreasing the firm's effectiveness.

In order for the bank to become more *consumer oriented*, it is important to make a distinction between efficiency and effectiveness. **Efficiency** is the ratio of input to output. Therefore, efficiency is an internal process related to providing services at the lowest possible cost, minimizing the cost of input and maximizing output. Efficiency is the a measure of the resources required to achieve the output, maximizing the input/output relationship. **Effectiveness** relates to meeting the consumers' needs. Effectiveness is the process of scanning the external environment and taking advantage of external opportunities to meet those consumers' needs. Therefore effectiveness is the process of scanning the external environment and taking advantage of external opportunities to meet those consumers' needs. It deals with the ability to match the services of the bank (output) with the needs of the bank's market target. If a bank produces a service efficiently but nobody cares for that service, it is ineffective. If the bank fails to deliver its particular service to the most appropriate market segment, it becomes ineffective.

In service industries, such as banking, efficiency without effectiveness does not lead to optimizing either consumer satisfaction or profit. Effectiveness without efficiency would suboptimize the bank's profits and may create some customer dissatisfaction due to inefficiencies in delivery or product development. Being effective does not necessarily imply that one is efficient nor does being efficient imply that one is effective.

Banks are not only in the business of providing *credit*, but they are also in the business of *marketing financial services*. Marketing financial services requires a detailed knowledge of the market place, customer profiles and customer expectations. The banking industry needs to develop a much more *consumer-satisfaction oriented business*, rather than merely a "providing credit" business. Primarily due to the industry defining its mission as "providing credit" efficiently and profitably, banks have become obsessed with cutting down operating costs. This emphasis on efficiency has been facilitated by increased computer utilization. Banks have been using many different computerized systems in recording and communicating information.

Increasing emphasis upon efficiency is resulting in depersonalization of banking, which instead needs to be more personalized because of their service industry status. In a competitive market system for services, the competitive edge is related to what is referred to as *high credence* qualities. The closer the consumer's perceptions of those services being delivered to those services that are desired, the higher is the credence. In order to achieve this high level of credence, the industry must develop consumer friendly products which meet the needs of the banks' selected market segments. There are four

propositions to consider:

- efficiency without effectiveness (or vice versa) results in suboptimization
- at least seven needs of the consumer must be addressed to fulfill the psychological needs of bank customers in a financial sense
- an explanation of the varying degrees and intensity of a consumers' financial needs can be explained by a hierarchy of needs model.
- in order to satisfy the consumer's financial needs, bank must use a Theory Y management style

The paradox of efficiency in consumer banking

In order to enhance the service quality aspects of the service industry, a technique called SERVQUAL has been developed. It is a multiple-item scale that can be used to better understand the service expectations and perceptions of customers. It is applicable across a broad spectrum of services including banking. It is understandable from this technique that *personalization* yields consumer satisfaction and long term profit realization for the bank.

A congruence between the customer's image and the bank's image will develop. High credence is this self-image/store (bank)-image congruence. The congruence concept implies that the way consumers see themselves is very closely and positively related to how they see their bank. If the two are consistent, then the consumer feels good about patronizing that financial institution. Congruence would result in high levels of bank loyalty. In service industries, unlike the product industries, loyalty and high credence are more closely related to an individual's psychological needs.

High credence in banking can be achieved by eliminating the four gaps that exist in service related industries. These gaps are:

- difference between consumer expectations and management's perceptions of consumer expectations
- difference between management perceptions of consumer expectations and service quality specifications
- difference between service quality specifications and the service actually delivered
- difference between service delivery and what is communicated about the service to consumers

This four gaps in the banking sector can be eliminated by meeting certain psychological needs of the consumers.

Consumer Needs	Bank Behavior
Advice	Sales Pitch
Information	Legalistic and/or poor utilization of information
Special attention	Robotic treatment
Quick reaction	Slow reaction
Empathy	Non-personalization
Understanding	No acknowledgment and/or reassurance
Option	Minimum option

Table 4.3: Discrepancy between consumer needs and bank behavior, constructed from a group of bank management surveys e.g. American Banker and a series of bank marketing references, from Samli and Frohlich (1993)

Psychological need of the consumer

Banks are used to exercise Theory X as a management style. In many US companies, the vendors (suppliers) or contract employees are treated according to Theory X. Similarly, many banks might consider their **customers as vendors** (suppliers of money). This may be considered as additional evidence of the use of Theory X management style in regards to bank's customers. This style implies that bankers decide for their employees and subordinates what need to be done and how functions should be performed. Since this behavior spills over to their relationships with their customers, bankers tend to solve consumer problems in the same manner, emphasizing order and stability as necessary to obtain technical efficiency. In fact, their excessive efficiency orientation lends itself to the Theory X management style. According to Theory X, since people will not take and do not want responsibility, some external source (the bank) must take the responsibility for the customer.

In order for bankers to become more effectiveness oriented, they must have to use **Theory Y** management style. This would entail involving the customer who is viewed as a responsible, **self-achieving individual**. A bank under Theory Y philosophy would tend to help identify the key consumer needs by scanning their external environment and provide for those needs with specific functions so that consumers will make optimal financial decisions and become self-actualizing.

In order to implement Theory Y, two approaches are proposed:

- identify at least seven psychological customer needs
- utilize the *hierarchy of needs theory* to fulfill the varying level and intensity of there psychological needs

Seven psychological needs of the customer and the current bank behavior

There are at least seven individual psychological needs identified from the *American Banker*¹ surveys. Satisfying these needs properly will bring efficiency and effectiveness together in an effort to generate consumer friendly financial services. Table 4.3 represents these seven psychological needs together with a series of negative forces derived from the current banks' current behavior.

The banks' treatment of the consumer intensifies the psychological needs. The seven psychological needs and the current corresponding bank behavior are:

- advice vs. sales pitch
- information vs. legalistic information and/or poor utilization of information
- special attention vs. robotic treatment
- quick reaction vs. slow reaction
- empathy vs. non-personalization
- understanding vs. lack of acknowledgement
- option vs. minimum options

Those seven consumer psychological needs and the corresponding bank behaviors are not exhaustive. They are utilized primarily to illustrate how banks are suboptimizing by being efficient.

Advice vs. sales pitch. The banker will have to be able to render advice similarly as does the doctor or attorney. This particular advice must go beyond the efforts to sell. In the long run, advice that is most beneficial to the consumer, thus enhancing his financial health will yield the most business for the bank. The reception of advice fulfills one of the basic financial needs of the consumer. Proper advice from the banker will help the consumer to perform better financially which in essence means financial survival and opportunity for growth. If the bank can provide advice in a constructive profitable manner to its consumer, it will also improve its opportunity to increase its profits. However instead of advice, the customer often receives the bank's current sales pitch for on of its product.

Information vs. legalistic information and/or poor utilization of information. In today's complex technological society, there is a significant movements towards generating, disseminating and using information. Thus, an individual's financial survival in the modern society is related to their ability to operationalize information. If the banker does not have or provide proper information for the consumer, the individual's financial survival may be in jeopardy. In the case of lacking proper information, the

¹American Banker is a daily trade newspaper covering the financial services industry. Founded in 1836 and based in New York, American Banker has approximately 50 reporters and editors in six US cities who monitor developments and breaking news affecting banks. Website: www.americanbanker.com

banker cannot pay attention to individuals, cannot provide constructive advice, cannot offer reasonable options, and cannot react to the consumer's needs with understanding or empathy. The financial service industries were among three of the four lowest ranking service industries in terms of *marketing information*. Because of the banks' overwhelming orientation to efficiency and, therefore, less personal services, banks simply do not collect the proper information to provide consumer oriented solutions for the individual. Since information is a basic need necessary to fulfill the consumer's financial needs, sub-optimization on the part of the bank is a widespread occurrence.

Unfortunately, although information may be readily available about the bank's customers and needs, this information is not usually accessed. As an example: Mr. K has a very large savings account and he is quite independently wealthy. He has been banking with the same bank for over twenty years. He needs some money quickly. The bank turns him down insisting that as a policy it needs to run a *credit check* on all application before approving a loan. This *lack of information* on a consumer coupled with the lack of flexibility available to the front-line personnel to make an exception to a standard policy will result in a loss of a profitable customer.

Special attention vs. robotic treatment. Today's consumer likes to be treated as a special person. Just as the psychiatrist, attorney, or doctor takes time to listen, understand and diagnose in an attempt to solve the individual's problems and enhance the patient's sense of security and safety, the banker must be involved at the personal level with each individual. The attention spent on an individual enhances his feeling of financial security and financial problems are identified and addressed. The attention paid by the bank towards the individual's specific and personal problems is likely to provide a certain feeling of freedom which is a necessary precondition for satisfaction. Instead of a special attention, the customer is often treated as a part of a production process. This *lack of personal attention* does not induce loyalty by the customer to his bank.

Quick reaction vs. slow reaction. Much of the time to visit the bank implies a problem which needs to be resolved very quickly. The banker must realize that the pressure of the particular financial problem on the consumer may be as serious or even more serious than a symptomatic disturb which might take that person to the physician's office. Quick reaction to a financial problem with a satisfactory solution will enhance the feeling of being in "good hands". Thus the bank increases the consumer's sense of financial safety and security.

The current practice of banks is not to provide timely decisions or advice to the customer. Consider a company that needs to activate an advance on its pre-approved line of credit in order to finalize a real-estate transaction. It is possible that the branch manager cannot approve the advance and he must proceed to the main office. It results in the *inability* to react quickly to meet the needs of a consumer. This inability to react quickly not only resulted in the customer's inconvenience but also in a substantial financial penalty due to the delay in the real-estate closing.

Empathy vs. non-personalization. Empathy is vicariously experiencing feelings, thoughts or attitudes of another person. This entails personalizing each consumer's problem and trying to deliver to each consumer as if he is a specially important person.

Through the bank personnel's ability to empathize, not only is the consumer's sense of value but his feeling of belonging to the bank's family is also increased. Using Maslow's (1943) hierarchy of needs, it is possible to keep the customers satisfied. The banks may find by providing empathy to their customers, the customers will identify the bank as a group. Thus certain social needs of belonging are fulfilled.

Instead customers are often treated in a very non-personal manner. It can happen for a strange occasion that the customer forgets to deposit a check and as a result the customer goes overdraft. Therefore the bank charges him overdraft fees. If the bank had its customers rated by value to the bank and/or information on age and prior overdraft of an account, a bank representative could have contacted the customer on this first-time overdraft and save the embarrassment. The *lack of empathy* shown to the customer during this trying time would have decreased his loyalty to the bank and is likely to result in negative word-of-mouth advertising.

Understanding vs. lack of acknowledgement. Consumers attribute some of their dissatisfactions with services to their own inability to communicate their needs. If the hypothesis that consumers partially blame themselves for the dissatisfaction in the services purchased is correct, the bank's sensitivity to the consumer's psychological needs is essential for profit optimization. The bank should not only understand the consumer's need but also it should contribute to the elimination of consumer's self doubt rather than make a contribution to it. The bank can accomplish this through providing reassurance of the service's value to the customer, as well as, boosting the consumer's self-worth by eliminating *cognitive dissonance*. The bank's lack of acknowledgement and reassurance can result in the loss of a valuable customer.

Option vs. minimum options. The bank must have and should point out multiple viable financial and service options for the consumer. While from a computerized efficiency and cost perspective the minimization and standardization of the option may be desirable, the effectiveness criterion requires that consumers be given different and unique alternatives to a specific problem. If the customer does not have a choice, chances are likely that he may seek solutions elsewhere. In current times of economic and financial hardship, consumers are developing a lack of self-esteem stemming from their financial uncertainty. The modern banker can fill in this void by providing financial leadership for their customers. Thus, by involving the customer with a choice of option, banks can increase the customers' self-esteem.

Banks in order to minimize costs provides only a limited number of options in their products. The bank's lack of emphasis on service options, is likely to result in the loss of a profitable account. All of these bank scenarios reflect a substantial degree of the bank's insensitivity to the psychological needs of the consumer. Psychological needs of the consumer in a banking setting can easily be associated with Maslow's (1943) hierarchy.

Bank customer's psyche and Maslow's hierarchy

Just as managers and management development specialists can use certain theories to understand, explain, predict and even control human behavior in the organizational envi-

Maslow needs	Financial needs
Self-actualization	Self-bank image congruence
Esteem	Options
Social needs	Understanding empathy
Safety	Quick reaction - Special attention
Physiological	Information advice

Table 4.4: Maslow's hierarchy of needs and the psychological needs of the consumer, from Samli and Frohlich (1993)

ronment, bank can also understand, explain and predict, if not control, their customer's behavior. Samli and Frohlich (1993) consider two theories:

- **Maslow's hierarchy of needs**, as the basic theory for understanding banks' customers, in order to explain the varying levels and intensity of financial needs
- **Theory Y**, in order to manage their varying needs and their degrees of intensity

Abraham Maslow tried to determine why consumers were driven by particular needs at particular times. There is a very strong parallel between Maslow's (1943) observations and the consumer's financial needs. The relative variations in the financial needs and the relative intensity of these needs can be explained by a hierarchy of needs. Although there is no literature support for bank services as they relate to Maslow's hierarchy, Samli and Frohlich (1993) maintain if Maslow's hierarchy is credible then, almost by definition, the variety of financial services and the relative intensity for these services will be quite parallel to the hierarchal nature of Maslow's model. Samli and Frohlich (1993) maintain that banks will have a much better understanding of the customer's psyche if they are familiar with Maslow's hierarchy or related theories.

In each hierarchical level for financial services, the consumers' needs are expressed differently. Therefore the modern banker, in order to optimize performance, must also determine the psychological and financial needs of the consumer and how the two interact. Maslow conctruted a well-known hierarchy which indicates the changing needs of the individual as they move from the most basic psychological to higher order psychological needs. Table 4.4 illustrate Maslow's hierarchy related to the bank's customers' psychological needs. The seven needs presented in table 4.3 are reexamined to correspond to Maslow's hierarchy. Consumer needs as illustrated in table 4.4 have different degrees of importance and, therefore, need to be prioritized by the bank to provide more effective customer service. The fact that financial needs illustrated in table 4.3 and table 4.4 have different degrees of importance indicates that consumer financial needs can be examined in a hierarchical framework.

Analogous to Maslow's physiological needs which are the basic necessities to sustain physical life, both the need for financial advice and information are basic necessities to sustain the modern consumer's financial life. The banker must be able to provide the

consumer constructive financial advice based upon information on both the consumer and the current market conditions to fill this basic financial need.

Safety is the first psychological need. Meeting the safety need provides the individual freedom from both physical and emotional insecurity. The special attention paid to the consumer's financial problems and the banker's quick response to those problems provides the consumers with a feeling of financial safety and security.

Social need or need to belong is the second need. It is associated with the need for *acceptance* and *commitment*. The banker must be able to understand and to empathize with the consumer's problem. The increased feeling of the bank's acceptance and commitment would further enhance the consumer's ability to identify with the bank. There may be an emergence of various groups of different degrees of attachment to the bank.

Esteem is the third need. It includes the psychological needs of recognition and status. The banker provides viable financial and creative service option for the customer. In doing so, the banker recognizes the consumer as an important individual with unique financial needs worthy of special attention. This whole process increases the consumer's sense of status. Banks are leaders of the *financial decision making process* at the consumer level. They can establish much stronger followership by helping the consumer to enhance their self esteem in the complex process of financial problem solving.

From a bank marketing perspective, Maslow's consumer **self-actualization** is the highest level of satisfaction a consumer may achieve. The *self congruity theory* posits that if the consumer's self-image and the bank's image are congruent in a positive sense, then the customer's satisfaction will be optimized resulting in a strong customer loyalty to the bank. The bank can facilitate their customers' self-actualization. Effective marketing for a bank will reach its highest pinnacle as it creates congruity between its customer's self-image and its' own image as financial institution.

Of course the fulfillment of the seven consumer needs implies that the banks must have a carefully developed consumer research activity and the resulting consumer databases. There have to be involved at least three types of consumer research activities:

- banks must have an idea as to what kind of image they are currently projecting
- banks must understand the characteristics of their target markets and the self-image of their consumers
- banks must be in a position to compare the two and determine the necessary actions to create a congruence between the two which is also referred to as high credence.

The banks need more emphasis on consumer behavior research. It should be designed to meet the seven individual psychological needs of the customer.

An equally important research agenda is related to Theory X and Theory Y. A bank's understanding of how a Theory Y type of orientation would improve the consumer's well-being will undoubtedly improve their ability to satisfy their customers and, therefore, improve their profit picture. McGregor explains **Theory Y** in his book "The Human

Side of Enterprise ”. Management assumes that people may be ambitious and self-motivated and exercise self-control. It is believed that people enjoy their mental and physical work duties. They possess the ability for creative problem solving, but their talents are underused in most organizations. Given the proper conditions, Theory Y managers explains that employees will learn to seek out and accept responsibility and to exercise self-control and self-direction in accomplishing objectives to which they are committed. A Theory Y manager believes that, given the right conditions, most people will want to do well at work. The satisfaction of doing a good job is a strong motivation. Theory Y managers are more likely than Theory X managers to develop the climate of trust with employees that is required for human resource development.

In this troubled era of banking, the combination of efficiency and effectiveness is perhaps the only avenue through which the banking sector can cope with the adversities that exist in the environment and establish a competitive edge. This optimization process is related to the overall performance of balancing its resources and market opportunities. Thus, becoming more consumer sensitive is not an option a bank, but a necessity.

4.4 Customer relationship management

Boulding, Staelin, Ehret and Johnston (2005) present the state of the art of customer relationship management. Many years ago, economists introduced the concept of *value maximization*. A firm applying this concept can maximize profits and consumers maximize utility. Today there is the concept of **dual creation of firm and customer value** (see also Rogers (2005)). **CRM** is the outcome of the continuing evolution and integration of marketing ideas and newly available data, technologies, and organizational forms.

One of the original big ideas in marketing is that for firms to stay in existence, they should not focus on selling products but rather on *fulfilling needs* (Levitt 1960 cited in Boulding et al. (2005)). In other words CRM is a *process of dual creation of value*. Levitt (1969) cited in Boulding et al. (2005) introduced the concept of the *augmented product*, stressing that consumers are interested in the total buying experience, not just the core product. CRM relies on this concept because it tries to find the specific elements of the exchange process that produce value to the customer. Exchange occurs only when both parties perceive that they are receiving value (Bagozzi (1974) cited in Boulding et al. (2005)).

Marketing scholars say that maintaining good customer relationships are necessary to develop and maintain. Concept such as market orientation, market focus, and market-based learning were developed and they emphasized the establishment of good information process and capabilities within the firm to understand the needs and wants of customers. Moreover there was an evolution from product or brand management to customer management and from product portfolio management to customer portfolio management. The transitions were due in part to work in the area of brand equity, which recognized that *equity resides in the minds of consumers*.

In the 1980s there was an explosion of customer data. When hardware and software

where available, vendors capitalized on the ideas of *one-to-one marketing* and *mass customization* using the term CRM to refer to the collection of data and activities surrounding the management of the customer-firm interface. These CRM solutions enable firms to acquire, warehouse and analyze data about customer behavior and company actions more easily. Using this data and analyses, firms began to focus on acquiring new customers; retaining their current customers (i.e. building long-term relationships); and enhancing their relationships through such activities as customized communications, cross-selling, and the segmentation of customers, depending on their value to the firm. Implementation of these CRM solutions also required firms to have a customer relational orientation and to have processes in place to collect, analyze and apply the acquired customer information.

CRM requires a **cross-functional integration of processes, people, operations, and marketing capabilities** that is enabled through **information, technology and applications** (Payne and Frow, 2005). CRM goes beyond a customer focus: not only does CRM build relationships and use systems to collect and analyze data, but it also includes the integration of all these activities to both firm and customer value, extending this integration along the value chain, and developing the capabilities of integrating these activities across the network of firms that collaborate to generate customer value, while creating shareholder value for the firm.

Payne and Frow (2005) attempt to provide a definition of CRM:

“CRM relates to strategy, the management of dual creation of value, the intelligent use of data and technology, the acquisition of customer knowledge and the diffusion of this knowledge to the appropriate stakeholders, the development of appropriate (long-term) relationships with specific customers and/or customer groups, and the integration of processes across the many areas of the firm and across the network of firms that collaborate to generate customer value”.

CRM demonstrably enhance firm performance. Firms that invest in more in CRM activities and technology have greater customer satisfaction. The use of CRM application is associated with increased customer knowledge, which in turn is associated with greater customer satisfaction. Firm performance measured in terms of retention and customer satisfaction is greater for firms that have good relational information process in place. Intermediate relationship performance measures that emerge from the business-to-business literature (e.g. satisfaction, calculative commitment) directly and positively influence actual behavior in the form of retention within a business-to-consumer setting.

There is a positive impact of CRM in a wide variety of industry settings. Success with CRM is not contingent on being a part of a particular industry. It is always possible to find a local improvements in profits. It could be interesting to imagine what could be accomplished with a more comprehensive systems approach.

Payne and Frow (2005) emphasize that one major element in any CRM system is the measurement process. Although the ultimate objective of any measurement process is to increase shareholder value, one of the real advantages of a CRM measurement process

is that the firm normally also obtains measures such as *customer lifetime value* and *acquisition and retention costs*. Good CRM process measures provide the firm with the opportunity to gain deeper insights into how these intermediate process measures link to downstream firm performance. In general, CRM creates the potential for firms to begin to treat as firm investments what were previously considered marketing costs.

Holding fixed the level of CRM investments, the effectiveness of CRM activities depends on how CRM is integrated with the firm's *existing processes* and *preexisting capabilities*. The positive effects of investments in CRM technology are enhanced when the firm already has the appropriate relational information processes in place. CRM activity returns are enhanced when **firms share information with their supply chain members**. Enterprise CRM system that coordinates and integrates data from different channel sources, enables the firm to gain new knowledge about each customer and thus enhance firm performance. **Effective CRM implementation does not necessarily require sophisticated analyses, concept, or technology.**

Traditional *market segmentation* is still relevant in the context of CRM. Some may equate the use of CRM with the idea that every firm offer or activity should be customized for individual customers. However, the use of basic market segmentation is still present as best practice. Segments are not based just on standard demographics, but rather on detailed *analyses of prior observer behavior*.

The most important element in CRM implementation is for the firm to acquire customer knowledge and then use this knowledge wisely for the dual creation of value. Firms can create value for one customer through information drawn from other customers (e.g. Amazon, see also Davenport and Harris (2009)) rather than direct collaboration. It is possible to delineate five *relational informational subprocesses*:

- information reciprocity
- information capture
- information integration
- information access
- information use

This can lead to a *win-win situation* for the firm and its customers (i.e. the dual creation of value). However, this raises the issue of **fairness** and **trust** because the goal is for the firm to use knowledge about customers to extract more value for the firm and therefore creates less value for the customer. If CRM is implemented in a way that leads customers to believe that they are poorer and in worse conditions, firms can put themselves at substantial risk. Information reciprocity can break down, and consumers may ultimately choose to opt out for relationships.

In ideal circumstances, CRM and the dual creation of value expand the pie such that both consumers and firms are better off. However CRM might be considered a pie-splitting mechanism the firm can use to learn things about customers that enable it to take a big slice of the created value. Firms may use CRM activities to attempt

to extract consumer surplus. Sometimes the firm can unobtrusively collect information about the customer at the time of transaction. Other times, the firm must rely on the customer providing this information. Firms that acquire think knowledge are more likely to have superior firm performance.

However it may not always be in the customer's self-interest to provide these data. The firm can infer customer types from observed prior behavior. However, some customers anticipate what a firm will do after it observes customer behavior. If the customers act strategically, this reduces the firm's share of the value creation pie, even if the firm anticipates these reactions. As more consumers begin to consider that firms are using CRM to act strategically, an increasing number of customers become less trusting of firm behavior and therefore act strategically in repeated interactions with the firm. The real issue from the consumers' perspective is whether they trust that firms will use their data in a way that helps the consumer.

The consumers can keep their data private or distort the data. Individually based efforts to keep data private and privacy regulations are certainly reasonable and appropriate. Firms should think with foresight about trust and privacy implications of their CRM activities. If the firm does not adequately consider the creation of value for both their customers and themselves, they may lose access to data required for the dual creation of value process.

Based on what a customer observes other customers receiving either from the same firm or from competitive firms, customers develop expectations about what they should receive and downgrade their perceptions of the firm if they receive less than what they believe they should. What customers experience, both within a particular firm and compared with other firms, drives what they believe is fair and affects the firm's performance.

Inappropriate and incomplete use of CRM metrics can put the firm at risk of developing core rigidities, thus leading to long-term failure. Most of the most popular measures of current CRM systems (e.g. acquisition, retention, cross-selling, up-selling, customer migration, customer lifetime value) are outcome measures. These are important and necessary but they may not be directly linked to the value dual-creation process that is the core concept of CRM. Thus, it is essential that the firm also develops measures that are directly connected with this value dual-creation process, enabling the firm to understand the drivers of value and thus to ensure long-term success. The flip side of this is that failing to do so can lead to doing too much of a "good" thing, producing core rigidities and long-term failures.

It is important then to consider the *customer portfolio management*. It is important to balance customer portfolio in terms of customer needs, implied from the actions to create customer value, so that these customers create company value. In a bank case study, the bank decided to stop targeting younger, less profitable loan customers on the basis of lifetime value calculations. This decision is potentially based on incomplete use of metrics in two different ways. First, it could be that the younger, less profitable customers evolve over time into older, more profitable customers. The lifetime value metric needs to be complete in the sense of capturing this potential dynamism in customer value. Second, it could be that dropping these smaller, less profitable customers

undermines the economies of scale that enable the firm to generate profits from larger customers.

Successful implementation of CRM requires that firms incorporate knowledge about competition and competitive reaction into CRM processes. It is well accepted that CRM is a *strategic initiative*. Therefore it should be held accountable to the same standard as the evaluation of other strategic choices that a firm faces. It is reasonable for a company to wonder if CRM provides *sustainable advantage* for the firm in the face of competitive reaction. The firm should focus on competitors, customers and company capabilities.

It is difficult to imagine how the technology underlying CRM could create a sustainable advantage in the face of competitive reaction. However the relational information processes, the customer knowledge generated from these processes, the integration of processes, and the customer loyalty resulting from the value creation processes may be difficult to imitate.

Effective CRM implementation requires coordination of channels, technologies, customers, and employees. The integration of CRM across both people and processes may be difficult to imitate and thus provide a source of sustainable competitive advantage.

One of the major stakeholder of relevance to CRM is the the firm owners (i.e. the shareholders). A key objective for these stakeholders is profit maximization. A second key stakeholder of relevance to CRM is the customer. A key objective for customers is utility/value maximization. Other stakeholders of relevance to CRM include employees, suppliers and collaborators. It could be interesting to measure of relevance for these stakeholders. It is possible to expect that these measures are present in other subjects as strategy, **supply chain management**, organizational behavior and design.

Customer relationship management activities are not static. Firms and customers choose (and change) their behavior and the basis of others' actions to maximize value. Managers modify their behavior toward individual customers after being given access to measures of customer lifetime value. Customers act strategically to alter their behavior depending on the actions of the firm and the firms can alter their behavior on the basis of customer behavior. Firms can modify customers' channel choice through different communication strategies. In all these cases, the actions of one player are chosen because of or depend on the action of other players.

An underlying premise of CRM is that customers have different needs, and thus the firm should treat them differently. Therefore it is important to acknowledge heterogeneity in customer behavior. It is possible to consider latent class segmentation schemes. There any many possible approaches, but it is interesting to consider the Bayesian estimation, which, at least conceptually, enables every person to have his own response coefficients.

Payne and Frow (2005) develop a conceptual framework for CRM. It can be defined from at least three perspective: *narrowly and tactically* as a particular technology solution, *wide-ranging technology*, and *customer centric*. These perspectives can be portrayed as a continuum, as in figure 4.1. Payne and Frow (2005) propose that CRM should be positioned in the broad strategic context of the customer centric perspective.

Figure 4.2 describes Payne and Frow's (2005) framework and it presents five generic

5. the performance assessment process

Strategy development process requires a dual focus on the organization's business strategy and its customer strategy. How well the two interrelate fundamentally affects the success of its CRM strategy. The *business strategy* can consider a review of a company's vision and how it relates to CRM. Then it is possible to conduct a review of the industry and competitive environment. The *customer strategy* involves examining the existing and potential customer base and identifying which forms of segmentation are most appropriate. The organization needs to consider the level of subdivision for customer segments, or segment granularity. This involves decisions about whether a macro, micro or one-to-one segmentation approach is appropriate. Exploiting e-commerce opportunities and the fundamental economic characteristics of the Internet can enable a much deeper level of segmentation granularity than is affordable in most other channels.

Value creation process transforms the outputs of the strategy development process into programs that both extract and deliver value. The three key elements of the value creation process are:

- determining what value the company can provide to its customers
- determining what value the company can receive from its customers
- maximizing the lifetime value of desirable customer segments.

The value the customer receives from the organization draws on the concept of the benefits that enhance the customer offer. The customer is seen as a *co-creator* and *co-producer*. These benefits can be integrated in the form of a value proposition. To determine whether the value proposition is likely to result in a superior customer experience, a company should undertake a value assessment to quantify the relative importance that customer place on the various attributes of a product.

Customer value is the outcome of the coproduction of value, the deployment of improved acquisition and retention strategies, and the utilization of effective channel management. It is necessary to determine how existing and potential customer profitability varies across different customers and customer segments. The economies of customer acquisition and customer retention and opportunities for cross-selling, up-selling, and building customer advocacy must be understood.

Calculating the customer lifetime value of different segments enables organizations to focus on the most profitable customers and customer segments. The value creation process translates business and customer strategies into specific value proposition statements that demonstrate what value it to be delivered to customers, and thus it explains what value is to be received by the organization, including the potential for co-creation.

Multichannel integration process takes the outputs of the business strategy and value creation processes and translates them into value-adding activities with customers. It focuses on decisions about what the most appropriate combination of channels to use are; how to ensure that the customer experiences highly positive interactions within those channels; and when a customer interacts with more than one channel, how to create and present a single unified view of the customer. The categories of channel options are:

- sale forces, including field account management and personal representation
- outlets, including retail branches
- telephony, including traditional telephone and call center contact
- direct mailing, including direct mail, radio, and traditional television
- e-commerce, including e-mail, the Internet and interactive digital television
- m-commerce, including mobile telephony, short message service and text messaging, wireless application protocol and 3G mobile services.

The concept of the *perfect customer experience* must be affordable for the company in the context of the segments in which it operates. Multichannel integration is a critical process in CRM because it represents the point of co-creation of customer value.

Information management process is concerned with the collection, collation and use of customer data and information from all the customer contact points to generate customer insight and appropriate marketing responses. The key material elements are the data repository, which provides a corporate memory of customers; IT systems, which include the organization's computer hardware, software and middleware; analysis tools as data mining to discover meaningful patterns and relationships; and front office and back office applications, which support the many activities involved in interfacing directly with customers and managing internal operations, administration, and supplier relationships.

The information management process provides a means of sharing relevant customer and other information through-out the enterprise and "replicating the mind of the customer".

Performance assessment process covers the essential task of ensuring that the organization's strategic aims in terms of CRM are being delivered to an appropriate and acceptable standard and that a basis for future improvement is established. This process has two main components: shareholder results, which provide a macro view of the overall relationships that drive performance, and performance monitoring, which provides a more detailed, micro view of metrics and key performance indicators. Two means of cost reduction are especially relevant to CRM deployment of technologies ranging from automated telephony services to Web services and the use of new electronic channels such as online *self-service* facilities. Recent efforts to provide cross-functional measures, such as the balanced scorecard, are a useful advance. The format of the balanced scorecard enables a wide range of metrics designs. Indicators that can reveal future financial results, not just historical results, need to be considered as part of this process. Standards, metrics, and key performance indicators for CRM should reflect the performance standards necessary across the five major processes to ensure that CRM activities are planned and practiced effectively and that a feedback loop exists to maximize performance improvement and organizational learning.

Berger, Gensler, Skiera and Wiesel (2009) try to define some best practices for CRM in **retail banking**. CRM is widely used nowadays, but the implementation and understanding of specific business processes differs significantly in the financial services indus-

try and there is no set of best practice (reference) processes publicly available. Business processes have to be designed and implemented to contribute to the companies' success in the long run.

Taking the increased relevance of value-based customer management into consideration (Payne and Frow, 2005), the metric for processes' business value should be customer related and linked to the value of the customer base. Berger et al. (2009) apply the **customer lifetime value (CLV)** and **customer equity**, being the focal construct of customer management of the firm level.

A **business process** is widely defined as a structured flow of activities supporting business goals. Reference modelling gained relevance for improving business processes to a "best practice" status and reusing optimal reference process modules. While there are precise reference processes for diverse business processes, detailed customer management processes especially for retail banks cannot be found in the literature yet (Berger et al., 2009). Industry-specific standard software (core banking software and related products) focus on the transaction aspects, whereas industry-independent CRM solutions may be adopted to the banking context. There are some processes published, but those are mostly related to a generic customer life cycle.

Reference processes as well as other reference models are considered as "generic conceptual models that formalize state-of-the-art of best practice knowledge" in a certain application domain. A common way of development is the derivation from company specific situational models, but they can comprise specific situational information that can contradict with the intended universality. Berger et al. (2009) try to mitigate those inherent problems by developing a reference process from scratch using rigorous methods, involving different sources of industry knowledge and a survey for validation.

Existing reference processes propose the customer life cycle as a framework for the process structure. Moreover 10 relevant core processes are identified and grouped along the customer life cycle as described in table 4.5. The result of the channel assignment process is presented in figure 4.3 based on standard element of Business Process Modelling Notation (BPMN).

The survey was performed in 2006 and it has been conducted among retail banks in German-speaking countries in order to determine the fit of the whole reference process. The questionnaire was responded by 68 retail banks, which consisted of 53 from Germany, 7 from Swiss and Austria and 1 bank from South Tyrol/Italy. The distribution of responses amongst the banking groups is 22% private banking, 31% savings bank, 25% cooperative banks and 22% other banks. The results in table 4.6 show that the developed reference process was evaluated as appropriate by 89% of the banks.

Savings banks still feel more obliged to their customers' welfare (expressed by implemented feedback management processes) and less grow-oriented (expressed by lacking implementation of Sales Prospect Management).

The bank's CRM changes are based on customer value related metrics. Performance criterion and key metric is the **customer equity**, which serves as an aggregated measure for the value of customer base, consisting of five core customer metrics:

- number of customers

<i>No.</i>	<i>Process name</i>	<i>Process description</i>
1	Market / Potential analysis	Analysis of key market trends and potential target customer groups
2	Contact Management	Registration, structuring and analysis of all customer interaction events
3	Individual Sales	Sales and offerings submitted individually by an agent
4	Channel Assignment	Migration of customers to a channel fitting to their specific needs and the bank's profitably requirements
5	Sales Prospects Management	Identification/handling of prospects and leads as well as distribution to sales and campaign management
6	Campaign Management	Planning, development, conduction and analysis of marketing campaigns
7	Customer Analytics	Evaluation of customers as basis for strategic segmentation and controlling
8	Loyalty Management	Establishment of a permanent customer relationship by continuous dialog to increase retention rate and share of wallet
9	Customer Service	Non-sales contacts, initiated by the customer (especially support requests)
10	Feedback Management	Registration, handling and analysis of positive customer feedback and complaints

Table 4.5: CRM core processes in retail banking, from Berger et al. (2009)

<i>Process</i>	<i>Already existing</i>	<i>Being implemented</i>	<i>Not considered for implementation</i>
Market / Potential analysis	67.3%	32.7%	0.0%
Contact Management	60.0%	32.7%	7.3%
Individual Sales	80.0%	7.3%	12.7%
Channel Assignment	46.3%	42.6%	11.1%
Sales Prospects Management	43.6%	43.6%	12.7%
Campaign Management	75.9%	20.4%	3.7%
Customer Analytics	54.5%	45.5%	0.0%
Loyalty Management	36.4%	43.6%	20.0%
Customer Service	85.5%	12.7%	1.8%
Feedback Management	61.8%	34.5%	3.6%

Table 4.6: Implementation status of CRM core processes in retail banking, from Berger et al. (2009)

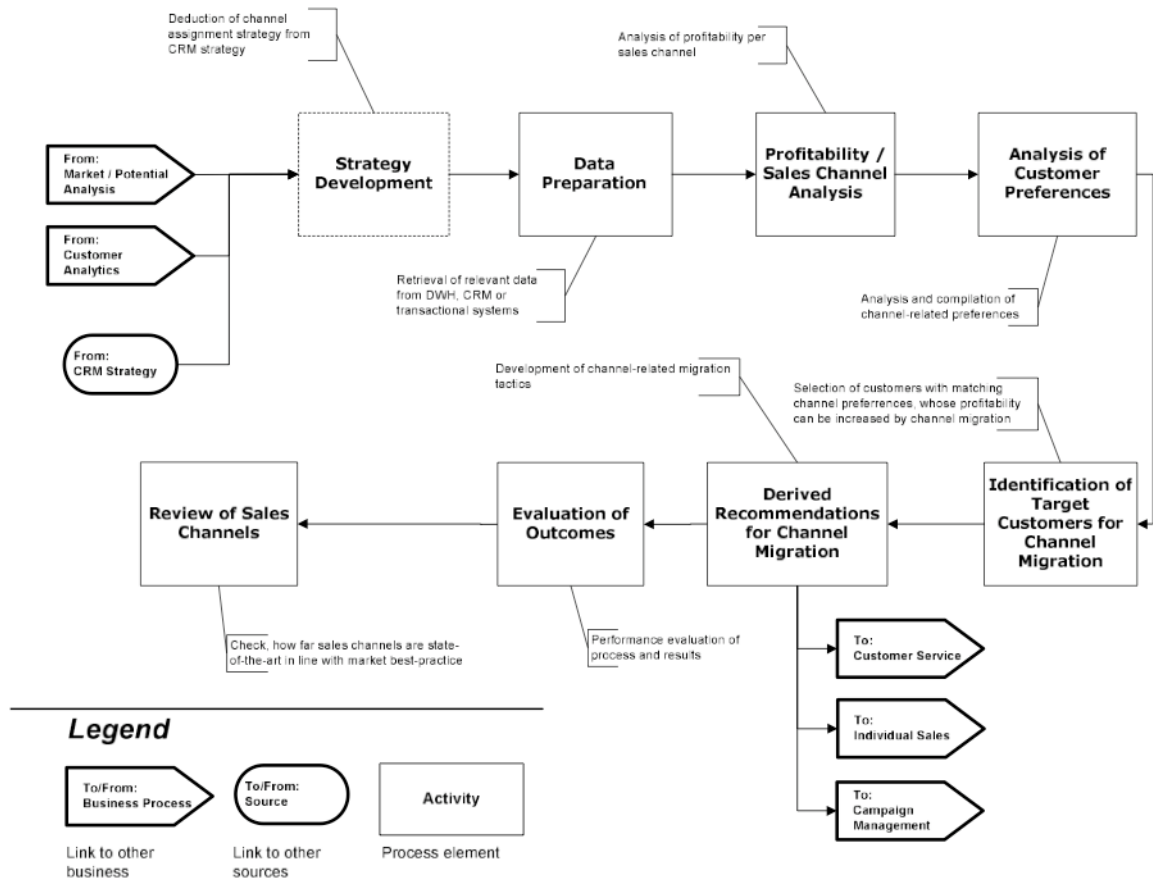


Figure 4.3: Example of detailed core process: *Channel Assignment*, from Berger et al. (2009)

- retention rate
- retention expenditures
- acquisition expenditures
- cash flow

Customer equity can be seen as the total of the discounted customer lifetime values summed over all current and future customers, whereas the **lifetime values** can be calculated using the other success measures and a given discount rate (see references 33 and 34 for more details in Berger et al. (2009):

$$CE = N_{current} * \left((ccf - cr) * \frac{1+k}{1+k-r} \right) + \frac{N_{future} * \left((ccf - cr) * \frac{1+k}{1+k-r} - ca \right)}{k}$$

with:

CE : customer equity

ccf : customer cash flow

$N_{current}$: number of customers (in current period)

N_{future} : number of customers (new customers per period)

cr : expenditures for customer retention

ca : expenditure for customer acquisition

k : discount rate

r : retention rate

The value of the future customers is calculated by assuming that the cash flow, retention rate and discount rate is the same as for the current customers. Based on the number of new customers per period in the past, it is possible to estimate the number of new customers in the future periods and the manager has no to provide information about the average acquisition costs per customer.

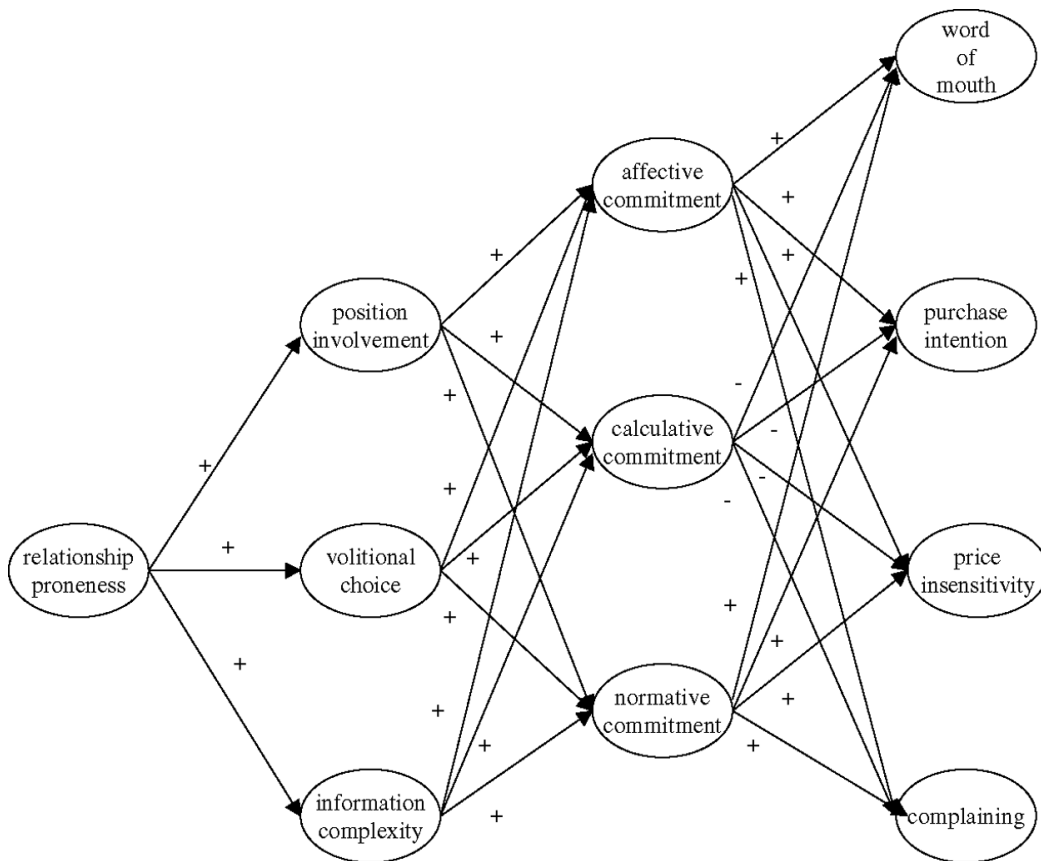


Figure 4.4: Conceptual model of the psychological antecedents of enduring customer relationships, from Bloemer and Odekerden-Schröder (2007)

Bloemer and Odekerden-Schröder (2007) made a survey in a bank setting about

the impact of three psychological antecedents (position involvement, volitional choice and informational complexity) on affective, calculative and normative commitment to a bank. In turn they assessed the impact of consumer relationship proneness on these three psychological antecedents. Moreover Bloemer and Odekerden-Schröder's (2007) research project addresses the consequences of affective, calculative and normative commitment on loyalty in terms of word of mouth, purchase intention, price insensitivity and complaining.

Commitment is generally referred to as an enduring desire to maintain a relationship. The concept of commitment is similar to the concept of a long-term orientation. The stronger the commitment, the more likely the buyer is to overcome potential obstacles in the buyer-seller relationship, resulting in customer loyalty. In the research Bloemer and Odekerden-Schröder (2007) distinguish three types of commitment. **Affective commitment** refers to the emotional attachment to an organization. It can be defined as a party's desire to continue a relationship because of the enjoyment of the relationship for its own sake, apart from the instrumental worth and because they experience a sense of loyalty and belongingness. **Calculative/continuance commitment** refers to the costs that individual associate with leaving the organization. It can be defined as the degree to which channel members experience the need to maintain a relationship, given the significant perceived termination of switching costs associated with leaving. It is the cold calculation of costs and benefits. **The normative commitment** refers to individuals' feeling of obligation to remain with the organization. It is reflected in the (moral) obligation to stay in a relationship.

Since commitment is a desirable outcome, it is valuable to gain insight into its antecedent processes. Bloemer and Odekerden-Schröder (2007) consider three processes. Identification process refers to the question whether customers identify themselves with the values and images embodied by a particular bank. **Position Involvement** is defined as a situation in which important values or self-images are identified with a particular bank choice. Volitional process refers to customers' perceptions that their preferences are free and not dictated by any constraints. **Volitional choice** can be defined as a process that involves both a freedom from constraints and a freedom to choose. Informational process deals with *cognitive structures* and how customers manage information about their preferred bank. **Informational complexity** can be defined as the extent to which information processing is required to form cognitive structures.

For banks it is interesting to know which customers are most inclined to reveal these desirable antecedents processes. **Consumer relationship process** refers to the idea that some customers are intrinsically inclined to engage in relationship. It is defined as a consumer's relatively stable and conscious tendency to engage in relationship with retailers of a particular product category. Bagozzi (1975, p.33) cited in Bloemer and Odekerden-Schröder (2007) already stated that "retailers, for example, know that they will not obtain repeat purchases if the consumer is taken advantage of and deceived". While many relationship marketing studies dealt with relationships based on dependence and locking its buyers (constraint-based relationships), *customer relationship proneness* focuses on positive motivations of customers driven by a stable and conscious tendency

to engage in relationships with sellers (dedication-based relationships).

Customer loyalty is defined as the biased (i.e. nonrandom) behavioral response, expressed over time, by some decision making unit, with respect to one bank out of a set of banks, which is a function of psychological (decision making and evaluative) processes resulting from commitment. Usually it has been measured with repurchase intentions, willingness to recommend, willingness to pay more, loyalty under increased pricing. With regarding behavioral intentions in a service settings, it is possible to evaluate customer loyalty by four main dimensions: word-of-mouth communications, purchase intentions, price insensitivity and complaint behavior.

Bloemer and Odekerden-Schröder's (2007) survey data were collected from a sample of customers of three bank offices belonging to one Belgian bank in three mid-sized towns in the Flemish part of Belgium in 2001. A total of 439 questionnaires were collected. The results clearly show that *affective commitment* is the most important determinant of loyalty in terms of increased positive word of mouth, increased purchase intention, increased price insensitivity and increased complaining. *Calculative commitment* on the other hand seems to have negative impact on loyalty. The positive influence of *normative commitment* on loyalty is limited to positive word of mouth, purchase intention and price insensitivity.

Affective commitment is clearly positively influenced by position involvement and to a lesser extent by volitional choice. *Calculative commitment* is positively influenced by position involvement and information complexity, and negatively by volitional choice. *Normative commitment* is also positively influenced by position involvement and informational complexity, and negatively influenced by volitional choice. *Relationship proneness*, as an individual difference variable, positively impacts the psychological antecedents underlying commitment: position involvement, volitional choice and informational complexity.

The result of Bloemer and Odekerden-Schröder's (2007) study shows that affective commitment is the most important determinant of word of mouth, purchase intentions, price insensitivity and complaining behavior. Affective commitment deals with having a sense of belongingness to the bank, being happy of being a customer of the bank, feeling emotionally attached to the bank and feeling part of the family of the bank. Moreover, it deals with having a comfortable and reliable relationship with the bank. Improving those aspects of affective commitment exceeds a positive influence on loyalty. A bank, therefore, should make sure that a customer is treated as a true individual in which the bank is really interested and cares for. This can be achieved by, among others, actually *personalizing* the communication efforts of the bank, and by showing attachment and by being of *personal meaning* to each and every individual customer.

Position involvement can be created by making sure that the image of the bank comes close to the *lifestyle* of the customer and that the bank reflects the personality of the customers in terms of their values and norms. The bank should target those customers who are intrinsically inclined to engage in relationship with banks. It is important to realize that not every customer is willing to engage in long-term relationships and therefore the bank should not waste resources on targeting there unwilling customers.

Relationship prone customers tend to reveal high-position involvement which impacts affective commitment and finally loyalty.

Finally, the calculative commitment can have a possible danger of the role, since it has negative impact on loyalty. Calculative commitment seems to function as an exit barrier as long as the benefits of the current bank exceed the costs of switching. Apparently, customers who feel constrained in their relationship do not experience the required dedication to be loyal to the bank. This implies that the bank should avoid calculative commitment by not stressing the cost-benefit relationship of the offered services, but rather emphasizing the personal attachment and the comfort of having an ongoing relationship with the bank.

4.5 Scandinavia: market-oriented and Internet-banking

Nielsen, Høst, Jaensson, Kock and Selnes (2003) present a survey about market orientation in Scandinavia. *Market orientation* is a general international prescription which is based on a straightforward argument: as competition and environmental uncertainty increase, companies have to organize their activities with a strong focus on their markets and their customers. This will be the path to better performance. From a marketing perspective, the market-oriented organization is an ideal version of the adaptive organization. Market orientation is composed of three sets of activities:

- organization-wide generation of market intelligence on current and future customer needs
- dissemination of the intelligence across departments
- organization-wide responsiveness in using the intelligence in support of market-related behavior

The literature on market orientation is mainly American, but at first sight the pattern of antecedents and consequences seems to be almost the same in Scandinavia. Probably nowhere in the world it is possible to find a better place to study how companies meet the current market and technology challenges than in the Nordic banking sector (Nielsen et al., 2003). The Nordic countries are not merely wealthy nations being technologically upfront with some of the world leaders in Internet-banking. Their banking cultures are also strongly challenged by deregulation and new norms of market orientation. What makes the banking industry a research field of special interest are the ongoing changes reflected in mergers, acquisitions and technological developments.

From a global perspective the Nordic countries are very much alike. They share the characteristics of a political economy with a high level of government spending and a high level of government regulation. Furthermore, they share a cultural democratic heritage, which is also reflected in strong unions and participative management. Even the presence of many small banks may be seen as rooted in a local democratic tradition. Nevertheless, the Scandinavian companies seem to be as market oriented as the US

companies. Because of their context and values, they may, however, organize differently, for example by using more empowerment to market-orient their activities.

Many years ago, it was shown how attitudes in the Scandinavian countries differ from attitudes in other countries. In Scandinavia there is a low degree of acceptance of power distance in organizations and there everyone should have a say in everything that concerns them. Scandinavians have less individualistic attitudes and less competitive, less self-promoting (less “masculine”) attitudes than American and Britons. Such difference may lead to different approaches to market orientation. Recent studies have shown that market orientation in US and Scandinavian companies can be explained by the same framework. This may imply that in Scandinavia market orientation should be achieved by greater reliance on empowerment, cooperation and teamwork.

However, some differences do exist between the Nordic countries. Though they are often treated as one unit in international comparisons, it should be noted that their cultural values differ slightly. Thus, Denmark has the highest score on individualism, while Finland has the lowest. Furthermore, Denmark has the lowest score on power distance and uncertainty avoidance, while Finland has the highest. In these respects, Norway and Sweden have scores between. **Sweden** has the most “Scandinavian” values in the sense that it has the most “feminine” values.

There are also visible differences between the Nordic countries regarding the structures of the banking industries and their use of technology. For example, in regard to the use of *Internet-banking*, Finland is almost the leading nations in the world top with 17,4% of private customers using Internet-banking. The corresponding figures for Sweden, Denmark, Norway and the USA are 6,9%, 5,8%, 3,1% and 6,0% (year 2000). The *banking market* in Denmark is the most fragmented with about 175 banks, though the three largest banks control about 75% of the market, and the density of branch offices is considerably higher in Denmark than in other Nordic countries, as number of offices per number of inhabitants (year 2000).

Nationality is thus a background variable which is expected to influence other explanatory factors and its influence can be analyzed from contextual, behavioral and environmental perspectives. Therefore it is possible to explore the influence of national culture based on the findings that culture-specific factors will at least have a mediating effect on the influence of culture-free contingency factors.

Swedish companies often have a very decentralized approach to control. In another international comparison in which banks are used as a matching type of organization, it is shown that Danish branch bankers have a great deal of autonomy in decision-making situations compared to French branch bankers. They also reported less managerial involvement and fewer hierarchical referrals than the French officers, who were more dependent on other decision makers and, to a lesser degree, authorized to approve loan requests.

It is possible to expect that the path to market orientation is most Scandinavian in Denmark (i.e. less dependent on market-based reward systems and with less interdepartmental conflicts and more dependent on empowerment and on teamwork) and least so in Finland, with Norway and Sweden in between.

In international research, size as well as location and market complexity are often considered more important than national culture. Danish experience indicates how the mechanisms work in the banking sector. Compared to large banks, small banks seem to have produced acceptable results and have more loyal customers. Size may imply barriers to market orientation, e.g. considerable distance may be found between the central offices and the employees meeting customers at the branch level. However such problems are dealt with in different ways. Thus, large banks make surveys among customers and employees more often than small ones. Large banks are often in a better position to tailor their educational programs and their computer systems to their own specific needs, also when buying these services outside the organization. The managers of small companies are less likely to consider changes in their information handling procedures, probably because they do not perceive the same need for sophisticated formal systems. Some of the large banks - especially Finnish and Swedish banks - are also leaders in Internet banking. Large banks are expected to be more market-oriented especially owing to the score of the (formal) intelligence component. Large banks are expected to provide more innovation in their market-oriented initiatives.

Nationwide surveys in Denmark, Finland, Norway and Sweden form the main part of the empirical basis for Nielsen et al.'s (2003) study. The total response was 51% in Denmark, 60% in Norway, 45% in Sweden and 30% in Finland. 391 banks are represented in the responding sample and unfortunately small companies were significantly underrepresented in the resulting sample.

Nielsen et al. (2003) found that market orientation improves performance in Nordic banks. Providing IT-automated routines and updated and relevant data to the front-line employees positively influences market-related performance. Market orientation has as antecedents top-management emphasis, line-crossing cooperation and market-based rewards. Well performing organizations may be reluctant to market-orient their activities. If there is no performance gap, there is less inducement to introducing change and there will be more self-satisfaction.

The findings show some differences between countries between Denmark-Norway on one hand and Sweden-Finland on the other. Generally, there seems to be little difference between the Scandinavian banks when national means of market orientation are compared. However, there are differences between countries in respect to how the component of market orientation are weighed, and especially in respect to how the organizational antecedents are described.

There are small indicators of a less Scandinavian way of organizing in Finland compared to the other countries. Finnish bank may be little more dependent on top management support to become market-oriented and there is a little more interdepartmental conflict than in Denmark and Norway. However, in these respects there are no significant differences between the countries and contrary to our expectations, cooperation, teamwork and empowerment are more normal in Finnish banks than in Danish and Norwegian banks. As expected, Swedish banks most frequently stress cooperation, teamwork and empowerment.

The pattern shown in table 4.7 still holds when controlled for size. Size influences

	Denmark	Norway	Sweden	Finland
"Thinking of the organizational aspects of your company, please consider the following statements"				
<i>Top-management support</i>				
1. The top management encourages new market research to identify profitable customer segments	38	41	71	76
2. The top management repeatedly emphasizes the need to develop new products	46	46	58	59
3. The top management encourages new marketing activities despite their effect being uncertain	43	31	53	48
<i>Cooperation</i>				
1. Generally, there is a positive attitude towards cooperation with outside suppliers/partners	85	82	81	87
2. Generally, there is a positive attitude towards cooperation across departments and functions in our company	83	76	98	88
3. Customer-oriented initiatives are hampered by problems of cooperation between those responsible for marketing and those responsible for the products	4	3	13	9
4. Customer-oriented initiatives are hampered by problems of cooperation between those responsible for marketing and employees working with customer service	4	5	17	13
5. Customer-oriented initiatives are hampered by problems of cooperation between those responsible for marketing and those responsible for education	0	2	7	7
6. The organization clearly defines who is responsible for the results relating to the various customer groups	36	34	52	48
<i>Organization of the work</i>				
1. Employees working with customer service are strongly supported with rationalized work organization "back-office"	36	34	57	58
2. Work routines are to a great extent automated by means of IT	69	84	89	79
3. Employees working with customer service are to a great extent empowered to make the decisions themselves	68	60	85	74
4. Employees working with customer service are to a great extent able to complete their work tasks from start to end	50	74	88	91
5. There is a strong professional specialization in customer service	27	30	59	68
6. Teamwork in customer service is important	73	51	96	82
7. It is important that employees working with customer service are up-dated on a regular basis with current and clear information about the market and the results that have been achieved	75	59	96	99

Note: Percentage of the marketing managers who "agree" or "partly agree" with the statements

Table 4.7: Organizational antecedents of market orientation in the Nordic banks, from Nielsen et al. (2003)

	Danish		Finnish		Norwegian		Swedish	
	Small banks	Large banks	Small banks	Large banks	Small banks	Large banks	Small banks	Large banks
N	19	50	59	29	29	48	18	21
Seniority, years (means)	10.0	16.1	17.0	12.0	13.2	13.4	14.1	17.5
IT specialized positions ^b	50%	80%	n.a.		28%	83%	50%	71%

^a'Small banks': less than 25 employees.' Large banks': 25 or more employees

^bPercentage indicated by reported position – based on 94 answers to a survey question

Table 4.8: Profile of respondents (IT managers/IT responsible), from Lüneborg and Nielsen (2003)

single items positively such as teamwork, customer-based responsibility, IT-automation of routines, and sophistication of information processing. At any size, however, Swedish and Finnish banks have higher scores on indications of “supported empowerment” than Danish and Norwegian banks. For example, the Swedish and Finnish respondents very often stressed that front-line employees are updated with information about the market and the results that have been achieved. They also use market-based rewards to a wider extent than Danish and Norwegian respondents.

A conclusion concerning national comparisons is that especially Swedish banks - and to a lesser degree the Finnish - are up-front in their use of “the technology of customer-focusing” and “supported empowerment”. This can partly be explained by Scandinavian management and partly by the use of new technology. Their path to performance seems to go through the use of sophisticated information systems with strong support from the top management and front-line commitment. Their form of market orientation may more often stress dissemination and cooperation.

Nielsen et al.’s (2003) findings reflect an international phenomenon, not restricted to any specific national or Scandinavian context. Some of the actual manifestations have only been found earlier in the Nordic countries, because they are leading in respect of the use of technology and attention given to quality of service. Generally, some of the barriers may look different in Scandinavia and the culture may favor participative and cross-functional solutions, but the path to market orientation is fundamentally the same as in the USA.

Those findings may be valid in several industries. The *financial service sector* merely provides special opportunities for comparative analyses in a context with very visible pressure towards market orientation and with information processing of a large amount of customer data. Those findings are of particular relevance to the financial service sector and other sectors which traditionally have been subject to bureaucratic control and are under increasing market pressure.

Lüneborg and Nielsen’s (2003) study explain how small, medium-sized and large banks may differ in the way they use technology to achieve performance. They analyze differences due to firm’s size in the use of Internet-banking and customer-relationship

management. The study draws on resource-based views but may also be categorized as a study of the impact of information systems or customer-relationship management.

The research is based on survey data of 278 retail banks in Denmark, Finland, Norway and Sweden performed in the fall 2000. See table 4.8 for more details. The firms range from only a few employees to tens of thousands.

As a study of the impact of information systems, it seems to support research that has identified IT-related resources as a potential for competitive advantage, and research that has recognized the importance of including cross-functional capabilities, new product-development capabilities, and customer-support capabilities IT-related resources. Lüneborg and Nielsen's (2003) study strongly supports the assumption that market orientation contributes to customer-related performance. Given the importance of the information technology in the banking industry - the financial sector is the biggest single investor in IT (Lüneborg and Nielsen, 2003) - an effect from resources is likely to be detectable in this industry. Firms with high IT capability tend to outperform a control sample of firms on a variety of profit and cost-based performance measures. Through comprehensive mergers and acquisitions the Nordic banking sector seems to have adjusted to the new conditions. The new large banks have embraced e-banking enthusiastically and are leading Europe in the field of Internet-banking.

New information technology plays an important role in recent developments of customer focusing, and customer-relationship management is often considered as a strictly technical issue. "Technology of customer focusing" is used in a broad sense as the activities, equipment and knowledge that may be used to identify and serve profitable customer segments. Organization-wide perspective are needed to explore the path to retaining and enhancing customer relationships, which in turn are assumed to lead to profitability. Such a wide perspective is provided by theories on **market-driven** organizations. These organizations stress outside-in capabilities, which are connected to superior market sensing, customer linking and channel bonding. Market orientation seems to have some impact on market-related performances.

Information technology is an area of high importance in the financial services and firms continue to struggle to keep service offerings aligned with customer demands. Nordic retail banking industry is characterized by a number of industry alliances through which firms are able to pool technology components, applications and knowledge. Such arrangements provide a division of labor that level the playing field and reduce the importance of firm-specific assets, since the services provided by the industry alliances becomes a public good for firms in the sector.

Firms do not only compete to attract and satisfy customers, they also compete for resources and capabilities vehicles for inter-organizational transfer of technology and knowledge, such as strategic alliances, and industry alliances among several firms will likely resemble a factor market from which the firm can source knowledge and technology without having the full rent associated herewith appropriated by suppliers of these services.

Size has an impact on the value of resources. While large firms are able to benefit from internal resources and leverage there into a competitive advantage, smaller firms

may well be forced to rely on a partnering strategy, because their size may not allow them to rely on internal capacities, as these are sub-scale compared to minimum-efficient scale. IT contributes to a competitive advantage if deployed parallel with other complementary resources. Size only provides an opportunity for scale economies and may not be achieved without adequate strategies and actions.

Small organizations have well-known advantages. They may be more flexible and customer oriented and their employees are presumed to perceive a closer link between their actions and organization performance. A large bank may act as a strong partner who is able to take advantage of inter-firm cooperation as a vehicle to innovation and superior performance. In a small bank inter-firm cooperation may be used to compensate for lack of internal resources.

Size may blur the link between resources, activities and organizational performance. From the *resource-based view*, size may be regarded as having an indirect impact and being an antecedent to organizational resources. In the information system literature there is evidence of large firms being more sophisticated and allocating more resources to their IS function.

The results of the survey is that 85% of the 278 Nordic retail banks offer an Internet-banking solution to their customers. Internationally, the Nordic countries are generally very advanced and some of the large banks are considered world leaders in Internet-banking. Globally, Finland has the highest share of customers using the Internet access and conduct personal banking, while Denmark and Sweden are on par with the US, and Norway slightly lower.

Technology is widely used to gather information on customers and on the volume of business derived from the individual customer relationship. Thus customer-relationship management, including *customer-profitability analysis* and *cross-selling focus*, seems to be a top priority across the board.

There seems to be little difference between small and large banks regarding the extent to which they offer Internet-banking. 83% of the small (with less than 25 employees) and 89% of the large banks offer the basic option. Compared to the US, this is interesting as only 7% of smaller US banks (less than 100 M. USD in assets) offered this option.

There are no significant differences due to size in customer-relationship performance. However large banks have more internal resources such as IT knowledge and they have adopted more Internet-banking applications and customer-relationship management technology. On front-line support, which is based on a measure favoring formal reporting systems large banks also get a significantly higher score.

The acceptable state of Internet banking among smaller banks in the Nordic countries is due to a highly institutionalized cooperative environment where small- and medium-sized banks jointly own IT service providers. Anyway small banks seem to use different paths to performance compared to the medium-sized and large banks. The larger the bank, the more sophisticated control systems and applications.

Broader perspective are needed to understand and to prescribe the manner in which new technologies are introduced into the organization. Technological advance implies strategic and organizational possibilities at several stages in the adoption and imple-

mentation processes, and it seems necessary to analyze these processes all the way. The explaining factors may vary through the processes and it is dangerous to treat technology adoptions as the only indicator of performance.

The weak influence of size may be explained by the fact that several small banks have achieved a basic offer of Internet-banking, which some customers find sufficient. Furthermore, the resources connected to size may partially be captured by the variable IT knowledge.

The influence of inter-firm cooperation is more complex. When inter-firm cooperation seems to be without any influence at all, the explanation may be that the positive influence on innovation is outweighed by a compensation effect connected to the fact that some resource-weak banks need outside help to reach a basic level of Internet banking or customer-relationship management. There is less negative correlation between inter-firm cooperation and performance in large banks. Larger organizations have an advantage in engaging in inter-firm cooperation, but the advantage evens out in these engagements are augmented.

The moderate effect of offering sophisticated Internet-banking applications may reflect a general first mover dilemma. It is dangerous to enter into new activities too late in the game, but if the firm enters too early, the innovation may be unsuccessful because the design is insufficiently developed. In the Internet-banking context these problems of early adoption may be intensified by the fact that after the most enthusiastic customers have gone on-line, the banks have to turn to more reluctant customers, who are probably more sensitive to user-friendly interfaces. It may be very profitable for the banks to survey these marginal Internet-bank customers' incentives. To these customers, user-friendly and attractive websites are more important than multiple applications. If customer loyalty is the issue, some degree of personalized linking is unavoidable.

To small banks the lesson from the emerging Internet-banking is quite clear. They have to offer an Internet-banking solution but not necessarily a very sophisticated one. Indeed the small banks should use the technology to support service encounters, not to automate them. The principles of customer relationship management seem to have an unquestionable positive impact on performance in small banks, though their systems may be less formalized and less computerized than systems in large organizations. This is in line with micro-level studies that indicate the benefits of supporting front-line employees with performance-related information to secure profit-oriented behavior at the service encounter.

Large banks may have an advantage by engaging in inter-firm cooperation, but a diminishing advantage when the engagement is above a certain level. Consequently a balanced view of network cooperation could be appropriated.

Small Nordic banks are not outperformed because of new technology. In contrast, Lüneborg and Nielsen's (2003) study indicates that small banks are able to keep or strengthen their competitive position by the use of new technology. Many initiatives originated in the Nordic banks and saving banks, organizations are becoming more market oriented, and market orientation in turn leads to better performance. The impact on profitability is not perfectly clear. On the other hand, there is a significant impact

on performance measures such as sales, market share and the establishing of customer relationships, which are expected to become profitable.

In an international perspective, the Nordic banks are up-front in their use of new technology and there may be a distinctive Scandinavian path to superior performance. **Swedish banks** in particular seem to indicate a *customer focus*, which is based in comprehensive empowerment of the employees working with customer service combined with support from systems that provide the employees with updated and clear information about the market and the results achieved.

The differences between small and large banks are generally not significant. As expected, the large banks have the most developed Internet-banking features but almost all banks are able to offer an Internet-banking solutions. Small banks and saving banks seem to have been very effective in using inter-organizational cooperation in their development of new technology. Still, large banks have developed sophisticated systems able to identify profitable customers segments and to support their front-line employees with customer-focused supporting. The small banks seem to perceive less need to introduce more sophisticated reporting systems. Nevertheless, even among the group of small banks, such systems appear to be associated with superior performance as well.

Another survey has been conducted by Nielsen, Høst and Mols (2005) that considers manufacturers' adoption of Internet-based marketing channels. The survey data is taken from 1.163 Danish, Finnish and Swedish manufactures. It is conventional wisdom that both customer and manufacturer have strong incentives to use Internet-based marketing channels. It has been argued that the Internet is changing the structures of marketing channels, especially in industries such as *retail banking*, news media, and music, where an important part of the output is in digital form.

Willingness to cannibalize and recent findings in the USA stress the importance of the *sense-and-respond* capabilities of firms in e-business. The right investments in distribution channels have traditionally provided long-term protection against competition. The starting point for changes in distribution channels is innovation in marketing technology and changes in consumer wants. These start an adaptation process in which the existing channel gravitates towards the new channel. Many firms do not change their distribution channels in a frictionless way and the conversion process meets with substantial inertia. To overcome this inertia, strategic analysts explained that environmental forces for change, as proliferation of customer needs and shifts in the balance of channel power may not be sufficient. The forces must be combined with internal organizational and attitudinal drivers in order to promote innovation.

Several factors have been found to be important for understanding new service and product development. *Channel-specific investments* are investments that have a lower value if they are used for other purposes than in a specific marketing channel. Willingness to cannibalize can be a central construct for explaining product-innovation behavior, but specialized investments may make firms reluctant to introduce innovations in their markets. In new projects requiring radically different capabilities, existing capabilities may also serve as barriers to success. However, the existence of a product champion and a future market focus has a significant positive influence on the willingness to cannibalize

and the ability to innovate.

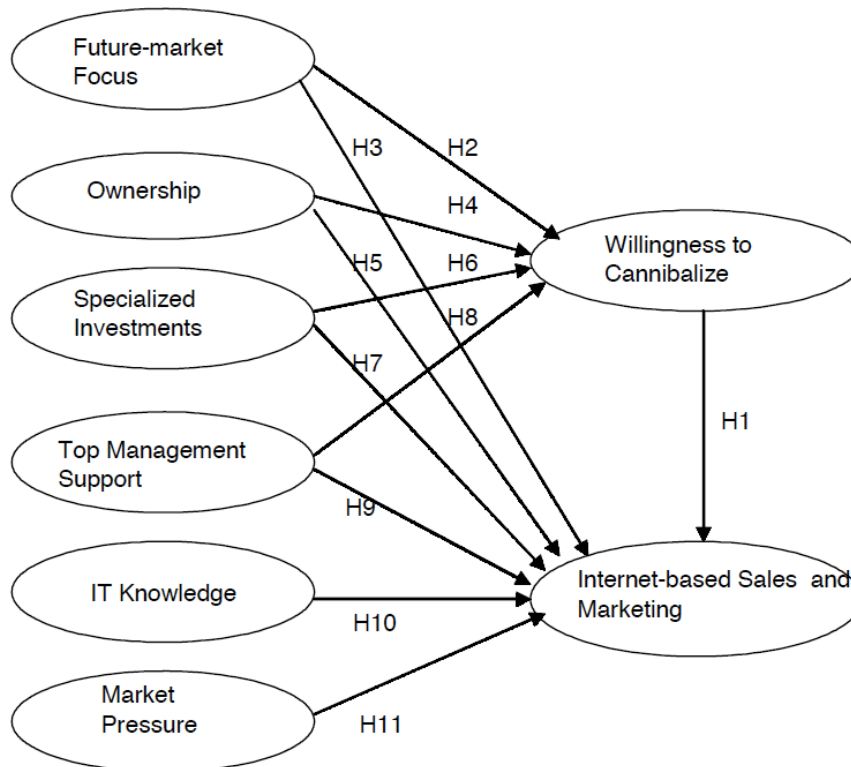


Figure 4.5: Model of Internet channel adoption, from Nielsen et al. (2005)

The adoption of Internet-marketing channels is a technical and administrative innovation. It is a *service innovation* in the sense that it meets an external market need, and it is a *process innovation* in the sense that workflow may be changed. Attitudinal factors, presented in figure 4.5, can be the most important. They can be: future market focus, ownership, specialized investments and top management support, mediated by a willingness to cannibalize. All them have a direct effect on the adoption of Internet-based interaction with the customers. IT knowledge and market pressure have a direct effect on the adoption of the new channel.

Willingness to cannibalize has been defined as the extent to which a firm is prepared to reduce the actual or potential of its investments. A firm that is willing to cannibalize does not wait until it is forced by competitors to innovate and introduce new channels, but allocates resources in order to handle the new channels and integrate them into the existing organization. The willingness to cannibalize current investments is often desirable because it promotes innovation and it is necessary for the long-term survival of the firm. It may however hurt short-term profit.

Customer-driven design models take their starting point in existing segments of the market. A future-oriented firm, will be interested in future profits, customer segments

and competitors. Future orientation and future-market focus indicate how alert the decision-makers are to new technologies and changes among competitors relative to current customers and competitors. A future-oriented firm will be interested in those customers who will be the most attractive a year or more from now.

Ownership of technological innovation means employee commitment to the Internet project. A strong feeling of ownership of an Internet project will generally stand in opposition to any personal loyalty to existing marketing channels. The effect of ownership on the adoption of Internet-based interaction with customers may be mediated by the willingness to cannibalize. However, there also may be a direct effect, because innovation is not always expected to cannibalize existing investments or because the cannibalization effect is unimportant.

The huge resources invested in existing distribution channels may be *channel-specific investments*. Many companies have built relationship with various distributors or have opened stores, hired employees, taught them to work with their products and services, and implemented effective organizational routines. In order to protect channel-specific investments, managers may end up without the ability to pursue courses of action that threaten to cannibalize current investments. Development projects imply an organizational struggle to maintain, renew and replace core capabilities, because new technologies may both enhance and destroy existing competencies within an industry.

Top management support may be needed to compel or legitimize a change beyond the initiation stage. For new marketing channels to become a success, it is important that one or more among the management team are ready to play the role of sponsors or orchestrators. Managerial support is especially required in the implementation stage, when conflict resolution is needed and in the decisions of project financing. Management climate may influence the use of IT and effective innovation management may require the simultaneous use of mechanistic and organic structures.

Innovations are based on knowledge related to firms' existing skills, abilities and routines. Both radical and incremental innovations are contingent upon the presence of relevant *technical knowledge*. The more competent a firm is in an area, or the better it masters a specific technology, the easier it will be to apply that technology for various uses in the firm.

So far those are just internal drivers of innovation. Changes in channel design are also expected to be determined by strong external forces, such as changes in customer needs or shifts in the balance of channel power. The presence of competitors with Internet-based channels may motivate adoption, making willingness or reluctance to cannibalize less important. The pressure from competitors is considered a critical element of the construct *institutional pressure* that has been shown to correlate e-business adoption.

Size is major indicator of organizational complexity. There is a positive relationship between firm size and ability to innovate, because large organizations have more slack, more marketing skills and more technological knowledge. On the other hand small organizations are more flexible and more able to innovate because of the easier availability of cross-functional cooperation. This relationship seems to be moderated when administrative and process innovations are the focus. Some of the most relevant recent studies

	<i>Danish</i>			<i>Finnish</i>			<i>Swedish</i>	
	Small firm	Medium sized firm	Large firm	Small firm	Large/ Medium sized firm	Very Small firm *	Small firm	Large/ Medium sized firm
N	173	150	34	153	174	134	139	138
Seniority, years (Means)	9.5	8.7	6.6	9.7	9.2	12.2	10.8	10.0
Mean-score on "we receive orders through the Internet" **	2.85	2.90	3.18	2.64	2.78	2.24	2.58	2.50

*) Only included in analysis of size effects (Table 3)
 **) Scale: not considered (1), Considered (2), Planned (3), Under implementation (4), Implemented (5) Successfully implemented (6)

Note: "Very small firm" (Only Swedish): Less than 20 employees. "Small": More than 20 and less than 50 employees. "Medium-sized": More than 49 employees and less than 250. "Large": More than 249.

Table 4.9: Profile of respondents, from Nielsen et al. (2005)

found size to be negatively related to innovation. Managers in smaller businesses were more ambitious concerning the implementation of interactive Web sites. Willingness to cannibalize may be less crucial to a large company.

The survey was conducted between between October 1999 and May 2001. The sample consisted of Danish, Finnish and Swedish manufactures drawn from a number of different industries. The Swedish sample included manufacturers with less than 20 employees. The distribution of the sample and the respondents are described in table 4.9. No single industrial sector contributed over a quarter of the respondents.

The results identify knowledge of IT and management support as important drivers of the adoption of Internet-based sales and marketing. Willingness to cannibalize is also an important factor and plays a major role as mediator of other drivers an barriers, particularly among small firms. Specialized investments in logistical systems, sales and marketing skills, and current operating procedures had a negative effect on willingness to cannibalize. Future market focus and management support, however, increased willingness to cannibalize, and together these two variables are not only able to neutralize

the effects of specialized investments, but together they also may be more important determinants of the willingness to cannibalize.

In cases where the implementation of Internet-based sales and marketing is expected to detract from existing investments in traditional marketing channels, willingness to cannibalize appears to be an important mediating variable. Willingness to cannibalize exerted a significant mediating effect on the adoption of Internet-based marketing channels in a sample covering different countries and different industries. Size seems to play a minor role. However willingness to cannibalize has the most explanatory power in small firms, whereas market-pull factors are most important in medium-sized and large firms.

For firms operating in markets where technology is changing rapidly, a market orientation is not as important as in stable industries. In such industries, R&D-driven innovations and a future orientation may be more important than customer-driven innovations. In the case of incremental innovations, manufacturers are more likely to benefit from being market oriented.

Commitment to relationship marketing may facilitate the development of interactive Web sites. Especially in small and medium-sized companies, managers probably have to make uneasy decisions regarding cannibalization and the provision of IT knowledge for successful implementation to be achieved. Ownership and involvement are usually important when either the focal problems are complex and unstructured, or user acceptance is crucial.

When attitudinal and organizational factors are taken into account, however, the effects of size are weak. Large organization may have an advantage in that they seem able to react earlier to competitors' moves, but the problem of differentiation in the case of a large company make it difficult to initiate and implement an innovation that involves important administrative and procedural factors.

In the end, the empirical results suggest that knowledge of information technology, firm size, future market focus, specialized investments, management support and willingness to cannibalize old channels for the sake of new ones are all important factors influencing firms' effective introduction of Internet-based sales and marketing channels.

For further readings about actual adoption of emergent Internet technologies, it is advisable the work of Nielsen (2008) drawn on surveys of Nordic banks. The point of departure is the identification of four basic types of theories of change: life cycle, teleological, dialectical and evolutionary theories.

Chapter 5

Customers

5.1 Consumers' financial behavior

Viaud and Roland-Levy (2000) studied the French households' consumption in order to understand people's financial behavior when dealing with credit and loans. The study has been financed by a French bank, Crédit Mutuel. The idea is to establish a typology of different types of money management according to different personal variables. Previous studies established four types of savers:

- cash managers
- wealth managers
- buffer savers
- goal-directed savers

It is important to know where these individuals are in the life-cycle and whether the differences between them are the cause or the consequence of their saving and borrowing behavior.

The study involves a series of 50 semi-structured in-depth interviews focused on consumption, credit, debt and family budget management. The sample is too small to justify the use of percentages or to generalize the results to the French population (and therefore to any other population). However, it is large enough to obtain rich qualitative information and it allows to define different profiles of consumers and to apprehend the universe of their representations. The interviews are organized around six main themes:

- expenses involved when having children
- consumption ("Where do they spend their money? How? Who decides?")
- loans ("Is it the same as debt?")
- debt ("Do they have any? What do they think of those who do? Is there an unbearable ration for indebtedness?")

- savings (“Why would anyone save? Who would? Why?”)
- what do they expect from a bank?

These interviews are conducted to households from various backgrounds. Families have to belong to different social groups, each with different social status. The focus is on people whose age ranged between 30 and 50. After the interviews, the households are classified according to their degree of indebtedness, going from none to all to multi-indebtedness:

- “those with no debt” are less than 19% of household revenue
- “normal debtors” are between 19% and 31%
- “those in multi-indebtedness” are more than 31%

The criteria of the questionnaire are the following:

- age
- sex
- marital situation
- number of children
- type and nature of housing
- status (owner or tenant)
- domestic equipment (refrigerator, fax machine, computer,...)

It is possible to divide the sample into three groups:

- low-income
- middle-income
- wealthy households

Various indicators concerning financial behavior are also measured:

- the number of loans (on the basis of the revenue of the household)
- the rate of indebtedness (on the basis of the revenue of the household)
- time needed to reimbursement of the most recent and the longest loans
- number of bank accounts owned
- number of bank accounts used for savings

The results show that it is possible then to describe four possible classes of households according to their position on some factors of social differentiation and their specific use of savings and loans.

Class 1 is characterized by couples who are property owners, with a lot of domestic equipment. They have to borrow money from banks in order to buy both their home and furniture. Even though they belong to the oldest age group, their general financial situation seems very *fragile*, with a high level of indebtedness (above 30%). It appears that multiple buying involving the accumulation of loans weakens this group, which can be identified as **fragile borrowers**.

Class 2 is characterized by older households with no credit and no debt, few savings accounts and a lot of domestic equipment. These households have already accumulated capital and do not need to borrow anymore. Their main characteristic is "savings". Households of this type are grouped together around their main theme and are identified as **accumulating savers**.

Class 3 involves young households. These people are tenants with no domestic equipment and one loan. They have various savings accounts. This configuration describes a type of household for which savings are of particular importance. It corresponds to an effect in which the idea of keeping savings for more difficult times or for long-term projects is combined with dealing with daily needs. This type could be qualified as **prudent households**, households for which savings precedes buying.

Class 4 is composed of young households with one child, a few savings accounts and some loans amounting to 19-30% of the revenues of the family. Their domestic equipment is intermediate in level, and most of people in this class are tenants. They constitute a group of households who borrow to acquire domestic goods even though they were rather wealthy. This may be considered as **prodigal households** who favour a way of life based on quality and *immediate satisfaction of needs*, even if this involved taking out loans and putting off buying real estate.

Overall, the juxtaposition of the four types that have been isolated shows a structure of behavior organized around two dimensions, one concerning **savings** and the other **credit**. In fact, the *fragile borrowers* and the *prodigal households* save very little and borrow often, sometimes a lot. On the other hand, *prudent households* and *accumulating savers* save much and rarely resort to credit. Each of the two groups has, a priori, the same relation to savings and credit. However, the behavior is different in each case, mainly because the situations of these households are not alike at the beginning. These types, which differ by their actual behavior but not by the structure of their behavior, do fundamentally have the same lifestyle. Although *fragile borrowers* as well as *prodigal households* save little and easily resort to credit, they do not do so for the same reasons. The formers have developed a lifestyle in which capital acquisition can only be realized through the contraction of loans, whereas the latter favour immediate satisfaction of domestic needs. Similarly, *accumulating savers* and *prudent households* do not easily resort to credit. The former because property has already been acquired. The latter because it has not yet been acquired. Finally, differences in actual behavior may suggest different positions in the life cycle.

Two main fields are concerned with the functions of the banks. The first is related to the household expenses (account, income, family, husband, month, credit card, food, electricity, taxes, rent). The second is linked to savings and to the different savings accounts. Generally, the bank is seen as having many practical uses. The functions assigned to the banks are equivalent from one bank to another, and indicate the traditional roles of the banker. The bank plays an essential role in receiving and redistributing salaries. The bank is once again evoked when loans are needed.

When analyzing the fields of representation of consumption, spending or buying seem to be strongly related to the universe of credit, savings and debt: this analysis shows that dimensions which are found to concern behavior are echoed in the subjects' *mental representations*.

Credit cards have become an important component of personal money management and consumer lifestyle management. Wickramasinghe and Gurugamage (2009) give an overview on the relative literature. Credit card ownership and use have increased substantially over the past decades, and credit card service has become one of the most lucrative financial services. Literature provides evidence of the availability of credit cards to working and middle-class families as credit card lenders have extended credit to riskier customers. Despite the substantial risks to lenders that they will be unable to pay their bills on time, working and middle-class families often pay high rates of interest and they are among the industry's most profitable customers. However, this broadened access to credit cards facilitates those who are in the working and middle class to achieve a level of participation in contemporary consumer culture that is qualitatively different from what would be possible in its absence. In the context, the entire range of practices consumers use to manage their lifestyles with credit cards is of particular interest to research.

Consumers use credit card, which are issued by financial institutions, as a payment device and a source of revolving credit. Based on the main use of credit cards and benefit sought, extant literature segments credit card users into two groups: convenience users and revolvers. *Convenience users*, on one hand, tend to use credit cards as an easy mode of payment and to typically pay their balance in full upon receiving the account statement. *Revolvers*, on the other hand, use the card principally as a mode of financing and elect to pay interest charges on the unpaid balance.

When consumer use credit cards as a mode of financing, credit cards compete with bank loans and other forms of financing. As a result, credit cards account for a substantial and growing share of consumers' debt through incremental borrowing. In this context, credit cards have raised concerns in two areas, namely, where consumers fully understand the costs and implication of using credit cards, and whether credit cards have encouraged widespread over-indebtedness, particularly among those least able to pay. These two issue are identified as related because the lack of understanding may result in over-indebtedness. Hence, and individual's level of intellectual understanding and comprehension of credit cards and their use, knowledge of and ability to compare information on credit card costs, and *literacy on personal finance* have become very important.

Extant literature identifies credit card practices as the reasons for owning credit cards, number of credit cards owned, types of credit card purchases, places of purchase, frequency of usage, payment practices and all other factors associated with owning and using credit cards. Several studies have reported that the demographic and socio-economic background of individuals has a strong influence on their credit card practices. Some of the demographic and socio-economic characteristics that have been found to be significant in describing consumer credit card practices are sex, education, income, age, ethnic, background and credit card type.

Females use credit cards more for household goods, clothing and personal belongings, while males use their cards more for electronics, entertainment, travel and food away from home. Extant literature provides evidence for the relationship between the level of education and credit card ownership and the frequency of credit card usage. Respondents with a high level of education and knowledge of consumer credit tend to own and use credit cards more often. Income is another demographic variable. High-income groups are found to spend more on different product categories than any other group. Further, economically less privileged persons use credit cards as a means of installment credit as they are not able to borrow money from banks at a reasonable rate. Middle-aged group is more likely to hold and use credit cards. Married respondents are found to have more credit cards than singles and separated or divorced.

Credit cards offer service to customers. This service is a “performance” rather than a “thing”. There are more experience and credence qualities with services than search qualities. Further, the experience attributes it has can only be assessed after purchase or during consumption. Therefore, consumers may find difficulties in evaluating credit cards pre-purchase. Hence, choosing an economically appropriate credit card requires knowledge of one’s credit card usage and comparison information on credit card costs.

5.2 Behavioral economics

Leiser and Azar (2008) explain that, for many years, economists assumed that people exhibit full rationality: they have perfect recall and planning ability; they can maximize utility in a very complex world; they have well-defined preferences. While these assumptions proved very useful for the purpose of building economic models, there is growing evidence that people often behave differently and are not full rational. In recent years, an increasing number of economists have been convinced that full rationality is a problematic assumption, at least in some contexts, and that applying insight from psychology to economics can be useful to better understand, describe, and analyze economic behavior.

de Meza et al. (2008) and Linciano (2010) released two papers respectively for the British and Italian finance authorities. FSA is the Financial Services Authority of Great Britain and CONSOB is the Italian Securities and Exchange Commission. They present behavioral economics and how it is possible to apply this knowledge in the financial markets and more.

It is possible to measure different types of financial behavior and attitudes in five key

areas:

- being able to manage money
- keeping track of finances
- planning ahead
- making informed decisions about financial products
- staying up to date about financial matters

People's financial behavior may primarily depend on their intrinsic psychological attributes rather than information or skills or how they choose to deploy them. To promote their long-term interests, people need to identify crucial financial choices and deal with them in a timely, knowledgeable and coherent fashion. There is no doubt that many people are poorly informed about basic issue in personal finance and take decisions that are difficult to interpret as rational. It is tempting to assume that the remedy is more and better financial education. This does not follow since even highly educated finance specialists make errors. MBA students at the top ranked Wharton Business School were the subjects in an experiment. Elementary mistakes were common in choosing between index-tracking funds that differed only in their administration expenses. In making their choice, all sorts of irrelevant aspects of the presentation materials were influential with the subjects. If even the most financially sophisticated individuals do not take sensible decisions when confronted with apparently simple choices, the problem may not primarily be due to financial ignorance and lack of financial education.

Financial capability tends to increase in the level of general education and in age. The former indicates that ability and attitude matter but does not imply that more education would help and has no message regarding the importance of specifically financial education. The age effect may indicate generational effects, that experience is the best teacher, or that older people have more settled financial lives.

From a *policy* perspective, it is crucial to identify whether the reason people behave as they do is primarily the result of lack of knowledge and mastery of relevant financial management techniques, or whether it reflects fundamental aspects of human nature. Only in the former case is conventional financial education an appropriate remedy. Such education might includes topics such as the benefits of diversification, the nature of compound interest, the implications of tax incentives, pension planning, the management of credit cards and so forth.

Making people better informed is hard and expensive and is of minimal value if it has no effect on behavior. This would be the case if low financial capability is more to do with psychological factors than lack of knowledge. For example, many people think they should save more than they do and borrow less. Why this does not happen may be more to do with the psychology of self control, procrastination and immediate gratification. than ignorance of the relevant opportunities. Apparently this seems to be the case.

Rather than educating people out of error, a more effective approach may be to take the biases into account when designing the policy. For example, saving rates are

much higher if employees are enrolled in savings schemas from which they can easily opt out (Thaler and Benartzi, 2004) than it there is no automatic deduction but an easy opportunity to opt in.

The theory supposes that individuals rationally process available information to make optimal saving, borrowing and insurance choices. If people take decisions that appear to be irrational, there are two reasons. One is that the cost of being rational is deceptively high. That is, it may take a lot of psychic effort to process rather boring information. Secondly, the information available to make the decision may be inadequate or false. So, it there is a role for *policy*, it is to provide better information in forms that are easy to work with. Education in how to understand and work with the data is possibly also justified. Even elimination of any bias (as opposed to falsehood) in what is reported by information providers should not be needed as rational consumers should not be fooled.

The approach of behavioral economics is that psychology also matters. Even if people know and understand the facts, they may still take poor decisions due to lack of self-control and other personality characteristics. Moreover, there are ingrained methods of processing information that lead to systematic bias.

The basis for policy when people take systematically unwise decision is controversial. Many behavioral economists think that the appropriate thing to do is to guide people in the direction they would want to bind themselves after taking expert advice. This is the agenda of **libertarian paternalism**. “Equipped with an understanding of behavioral findings of bounded rationality and bounded self-control, libertarian paternalists should attempt to steer people’s choices in welfare-promoting directions without eliminating freedom of choice”¹.

With this in mind, it is possible to examine a series of behavioral biases.

Procrastination

Procrastination happens when there is a delay taking an action in spite of being aware that prompt action would be better. Cognitive psychologists say that it occurs because present or immediate costs/benefits are excessively salient or vivid in comparison to future costs/benefits. As an example, people’s tendency to procrastinate affects the capability of planning ahead for retirement and unexpected events.

Procrastination is characterized by preference reversal over time. Such preference reversals apply to rewards as well as costs: most people prefer €100 today to €110 tomorrow and at the same time prefer €110 in 31 days to €100 in 30 days. There are high discount rates for short horizons and low discount rates for long horizons. The behavioral economics literature often uses *hyperbolic discounting utility* to capture dynamically inconsistent preferences. Animals, including humans, appear to have such hyperbolic discount functions.

Procrastination fundamentally interferes with an individual’s ability to engage in financial planning. The urge for instant gratification (consuming immediate benefits or

¹Sunstein C., Thaler R. (2003). *Libertarian Paternalism Is Not An Oxymoron*. Forthcoming of University of Chicago Law Review

avoiding immediate costs) leads people to make decisions and take actions which are not in their *long-term interest* such as overspending on credit cards. It is not surprising that the growth of ATMs and immediate borrowing possibilities offered by credit cards and store cards in the last few decades has coincided with reduced saving and mounting debt.

One of the main causes of procrastination is the availability of the other activities which provide instant gratification. This suggests that financial decision making is best organized by setting aside a specific time and location where there are no distractions or other demands.

Procrastination also results from the desire to avoid emotional distress. It is plausible that some people fear financial decision making or planning because they anticipate that it will be a painful experience. From neuroscience both the *affective (limbic) system* and the *cognitive regions* of the brain are involved in intertemporal decision making. The limbic system is designed to ensure survival and (reproductive) fitness which is why our drives and emotions are inherently myopic. In normal individuals, the cognitive parts of the brain to some extent override the limbic system which allows for postponement of gratification. Patients with damage to the prefrontal regions, however, tend to behave myopically (Camerer, Loewenstein and Prelec, 2005).

Evidence of the connection between neurological processes and procrastination is provided by an experiment on intertemporal choice where some rewards are immediate and others are delayed. The immediate rewards activate mostly the *limbic system* whereas the delayed rewards activated the cortex (*cognitive system*). Greater activity in the limbic system was associated with more impatience, i.e. choosing immediate rewards more often.

Human preferences are time inconsistent. People save too little and many spend far more than they should or, in a sense, “want” to. It is clear, however, that most people would like help in their attempts to achieve their long-term goals of saving more and borrowing less. What makes the procrastination problem worse is that it is subject to a cumulative effect. The procrastinators may change their self-conception to reduce cognitive dissonance. Someone who repeatedly fails to save or continues to overspend may over time decide that he really does not want to get his finances under control by saving or curbing their spending. Moreover, people may be reluctant to take actions which, if they had taken them earlier, would have delivered large benefits.

Some of us are aware of our tendency to procrastinate or overspend and look for commitment devices which bind us to the “right” course of action, e.g. saving in non-interest bearing Christmas clubs which do not allow withdrawals for a certain period. Another help is to have separate “*mental accounts*” for example for “money to spend” versus “money to invest”. When people are aware of their self-control problems (in the financial planning area), if it is given an opportunity to solve these problems by binding themselves, they will do so. Thaler and Benartzi (2004) discuss the result of a “Save more tomorrow” plan which allows employees to commit to increase their contribution (saving) rate in a 401(k) pension plan whenever they get a raise. The idea here is to delay the salient immediate cost of foregoing current consumption. After two years,

participants in this scheme had nearly quadrupled their saving rate.

Some solutions are possible to solve this problem. Complexity and resulting confusion may lead people to passivity. If confusion was the only reason for procrastination, then **simplification of information** on product attributes and financial education might be fruitful. People procrastinate when they have to make complex decisions. Dealing with complexity and ambiguity is unpleasant. In certain situations, simplification (e.g. by setting a default) might therefore help. Moreover, less intelligent people, in addition to being handicapped by their relative inability to process complex information, are more likely to have self-control problems - time discounting correlates with IQ (de Meza et al., 2008).

The **presentation of the information** is crucial. There are ways of making the long term problems of debt more salient. For example vivid and personal information is more effective than statistical information. Government could sponsor commercials illustrating the dangers of overspending much like the ones warning against drunk driving or drugs.

Most of the time maintaining the *status quo* does not involve (mental) activity and the easiest option is therefore to stick with the status quo and procrastinate, for example by keeping savings where they are. This is precisely why setting the “right” default options, e.g. for pension plan, is such a powerful tool. Defaults remove the immediate cost of mental anguish involved in decision making and it is therefore not surprising that they have significant effects on financial choices. Another area where defaults could be introduced is in credit-card payments. The default could be that the balance is automatically deducted from a current account. Customer could opt out of this arrangement at the cost of some minimal effort.

A powerful remedy for procrastination is the elimination of the “no decision” option and use alternative decision mechanisms. Moreover, commitment devices can help people overcome procrastination. Offering, as default, a standard saving plan which transfers a set amount from a current account into a savings account could be the default option. So rather than incurring costs (in time and hassle) to set up a savings scheme, a customer would have to incur some costs or apply some effort to undo the default saving scheme.

Loss aversion

As Adam Smith put it, “we suffer more. . . when we fall from a better to a worse situation, than we ever enjoy when we rise from a worse to a better”. Gain and losses matter independently of final outcomes. Loss aversion is the tendency of individuals to weigh losses about twice as much as gains. Loss aversion is very common and it increases in age, income and wealth. It decreases in education. Loss aversion leads people to value what they own more than what they don’t own. For example people demand more money to give up an object than they would be prepared to pay to acquire it (the “endowment effect”).

In prospect theory, a value function $v(x)$, defined on gains and losses with respect to a reference point replaces the standard utility function of expected utility theory. There reference point normally corresponds to the current position but may also be determined

by aspirations or norms. The “loss side” of the value function is steeper than the “gain side”, i.e. $v(x) < -v(-x)$ for $x > 0$. The value function is concave for gains and convex for losses, indicating declining sensitivity for larger amounts, i.e. $v''(x) < 0$ for $x > 0$ and $v''(x) > 0$ for $x < 0$ so that the value function is S-shaped.

Several interesting observations follow from these assumptions. For multiple gains, x and y , segregation is preferred since $v(x) + v(y) > v(x+y)$. For multiple losses, integration is preferred since $v(x) + v(-y) < v(-(x+y))$. This latter property may explain the popularity of credit cards: many small losses are pooled into a larger loss.

Loss aversion implies that people are reluctant to sell at a loss (the “disposition effect”). It is an empirical regularity in the housing market that when house prices fall, volume also decreases and houses remain on the market for longer than when prices are rising.

The *Save More Tomorrow* scheme exploits people’s tendency towards loss aversion. Participants commit to increase their saving rate whenever their income increases so that they never see their take-home pay go down. They therefore don’t view their increased 401(k) contribution as a loss.

It is possible to manipulate loss aversion by using different frames. **Myopic loss aversion** is the tendency to see risks in isolation rather than taking the perspective that life is a sequence of mostly small risks and what matters is the total outcome, not the outcome of individual small lotteries.

Longer horizons and less frequent feedback lead to higher investment. Setting a long horizon and low feedback frequency as the default is very effective in inducing higher investment with higher expected return. A lesson for financial regulators is that investment decisions are likely to be affected by how risk and return data are presented. Financial advisers should draw investors’ attention to long term distributions of outcomes.

Regret aversion

Regret theory assumes that the emotional consequences of decisions, such as rejoicing and elation but particularly regret, are anticipated and taken into account when making decisions. People are regret averse and hope to avoid situations where they appear to have made the wrong decision even if the decision was the corrected one ex ante given the information available.

There is obviously potential for regret in most financial decisions. If the consumer invests in portfolio A rather than portfolio B, he can find out about the performance of his rejected option and experience regret. In a financial decision making context where subjects have to choose between two investment options, the expectation of feedback on the outcome of the riskier option can promote risk seeking choices. Subjects may prefer the less risky option if they are not going to find out the result of the (rejected) risky choice, but reverse their preference if they are going to get feedback on the risky choice. However, in reality regret aversion is more likely to lead to underinvestment in risky assets.

The possibility or anticipation of regret can have a paralyzing influence in financial decision making. In particular, when there are many options to choose from, especially

when these options are complex, inaction is likely. People lack the confidence to decide. This phenomenon is called “choice overload”. Presenting more options encourages investigation of lower quality options. Perhaps the cognitive overload of considering a large number of possible choices leads consumers to make mistakes. It is simplicity seeking rather than risk avoidance which drives these choices. Faced with large choice sets, decision makers apparently tend to prefer the simple option.

The obvious remedy for information overload is to restrict choice rather than to try to educate consumers to handle excessive variety in a stress-free fashion. A jam experiment does though find a useful cognitive routine to handle such situations. It has been asked the subjects to rate jams. Left to their own devices, control subjects formed preferences for strawberry jams that corresponded well to the ratings of experts. Subject asked to think about why they liked or disliked the jams made choices less in agreement with experts. Therefore it seems there is less regret with *spontaneous choice*. Deliberation and planning is not always the right way to make decisions.

Mental accounting

Mental accounting refers to the cognitive methods people use to evaluate and keep track of transactions, investments, gambles and other financial outcomes. People tend to group their assets into a number of non-fungible mental accounts and use these accounts for different purposes. They tend to spend gamble winnings or unexpected bonuses differently from other money for example.

Supposing a person is saving to buy a house and his savings are in a low interest account. He buys a car and take out a loan at high interest to pay for the car although he could pay cash out of his savings. He might do that because he has separate mental accounts for housing and car expenses. It is possible that people engage in this type of behavior to counteract self-control problems. They may fear that if they withdraw money from their “special” savings account once, they may not be able to force themselves to pay it back into the account (slippery slope) whereas a loan has to be paid back.

Standard economic theory assumes that people make decisions based on current wealth, probability distribution of future earnings, etc. but in reality transactions are evaluated within a much narrower frame. Thaler (1999) cited in de Meza et al. (2008), suggests that, in their construction of mental accounts, people engage in “hedonic editing”. They choose the set of accounts that is most attractive to them. In terms of prospect theory’s value function, they choose to evaluate transactions and corresponding gains and losses (x,y) according to:

$$v(x \& y) = \text{Max}(v(x + y), v(x) + v(y))$$

Subjects want to separate gain (intertemporally) but they also want to separate losses, which is inconsistent with prospect theory. Mental accounting explains why, in contradiction to the life-cycle model, current income flow is more important in budgeting decisions than present value of lifetime wealth. Budgeting is done on a month-by-month basis and expenditures are grouped into categories so that if the “entertainment budget”

has run out for example, consumers will decide to postpone their next movie theatre visit but at the same time they may be willing to spend money on books, as long as there is money left in the “book” account.

People tend to consume some types of income or wealth and not others. Money in a current account gets spent but special retirement accounts remain untouched. According to standard theory, savings in the form of pension wealth should reduce other savings but the effect of pension saving on the other saving is actually positive. Pension wealth does not appear to be a close substitute for other wealth. In 401(k) plans, employees view company stock as a special asset class (or mental account). Separate mental accounts are also kept for money already accumulated in the plan and amounts of money not yet contributed.

Investors also choose when to close a mental account and it appears they are very reluctant to close an account which is in the red. Trading volume for stocks which have declined in price is lower than trading volume for stocks which have increased in price.

Status quo bias

People generally don't like changing strategies or behaviors. Three of the biases already discussed may contribute to a preference for the status quo. Change typically involves a current cost to reap higher benefits in the future, so hyperbolic discounting may result in the investment never being made despite the returns covering costs many times over. Loss aversion and regret aversion may also play a role in status quo bias. By sticking with their existing option, people shield themselves from the regret arising when a new choice leads to a worse outcome than the original choice. A status quo bias follows because error of commission generate more anticipated regret than errors of omission and because the negative consequences of a change tend to be seen as more painful than the pleasure associated with the possible positive consequences.

Another manifestation of the status quo bias is the endowment effect. This refers to the tendency of individuals to be willing to pay less for a good than the minimum they are willing to accept for the same good once they own it.

The status quo bias is behind the tendency in financial decisions to follow the path of least resistance. In financial choices defaults are more influential than other interventions that have been studied. For example, even for important choices that will have major long-run consequences, it may make a major difference whether subjects must opt in to a saving scheme or opt out, even if a change from the default merely requires that a phone call is made. Sometimes it seems by far most effective and cheapest to set the appropriate default rather than educate consumers to think through problems from scratch.

One way to remove the status quo is to require an active decision by some imposed deadline. In the absence of external forces designed to offset (or exploit) the status quo bias, it may be helpful if individuals are taught to frame their financial decisions as “if I had to make the initial choice now, what should I do?” rather than “how should I change from what I am now doing?”

The curse of knowledge

Financial education as traditionally conceived supposed that being better informed improves decision. That does not always apply. One reason that more may not be better is that attention is a scarce resource and processing power is limited. More information may deflect attention from what is really important. A pervasive finding is that cue competition occurs: more salient cues weaken the effects of less salient ones, and the presence of irrelevant cues causes subjects to make less use of relevant cues and base rates (unconditional frequencies). Introducing additional accurate information may therefore lead to worse outcomes.

Many factors that are inconsequential in terms of standard theory had large effects on the decision to take a loan. For example, providing applicants with the opportunity to win a prize discouraged loan demand. Less information about the variety of loans available increased take up. Extra information appears to be distracting and leads to poor decisions. Education may be counter-productive, not just due to information overload but because it augments overconfidence in the sense of attaching too much precision to estimates.

A problem related to overconfidence is optimism or self serving bias: the tendency to overestimate the probability of favorable events. As Adam Smith puts it:

“The chance of gain is by every man more or less overvalued, and the chance of loss is by most men under-valued, and scarce by any man, who is tolerable health and spirits, valued more than it is worth.”

Optimism is especially prevalent when people think events are under their own control, an impression that financial education may foster. Optimism gives rise to a host of problems relating to financial capability. Overestimating future income and employment prospects leads to inadequate precautionary saving and too little pension provision. People are too ready to borrow because they are too optimistic about their ability to repay. Optimism is a prime cause of financial incapability.

One ingredient of overconfidence is the law of small numbers. People draw far too strong inferences from small amounts of data. A tendency to believe lessons from insufficient data is augmented by the availability heuristic whereby people disproportionately weight salient, memorable or vivid evidence. People rely far too much on personal experience or that of friends relative to aggregate data in judging risks and returns and evaluating financial products.

This problem of wrongly evaluating evidence may be worsened by basic mistakes in inference. The most notable is the base rate neglect bias. In evaluating evidence, people tend to ignore the prior probability that a hypothesis is true. General knowledge of statistics reduces observed biases.

Camerer, Loewenstein and Weber (1989) coined the term “curse of knowledge” to cover a specific effect according to which better-informed agents are often incapable of reproducing the judgments of less-informed agents. In their experiment, subjects were rewarded according to their success in predicting what others would decide. Participants

had the opportunity to buy information that would help predict actual outcomes. Many bought the information even though those that did so were worse at predicting how the uninformed would decide. Had the information not been acquired, they would have been better off, even gross of the purchase price. The problem is that people tend to imagine everyone knows what they know. This bias may lead to mistakes in stock market investment. Beating the market involves finding companies that are undervalued. This involves a theory of mind, appreciating that others may know more or less than you know. Even experts may react badly to more information.

Improving financial capability by debiasing

Numerous studies from psychology and behavioral economics show that humans are systematically prone to various kinds of cognitive biases. Biases lead to predictable but suboptimal decisions. Almost all biases originate from the human tendency to use rules of thumb or heuristics which considerably simplify the decision process.

The three most prominent heuristics are the *availability* heuristic, the *representativeness* heuristic and the *affect* heuristic. The first denote the observation that people assess the frequency, probability, or likely causes of an event by the degree to which instances or occurrences of that event are readily “available” in memory. According to the representative heuristic, people look for characteristics of an individual, and object, or a situation that correspond with previously formed stereotypes. Judgements are that are evoked by genuine subjective feelings and moods (for example, sadness or disgust) are influenced by the affect heuristic.

There are relatively few studies that investigate biases with specific focus on financial decision making. Examining these biases in such a context is highly desirable because the few existing studies yield surprising insights. For example, it has been found that the more is spent on a primary purchase the more willing people are to buy additional smaller items. Apparently, small extra purchases are perceived as minor expenditures when they follow larger purchases.

There is even less research on how financial decision makers can be made less vulnerable to relevant biases. Debiasing techniques can be applied by the individual decision maker rather than by institutional design such as appropriate defaults. There are six debiasing approaches:

- consider-the-opposite
- accountability
- training in rules
- training in representation
- voluntary cooling-off periods
- group decisions

With these techniques in mind one might hope to be able to tailor and test more effective advice schemes for people who are in the process of taking decisions on financial matters. So far little is known on whether more knowledge about biases reduces their impact. Thus, it is not immediately clear whether enhancing the awareness of biases really reduces their consequences. For some biases the answer seems to be negative. For example, teaching people the existence of the hindsight bias does not make them much less vulnerable to it. More research is needed regarding the effect of teaching the existence of cognitive biases. One way to do this might be to let people gain their own experiences with relevant biases. Learning by doing, with feedback, has the advantage that people are more likely to remember the consequences of these traps and how difficult it is to avoid them. Such a learning environment could be implemented by well designed, interactive and incentivised (online) simulations.

Debiasing for managing money

Despite the importance of budgeting for consumers, knowledge about the budgeting process is limited. Thaler and Johnson (1990) cited in de Meza et al. (2008) report evidence that budgeting is highly dependent on prior outcomes. Prior gains, for example, can induce people to increase budgets for gambles. This tendency is called “house money effect”. In contrast, prior losses can decrease willingness to take risks and outcomes which offer the opportunity to break even become especially attractive. In a recent study Ülkümen, Thomas, and Morwitz (2008) (de Meza et al., 2008) analyze how *different temporal frames* can lead to different budgeting. They found that estimated budgets for the next year are closer to recorded expenses than monthly budgets because consumer feels less confident when estimating the former and therefore adjust them upward. Their interpretation is that the *budget-estimation process* entails an anchoring and adjustment mechanism in which initial estimates are too low, and the amount of upward adjustment depends on the degree of confidence and the availability of cognitive resources. Consumers’ beliefs about the accuracy of easily generated budget estimates make them more confident in a next month frame. Changing these beliefs by informing customers that feelings of ease do not signal accuracy leads to a significant increase in the amount of adjustment for next month budgets. They find that participants persistently underestimate their expenditures for the next month even when the budget estimates were elicited only seconds after participants reported their earlier period’s actual expenditures. This observation is consistent with the finding that people fail to incorporate past experiences into their problems.

Accountability involves decision makers imagining or really having to explain their decision to somebody else. It has been shown that such an expectation leads people to anticipate and take into account potential criticism by employing a kind of preemptive self-criticism. People who think about a decision in the expectation of being held accountable tend to exert more effort. They spend longer on the task and collect more information before taking a decision. It is important to guarantee that the decision maker believes that the person whom he is held accountable has no preference regarding the decision outcome. If this is not guaranteed, social issues, such as wanting to please

the other, come into play which might bias the search for information. A potential drawback of holding people accountable comes from the fact that decisions are perceived as more difficult if accountability is higher.

The *recency bias* refers to the tendency to overweight information received later in a sequence. This clearly has the potential to distort financial decisions, for example, by generating urgent desires for products one has been informed about recently. It has been shown that accountability reduces the tendency for receiving information in auditing tasks. Accountability also reduces the tendency for recency of information to influence judgements when predicting a candidate's success at a job based on sequential information. This remains true if subjects experience mental fatigue.

Debiasing for keeping track of finances

People often behave as if their money resides in different compartments, so called "mental accounts" (Thaler (1991) cited in de Meza et al. (2008)). This leads to the illusion that money is not as "fungible" as it actually is. Mental accounting is helpful in overcoming people's impulsiveness or their tendency to neglect the long term. They reserve some money for retirement, some for food, some for fuel, etc. Thus, mental accounting is an important means of financial self-control by way of pre-commitment. (Thaler and Shefrin (1981), Heath and Soll (1996) cited in de Meza et al. (2008)). Consumers also use mental accounting to justify purchases by setting up an account for a transaction, debit the expense, and credit the benefit accrued from consumption (Prelec and Loewenstein (1998) cited in de Meza et al. (2008)). However, mental accounting may lead to inconsistent financial decisions. For example, one may borrow at high interest to buy a consumer item whilst simultaneously saving at lower interest rate for a child's college fund.

Another aspect of mental accounting relates to observations that people vary in their attitudes to risk between their mental accounts. Although in general mental accounts support self-control, sometimes they can also be used to justify additional spending by "creative bookkeeping". Consumers have flexibility:

- in *classifying* ambiguous expenses and, therefore, in assigning them to different mental accounts
- in *constructing* mental accounts to accommodate unclassified expenses.

For example, in the situation of price bundling when mortgage bundles consist of the mortgage and a mortgage protection insurance, the individual typically has flexibility in assigning portions of the total cost to each of the separate benefits. Unbudgeted windfalls introduce flexibility into mental accounts, allowing consumers to allocate the gain to a mental account at their discretion and helping them write off sunk costs.

The principles of mental accounting often regulate the purchase and consumption of luxuries. In particular, buying and consuming luxury goods tends to call for justification and can evoke intra-personal conflict that might be resolved with the aid of

mental accounting. For example, there is evidence that people prefer to pay for luxurious consumption with “windfall gains”.

The “disposition bias” is closely related to mental accounting and loss aversion. It denotes the tendency of sellers of an object to treat its original purchase price as a reference point for the selling price. Learning seems to attenuate the magnitude of the disposition effect. Frequent traders sell their winners less and their losers more often, resulting in lower disposition effects.

Debiasing for planning

A remedy for various cognitive biases is to encourage decision makers to ask themselves: “What are the reasons that my judgment might be wrong?” The basic mechanism is to counteract the problem of overly narrow sampling of evidence which mainly results from the availability heuristic. Expanding the sample makes it more representative. Interestingly, a similar procedure of simply listing more reasons for or against making a particular decision is not effective. This is because of the availability heuristic. Decision makers tend to generate reasons which support their view since these reasons come to mind more readily. The “consider-the-opposite” remedy turns out to be effective in reducing the severity of a number of biases, for example, anchoring and overconfidence, but is not very effective with respect to hindsight bias.

Counterfactual reasoning can influence the accuracy when predicting the outcomes of future personal events. This setting is quite relevant when planning ahead and thinking about the right amount of savings or insurance. Graduate business students made predictions about their results of their job search efforts nine months in advance (e.g. starting salary). Some subjects were asked to generate pro and/or con reasons concerning event occurrence before making their predictions. Generating con reasons increased their predictive accuracy while generating pro reasons had no effect. The latter suggests that subjects may have automatically generated supportive reasons.

Hindsight bias involves the error of assuming that what you know you always knew. Investors may as a result overweight past success and failure in judging competence of fund managers, companies and indeed their own skills. People fail to remember how ignorant they were in the past. This can have serious negative consequences for learning in financial environments and compromises planning ahead. Investment bankers who score highly on hindsight bias have lower performance. To force oneself to argue against the inevitability of a reported outcome, that is, to try to convince oneself that it might have turned out otherwise, might in fact increase the hindsight bias. Ironically, the strategy may be less effective the more one tries to convince oneself that it might have turned out otherwise realizing along the way that reasons for an alternative outcomes are difficult to bring.

How difficult it is for humans to plan ahead becomes evident from the findings on the “planning fallacy” which denotes the tendency to underestimate task-completion times. The debiasing manipulation that has worked so far is called “recall-relevance” manipulation. Within this manipulation people are asked to describe a plausible scenario, based on their past experience, that would result in their completing an assignment at

their typical time. This manipulation avoids the “internal approach” to prediction which involves sketching out a scenario that captures how a future project is likely to unfold. This is, by and large, what planning means to most people: develop a series of steps that lead from the beginning to a successful conclusion to the project. Completion estimates for such exclusively plan-based, future scenarios, however, are likely to be overly optimistic. In contrast the “recall-relevance” manipulation takes an outside view by referring to experience with broadly similar projects.

It is possible to distinguish two modes of forecasting: the *inside view* focuses on the specifics of the case at hand, whereas the *outside view* focuses on the statistics of a family of cases similar to the case at hand. The former approach results in exceedingly optimistic forecasts, and the latter approach results in more accurate forecasts.

Taking decisions as a *group* is sometimes a successful debiasing technique because:

- groups can be an error-checking system
- synergies can emerge if group members have complementary expertise
- groups can increase the effective sample size of knowledge

It has been shown that simply averaging forecasts tends to reduce errors. However, one also has to be careful when taking a decision as a group because social influence can undermine the effectiveness of the group. In a group, people often intentionally withhold or misrepresent their private information or they are unknowingly influenced by the public judgement of other group members.

The aim to make appropriate financial decisions for the future is also likely to be influenced by unrealistic optimism, i.e. people’s consistent tendency to claim that they are less likely than their peers to suffer harm. Informing people about relevant health risk factors in general and requiring them to describe their standing on these factors has no overall effect on subsequent risk judgment. However, if individuals are exposed to lists made by other individuals or factors improving the other individuals’ chances of positive outcomes reduces unrealistic optimism. Also offering people information about their own individual standing on risk factors or information about peers’ standing on these factors has been shown to decrease optimism. Exposing people to a concrete instance of the occurrence has also been proven to successfully offset optimism. Thus, for instance, a recent series of study of smoking behavior finds that smokers are more likely to believe that smoking will harm their health if they are aware of specific instances of such harm. The latter is in line with the finding that people generally tend to respond to concrete, narrative information even when they do not respond, or respond far less, to general statistical information.

Debiasing for making informed decisions about financial products

It is questionable whether people make better decisions when they have more or better information. The tendency to defer choice is greater when the difference in attractiveness among the available alternatives is small than when it is large. The percentage of people

who defer choice among comparable alternatives tends to decrease when people first learn to make trade-offs among the different features.

To be able to make informed decisions about financial products people have to be familiar with basic rules of mathematical and statistical reasoning. Ideally the rules should be learned in such a way that the trained person can apply them in a wide range of events. It is possible to consider two approaches:

- formal training in abstract rules in the hope that people can transfer the abstract knowledge to specific domains
- learning the rule in a specific domain in the hope that people can generalize the knowledge to other domain.

Abstract rule training improved statistical reasoning in manifestly probabilistic problems, objectively measurable events and subjective judgement. Training by examples did enable routines to be transferred to very different domains.

The “sunk cost” or “escalation fallacy” denotes the tendency of people not to consider past actions as a “sunk”.

There is evidence that people reason more accurately about frequencies than about probabilities. At least two possible strategies emerge from this insight which have been shown successfully:

- regulation to exemplify decision alternatives by frequencies rather than probabilities
- training people to translate probabilistic reasoning tasks into frequency formats

Anchoring refers to the tendency for numerical estimates to be influenced by a previously considered (and potentially exogenously provided) standard of comparison. As a possible empirical support for the anchoring effect in a illustrative field experiment, a person walks down the supermarket aisle and he encounters a stack of cans of canned tomato soup, and a sign says “Limit 12 per customer”. This sign actually causes people to buy more cans of tomato soup since customers anchor at 12. The “consider-the-opposite” debiasing technique can make weaker the anchoring when participants were instructed to generate anchor-inconsistent arguments.

Overconfidence involves people giving subjective range estimates which are typically too narrow. Such overconfidence in judgment is quite relevant in financial decision making, for example in judging whether to hedge investment risk.

People in good moods make unrealistically optimistic judgments and choices, and people in bad moods make unrealistically pessimistic judgements and choices. Visceral factors, like negative emotions (e.g. anger, fear), drive states (e.g. hunger, thirst, sexual desire), and feeling states (e.g. pain), are more basic to daily functioning than the higher level cognitive processes that are often assumed to underlie decision-making. There is evidence that people in “hot” states tend to overestimate how long those states will last (“projection bias”). Moreover, visceral factors are powerfully influenced by temporal

proximity indicating that voluntary cooling-off-periods promise to be quite effective for debiasing.

There is evidence that affective reactions have greater speed and automaticity over cognitive reactions. People can have an affective reaction to a stimulus before they know what it is they are reacting to. For example, sudden, unexpected noises can cause fear well before we determine the source of the noise. Thus, it may well be that “I decided in favor of X” is no more than “I liked X”. Non-conscious biases guide behavior before conscious knowledge does. Affect in particular influences decisions about whether to purchase insurance.

Choosing the right financial product might also be significantly hindered by the *conjunction error* due to which probability is often over-estimated in compound conjunctive problems. Accountability is an appropriate remedy for conjunction error.

Debiasing the staying up to date about financial matters

There are three biases that together are likely to inhibit the motivation of people to stay up to date about financial matters: the confirmation biases, the belief bias and the completeness bias. The *confirmation bias* (also called *myside bias*) denotes the tendency to evaluate evidence, generate evidence, and test hypothesis in a manner biased toward one’s own previously held opinions. The *belief bias* refers to people’s difficulties to evaluate conclusions that conflict with what one thinks one knows about the world. According to the *completeness bias* people tend to stop searching too early if they have generated one hypothesis to answer an open question.

What they rarely do is attempt to challenge or falsify their hypotheses by testing examples that they believe will not conform their rule. In a judgmental task two types of justification pressure can lead to a distinct increase in the amount of utilized information:

- the requirement to explain the decision afterwards
- the requirement to convince another person

Teaching in principles of reasoning (by elaborated verbal instructions) seem to reduce the belief bias in syllogistic reasoning, but cannot eliminate it. The necessity of rapid responding increased the amount of belief bias observed on a syllogistic reasoning task and it reduces the number of logically correct decisions. Thus, it is not unlikely that the three biases which make it particularly difficult to stay up to date with financial matters are amplified by time pressure, information overload, cognitive busyness, increased introspection, etc.

To summarize up, inertia, complexity, status quo bias, self-control and hyperbolic discounting are amongst the factors that sway financial decisions. What is largely unexplored territory is whether techniques can be learned that can effectively neutralize bias

itself. A few possibilities have been discussed in this survey. What should be taught may not be explicit financial capability but *thinking skills*.

If there is more interest about behavioral economics, Azar (2007) presents a ranking about all the most relevant journals.

5.3 Mental accounting

Mental accounting seems the more promising topic relative to a consumer budgeting process. Therefore it deserves more investigation. Homburg et al. (2010) studied the role of mental budgeting, income and framing.

Customers often engage in mental budgeting process in order to control their spending behavior and to avoid financial debt. They divide their financial resources among different categories of expenses (e.g. expenses for clothing, food, or entertainment) and track their expenses in these categories. These mental budgeting processes have received growing attention in marketing research and have been labeled as “pervasive process in consumer behavior”. Mental budgeting processes are important, since they *alter* customers’ purchase decisions. For example, customers often evaluate potential purchases against their available budget for the corresponding category and, as a result, tend to align their future purchases with this reference level.

Prior research on mental budgeting has identified several factors that affect future spending behavior in a particular budget category. For example, a future purchase in a budget category become less likely when the amount already spent in that category. Moreover, a future purchase in a budget category become less likely when prior payments are made in cash (as compared to credit card or check). Finally, research has shown that accidental losses (e.g. paying a parking ticket) affect the likelihood of a future purchase in a budget category.

Price increases negatively affect customers’ shopping and repurchase intentions. According to research on mental budgeting, customers restrict their negative reaction to the category of expenses in which the price increase occurs. The effect of mental budgeting on future purchases in a budget category prevails when controlling for negative economic effect of a unexpected loss. Customer’s income attenuates the negative effect of a price increase on the likelihood of a future purchase in the budget category. Customers with low incomes are more budget constraint and want to limit the risk of overspending in a budget category. When a price increase occurs, the risk of overspending in the corresponding budget category increases. As a result, customers with relatively low incomes restrain their future spending in this category and future purchases become less likely. On the other hand, customers with higher incomes are more flexible in their budgets and thus perceive a lower risk of overspending in a particular category of expenses when a price increase occurs. Thus, they align their future purchases in the same category less strictly with the remaining budget than customer with low income. So it is possible to say that:

“When customers are confronted with a price increase, the likelihood of a

future purchase is the budget category decreases to a greater extent when customer income is low than when the customer income is high.”

Research drawing on the reference price concept has shown that the framing of a price increase (e.g. in absolute vs. relative terms) affects customers’ price perceptions. In particular, reference price research suggests that customers perceive a price increase in relation to a reference level and that their evaluation of the price increase depends on that reference level type. In addition, the reference level a customer takes into account depends on how the price increase is framed. Customers tend to rely on the initial price of the purchase when evaluating a price increase as a percentage. When evaluating a price increase in absolute terms, customers tend to evaluate the price increase in relation to global reference levels such as their income. A given price increase has a smaller weight in relation to income than in relation to the initial price. As a result, customers react to a price increase less negatively when the price is framed in absolute terms than when it is framed as a percentage. So it is possible to say that:

“The framing of a price increase has an impact on the likelihood on a future purchase in the budget category. When the price increase is framed in absolute terms the likelihood of a future purchase is greater than when the purchase is framed as a percentage.”

Research suggests that the degree to which customers *process information* determines the degree to which their decisions are affected by framing. The impact of price framing decreases when the degree of processing and evaluating price information increases. When income is low, customers engage in rigorous mental budgeting, devoting significant *cognitive effort* to booking expenses in the corresponding budget category.

The impact of customer income on future purchase behavior is mediated by the degree to which customers engage in mental budgeting processes. The underlying rationale is that customers with low income use mental budgeting more elaborately in order to minimize the risk of exceeding their budgets and to avoid financial debt. On the other hand, when customers have high income, they engage in budgeting to a lesser extent, as their need to control their consumption is smaller. Thus, they align their category purchases less rigorously to the available budget in this category. As a consequence, they should book their purchases in a particular budget category less precisely and less consistently. When the probability of booking an expense in a category is lower, the impoverishment of the budget allotted to this category become less likely. So it is possible to say that:

“The impact of customer income on the likelihood of a future purchase in the budget category is mediated by the degree to which customers engage in mental budgeting.”

Customers should restrict their future purchases in the expense category in which the price increase occurred in order to limit the risk of overspending in this category.

This holds, as mental budgeting implies that, once customers have allotted a particular amount of money to a particular category of expenses, they stick to this budget and track their category-specific expenses against it, but not against budgets of other categories. Thus, mental budgeting implies a negative effect of a price increase on the likelihood of a future purchase in the same category of expenses in which the price increase occurred. However, future purchase in other categories of expenses is affected only to a very limited extent. Standard economy theory, however, implies that a price increase should negatively affect the likelihood of any future purchase, whether in the same category of expenses or not, as a price increase leads to a lower overall financial budget. The assumption underlying this effect is that money is fungible. Thus, when customers do not engage in mental budgeting, the likelihood of a future purchase do not depend on whether the price increase occurred in the same or in a different category of expenses. So it is possible to say that:

“When customers engage in mental budgeting, the likelihood of a future purchase is lower when a price increase occurs in the same category of expenses than when it occurs in another expense category. When customers do not engage in mental budgeting, the likelihood of a future purchase does not depend on the category in which the price increase occurred.”

In conclusion, mental budgeting illustrates that customers align their purchase behavior to budgets *they* set for categories of expenses. Homburg et al.’s (2010) study is the first to provide empirical evidence for a mediation role of mental budgeting and it shows how particular purchases are affected by this mechanism. However, when customers do not engage in mental budgeting, the likelihood of a future purchase does not depend on whether both purchases occur in the same category or in different expenses categories.

The notion that customers with low income should process price information more accurately than customer with high income was not supported. A possible explanation for this finding might be that the price stimuli used in the study are relatively easy to process. Thus, the final price and the price increase might be relatively easy to access in all framing and income conditions.

Customer’s income influences the degree of mental budgeting and, as a result, how customers align their future purchase behavior to budgets they set for particular categories of expenses. However, the degree to which customers engage in budgeting could be affected by additional factors such as the customer’s stage in life cycle. For example, customers with young children might engage in mental budgeting to a higher extent than customers with no or adult children.

More complex price information might affect the principle of mental budgeting (i.e. of booking and posting particular expenses) as expense tracking becomes more difficult.

From a managerial viewpoint, the results highlight the fact that customer income can serve as an important *segmentation variable* in order to predict purchase behavior within categories of expenses. Thus, when implementing a price increase, companies with large base of low-income customers (e.g. discount stores) must consider these negative effects on future category purchase behavior.

Furthermore, Homburg et al.'s (2010) study shows that it is important for companies to think in *customers' purchase categories* and not only in product categories. There is further evidence that customers' purchase decisions are affected by past and intended future purchase they *assign* to the same purchase category. Thus, it is important for companies to understand how customers assign products to particular purchase categories and to monitor price changes to those categories.

Option and type	APR (%)	Duration	Repayment	Total cost	Flexibility
1 Bank loan	20.9	12 months	£36.88	£442.56	Fixed
2		24 months	£20.20	£484.80	
3		36 months	£14.72	£529.92	
4 Store card	32.8	12 months	£38.76	£465.12	Fixed
5		24 months	£22.10	£530.40	
6		36 months	£16.54	£595.44	
7 Credit card	21.9	9 months	£47.85	£430.65	Flexible
8		16 months	£28.25	£452.00	
9		60 months	£9.92	£595.20	

Figure 5.1: A multiple-attribute consumer credit decision (amount borrowed £400), from Ranyard et al. (2006)

Ranyard et al. (2006) studied the role of mental accounting in consumer credit decision processes. They identified a range of decision strategies for source and type of credit varying in the *depth of processing* of cost information. Type, flexibility and duration are defining attributes of credit offers. Figure 5.1 presents all the attributes. Two concepts relevant to understand consumers evaluations are *time discounting* and *mental accounting*. Time discounting refers to differences in the evaluation of future assets and outcomes compared to equivalent ones in the presents. In the context of installment credit, time discount depends on how credit options are mentally represented. A *dual* mental account model proposes that people construes installment credit in terms of two possible representations, the *total account* and the *recurrent budget period account*. The total account representation of a credit option is the non-discounted sum of future repayments plus the amount borrowed. The recurrent budget period account is an on-going budgeting construct that develops over time. Its temporal structure is based on a *budget period*, a heuristic that reduces the temporal complexity of financial transactions. The time over which a loan runs, is perceived as a sequence of discrete units, or budget periods, each of which is treated as a static unit: that is, all income and expenditure transactions within it are dealt with as if they occurred simultaneously. Successive budget periods are perceived as being similar to each other, incorporating similar, often recurrent, transactions.

If people follow the standard advice given by the economists, the rate as interest, as measured by APR (Annual Percentage Rate), should guide decision making. On the other hand, from the perspective of the dual mental account model, it will depend on whether people construe credit options in terms of either a total, or a recurrent budget period account. With respect to a recurrent budget period account, the main considera-

tions would be the monthly repayment accounts, and the number of budget periods over which the loan runs. With respect to a total account, the important attribute would be TC (Total Cost).

Customers usually adopt comparative strategies, comparing credit options on various attributes. Many are simple non-compensatory strategies or heuristics, for example “take the best APR”. However, more complex compensatory strategies were also common, in which an evaluation of APR or TC was accompanied by consideration of aspects such as the greater convenience of the loan, the greater flexibility of the credit or the advantages of shorter loan duration. A minority of participants searched cost information quite thoroughly and compared the cost of specific repayment plans across the three sources of credit in terms of TC and monthly repayment.

Although some consumers adopted decision strategies for source of credit based on TC, the majority used APR. One plausible reason for this is that APR was mentioned in the minimal description of the task, since this is the legal requirement for credit advertising in the UK. Another is that some participants believed APR to be a reliable indicator of TC, which would be main concern of those who represented credit options in terms of a total account. In fact, low APR was explicitly interpreted as meaning low TC in several tests. However, as an alternative explanation could not be ruled out, that people adopted a rational economic perspective and therefore the rate of interest was their main concern with respect to cost.

Where APR information is provided it influences choice in favor of alternatives with lower APR. However, when TC is given in addition, this information completely cancels out the influence of APR. Thus, when people are presented with the TC of specific repayment plans, this guides their decision, rather than APR.

These findings support the hypothesis that people evaluate installment credit in terms of *total mental accounts* specific to the decision context encountered. Tversky and Kahneman (Ranyard et al., 2006) first proposed the basic theory that people construct specific psychological accounts to mentally represent decision alternatives. This was subsequently developed by Thaler (1999) cited in Ranyard et al. (2006) and others to include the mental accounting processes of integration and segregation of sequential decision outcomes. The *total account* is an application of these concepts to installment credit. Rather than segregating successive repayment amount and associating each with its time of repayment, they are all integrated into the total account. It is a simplified representation that ignores the temporal complexity of a loan and does not enable time discounting to be considered. Also, it takes no account of any temporary stresses a loan might add to a borrower’s budget. However, the total account has two important adaptive function. First, it reduces the *memory load* and *cognitive effort* involved in thinking about a relatively complex financial product. Second, it provides information on the total “stress”, in terms of expenditure, that the loan would put on the borrower’s economic situation over time.

The Ranyard et al.’s (2006) findings confirm the importance of TC to the consumer, and the need to facilitate the evaluation and comparison of repayment plans in terms of a total account frame of reference. Many consumer advice organizations, such as the

UK Office of Fair Trading², recognize the importance of TC information. Credit sellers do not always present TC information as carefully as the consumer is entitled to expect.

Other aspects of decision strategies for repayment plans were interpreted in terms of *recurrent budget period accounts*. Comparative strategies were positively indicated in only about one third of the tests examined in detail. Typically, comparisons were made between two repayment options for one type of credit, for example, a two-year versus a three-year bank loan, usually including evaluations of monthly repayments. One commonly approach was to search for the arrangement with the maximum affordable monthly repayment, thereby reducing the loan duration as far as practically possible, often explained in terms of reducing TC. However other reasons for accepting higher monthly repayments included clearing the debt early, thereby freeing up future budget period for new projects, sometimes the future replacement of the vehicle. On the other hand, some people accepted a longer loan period in order to keep the monthly repayment low, thus leaving recurrent resources available for other anticipated expenditure over the period of the loan.

It is possible to explain differences in preference for loan duration in terms of temporal discounting, with preferences for shorter loans being related to lower subjective discount rates. Two concerns were prominent. First, concern with monthly repayments relative to a monthly budget, which is a basic element of a recurrent budget period account, and second, concern with financial planning. Research supposes that consumers form a specific mental account for the transaction that links the length of a loan to the life expectancy of the item in question and it relates to one aspect of financial planning. Some tests indicate that this link sometimes seems large in people's thinking about repayment plans: the need to replace the car or washer at some time in the future was sometimes taken into account. However, tests revealed that other aspect of financial planning were relevant, such as matching monthly repayments to recurrent budget goals and planning for other future projects and contingencies.

In conclusion, the aspects of decision strategies discussed above support the hypothesis that recurrent budget period accounts are used to evaluate both monthly repayment amounts relative to a budget limit and loan duration. They thereby serve the important functions of managing the short-term financial stress that a credit commitment may cause, and anticipating longer-term opportunities and problems in future budget periods.

APR has had a prominent role in consumer credit policy in UK and other countries since 1970s. Ranyard et al. (2006) found that people are able to use this information appropriately and effectively to choose from three different credit offers, even though they often misinterpreted its precise meaning. However, it is clear that **consumers want additional information**, not all of which is routinely available in the credit market. In particular, for long-term planning they need clear information on the duration and total cost of a loan and for short-term budgeting they need to know repayment amounts and the extent to which there are flexible.

In the end, people often mentally represent installment credit in terms of either a total

²www.offt.gov.uk/consumer-advice/

account or a recurrent budget period account. The main contribution of Ranyard et al.'s (2006) studies is to show how these frames of reference can influence the information people seek and use in credit decision strategies.

5.4 Neuroeconomics

Camerer, Loewenstein and Prelec (2004), Camerer et al. (2005) and Loewenstein, Rick and Cohen (2008) present three overviews of what Neuroeconomics is. Neuroeconomics is born in the late 1990s and it uses knowledge about brain mechanisms to inform economic theory. It opens up the “black box” of the brain, much as organizational economics opened up the theory of the firm. Neuroscientists use many tools - including brain imaging, behavior of patient with brain damage, animal behavior and recording single neuron activity. The key insight for economists is that the brain is composed of multiple systems which interact.

All economic activities must involve the human brain. Economics has achieved much success with a program that sidestepped the biological and cognitive sciences that focus on the brain, in favor of the maximization style of classical physics, with agents choosing consumption bundles having the highest utility subject to a budget constraint, and allocations determined by equilibrium constraints. Later tools extended the model to include utility tradeoffs with uncertainty and time, Bayesian processing of information, and rationality of expectations about the economy and about the actions of other players in a game.

Of course these economic tools have proved useful, but it is important to remember that before the emergence of revealed preference, many economists had doubts about the rationality of choice. In 1925 Viner lamented that:

“Human behavior, in general, and presumably, therefore, also in the market place, is not under the constant and detailed guidance of careful and accurate hedonic calculations, but is the product of an unstable and unrational complex of reflex, actions, impulses, instincts, habits, customs, fashions and hysteria.”

At the same time, economists feared that this “unstable and unrational complex” of influences could not be measured directly. The practice of assuming that unobserved utilities are revealed by observed choices - revealed preferences - arose as a last resort, from skepticism about the ability to “measure directly” feelings and thoughts. But now feelings and thoughts *can* be measured directly because of recent breakthroughs in neuroscience. If neural mechanisms do not always produce rational choice and judgement, the brain evidence has the *potential* to suggest better theory.

The theory of the firm provides an optimistic analogy. Traditional models treated the firm as a black box which produces output based on inputs of capital and labor and a production function. This simplification is useful but modern views open the black box and control labor. Likewise, neuroeconomics could model the details of what goes

on inside the consumer mind just as a organizational economics models what goes on inside firms.

Many different methods are used in neuroscience. Since each method has strengths and weakness, research findings are usually embraced only after that are corroborated by more than one method. Like filling in a crossword puzzle, clues from one method help fill in what is learned from other methods. Much neural evidence comes from studies of the brains of non-human animals (typically rats and primates). The “animal model” is useful because the human brain is basically a mammalian brain covered by a *folded cortex* which is responsible for higher functions like language and **long-term planning**.

Many human physiological reactions can be easily measured and used to make inferences about neural functioning. For example, pupil dilatation is correlated with **mental effort**. Blood pressure, sweating and heart rate are correlated with anxiety, sexual arousal, **mental concentration** and other motivational states. Emotional states can be reliably measured by coding facial expressions and recording movements of facial muscles.

Brain imaging is the great leap forward in neuroscientific measurement. Most brain imaging involves a comparison of people performing different tasks - an “experimental” task E and a “control” task C. The differences between images taken during E and C shows what part of brain is differentially activated by E. The oldest imaging method, electro-cephalogram (or EEG) measures electrical activity on the outside of the brain using scale electrodes. EEG records timing of activity very precisely (~ 1 millisecond) but spacial resolution is poor and it does not directly record interior brain activity. Positron emission topography (PET) is a newer technique, which measures blood flow in the brain using positron emissions after a weakly radioactive blood injection. PET give better spacial resolution than EEG, but poorer temporal resolution and is limited to short tasks (because the radioactivity decays rapidly). However, PET usually requires averaging over fewer trials than fMRI. The newest method is functional magnetic resonance imaging (fMRI). fMRI measures changes in blood oxygenation, which indicates brain activity because the brain effectively “overshoots” in providing oxygenated blood to active parts of the brain. Oxygenated blood has different magnetic properties from deoxygenated blood, which creates the signal picked up by fMRI. Unfortunately the signal is weak, so drawing inferences requires repeated sampling and many trials. Spacial resolution in fMRI is better than PET (\sim millimeter³ “voxels”). But technology is improving rapidly. Other measurement methods are *single-neuron measurement*, *psychopathology* and *brain damage*.

Figure 5.2 shows a “sagittal” slice of the human brain, with some areas that are mentioned further indicated. It has four lobes - from front to back (left to right, clockwise in figure 5.2), *frontal*, *parietal*, *occipital* and *temporal*. The front lobe is thought to be locus of **planning**, **cognitive control** and integration of cross-brain input. Parietal areas govern motor action. The occipital lobe is where **visual processing** occurs. The temporal lobes are important for **memory**, recognition and emotion. Neurons from different areas are interconnected, which enables the brain to respond to complex stimuli in an integrated way. When an automated insurance broker calls and says “Don’t you

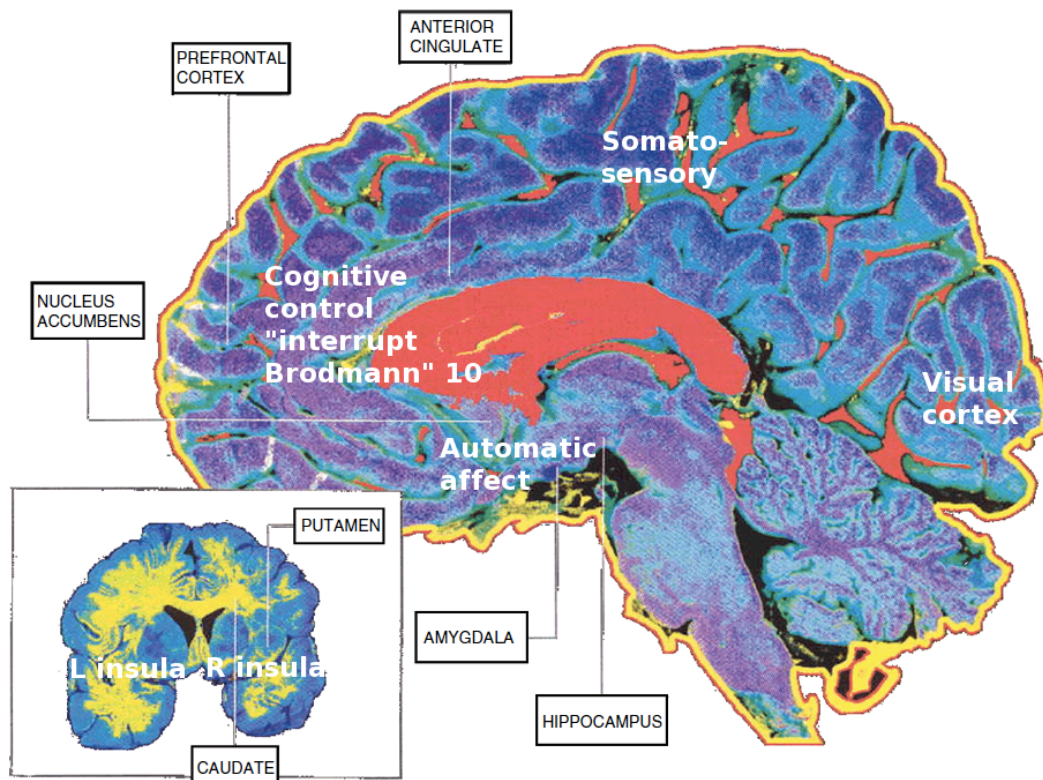


Figure 5.2: Human brain (frontal pole left) regions of potential interest to economists, from Camerer et al. (2004) and Camerer et al. (2005)

want earthquake insurance? Press 1 for more information”, the occipital lobe “pictures” your house collapsing; the temporal lobe feels a negative emotion; and the frontal lobe receives the emotional signal and weights it against the likely cost of insurance. If the frontal lobe “decides” you should find out more, the parietal lobe directs your finger to press 1 on your phone.

A crucial fact is that the human brain is basically a mammalian brain with a *larger* cortex. This means that human behavior will generally be a **compromise between** highly evolved **animal** emotions and instincts, **and** more recently evolved **human** deliberation and foresight. It also means that we can learn a lot about humans from studying primates (who share more than 98% of our genes) and other animals.

Neuroscience uses regional activity differences and other clues to elucidate the principles of brain organization and functioning. The organizing theme, depicted in table 5.1, emphasizes the two dimensions between *controlled* and *automatic* processes, and between *cognition* and *affect*.

Controlled processes, as described by the two rows of table 5.1, are serial (they use step-by-step logic or computations), tend to be invoked deliberately by the agent when he encounters a challenge or surprise, and are often associated with a subjective feeling of

	Cognitive	Affective
Controlled Processes <ul style="list-style-type: none"> ■ serial ■ effortful ■ evoked deliberately ■ good introspective access 	I	II
Automatic Processes <ul style="list-style-type: none"> ■ parallel ■ effortless ■ reflexive ■ no introspective access 	III	IV

Table 5.1: Two dimensions of neural functioning, from Camerer et al. (2005)

effort. People can typically provide a good introspective account of controlled processes. Standard tools of economics, such as **decision trees** and **dynamic programming**, can be viewed as stylized representations of controlled processes.

Automatic processes, are the opposite of controlled processes on each of these dimensions - they operate in parallel, are not accessible to consciousness, and are relatively effortless. Parallelism facilitates rapid response, allows for massive multitasking, and gives the brain remarkable power when it comes to certain types of tasks, such as **visual identification**. Because automatic processes are not accessible to consciousness, people often have surprisingly little introspective insight into why automatic choices or judgments were made. A face is perceived as “attractive” or a verbal remark as “sarcastic” automatically and effortlessly. It is only later that controlled system may reflect on the judgment and attempt to substantiate it logically, and when it does, it often does so spuriously.

Automaticity means that overcoming some habits is only possible with **cognitive effort**, which is *scarce*. The power of the brain to automatize also explains why tasks which are so challenging to brain and body resources that they seem impossibly difficult at first. At the same time, when good performance become automatic, it is typically hard to articulate, which means human capital of this sort is difficult to reproduce by teaching others.

Automatic and controlled processes can be roughly distinguished by where they occur in the brain. Regions that support cognitive automatic activity are concentrated in the back (occipital), top (parietal), and side (temporal) parts of the brain (see figure 5.2). The amygdala, buried below the cortex, is responsible for many important automatic affective responses, especially fear. Controlled processes occur mainly in the front (orbital and prefrontal) parts of the brain. The prefrontal cortex (pFC) is sometimes called the “executive” region, because it draws inputs from almost all other regions, integrates them to form **near** and **long-term goals**, and **plan actions** that take these goals into account. The prefrontal area is the region that has grown the most in the course of

human evolution and which, therefore, most sharply differentiates us from our closest primate relatives.

Automatic processes - whether cognitive or affective - are the default mode of brain operation. They whirl along all the time, even when we dream, constituting most of the electro-chemical activity in the brain. Controlled processes occur at special moments when automatic processes become “interrupted”, which happens when a person encounters unexpected events, experiences strong visceral states, or is presented with some kind of explicit challenge in the form of a novel decision or other type of problem. To the degree that controlled processes are well described by economic calculation but parallel processes are not, one could say that economics is about the “interrupt” or “override”.

The second distinction, represented by the two columns of table 5.1, is between *affective* and *cognitive* processes. Such a distinction is pervasive in contemporary psychology and neuroscience, and has a historical lineage going back to the ancient Greeks and earlier (Plato described people as driving a chariot drawn by two horses, reason and passion).

The distinguishing features of affective processing are somewhat counterintuitive. For most affect researchers, the central feature of affect is not the feeling states associated with it, but its role in human motivation. All affects have “valence”: they are either positive or negative, though some complex emotions, such as “bittersweet”, can combine more basic emotions that have opposing valences. Many also carry “action tendencies” - e.g. anger motivates us to aggress, pain to take steps to ease the pain, and fear to escape or in some cases to freeze - as well as divers other effects on sensory perception, memory, preferences, and so on. Affective processes are those that address “go/no-go” questions - that motivate approach or avoidance behavior.

Cognitive processes, in contrast, are those that answer true/false questions. Camerer et al.’s (2005) view is that cognition by itself cannot produce action; to influence behavior, the cognitive system must operate via the affective system.

These two dimensions, in combination, define four quadrants (labeled I to IV in table 5.1). Quadrant I is in charge when you deliberate about whether to refinance your house, poring over present-value calculations. Quadrant II is undoubtedly the rarest in pure form. It is used by “method actors” who imagine previous emotional experiences so as to actually experience those emotions during a performance. Quadrant III governs the movement of your hand as you return serve. Quadrant IV make you jump when somebody says “Boo!”

Most behavior results from the interaction of all four quadrants. A natural instinct of economists trained in parsimonious modeling is to think that cognition is typically controlled, and affect is automatic, so there are really only two dimensions (quadrants I and IV) rather than four. But a lot of cognitive processing is automatic as well - e.g. visual perception or language processing.

The four-quadrant model is just a way to remind that the cognitive-automatic dimensions are not perfectly correlated. Consider what happens when a party host approaches you with a plate of sushi. **Quadrant III:** your first task is to figure out what is on the plate. The occipital cortex in the bank of the brain is the first on the scene, drawing

in signals from your eyes via your optic nerves. It decodes the sushi into primitive patterns such as lines and corners, then uses a “cascading process” to discern larger shapes. Further downstream, in the inferior temporal visual cortex (ITVC), this information becomes integrated with stored representations of objects on the plate as sushi. This latter process is extraordinarily complicated (and has proved difficult for artificial intelligence researchers to recreate in computers) because objects can take so many forms, orientations and sizes.

Quadrant IV: this is where affect enters in the pictures. Neurons in the inferior temporal visual cortex are sensitive only to the identity of an object. They don’t tell you whether it will taste good. Outputs of the inferior temporal visual cortex as well as outputs from other sensory systems feed into the orbitofrontal cortex to determine the “reward value of the recognized object.” This is a highly particular representation. In economic terms, what is represented is neither pure information (i.e. what is sushi) nor pure utility (i.e. that it is something I like) but rather a fusion of information *and* utility. It is as if certain neurons in the orbitofrontal cortex are saying “this is sushi and I want it.”

The reward value of sushi depends in turn to many factors. First, there is your personal history with sushi. If you got sick on sushi in the past, you will have an unconscious and automatic aversion to it (“taste aversion conditioning”). The amygdala seems to play a critical role in this kind of long-term learning. Second, the reward value of the sushi will depend on your current level of hunger. People can eat almost anything - grass, bugs, human flesh - if they are hungry enough. The orbitofrontal cortex and a subcortical region called the hypothalamus are sensitive to your level of hunger. Neurons in these regions fire more rapidly at the sight or taste of food when you are hungry, and fire less rapidly when you are not hungry.

Quadrants I and III: processing often ends before quadrants I and II go to work. If you are hungry, and like sushi, your motor cortex will guide your arm to reach for the sushi and eat it, drawing on automatic quadrant III (reaching) and IV (taste and enjoyment) processes. Under some circumstances, however, higher level processing may enter in the picture. If you saw a recent documentary on the risks of eating raw fish, you may recoil; or if you dislike sushi but anticipate disappointment in the eyes of your proud host who made the sushi herself, you will eat it anyway (or pick it up and discreetly hide it in a napkin when she turns to serve other guests). These explicit thoughts involve anticipated feelings (your own and the host’s) and draw on explicit memories from a part of the brain called the hippocampus (see figure 5.2), inputs from the affective system (sometimes referred to as the “limbic system”) and anticipation (planning) from the prefrontal cortex. **Standard economics** is best described by the controlled, cognitive processes of quadrant I.

Behavior emerges from a continuous interplay between neural systems supporting activity within each of the four quadrants. Three aspects of this interaction bear special emphasis, which we labeled “collaboration,” “competition,” and “sense-making.” Collaboration captures the insight that decision making, which is to say “rationality” in the broad, nontechnical sense of the word, is not a matter of shifting decision making author-

ity from quadrants II, III, and IV toward the deliberative, nonaffective quadrant I, but more a matter of maintaining proper collaboration in activity across all four quadrants. If quadrant I tries to do the job alone, it will often fail. Competition reflects the fact that different processes—most notably affective and cognitive—often drive behavior in conflicting directions and compete for control of behavior. Sense-making refers to how we make sense of such collaboration and competition—how we make sense of our behavior. While behavior is, in fact, determined by the interaction of all four quadrants, conscious reflection on our behavior, and articulating reasons for it, is basically quadrant I trying to make sense of that interaction. And, not surprisingly, quadrant I has a tendency to explain behavior in terms it can understand – in terms of quadrant I processes.

Although it is heuristically useful to distinguish between cognitive and affective processes, and between controlled and automatic processes, most judgments and behaviors result from interactions between them. Collaboration, delegation of activity, and proper balance across the quadrants are essential to normal decision making. Many decision-making disorders may originate in an improper division of labor between the quadrants.

The affective system provides inputs in the form of affective evaluations of behavioral options—what it is referred as “somatic markers.” As LeDoux (1996) cited in Camerer et al. (2005) writes, **“While conscious control over emotions is weak, emotions can flood consciousness. This is so because the wiring of the brain at this point in our evolutionary history is such that connections from the emotional systems to the cognitive systems are stronger than connections from the cognitive systems to the emotional systems.”**

When it comes to spending money or delaying gratification, taking or avoiding risks, and behaving kindly or nastily toward other people, people often find themselves of “two minds”; our affective systems drive us in one direction and cognitive deliberations in another.

Economics implicitly assumes that people have general cognitive capabilities that can be applied to any type of problem and, hence, that people will perform equivalently on problems that have similar structure. The existence of systems that evolved to perform specific functions, in contrast, suggests that performance will depend critically on whether a problem that one confronts can be, and is in fact, processed by a specialized system that is well adapted to that form of processing. When a specialized system exists and is applied to a particular task, processing is rapid and the task feels relatively effortless. **Automatic processes involved in vision, for example, are lightning fast and occur with no feeling of mental effort, so people are not aware of the power and sophistication of the processes that allow it to happen.** Even the most powerful computers don’t hold a candle to humans when it comes to visual perception or voice recognition.

The brain’s powerful drive toward *sense-making* leads us to strive to interpret our own behavior. The human brain is like a monkey brain with a cortical “press secretary” who is glib at concocting explanations for behavior, and privileges deliberative explanations over cruder ones. Seeing spurious patterns in time series like stock-price data (“technical analysis”) may come from “too much” sense-making.

When the brain does assimilate information, it does so rapidly and efficiently, “over-writing” what was previously believed. This can create a powerful **hindsight bias** in which events seem, after the fact, to have been predictable even when they were not.

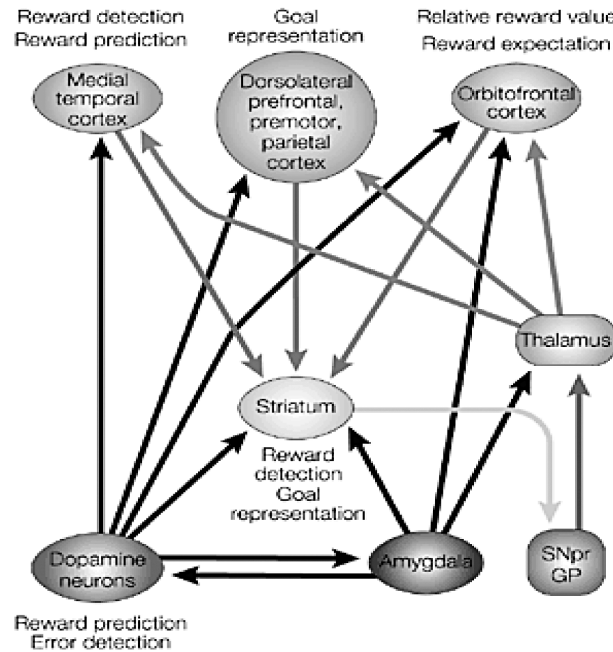


Figure 5.3: Hypothesized neural circuitry of reward processing, from Schultz (2002) cited in Camerer et al. (2005)

Figure 5.3 is a rough guess about the neural circuitry of reward. It is useful as a pictorial reminder that, while neuroscience often emphasize specific regions which are central in different kinds of processing, the focus in thinking about economic decisions should be on circuitry or systems of regions and how they interact. The diagram also shows how frontal regions (at the top of Figure 5.3) both receive input from “lower” systems (dopaminergic neurons and the amygdala), and also feed back processed information to the striatum.

Several early studies in neuroeconomics focused on understanding why people are sensitive to differences between outcomes and reference points, rather than to absolute endstates. Activation in medial prefrontal cortex (MPFC; a target of dopaminergic projections) is lower after failing to receive an anticipated **reward** than after anticipating, and then receiving, no reward. Similarly, several studies have found that activation in another dopaminergic target, nucleus accumbens (NAcc), is greater following the unanticipated delivery of juice and water than after the anticipated delivery of juice and water. This is consistent with earlier animal research, which has found that dopamine neurons within the ventral striatum of monkeys are sensitive to new information about anticipated rewards, which can be viewed as changes relative to the reference point of expectations. This research suggests that the tendency to encode gambles as gains and

losses rather than as final levels of wealth may not simply be due to the greater simplicity of the former, but rather to a **hardwired tendency** for specific neural circuits to respond to deviations from expectations.

Other neuroeconomic research has examined whether the prospect of **risky outcomes** elicits anticipatory emotions. An experiment has been taken in which participants played a game that required occasional bluffing, which exposed them to the risk of being caught and suffering a loss. When a choice had been made but the outcome remained unknown, activation in amygdala was greater following bluffs than following honest play. The amygdala is closely associated with the processing of fear, though it is often more generally associated with maintaining vigilance. Self-reported happiness and NAcc activation increased as anticipated (probabilistic) gains increased.

Decision makers encode the consequences of alternative courses of action affectively and that such “somatic markers” serve as an important input to decision making. As a consequence, individuals with damage to regions that affectively encode information should be disadvantaged relative to individuals without such damage in situations in which emotions lead to better decision making. The ventromedial prefrontal cortex (VMPFC) plays a critical role in this affective encoding process.

One phenomenon that is typically attributed to **loss aversion** is the “endowment effect”, which refers to the tendency for people to value an object more highly if they possess it than they would value the same object if they did not. It was attempted to examine the neural underpinnings of the endowment effect in an experiment in which participants had the opportunity to buy and sell digital copies of songs. It was found that amygdala activation was greater in the selling condition than in the buying condition.

In an experiment it has been asked participants to choose between certain and risky gains and losses while having their brains scanned with fMRI. The authors found that amygdala activation was greater when participants chose certain gains over risky gains as well as when participants chose risky losses over certain losses. Moreover, it was found that activity in anterior cingulate cortex (ACC) was greater when participants made choices that ran counter to the reflection effect (i.e., risky gains over certain gains, certain losses over risky losses). The ACC has been hypothesized to detect and signal the occurrence of conflicts in information processing. Accordingly, the results suggest that greater conflict must be resolved before expressing preferences inconsistent with the reflection effect than before expressing preferences consistent with the effect.

Several hypotheses have been advanced to explain why people discount the future hyperbolically. The most common has been to simply assume that **hyperbolic time discounting** is, in effect, **hardwired into our evolutionary apparatus**.

Neuroeconomic research on **intertemporal choice** has largely focused on whether behavior can be better explained by the interaction of multiple systems. The central debate in this domain of research has focused on the role of the limbic system in intertemporal choice. The limbic system, which commonly refers to the medial and orbital regions of frontal cortex (along the inner surfaces and base of the frontal lobes, respectively), the amygdala (along the inner surface of the temporal lobes), the insular cortex (at the junction of the frontal and temporal lobes), and their subcortical counterparts,

is thought to be critical to emotional processing.

Instead of assuming that hyperbolic discounting is hardwired into our evolutionary apparatus, some researchers have proposed that hyperbolic discounting reflects the operation of two fundamentally different systems, one that heavily values the present and cares little about the future, and the other deliberative, which discounts outcomes more consistently across time. It has been found that time discounting results from the combined influence of two neural systems. Limbic and paralimbic cortical structures, which are known to be rich in dopaminergic innervation, are preferentially recruited for choices involving immediately available rewards. In contrast, fronto-parietal regions, which support higher cognitive functions, are recruited for all intertemporal choices (as contrasted with rest periods). Moreover, it has been found that when choices involved an opportunity for immediate reward, thus engaging both systems, greater activity in fronto-parietal regions than in limbic regions is associated with choosing larger delayed rewards, whereas greater activity in limbic regions than in frontoparietal regions is associated with choosing smaller immediate rewards.

5.5 Privacy and trust

Langenderfer and Miyazaki (2009) present in their work the privacy in the information economy and the US are taken as example. Privacy is something that people of 2009 are concerned about. It seems that there is less privacy than it was used to and it seems this is bad. Privacy concern is not a new phenomenon, although the nature of the concern has changed over time. Privacy, especially the right to be free from governmental intrusion into one's home, was clearly of great importance in the late 1700s and remains so today. For example the nature of privacy is constitutionally based right in the US. The right to be free from governmental intrusion is fundamental and protected. However this important aspect of privacy is just one dimension of a potentially expansive concept. Modern notation of privacy include not only the right to be left alone, but also a person's right to control information about him or her. Indeed, most recent privacy discussion focus upon *information control* rather than intrusion, as the nature of privacy debate has shifted over time.

Relatively early in the computer age, it became apparent to US lawmakers that the ability to assemble vast amount of electronic information implicates privacy rights. The Privacy Act of 1974 controls the use of information held in federal government records by restricting disclosure of personally identifiable data, granting individuals the right to access information about them held in governmental records, allowing individuals the opportunity to amend federal records upon a demonstration of inaccuracy, and requiring federal agencies to adhere to particular standards of record keeping and maintenance. The Act was later amended to establish standards when federal agencies exchanged computer records through matching programs under the Computer Matching and Privacy Protection Act.

Although these statutes accomplish a great deal to ensure the fairness of governmental record keeping, regulation of private information practices applies only to certain

kinds of records. Educational, medical, and credit data³ are all subject to specific legislative provisions, but for many areas of recoding keeping in private hands, regulation is minimal or absent.

Largely free from federal control are such potentially sensitive areas as purchases histories for consumer products, web surfing history, employment records, and many types of insurance data. Even financial records, some of the most sensitive of any kind of privately held personal information, is only minimally regulated, with financial institution required to provide consumers with opt-out options from information sharing among unaffiliated companies. In other words, it is possible, if a person takes the affirmative step, to prevent a financial institution from selling a customer's bank balance, loan payment history, and debt level to other interested companies willing to buy the data⁴. However few customers take actually opt out, most don't even read the privacy notices and many have little knowledge regarding the privacy regulations affecting various types of firms. The onus is on the customers to control data sharing, because the institution owns the data, not the customers, and information flow is largely unimpeded.

The consequence of this regulatory void is that as private data collection has grown, commensurate with the development of inexpensive computing power, concern about the privacy implication of nongovernmental data sharing has grown also.

In a world that relies largely on consumers to manage their own privacy, privacy concern has evolved from a fear of intrusion to a generalized unease regarding the power that comes from easily accessible, personally identifiable data, with each area of sensitive information the subject of separate scrutiny.

Recently the attention is focused on information gathering and exchange and the felt intrusion that comes with the knowledge that anyone can easily discover a great deal about anyone else at little or no cost. Because federal lawmakers have adopted generally a hand-off approach with respect to private data collection and exchange, it has become increasingly incumbent upon individuals to take an active role in the ways they safeguard their own personal information.

Privacy literacy is the understanding that consumers have of the information landscape with which they interact and their responsibilities within that landscape. Lack of literacy may have important implications.

The privacy debate has changed from government invasion to private information sharing, with intrusion and loss of privacy experienced not from police entering the sanctity of the home, but from corporate entities compiling long and accurate dossiers regarding virtually every aspect of our existence. Indeed, it seems that, given the ubiquity of private data sharing and the importance of the accuracy of many data centers, we are increasingly defined by the information that databases store about us. There is a danger that we will lose the ability to define ourselves, having surrendered the definition of ourselves to the data gathering entities, often unregulated and beyond our control. It is easy to understand the anger of the loan applicant, denied a mortgage due to erroneous credit data, whose repayment history has never been blemished. Under such conditions,

³Fair Credit Reporting Act 1970

⁴Gramm-Leach-Bliley Financial Services Modernization Act 1999

rather than define the data about us, we are defined by it.

Although much has been accomplished over the past 20 years in terms of privacy research, there yet remains a void of research in certain areas, as for example how customer view the value of privacy as a commodity to be exchanged. The online provision of information has made the information availability more rapid, less costly and more far-reaching. Government-controlled information that was once only available by visiting a local government clerk during operating hours, can now be accessed around the world at any time of day.

As consumers find more of their information available to marketers, other governments, and other consumers, consumer attitudes toward feelings of control over privacy and accompanying desire for privacy must be examined. Third-party organizations that purport to assure consumer privacy by issuing “seals of approval” may find a renewed purpose in monitoring government agencies in addition to commercial enterprises.

As the burden of privacy protection shifts more and more onto consumers, they are increasingly becoming accustomed to the concept of paying (in time, money, and/or effort) to protect their privacy. More and more consumers understand that their privacy is for sale in the form of trading information for discounts and special offers as with buyer loyalty programs. For example, automobile insurers have recently begun to offer some of their lowest priced policies only to drivers who are willing to install a monitor that would record distance traveled, speed, and even driving habits. Other, more sophisticated devices are presently installed in many new cars that also monitor acceleration, braking, and seatbelt usage. Thus, to claim the lower fees once accorded to drivers based on less intrusive methods, many consumers will presumably pay now with their privacy.

Yousafzai, Pallister and Foxall (2009) present the multi-dimensional role of trust in Internet banking adoption. The banking industry is strongly associated with high levels of trust related to *security* and *privacy* issues in the *physical environment*. However, this association has not yet been translated in the electronic world to its full potential. The absence of physical branch and physical interaction renders a unique environment, in which trust is of vital importance. Majority of the customers are reluctant to adopt Internet banking because of security and privacy concerns. Thus, the lack of customer trust, both in the attributes of the bank and in the overall online environment has been, and remains, an obstacle in the widespread adoption of Internet environment has been, and remains, an obstacle in the widespread adoption of Internet banking. Customers’ trust is an important future challenge for Internet banking. Customers’ trust in Internet banking transactions has some unique dimensions, that is, the impersonal nature of the online environment, the extensive use of technology, and the inherent uncertainty of using an open infrastructure for transactions. There are also concerns about the reliability of the underlying Internet and related infrastructure with the extensive media coverage about frauds on the Internet. This provides a unique challenge for banks to find ways to initiate and foster electronic relationship with customers.

The survival of Internet banking depends on the bank’s ability to convince the customers to bank online, an act that is unlikely to occur if the bank is being perceived as untrustworthy. Banks can build mutually valuable relationships with their online cus-

tomers through a trust-based collaboration process. However, the way in which trust may be gained and the impact it has on Internet banking is not yet well understood. Trust in Internet banking is a new and emerging area of interest in the field of marketing of financial services research. Extant literature on trust related to Internet banking is scarce and focused on more general issue of e-commerce. However the literature of e-commerce has at large picked up trust as a major obstacle in its growth and adoption.

Consumers' trust in e-commerce is driven by the trustworthiness of the web vendor and that of the web-shopping medium, contextual factors, and the individual's trust propensity. Security and trust are also picked up as the key drivers of online trust. Consumers' ability to control the action of a web vendor directly affects their perception of security and privacy. Many other scholars have reinforced that only after security and privacy have been addressed, consumer will consider other web features to determine the extent to which they can trust and feel safe in transacting with the web vendor. In the early stages of the experience, online trust might have more to do with the performance of technology, whereas in the later stages, trust may depend more on the differences in the implementation of Internet technology by firms.

The data are collected through 441 Internet banking users of Halifax Bank of Scotland. The largest group consisted of those aged 26-45 years (41.6%), followed by the group 46-60 years (36.6%). The average Internet experience of the respondents was 2.59 years and the average Internet banking experience was 1.46 years.

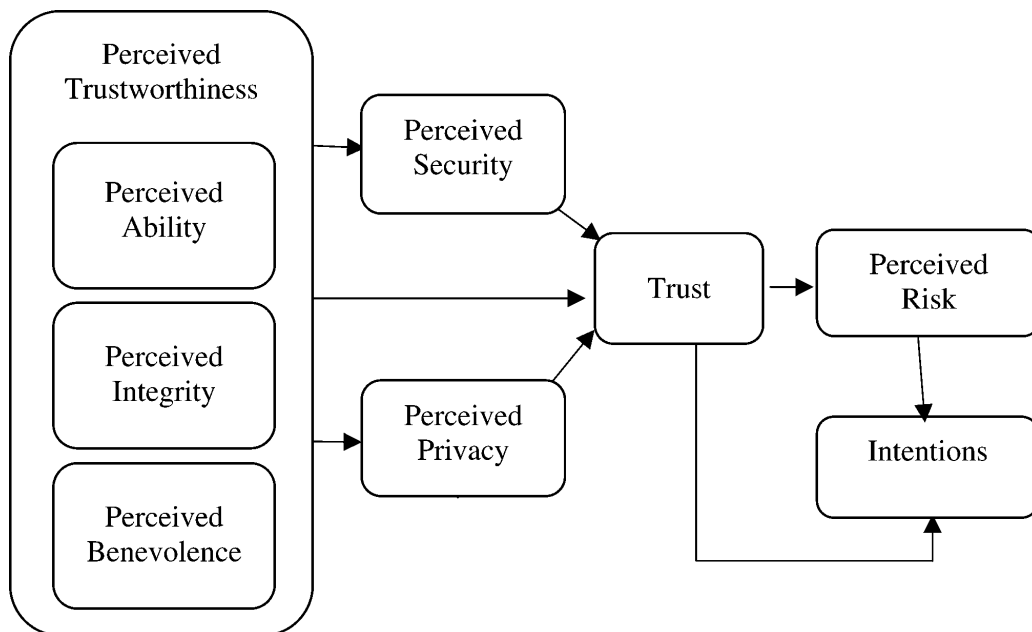


Figure 5.4: A model of trust for Internet banking, from Yousafzai et al. (2009)

Yousafzai et al.'s (2009) study tries to develop and validate a model of trust for Internet banking, as in figure 5.4. **Perceived security** is defined as the customers' perception of the degree of protection against threads of destruction, disclosure, modifi-

cation of data, fraud and abuse. Security can be guaranteed with adequate encryption, digital signatures and firewalls, albeit consumers' perception of online security is a different phenomenon. The study measures the customers' subjective perspective about secure Internet banking transaction based on their perceptions of timely, accurate, safe data transmission. The customer develops positive perceptions of security, the trust and confidence in the relationship will also increase and will promote open, substantive and influential **information exchange**.

Perceived privacy is the consumer's ability to control:

- the presence of other people in the environment during a transaction
- the dissemination of provided information

The study defines perceived privacy as customers' perception regarding their ability to monitor and control the collection, use, disclosure and subsequent access of their information provided to the bank during an online transaction. Financial services customers are more reluctant to use online services out of fear that their financial life will become an open book to the Internet universe. Thus there is a risk of a loss of privacy, which is a significant factor in building trust. This suggests that customers having a high perception of online privacy will be more willing to trust and patronize Internet banking services.

Perceived trustworthiness is the trustor's perception of how trustworthy the trustee is, while *trust* is the trustor's willingness to engage in a risky behavior. There are three main elements of perceived trustworthiness: *ability*, *integrity* and *benevolence*. Those factors help build the foundation for the development of trust.

There are several new findings. First, trust and perceived risk are shown to be direct antecedent of intention, suggesting that uncertainty reduction is a key component in the customers' acceptance of Internet banking. Thus, it deserves particular attention. Secondly, while trust has a direct effect on intentions, it also acts as an indirect antecedent through perceived risk and perceived usefulness. Thirdly, trust is a multi-dimensional construct with three antecedents:

- a belief that the bank is reliable (perceived trustworthiness)
- a belief that there are safety mechanisms built into the website (perceived security)
- a belief that transaction information will not be used without customer's consent (perceived privacy)

The significant effect of perceived trustworthiness on security and privacy validates the fact that trust only occurs when customers are assured of the bank's willingness and ability to deliver obligations. Thus, for the perception of high security and privacy to exist, the customer must believe that the bank has both the ability and motivation (perceived trustworthiness) to reliably deliver online banking services. The findings also highlight the importance of using security and privacy as two distinct concepts, even though they are conceptually related.

The most significant implication for the banking sector is the need to recognize that while the explicit essence of customer's relationship with the bank is to get a useful and efficient Internet banking service, the customer's trust and its antecedents are also an essential aspect of this relationship and contribute to its value. Banks should build websites that not only are useful and easy to use, but should also include trust-building mechanisms. In order to reduce the security concerns, effective trust-building strategies may include providing guarantees to customers to counter any fraudulent transaction. Customers may be more willing to absorb the perceived risk if they are confident that their bank stands behind the service. Simple statements and graphics stating that transactions are guaranteed may calm risk concerns. Clear graphical presentation of security systems, presented in layman's terms may also calm security concerns. Furthermore, a concise and well-presented privacy policy may reduce privacy concerns.

Chapter 6

The budgeting process

6.1 From the conception to the current definition

Sweeney (2009) presents in his article the origins of the budget and its evolution until the present days. The beginning of the budgeting and accounting processes comes from the innovations introduced by DuPont and General Motors. Pierre S. Du Pont became president of GM in 1921 and then he started to move many experienced employees from DuPont's financial department to GM's one. Donaldson Brown was one of those and Alfred Sloan Jr. described him as the one that introduced new forms of financial control.

In 1924 an incident of overproduction happened in several GM's departments. GM reacted creating a new pioneering financial controls, a sophisticated forecasting system, a flexible budget to evaluate performance and a stock-based incentive plan based on divisional performance. Brown became then the chief financial officer and Sloan will succeed him later.



Figure 6.1: James O. McKinsley

Another story comes from James O. McKinsley (figure 6.1). He started as an assistant professor at the University of Chicago and he tried for the first time to consider the budgetary control as a whole, instead of consider specific aspects of budgeting. He printed the book *Budgetary Control* in 1922 which is recognized as the first book that connected together in an organic vision: market forecasting, feedback loop of plan and

outturn. Budgeting was seen as the instrument of management over the current operations. In this way departmental and subdepartmental budgets were prepared to create and update the standards of performance for each unit. In the book McKinsley says that “budgets serve not only as standards by which to control current operations; they also serve as a means of coordinating the activities of several departments”. However McKinsley warned not to take his procedures as perfect and instead to take his work as a statement of the problems involved from which consider improvements.

Professors H. Thomas Johnson and Robert S. Kaplan describe the 1925 the year when all the management account practices we use today, have been developed. For example:

- cost accounts for labor, material and overhead
- budgets for cash, income and capital
- flexible budgets
- sales forecasts
- standards costs
- variance analysis
- performance measures

Suddenly the all the innovation slowed down. What really happened was actually was a shift of the cost accountants in the company to a professional consultants. In fact James McKinsley founded in 1926 his business *McKinsley & Company*. The first client was Armour and Company, one the biggest meatpacker in USA. McKinsley were used to simplify the concept of budget as “a statement of policy, expressed in terms of future accounts delegated to units of an organization”.

In the late 1950s Peter Drucker, one of the most important management thinker, suggested the shift from the organizational model of *command and control* through departments and division, to a new information-based model where the employees are are seen as knowledge specialists.

Hope and Fraser (2003) remember how in the 1960s the budget became a fixed performance contract. The companies started to use accounting results not just to be updated on the processes underneath, but also to use them as source on which rely to give orders at all levels of the company.

In 1963 Alfred Sloan Jr. wrote the book “My years with General Motors” and for the first time suggested that budgeting was a practice designed not to centralize power, but to decentralize it. Sloans says “if we had the means to review and judge the effectiveness of operations, we could safely leave the prosecution of these operation to those in charge of them”.

In the early 1970s a new generation of leaders schooled in the finer arts of financial planning had begun to drive performance improvement relying on financial targets and

incentives, instead of benchmarks as productivity and marketing effectiveness (Hope and Fraser, 2003).

In contrast with all that happened before, in 1972 a revolution started. Jan Wallander, CEO of the Swedish bank Handelsbanken, ordered the bank's finance department to stop producing an annual budget. Wallander was applying a new model based on the organizational thinking of Peter Drucker.

In the 1980s and 1990s high demands from institutional shareholders and the pressure caused by foreign manufacturers entering in the domestic markets gave pressure to all those organizations that were still using rigidly the budget. Few companies started to realize that the budget was just preventing the frontline employees to take responsibilities for the performance. It was time to make a change.

Today we call **budget** “a quantitative expression of a proposed plan of action by management for a specified period and an aid to coordinate what needs to be done to implement the plan” (Uyar, 2009). **Budgeting** “is the process of allocating an organization's financial resources to its units, activities and investments” (Uyar, 2009). Many surveys demonstrated that the budget is the most used tool for the planning and control of an organization in every part of the world, banks included: Malaysia, Bahrain, Australia, Japan Poland and Singapore (Uyar, 2009).

There are many discussions about budgeting, but Uyar (2009) distinguishes three main practices:

- traditional budgeting
- better budgeting
- beyond budgeting

6.2 Traditional budgeting

Libby and Lindsay cited in Uyar (2009) define traditional budget as a process that operates as a top-down hierarchical model (command and control). Decisions, resources and rewards come from the top, but the information comes from the bottom line, as described in figure 6.2. Numerous budgets are prepared in the organization. A part from the annual budget, companies more often prepare budgets every quarter of the year to control the performance.

Organizations can use budget for different goals (Uyar, 2009):

- forecasting the future
- assisting in profit maximization
- means of management communication
- performance evaluation
- way to calculate rewards

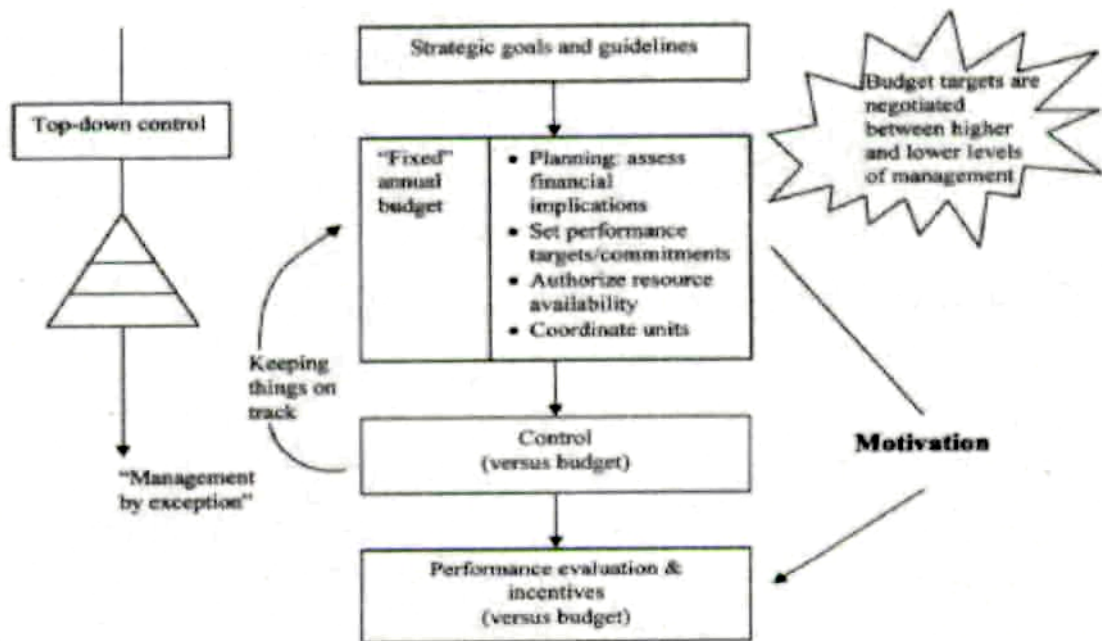


Figure 6.2: The traditional control process, from Libby and Lindsay cited in Uyar (2009)

- employee motivation
- controlling performance by investigating variance
- pricing decisions and control

A survey (Uyar, 2009) conducted in India about management account practices reveals that all the budget-related practices were considered important for the present activities and for the future of the company. The results are summarized in the table 6.1.

The traditional budgeting presents some limitations:

- the process is very time-consuming
- the budgets becomes quickly out-of-date
- the budgeting process ends up focusing only the financial status, instead of focusing on the operational requirements as it was designed
- the decision-making process in the organizations answers eventually only to the budget instead of listening to the customers and the long-term financial status of the organization

More specifically Neely, Bourne and Adams (2003) identify 12 weakness of traditional planning and budgeting practices. They divided them in three groups:

<i>Practice</i>	<i>Adoption rate</i>	<i>Benefits derived</i>	<i>Future emphasis</i>
Budgeting to plan day-to-day operations	100%	Moderate	High
Performance evaluation: budget variance analysis	100%	Moderate	High
Budgeting for planning cash flows	95%	High	High
Budgeting for coordinating activities across business units	95%	Moderate	Moderate
Budgeting for controlling costs	93%	High	High
Budgeting for planning financial position	91%	Moderate	High

Table 6.1: Budget-related practices, from Joshi cited in Uyar (2009)

Competitive strategy

- budgets are rarely strategically focused and are often contradictory
- budgets concentrate on cost reduction and not on value creation
- budgets constrain responsiveness and flexibility, and are often a barrier to change
- budgets add little value; they tend to be bureaucratic and discourage *creative thinking*

Business process

- budgets are time consuming and costly to put together
- budgets are developed and updated too infrequently - usually annually
- budgets are on unsupported assumptions and guesswork
- budgets encourage gaming and perverse dysfunctional behavior

Organizational capability

- budgets strengthen vertical command and control
- budgets do not reflect the emerging network structures that organizations are adopting
- budgets reinforce departmental barriers rather than encourage *knowledge sharing*
- budgets make people feel *undervalued*

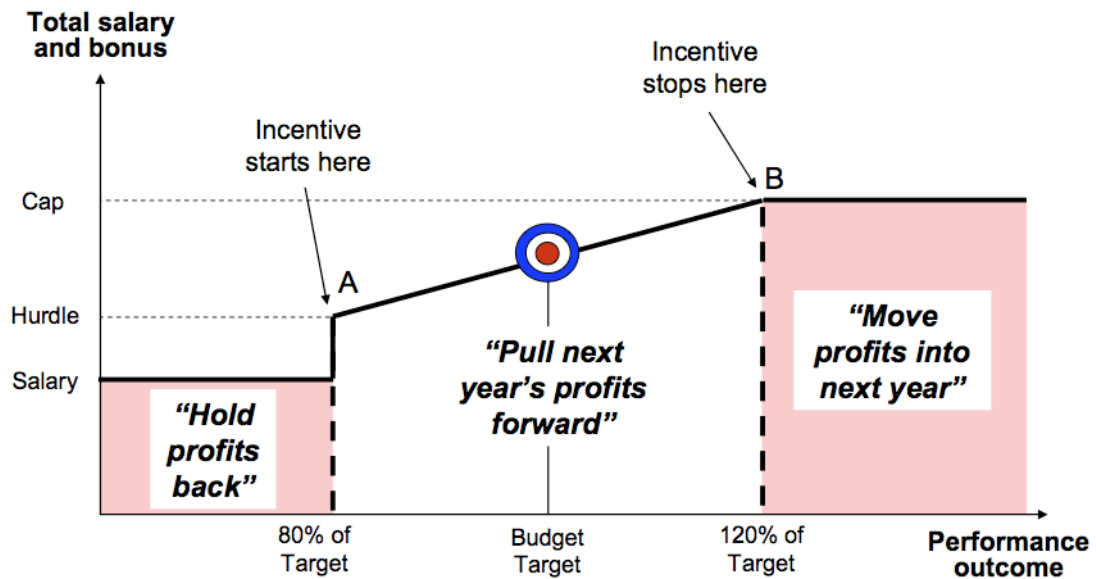


Figure 6.3: The problems with incentives, from Jensen M. C. 2001. *Corporate Budgeting Is Broken — Let's Fix It*. Harvard Business Review, Vol. 79, No. 11 cited in Bunce (2007)

Traditional planning and budgeting processes add limited value to the management of businesses, they are too much time consuming and too much expensive. The biggest weakness of the budget is the amount of time spend on producing it. Uyar (2009) founded that it is possible to count up to 20% of the time spent by the management to create it. Sometimes it can require up to four or five months to finish it. Budgets appeared then unresponsive to a fast-moving environment and more often it represents an incentive to budgeting gaming actions while trying to achieve the target, like (Uyar, 2009):

- understimation for sales and/or increasing the budget for expenses so that the budget target is easy to achieve
- spending the whole budget in the end of the period so that the responsible can save his title in the company
- attain the budget sacrificing the long-term goals
- convincing the customers with discounts to buy the goods before the budgeting period ends, so to make the budget
- incurring next year expenses in this year's budget
- deferring next year's revenues convincing customers to delay the purchase
- holding back the profits when it is sure to make the budget in the current year so to make easier to do it in the following year.

Budgets let possible internal politics and gaming behavior that will bring detriment to the organization. Moreover they encourage an inward-looking and short-termist culture that do not focus on the medium and long term. All these problems lead to business underperformance. Babbini, cited in Uyar (2009), pointed out that the main failure of the traditional budgets is that they are not able to measure the critical indicators for healthy company like:

- customer loyalty
- development of intellectual properties
- speed to meet customer expectations
- employee development
- product/service quality

A survey (Uyar, 2009) about how successfully firms adopt budgeting versus unsuccessfully firms, shows that the successfully factors are:

- commitment to budgets
- building linkages to to connect the firm's plans in the short, medium and long term
- adopting detailed and comprehensive procedures to prepare budgets.
- analyzing budget variances and taking corrective actions.

The alternatives are *better budgeting* and *beyond budgeting*.

6.3 Better budgeting

This approach suggests incremental improvements to the traditional budgeting. Neely et al. (2003) describe five principal better budgeting approaches (table 6.2):

- activity based budgeting
- zero base budgeting
- value based management
- profit planning
- rolling budgets and forecasts

Activity based and **zero base** budgeting aim to improve the focus and the accuracy of the budget outputs. More specifically zero-base budgeting (ZBB) is a process that, instead of using the current budget as a base for the next year, it starts from zero figures. This will enable managers to reorganize the operations and it will help to justify

the expenses oriented to the corporate goals. On the other side both the budgeting strategies add even more work than the traditional budgeting. Therefore they cannot be used regularly.

Valued based management and **profit planning** are not so commonly implemented and so there are not so many examples to evaluate deeply the efficacy of the approaches. There is little evidence that suggests a simplification of the process.

Rolling budgets and forecasts are adapt to perform regularly budgeting and they can solve the traditional budgeting lag-time problem. They suggest to conduct regular monthly or quarterly forecasts that look fifteen month or more in the future. The main tool to collect the budget from different departments is the spreadsheet. This has consequences like long waiting time to centralize the budgets and possible mistakes. Hornyak cited in Uyar (2009) proposes a web-based budgeting tool that can open the category of the *e-budgeting*. This concept will help the firms to:

- reduce administrative costs and tasks
- increasing service levels to employees
- freeing the finance department to focus on strategy

A survey (Uyar, 2009) has been conducted in the British food and drinks industry about the frequency of use and the importance of management accounting practices. Between all of them, seven were specific about budgeting and the results are presented in figure 6.3. This study demonstrates that budgeting is the tool used for planning and controlling costs. The “What-if” analysis is considered important as well, even if it is not used often. Finally budgeting is considered an important process for the long-term strategic planning.

However none of these approaches are without drawbacks.

6.4 Beyond Budgeting

Hope, Fraser, Bunce and Rösli (2006) present an overview of their budgeting model. DuPont and General Motors introduced the *command and control* model for their multi-divisional (M-form) companies. The top management was the source of knowledge, the strategic planner and resource allocator. The middle managers were the controllers and the front-line managers the implementers. The increasing complexity of those times was solved by grouping the business lines in a separated managed units and organizing those units by the financial decisions of the senior managers. The executives agreed on the mission statement, the planners translated the mission into the strategic plan and finally the operational managers prepared the plans and the budgets by the strategic plan directions. Continuous control reports were forwarded to the main managers to check if the plan was rolling out as it was agreed, and in the worse case they would give new orders.

activity based	<ul style="list-style-type: none"> • similar to activity-based costing (ABC) and activity-based management (ABM) • involves planning and controlling along the lines of value adding activities and processes • resource and capital allocation decisions are consistent with ABM analysis, which involves structuring the organization's activities and business processes so that they better meet customers and external needs
zero base	<ul style="list-style-type: none"> • expenditure must be re-justified during each budgeting cycle, rather than basing budgets on previous year or periods • avoids building on the inefficiencies and inaccuracies of the previous history • value of this approach depends on stability of operating environment
value based	<ul style="list-style-type: none"> • formal and systematic approach for managing the creation of shareholder value over time • all expenditure plans evaluated as project appraisals and assessed in terms of the shareholder value they will create • helps to link strategy and shareholder value to planning and budgeting
profit planning	<ul style="list-style-type: none"> • <i>profit wheel</i> method for planning future financial cash flows of profit centers • assesses whether an organization or unit generates sufficient cash, creates economic value and attracts sufficient financial resources for investment • ensures consideration of an organization's short and long term prospects when preparing its financial plan
rolling budgets and forecasts	<ul style="list-style-type: none"> • solves problems associated with infrequent budgeting and hence result in more accurate forecasts • more responsive to changing circumstances, but requires permanent resource to administer • also overcomes problems linked to budgeting to a fixed point in time - i.e. the year-end and the often dubious practices that such cut-offs encourage

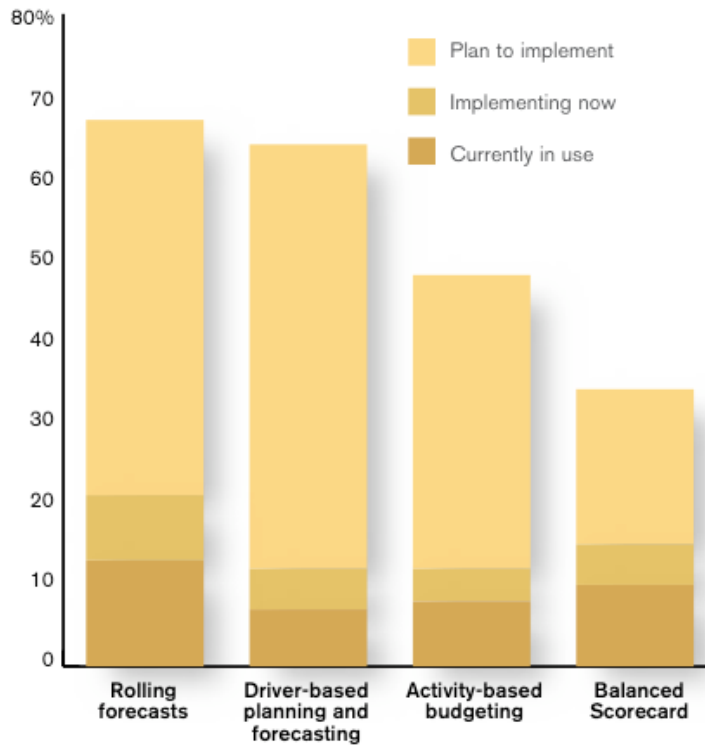
Table 6.2: Better budgeting techniques (Neely et al., 2003)

Budgeting	n	How important?			n	How often used?				
		NI (%)	MI (%)	I (%)		S1 (%)	S2 (%)	S3 (%)	S4 (%)	S5 (%)
Budgeting for planning	118	8	15	76	120	2	3	13	28	56
Budgeting for controlling costs	119	8	19	73	120	3	5	19	25	48
Activity-based budgeting	113	37	44	19	116	35	25	21	8	11
Budgeting with "what if analysis"	117	19	47	34	118	17	16	36	23	8
Flexible budgeting	117	27	40	32	117	29	16	23	19	13
Zero-based budgeting	116	58	30	12	117	52	19	14	9	7
Budgeting for long-term (strategic) plans	114	17	33	50	117	14	21	26	26	14

Notes: n: number of respondents; NI: not important = 1; MI: moderately important = 2; I: important = 3; S1: never; S2: rarely; S3: sometimes; S4: often; S5: very often

Table 6.3: Budgeting practices, from Abdel-Kader and Luther cited in Uyar (2009)

Which of the following budgeting and forecasting techniques does your organization use?



SOURCE: 2009 BUSINESS FINANCE RESEARCH STUDY: PLANNING AND FORECASTING IN TUMULTUOUS TIMES

Figure 6.4: Budgeting techniques (Sweeney, 2009)

This system has some drawbacks:

- it is designed around the hierarchy more than around the customer
- it limits the sharing and the innovation
- the bureaucracy involved generates high costs.

This model made possible an high increase of productivity, but it produced a “dehumanization” of the work. In the 1960 the researcher Douglas McGregor found that most of the manager of those time were using *Theory X*, that describes how the human nature is driven by its worst characteristics. He realized that the usage of this theory brings poor results that could be strongly improved by adopting *Theory Y*. This describes instead how human nature can give better results if driven by the positive characteristics, allowing people to grow and develop (Hope et al., 2006).

This concept were in contrast with the leadership philosophy of the *industrial age* in those times and McGregor was not believed. Nowadays the employees are different and they are referred as *knowledge workers*. As Peter Drucker declared decades ago, they are going to take the lead in the **information age** and the leadership philosophy for this age will change. To compete in the *information economy* the companies have to change their centralized hierarchies to networks of relatively autonomous units accountable for customers outcomes and move away from the incremental planning and budgeting mentality.

The Beyond Budgeting Round Table is a movement started in late 1997¹ to answer the problems of traditional budgeting. Sixty companies joined and funded it from many different countries, like Belgium, France, Germany, Netherlands, Norway, South Africa, Sweden, United Kingdom and United States. (Uyar, 2009).

BBRT defines *beyond budgeting* in its website² as:

“Beyond Budgeting is about rethinking how we manage organizations in a post-industrial world where innovative management models represent the only sustainable competitive advantage. It is also about releasing people from the burdens of stifling bureaucracy and suffocating control systems, trusting them with information and giving them time to think, reflect, share, learn and improve. Above all it is about learning how to change from many leaders who have built and managed ‘beyond budgeting’ organizations.”

The Beyond Budgeting, known also as *Coherent Model*, is designed to create a flexible organization. It takes advantages from the best side of the human nature, therefore it is compatible with Theory Y. It is adapted to knowledge based companies and it based on *cybernetics* and *system theory*, the most relevant management science (Hope et al., 2006).

BBRT conducted research on many firms that have dismissed the budget and it developed 12 principles represented in figure 6.4. The first six are dedicated to creating

¹www.bbbrt.org/BBRT/bbrt.html

²www.bbbrt.org/beyond-budgeting/bbwhat.html

Principles of the Coherent Model	
Leadership principles	
1. Customers	- Focus everyone on improving customer outcomes, <i>not on hierarchical relationships.</i>
2. Organization	- Organize as a network of lean, accountable teams, <i>not around centralized functions.</i>
3. Responsibility	- Enable everyone to think and act like a leader, <i>not merely follow 'the plan'.</i>
4. Autonomy	- Give teams the freedom and capability to act; <i>don't micro-manage them.</i>
5. Values	- Govern through a few clear values, goals and boundaries, <i>not detailed rules and budgets.</i>
6. Transparency	- Promote open information for self management; <i>don't restrict it hierarchically.</i>
Process principles	
7. Goals	- Set relative goals for continuous improvement; <i>don't negotiate fixed performance contracts.</i>
8. Rewards	- Reward shared success based on relative performance, <i>not on meeting fixed targets.</i>
9. Planning	- Make planning a continuous and inclusive process, <i>not a top-down annual event.</i>
10. Controls	- Base controls on relative indicators and trends, <i>not variances against plan.</i>
11. Resources	- Make resources available as needed, <i>not through annual budget allocations.</i>
12. Coordination	- Coordinate interactions dynamically, <i>not through annual planning cycles.</i>

Table 6.4: Principles of the Coherent Model, from Hope et al. (2006)

a flexible organizational structure and the second six recommend how to design and adaptive management process for a flexible organizational structure.

All those principles represent an *holistic model* that considers:

- competitive success factors
- leadership thinking
- management processes
- information systems.

Only if all the principles are practiced, then it is possible to create *coherent* organizations. A summary of the logic that made possible to design the principles is present in figure 6.5.

There are possible improvements from the switch to the Beyond Budgeting (Uyar, 2009):

- millions of dollars saved from not having to go through the budgeting process
- eradication of much of the “gaming” that occurs in companies that budge (there is little point in gaming if there is no fixed target to meet)
- faster response time that results from using more adaptive processes
- better strategic alignment between goals, plans, measures and behavior
- more value-adding work from the finance team
- permanent reductions in the cost structure

Today's competitive success factors			
External changes	Industrial age	Information age	Today's competitive success factors
Pace of change	Incremental	Discontinuous	Fast response
Growth constraints	Access to capital	Access to talent	Great place to work
Price dynamics	Rising (cost-plus pricing)	Falling (price-led costing)	Operational excellence
Product/strategy life cycles	Long (years)	Short (months)	Continuous innovation
Customer relationships	Loyal (little choice)	Fickle (extensive choice)	Customer intimacy
Ethical behaviour	Tolerant to lapses	Unforgiving to lapses	Excellent governance

↓

How leaders need to change to meet today's competitive success factors		
Today's competitive success factors	Leadership action	Leadership principles
Fast response	Create a large number of small self-managed teams	Enable teams to 'sense-and-respond' to changing markets and customer needs
Great place to work	Devolve planning and decision-making to teams	Endow teams with the freedom and capability to act
Operational excellence	Create internal supplier-customer relationships between teams	Make teams accountable for continuous improvement against peers and benchmarks
Continuous innovation	Dismantle cellular boundaries and enable company wide collaboration	Make strategy everyone's job and encourage innovation at every level
Customer intimacy	Assign ownership of customers to teams	Focus people and performance on customer-oriented processes
Excellent governance	Agree a governance constitution that enables local decision-making	Base governance on clear purpose, success criteria, values, and boundaries

↓

How systems need to change to support leadership principles		
Leadership principles	Process changes	Process principles
Enable teams to 'sense-and-respond' to changing markets and customer needs	Implement regular performance reviews that focus on continuous improvement	Make planning and control an inclusive and continuous process
Endow teams with the freedom and capability to act	Reduce rules, management layers, projects, reports and meetings to the minimum	Devolve goal setting to local teams and challenge their ambition
Make teams accountable for continuous improvement against peers and benchmarks	Abandon negotiated fixed targets and budgets	Reward shared success based on relative performance with hindsight
Make strategy everyone's job and encourage innovation at every level	Create a 'draw down' method for teams and fast track approval system to access resources when needed	Make resources available as required to meet the best current opportunities
Focus people and performance on customer-oriented processes	Measure end-to-end process flow and customer outcomes	Use measures to learn and improve and report through trends and abnormalities
Base governance on clear purpose, success criteria, values, and boundaries	Build a company-wide integrated information system with only "one truth"	Make information open and transparent so that everyone can access the same information at the same time

Table 6.5: The logic under the Coherent Model, from Hope et al. (2006)

- more capable people
- more innovation
- more loyal customers
- more ethical reporting
- release of the full potential of management system and tools

The survey presented by Neely et al. (2003) produced “5+1” critical success factors for radical planning and budgeting process re-engineering that can represent *best practice* principles.

Assumption, not opinion-based. It is important to dismiss the budgeting negotiation process and to apply then the forecasting models. These are separated from the financial management system. The models are based on clear assumptions, that were lost in the budgeting process. When the environment and world change, the assumptions will be modified and it is possible to create a new accurate forecast without spending much time.

Lean, not mean. Companies are investing in IT to build a cost and revenue database integrated and accessible through all the units. It will help to have a single view of the company. It will save efforts in running different legacy systems. For the leaders it is possible to review just few key financial measures and not every single line.

Strategically, not financially managed. Better financial performance results from better competitive strategies, and not from better financial management. Investments are managed separately from day-to-day operations. The focus is on non-financial targets measured with strategy-related scorecards. The management is aware of the “action/performance lag”. This prevents the support to continuously short-terms projects that result in wasting a lot of resources and promote conflicts with the long-term plans.

Competition, not budget focused. The comparisons are made with the competition, targets are referenced to external benchmarks, and incentives are focused on beating the competition. No more comparisons with the budget achievement neither with the current performance.

Action, not explanation oriented. The focus is on managing future results without spending too much time for explaining past performance. It is important to forecast and explain possible variances before they occur. The actual results have to be dismissed and the period-end forecast will be used instead. More than everything companies must focus on taking the actions that will really drive the performance, and most of those are not financial.

The extra ingredient. One of the most difficult part is to let all the managers and employees drive in the same direction and understand those principles. No more controls from the head departments about the actual performance and variances. Therefore *trust* between managers and between employees is the key that make those practices possible, otherwise the beyond budget approach will not work.

6.5 Beyond Budgeting tools

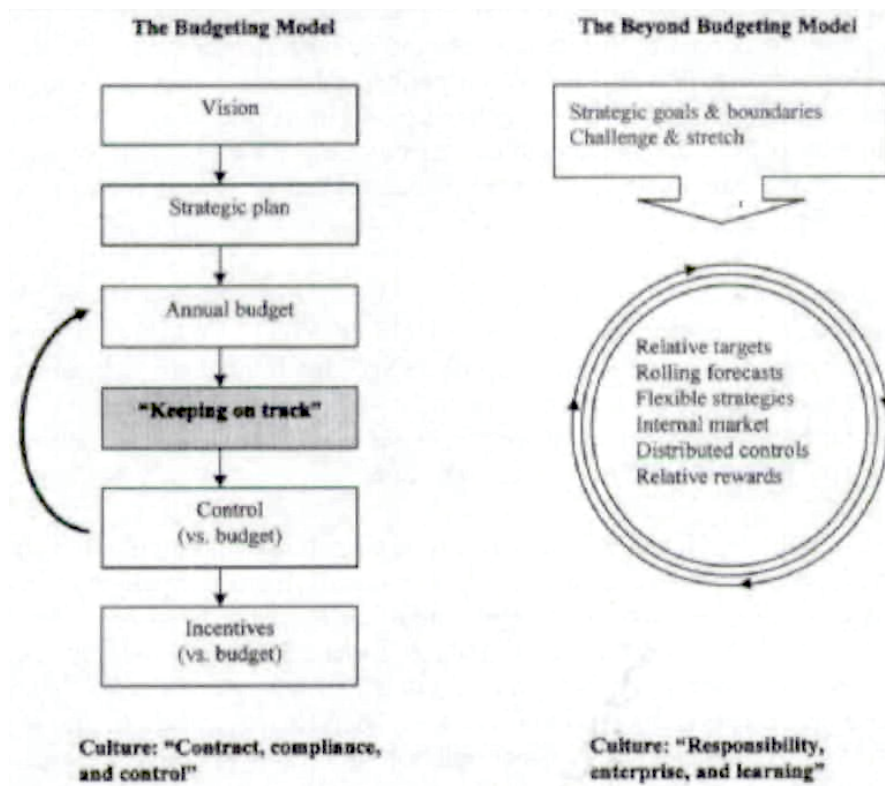


Figure 6.5: Comparison of traditional budgeting model and the beyond budgeting model, from citation 55 (Hope J. and Fraser R.) in Uyar (2009)

Bunce (2007) presents some tools to implement and use Beyond Budgeting practices. Beyond Budgeting is a **decentralized model**, in opposition to the traditional top-down (figure 6.5). Planning becomes an on-going process, it delegates autonomy and responsibility to teams and units, and the sub-units needs (and not the fixed annual budget) drive the resources allocation. The managers have wider discretion in making decisions, so they do not have to deal with bureaucracy

Modern organizations see **financial planning** as a continuous process, driven by *events* (like the launch of a new product or a competitive threat) and *emerging knowledge*. It is based on relevant and *actionable information*, and on responsible people. In continuous change environment it is advisable to perform monthly or quarterly strategic reviews, or perform a review when an important event (positive or negative) happened. The reviews are not time-dependent and they are performed when needed.

The **planning cycle** has four steps: check, aim, plan and act. The figure 6.6 represent the cycle and all the questions to answer at each step. There is no link to the upper management. It is the local team that decide to improve the performance. It is the team that set the goals and prepare a plan to succeed in. **People** are free to make

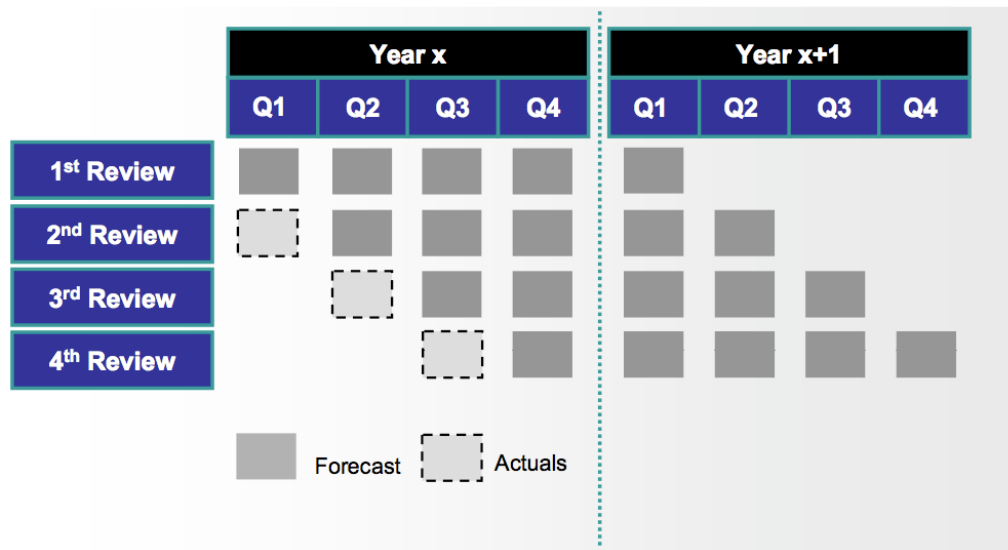


Figure 6.7: A 5-quarters rolling forecast, from Bunce (2007)

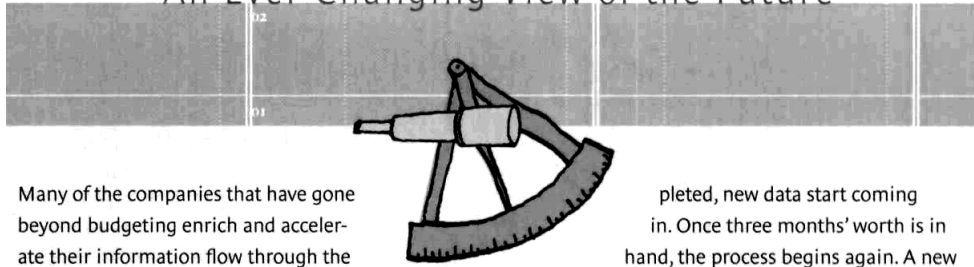
change. Hope and Fraser (2003) in figure 6.8 presents a detailed explanation of the rolling forecasts usage.

Budgets no longer define how resources are allocated, or which business units make and sell, or how the performance of those units and their employees will be evaluated. The **targets** are relative instead of being fixed, and therefore the performance are evaluated on the relative targets as well (figure 6.9). As a consequence, the firm is free from catching the annual fixed performance. Every part of the company is judged on how well its performance compares with its peers' and against world-class benchmarks. With these targets, business units becomes smaller, more numerous and more entrepreneurial. Strategy becomes the basis on which everything starts and it is been judged.

Figure 6.10 presents a graphic where **performance** is plotted over time. The example show that if the current performance will not change, it will be not possible to reach the baseline. If the planned improvements are considered, still a gap is present to get to the goal. The gap can be solved with more improvements and their effects will be present in the future forecasts.

Since the employees in each unit do not know if they reached the targets until the current period is over, they must all the efforts to be sure that they performed better than their peers. The comparison between different groups is obtained through few **key financial measures** (KPI). The **objective** is to continuously improve the unit position until the unit become the "league leader". Hope and Fraser (2003) noticed that, without budgets, alternative goals and measures returned in evidence. Some of them are financial, as *cost-to-income ratios*, and some are non-financial, as *time-to-market*. It is possible to use *operational benchmarks* as metrics based on industrywide best practices. Business units set long-term goals based on benchmarks as *return-on-capital*. The key performance indicators are now the self-regulatory functions of budgets, but they do not

An Ever-Changing View of the Future



Many of the companies that have gone beyond budgeting enrich and accelerate their information flow through the use of rolling forecasts, which are created every three months or so and always cover the same period—typically, five to eight quarters. Because these forecasts are regularly revised, they support managers' ability to fashion strategies that continuously adapt to market conditions.

Rolling forecasts differ from budgets in several ways. They don't envision a fixed "finish line" at the end of the fiscal year when income, costs, and other elements are measured against the budget's (by now) stale targets. They include only a few key variables, such as orders, sales, costs, and capital expenditures, which means they can be compiled relatively easily and quickly, sometimes by a single person in a single day. (Budgets and even conventional budget "updates," by contrast, involve detailed recom compilations of data and require several layers of approval.)

Most important, rolling forecasts are more accurate, for two reasons. First, they are constantly refreshed by the latest estimates of economic trends and customer demand and by emerging data from the most recent quarter. Second, no one has a reason to manipulate or spin the numbers, because there are no fixed profit targets—or penalties for missing them. Anyone who tried would probably fail: Organizations that use rolling forecasts rely on information and control systems that allow everyone in the company to see the same information at the same time.

Here's how rolling forecasts usually work. Let's say that in the middle of March 2003, a company creates a five-quarter forecast that covers the period from the beginning of April 2003 through the end of June 2004. From the moment it is com-

pleted, new data start coming in. Once three months' worth is in hand, the process begins again. A new five-quarter forecast updates the projections for the period covered by the previous forecast and creates a brand-new projection for the quarter farthest in the future, July–September 2004.

Volvo relies on several types of rolling forecasts. Every month, it orders up a "flash" forecast that looks three months ahead, informing managers about current demand and helping them determine whether, for example, price promotions should be introduced or curtailed. Every quarter, a 12-month forecast updates the managers' working assumptions about customer behavior and economic trends. And every year, two additional forecasts—one looking four years ahead, one looking ten years ahead—help managers assess the company's market positioning and determine schedules for phasing out old models and phasing in new ones.

Unlike budget updates, whose forecast period becomes shorter and shorter as the end of the fiscal year approaches, rolling forecasts always look the same distance into the future, allowing the company to see whether performance is on a trajectory to meet goals that are a year or more away. Rolling forecasts enable finance people to collect and manage the cash needed for tax payments and capital expenditures, and they help operational managers estimate capacity and thus plan for expansions or contractions in demand. As managers become more adept at preparing and interpreting rolling forecasts, the CEO is able to anticipate performance changes sooner, thereby improving his or her ability to establish, well ahead of time, realistic expectations in the investment community.

Figure 6.8: How rolling forecasts work, from Hope and Fraser (2003)

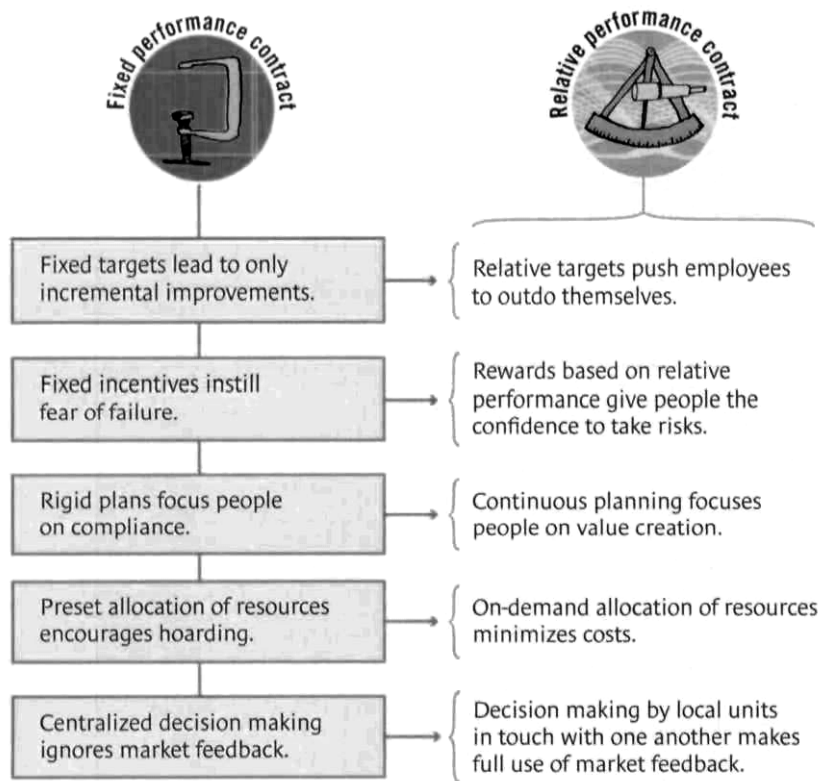


Figure 6.9: The new performance contract, from Hope and Fraser (2003)

have to be extremely precise. The KPI that are used to be measured are:

- profits
- cash flows
- cost ratios
- customer satisfaction
- quality

The *criteria* of measurement are the performance of the peers against internal or external benchmarks, and the results in previous periods.

Figure 6.11 presents a graphic about a KPI. At each review the previous quarter can be compared to the values it was forecasted. This is important because it will help to learn if the forecasting quality is improving and how make it better. More relevant, it will reveal the **changes in the trends** between the actual data and the forecasted ones that need to be explained. The most important communication from the forecast are the *trends*. It is possible to reveal easily any unexpected change when moving average

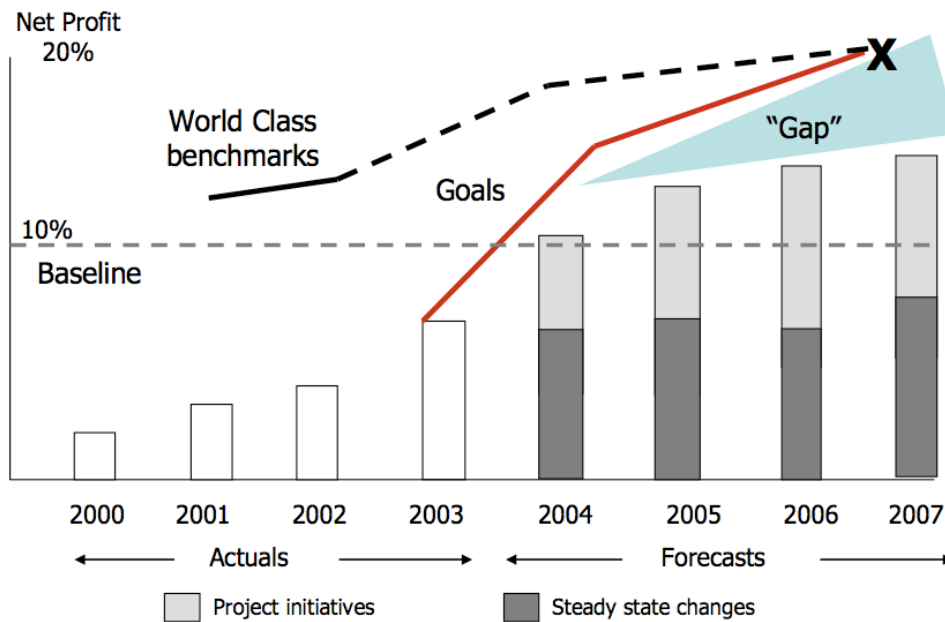


Figure 6.10: Constantly managing performance gaps, from Bunce (2007)

totals (MATs) and actual data are plotted on the same graphic. It is possible to see the progress for the goal achievement. Figure 6.11 presents some noise in the actual data and in the forecast, but MATs allow a more precise analysis.

It is possible to **control costs** providing simple *cost ratios*. Svenka Handelsbank is using *cost-to-income ratio* and *profit* on a monthly basis. The branch managers have the figure of 40% for the cost-to-income ratio. So if the business is growing or reducing they must constantly adjust costs and revenues to remain aligned with the guidelines.

Another possibility to control costs is to give clear indication of the resources trend over medium term, based on the strategic priorities. This can comprehend expenditure directions (for example three years) related to the last twelve months. Is the current spending level following the agreed trend? This can be possible using *ratios* or *moving averages*, like 2% decrease over a period. The business units are responsible for managing their own costs and *making informed decisions*. Costs were tracked on a monthly moving average basis. This rolling system of cost management answers to the most important questions like: are costs under control? Are they moving in the right direction? A rolling process is constantly informing and regulating itself about what is happening.

Planning and decision-making should be devolve to the front-line system. In this way a lot of *information* is filtered by the front-line units and all the really relevant information is forwarded to the top management. This have just to monitor the unit and react if there are patterns and trends that the top management believes dangerous.

Continuous planning and forecasting can only work effectively when the power and the authority is devolved to the front line units. The commitment to improve is inside the local team which utilizes the power of intrinsic motivation, as the McGregor's Theory Y.

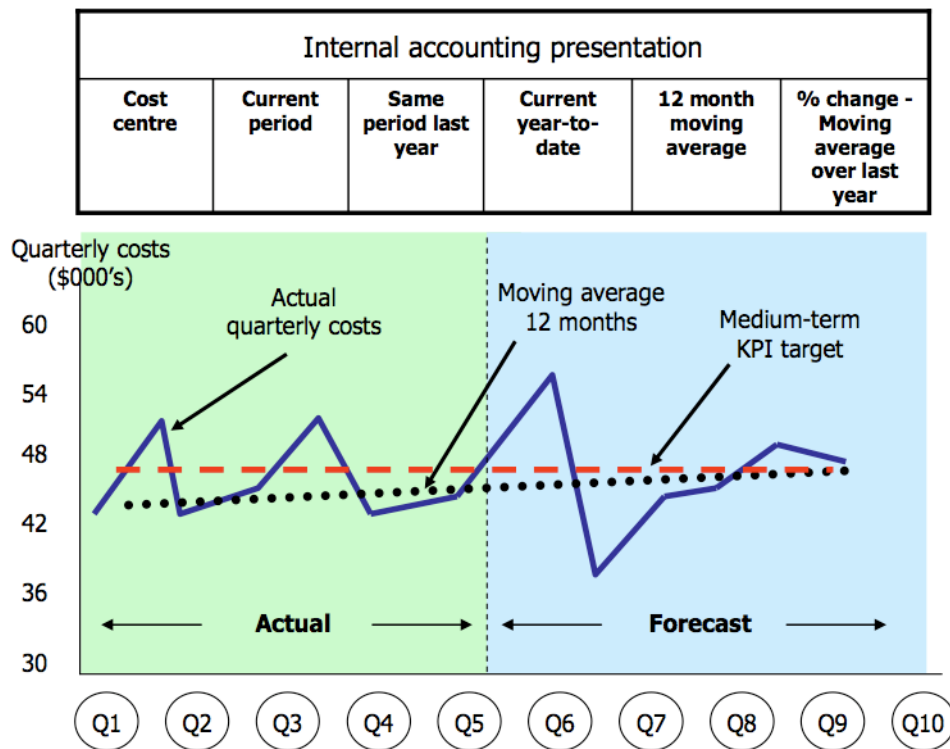


Figure 6.11: Rolling framework, from Bunce (2007)

The role of the corporate center is to design the strategic directions and clear operating guidelines, governance procedures and performance standards. It has a clear monitor role as well.

6.6 Examples of Beyond Budgeting implementation

The first companies to abandon budgets are in Northern Europe, but nowadays Beyond Budgeting is spread out in every countries, industries or cultures. There are banks, petrochemicals companies, distributors, car manufactures, eye-care companies, computer manufactures, telecommunications companies, ball-bearings manufactures, food producers and specialty chemicals companies (Hope and Fraser, 2003).

Neely et al. (2003) presents some example of companies that have abandoned budgeting completely and others are working to arrive at that solution. For the latter group it is possible to cite:

- Shell
- BP
- AstraZeneca

- Ford Motor Company
- Telecom New Zealand
- Electronics and Telecommunication Industry Training Organization (New Zealand)

For the former group:

- Skandia
- ABB
- Ahlsell
- AB Volvo
- Unilever
- Rhodia, a French chemical company
- UBS AG
- BASF-IT Services
- Deutsche Bahn, the German railway company

All those companies quitted the budgeting process a lot of years ago. AB Volvo did it in 1994 and went to a quarterly forecast planning. Ahlsell decided in 1995. For ABB it happened in 1999 and it decided to use a five-quarter quarterly forecasting system and KPIs oriented to control the strategy of free cash flow.

Here it will be presented more specifically the stories about companies that implemented Beyond Budgeting (Neely et al., 2003; Hope and Fraser, 2003; Hope et al., 2006).

UBS Wealth Management and Business Banking

In 2004 they were training their 44.000 employees worldwide to an entrepreneurial and re-engineering their management processes to support Beyond Budgeting. They totally abandoned budgeting “replacing budgets with leadership”. The main goal was to grow in profitability. In the third quarter 2005 UBS Group showed the record annual growth of 71%.

Skandia

This Swedish financial services organization uses in its business units a light budgeting process that focuses just in the high-level budget figures. Then it just applies its own scorecard framework to manage the business. Quarterly bonuses are used to motivate the units and they are granted depending on financial and non-financial facts.

Borealis A/S

It is one of the world's largest polyolefin plastic producer based in Denmark. It abandoned the budget in 1995. Nowadays it uses *rolling forecasts* on a quarterly basis for a rolling five quarters. It takes around just 10 days. Moreover a *balanced scorecard* is the tools settled to control the performance and to motivate the staff from the target setting. Each business unit, site and department has one. This latter process is driven by *external benchmarks* that will bring more information related to fixed costs and non-financial indicators. This will solve the internal negotiation and focusing in what really matters.

Ahlsell

In 1995 this Swedish wholesaler abandoned the budget. In the early 1990s a business crisis struck the company. So it was decided them to centralize warehousing, administration and logistical support while devolving responsibility to large number of profit centers. The headquarters are now communicating general goals. The local teams developed their own way to react to customer demands. The finance staff taught the local unit how to interpret a profit and a loss statement. In this way the employees manage themselves more effectively. The KPI are used to set goals and impose controls. As an example, in the central warehouse the KPIs are: cost per line item, costs as a percentage of stock turnover, stock availability, level of service and turnover rate. For the sales units, instead, they are: profit growth, return on sales, efficiency (as gross profit \div total salary cost) and market share.

Park Nicollet Health Services

Hall (2007) presents the case of Park Nicollet Health Services, a nonprofit integrated care delivery system that includes Park Nicollet Methodist Hospital, Park Nicollet Clinic, Park Nicollet Foundation and Park Nicollet Institute. The organization serves patients, health care professionals, industry and the community.

In 2003 the CEO David Wessner and the CFO David Cook decide to apply the Toyota Production System model and Beyond Budgeting to increase the quality of health care delivery and to reinvest money in the institution. They started with the *lean thinking* initiative, so key performance indicators replace the detailed budgets reports. They set targets for improvement and track actual performance to them. At that moment there was no comparison with a forecasted performance, as it was with budgets and variances. The responsibility was shifted toward the operating units. In 2004 the lean measurement system was in place and data began to be collected. In 2006 no annual budget was prepared.

Now data are collected weekly and posted on a wall board that replicates in summary form data that are mostly hand-generated. Several people keep busy updating this big wall. At the work level, people are trained on 5S, visibility, value stream mapping, spotting the seven wastes, and standard work.

Every Tuesday morning everything comes together at a stand-up meeting of the Kaizen Operating Teams (KOT) from all the operations within Park Nicollet. It happens near the big wall board and every team has six minutes for the presentation and two minutes for Q&A. The report considers progress versus targets for the past week, the kaizen plan for the current week, and any barriers to progress that others may have to help deal with.

For Park Nicollet, dumping the conventional budget means that the health service managers have to do what is needed and look at the budget later, if ever. Actual costs result from people fulfilling their mission using whatever process exists at the time. They can provide better service at lower cost only by developing better processes. Finance needs to manage the cash flow. Once a quarter, the CFO's office updates a six-quarters financial rolling forecast. An annual capital spending budget is planned based on cash flow from the prior year. Only the top operating unit managers get a budget. Senior managers measure the units' performance by key performance indicators. At the service line level only five KPIs are monitored:

- units of service per full-time equivalent (productivity)
- actual cost per unit of service
- margin on units of service
- total expences
- units of service per square foot

Performance is measured by period-by-period improvement from the KPIs.

The CFO David Cooke judges the overall process improvement with a mental ratio:

$$\text{Value} = \frac{\text{Patient-centered outcomes and experience}}{\text{Price and Time}}$$

The main pressure is from peer comparisons. The wall board is open for anyone at Park Nicollet to see. All reports issued disclose the performance of all service lines. No data are secret whether regularly posted or not.

The vice-presidents with several service lines have a top level quarterly performance review in conjunction with each cycle of the rolling forecast. They look at what is changing, give their reports, and present their action plans for the coming quarter and beyond. For longer-term planning, top management reviews performance over the past 12 months every quarter. The CFO prepares five years forecasts, that of course can not be precise but Park Nicollet needs something for anticipating capital projects. None of those projections are used to drive operations. In effect, the budget is not totally eliminated: it is constrained to a high level of aggregation.

The Svenska Handelsbanken case

Lindsay and Libby (2007) present a case study of one of the largest banks in Sweden. In the 1960s the bank decided to become the largest bank in Scandinavia adopting the

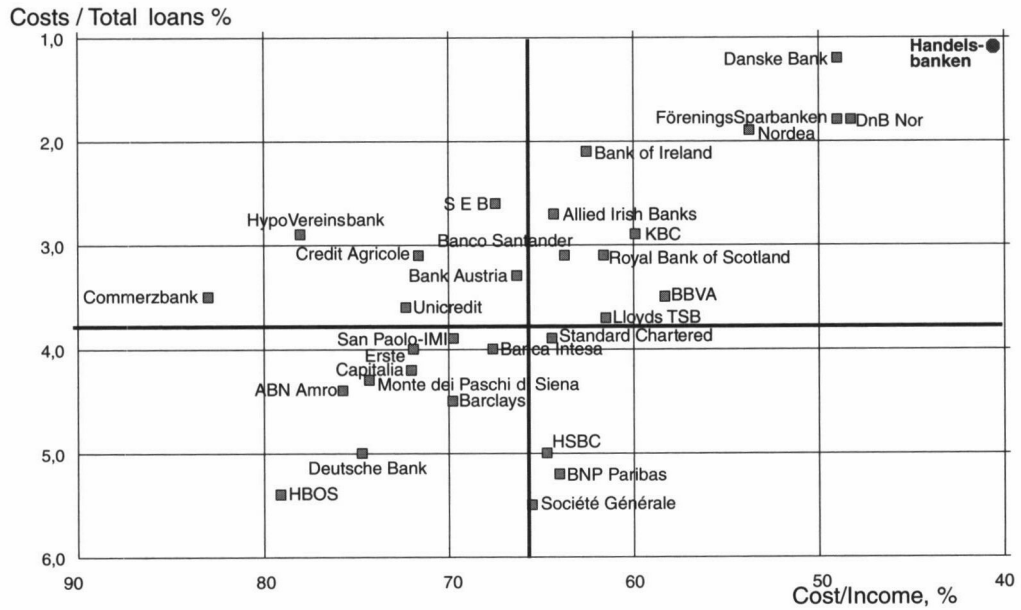
strategy of increasing the business volume. A traditional multi-divisional model was in charge of organizing the company. Budgets were used as the tool to plan, coordinate and manage the capital. The bureaucracy, a large number of small account and increasing marketing expenditures raised the costs by a huge amount. Moreover a the bank was not responsive enough to its customers. A further financial loss struck down Handelsbanken.

Jan Wallander was nominated the new CEO to solve the crisis in the 1970s. He changed the policies drastically and since then the bank managed to grow constantly and eventually it became one of the best in the international market. Some awards received:

- ten best-rated banks in Europe for Moody's
- the only major Swedish bank not to ask for government supporting during the financial crisis in the early 1990s
- world-class performance of the cost/income and cost/total loans ratios (figure 6.12). Moreover it had a lower loan loss ration than its competitors for the last ten years (figure 6.13)
- greatest proportion of satisfied customers (retail and corporate) among large Swedish banks every year since 1991 (source Svenskt Kvalitetsindex)
- one of the lowest employee turnover in the Swedish labor market.
- one of the best ROE (return on equity) for 29 consecutive years. It is one of the most cost efficient universal bank in Europe for the expenses/total assets percentage and cost/income ratio (Uyar, 2009)

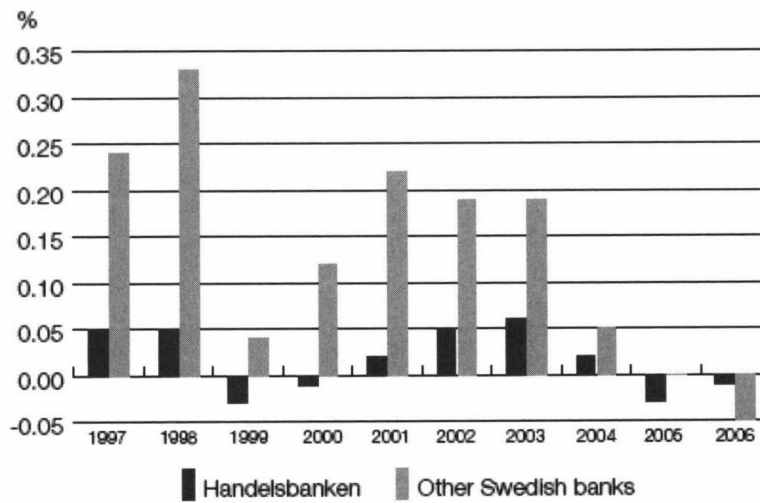
Wallander prepared the document "*Our way*" that describes the new policies to fix the crisis. The overall goal was to be the most profitable of the Nordic banks evaluating the return on equity. The main process involved in the revolution are: radical decentralization, better customer service and lower costs than competitors.

Most of the thoughts of the CEO were influenced by his background. Wallander has been a professional economist in macro-economics forecasting and he has been employed at a bank called Sundsvallsbanken, which operated without budgets. All his view were confirmed in his experience as non-executive director at the Swedish electronics company L.M. Ericsson. His background taught him that budgets' usefulness depended on the validity of the assumptions underlying their construction. Those are of two kind: "the same weather tomorrow as today", that means that a budget can be correct if it is built with the assumption that the management current knowledge is appropriate. The second is "different weather tomorrow" that means that if it possible to rely on the forecast, then the budget will go in the right direction. Wallander believed that "psicologically, it was difficult for humans to perceive that something new was on its way even when, in hindsight, it would be difficult to comprehend how one could have missed the signs". His experience said that forecast are rarely precise, so the only reliable strategy is to be able to make quickly adjustments to the business according to the new needs.



Source: Deutsche Bank, "Running the Numbers," Spring edition. Costs including loan losses, Jan–Dec 2005.

Figure 6.12: Svenska Handelsbanken Cost to Income and Cost to Total Loans Ratios compared to European Universal Banks, from Lindsay and Libby (2007)



Source: Svenska Handelsbanken Annual Report 2006.

Figure 6.13: Loan losses as percentage of lending (1997-2006), from Lindsay and Libby (2007)

The decentralization was based on two principles. First, the employees at the branch level were considered the right people that can take the best decisions in terms of granting loan, setting prices or offering a discount. The branch managers were in the best position to judge the quality of their loans because they know the customers, their changing requirements and their profitability. The branch managers are responsible for the credit risk decisions. The credit risk was managed, not on an portfolio basis, but on the quality of the individual customer. Wallander was very clear about considering more the quality of the lender than sacrificing it for having higher volumes. The central office manages financial risk exposure connected with trading, funding and liquidity. Therefore it was covering interest rate risk, liquidity risk, insurance risk, and foreign exchange risk. All the branches are connected with the central bank's information system and data center. In this way they utilize the same common accounting system. The second principle relies on having capable and committed employees, increasing responsibility and let employees being identified within the branch group.

Planning was devoted to branch managers. The CFO staff prepares each quarter rolling cash forecasts, that were seen by the high managers only if the cash flows were improving or declining. Handelsbanken was not utilizing a formal plan but it relied on informal regular meetings of four-five hours held every month. Banks's IT system facilitated the coordination process.

Wallander thought that beating the competition is one of the concepts inside the performance management process. It is important to resist from the temptation of interfering with the decisions at the branch level. Employees are directly accountable for their performance. The branch is considered to be the whole bank. The final value is thrift: the employees must avoid any expenditure not supported by those policies. The performance measurement occurred every quarter. The bank compared itself to its competitors on *return on equity* basis. Regions were compared using *return on equity* and *cost-to-income ratio*. Each year the best region was awarded a trophy cup. Within each region, branches were compared using the *cost-to-income ratio*, *profit per employee* and *total profitability*. The group controller was able to view branch and regional balance sheet every day. If a branch was underperforming, then the controller could telephone the branch to ask about the situation. This openness made possible checks and balances that are the basis of the decentralization.

Wallander were used to say: "we just communicate to people the average and a ranking that show which branches are above and which are below. The system works on its own. It is this tension between internal competition and cooperative support that enables us to keep improving". People had to be involved in setting their own targets or goals, so to embrace ownership and commitment values. Continuous improvement was the basis for the relative performance measurement system.

Chapter 7

Information visualization design

7.1 History and models of statistical graphics

Friendly (2008) presents a work about the evolution and the usage of statistical graphics. Their modern form appeared in the beginning of 1800 and around 1850 and 1900 they have used in a wide range of topics and in new and creative forms. This has been possible because in those times it was rising statistical theory and the states started to give importance to the systematic data collection.

Information visualization means any technique that make possible to present quantitative and qualitative information in a way that it is possible to see patterns, trends or anomalies that are hard to find using just text and tables. “New graphical methods are proposed to help convey to the eyes an increasingly complex range, size and scope of the data of modern science and statistical analysis.”

Statistical graphics started with the work of William Playfair. In 1786 he invented *line graph* and *bar chart* and in 1801 he invented the *pie chart* and the *circle graph*. Statistical maps started in 1701 when Edmund Hally invented the *isolines*, that are curves of constant value. Baron Charles Dupin improved the map technique introducing the usage of *continuous shading* from light to dark to show the distribution of values.

Friendly (2008) recognizes that in order to achieve this extended production of graphics, there is an infrastructure that made this possible:

- recognition of the importance of systematic data collection by the state
- the rise of statistical theory and statistical thinking
- enabling developments of technology
- inventions of novel methods to portray statistical data

From the figure 7.1 it is possible to recognize what is called “the golden age of graphics” between the 1860 and 1890. It has been a period characterized by great enthusiasm of the statisticians and of government and municipalities as well. The graphic method has been seen as an *universal language* for any science.

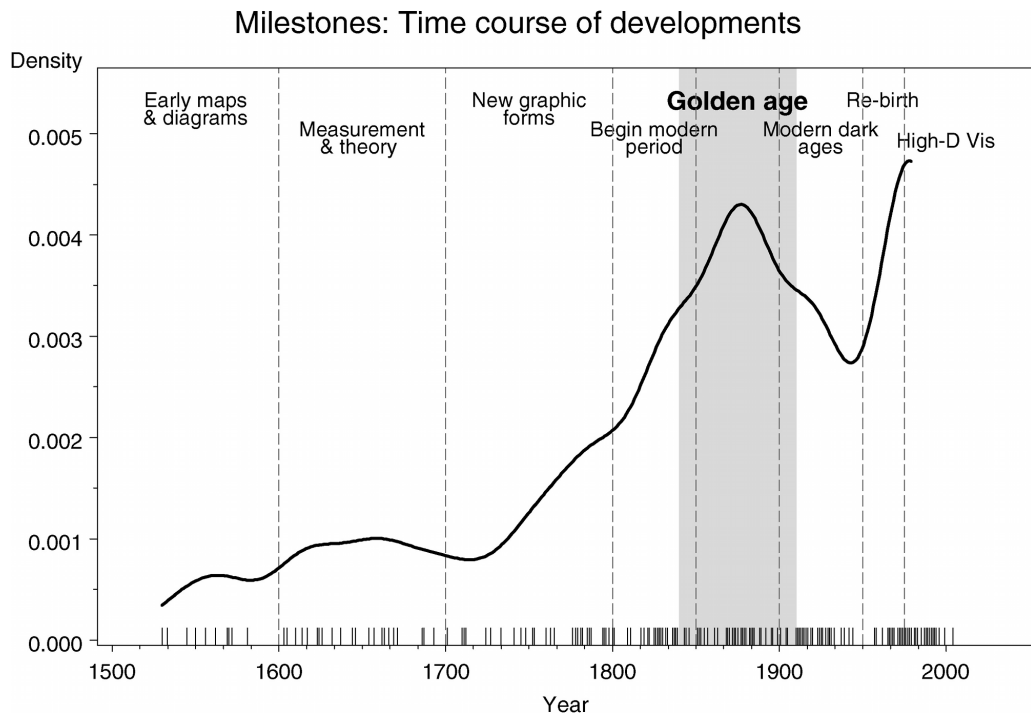


Figure 7.1: The time distribution of events considered milestones in the history of data visualization, shown by a rug plot and density estimate. The density estimate is based on $n=260$ significant events in the history of data visualization from 1500–present, and uses the Sheather–Jones (1991) plug-in estimator for bandwidth selection. In the plot, the density curve is truncated at 1985 to avoid end effects. The developments in the highlighted period, from roughly 1840–1910, comprise the subject this paper seeks to explain (Friendly, 2008).

The word *statistics* has been introduced in practice by Gottfried Achenwall around 1750 to refer to the collection and tabulation of numbers about the state. This word then highlights the interest in data about human populations. In the past, data about births and deaths revealed to the state information about population dynamics and human capital, for example age-related mortality or the possibility to raise an army or how to collect taxes.

In the beginning of the 19th century the interest expanded to more topics, especially crime, social, medical and economic conditions. In the same time a massive tabulation of data started to be collected and consequently the data has been portrayed in graphic forms to better understand the social changes that were happening in those times. For example a *choropleth map* (map in which each area has different tint to depict different degrees) had been adopted to show the level of education and it showed a clear demarcation between north and south France.

The data represented in graphs help to show the *relations* between variables. The scientist John F. W. Herschel developed the idea of the *scatterplot* to make the trend

more evident and to give the chance to predict and interpolate the data.

In the same time, advances in technology, like *lithography*, allowed to produce and reproduce images faster and cheaper. Finally it was possible to use colors in the printing and this allowed color to be used as an important *perceptual feature* on the design of thematic maps and statistical diagrams.

Moreover the a big quantity of statistical data could be collected and summarized effortlessly. For example *graphic recording devices* started to be used in 1800. They were instruments that transform a time-varying phenomenon into a graphic record. Some examples are the *pen-recorders* of temperature and barometric pressure. With this technique it was possible to visualize the maximum and the minimum over time.

As Alexander von Humboldt said in the 1811:

“Whatever relates to extent and quantity may be represented by geometrical figure. Statistical projections which speak to the senses without fatiguing the mind, possess the advantage of fixing the attention on a great number of important facts.”

The graphics introduced can be categorized in three groups:

- statistical graphics
- thematic cartography
- nomograms and graphical calculation

The **statistical graphics** has been driven by an emerging visual language designed to make quantitative data easier to comprehend and to relate each other. The core idea was a graphic comparison between different sets of data over time or space using variation in visual attributes, like length, position, angle or size.

Line graphs have been created to show the changes in economic indicators over time, like national debt, imports or exports. It was possible then to show the differences and relations among multiple time-series.

Comparative bar charts are meant to show relations of discrete series for which no time metric was available.

Pie charts and *circle diagrams* are used to show part-whole relations. More specifically new principles has been introduced:

- angular sector to show part-whole
- diameter to show a total size
- overlapping proportional circles to show relations among three entities

Polar-area diagrams are similar to the pie chart. The latter is a plot in a polar coordinates of (r, θ_i) with constant r and varying θ_i , instead the former is a plot of a cyclic phenomenon (as deaths by months of year or day of week) of (r, θ_i) . The constant angle θ divides the year or week into equal sectors, and the radius r_i is proportional to the

$\sqrt{n_i}$. Therefore the area of each sector represents the frequency or count n_i . An example of this representation is the *coxcomb diagram* in figure 7.2 used by Florence Nightingale in 1858 in her studies about improve sanitary conditions in the British Army.

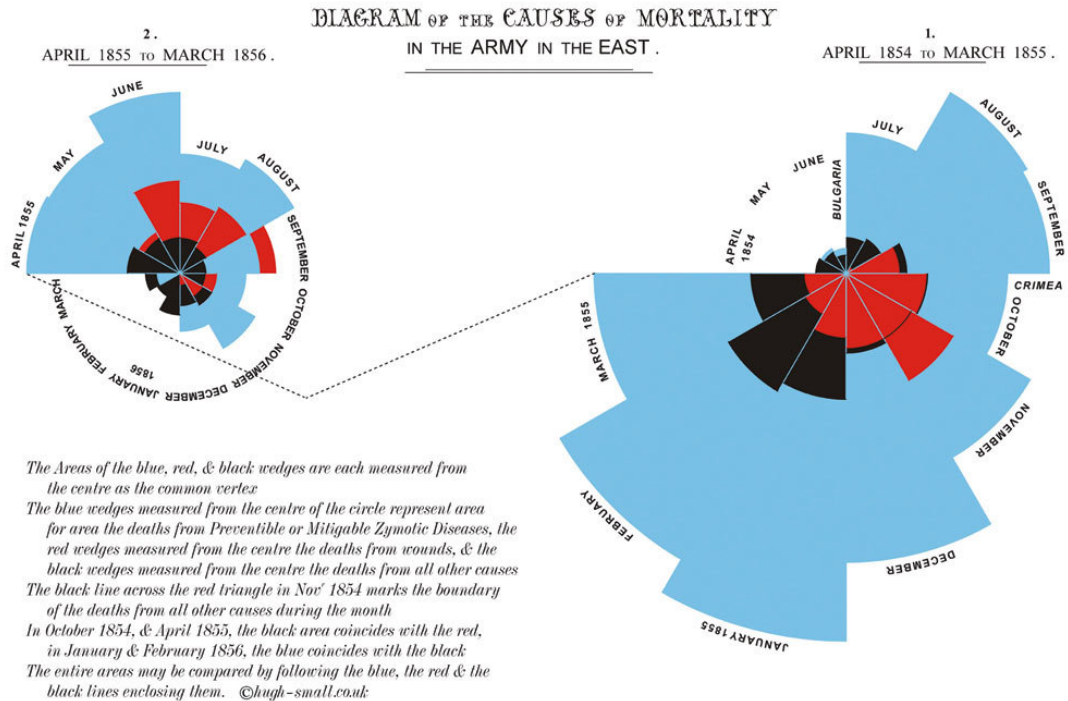


Figure 7.2: Multicomparative polar-area diagrams: Florence Nightingale, “Diagram of the causes of mortality in the army in the east.” For each month, the number of deaths is shown by the area of sectors, distinguished as deaths from preventable diseases (blue), wounds (red) and other causes (black). Left/right: after and before March 1855. Source: Modern reproduction of the image from Nightingale (1858), <http://www.florence-nightingale-avenging-angel.co.uk/> (Friendly, 2008).

The most important goal of **thematic cartography** is to show the intensity of a quantitative phenomenon or density of events on a geo-spatial context. For example there are the *shaded choropleth map* that represents continuous phenomena with abrupt changes across geographical units.

Dot map is a representation of count data with more fine-grain variation. For example a dot is proportional to a given quantity.

Isolines are contours of equal value in a map. They can show a three dimensional phenomenon.

The usage of *symbolism* helps to draw movement or change on a geographical map. *Flow lines* are used to show movements of any traffic in a given direction in the map. Their width is proportional of the quantity of interest.

Nomograms are used then to perform easily complex calculations just using the

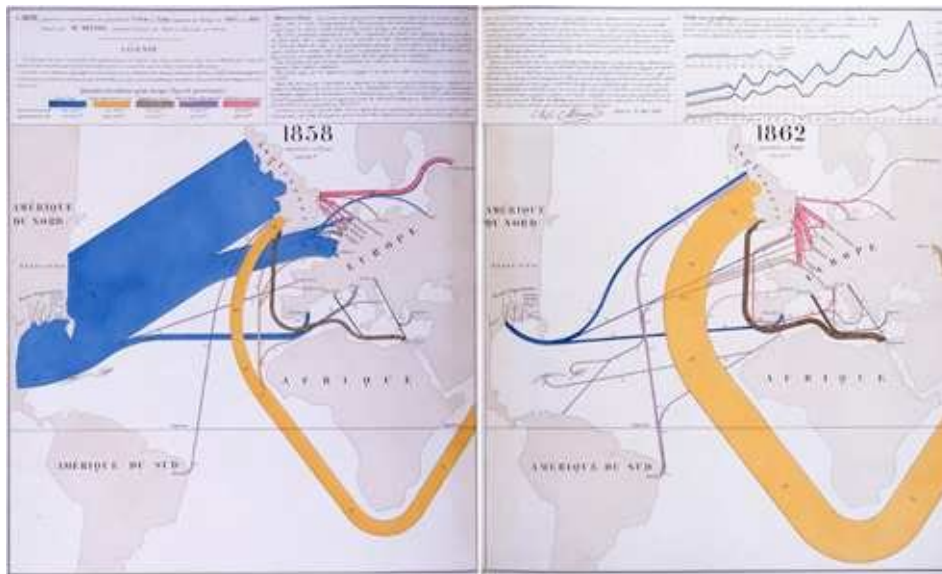


Figure 7.3: Comparative flow maps—effect of U.S. Civil War on trade in cotton. The import of raw cotton to Europe is shown from various sources to destination by colored flow bands of width proportional to the amount of cotton before (left: 1858) and after (right: 1862) the U.S. Civil War. Charles Joseph Minard, *Carte figurative et approximative des quantités de coton en Europe en 1858 et 1862* (1863). Source: ENPC: Fol 10975 (Friendly, 2008).

diagram, a straight-edge ruler and a pencil. For example a mariner can use this diagram to find his position in the anamorphic map.

The Golden Age contributed to the history of statistical graphics in:

- the development of visual thinking
- the role of virtualization in scientific discovery
- graphical excellence

“Any answers depended first on systematic and reliable data, and second on the ability to find coherent patterns in the data that could contribute to a general understanding of the forces at play.” (Francis Galton cited in Friendly (2008)).

Trellis display is design to allow comparisons of the rows and columns. Figure 7.4 is an example. The years are indicated on the rows and the months are on the columns. Each star diagram presents daily attendance by the length of the ray. The yellow colour represents paid entrance and the black for free admissions.

Bilateral histogram is a graphic designed to show two frequency distributions back-to-back. Figure 7.6 is an example. If the classification is base on age, then they are called *age pyramid*.

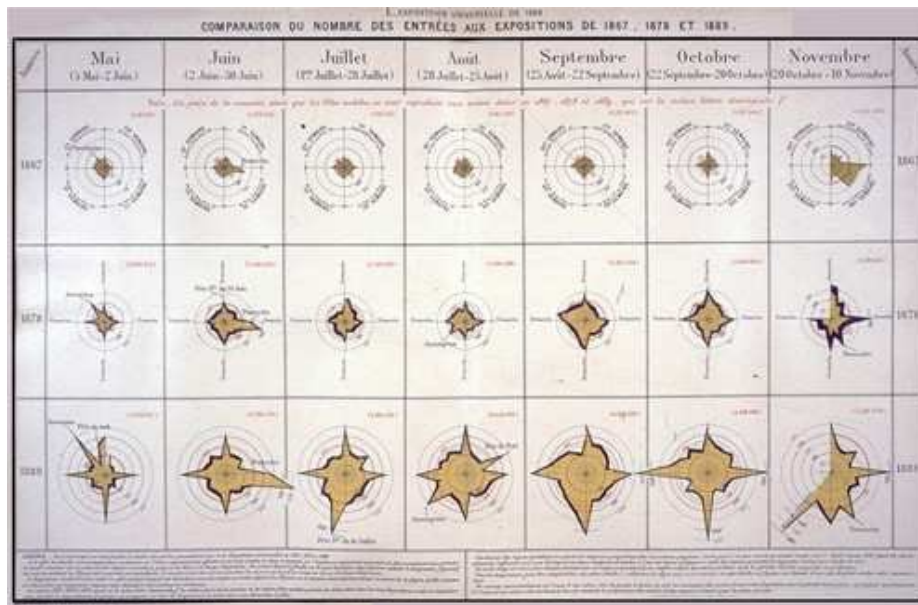


Figure 7.4: Two-way star/radar diagrams. “Comparison of the Numbers Attending the Expositions of 1867, 1878 and 1889” (Exposition Universel le de 1889: Comparaison du Nombre des Entrées aux Expositions de 1867, 1878 et 1889). Each star-shaped figure shows the number of paid entrants on each day of the month by the length of the radial dimension. Source: Album de Statistique Graphique, 1889, Plate 21 (Friendly, 2008).

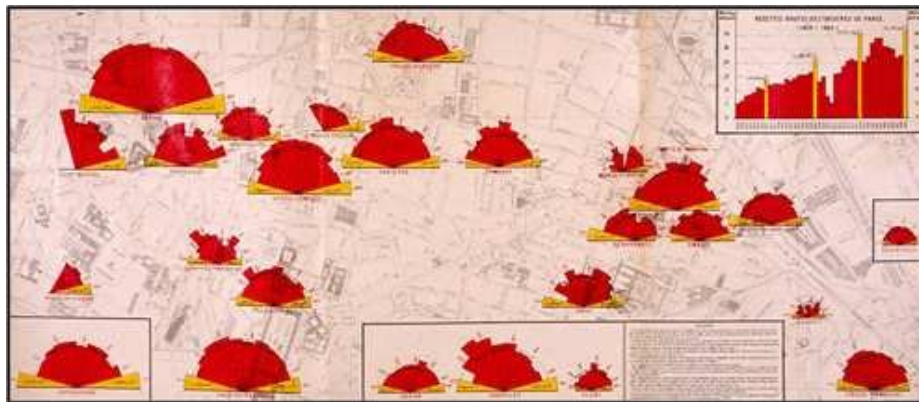


Figure 7.5: Polar-area diagrams. “Gross receipts of theaters in Paris from 1878 to 1889” (Exposition Universel le de 1889: Recettes brutes des théâtres et spectacles de Paris 1878 à 1889). Each diagram uses sectors of length proportional to the receipts at a given theater in each year from 1878 to 1889, highlighting the values for the years of the Universal Expositions in yellow. Source: Album de Statistique Graphique, 1889, Plate 26 (Friendly, 2008).

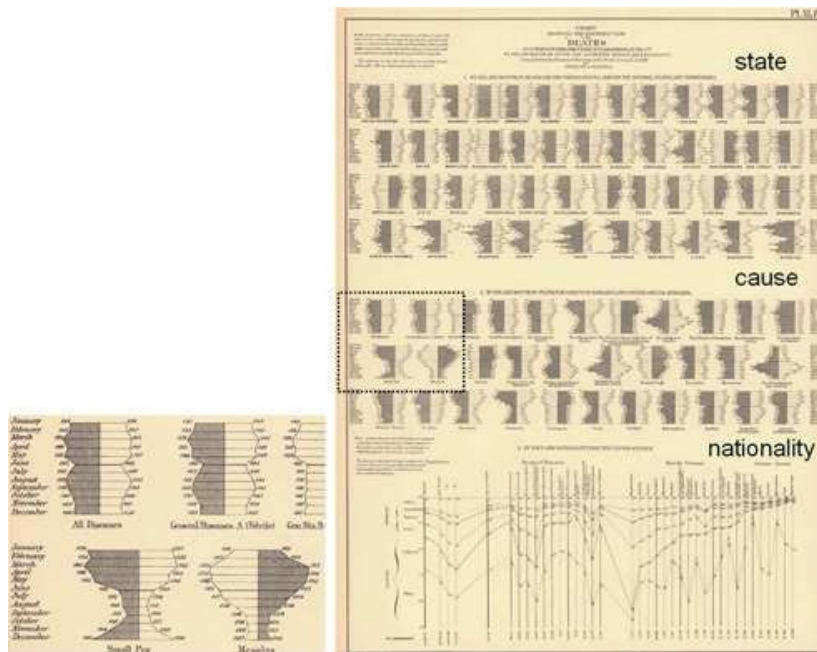


Figure 7.6: Bilateral histograms: “Chart showing the distribution of deaths... by sex and month of death and according to race and nationality.” Left: detail from causes of death; right: full plate, with labels for the three sections added. Source: Statistical Atlas of the United States, 1874, Plate 44 (Friendly, 2008).

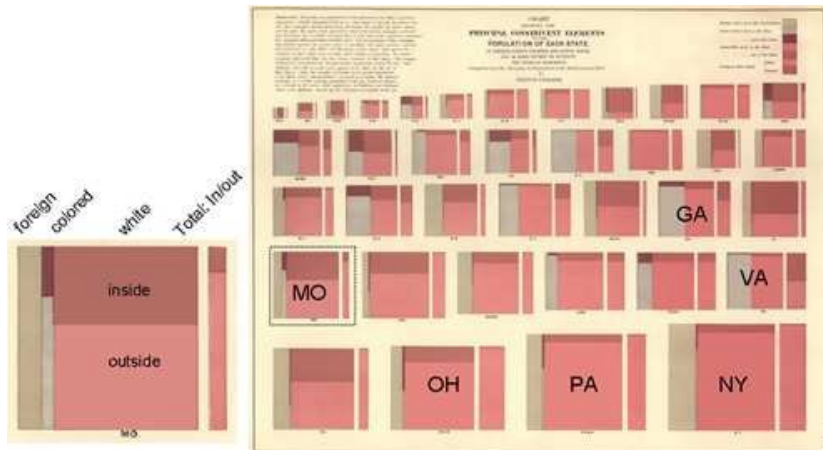


Figure 7.7: Mosaics/treemaps: Francis Walker, “Chart showing the principal constituents of each state” (1874). Left: detail for Missouri; right: full plate, with annotated labels added. Source: Statistical Atlas of the United States, 1874, Plate 20 (Friendly, 2008).

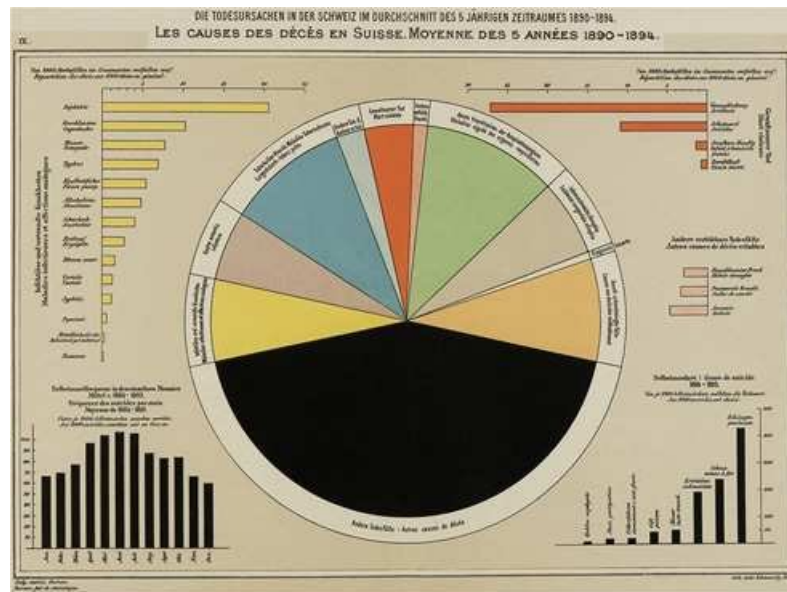


Figure 7.8: Color-linked pie and bar charts: Swiss Statistical Office, “Causes of Death in Switzerland, Average of 5 Years, 1890–1894” (Les causes des décès en Suisse Moyenne des 5 années 1890–1894). Some of the causes shown in the pie chart are color-linked to decompositions shown in the bar charts. Source: Private collection, Switzerland Graphical Statistical Atlas, 1897, Plate 9 (Friendly, 2008).

Mosaic diagrams or *treemaps* highlight the relative sizes of the different elements. Figure 7.7 in an example.

Figure 7.8 is one of the first examples of linking separate displays by a perceptual attribute. In that case, the attribute is the color of the pie slices in a similar manner of what today it is called *drill-down* to show finer details.

All those graphical methods provided new insights, discoveries and theories in astronomy, physics, biology and other natural sciences.

Around 1950 and 1970 the statistical graphics rose again and new graphical methods appeared like *metroglyphs*, *star plots*, *fourfold circular displays for 2×2 tables of counts*, *mosaic displays*, *parallel coordinates plots* and *clustered heatmaps*.

7.2 Theoretical foundation for visualization

Visualization represents the human mental process of developing mental images, but recently it is used to comprehend all the activities that can improve that mental process. The human eyes have the unique characteristic of analyzing quickly a series of visual cues. On the other side computers can manage a big amount of digital information.

Information visualization has been coined by George G. Robertson to indicate the presentation of abstract information through a visual interface. It is made possible by

technologies aiming at interactivity and animation, dynamic query thorough interface and layout algorithms on a computer screen.

Zhu and Chen (2008) explain what are the theoretical foundations for the visualization. **Cognitive capacity** determines the possibility for a person to succeed in a complex task. It consists of two elements: working memory and long-term memory. When the visual information arrives, the working memory stores it in a temporary visual storage area called iconic memory. It stays there for less than a second and then is read by the working memory. This memory takes the information from the icon memory and from the long-term memory with the aim of solving a selected problem. All the pending talks use this memory and their outcomes are affected by the working memory span.

Long term memory saves information related to the experiences happened in the whole life extension. It can be represented as a network of linked concepts where the domain knowledge is situated. An adequate long-term memory is what people need to accomplish tasks efficiently and effectively.

Human eyes can process visual cues in a parallel way. This make possible then to use visualization to improve working memory and long-term memory in two possible ways: memory extension and visual cognition extension. “The high bandwidth of visual input enables working memory to load external information at the same speed as loading internal memory.” In this way visualization can be seen as external memory and it will save more space in the working memory.

Visualization can help in the internal computation because it makes solution perceivable. In this way **visualization reduces the cognitive load of mental reasoning** and mental image construction necessary for certain tasks. A visual interface can ease a cognition extension. In this way “visualization could convert a required conceptual process by mental inference into a perceptual process requiring less cognitive effort” (Zhu and Chen, 2008).

Each individual uses working memory in his own way to solve tasks and this is caused by how a concept network is built in long-term memory. *Proximity* can be used to express semantic relationships among concepts.

7.3 Information visualization for decision support

It is interesting to understand the relationship between the type of individual decision-making tasks and the type of visualization technologies. It is possible to improve the decision-making process by reducing the uncertainty in the process. In turn this is possible when the information is available and the decision maker has the skills to process the available information. This implies that if the amount of information is too big and not manageable, the decision maker’s cognitive system is going to be overloaded. This can be solved by a visual representation of the information.

“A decision-making process usually includes the acquisition of related information, the construction of a mental representation of the problem and solutions, and the identification of an optimal solution” (Zhu and Chen, 2008). The visualization can help

in each processes, identifying trend and summarizing information or extending working memory and cognition. In any case, the visualization improvement is task-specific. However the visualization support is really effective when it is consistent with the decision maker's mental representation of the problem. This because a decision is the result of the interaction between the decision maker's skills, the type of the decision task and visualization of the problem space. There is not an universal representation that fits to all the problems.

There are four different approaches that the decision maker can use to evaluate the alternatives:

- the analytical approach
- the bargaining approach
- the subjective approach
- the judgmental approach

The bargaining approach is applied when the decision maker need to create consensus among stakeholders. Since the focus is supporting decision making at individual level, all the others approach will be considered.

The **analytical approach** is a well-structured decision task. The decision maker interact with a mathematical model seeking answers to his "what-if" analysis. The visualization can transform the interaction between the decision maker and the mathematical model from a conceptual process to a simpler perceptual process. A first solution can visualize graphically the results of the mathematical formula to define easily the optimal solutions. This implies that the decision maker has a minimum knowledge about the mathematical model. If this is not the case or the model is too complex, it is possible to visualize the model itself so it can be easier to understand and interact with it. An example can be a trade-off decision problem between different goals.

The **subjective approach** is considered when the decision maker have to take subjective conclusions. It has to be possible to use archive data, consult experts or evaluate users' opinion for subjective inferences. *Treemaps* and *hyperbolic trees* are the visualization technologies more used for those intents.

Finally **judgmental approach** is involved the the decisions are taken intuitively. The optimal solutions are found on the previous experience, domain knowledge and awareness of the situation. So the visualization has a marginal role in the process but it can still provide some help facilitating the comprehension of the domain knowledge and enhancing the awareness of situations.

7.4 Information visualization technologies

The information visualized can be structured or unstructured. The structured information is represented in numerical format and so it is easier to be managed directly within computer software. The unstructured information instead requires a process before been

processed inside the computer: the *information analysis*. This process fulfill the need of filtering the information to be displayed on the computer screen that will help to better extract the structures from the unstructured information. This is even more important when a manual pre-processing is not possible, for example when there is too much data.

Structured and unstructured information visualizations have in common two technique: *mapping abstract information* with visual representation and *user-interface interactions* to better interact with the information.

The **information analysis** is divided in two stages. The *indexing stage* tries to extract the semantic structure of information that will be impossible to extract manually. Pre-processin algorithms, like automating indexing and information extraction are used for the task. As a best practice it is possible to combine human-created rules with machine learning algorithms (neural networks, decision trees, Hidden Markov Model, entropy maximization). The *analysis stage* tries to find embedded patterns. In a supervised learning process, it is possible to make a classification in predefined categories. It is possible to use naive bayesian method, k-nearest neighbor and network models. In a unsupervised learning, it is possible to cluster categories dynamically based on their similarities. It is possible to use Kohonen's self-organizing map (SOM), multidimensional scaling (MDS), k-nearest neighbor method, Ward's algorithm and k-means algorithm.

The **information representation** technologies "map abstract semantic structures into visual objects that can be displayed on a computer screen". Possible structures are:

- 1D
- 2D
- 3D
- multi-dimension
- tree
- network
- temporal

The user can understand the information the developer wants to provide only if the visual structure is appropriate for the semantic structure. As an example, a tree structure presents better the hierarchical relationships and a network structure has a better result for complex relationships.

Different algorithms can map a semantic structure in the same visual structure. For example the hierarchical relationship can be mapped in a tree structure in three different visualization strictures:

- tree map
- cone tree system
- hyperbolic tree

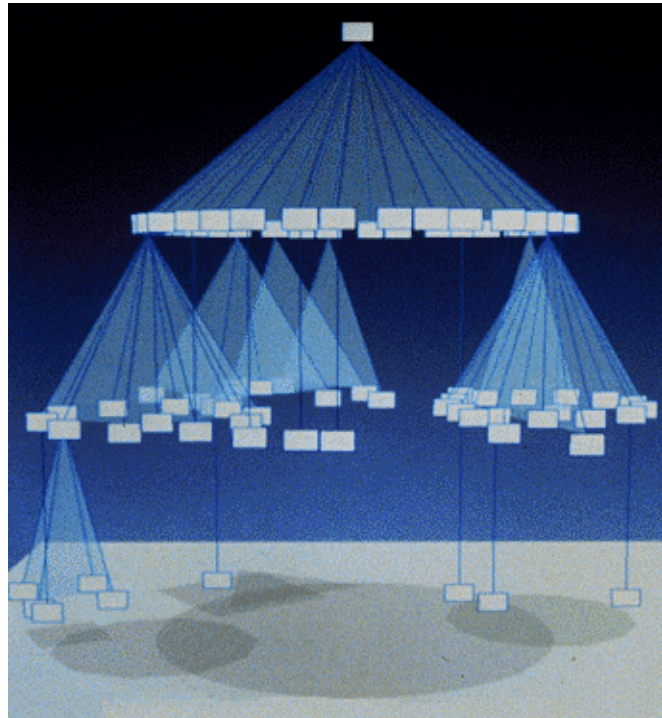


Figure 7.9: A 3D cone tree, from Robertson G., Mackinlay J. and Card S. 1991. *Cone Trees: animated 3D visualizations of hierarchical information*. Proceedings of the SIGCHI conference on Human factors in computing systems. pp. 189-194

It is important to promote pattern recognition in the information visualization. Color, size, shape or texture can be the visual cues inside the visual structures. This visual cues has to be appropriate to human perception attitude. It is important to consider the “small screen problem”. A computer or a mobile device screen can be not large enough to present all the information required. It is important then that the representation method is design considering the **user-interface interaction** in order to be more effective. The main goals are to interact directly with the object displayed and to select which object to display. There are six interface functionalities:

- overview
- zoom
- filtering
- detail on demand
- relate
- history

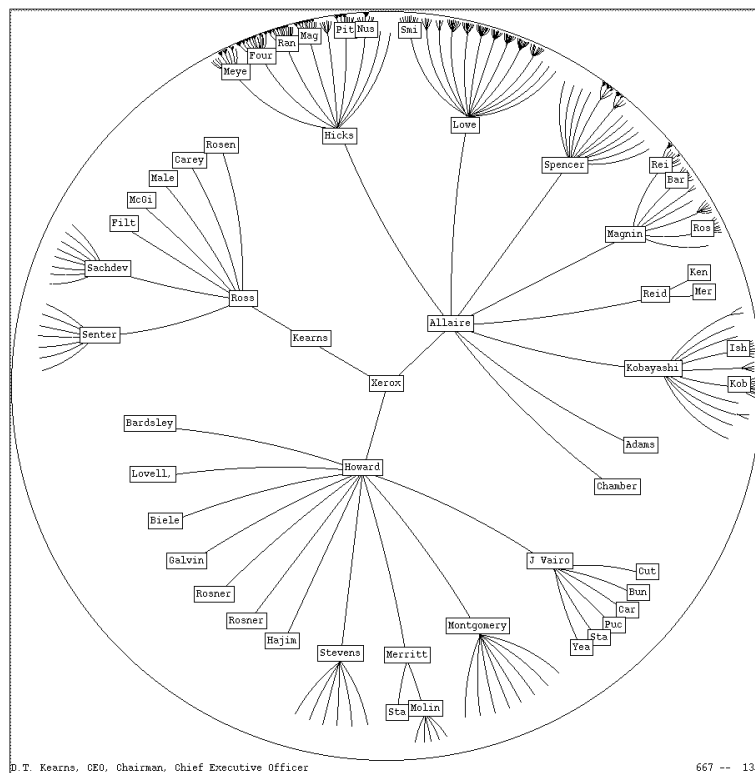


Figure 7.10: An hyperbolic tree, from Lamping J., Rao R., and Pirolli P. 1995. *A Focus+Context Technique Based on Hyperbolic Geometry for Visualizing Large Hierarchies*. Proceedings of the SIGCHI conference on Human factors in computing systems.

There are two main interaction approaches:

- overview + detail
- focus + context

Overview + detail displays different views: at first an overview that can help the user to visualize general patterns. Then it is possible to display detailed views depending on what the user is interested in. It is possible to use then two different zooms. A spatial zooming enlarges spatially the selected objects and, on the other side, the semantic zooming adds more content to the selected object changing the appearance.

Focus + context displays detail and overview in a dynamic way in the same view. Some examples are:

- information landscape
- cone tree
- fisheye view

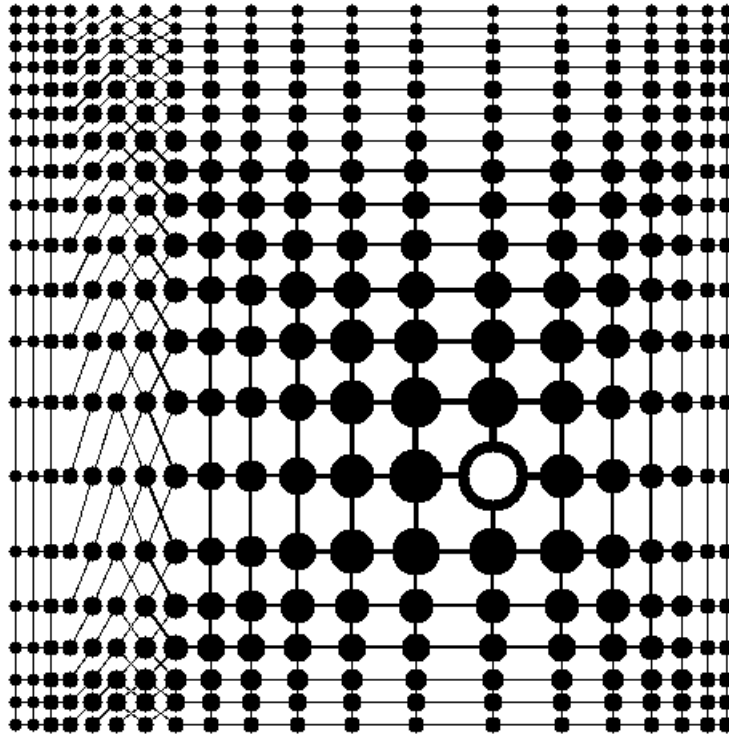


Figure 7.11: A fish-eye view, from Sarkar M. and Brown M. H. 1992. *Graphical Fisheye Views of Graphs*. Proceedings of the SIGCHI conference on Human factors in computing systems.

- hyperbolic tree
- filtering
- highlighting
- selective aggregation

The main idea is to provide in the same time neighboring information with less amount of details and then display more details on the selected region.

Figure 7.12 represents a *treemap* technique for **financial information**. More than 500 stocks in the market are represented at the same time. The stocks are grouped by main sector. The size of a stock represents its market capitalization. It is represented the change direction of the stock price. The red and green represent decreases and increases in the stock price. The color hue indicates the range of the change. Moreover it is indicated that there are more news about a specific stock when a “N” is present.

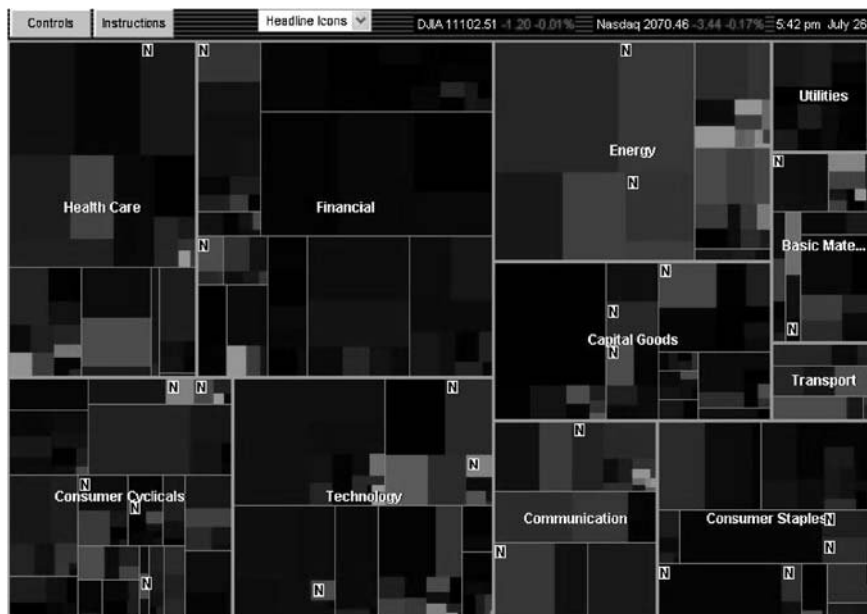


Figure 7.12: Using the Treemap to support financial decision making, adopted from www.smartmoney.com (Zhu and Chen, 2008).

Chapter 8

MyBudget 2.0 design

8.1 The artifacts derived from the knowledge base

The retail banks' profile and utility

- the main concept of a bank is borrowing and savings. The main resource of a modern bank is borrowed money
- more banks are compatible with a possible “budgeting interface” (commercial, savings, retail banks)
- online banking is a possible channel
- criterion of relationship specificity and information asymmetry
- in Europe new typology of bank as supermarkets (ICA Bank)
- banks going in non traditional banking business
- barrier in the retail markets for the european integration because of trust and confidence
- BASEL II legislation
- pro-cyclical characteristics of lending too much in good times and too less in bad times
- banks' grow from non interest sources
- endogenous costs (technology), horizontal-vertical product differentiation
- relationship banking: the provision of financial services repeatedly to the same customer.
- inter-bank competition for loans and capital market. Prisoner's dilemma

- borrowers with multiple banks
- operational inefficiencies
- profit oriented banks focus on wealthy customers
- technology that reduces the costs associated with the collection storage and processing of information
- consumer friendly financial services
- efficiency vs effectiveness for the banks
- customers as vendors (suppliers of money)
- Theory Y and customer seen as self-achieving individual
- specific function that make optimal financial decisions and become self-actualizing
- 7 psychological needs
- CRM
- dual creation of firm and customer value (win-win)
- equity resides in the mind of the customers
- customer data
- customer knowledge
- from the b2b literature
- measures as customer lifetime value, acquisition and retention costs
- market segmentation
- fairness and trust, consumer can distort the data
- collect information at the time of transition
- think knowledge
- customer portfolio management
- the measures are present in other subjects as Supply Chain Management
- it is possible to consider latent class segmentation schemes
- self-service
- replicate the mind of the customers

- customer equity
- lifestyle of the customer
- affective commitment of the customer is the stronger!!!
- Sweden and Scandinavia
- internet banking leaders and technology
- from a global perspective the Nordic countries are very much alike
- market oriented as the USA
- leader in technology of customer focus
- market driven
- market industry organized in a number of industry alliances through firms are able to pool technology components, applications and knowledge
- 85% of the banks offer internet banking
- provide some personalization of the technology of the non first-movers
- willingness to cannibalize
- Swedish banks in particular seem to indicate a customer focus
- customer driven design

The consumers' profile and utility

- four types of savers: cash managers, wealth managers, buffer savers, goal-directed savers
- apprehend the universe of their representation
- fragile borrowers
- accumulating savers
- prudent households
- prodigal households
- 2 dimensions: credit and savings
- credit card
- behavioral economics

- being able to manage money
- keeping track of finance
- planning ahead
- making informed decisions about financial products
- staying up to date about financial matters
- procrastination
- loss aversion
- regret aversion
- mental accounting
- status quo bias
- the curse of knowledge
- debiasing
- it is possible to select the most relevant a possible to trace defects
- cognitive efforts
- neuroeconomics as the bases
- privacy and trust
- trustworthiness

The firms' budget management process

- Beyond Budgeting technique as reference because it is the cutting edge best practice
- compatible with TheoryY of the financial services
- rolling forecast
- KPIs
- trends

The information visualization

- to prevent the cognitive stress
- the values for which the information visualization design was born
- visual thinking
- list of the possible graphs
- information visualization for decision support
- promote pattern recognition

8.2 The design

Porter and Millar (1985) in their work explain the importance of the information and the information systems in the industry structures and in the competitive advantage. Among all the examples, they consider banking and insurance among the most information intensive industries. They have high information technology content in both product and process. IT can modify each of the five competitive forces and it creates then the need and the opportunity of change. “Information technologies requiring large investments in complex software have raised the barriers to entry. For example, banks competing in cash management services for corporate clients now need advanced software to give customer on-line account information” (Porter and Millar, 1985).

To select the topics on which have focus, it has been drawn a map between the processes in the bank environment and the possible processes of the customers. The main processes selected for the bank are the **CRM** and the **financial services**. For the customers, the main aspects are a **behavioral economic** analysis and a selection of **best practices for budgeting**. These elements are considered relevant because they interface each between the two entities.

Moreover, deepening the research on behavioral economics, it is possible to achieve the key point of view: **neuroeconomics**. This scientific branch is analyzing how our brain answer the external economical information. For the example they discovered that the *amygdala* answer to the money loss condition. It has been mapped all human brain and the result is that our behavior is driven by the *hardwired* connections in the brain. Our rational side is suffering for the hardwire connections, that actually are configured from an ancient survive conditions.

Moreover again the behavioral economics analysis highlighted the importance of the cognitive system. It is a part of our brain that requires a lot of resources to work. That means that the cognitive system can switch off if the task requires too much complex. The outcome is that the human being stops to reason rationally.

It is important to let the customer use the visual system, that is a very powerful system and often it is underused. Therefore it is advisable to use graphical representation of the economic information. This will help the non technical people to better understand their economic situation. So there will be a analysis of the typology of graphs.

A very important asset for the banks is the **trust** they receive from the customers. This link has to be protected so the bank will not lose value. The same thing hold for the bank's **internet technologies** as the *e-banking*. Technologies have to be easy to use and facilitate the communication between bank and customers.

As a design of possible new solutions, it has been chosen to borrow the best practices of budgeting from the literature about companies, and then modified them to comply the common customers' needs. A research has been conducted on the best practices for **budgeting**. Surprisingly, all the practices are seen as outdated. A recent group BBRT is promoting the **Beyond Budgeting** practices. Those are base on the management **Theory Y** opposed to Theory X. In this theory the humankind is not seen as lazy and without the will to work (so the manager have to push in this direction), instead it is seen as if the manager gives the responsibilities, than the worker can work better. There will not be any strangling budget to stick to. But a series of practices in the company will give commitment for the workers. It is possible to suggest a similar processes between bank and customer to give a good pressure to the customer to give the opportunity to improve their money spending.

Based on the Theory Y, **Maslow's hierarchy of needs** describe the ladder of needs. This could help to give a graphical representation for the budgeting.

On the financial side, it is possible to give a **value to the quality of budgeting** practices of the customers. It could be used in the loan granting processes.

Business Intelligence and **Decision Support Systems** as the technology solutions that will make possible the prototype.

As a result of the integration of the customers' budgeting process into the bank's processes, it is possible to use all the acquired information as in **Supply Chain Management**.

Concrete budgeting

Concrete budgeting is a project derived from the *eRationality*¹ research group inside the Massachusetts Institute of Technology. Dan Ariely guided the research in both the works of Caballero (2008) and Krumme et al. (2009). They represents projects with a smaller vision, more directed to evaluate how behavioral economics can be integrated in a software. Figure 8.1 suggests how the customer can manage two (or many) goals. Figure 8.2 and 8.3 promote a way to represent graphically the information of debt or goals.

MyBudget 2.0

Figure 8.4 represents a possible interpretation of the interface for the customer.

It is possible to explain the potentials of this tools using the metaphor of the *shared whiteboard*. At first the customer writes on his MyBudget whiteboard all his important information, like his categories (that correspond to his mental accounting) or his saving

¹<http://erationality.media.mit.edu/>



Figure 8.1: Goals trade-off, from Caballero (2008)

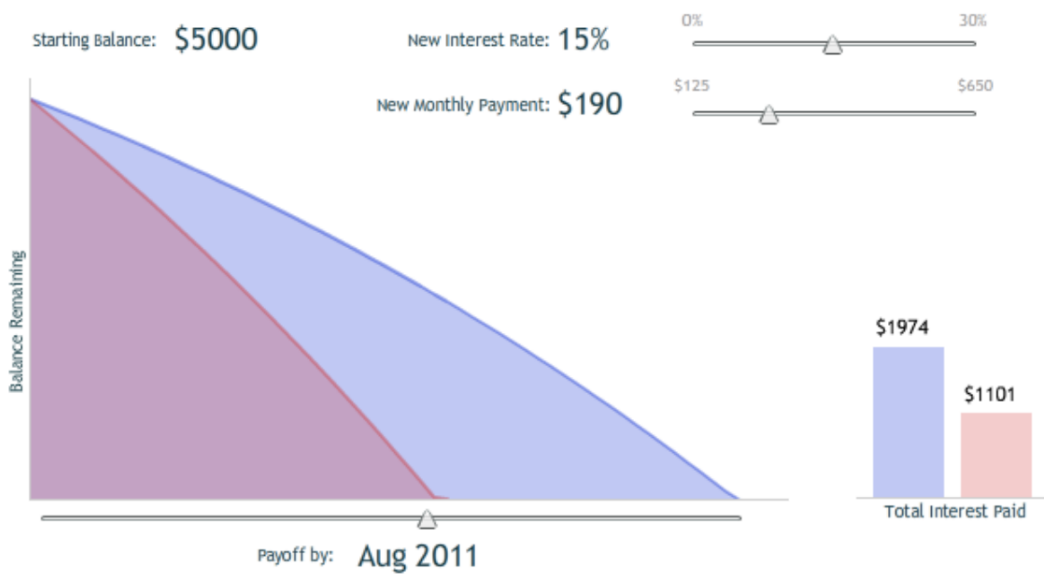


Figure 8.2: Credit card debt calculator, from Krumme et al. (2009)

goals. On the other side the bank can read and take in consideration this information to perform customer segmentation or to organize the bank's cash flow or credit risk.

In MyBudget 2.0 each feature has to have a "double value" function. For example a time graph can help the customer to see his own spending behavior and a function

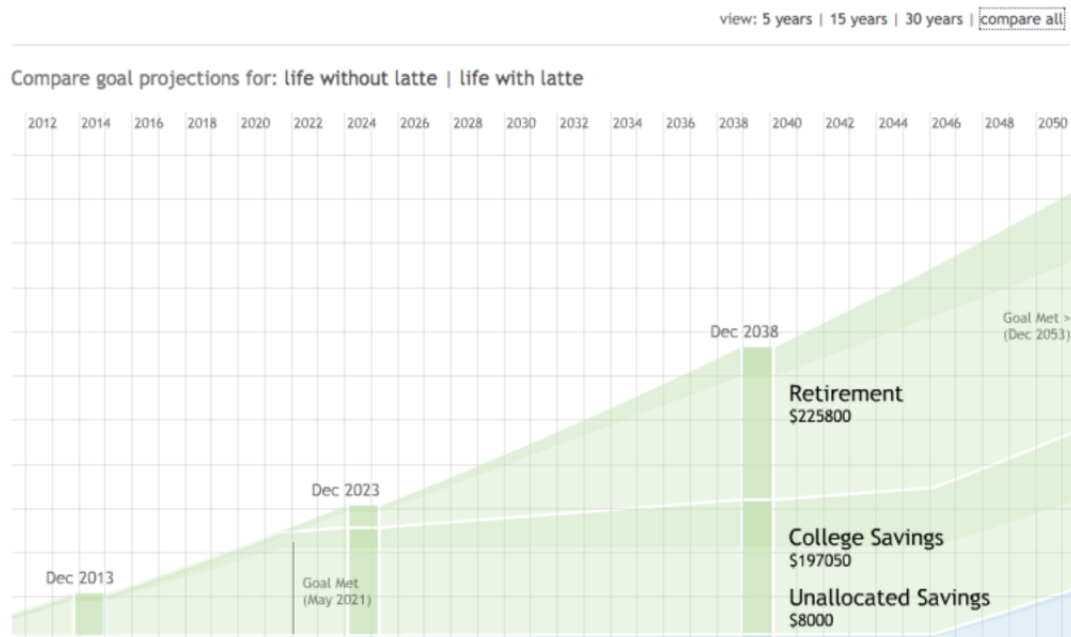


Figure 8.3: Goals projections, from Krumme et al. (2009)

“zoom in - zoom out” can support a deeper analysis. On the bank side, it is possible to trace how many times the customer’s zooms and which is the horizon he prefers (short time, long time). In this way it is possible to trace how strong is his *time discount*.

Another example is the “saving money for a goal” part of the software. It is possible to provide a section where the user can select and drag the amount of money he wants to put in “locked” virtual boxes. When he decides the amount, then he has to press a button to make effective the transfer in the box. It is not only a virtual metaphor, but it is a psychological help for him to be forced not to use those money. He can decide for how long he cannot take the money (1-3-6-9-12 months for example). In the other side the banks knows that they can use that money for that amount of time.

This function is interesting in a customer-driven business. In this way the bank knows for how long the customer will not withdraw his money, therefore the bank can use them for other purposes.

It is important to conceive MyBudget in a shared way between the single bank’s customers. A shared vision permit to collect many information from the customers and then share them bank to support them in their own budgeting process. For example it is possible to collect KPIs like “cost-to-income” and then share it back as average between the customers in the same segment. As in the beyond budgeting process, the offices have to share their financial results to trigger a continuous improving process, in the same way sharing the average KPI can stimulate the underperforming customers to improve their finance.

It is possible to track the goals that the customers set for themselves and then verify

MyBudget 2.0



Figure 8.4: Mockup of MyBudget 2.0

how often they are achieved. In this way it is possible to check the *planning fallacy* of the customers.

It can be interesting to create an interface for the bank for the front-end offices. It can be possible to show to the front-end employee the psychological profile of the customer and, together with the customer, study the current financial situation and suggest improvements. It is important to update the current legislation, so that it can be aware that the banks have now a more precise profile of the customers and therefore they should be more responsible of the financial advices.

It is important that the customer can decide how his data can be used by the bank, for example if he wants to share the name of the categories. In a fair way, if he decides to share more information the bank can provide more features of feedback, like for example the average KPIs from the other customers. This is always with the aim to support the

customer's budgeting process.

It is interesting to notice that for small banks it is possible that the average KPIs cannot be so precise. To solve this problem, Skyforge can sell to them the averages acquired by all the installations in different banks.

The loans are one of the most important business core of the banks. MyBudget 2.0 can improve the management, providing different ways to represent in the graphs the installments. In fact the customer can think (mental accounting) about the loans as a "global total cost" or as a "monthly repayment". In this way the customer can visualize easily and better if it is realistic the repayment or not, and if it is a good choice of him.

It can be interesting to configure MyBudget 2.0 with a short initial survey, where the customer has to answer to generic questions related on how he likes to save or spend money. In this way it is possible to have a first profile of the customer. This process is inspired by a similar survey provided by Bank of America.

There is a possibility that the transactions are not done by credit card or ATM, therefore immediately inserted in the system. For example the cash payments are difficult to trace automatically. It is necessary that the customer enter manually this information in the system. The more complete and precise are the information in the MyBudget 2.0 system, the more precise can be the decisions based on the tool.

It is possible that in the same transaction (made by cash or card payment) the customer is interested to split the amount in different categories. Therefore it is important to provide this feature, so that the customer can feel more comfortable to perform without stress his mental accounting.

There is no easy way to automatize the categorization of the transaction and the safe way is to drag the interested transaction to the relative category. However nowadays are present mobile devices with Internet and GPS features. Therefore it is possible to exploit this technology in a social network contest.

When a customer perform a transaction in a shop, he can check the transaction online in his MyBudget 2.0 interface. In the mobile phone has GPS feature, it is possible to tag the transaction with the actual position. This will create an geographical map of all the shops where the customer has been.

It is possible that MyBudget 2.0 organize an interactive map shared by the customers, where it is possible to tag all the shops with the keywords that represent the possible categories.

In this way, the next time the customer will have a transaction in a shop that has been geographically tagged in the shared map, he will just tag the transaction in the shop GPS location and the system will suggest the keyword-categories shared by the other MyBudget users.

This allows to save time in the transactions management and to save some errors in the category selection. Moreover, it can put as an option to automatically accept the tags selected by the other users as default for organizing his own transactions.

It is possible for Skyforge to collaborate with the Swedish consumers agencies called **Konsumentverket**². This can be a strategy to fulfill the customers' need of trustwor-

²www.konsumentverket.se

thiness.

It is possible to perform an analysis for the previous design that Skyforge decided. There are many advantages for the business solution of selling the product directly to the banks and then configuring the tool in the banks' information systems. First, web interfaces are portable and they run on any devices and in any places thanks to the wireless and the internet on mobile phones. Second, the fact that is directly configured in the internet banking website can give for granted the integration with the bank's system and it solves the problem of updating manually all the transactions.

It is important that MyBudget 2.0 can run on mobile platforms like Android, Blackberry, iPhone, Symbian, Windows Mobile or Linux. The main reason is to give to the customer his actual economical status always with him. This allows him to take always any important decision.

Information stream overview

Some problems are related to the quality and the quantity of the data. In the quality quest we can consider several problems:

- which kind of information is transmitted in the credit card or the bancomat/ATM circuit.

In the quantity side:

- the user is not always using the credit card or the bancomat. So non all the information can be in the MyBudget systems.
- and even when the user is adding manually the information, it can be that it is not precise in the amount or either in the category. For example in a big purchase it could be that in the same cash transaction a big amount of money is related to entertainment electronics but a minor amount is for cleaning house electronics (vacuum cleaner). The user could act unpredictably: it could be picky and record the purchase in the 2 different categories house and entertainment. Or either it could be lazy and just categorize manually all the amount (or part of it) in just one of the categories. This will be cause imprecision in the statistics and the records. Will be the analysis then valuable? It depends on the ration between manual transactions and card transactions.

8.3 Qlikview as prototype

It is possible to consider the Swedish software Qlikview³ as a prototype to test and improve the graphical interface and how the data flow in the system. In the last version it has been added most of the graphs present in the Information Visualization chapter, as for example spark line charts, whisker charts, trellis charts, tree-view list boxes. Going

³www.qlikview.com

through the application, you will find different ways of utilizing the spark lines. It is great to show the trends of each performer and their differences in each trend's pattern. It is also valuable to use it as technological backbone, since it has all the most important features:

- independent from any data source
- editable data format
- it supports the most popular consumer mobile platforms and devices (Apple iPhone, iPod Touch and iPad, Android phones, Java Mobile Client-based phones)
- AJAX technology
- real-time data update
- scripting functions
- a web server capabilities
- mini charts
- trellis charts
- tree-view list boxes
- dynamic chart backgrounds
- clickable URL links in table cells



Figure 8.5: Qlikview - Dashboard

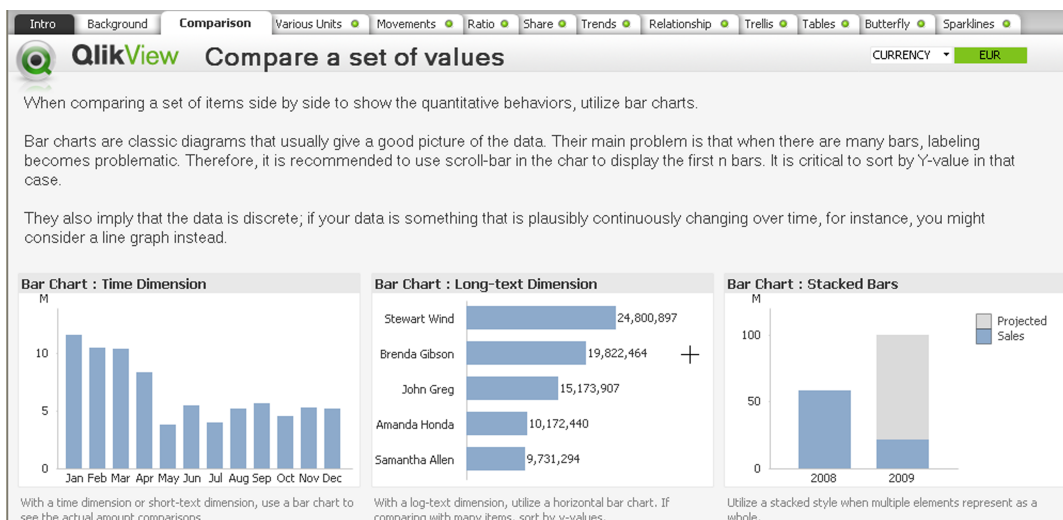


Figure 8.6: Qlikview - Comparison

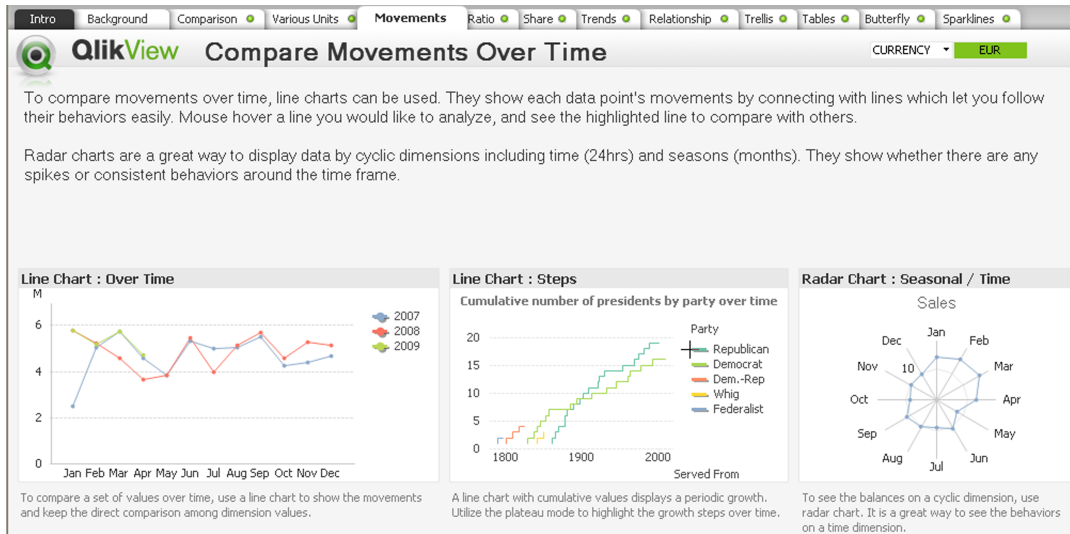


Figure 8.7: Qlikview - Movements

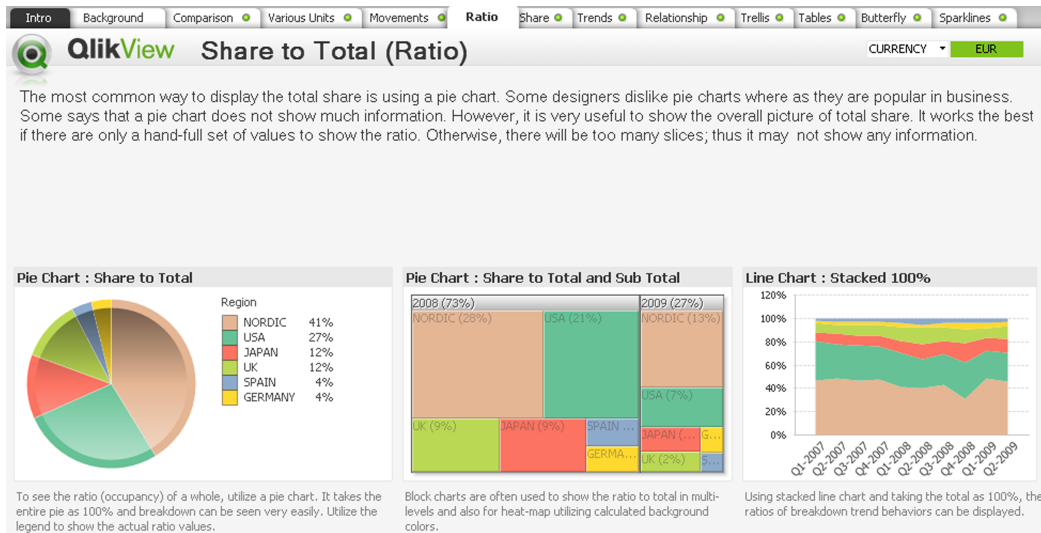


Figure 8.8: Qlikview - Ratio

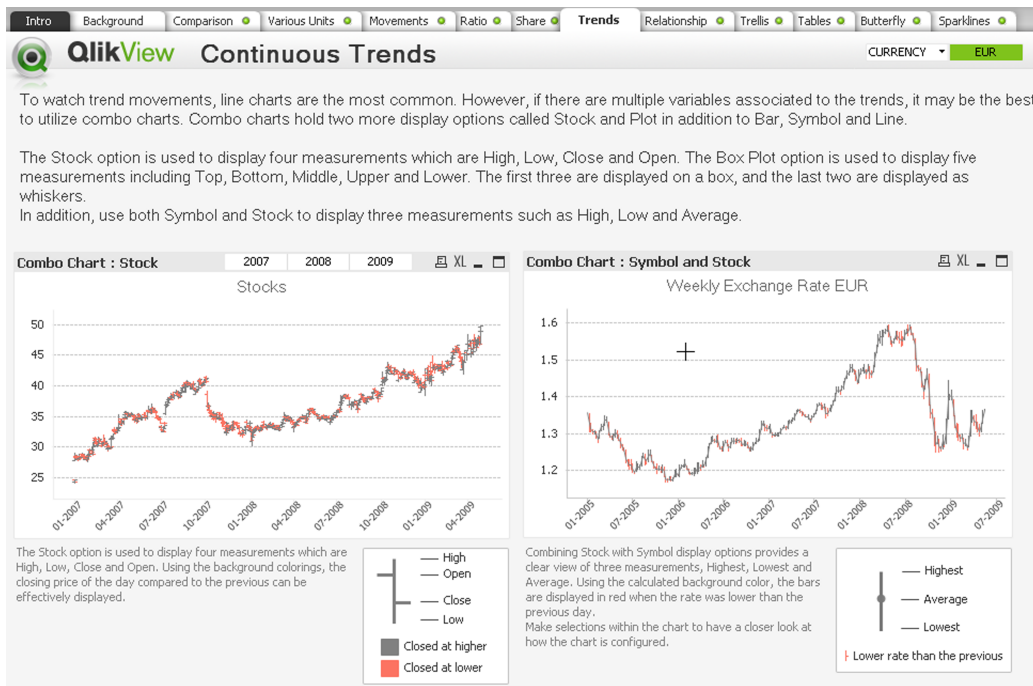


Figure 8.9: Qlikview - Trends

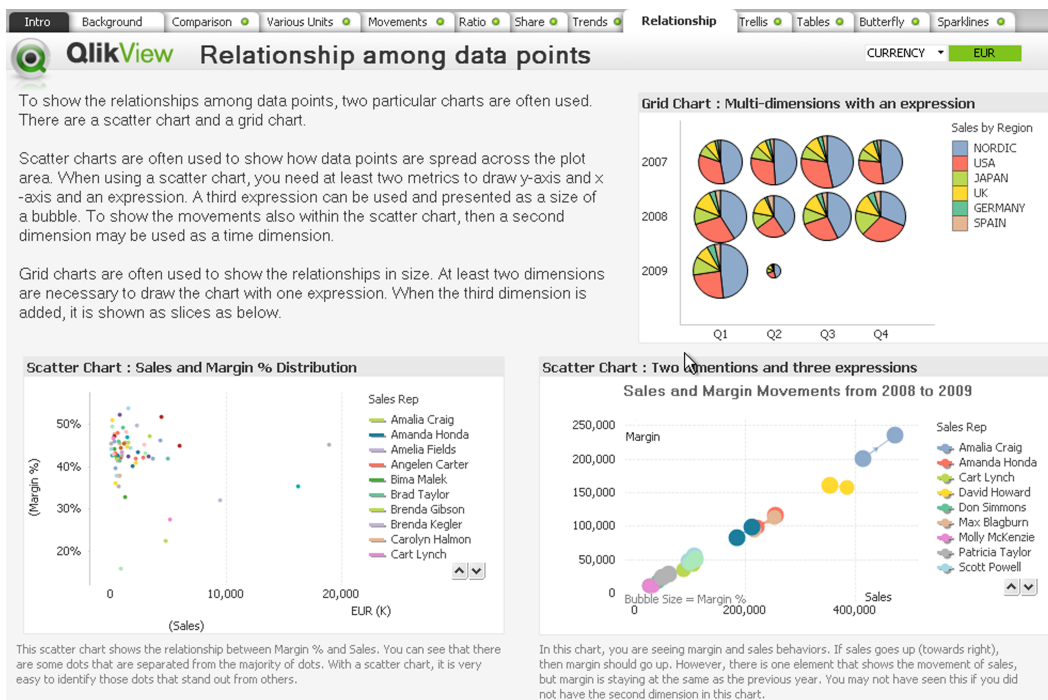


Figure 8.10: Qlikview - Relationship

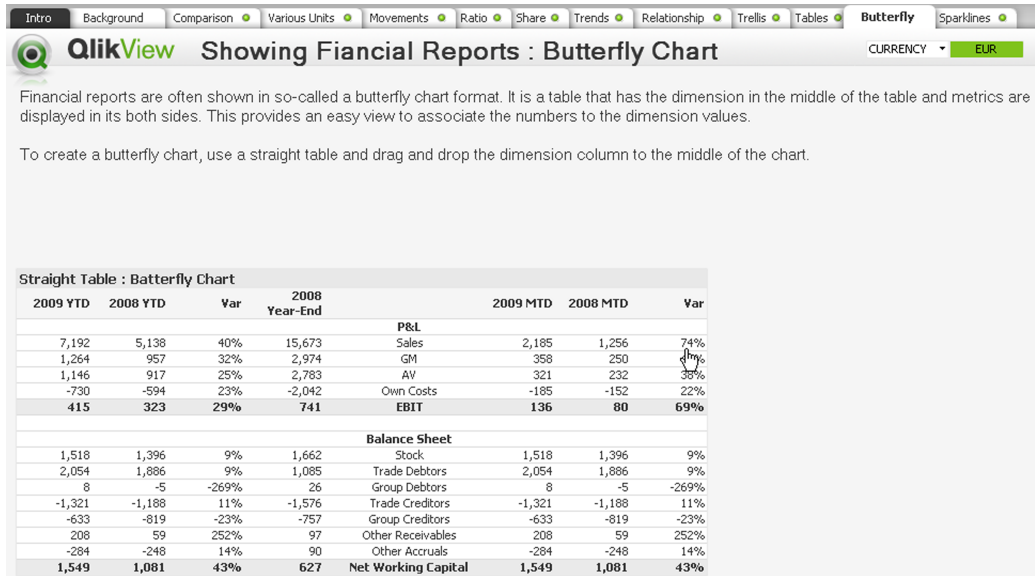


Figure 8.11: Qlikview - Butterfly

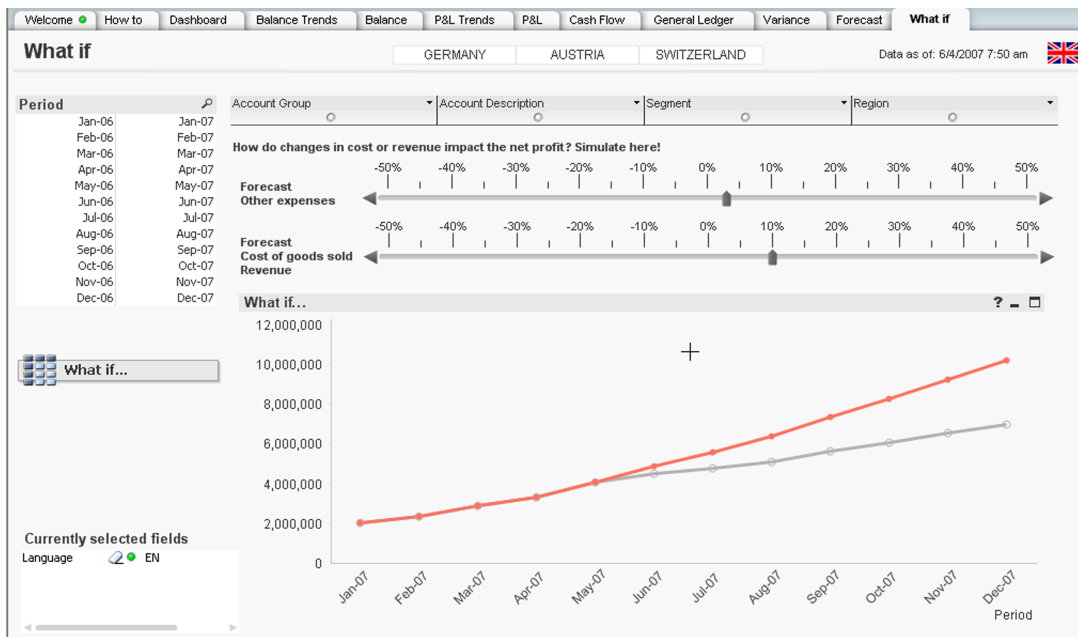


Figure 8.12: Qlikview - What-if Analysis

Chapter 9

Conclusions

9.1 The research work

The amount of the work follows the *Pareto principle*, also known as the 80-20 rule. In fact 80% of the time spent in the research, has been dedicated to understand the environment requirements and to research and study the knowledge base. This investment of time enabled to spend efficiently the remaining 20% of the time for the main design processes. The complete understanding and vision of the environment and the knowledge base permitted to infer more quickly solutions to the design requirements, the similarities behind different theories and the relevance of the most important topics and technologies.

The material actually found is at least double of the material in the bibliography. It has been decided, in agreement with the company, to size the amount of work to the point where the result allows the company to start the technical requirements analysis. This design work does not pretend to be a complete description of all the aspects of this software typology. However it presents the main aspects that the software typology of MyBudget should consider.

There are still many possible aspects to explore in order to have a more detailed vision of the system, and they are mostly related to the technological aspects. However the most important value of this work is to provide a coherent and consistent vision of a new product, based on the most recent knowledge base. Once there is a clear and justified vision, it is possible to move into the implementation stage more easily and with more confidence. The implementation stage can be conducted in a short time because all the requirements are clearly stated and a clear view of the product help to choose the right technologies that can enhance the final product. It is possible then to proceed in the implementation with less test cycles of usability, saving time and money. Moreover an holistic knowledge on the product allows the possibility to take better decisions about what functionalities are more important to implement in the different stage, since it is clear which functionalities are more connected to the business strategy.

Comments on the Information system design theory

It is possible to interpret the three cycles in figure 2.3 as composed by an internal cycle dedicated to the design process and an external cycle that is the result of the design process. The external cycle seems to connect what are the two main entities: the environment and the knowledge base. Therefore it seems that the internal design process is an engine of the external cycle that has been created between the environment and the knowledge base. In this way the design process can be considered the process that permits to update the current environment with new theories from the knowledge base. With this perspective it seems that design can represent one of the most important process within to the company. It allows the company to conceptualize a product always updated to, for example, best practices or technologies. In this way it is possible for the firm to understand which is the best direction to take in the development of the product or service that is providing.

It is important to underline that the information system design process consists in an holistic approach. The design process considers all the aspects of the firm (strategy, current implemented technology, etc.) and it aims to give a solution that is consistent with all of them. Design can be considered a tailoring process.

The design process can be used as a feedback for all the firm's decisions. A continuous check with the knowledge base can help to understand which decisions are currently considered valid in the knowledge base, producing a ranking for each decision. It can represent a validation for many firm's processes.

The design style is described by the choices taken to adapt the knowledge found to the current firm's environment, composed by business strategy, internal people organization and actual economic situation. It enables to reveal the current firm's problems and it allows to the clearly the future directions.

9.2 MyBudget 2.0

The ultimate question is: would the customer attain to his own budget? Homburg et al. (2010) verified that mental budgeting process substantially affects future category purchase behavior. Moreover they explained that the influence of customer's income on future purchase behavior is partially mediated by the degree to which customer engages in mental budgeting. Mental budgeting strengthens the negative effect of a price increase on a future purchase in the same category of expenses, whereas it does not alter the effect of a price increase on a future purchase in another category.

In this project *behavioral economics* has been directed more to explain choices than to change them. A relative small literature has looked at remedies for various cognitive biases and little of this is specifically applied to personal finance. Some debiasing techniques in the literature involve encouraging thinking that is more critical. "Consider the opposite" encourage people to think why they may be wrong. This counteracts general tendencies to be overconfident and to suppress disconfirming evidence.

Accountability accentuates the need to think about all aspects of a decision by making

people imagine they have to explain their choices to others or really having them explain their choice to others. This has elements of a Weightwatchers or Alcoholics Anonymous approach, but it has not been directly tested in the financial domain.

This design provides an holistic solution that considers all the aspects that allow a customer to be more rational in his economical decisions and therefore acting more similar to what was theorized as *homo economicus*. The software does not represent the rationality, but it is the technological support to the process of thinking rationally.

The tool does not force the customers to act in an unnatural way. They are free to manage their expenses and their savings how they consider better for themselves. The tool makes possible to perform detailed analysis that can help the customer to better focus on the right expenses or to save money in a more organized way to achieve faster the personal goals.

The tool is scalable to the personal level of curiosity. The more curious is the customer, the more he can drill into his spending behavior graphs. With this point of view, MyBudget 2.0 represents a tool for “personal intelligence”.

Possible other usages

The beauty of this human-centric design is that it is possible to use the same concept for different aims. MyBudget 2.0 has an universal design, since it is based on how the human brain is working, not just on special mental conditions or special national cultures. Therefore it can be possible to imagine it to be used also in *corporate* environment.

MyBudget 2.0 can be used to teach in the schools how to manage money, in collaboration with local consumer authorities. This usage can be interesting in many countries where some personal finance *educational* programs already exist. For example the FSA launched a program in March 2006 to improve significantly people’s levels of financial capability. In March 2008 FSA led a two-year “Pathfinder” program to set up a service offering free, impartial information and guidance on money matters. The Consumer Financial Education Body (CFEB) is responsible for helping consumers understand financial services in the UK and manage their finances better.

Moreover it could be used to trace the budgeting and planning of the subsidies granted to people with special disabilities, as required by the FSA¹.

Common background theories in different topics

It is interesting to notice how many researches from different topics are connected each other and share the same driving theories, as:

- the relevance of information
- psychology, economics and neuroscience
- brain cognitive capabilities

¹www.fsa.gov.uk

- brain visual capabilities
- decision-making theory
- human motivational “Theory Y”
- libertarian paternalism
- customer-oriented processes
- trust

Knowledge added to the knowledge base

This work provides an interpretation of the general guidelines of the information systems design theory. More specifically, the work is characterized by the personal search heuristics and by the final design process that collects and reorganizes all the knowledge acquired from the knowledge base.

The main novelty of this information system design project is to consider the psychology of the users as one of the main style of the design. The technologies are designed to cooperate naturally with any possible psychological profile, without obliging the user to change mindset. For example the temporal lock is a psychological trigger that helps to guide the customer autonomously to his saving goal.

The main concept is show the real data from which the user can extract which are the actual facts of his behavior. It is upon his interest and curiosity to go further and to better understand his own profile. The technologies should allow this.

It is interesting how all the technologies needed are currently present, like DSS, data mining, AJAX, but it is just a new and unusual point of view (the need to make a profile of the banks customers’ psychology) that allows to extend the capabilities of these technologies and to configure them accordingly. The possible evolution of IS is not just strictly technical but is about to reinvent the interaction of human abilities with values, emotions, memories and mental (personal) connections in an enhanced place like computer and reality.

Evaluation of the research work in the application environment

MyBudget 2.0 can be considered an big upgrade in the banking and financial industry. It is a technology that can solve the *information asymmetry* that characterize many products, as loans. This can help support credit permission even in bad economical times, exactly when the credit is more needed by the firm (and then by the customers) to release the pressure.

On the customer’s side, it introduces a tool that supports life-long financial decisions and it allows the customers to perform analyses on themselves. More important, it permits to give a ranking to the “budgeting” capabilities of the customers. It is possible to suggest the bank to use there new parameter in the credit evaluation. If this ranking is calculated with “open box” technologies (as opposed to black box technologies, like

neural networks) it is possible to use as a shared standard between banks. In this way, if the ranking is implemented centrally between all the banks, the customers can always bring with them their “budgeting quality rank” evaluation, when they decide to apply for loans to another financial institution.

MyBudget 2.0 in Sweden

To better understand the Swedish market and the customer needs, Skyforge can refer to the EPSI Rating organization², more specifically the Swedish Quality Index (SKI)³. EPSI Rating (Extended Performance Satisfaction Index) is a system to collect, analyse and disseminate information about image, preferences and perceived quality as well as loyalty of customers and other stakeholders to commercial entities and other organizations. The Swedish Quality Index is the organization that analyze the Swedish market. It is a system to collect, analyze and disseminate information about customer expectations, perceived quality and the valuation of goods and services. In figure 9.1 it is present the analysis model for the firms’ customers.

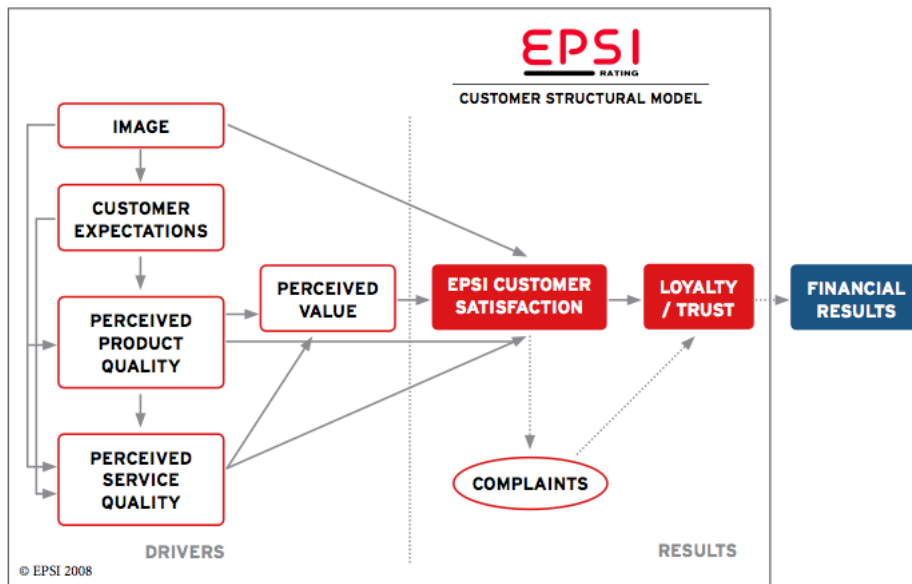


Figure 9.1: EPSI Customer Structural Model

It can be interesting for Skyforge to follow the reports dedicated to the Swedish banks market, like “The banks in 2009 under the Swedish Quality Index”⁴. Figure 9.2 is part of that document and helps to understand how the banks are interested in the customer satisfaction or how much they can be interested in find a solution to improve their customers’ satisfaction.

²www.epsi-rating.com

³www.kvalitetsindex.se

⁴http://www.kvalitetsindex.se/index.php?option=com_content&task=view&id=164

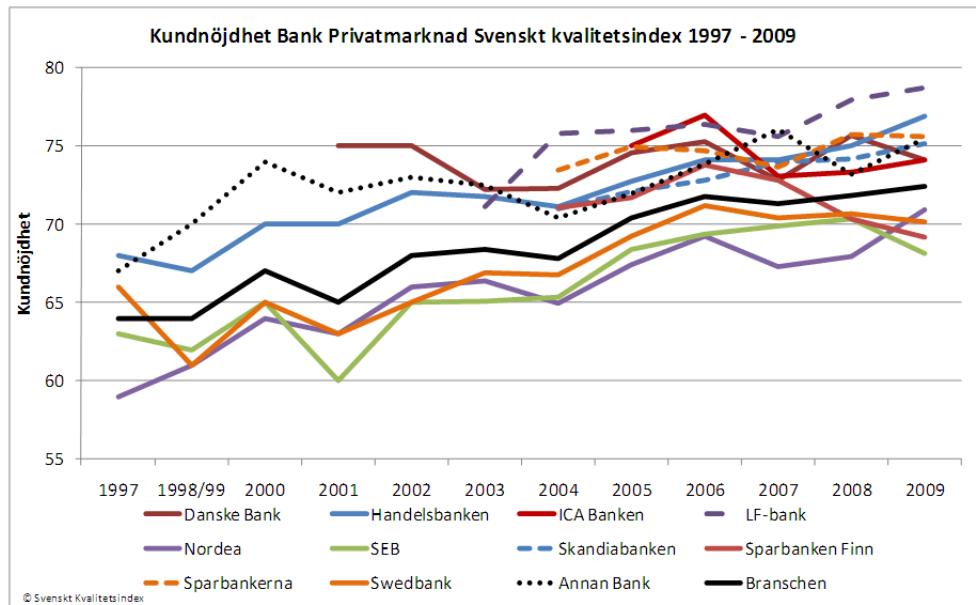


Figure 9.2: Customers satisfaction in bank private market 1997-2009

Swedish Personal Data Act (PUL - Personuppgiftslagen⁵). PUL is the Swedish implementation of the EU's Data Protection Directive 95/46/EC. The Swedish authority Data Inspection Board (Datainspektionen⁶) can check if the law is implemented in the firm's processes. So it is important to comply to the law.

Moreover it can be interesting to consider the Swedish Credit Information Act⁷ that explains how credit-rating agencies collect information regarding the financial position of companies and the financial and personal circumstances of individuals.

All these legislation notes put evidence of the efforts needed for implementing the tool in each country. Although the concepts behind the design of the product are universal because they are scientifically based on the studies of the human brain, the proliferation of different laws in different countries represent a barrier. Technological achievements have to manage this problems.

Moreover the process of designing and building MyBudget 2.0 has required to acquire different knowledge, from what is a budgeting process to what a bank is, and more, to which are the customer relationship management main aspects. All this acquired knowledge reevaluates Skyforge as firm with high skills that can be used even in general bank consultancy services. Moreover, Skyforge can exploit the acquired knowledge (for

⁵The official text is here: <https://lagen.nu/1998:204>. The law translated in English is here: www.sweden.gov.se/content/1/c6/01/55/42/b451922d.pdf. It is possible to check a website related here: www.pul.nu

⁶www.datainspektionen.se

⁷www.datainspektionen.se/in-english/legislation/The-Credit-Information-Act/

example about CRM and budgeting process) to improve its own internal processes.

MyBudget 2.0 in different countries

In a worldwide perspective, it is important to adapt these tool to different culture, habits and technological situation. In this Swedish case, it has given for granted that the majority of the transactions are made by credit card (or bankomat) or in cash. In other countries, for example in Egypt the transactions with credit cards are less common and it is more common to pay with mobile operators' SMS services. Moreover SMS are used to receive updates on the bank transactions. On the other hand, even in countries where all the technological facilities are present, the usage of the tool can be different. For example in Italy, where the family is a strong value and the children get economically independent later, it is possible to imagine to use the budgeting tool more integrated in the families' processes. A scenario can be represented as the family hierarchy, where the parents are the main responsible of the family's income. In the tool they can consider some categories like "Mario's pocket money" or "Giulia's pocket money", possibly connected to the children's bank account. It is important then to give a different interpretation of the tool in each countries.

It happens that some technologies are banded by the local laws. For example in the US neural networks are banded for the consumer credit scoring. The reason behind is that the neural networks work as a "black box", so in case of dispute from the consumer, the bank or the credit agency can prove with difficulties the reasons of, for example, a reject. Therefore decision trees are used instead.

The Sweden seems the perfect country in which apply banking technologies for customers, as described in Lüneborg and Nielsen (2003). The customers have enough expertise to use IT technologies for managing their on-line bank accounts and the banks have enough experience in managing IT products. In Italy it is possible to find this open attitude more in the young generations, that already got experience and confidence with Internet.

The Swedish bank environment has the peculiarity to share often the main technologies (as Internet), using the same provider. This is more common between small banks to share the costs of the service and therefore pay less.

Consequences to the economy

It is important to evaluate this tool in a broad perspective, since its features are based on human characteristics and are not based on specific profiles neither any specific national culture. As de Meza et al. (2008) says: "over time, improving people's financial capabilities will not only benefit them directly, but also enable them to exert a stronger influence in the retail markets, creating more effective and efficient markets and reducing the need for regulatory intervention".

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Improvements in the level of financial capability require a long-term change in attitudes, habits and behavior towards money.

If the final customers are able to take stable and strong decisions, then all the society and the economies that rely on them, can be more solid. Stable decisions means a stable market. It's like a pyramid based and in this way MyBudget 2.0 can reinforce the foundations. Hopefully in this way it is possible to improve the society. They can finally drive a big change in the society, but being aware of your own economical status and being responsible it's not an easy task.

MyBudget 2.0 can help this change and it can support a *customer-driven* business policy. The information extracted by this tool from the customer can help the banks to shift to a customer-driven business model. The customer has all the interests to enter correct information in the system to better understand his economical position. Therefore the bank can rely on this customer's information and it can deduct the information to plan the business around the customer's plans.

9.3 Further research

Basel II is the second of the Basel Accords, which are recommendations on banking laws and regulations issued by the Basel Committee on Banking Supervision. The purpose of Basel II, which was initially published in June 2004, is to create an international standard that banking regulators can use when creating regulations about how much capital banks need to put aside to guard against the types of financial and operational risks banks face. Advocates of Basel II believe that such an international standard can help protect the international financial system from the types of problems that might arise should a major bank or a series of banks collapse. In practice, Basel II attempts to accomplish this by setting up rigorous risk and capital management requirements designed to ensure that a bank holds capital reserves appropriate to the risk the bank exposes itself to through its lending and investment practices. Generally speaking, these rules mean that the greater risk to which the bank is exposed, the greater the amount of capital the bank needs to hold to safeguard its solvency and overall economic stability.

It can be interesting to see how this software can help to be integrated in risk and capital management. With this point of view, it can be possible from the information on the budgeting qualities of each borrower to extract an appropriate index and ranking useful to better manage the banks' risk.

One of the main outcome of the design of this tool is to reduce the asymmetry of the information between lender and borrower. A deeper analysis on this point of view can help to understand exactly up to which level this tool can make even the both parts.

It can be interesting to imagine how the product can be configured to be compatible with different legislations. In Europe there is not a common regulation on the banks market, but there are process to converge in the same direction. It can be interesting to design a technology to configure MyBudget 2.0 for different laws requirements (for example privacy laws on personal data) and how to configure it for following the business goals of each bank.

It is important to be relaxed and out of stress in order to make the best decisions. In May 2010 there have been an hack event in Malmö called ThoughtMade⁸. Chris Hughes⁹ presented an interesting hack called MINDFLEX EEG, that is able to read the brain wave and then to evaluate how much relaxed the tester is. The hack is a small modification from the original project called Brain Hack¹⁰. The result of the brain waves reader is in the graph 9.4.



Figure 9.3: Chris Hughes and his brain wave reader

It is possible to image this tool as a external agent that help the customer to check if he is in the proper relaxed conditions to make rational decisions.

It is possible to see this project sharing the same philosophy behind a new movement called *Thrivability*¹¹. “Thrivability is our path out of unsustainable practices toward a world where all people have a high quality of life, a voice, and a nurturing earth supporting them. Using whole systems approach, we evolve our way of being together, of collaborating, so that our collective wisdom and action bring forth a flourishing world and thriving life.”

Infographics are graphic visual representations of information, data or knowledge. These graphics present complex information quickly and clearly, such as in signs, maps, journalism, technical writing, and education. With an information graphic, computer scientists, mathematicians, and statisticians develop and communicate concepts using a single symbol to process information. More research can be performed to better refine the way to represent the information related to economics. It is important to perform more research on the *information design* to better understand how presenting the eco-

⁸www.thoughtmade.com/

⁹<http://thoughtmade.com/chris-hughes/>

¹⁰<http://ericmika.com/itp/brain-hack>

¹¹<http://thrivable.org/>

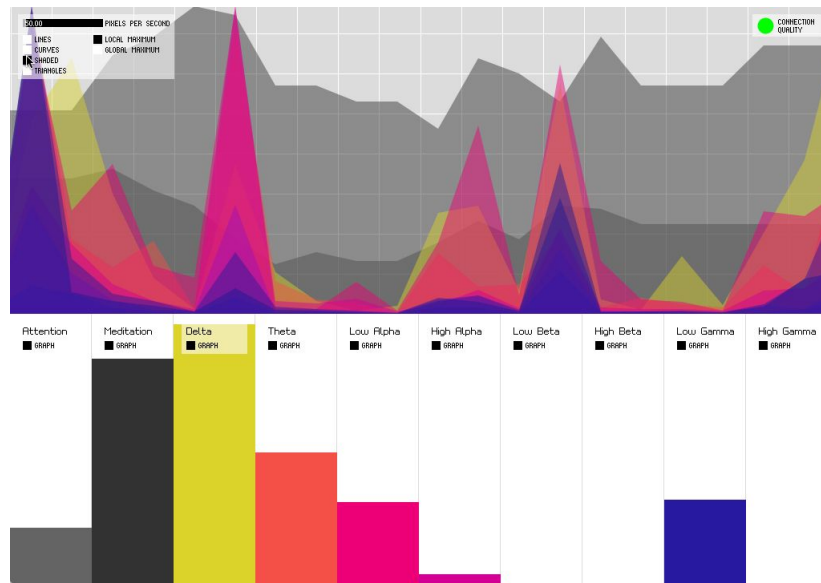


Figure 9.4: EEG graph

nomical information in a certain way can drive the customer to deduct another layer of information.

Appendix A

Taxonomy of cognitive biases

Numbers in brackets [] indicate (most) likely relevance for different characteristics of financial capability:

1. being able to manage money
2. keeping track of finances
3. planning ahead
4. making informed decisions about financial product
5. staying up to date about financial matters.

The Taxonomy is in part structured according Arnott (2002) cited in de Meza et al. (2008)

<i>Bias</i>	<i>Description and potential relevance</i>	<i>(Non-)Remedies</i>
Memory		
Curse of knowledge	Knowledge of an event's outcome can compromise the ability to reason about another person's beliefs about that event.	Individuals cannot ignore private information even when monetary incentives and feedback are provided. However, a market setting reduces (but does not eliminate) this bias. Entreating subjects to work hard and warning them about the bias have been largely ineffective. The curse of knowledge is not mitigated by accountability defined as the requirement to justify one's judgments when called upon (but it encourages people to exert additional cognitive effort). Counterexplanation, i.e., explicitly considering evidence that would not support or lead one to expect the outcome that occurred, helps (because it addresses the cognitive nature of this bias and weakens causal connections between evidence and the actual outcome). Alternative outcomes are made more salient with counterexplanation.
Hindsight [3]	Outcomes that are considered improbable ex ante are often overestimated ex post.	Advanced students of strategy analyzing a complex business case systematically distort their evaluations of initial decisions and projections for the future. The amount of hindsight bias in a knowledge question task is not reduced by having received information about the bias in advance or by having received feedback about their individual performance before being subject to the same procedure a second time. When surprise levels are moderate or low, judgments are consistent with the hindsight bias, whereas highly surprising outcomes lead to the reversal of the bias. Subjects under these conditions seek explanations to the outcome and "effortless assimilation," the most accepted theoretical account for the hindsight bias, is less likely. To force oneself to argue against the inevitability of the reported outcome, that is, to try to convince oneself that it might have turned out otherwise might in fact increase the hindsight bias. Ironically, the strategy may be less effective the more one tries to convince oneself that it might have turned out otherwise realizing along the way that reasons for an alternate outcome are difficult to bring to mind.
Mental accounting [2]	Mental accounting is the set of cognitive operations used by individuals and households to organize, evaluate, and keep track of financial activities. People are assumed to group their assets into a number of non-fungible mental accounts.	

Procrastination [3]	Postponing things one knows one should do today. A psychological reason might be that present or immediate costs/benefits are unduly salient or vivid in comparison to future costs/benefits.	The tendency to defer choice is greater when the difference in attractiveness among the available alternatives is small than when it is large. However, the percentage of people who defer choice among comparable alternatives decreases when the subjects first learn to make trade-offs among the different features.
Recall, Imaginability [3, 4]	An event or class may appear more numerous or frequent if its instances are more easily recalled than other equally probable events.	Financial accounting information only mildly mitigates investors' tendency to judge those outcomes more probable for which they are able to generate the most supporting reasons.
Naïve Statistics		
Base rate neglect, stereotyping [1, 3, 4]	The base-rate fallacy is people's tendency to ignore base rates in favour of, e.g., individuating information (when such is available), rather than integrate the two.	
Conjunction [1, 4]	Probability is often overestimated in compound conjunctive problems.	Statistical training tends to improve reasoning. Bayesian reasoning can be improved by representing information in frequency formats rather than in probabilities. Accountability has a positive effect.
Correlation [1, 3, 4]	The probability of two events occurring together can be overestimated if they can be remembered to have co-occurred in the past.	
Disjunction [1, 4]	Probability is often underestimated in compound disjunctive problems.	
Small number [1, 4]	Believers in the law of small numbers tend to over-infer the outcome of a random process after a small series of observations. People tend to believe that small samples replicate the probability distribution properties of the population.	

Adjustment		
Anchoring [4]	Assimilation of a numeric judgement to a previously considered standard	<p>Implausibly extreme anchors have a proportionally smaller effect than anchors close to the expected value of the lotteries evaluated. Anchoring occurred only if the anchor and preference judgment are expressed on the same scale.</p> <p>Prompting subjects to consider features of the item that are different from the anchor reduces anchoring, while increasing consideration of similar features has no effect. Anchoring can be reduced by applying a consider-the-opposite strategy.</p> <p>One can distinguish between externally provided (by another person, e.g., by the experimenter) and “self-generated” anchors. The latter are invented by oneself as part of a heuristic process and function as a short-cut and therefore they are known from the beginning to be wrong. Responses to “selfgenerated” anchors are found to be influenced by monetary incentives for precise judgment and by forewarning regarding an anchoring bias. Responses to externally provided anchors are not.</p>
Default [3, 5]	People tend to stay with the default.	
Disposition [2]	The original purchase price of an item is treated as the reference point (closely related to mental accounting and loss aversion).	Learning seems to attenuate the magnitude of the disposition effect. Frequent traders sell their winners less and their losers more often, resulting in lower disposition effects.
Endowment [2, 3, 5]	The value of an item increases when it becomes a part of a person’s endowment. The person demands more to give up an object than they would be willing to pay to acquire it.	
Loss aversion [2, 3, 5]	Tendency of individuals to weigh losses about twice as much as gains.	
Projection [3]	People exaggerate the degree to which their future tastes will resemble their current tastes.	

Regression to mean	Consider two variables X and Y which have the same distribution. If one selects individuals whose average X score is higher than the mean of X by k units, then the average of their Y scores will usually deviate from the mean of Y by less than k units. Often people do not take this into account in their judgments. For example, investments that have been extraordinary profitable yesterday are likely to regress back to their mean today.	
Regret aversion [3, 5]	Tendency to avoid taking an action due to a fear that in hindsight it will turn out to have been suboptimal.	There seems to be a temporal pattern to the experience of regret. Actions, or errors of commission, generate more regret in the short term; but inactions, or errors of omission, produce more regret in the long run.
Omission [3]	Tendency to judge harmful actions as worse or less moral than equally harmful omissions (inactions), especially in the short run.	Bias towards omission tends to be higher when potential regret or knowledge of outcome is expected.
Status quo [3, 5]	People like things to stay the same. An alternative may be chosen only because it was used before (habit).	
Confidence		
Belief [3, 4, 5]	Difficulty evaluating conclusions that conflict with what one thinks one knows about the world.	Rapid responding increases the amount of belief bias observed on a syllogistic reasoning task and it reduces the number of logically correct decisions. Elaborated verbal instruction in principles of reasoning seem to reduce the belief bias in syllogistic reasoning, but cannot eliminate it.
Completeness [3, 4, 5]	Perception of an apparently complete or logical data presentation of information base can stop the search process too early.	

Confirmation, Myside [3, 4, 5]	Tendency to evaluate evidence, generate evidence, and test hypotheses in a manner biased toward one's own previously held opinions.	Counterfactual primes – examples that make subjects aware of both an actual outcome (e.g., getting into an accident; winning a lottery) and the converse counterfactual outcome (e.g., avoiding the accident; losing the lottery) – attenuated the confirmation bias in a trait hypothesis testing context by increasing the selection of questions designed to elicit hypothesis-disconfirming answers. In a judgmental task two types of justification pressure, i.e., the requirement to explain the decision afterwards and the requirement to convince another person, lead to a distinct increase in the amount of utilised information.
Unrealistic optimism, desire, wishful thinking [3]	The probability of desired outcomes is assessed to be greater than actually warrants.	Offering people information about their own standing on risk factors or information about peer's standing on these factors decreased optimism. Counterfactual reasoning tends to increase accuracy when predicting the outcomes of future personal events. The desirability bias tends to be reduced in the case of repetitive events. Generally informing people about relevant health risk factors and requiring them to describe their standing on these factors had no overall effect on subsequent risk judgement.
Illusion of control [4]	The expectancy of a personal success probability of an outcome often increases (normally above the objective one) when one has some control over the outcome.	
Planning fallacy [3]	Refers to the tendency to underestimate task completion times.	Pessimistic-scenario generation is unlikely to be an effective debiasing technique for personal completion predictions. The “recall-relevance” manipulation is more promising. Within this manipulation people are asked to describe a plausible scenario – based on their past experience – that would result in their completing an assignment at their typical time.

Overconfidence [3]	The ability to solve difficult or novel problems and the accuracy of our own judgements is often overestimated.	Calibration is improved after intensive training in the task. In a preexposure-accountability condition of a personality prediction task (subjects learned of the need to justify their responses before seeing the test-takers' responses) subjects reported more integratively complex impressions of test takers, made more accurate behavioral predictions, and reported more appropriate levels of confidence in their predictions than did either no-accountability or postexposure-accountability subjects. Subjects who have received five apparently "easy" practice questions and then have been given feedback on the accuracy of their answers are underconfident on the final 30 questions. Subjects who anticipate a group discussion of their answers to general knowledge questions take longer to answer the questions and express less overconfidence in their answers than does a control group.
Success	Often failure is associated with poor luck and success with the abilities of the decision maker.	
Presentation		
Dilution [4, 5]	The weakening of a belief by providing irrelevant neutral information.	
Framing [3, 4, 5]	Alternative wordings of the same objective information can significantly alter the decision, though differences between frames (e.g., as losses or gains) should have no effect on the rational decision.	
Linear	Decision makers are often unable to extrapolate a non-linear growth process.	
Information order, recency [4]	The first item presented or the last may be overweighted in judgment. Decision makers derive different conclusions depending on the order in which they receive information	Accountability reduced tendency for recency of information to influence judgments when predicting a candidates' success at a job based on sequential information. This is still true if subjects experience mental fatigue. Accountability reduced tendency for recency of information to influence judgments in auditing tasks. In auditing task-specific experience tends to reduce the recency bias.
Pruning bias, partition dependence	Bias in probability assessment due to which the particular choice of events into which the state space is partitioned does affect the assessed probability distribution over states	

Scale [4]	The perceived variability of data can be affected by the scale of the data. This might cause that small extra purchases are perceived as minor expenditures when they follow larger purchases.	
Situation		
Attribution	Tendency to draw inferences about a person's unique and enduring dispositions from behaviours that can be entirely explained by the situations in which they occur.	
Complexity [4, 5]	Time pressure, information overload, cognitive busyness, increased (internal) inspection and other factors that increase the perceived complexity of the task can lead to worse decisions.	Increased introspection caused people to make choices that, compared with control subjects', corresponded less with expert opinion.
Escalation, sunk cost [1]	Commitment to follow or escalate a previous unsatisfactory course of action. This leads to throw "good money after bad".	<p>Professional training in economics is positively correlated with cost-benefit reasoning and naïve subjects who have been given brief training in the sunk-cost rule (i.e., only future costs and benefits should be considered in current decisions) subsequently use the rule outside the laboratory.</p> <p>Accountability (expectation that at some point in the future one might be required to justify ones decision to other people) do not necessarily reduce the sunk cost bias. This is consistent with the notion that accountability effects in decision making are driven by the desire to be favourably evaluated and avoid criticism by others.</p> <p>Sunk cost effects are mitigated by explicit estimating the future returns the given options might yield.</p> <p>Observing the budgeting process suggests that people are only likely to escalate commitment when they fail to set a budget or when expenses are difficult to track.</p> <p>The level of training, as measured by the number of college courses in managerial accounting, is found to be positively correlated with performance (by making less use of sunk cost information), while the level of experience, as measured by years of financially-related work, is not. Justification is found to improve decisions only for those participants with significant work experience.</p>

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