



Discussion Papers in Business and Economics

Prof. Dr. Claudia Kreipl, Prof. Dr. Dagmar Preißing,
Prof. Dr. Michael Huth/Prof. Dr. Dirk Lohre, Dominik Och MA, Prof. Dr. Josef Neuert

**Contributions to Applied
International Business Management Research**

Discussion Paper No. 06

April 2013

Herausgeber/Editor:
Hochschule Fulda/Fulda University of Applied Sciences
Fachbereich Wirtschaft/Faculty of Business
Marquardstraße 35
36039 Fulda
Deutschland/Germany
www.hs-fulda.de/wirtschaft

ISSN: 2194-7309

Table of Contents

| | |
|---|-----|
| Table of Contents | II |
| List of Figures and Tables | III |
| Preface of Editor..... | 1 |
| Prof. Dr. Claudia Kreipl The Health Care Sector – Growing market or ticking time bomb? | 3 |
| Prof. Dr. Dagmar Preißing The consequences of flexible employment on the expertise development of employees in times of severe demographic change..... | 17 |
| Prof. Dr. Michael Huth / Prof. Dr. Dirk Lohre Risk Management in Logistics Enterprises: Results of an Empirical Study | 26 |
| Dominik Och, MA The risk awareness and the degree of implementation of systematic Enterprise Risk Management in the economic region Fulda | 37 |
| Prof. Dr. Josef Neuert The impact of intuitive and discursive behavioral patterns on decision making outcomes: Some conjectures and experimental findings | 48 |
| Overview previous Discussion Papers | IV |

List of Figures and Tables

| | |
|--|----|
| <i>Figure 1: Risk management cycle (Huth/Lohre, 2009, p. 5)</i> | 28 |
| <i>Figure 2: Types of risk management actions (Huth/Lohre, 2009, p. 6)</i> | 29 |
| <i>Table 1: Top future risks (in brackets: development compared to status in the 2008 field-study)</i> | 30 |
| <i>Figure 3: Implementation status of risk management in logistics companies</i> | 31 |
| <i>Figure 4: Functional focus of risk management</i> | 32 |
| <i>Figure 5: Use of software tools for risk management</i> | 33 |
| <i>Figure 6: Use of risk management methods</i> | 34 |
| <i>Figure 1. Legal forms of respondents</i> | 39 |
| <i>Figure 2. Number of employees</i> | 39 |
| <i>Figure 3. Reasons for ERM</i> | 40 |
| <i>Figure 4. Methods of risk identification</i> | 40 |
| <i>Table 1. Relevant risk types</i> | 41 |
| <i>Figure 5. Implementation of early-warning-systems</i> | 43 |
| <i>Figure 6. Implementation of monitoring-system</i> | 43 |
| <i>Figure 7. Implementation of risk controlling</i> | 44 |
| <i>Figure 8. ERM implementation in the region Fulda</i> | 45 |

Preface of Editor

The research papers published in this reader were presented to an audience of academicians and practitioners at the 2011 Global Business Management Research Conference at Fulda University.

The conference was conducted under the topic “Recent Developments in Business Management Research in an International and Regional Context”.

Altogether, in the course of the conference, about 60 presentations within six focus sessions took place, addressing actual and contemporary research issues and practical problems of Business Management. In particular, the areas of Finance and Risk Management, Supply Chain Management and Logistics, Leadership in Organizations, Marketing Management, Sustainable Organizational Development, and Employment Management were in the center of the presenters’ efforts.

In addition, keynote addresses were given to the conference audience, emphasizing aspects of regional development and quality of life issues in the Fulda area (Diplom-Volkswirt Stefan Schunck, Hauptgeschäftsführer der Industrie- und Handelskammer Fulda), and perspectives of modern temporary work and personnel services companies in an international context (Diplom-Betriebswirt Stefan Polak, Vorstand Job AG Fulda).

All of the submitted articles and presentations abstracts were subject to a review by the Editorial Board of the conference, comprised of the following persons: Prof. Dr. Baiba Savrina, Prof. Dr. Erika Sumilo (both University of Latvia, Riga, Faculty of Economics and Management), and Prof. em. Dr. Johannes Lachhammer (Augsburg University, Germany).

The Editorial Board also reviewed and approved the submitted full papers for publication in this reader:

- Prof. Dr. Claudia Kreipl addresses the requirements of social responsibility under economic pressure in the health care sector.
- Prof. Dr. Dagmar Preißing discusses and explains the consequences of flexible employment on employees’ expertise development under significant demographic changes.
- Prof. Dr. Michael Huth and Prof. Dr. Dirk Lohre present the results of an empirical study dealing with risk management issues in logistics enterprises.
- Dominik Och, MA, outlines the risk awareness and the degree of implementation of systematic risk management tools in companies of the Fulda region.

- Prof. Dr. Josef Neuert reports on his research project, dealing with the impact of diverse behavioral patterns on decision making efficiency, based on the findings from experimental studies.

This reader intends to sustainably stimulate the discussion concerning recent developments in Business Management Research among scholars and practitioners. Each and every feedback, also and particularly from students, is most welcome.

Prof. Dr. Josef Neuert

Fulda, April 2013

Chairman, Editorial Board

Prof. Dr. Claudia Kreipl

The Health Care Sector – Growing market or ticking time bomb?

Prof. Dr. Claudia Kreipl

Germany, Fulda University of Applied Science

Email: claudia.kreipl@w.hs-fulda.de, Phone: +49 (0) 661 9640 272

Abstract

Health is regarded as our most precious good. Since decades, the Western societies are confronted with growing health care expenditures. An absolute cost increase can be observed, as well as an increase on the ratio on the gross national product. Combined with a growing demand on health care products and services, this problem is aggravating. Maintaining a high quality health care supply is therefore a challenging task of our time.

Reasons for the development concerning cost escalation and demand increase can be found in our over-aging society, a growing range of offers due to medical progress and innovation and furthermore an increase in the number of chronic diseases. Usual market mechanisms to regulate demand and offer via the price do not work in the health care sector. This results from health being a merit good. Therefore, and furthermore to secure access to follow the requirements of social responsibility even under economic pressure, government is forced to interfere in this sector.

Sustaining a health care system where the demand of people can be met on one hand with a secured funding on the other hand is one of the major challenges of our time. Without reducing the quality standard and with only scarce options for reducing costs, only a limited range of actions to meet the challenges remains. The increase of efficiency is carved out being a suitable method of resolution. Three approaches will be focused. Starting with health economics, methods to evaluate the efficiency in the health care sector will be illustrated. Concepts identified in other markets with identical challenges show further approaches for meeting the challenges in the health care sector. Therefore, the concept of Efficient Consumer Response is presented. Discussing ideas for research on factors of success to secure an effective and efficient introduction of new methods supplement the contribution of scientists to meet the requirements of social responsibility and economic pressure in the health care sector. Thoughts result in the interaction of the three approaches to come to a conclusion.

Introduction

Health is regarded as our most precious good. Since decades, the Western societies are confronted with growing health care expenditures. An absolute cost increase can be observed, as well as an increase on the ratio on the gross national product. Combined with a growing demand on health care products and services, this problem is aggravating. Maintaining a high quality health care supply is therefore a challenging task of our time.

The paper in hand addresses reasons for the development concerning cost escalation and demand increase. This is accompanied by an explanation for the government's sanction to interfere in the health care market. It is an important public task not only to secure a functioning system in the situation of economic pressure, but moreover to assume social responsibility. Opportunities to fulfil these requirements will be discussed.

The increase of efficiency is carved out being a suitable method of resolution. Three approaches will be focused. Starting with health economics, tasks and methods will be illustrated. The following approach identifies options on the basis of other markets with identical challenges. Discussing ideas for research on factors of success to secure an effective and efficient introduction of new methods supplement the contribution of scientists to meet the requirements of social responsibility and economic pressure in the health care sector. Discussing the interaction of the three approaches complements the thoughts to come to a conclusion.

Specifics of the Health Care Sector

The health care sector is determined by some specifics differing from common competitive markets. Generally, products and services for consumers called patients are traded in this market. But e.g. due to the social responsibility resulting in the demand for access to health care for all people, the market mechanisms do not come into action in their traditional way.

Dealing with the subject of health care is a matter of public interest, because public spending finances this sector. As the health care expenditure increase is not followed by an equivalent development of the income growth in this sector, even a sinking income can be expected, the situation will be aggravating. This growing gap is accompanied by the ticking of a time bomb, unless this development will be stopped. Analysing the developments and challenges in the health care sector is the first step to identify possible levers to influence trends and reacting on challenges. Understanding the characteristics of health supply marks a starting point. The description of developments on the demand side and the cost side of the health care sector will complement the understanding of the situation.

Health as a private, public and merit good

Due to the constitution of the World Health Organisation (WHO), health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. It is considered the most precious good of humans.

Well-being of individuals is of both, private and public interest. The importance of health for human beings is evident. An appropriate state of health comes along with the ability of people to cope with their everyday life. Moreover, it is the basis of enjoying life. Generally it is of everybody's private interest to keep a good state of health and to be able to participate in life without limitations.

On the other side, health as a public good comes into focus due to two reasons. In the last century under difficult hygienic conditions it was of public interest to avoid epidemic plagues for keeping a social community alive and avoiding hunger and sorrow. Therefore, sanitation and later the introduction of obligatory vaccinations became a public task.

The second reason for public interest in health is the role of individuals as production factor in business life. Healthy people can go to work, pay taxes and contribute to the existence of the social community. The lack of health may lead to the loss of job and the dependence on social welfare – temporarily of daily sick benefit or even of long-term nursing. Former tax-payers convert into demanders of social services.

Furthermore, health is regarded as a merit good. Due to the term introduced by Richard Musgrave (1957), merit goods are characterised by an insufficient demand from public perspective. The main reasons for the low demand can be found in

Irrational decisions: Consumers do not consider the advantages and disadvantages of decisions or do not understand the complex situation. Not using a security belt in a car was considered irrational and led to the introduction of the obligation for installation and use of belts in cars in the 1970 years. Another example is the obligation not to drive a car after heavy alcohol consumption.

Incomplete information: People are considered not to have access to all information for an optimal budget allocation, e.g. house owners do not know about the savings caused by thermal insulation. Government therefore subsidised testing at times. In health care, consumers cannot assess the doctors' skills. Therefore, quality of medical care is secured by education standards on one hand and the obligation for obtaining approvals on the other hand.

Wrong time preferences: They refer to the fact, that future events are ascribed less importance than present events. Therefore e.g. the compulsory nursing insurance was introduced, so young people already contribute to an insurance they will make no use of in their present life, but with growing probability in the future.

External effects: The advantage of the individual deciding about the demand differs from the public interest in the demand. E.g. a vaccination can cause the individual a light fever or a light inflammation

at the injection site. On the other hand, vaccinations avoid the spreading of epidemics and are therefore of public interest.

Whereas in most markets pricing mechanism and competition rule the market developments, the health care market requires interferences. The classification of health as a private, but moreover a public and merit good explains government action to obtain a sufficient demand on one hand and access for the entire population on the other hand. Being a public and merit good legitimates the government's interference in the health care market and the necessity to develop market regulation mechanisms.

Demand for Health Care Products and Services

The health care market is considered a growing market. These markets are characterised by a growing demand for the relevant goods. Market growth in an existing market can be generated in different ways. First of all, the number of users can be increased. Secondly, the intensity and the duration of use in an existing market with regular customers can be enhanced. A third way can be found in creating need for new, differentiated goods.

Goods offered in the health care market can be classified in services and products. Services are delivered at hospitals and resident doctors, but moreover at physiotherapists, ambulant nursing units etc. Products include physical goods like drugs or medical devices delivered by pharmaceutical and medical companies directly or via pharmaceutical wholesalers or pharmacies. Services and products are combined to offer therapies to treat specific diseases, diagnosing them, avoiding them by prophylactic activities or to ease the patients' situation by palliative activities.

A special interest in the health care market can be set, because it is a market with growing demand due to

An over-aging society:

Life expectation is steadily growing while the number of newborns is still slightly sinking. Combined with a slow reduction of the German population from 82.26 Mio in 2000 to 81.802 Mio in 2009 (Bundesministerium fuer Gesundheit (2011), 1.1) this leads to a growing ratio of elderly people. As especially elderly people demand health care, the number and the ratio of demanders grow and moreover, the duration of their demand grows.

A growing range of offers caused by medical progress and innovations:

This creates new demand. Having e.g. a large number of diagnostic devices creates the possibility to make use of a range of them to come to a diagnosis. As soon as new therapeutic or diagnostic tools are invented, one makes use of them. This is desired, because it offers the possibility to detect diseases earlier or to treat diseases that had been incurable so far.

An increase of chronic diseases:

Especially the big diseases resulting from an unhealthy lifestyle like hypertension and diabetes mellitus show an earlier incidence, i.e. younger patients with an earlier outbreak of the disease. Combined with a higher expectation of life due to excellent treatment options this leads to the prolongation of the time under therapy.

Costs of Health Care Products and Services

From an economic perspective, a market with an expected increase in demand may be called a paradise for managers. A secure and growing demand secures jobs and gives investments the opportunity to pay out. Investments in the number of hospitals and beds in hospitals, in production plants of pharmaceutical companies, in product development should be expected. None of that happens in the health care market. Instead, the number of hospitals and of beds is sinking. A decrease of 8% of the hospitals respectively 12% of the beds from 1998 to 2009 can be observed (Bundesministerium fuer Gesundheit (2011), 11.4).

But with a glimpse on the financing of the health care sector, the challenges in this market become obvious. The growing demand for health care products and services leads to growing expenses. Unlike other markets, the costs for products and services are not only covered by consumer. This can be explained by claiming access to the market for all citizens independently from their purchasing power.

Health care costs are distributed to three groups of payers. The first group to be mentioned is the health insurance. In Germany, all people are obliged to contract with a health insurance, either a public or a private one – dependent from their income respectively their job. With 87%, the majority of people are member of a statutory health insurance. The earnings and the spending of these insurance companies are both growing constantly. An increase of spending of 14.3% from 2000 to 2007 can be observed (Bundesministerium fuer Gesundheit (2011), 9.5A).

Government shares furthermore the costs for the health care system e.g. for operating and investing in hospitals. Third group of payers are patients themselves. They contribute via prescription and practice fee, co-payments for specific services and taking over the entire costs for the so-called OTC-drugs that are prescription free. An increase in spending can be observed here as well.

Overall, the ratio of health care expenses on the gross national product raise from 10.3% in 1999 to 11.6% in 2009. In the same period, the health care expenses per capita grow from 2 530 € to 3 400 €, which is an increase of 34% (Bundesministerium fuer Gesundheit (2011), 9.3).

1. Facing the Challenges

Sustaining a health care system where the demand of the people can be met on one hand with a guaranteed sustainable funding on the other hand is one of the major challenges for Germany as well as for most European countries. This health care system has to meet the following requirements:

- The requirement for health services on a high quality standard is the first to be named.
- From a social perspective, access to this high standard for the entire population has to be maintained.
- And last not least, bearable costs for all parties involved have to be secured.

Moreover, the health care market has to be considered from the macro-economic perspective. The market offers an enormous and growing number of jobs. An increase of jobs from 1999 to 2009 of 15.4% can be observed. 11.8% of all employed work in 2009 in the health care sector (Bundesministerium fuer Gesundheit (2011), 11.4). This sector not only allows a wide number of employed the opportunity to make a living, they moreover contribute to health insurances. By paying taxes, the employed contribute to the national income and to financing the health care system.

Observing the aggravating problem of financing the health care services, the income side offers solutions by increasing the contribution rate, the co-payments made by patients or raising the taxes used to finance health care services. Other possibilities can be found in reducing expenses by an elimination of services. These options are not in accordance with the requirements stated above and are neither favoured by governmental units nor by patients.

Reacting on the challenges has to consider complex market relations. An increase of the contribution rate of the health insurance leads to higher non-wage labour costs and makes investment in jobs more unattractive. On the other hand, a decrease of the contribution rate came along with a shift of costs either to the tax payers or the patients directly – both alternatives that do not really relieve the system as a whole and therefore do not deliver an acceptable solution.

Patent expiries of drugs lead to the introduction of low-priced generic drugs and to a price decline in the product market. Despite high product development costs for pharmaceutical companies, only a short period of time with exact schedules for gaining revenue remains. So the price reduction by generic drugs reduces the costs of the health insurances respectively of patients in case of OTC-drugs. But on the other hand, it destroys jobs in the pharmaceutical companies and, moreover, it brings a negative impulse for further product development and research on pharmaceutical products.

Without reducing the quality standard of the health care system or removing services and furthermore with only scarce options for reducing costs, only a limited range of actions to meet the challenges remains. Concentration on increasing the efficiency of the system can be regarded as the silver bullet to meet the requirements.

2. Contribution of Management Research

Activities to secure a high quality health care system therefore have to focus approaches increasing the efficiency of actions. Concepts fulfilling this requirement have to be identified and implemented in all parts of the health care sector. This may first of all include methods to determine the grade of efficiency of health care processes, services or products to identify the best choice. Health and pharmaco-economics deal with that subject.

Dealing with rare goods is the core competence of economics. Scarcity of (monetary) resources is common in most economical situations. For that reason, a view in other sectors to learn from their experiences is an effective approach. If suitable concepts to solve problems in the health care sector are identified and their implementation is prepared, one has to pay respect to a successful i.e. effective and efficient introduction. Identifying factors of success is one major task in meeting this requirement. These three approaches will be addressed in the following sections.

2.1 Health Economics

As a specific branch of economics, health economics deals with the evaluation of the effectiveness and efficiency of health care products and services (Hajen et al. (2006), p.11ff.). Pharmaco economics in particular compare the benefits of specific therapies to identify those with the best input-output relation (Mueller-Bohn & Ulrich (2000), p.11ff.).

Generally, health economics address the problem of allocation. It intends to give answers to the questions, whether public and private resources are distributed in accordance with peoples' needs. Health care has to be delivered for minimized costs by a given quality without wasting narrow means. It addresses the question, whether the ratio of health expenses on the overall public expenses is on a desirable level. It deals with the optimal ratio of e.g. health promotion to therapy costs.

Health economics deals furthermore with the problem of efficiency (Hajen et al. (2006), p. 13). This implies the uncovering of potential for cost reduction while keeping quantity and quality of the outcome on a constant level. Specific methods to assess this ratio are developed.

A third field of health economics can be found in assessing the quantity of offers based on the needs known. As the market mechanism in the health care sector does not work, regulating methods have to be identified, e.g. for assessing the desired number of doctors or hospitals. This is accompanied by regulating prices of health care services and the distribution of costs on the cost units in the health care sector. An optimal financing procedure has to be found. Another subject health economics deals with is the question of the health care sector's contribution to the growth of a country's national economy.

For investigating the raised questions, health economics uses specific economic evaluation methods. These methods are characterised by assessing the relationship between input and output. They are based on the assumption that in the health care sector decisions about an alternative use of given

resources are taken. As a person's health respectively his life is not traded on a market, we do not have market prices for assessment. Furthermore, the market regulations inhibit the forming of market prices. These specifics form the necessity of evaluation techniques individual for health care.

This evaluation concentrates on the impact of a health technology such as prevention programs, medical treatments, drugs, a comparison between ambulant and inpatient treatments or new steering instruments like Disease Management Programs or treatment guidelines etc. Their impact can be observed as an improvement of the life expectation of patients or an improvement of people's health status. After assessing this, it can be compared with its costs. Further consequences like their legal, society or ethical aspects are matter of the so-called health technology assessment (Hajen et al. (2006), p.222).

Evaluating these objects requires the operationalization of the benefit of medical technologies. This can be the prevention of death, healing or easing diseases and therefore reducing pain and malaise, the recovery of physical and mental functional efficiency. They cover a wide range of embodiments.

They are opposed to the related costs. Costs can be classified in direct, indirect and intangible costs. Direct costs cover personnel and material expenses for health technologies, i.e. drugs, medical products or operating costs. Indirect costs include e.g. productive loss due to illness and time costs. Intangible costs are psychosocial costs like pain, fear or social isolation (Hajen et al. (2006), p.225).

Costs are expressed in monetary terms. Benefit can be expressed in monetary terms as well, but furthermore in efficacy or enhanced quality of life. Several types of health economical evaluations exist. The cost minimization analysis, cost benefit analysis, cost effectiveness analysis, and cost utility analysis are among the most common ones (Schoeffski (2008), p. 79ff.).

Cost minimization analysis combines two separate cost analyses to gain information about the cost of two or more alternative technologies. The analysis aims at finding the cheapest way of treatment. Whereas the focus is on cost, the outcome and especially differences in the benefit should not be neglected. This can be obtained by means of a cost benefit analysis. Cost benefit analyses consider the overall cost and the entire benefit of medical technologies are expressed and evaluated in monetary terms. Cost effectiveness analysis focuses the efficiency of medical interventions. This can be expressed in e.g. days without pain or the absence of symptoms as well as the gain of life years. Whereas costs are expressed in monetary values, benefit may be demonstrated in non-monetary objectives and opposed to the costs. It allows the comparison of two or more ways of treatments. Cost utility analysis can be regarded as a sub-class of the cost effectiveness analysis. Here the evaluation of the benefit is performed based on the patients' assessment, i.e. the perceived effects on peoples' quality of life are set into focus. This allows far reaching comparisons within the entire health care system.

All these evaluation technologies require knowledge of both, medical and economical aspects. A collaboration of experts from both professions is strictly required. Furthermore, gaining realisable

information from the evaluations has to solve the problem of the quantification of the benefit. And furthermore, access to valid and reliable data in a sufficient quantity has to be secured.

2.2 Learning from other markets

The transferral of existing approaches and experiences from other sectors into the health care sector is a suitable way of introducing new processes and concepts to organize processes in the health care sector more efficiently without inventing the wheel anew. One option presented in this paper can be found in the ECR-concept.

Efficient Consumer Response (ECR) is a co-operative concept where retail companies and producing respectively service companies work together to make the market as a whole more responsive to consumer demands and promote the removal of unnecessary costs from the supply chain. The concept was developed in the grocery sector in the mid-nineties (cf. Mueller-Hagedorn et al. (1999), p. 61ff; Zentes & Swoboda (1999)). It aims on serving the customers' needs better, faster and at less cost. In the grocery sector this includes a broad assortment with an adequate choice, service convenience, the quality of goods and their freshness. An efficient way of reaching the customer to make profits in a world of small margins is most critical for success. This implies the delivery of the right product in the right amount for the right price and focuses therefore the optimisation of the supply chain as well as improvements on the demand side i.e. with the concept of category management to meet the customers' needs.

The innovative approach was created in a market that is determined by strong competition between the trade companies, but also between retail and producing companies. Concentration and displacement processes on both, production and trading side as well as growing system costs (e.g. for CRM-systems) combined with growing expectations on the customer side are predominant in the fast moving consumer goods sector. These developments led not only to an aggravation of the horizontal, but moreover the vertical competition. Beside this competitive element, the relation between industry and retail is determined by mutual dependencies. The retail needs the manufacturers' products to fill their shelves. Manufacturers need access to the customers. A cooperative arrangement of the business relationship can deliver a contribution to ease the companies' situation. In this situation the concept of Efficient Consumer Response was born.

This situation is in accordance with the health care sector's. Equating patients with customers in the FMCG-sector and furthermore the retail's gatekeeper function towards the customer make parallels between the competitive pressure in the grocery market with the situation in the hospital sector obvious. Therefore, the idea suggests itself to investigate a possible solution to solve the problems in the hospital sector. This requires the description of the ECR elements as well as their transferral into the hospital situation (Kreipl (2004)).

ECR aims at improving the processing goods including all related transactions. Costs that do not create value to the customer are to be eliminated in all steps of the distribution system. Needs and expectations of the customers are set into focus to gain a win-win-win situation for producer, retail and customer. This has to be obtained by the combination of supply chain management and category management as a value chain management.

In detail four strategies create the concept. Efficient replenishment is the first strategy to be mentioned. It realises co-operative supply chain management. The remaining three marketing oriented strategies focus with the category management the value chain.

Efficient replenishment structures the processing of goods, information and payments to realise cost reductions in logistics and its administration along the entire supply chain. These activities result in a stock reduction, improvements of processes in warehouses, use of capacity of transport resources combined with a reduction of inventory cost and capital bonding costs. Avoiding an out of stock situation is basic requirement to be followed. The conventional delivery system is replaced by an inverted system, where an employee at the production site controls the quantity and rhythm delivered via the point of sale data directly from retail.

Efficient Assortment describes the arrangement of the assortment by retail and producer together to optimise retail capacity in the shelves as well as optimising the customers need. This aims at optimising the revenue in the sale area via optimising the space productivity. Optimising the placement of products, having an optimal assortment, eliminating redundant articles and creating clearly arranged assortments is intended. Efficient Product Introduction intends to develop and introduce new products in close co-operation between retail and producer. This aims at the provision of a larger number of demand-oriented products with a reduced time-to-market and a reduced flop rate. This shall improve the image, increase the turnaround of products and create revenue. This can be realised via combined market research, integration of the retail in the product development process and the creation of complementary product marketing systems. Efficient Promotion aims at the increase in sales with optimised costs for promotion activities. A joint optimising of the communication politics intends to distinguish the assortment of all enterprises involved.

Taking into account the demand for an all-embracing concept, all ECR basic strategies have to be realised. The supply side in hospitals does not differ from other sectors, so the introduction of Efficient Replenishment can be transferred easily. First techniques are already taken into action. Transferring the strategies of the demand side requires a translation of termini into the hospital situation. The hospital is the trading place where patients consume the health services. Assortment includes therefore the diagnosing, therapies and nursing performances as well as administrative services. Their optimising, e.g. a reduction of stay by a reduction of complications and frictionless processes can improve the cost situation, but furthermore the patients' satisfaction and the image. Efficient Assortment in hospitals cannot exclude services from the catalogue, but it can focus the efficiency of

the process of services. Besides general administrative or nursing processes, this has to focus therapeutic and diagnostic services. This can be realised by common research in detecting most efficient treatment pathways together with other parties in the health care system. This goes in accordance with an Efficient Product Introduction in hospitals, where innovative therapy concepts may lead to the introduction of new standards. This may consider specific indications or new nursing offers and can be performed together with e.g. medical suppliers. Its advantages can be found in a decreased use of resources combined with a quicker healing process and therefore reduced hospital stays. Efficient Promotion commonly organised by hospital and medical suppliers are possible in the field of public relations, e.g. in health promotion activities. It can create a positive image. These thoughts demonstrate starting points for introducing a concept from the grocery market into the hospital sector.

2.3 Research on the factors of success

Introducing new management concepts or new approaches to organize processes in the health care sector requires the investment of different resources. It is therefore a time and cost consuming undertaking which should be successful without spoiling resources.

Research on the factors of success aims at identifying the source of success for enterprises. Despite the numerous dimensions and multiple causes, success respectively missing success can be led back to a few basic factors. Knowing the reasons for success offers the possibility to concentrate on relevant aspects to be successful. Besides detecting ways for securing success, research on success and its influencing factors allows the use of the knowledge to detect crisis in an early stage and deliver therefore starting points for avoiding failures and therefore the loss of invested resources.

Basic requirement for maintaining an ECR co-operation and indicator for its success is doubtlessly the gaining of the intended increase in efficiency. These are indicators for success. Moreover, factors concerning the shaping of the partnership can be regarded as of prominent importance in a vertical co-operation (Kreipl (2004)). Ruekert and Churchill (1984) postulate, that the construct of satisfaction is of fundamental importance in understanding channel relationships. They assume that channel member satisfaction will lead to higher moral, greater co-operation and fewer terminations of relationships.

A relationship management with the partner is therefore a key factor for success. Trust between partners has to grow. Successful alliance partners can balance the interests of their partners with their own, maximise the potential of their network of partners, are capable of understanding and managing cultural differences, and know how to walk the fine line between competition and collaboration (Douma et al. (2000) p. 594).

Maintaining a co-operation depends on the ability to find consensus, solving conflicts between partners and distributing the realised advantages among partners. A stable partnership can only be obtained, when a short term, project oriented collaboration is developed being a long term

relationship. Then investments e.g. in new information and communication technologies and the adoption of structures and processes of the partner enterprises can pay off. Consequently, the long-term continuances depend on the selection of the right partner.

Supplementing factors of a successful implementation and operation of the ECR-concept can be found in the demand for consequent activities. This has to be based on the commitment of the general management. A change management to create a positive attitude to the new concept is required. This has to be embedded in an organisational form oriented on the changed processes.

The research focus in this concept is therefore on the satisfaction of partners in a relationship. Although research on relationship satisfaction did not develop a general accepted theory yet, the theoretical basis to explain this phenomenon is led back to the confirmation-disconfirmation paradigm, the most used approach in this field. This approach is based on the thought of a comparison of a target with an observed aim. This comparison results in either confirmation of the meeting the expectations or the expectations are not held, which leads to a disconfirmation. Only (over-)confirmation leads to satisfaction (Chaston (2000)). The more the co-operation partners' expectations in the collaboration are met, the higher is their satisfaction and the less likely is an interruption of the relationship.

Scientists have to find out the most relevant of relationship factors satisfaction and their development over time. From a method point of view, quantitative multidimensional constructs are to be recommended as the state of the art in management research. Quantitative large scale studies deliver a broad data basis, where universally valid statements can be generated relying on hypotheses based on management and behavioural theories.

This requires on one hand the development of scales that show the success of the ECR-implementation. Kreipl (2004) developed these key performance indicators based on the ECR Global Scorecard. To obtain a multidimensional construct, the measurement of relationship satisfaction has to be integrated. The model developed by Jap/Ganesan (2000) based on Ruekert/Churchill (1984) is suitable for this research task. They develop a three-dimensional construct of relationship satisfaction in business relation, consisting of the financial satisfaction, product satisfaction, and staff satisfaction. By means of a structural equation model (Backhaus et al. (2000)), the interaction of the relationship satisfaction with its single subfactors and the key performance indicators of the ECR-concept was tested then (cf. Kreipl (2004)). The satisfaction showed a strong effect on the willingness to cooperate with a specific partner, the most important factor of satisfaction was staff satisfaction, especially staff behaviour followed by staff competence.

This example shows the applicability of management research to integrate monetary, quantitative variables and furthermore behavioural variables into one statistical model based on statistical hypotheses that are led back on management and behavioural theories. This leads to the ability to deliver theory-based and hypotheses-based testing results with relevance for practical implications.

3. Conclusion

The paper in hand addresses the specific situation in the health care sector. Health as our most precious good is of major importance for every person, but as well for the public. Its characteristics as private, public and, moreover, merit good explain government's task to interfere in the market and regulate to secure social justice and social peace are described. The growing demand for health care products and services arises from an over-aging society, an increase of prevalence and incidence of many diseases and a wide and growing range of innovative health care offers. On the other side, financing the system is a growing challenge. With government, health insurances and the patients themselves, three parties bear the health care costs. Their capacity is limited. An increase of their cost burden can be accompanied by side effects, as e.g. an increase of non-wage labour costs making the country less attractive for investing in employment.

So on one hand we face the growing social responsibility to secure access to a high standard health care system for the entire population. On the other hand, we have to secure jobs in a big and even growing market offering income for members of the German population and taxes for the public authorities. A sustainable funding of the system is sacrosanct for its further integrity.

This challenge has to be faced by practitioners and scientists as well. This paper concentrates on the scientists' feasible contribution. A solid basis of knowledge is needed to come to decisions and allow sustainable, effective and efficient reforms. We discussed three approaches. Firstly, health economics respectively pharmaco-economics offer the possibility to compare cost and efficiency of therapies and therefore to identify the therapy of choice. In this field, the co-operation of scientists with medical, pharmaceutical and economic background is required. Secondly, the experience of other markets facing cost pressure can be used to adopt their efficiency increasing concepts to the health care sector. Thirdly, research on factors of success can accompany an efficient introduction of new concepts to accelerate the operational capability.

All three approaches together make a contribution to secure the existence of our high standard health care provision for the entire German population. Many tesserae create an all-embracing picture of life.

References

1. Backhaus K.; Erichson B.; Plinke W.; Weiber R. (2000): *Multivariate Analysemethoden: eine anwendungsorientierte Einführung*. Berlin: Springer
2. Bundesministerium für Gesundheit (2012): *Daten des Gesundheitswesens 2011*. Rostock: Veröffentlichungen der Bundesregierung
3. Chaston, I.: Relationship marketing and the orientation customers require of suppliers. In: *The services industries journal*. Vol. 20
4. Douma M.U.; Bilderbek J.; Idenburg P.J.; Looise J.K. (2000): Strategic Alliances, Managing the Dynamics of Fit. In: *Longe Range Planning* Vol. 33
5. Hajen L.; Paetow H.; Schumacher H. (2006): *Gesundheitsoekonomie; Strukturen – Methoden – Praxisbeispiele*. Stuttgart: Kohlhammer
6. Jap S.D.; Ganesan S. (2000): Control mechanisms and the relationship life cycle: Implications for safeguarding specific investments and developing commitment. In: *Journals of management research* Vol. 37
7. Kreipl C. (2004): *Efficient Consumer Response und die Bereitschaft zur Kooperation*. Wiesbaden: Gabler-Verlag
8. Mueller-Bohn T.; Ulrich V. (2000): *Pharmakoökonomie: Einführung in die ökonomische Analyse der Arzneimittelanwendung*. Stuttgart: Wiss.Verl.-Ges.
9. Mueller-Hagedorn L.; Dach C.; Spork S.; Toporowski (1999): Vertikales Marketing: Trends in der Praxis und Schwerpunkte in der theoretischen Diskussion. In: *Marketing • ZFP* Vol. 11
10. Musgrave, R. A. (1957): A Multiple Theory of Budget Determination. In: *Finanzarchiv* 17
11. Ruekert R.W.; Churchill G.A. (1984): Reliability and validity of alternative measures of channel member satisfaction. In: *Journal of Marketing Research*, Vol. 21
12. Schoeffski, O. (2008): Grundformen gesundheitsökonomischer Evaluationen. In: Schoeffski, O.; Graf v.d. Schulenburg, J.-M.: *Gesundheitsökonomische Evaluationen*; Berlin: Springer.
13. WHO (2005): *Constitution of the World Health Organization*.
14. Zentes J.; Swoboda B. (1999): Kundenbindung im vertikalen Marketing. In: Bruhn M.; Homburg C.; *Handbuch Kundenbindungsmanagement: Grundlagen – Konzepte – Erfahrungen*; Wiesbaden: Gabler.

Prof. Dr. Dagmar Preißing

The consequences of flexible employment on the expertise development of employees in times of severe demographic change

Prof. Dr. Dagmar Preißing

Germany, Fulda University of Applied Sciences

Email: dagmar.preissing@w.hs-fulda.de, Phone: +49 661 9640 269

Abstract

Purpose: *The purpose of this paper is to examine the effects of flexible employment on the receipt of knowledge and skills of flexible employed persons. The intention is to show that flexible employment is no appropriate working form for the future, especially when the expertise-retention of employees is a key factor for the success promising arrangement of the demographic change in an aging society.*

Design/methodology/approach: *This is a conceptual paper based on theoretical constructs relating to flexible employment.*

Findings: *The key finding from this study is that flexible employment is no adequate form of employment for the successful overcoming of the demographic change.*

Practical implications: *This paper provides evidence of the negative consequences and effects of flexible employment. Companies may realize that the replacement of the so far classical normal employment, understood as a perpetual full-time employment, by flexible forms of employment is no long-term solution in a demographically changing environment.*

Keywords: *Human resource management; flexible employment, precarity.*

Introduction

The demographic change in Germany is essentially coined by an aging workforce, an absolute declining number of employed persons and a dramatic scarcity of junior employees. Resulting out of this, one of the key demands for the creation of employment therefore is that the receipt of knowledge and skills for the whole still available labor force is assured over its entire working career.

But now the basic forms of employment change rapidly. The so far classical normal employment, understood as a perpetual full-time employment, is being increasingly replaced by flexible forms of employment. One of the reasons for this lies in the global competition, which causes an ever shorter becoming predictability of developments. In return, the demands on the adjustment-speed of the production processes and the employment systems increase, in order to survive as a business in the competitive environment. This essential flexibilization demand of work takes place in form of flexible

employment. But are these adequate forms of employment for the successful overcoming of the demographic change?

This question will be answered with a "No". Because flexible employment causes a segmentation of the labor market: The one part of the labor force is permanently in stable and well-regulated, and the flexibly employed part of the labor force is in unstable and irregular, respectively precarious employment. This precarization of the flexible employed includes the aspects of low wages, successive withdrawal of tariff-based protection regulations and short retention periods of employees in companies. Along with this comes a lack of expertise-retention of flexible employees by the company, as well as by the concerned themselves. Downgrading and an interconnected deficient employability are the result.

Thus, flexible employment is no appropriate working form for the future. Especially the expertise-retention of employees is a key factor for the success promising arrangement of the demographic change in an aging society.

The Demographic Development in Germany

The eleventh population forecast of the German Federal Statistics Office (StatBA: 2010) basically shows two main developments: The number of young people is declining; the number of older people is rising. The reasons for this are well known. Declining birth rates, longer life expectancy and lower positive balance of immigration are reasons for this demographic situation. The available manpower is decreasing.

In 2000 there were 51,000,000 people available on the job market. In 2050 there will be only about 40,000,000 people. At the same time this development is closely connected to an aging workforce. In 2007 the 35 – 50 years old age group was the largest one represented in the work force. As early as 2020 this largest group will be the 50 – 60 years old. (StatBA: 2010) The number of people in the young age groups is steadily decreasing while, at the same time, number of people in the older age groups is growing. As the number of older employees in companies rises significantly, enterprises will need forms of employment which guarantee the long-term expertise-retention of employees.

Basics of flexible employment

Definition of flexible employment

A flexible employment relationship differs in one or more areas from the normal labor condition, respectively that it does not meet at least one criterion of normal working conditions. In a positive definition of content a flexible working relationship features at least one of the following criteria:

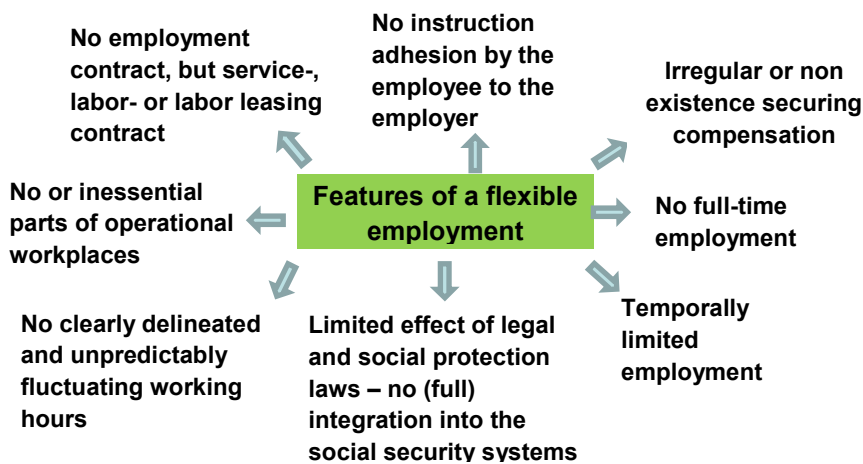


Fig. 1: Characteristics of flexible employment; source: own illustration in dependence on Haunschild, 2004: 199 et seqq.

Forms of flexible employment

There are several forms of flexible employment, which are often classified according to their degree of flexibility and the workforce planning dimensions. However, in the following only those forms of flexible employment will be looked at more closely, which are quantitatively gaining importance. These flexible employment relationships include:

- Temporary employment (+238% growth rate)
- Minor employment (+112% growth rate)
- part-time employment (+46% growth rate)
- Limited employment (+46% growth rate) (Source: Federal Statistical Office (a), micro-census, 2008)

The importance of flexible employment therefore has increased over the last few years: the share of flexible employees has increased from 17.5% in 1997 to 25.5% in 2007. (Federal Statistical Office (b), 2008: 7).

Effects of flexible employment on the expertise development

Principally it could be assumed, that the employer bears the responsibility for the maintenance of competence of their employees. The reality is different however. According to the statements of the Expert Commission Financing Lifelong Learning several types of flexible employment suffer from the fact, that hardly any qualification adaptation to changed requirements for the target group of flexible employees takes place, in the context of occupational advanced training. (see Commission of Experts, 2004)

Thus, the following analyzes whether flexible employed have chances available, to educate themselves in order to maintain or to advance their professional skills. At this juncture four key dimensions were identified, which have a negative impact on the qualification in the context of flexible employment.

1. The income dimension

Flexible employment includes precarious potential. "Employment can be described as precarious, if the employed fall, due to their occupation, distinctly under an income-, protection- and social integration standard, which is defined and majoritarianly accepted in the present society. But even if labor is associated with loss of meaning, recognition deficits and uncertainty of planning to the extent, that social standards are being corrected in favor of the employees, they can be described as precarious." (Dörre, 2005: 252).

Precarious potential refers primarily to the income dimension, for example, the exclusion of flexible employees from collective and company agreements should be mentioned here. (see Brinkmann et al., 2006: 19). The temporary workers are being excluded from the principle of "equal payment" by the establishment of own associations and correspondingly low ratified collective agreements. This means that the income of temporary workers compared to those working in regular employment is lower and holds precarious potential.

The other flexible employees also show a precarious income potential: It is self-explanatory that no advanced training or further education can be financed on part of the employees, with the income of a minor job (monthly income up to 800 €). This income is barely sufficient for the preservation of life, the same applies to part-time employees. Low respectively precarious income therefore prevents the person concerned to take over advanced training in personal responsibility. The private financing of the training measure is not possible.

2. The temporal dimension

The temporal dimension - in terms of long-term employment stability and therefore job security – hinders a longer-term planning of personal investment in education. If the employment security is cut, the income security is also cut. On the one hand, the finance ability of advanced training measures is being questioned again. On the other hand, the lack of employment stability means a more frequent change of workplaces. Thus the question arises for the future field of activity following the currently carried out function. As a chief example the temporary work employments should be mentioned. The average retention time in a labor leasing company is three to six months. A goal-oriented educational planning becomes impossible, since a follow-up employment is often not always taken up under the aspect of qualification maintenance or even qualification build-up, but rather under the aspect of preventing unemployment.

This means, that quite inferior employment conditions are being entered, understood as a non-conformity of the learned profession or academic degree with the performed occupation. As the term "inferior" already expresses, this means an over-qualification of the job holder, whose professional competence of action cannot be completely deployed in the context of the task area. Resulting is a high de-skilling risk for the employed. Therefore the temporal dimension also includes that education measures are being insufficiently implemented.

3. The spatial dimension

Employment insecurity additionally has a spatial dimension as a consequence. In the case of frequent job changes (in the context of temporary work, operation areas of up to 200 km from the residence of the employees are deemed as acceptable) either changes of residence or daily commuting can be connected. Especially the latter denotes, that regularly held evening advanced training measures cannot be visited due to lack of time. Required residence changes additionally prevent education measures, which are not being attended over a longer time horizon, such as evening schools (make up of a qualified school diploma) or accompanying occupational evening degree programs (for example, remote universities). The uncertainty is immense whether a change to a similar educational offer at the future location is possible. Therefore the spatial dimension can also prevent the further education and advanced training measures.

4. The construct dimension

The reasons for a lack of competence development may also lie in the formal construct of flexible employments. This especially becomes apparent at the example of temporary employment. The different interests of all parties within the construct of temporary employment are complex and require the question of responsibility for the maintenance of competence within temporary employment. These three groups can be considered:

- a.) the lender,
- b.) the borrower,
- c.) the temporary employee.

To a: The lender

The lender provides the borrower with skilled labor force, which means he should be concerned about the qualification of his employees. But primary, the costs of advanced training measures are contrary to this. The agencies of commercial temporary employment only act successfully in the market, if they generate revenues for the rental. Any additional measure, which increases the costs of the lender,

would have to be passed to the client, the borrower. This would give the lender competitive disadvantages, compared to the agencies which relinquish costly qualification measures. Therefore, the lenders will prefer to only take in already qualified employees at the beginning of an employment relationship. Should a de-skilling and an associated lack of subletting of a temporary worker take place, he/she can be released and replaced by a suitably qualified successor, or hence the required requalification occurs.

Another negative aspect for the lender is that with a qualification of the temporary worker his employability and thus his labor market value is increased. Thus the lender at once increases his risk to lose the temporary worker to the borrower through the takeover into normal employment.

A third reason for the lender to abstain from qualification measures for his employees, are organizational aspects. The lender seeks a temporarily consistent subletting phase of his employees, because only then revenues are generated. If further education measures would be implemented within a possible borrowing phase, costs would occur for the borrower in two ways: First, the revenues for the rental would be omitted, secondly costs for the qualification would occur. Thus essentially only the rental-free periods remain for the implementation of advanced training measures. But organizational issues come into play here. Rental-free periods are very rarely able to be planned, the right qualification measure therefore would have to be arbitrarily available. This situation is rather unlikely, because individually accomplishable qualification offers would have to stand by (see Weinkopf, 2007: 51). The exception to this may represent e-learning. Summing up it can therefore be stated, that the lender has little incentive to develop his employees.

To b: The borrower

It is unlikely that the borrower feels responsible for the maintenance or extension of competence of the temporary worker. Because he has requested those workers from the labor leasing company, who already have the adequate profile of requirements in order to perform the task that should be fulfilled.

Furthermore recent studies show, that the labor leasing company does not see itself in the responsibility for the competency development of temporary workers. This is the summary of the study by Axel Bolder, that development of competence in temporary work only occurs to a small extent (see Bolder, 2007: 105). The obtained data in the survey of borrowers and labor leasing companies show, that the temporary workers have to acquire their professional competence by themselves. The results of a re-presentative study on skills development in temporary work by Seidel and Münchhausen show, "... that the skills development is perceived and taken into account very little by the companies..." (Seidel, Münchhausen, 2007: 160).

To c: The temporary employee

If the temporary employment shows precarious dimensions, especially with respect to the income, temporal and spatial, a conducted further education on one's own responsibility will not take place. The temporary worker is dependent on the support of third parties. However, since neither the borrower nor the lender have little positive incentives to invest in the skills development of the temporary worker, it will not take place.

Result of the four main effects

Flexible employments are no appropriate forms of employment concerning the demographic change, because a preservation of the operating ability over the history of employment does not occur.

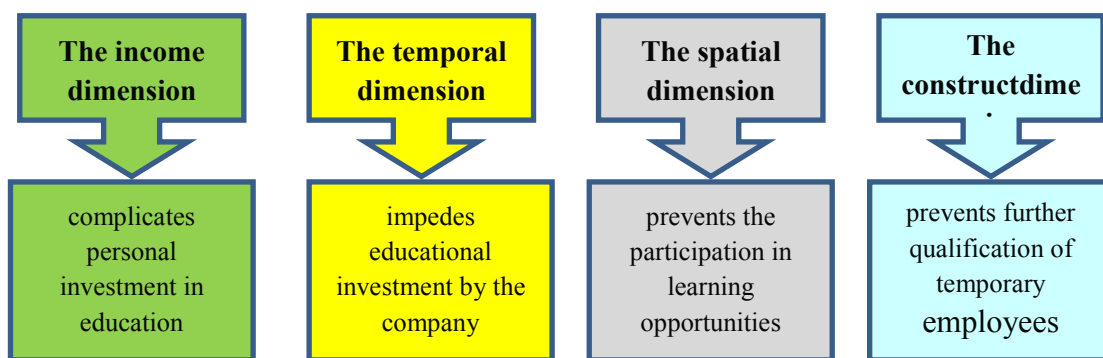


Fig. 2: Result of the four main effects of flexible employment, source: own illustration

Conclusion

The importance of flexible employment has increased significantly in recent years. The central question in this context is about the impact on the skills of flexible employees. In the context of demographic change, the qualification maintenance and skills development of available employable persons becomes an important strategic success factor of companies.

The results from the preceding considerations show, that flexible employment demonstrates an unsuitable form of employment for the successful handling of the future requirements in the area of human resource management. Most flexible work employments may fulfill the flexibility requirements of the company, however foil the apparently positive effect with negative impacts on the skills development of the occupational group. Flexible employees are no target group for the companies in further education measures. Because in the context of work flexibilization the retention period of employees sinks, decreasing the profitability of advanced training investments.

Furthermore, it was shown that the majority of flexible employment includes a high precarity risk. Since this mainly alludes to the income dimension, the person concerned himself does not have

sufficient financial resources in order to invest in his personal employability. The resulting consequences can be de-skilling and thus lacking long-term employability. The demand that staff has the responsibility for their employability is ad absurdum.

A knowledge-based society should imperatively ensure that the growing proportion of employees, who are in precarious and flexible employment relationships, become adequately qualified with regard to the demographic development. Otherwise the demographic development will clarify the fatal consequences of flexibilized employment, even if it only will be in a few years.

Literature

1. Bolder, A.: Kompetenzentwicklung in der Zeitarbeit: Die Aktivitäten von Zeitarbeit- und Entleihunternehmen, in: Münchhausen, G. (Hrsg.): Kompetenzentwicklung in der Zeitarbeit – Potenziale und Grenzen, Schriftenreihe des Bundesinstituts für Berufsbildung, Bonn, 2007, p. 97-106
2. Brinkmann, U., Dörre, K., Röbenack, S., Kraemer, K., Speidel, F.: Prekäre Arbeit. Ursachen, Ausmaß, soziale Folgen und subjektive Verarbeitungsformen unsicherer Beschäftigungsverhältnisse, in: Wirtschafts- und sozialpolitisches Forschungs- und Beratungszentrum der Friedrich-Ebert-Stiftung (Hrsg.), Abteilung Arbeit und Sozialpolitik, Bonn, 2006
3. Däubler, W.: Perspektiven des Normalarbeitsverhältnisses, in: WSI-Mitteilungen 8/1988, p. 449-457
4. Dörre, K. (a): Entsicherte Arbeitsgesellschaft. Politik der Entprekarisierung, in: Widerspruch, Beiträge zu sozialistischer Politik. Prekäre Arbeitsgesellschaften, Ausgabe 49, Basel, Zürich, 2005, p. 5-18
5. Dörre, K. (b): Prekariat – Eine arbeitspolitische Herausforderung, in: WSI-Mitteilungen 05/2005, p. 250-258
6. Galais, N., Moser, K., Münchhausen, G.: Arbeiten, Lernen und Weiterbildung in der Zeitarbeit – Eine Befragung von Zeitarbeitnehmer/-innen in Deutschland, in: Münchhausen, G. (Hrsg.): Kompetenzentwicklung in der Zeitarbeit – Potenziale und Grenzen, Schriftenreihe des Bundesinstituts für Berufsbildung, Bonn, 2007, p. 161-178
7. Haunschild, A.: Flexible Beschäftigungsverhältnisse: Effizienz, institutionelle Voraussetzungen und organisationale Konsequenzen, Habilitationsschrift für das Fach Betriebswirtschaftslehre, 2004, www1.uni-hamburg.de/perso/Haunschild_Habil_2004.pdf, Abrufdatum 11.09.2007
8. Keller, B., Seifert, H.: Atypische Beschäftigungsverhältnisse: Flexibilität, soziale Sicherheit und Prekarität, in: WSI Mitteilungen, 5/2006, p. 235-240
9. Kowalski, N.: Leiharbeit als neue Beschäftigungsform. Flexibilität als Markenzeichen, Berlin, 2006
Münchhausen, G. (Hrsg.): Kompetenzentwicklung in der Zeitarbeit – Potenziale und Grenzen, Schriftenreihe des Bundesinstituts für Berufsbildung, Bonn, 2007
10. Preißing, D. (Hrsg.): Auswirkungen prekärer und atypischer Beschäftigungsverhältnisse auf die Kompetenzentwicklung im demografischen Wandel, in: Erfolgreiches Personalmanagement im demografischen Wandel, München, 2010, p. 195-225
11. Seidel, S., Münchhausen, G.: Kompetenzentwicklung in der Zeitarbeit – Repräsentativerhebung bei Zeitarbeitsunternehmen, in: Münchhausen, G. (Hrsg.): Kompetenzentwicklung in der Zeitarbeit – Potenziale und Grenzen, Schriftenreihe des Bundesinstituts für Berufsbildung, Bonn, 2007, p. 137-160
12. Statistisches Bundesamt, Mikrozensus, 2010
13. Statistisches Bundesamt (a), Mikrozensus, 2008
14. Statistisches Bundesamt (b) (Hrsg.): Atypische Beschäftigung auf dem deutschen Arbeitsmarkt, Wiesbaden, 2008
15. Weinkopf, C.: Qualifizierung in der vermittlungsorientierten Arbeitnehmerüberlassung, in: Münchhausen, G. (Hrsg.), Kompetenzentwicklung in der Zeitarbeit – Potenziale und Grenzen, Schriftenreihe des Bundesinstituts für Berufsbildung, Bonn, 2007, p. 45-54

Prof. Dr. Michael Huth / Prof. Dr. Dirk Lohre

Risk Management in Logistics Enterprises: Results of an Empirical Study

Prof. Dr. Michael Huth

Germany, Fulda University of Applied Sciences

Email: michael.huth@hs-fulda.de, Phone: +49 (0)661 9640-250

Prof. Dr. Dirk Lohre

Germany, Heilbronn University

Email: lohre@hs-heilbronn.de, Phone: +49 (0)7131 504-252

Abstract

Recent developments and events – e.g. trend to globalization, outsourcing activities, shorter life time cycles, but also natural disasters and others – have led to the increase of risks in business. Therefore, risk management has been identified as one of the important management tasks to support reaching the objectives of a company. This is in particular true in supply chain management, a management area focusing on planning, controlling, and monitoring material, information, and financial flows in a network of companies and institutions. In academic research, so-called supply chain risk management is a relatively new research area, starting in the middle of the 90s of the recent century. Usually, supply chain risk management focuses on industrial institutions that are connected by a supplier-customer-relationship, but often ignores to incorporate companies that build a link between two industrial partners. Those ‘missing links’ are logistics enterprises that offer a wide range of logistics services (for example, transportation, warehousing, handling, value-added services).

The authors’ objective is to document and analyze the current status of risk management in logistics enterprises. They had conducted a first empirical study in 2008/2009, analyzing data from some 80 logistics enterprises in Germany. The data enabled them to document the ‘state of the art’ of risk management in the logistics industry. In 2011, a follow-up study had been conducted to track the developments in this industry. This study incorporates answers from some 70 logistics companies in Germany. Beside the documentation of the status quo and of possible developments in the logistics industry, this study shows how logistics companies reacted to the global financial and economic crisis in 2009/2010.

The paper intends to highlight the most important findings from the 2011 field study and to evaluate the status quo of risk management in logistics enterprises. It also specifies room for improvement to reach a higher level of professionalism in risk management for the focused industry.

Introduction

Recent developments and events – e.g. trend to globalization, outsourcing activities, shorter life time cycles, but also natural disasters and others – have led to the increase of risks in business (see examples in Sheffi, 2005, pp. 3-13 and 17-21). Therefore, risk management has been identified as one of the important management tasks to support reaching the objectives of a company (Hampton, 2009, pp. 10-13). This is in particular true in supply chain management, a management area focusing on planning, controlling, and monitoring material, information, and financial flows in a network of companies and institution. In academic research, so-called supply chain risk management is a relatively new research area, starting in the middle of the 90s of the recent century. Usually, supply chain risk management focuses on industrial institutions that are connected by a supplier-customer-relationship, but often ignores to incorporate companies that build a link between two industrial partners. Those ‘missing links’ are logistics enterprises that offer a wide range of logistics services (for example, transportation, warehousing, handling, value-added services).

In 2008, the authors conducted a first empirical study to analyze the status quo of risk management in the logistics industry. For this study, data from some 80 logistics enterprises in Germany had been analyzed. The data showed that risk management in the logistics industry was only rudimentary put into practice (Huth/Lohre, 2009, p. 31). The authors also assumed that both the requirements of stakeholders (banks, insurance companies, auditors, but also customers) and the starting global financial and economic crisis would lead to an increased set-up and use of a structured risk management in the industry (Huth/Lohre, 2009, pp. 31-32).

The first empirical study was followed by a second field-study in 2011 to track the developments in the logistics industry. This study incorporates answers from some 70 logistics companies in Germany. The most important findings from the 2011 field study are highlighted in this paper. Furthermore, the paper evaluates the status quo of risk management in logistics enterprises, compares it with the status of 2008/2009 and specifies room for improvement to reach a higher level of professionalism in risk management for the focused industry. The study also analyzes, if logistics companies reacted to the global financial and economic crisis in 2009/2010. (All results from the 2008 field study are taken from Huth/Lohre, 2009.)

The paper is structured as follows: Next chapter will give a brief introduction to risk management, so that the results of the analysis can be connected to concepts, tools, and methods in risk management. Subsequently, the 2011 field study is presented. First, the general information of the study is explained. Next, the paper discusses the top types of risk from the perspective of logistics enterprises. Finally, the current status of risk management in the logistics industry is discussed, focusing on different implementation and usage aspects. The paper concludes with a summary and an outlook to possible future developments.

Introduction to risk management¹

Risk management can be defined as a management system which – by using independent processes – should make sure to identify, assess, aggregate, control and manage all risks. Thus, it builds a framework for handling risks within specified risk tolerances. The management of risks should lead to fulfilling specified objectives, such as protecting the company's existence and success, increase of the shareholder value, and the minimization of risk-related costs.

There can be two types of motivation for implementing a risk management. On one hand, top management is interested in identifying and managing all risks that might lead to a serious threat to the company's success. On the other hand, there are numerous external parties that require a company to use a risk management. First, there are regulations and the law that force companies to install and run a risk management. Second, there are groups as external auditors, banks, and insurance companies that have an influence on the implementation of a risk management system. Third, customers (especially in B2B relationships) might require their suppliers to have a risk management system in use.

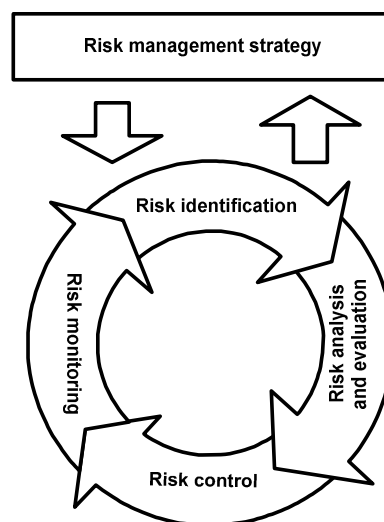


Figure 1: Risk management cycle (Huth/Lohre, 2009, p. 5)

Risk management is understood as a cycle that consists of a number of phases (see Figure 1). The framework for the risk management process is built by the risk management strategy. Here, standards and requirements for handling risks are defined as well as threshold values for implementing risk-reducing measures. The risk identification phase intends to detect known and unknown risks. The results of the risk identification are documented in the risk inventory, a table where all lists and their attributes are listed. All risks are analyzed, so that the sources and consequences are identified. This enables the risk manager to evaluate and prioritize risks regarding their probability and consequences.

¹ This chapter is based on Huth/Lohre, 2009, pp. 4-8.

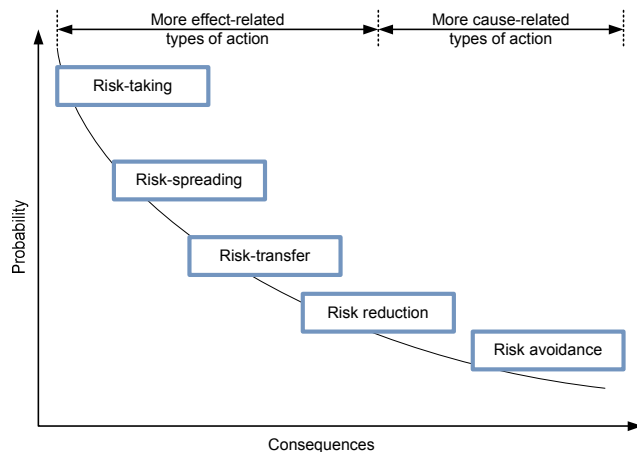


Figure 2: Types of risk management actions (Huth/Lohre, 2009, p. 6)

For those risks that exceed the defined threshold values, risk-reducing measures have to be identified, evaluated, and implemented. This is done within the risk control phase. Figure 2 shows different types of actions: Some of them focus more on the causes of a risk; others try to reduce the effects of risks. In general, risk-related actions intend to reduce both the probability and the consequences of a risk. Finally, in the risk monitoring phase, the implementation and effectiveness of an action is monitored. This is also the start for the next iteration of the risk management cycle.

Results of the 2011 risk management field study

General data of the empirical study

The 2011 field study had been conducted between February and April 2011. It was supported by Speditions- und Logistikverband Hessen/Rheinland-Pfalz e.V. (forwarding and logistics association in Hesse and Rhineland-Palatinate) and Verband Spedition und Logistik Baden-Württemberg e.V. (forwarding and logistics association in Baden-Wuerttemberg). Almost 700 logistics companies had been contacted via traditional mail and e-mail. They had been asked to fill-in a questionnaire that was available as a word document or in an internet-based form. The questionnaire consisted of four parts:

70 logistics companies sent back a filled-in questionnaire. This is a return rate of 10 %. From a statistical point of view, the absolute and relative number of returned questionnaires is not satisfying requirements for statistically firm results. However, the number is sufficient for statements regarding the status quo of risk management in the observed industry. This general structure of the companies that took part in the survey matches the structure in the industry which is described in detail in DSLV Deutscher Speditions- und Logistikverband e.V., 2010.

Important types of risk for logistics enterprises

There are many different approaches to classify types of risk. For example, *Wolke* differentiates between financial and performance-oriented risks and breaks them further down into more details risk categories (Wolke 2008, p. 7). For this study (and the first empirical study in 2008), the authors developed a list with 14 different types of risk. The participants were asked for the top risks for the logistics industry for today and for the future (within 5 to 10 years). Although an overview over today's risks might be of interest, the more interesting is an overview over tomorrow's risks, as shown in table 1.

Table 1: Top future risks (in brackets: development compared to status in the 2008 field-study)

| 2008 field-study | 2011 field study |
|--------------------------------|-----------------------|
| Human resources | Human resources (⇒) |
| Politics | Energy costs (↑) |
| Energy costs | Operational risks (↑) |
| Customer-related risks | Politics (↓) |
| Operational risks, competition | Competition (⇒) |

The top future risk, seen both in the 2008 field-study and in the current study, is human resource related risk. There might be two reasons for this type of risk: On one hand, the lack for truck drivers in Germany has been and will be increasing already in the near future, because the demand for drivers is still rising, and at the same time the number of job candidates is decreasing (Bundesamt für Güterverkehr, 2012, pp. 24-25). On the other hand, many companies realize that often their business is becoming more complex, e.g. due to increased contractual logistics projects. To be able to handle this complexity companies need graduates or junior managers with a profound background of knowledge. They might identify the gap between their demand for graduates and the 'supply' as a major risk for the future.

Beside human resource related risks, risks related to the (increase of) energy costs are ranked as the second most important future type of risk. For logistics companies, energy costs are a major driver of total cost. Often, this type of cost adds up to between 25 % and 33 % of the company's total cost (Bundesamt für Güterverkehr, 2012, p. 24). Therefore, they can strongly influence a company's profitability. This fact, plus the relatively low margins in many logistics area (except contractual logistics) and the volatility in energy prices, leads to energy costs seen as one of the top risks in logistics.

Status quo of risk management in logistics enterprises

Although the importance of risk management is widely acknowledged, the implementation status of risk management is still relatively low. Figure 3 shows the situation of risk management implementation in the logistics industry.

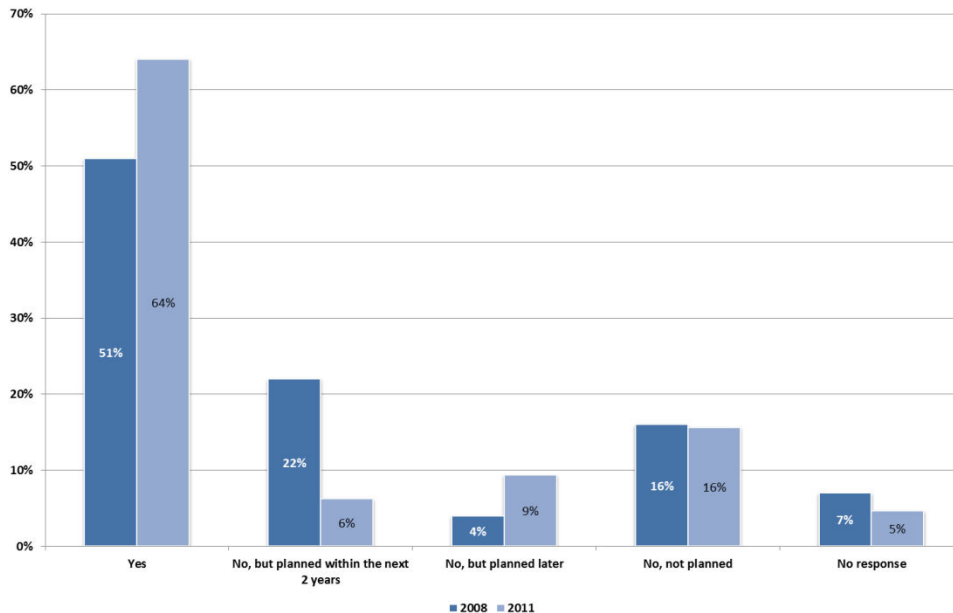


Figure 3: Implementation status of risk management in logistics companies

It becomes clear from the figure above, that most of those companies, that in 2008 had planned to implement risk management within the next two years, have realized their plans. Thus, almost two third of the companies have implemented a risk management. (This number, however, does not say anything about the qualitative status or the maturity of risk management, as we will see later.) Beside the percentage of companies that have a risk management system in use, there are still 25 % of the companies that do not have risk management on their agenda. Some of those companies do not plan to implement risk management at all, some do plan to establish it, but not within the next 2 years. It is interesting that still for one quarter of the companies risk management is not a topic, although at least the external requirements exist, as shown in section 0.

In most cases, risk management is assigned to the general management of a company: In almost two third of the companies is the general management in charge of risk management. 23 % of the companies use an existing department for risk management, whereas only 7 % have set-up an administrative department especially for risk management. This result is not surprising, since the logistics industry is characterized by a high number of small and medium companies (SME companies); only 11 % of the enterprises have more than 200 employees, and can be classified as a large company (DSLVL Deutscher Speditions- und Logistikverband e.V., 2010, p. 19). Thus, general

management in SME companies often is responsible for a number of different tasks. The tendency to build separate administrative units for certain tasks increases with the size of an enterprise.

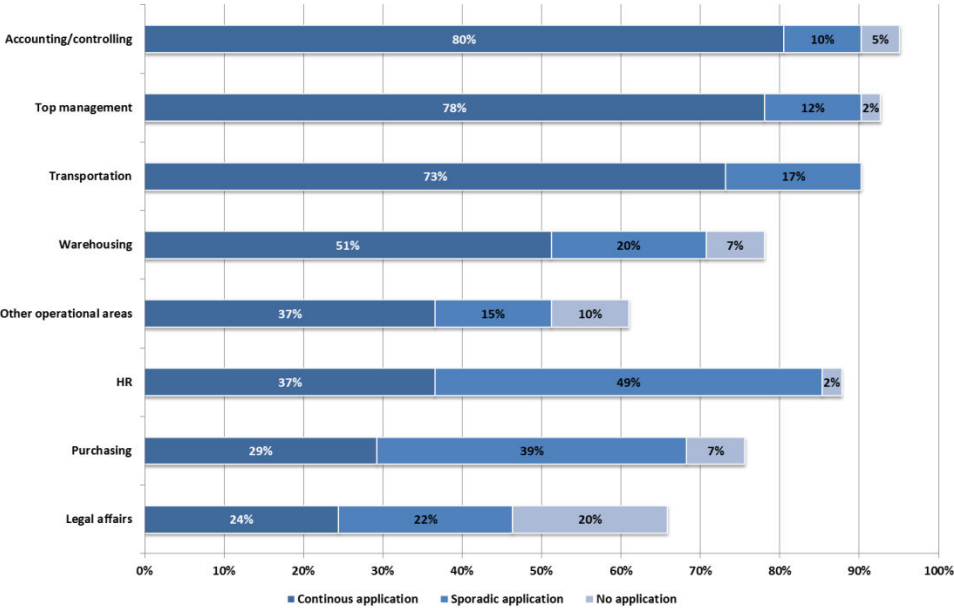


Figure 4: Functional focus of risk management

When it comes to the business functions risk management focuses on a regular basis, the functions most frequently mentioned in the empirical study are accounting/controlling, top management, and transportation, as shown in Figure 4. It is worth to take a look at those functions where risk management is less continuously, but more sporadically applied. The sporadic application of risk management in the HR and the purchasing function is contradictory to the identified top risks, discussed in section 0. Both, human resource risks and energy cost related risks should imply a regular focus of risk management onto those two functions. However, although companies see the importance of the two aforementioned risks, they have not adjusted their risk management adequately yet.

As mentioned before, some two third of the companies in the logistics industry have implemented a risk management. Nevertheless, the maturity level of risk management varies widely. The level of maturity can be characterized by a number of factors. In this paper, we will focus on the type of software companies use to support the risk management process and on the methods companies apply in risk management to identify, analyze, and evaluate risks.

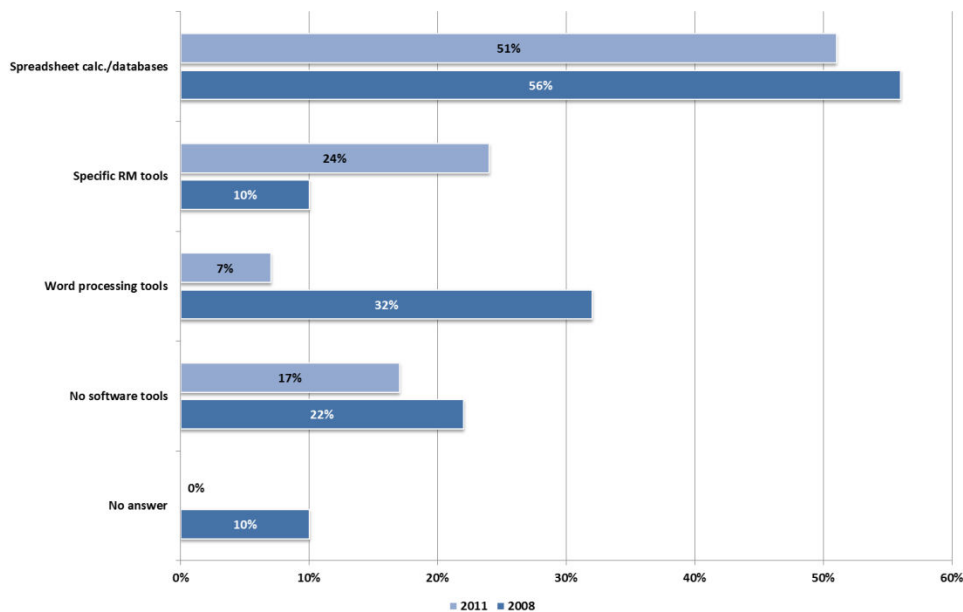


Figure 5: Use of software tools for risk management

Although it is not indispensable to use software tools in risk management, software can fundamentally support the whole risk management process (see, for example, Gleißner, 2008, pp. 243-246). The quantitative results of the two studies seem to show a shift to a more professional risk management: A quarter of the companies stated to use specific risk management software. However, the term ‘specific risk management tools’ was interpreted differently: For some companies, some functions in the fleet management or tour planning software lead to the conclusion that those tools are specific risk management software. Thus, although the professionalism in risk management seemed to have increased in the meantime between the two studies, this result has to be viewed critically. A positive trend can be seen in the strongly decreasing use of word processing tools for risk management. However, still one out of six companies does not use any software tools for risk management.

The maturity level in risk management can further be characterized by the methods companies use in risk management. Especially risk identification, risk analysis, and risk evaluation can be substantially supported using risk management methods.

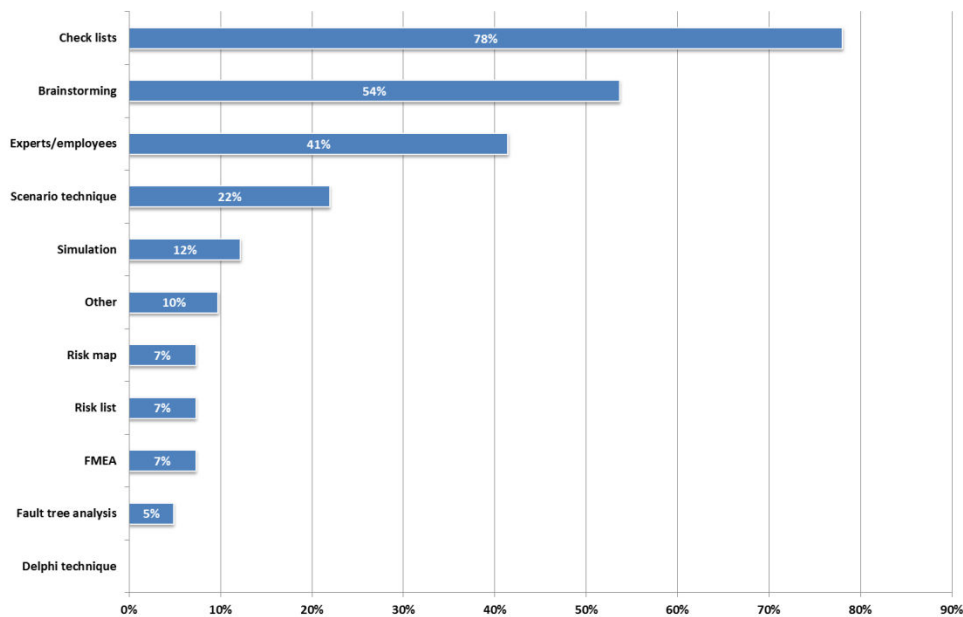


Figure 6: Use of risk management methods

Figure 6 shows a list of different methodological approaches and how intensively they are used in logistics risk management. The method that is widely adopted by companies is the use of checklists. They are easy to use, and build a good framework – even for staff which has little or no experience in risk management – to identify risks. Using checklists companies make sure, no known risks are overlooked. However, there is the danger that some risks, that are unknown so far, might not be identified, because there is no ‘search’ for new risks. Thus, checklists are a good and structured tool for checking a set of known risks.

The use of brainstorming (more than half of the companies) and interviews with experts in their domain (more than 40 % of the logistics enterprises) are also widely adopted approaches.

However, it is also clear, that only a small fraction of companies in the logistics business use methods that are well-known and established in risk management and that help to structure identification, analysis, and evaluation of risks. Such methods, e.g. scenario technique, simulation approaches for complex and dynamic systems, and fault tree analysis for identifying sources of risks, are used only by a small number of enterprises.

Even more interesting is the level of application of two more tools that are seen as the necessary basis of risk management. However, they are used only by a minority of logistics companies. One of the methods is the so-called risk inventory, which actually is a list of identified risks (Gleißner, 2008, pp. 117-119). Often, additional risk-related values are stored in the risk inventory, such as data regarding probability or occurrence of the risk and the possible consequences. Only one out of 14 enterprises seems to use a risk inventory.

The same situation appears when looking at the use of the so-called risk map, a graphical representation of the risk situation (Gleißner, 2008, p. 119). In a risk map, typically, the two axis are

used for the probability or frequency of a risk and for the average (or maximum) consequences. Although a risk map is an easy to use tool, again only 7 % of the companies with a risk management system use this approach.

Another interesting finding is the relatively low usage of the failure mode and effect analysis (FMEA). This method allows for documenting most activities of the risk management process in a single document. It is widely used in the automotive industry. Although 44 % of the logistics enterprises realize services in and for the automotive industry, only 7 % of all companies use FMEA.

Thus, while the use of checklists, brainstorming and expert interviews can be expected, since they are easy to apply methods, the low degree of application of other typical and well-established risk management tools leads to the conclusion, that risk management in the logistics business is still on a low maturity level.

Summary and outlook

When comparing the results of the 2011 study with those from the 2008 study, it becomes clear that the implementation of risk management in the logistics sector made progress. More logistics companies use a risk management system. However, still a fraction of some 25 % of the enterprises does not have plans to realize a risk management within the next two years. Those companies might not be sufficiently prepared for either the realization of risks (or an economic crisis as in 2009/2010) or for requirements by their customers to prove using a risk management system.

Beside the increasing percentage of companies with a risk management system, risk management is still on a relatively low maturity level. This had been shown focusing on two aspects. On one hand, risk management is only partially supported by IT systems. Although, it might not be appropriate – especially for small and medium enterprises – to use a high-end risk management tool, the use of risk management software can structure the risk management process and can help to make the risk situation transparent. The second aspect is the use of state-of-the-art methods to identify, analyze, and evaluate risks. Here, only a small number of companies use established approaches such as risk inventory, risk maps, or FMEA. Thus, for logistics companies, there is still room for increasing the maturity level of their risk management system that helps them to stay competitive in the market.

References

1. Bundesamt für Güterverkehr (2012): Marktbeobachtung Güterverkehr – Jahresbericht 2011, Cologne, http://www.bag.bund.de/SharedDocs/Downloads/DE/Marktbeobachtung/Herbst_und_Jahresberichte/Markt_2011_Jahresber.pdf?__blob=publicationFile.
2. DSLV Deutscher Speditions- und Logistikverband e.V. (2010): Zahlen, Daten, Fakten aus Spedition und Logistik 2010, Bonn.
3. Gleißner, W. (2008): Grundlagen des Risikomanagements im Unternehmen, Munich.
4. Hampton, J. J. (2009): Fundamentals of Enterprise Risk Management – How Top Companies Assess Risk, Manage Exposure, and Seize Opportunity, New York.
5. Huth, M. (2010): Entwicklung eines logistisch orientierten Risikomanagements, in: Praxishandbuch Logistik, edited by U. Pradel et al., Cologne, chapter 3.3.18, pp. 1-18.
6. Huth, M./Lohre, D. (2009): Risikomanagement in der Speditions- und Logistikbranche – Bestandsaufnahme zu Verbreitung und Reifegrad, edited by Speditions- und Logistikverband Hessen/Rheinland e.V., Frankfurt/Main.
7. Sheffi, Y. (2005): The Resilient Enterprise – Overcoming Vulnerability for Competitive Advantage, Cambridge.
8. Wolke, T. (2008): Risikomanagement, 2nd edition, Munich.

Dominik Och, MA

The risk awareness and the degree of implementation of systematic Enterprise Risk Management in the economic region Fulda

Dominik Och, MA

Marketing Manager

Germany, Walter-Fach-Kraft GmbH & Co. KG

Email: dominik.och@gmx.de

Abstract

Due to current economic crisis, increasing complexity of the world economy as well as legal regulations, the topic risk management gains more and more importance. Risk management is a management instrument to identify, evaluate, and control threats as well as chances that arise for companies. Capital market-oriented companies in Germany are legally bounded by the Control and Transparency in Enterprises Act (KonTraG) to practice Enterprise Risk Management. Goal of the legislator is to increase the transparency in order to avoid serious company crisis in Germany. In addition, many companies have recognized that risk management is a necessary instrument for ensuring competitiveness. Even small and medium sized companies which are not bounded to the KonTraG started to practice risk management to meet the market's new challenges. The economic region Fulda is characterized by successful operating small and medium sized companies, which makes it an interesting area for the study of how those companies evaluate the topic risk management, how they deal with emerging risks on the operational level, and in which way they implement possible risks in their strategic planning. This paper shows the results of a survey which was conducted in the context of a master thesis at the University of Applied Sciences Fulda. It summarizes the present status of implementation of risk management instruments, and gives recommendations for the improvement of the Enterprise Risk Management in the region.

1 Introduction

Enterprise Risk Management (ERM) is the identification, measuring, and treatment of risks. Risks are possible positive or negative variances from an expected result, leading to possible chances and threats (Gleißner and Romeike, 2005, p. 27). For a systematic ERM, a risk culture and strategy, constituting the risk management framework, are indispensable. In that framework, a risk early warning system, a monitoring system, and a risk controlling have to be implemented as subsystems. These subsystems form a holistic Enterprise Risk Management system in which the risk management process proceeds. The risk management process is dynamic and consists of the risk identification, risk evaluation and analysis, risk treatment, and risk monitoring (ISO 31000).

Capital market-oriented companies in Germany are legally bounded by the Control and Transparency in Enterprises Act (KonTraG) to practice ERM in an appropriate way. Since ERM is an efficient instrument to secure the future of the company it is also important for companies which are not bounded by the KonTraG to practice ERM. Furthermore, the corporate environment has a high degree of complexity and becomes more and more dynamic. As a result of this changing environment, there are more and new chances but also threats for companies, which is why even small and medium sized companies are compelled to practice ERM systematically in order to secure their future. Hence, it is deeply interesting to investigate the actual degree of implementation of systematic ERM of small and medium sized companies.

After giving a short introduction to the research base, this paper presents the results of a survey on the risk awareness and the degree of implementation of systematic ERM in the economic region Fulda which is characterized by medium sized companies acting successfully on both the national as well as international level. At the end, a conclusion and a short recommendation will be given.

2 Research base

The survey was conducted in the context of a master thesis at the University of Applied Sciences Fulda. The questionnaire for the survey consists of meaningful indicators which are able to measure the risk awareness as well as the degree of implementation of systematic ERM in the economic region Fulda. All the respondents were companies that belong to the Chamber of Industry and Commerce Fulda (IHK Fulda). In 2010, the IHK Fulda comprised 13,358 companies in total. Since the ERM of banks and insurance companies is quite different due to special laws, banks and insurance companies were not consulted. The respondents were sampled by a simple random sampling. In total, the survey had 28 respondents, a response rate of 10.37%.

3 Results

3.1 Structure of respondents

The 28 respondents are characterized by different structures. The following figure shows the legal forms of the respondents.

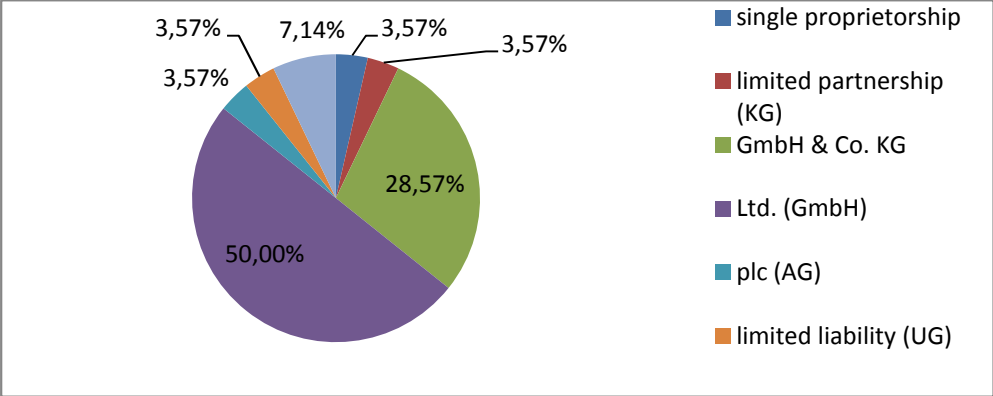


Figure 7. Legal forms of respondents

Concerning the economic sector, the companies can be classified as follows: 64.29% of the respondents belong to the tertiary sector, 32.14% to the secondary sector, and 3.57% to the primary sector. In total, the population is well represented by the sample in as much as it closely resembles the segmentation ratios with respect to legal forms and economic sectors of all companies in the region.

Figure 2 shows the number of employees of the participating companies.

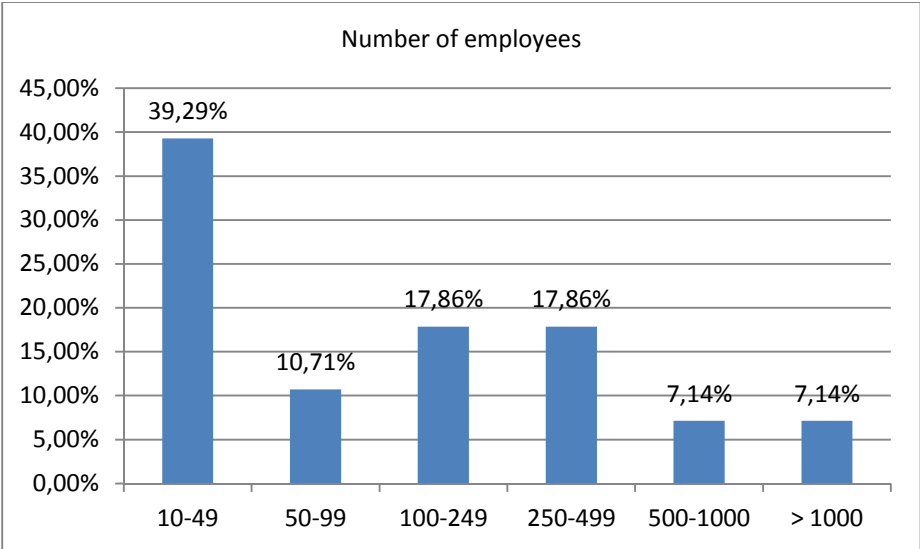


Figure 8. Number of employees

Companies with less than 10 employees have not participated. Another aspect of the companies structure is the geographical split of the activities, 39.29% of the companies operate internationally, 28.57% operate on the national level. The remaining companies operate trans-regionally. Companies which operate only regionally have not participated.

3.2 The risk awareness in the region Fulda

Nearly all respondents assess the topic risk management as “very important” or at least “important”. For 75%, the importance of risk management has increased during the last three years. The remaining 25% see no changes in the level of importance. The following figure shows the reasons why the respondents practice risk management systematically (multiple answers were permitted).

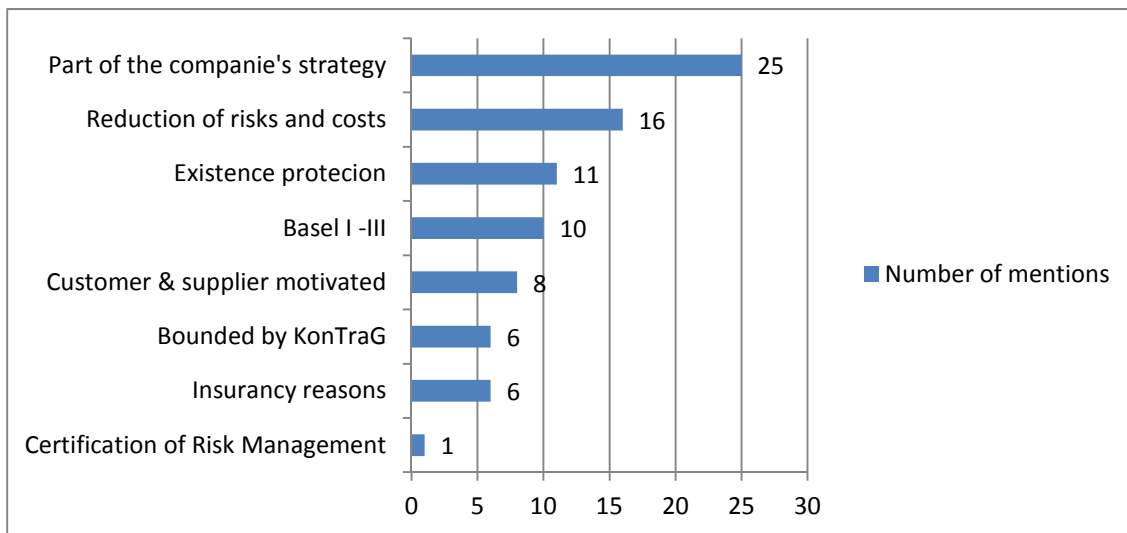


Figure 9. Reasons for ERM

In major the companies practice risk management as part of their company strategy. Further important reasons are the reduction of risk specific costs and minimizing the residual risk. Only one respondent has a certified risk management according to a risk management standard. In nearly 90% of the companies, the CEO has the main responsibility for the ERM. Figure 4 shows that early warning indicators are the most frequently used for the identification of risks (multiple answers were permitted).

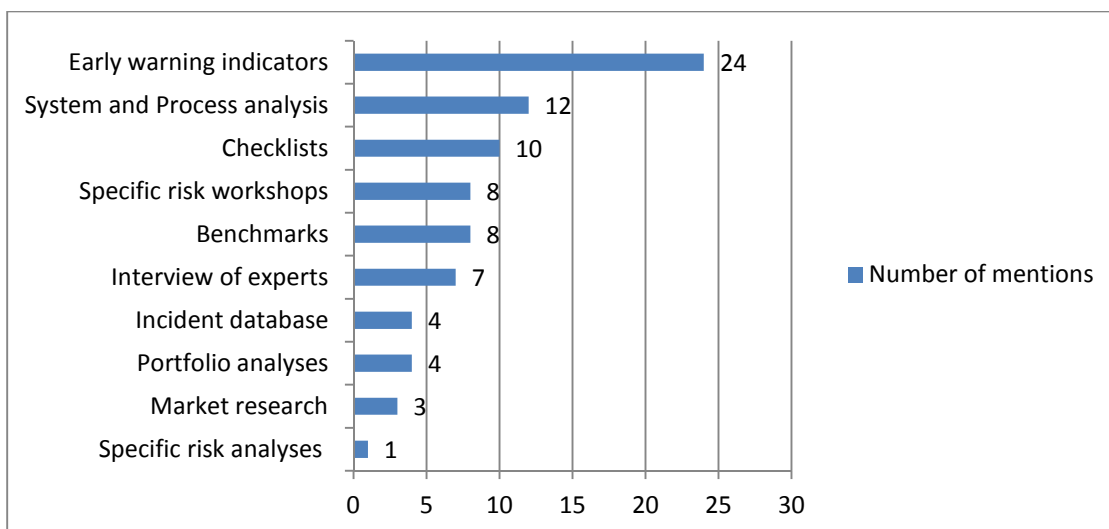


Figure 10. Methods of risk identification

Table 1 shows the evaluated average of the relevance of different risk types. A five-step Likert-Scale was used for the evaluation. The value 1 stands for “very relevant”, the value 5 for “not relevant”.

Table 2. Relevant risk types

| Risk type | Average | Standard variance |
|-----------------------------|----------------|--------------------------|
| System risks (IT, machines) | 1,86 | 0,85 |
| Sales risks | 1,86 | 0,80 |
| Person-related risks | 2,07 | 0,94 |
| Procurement risks | 2,14 | 1,15 |
| Liquidity risks | 2,14 | 1,04 |
| Process risks | 2,29 | 1,05 |
| Default risk | 2,54 | 1,37 |
| Legal risks | 2,71 | 1,21 |
| Interest rate risks | 3,14 | 1,30 |
| Natural risks | 3,57 | 1,17 |
| Political risks | 3,61 | 1,10 |
| Exchange rate risks | 4,07 | 1,18 |
| Share price risks | 4,36 | 0,87 |
| Real estate risks | 4,43 | 0,69 |

The most relevant types of risks are system risks, sales risks, person-related risks, procurement risks, and liquidity risks. Exchange rate risks, share price risks, and real estate risks are irrelevant for the respondents.

In all companies, the CEO has the main responsibility for the risk controlling. The diversification of portfolios, the limitation by determined risk limits, and insurances are the most used instruments for the controlling of threats. The increase of equity, outsourcing and the threat compensation by derivatives are not often used for threat controlling. A negative aspect is that about 21% of the respondents do not promote the risk awareness of the own employees. The 79% promoting the awareness do that by means of employee-trainings, distribution of info material, and individual supervisions.

In total, risk awareness in the economic region Fulda is appropriately high since the topic risk management is of great relevance in the view of the respondents. The companies know which types of risks are important and use efficient methods for the controlling of threats.

3.3 The degree of implementation of systematic ERM in the region Fulda

For the evaluation of the degree of implementation of systematic ERM, the following indicators were used:

- Integration of potential risks into the business plan
- Definition of risks within the company
- Degree of implementation of
- Risk early-warning-system
- Risk monitoring-system
- Risk controlling
- Value at Risk (VaR) calculation
- Implementation of scenario analysis
- Root cause analysis of risks
- Risk management documentation
- Combination of risk management with other management systems
- Risk information flow within the company

For a holistic risk management, it is necessary to consider possible threats as well as possible chances, whereas 32.1% of the respondents do only consider possible threats in their business plans.

During the companies planning process, 92.86% consider potential risk factors, 46.43% of them consider the factors during the planning of the entire company goals, the other 46.43% consider these factors during the planning of the strategic business fields. 7.14% do not consider potential risk factors during the planning process.

About 14.29% of the companies define their risks for all of their business fields, 35.71% define their risks partly dependent on the business fields, and 28.57% do a general definition independent of the business fields. The other 21.43% define their risks partly independent of the business fields.

Equally significant for the degree of implementation of a risk early-warning-system are:

- Permanent identification of risks
- Determination of early warning indicators and tolerance levels
- Evaluation of identified risks

The following figure shows the degree of implementation of the risk early-warning-systems of the respondents.

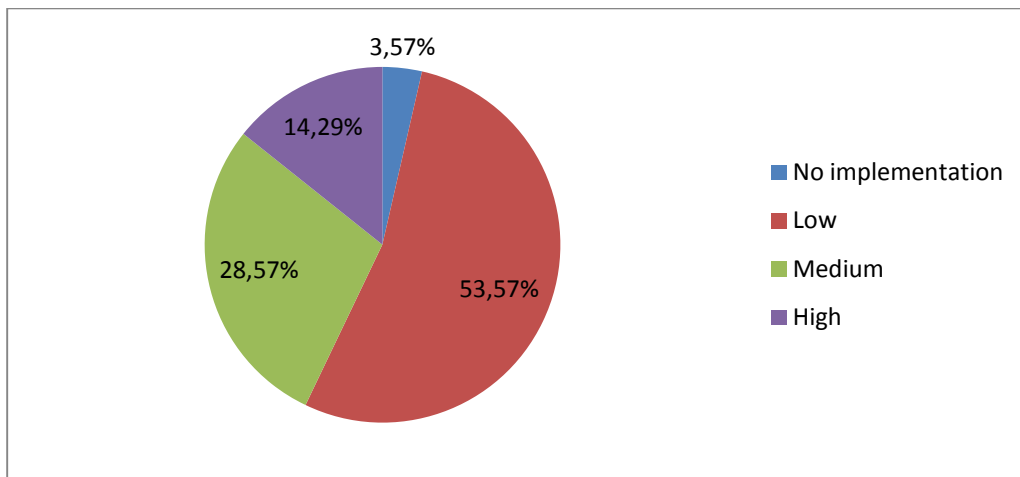


Figure 11. Implementation of early-warning-systems

Unfortunately, more than half of the respondents (53.57%) have a low degree of implementation, 28.57% have a medium, and 14.29% have a high degree of implementation. Only one company (3.57%) has no risk early-warning-system.

Another important aspect is the degree of implementation of a risk monitoring-system. A holistic risk monitoring-system contains:

- Organizational safeguards, like IT-security-systems and security training of the employees
- Internal monitoring by internal monitoring authorities
- External monitoring, for example by auditors

Figure 6 shows the degree of implementation of the risk monitoring-system.

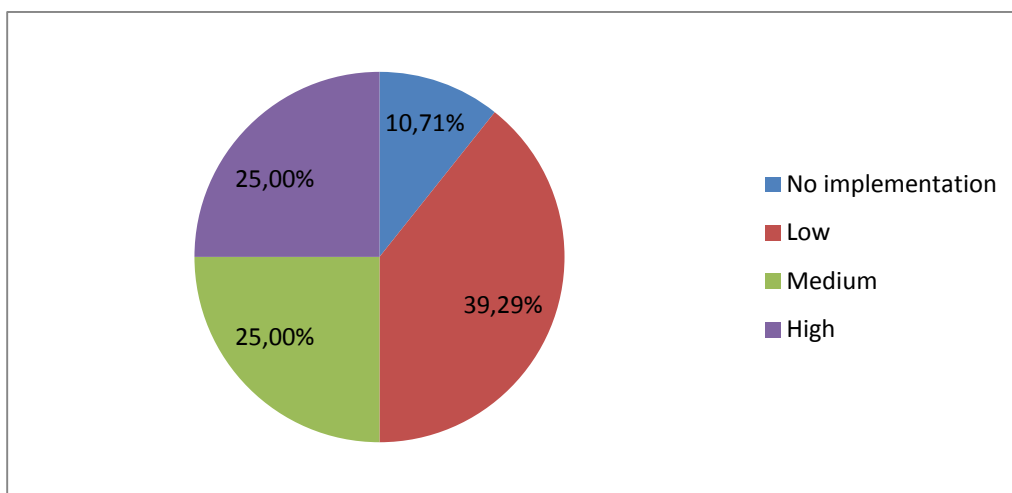


Figure 12. Implementation of monitoring-system

Over 10% have no monitoring-system, which is precarious. Nearly 40% have a low, 25% a medium and further 25% have a high implementation.

Important elements of the risk controlling are:

- Planning of actions for the controlling of identified and evaluated risks
- Result-monitoring of the risk controlling by target-performance comparison
- Coordination of the risk management in the whole company
- Reporting about the risk situation to internals
- Reporting about the risk situation to externals

Figure 7 shows that 35.71% have a low implementation of risk controlling. 46.43% have a medium, 14.29% have a high implementation. Only one company (3.57%) have no risk controlling.

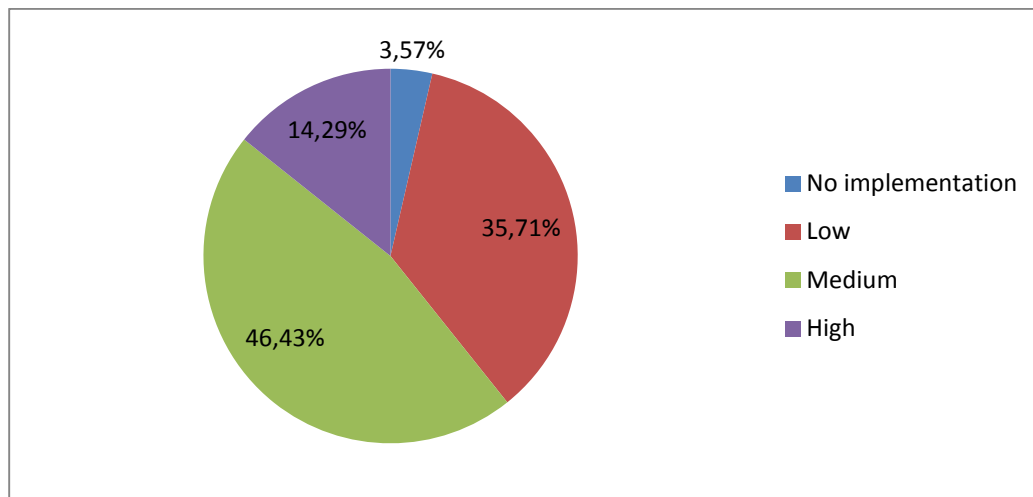


Figure 13. Implementation of risk controlling

In total, only two of the respondents (7.14%) have a high implementation of all the risk early-warning-system, risk monitoring-system, and risk controlling. One company has neither an early-warning-system nor a risk controlling.

The respondents prefer the calculation of the expected loss for the evaluation of identified risks. Furthermore, they often use scoring methods and calculate the maximum loss and the volatility. Only 10% calculate the Value at Risk (VaR) which is the most important risk management value. “The Value at Risk measures the potential loss in value of a risky asset or portfolio over a defined period for a given confidence interval (NYU).” 7.14% do not evaluate the identified risks. In most cases, the respondent companies present a possible extent of losses both monetary and as percentage from important key indicators like turnover or profit. Additionally to the evaluation of risks, 67.9% of the respondents do scenario-analyses. About 96.4% analyze the cause of emerging risks. Unfortunately, only 17.9% have a risk management guideline and documentation which is very important for a systematic risk management. 75% link the risk management with other planning and controlling instruments as strategic planning or a Balanced Scorecard. The other 25% do not link their risk management with other instruments. About 50% of the respondents have an optimal information-flow within the risk management since there is a mutual exchange of information between the company’s management and the different departments of the company. One company even has a risk management

software which informs the management and the departments automatically. 46.43% have a one-way information. One company has no exchange of information within the risk Management. In consideration of all aspects which are relevant for the degree of implementation of systematic risk management, the survey concludes that the degree of implementation is low to medium in the economic region Fulda. In total, 46.43% of all companies have a low, 42.86% a medium, and only 7.14% (two companies) a high degree of implementation. Even one company (3.57%) has no noticeable implementation of a systematic risk management. This result is clarified again by figure 8.

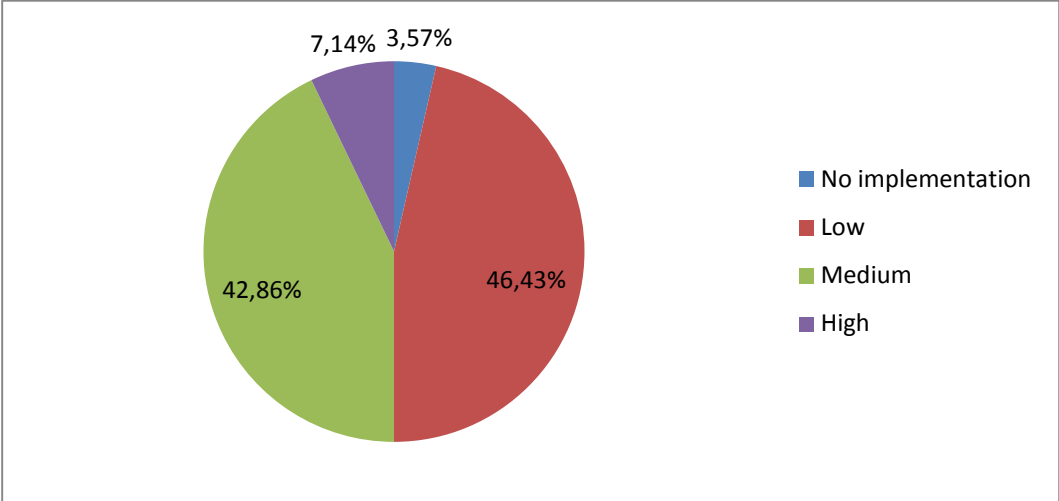


Figure 14. ERM implementation in the region Fulda

Despite these results, the companies evaluate the benefit of their risk management as high and the effort as medium. However, more than half (53.6%) of the companies stated that they will optimize their risk management in near future.

4 Conclusion and recommendation

In the economic region Fulda, the risk awareness is high, all 28 respondent companies practice risk management as part of their strategy. The company’s managements are aware of the importance of the topic and know the risk relevant fields. Furthermore, the companies use efficient measures for the controlling of risks. Nevertheless, despite the high risk awareness, the degree of implementation of systematic risk management is only low to medium since important aspects of a risk management system have been implemented either not at all or inadequately. Above all, the early-warning-systems of the companies are insufficient. In addition, the Value at Risk, the most important risk ratio, is calculated by few companies only. Even less companies have an adequate risk documentation. Another point of criticism is the one way risk information-flow of half of the respondents. So, it is recommendable that the companies improve their early-warning- system and the information-flow within the risk management. Furthermore, it is necessary to calculate the Value at Risk and a documentation of the risk management. Since more than the half of the companies plan to improve

their ERM soon, follow-up studies in this region measuring the progress of improvement would be interesting.

Calling References

1. ISO 31000 (2010): *Risk management – Principles and guidelines on implementation*. iso.org
2. IHK Fulda (2011): *Statistical numbers 2010 – IHK Fulda*. ihk-fulda.de
3. Gleißner and Romeike (2005): *Risikomanagement: Umsetzung, Werkzeuge, Risikobewertung; Controlling, Qualitätsmanagement und Balanced Scorecard als Plattform für den Aufbau*. Freiburg:Haufe Verlag
4. NYU: *Value at Risk – VaR*. <http://people.stern.nyu.edu/adamodar/pdfiles/papers/VAR.pdf>
5. Och, D. (2011): *Master Thesis: Das systematische Risikomanagement und dessen Implementierungsgrad in der Wirtschaftsregion Fulda*. Fulda: University of Applied Sciences Fulda

Prof. Dr. Josef Neuert

The impact of intuitive and discursive behavioral patterns on decision making outcomes: Some conjectures and experimental findings

Research Project funded by the State Government of Tyrol – Tiroler Wissenschaftsfonds

Prof. Dr. Josef Neuert

Germany, Fulda University of Applied Sciences

Email: josef.neuert@hs-fulda.de, Phone: +49 (0)661 9640-2551

with the assistance of:

Mariya Lebedeva, MA

Austria, Tyrol, University of Applied Sciences Kufstein

Abstract

Decision making behavior, decision making processes and decision making outcomes have been in the focus of business management and economic analysis both from a scientific and a professional angle ever since. Decision making research has particularly emphasized the role of individual and collective conduct in decision making processes related to their outcomes. The paper analyzes the impact of intuitive and discursive behavioral patterns in decision making, and in particular the potential impact of “diverse” personal predisposition on decision making results. The authors test hypotheses which suggest a cause-effect-relation between decision making behavior and decision making efficiency via lab experiments conducted 1980s and 2009. Both investigations show that obviously a “mixture” between intuitive and discursive decision making approaches tend to improve decision making efficiency.

Keywords: *decision making, intuition, discursion, efficiency.*

Introduction:

Research into business decisions and decision making behavior – summarizing synopsis

A myriad of academic and professional publications has dealt with the phenomenon of “human decision making”, particularly emphasizing individual and/or collective behavior in decision making processes for decades. Already Immanuel Kant refers to the way human decisions should be conducted, by pointing out behavioral instructions in his categorical imperative, demanding to “act along the guideline, based on which (one) wish(es) that it should become a general law” [31].

Whereas the categorical imperative stresses the underlying norms, human behavior should be based on, decision making and decision making processes as a research topic have been looked at in a multi-fold manner, especially focusing on analytical, theoretical, explanatory, exploratory and empirical aspects, intensively and extensively [11] [9] [7] [15] [25] [4]. The list of relevant publications could be continued nearly endlessly, however, the major areas of decision research are comprised of the following: People, situations and contexts, goals, quantitative and qualitative aspects, heuristics, efficiency and outcomes, timing and processes [35].

Either implicitly or explicitly, the issue of rational vs. irrational conduct can always be observed in the forefront of decision making research. Fehr and Ockenfels, for example, have recently demonstrated that in reality human beings are neither as efficient nor as rational as classical and neo-classical economists suggest in their various models [16] [8]. Thaler and Sunstein deal with the problem how to improve decisions in various areas of the society and the economy, and come to the conclusion that “nudges” indeed increase the efficiency of decisions, also in a socially preferred manner [51].

Kagel and Roth examined degrees of rationality and empirical anomalies in individual decision making, particularly focusing on judgment issues and choices, and uncertainty. They, too, demonstrate that the “classical” notion of the “rational man” (homo oeconomicus) in decision making processes can no longer be maintained [30].

Generally, decision making research can be divided into three major areas: Normative or prescriptive decision theory, descriptive or explanatory decision theory, and empirical decision theory as the field, where prescriptive and descriptive theory either clash or comply [37] [27].

Prescriptive and normative decision theory have developed rules, tools, models and heuristics for decision making behavior (i.e. rules for decision optimization, decision support models, decision tree, decision matrices, etc.).

Descriptive decision theory has discovered behavioral patterns in problem solving processes, like fairness and reciprocity, special effects like endowment, asymmetric information, loss aversion and specific biases [28].

Empirical decision theory, especially experimental economics, have dealt with various hypotheses of rational conduct in decision making processes and have disclosed numbers of ambiguous behavioral

patterns in decision making processes (which is especially pointed out in Kahneman's and Tversky's prospect theory, 1979).

In sum, decision making theory is still one of the most preeminent fields of business and economic research, both in a theoretical and empirical context. In particular, the issue of rationality is still being investigated from various angles, with a strong focus on the potential dependence between decision making rationality and decision making efficiency. Pars pro toto, Neuert (1987) has come to the empirically proven conclusion that in the context of business decision making tasks, the utilization of decision heuristics tends to improve the outcomes of semi-structured problem solving processes on the one hand. But also on the other hand, it was found out that human behavior in decision making processes never shows a pattern of "full" rationality, but moreover a limited frame of rationality [43], in particular combining "intuitive" and "discursive" elements of decision making behavior, can also lead to sufficient decision making results.

Intuition vs. "discursion" in decision making processes – Theoretical background and basic theorem of conduct

In a basic research study into managerial planning and decision making behavior and its impact on decision making efficiency, Neuert investigates potential cause-effect relations between human conduct in decision making processes, measured by degrees of rationality, and respective decision making outcomes [35]. In addition, a specific research question was formulated, trying to find out whether "intuition" and "discursion" as pre-dispositions of individual personality and behavior do have an impact on the degree of rationality in decision making processes and thus also on decision making efficiency. This research question is, with a time gap of 20 years, again in the focus of the paper.

Classical and neo-classical models of human behavior in business transactions are characterized by the image of individuals as the "homo oeconomicus", the rational man [46] [50]. The rational man possesses "a complete and consistent system of preferences which allows him to choose (advantageously) among alternatives available; he always knows completely what the alternatives are; there are no limits for the complexity of his rationale in order to find out which alternative is the optimal one; probability calculations are neither scary nor puzzling to his mind" [44, pp. 24 et sqq.].

In the meantime, additional research has convincingly proven that such an illusion of human behavior does not exist at all. In a number of publications it has been demonstrated that limited rationality and even sometimes obvious irrational behavior can be observed in decision making processes and business transactions. Effects like fairness, reciprocity, endowment, biases like loss dominating aversion, emotions etc. do play a preeminent role in decision making and business transactions [4] [23] [3]. On the other hand, there have been tendencies in social science trying to reduce human

reasoning and behavior solely to being based on affective impulses [5] [6].

More recently, questions have been raised whether human beings are at all capable to act goal-oriented, rationally reasoning and pro-active, or whether our entire behavioral patterns are based on “depth psychology”, which triggers human reaction by environmental stimuli. It is claimed that, in this sense, unconsciousness and sub-consciousness determine all our decisions and actions [49, p. W4]. In particular, latest research efforts in the area of “neuroeconomics” intensively deal with the issue, to which extent neurological pre-disposition is responsible for decision making behavior and our actions and transactions [40, pp. 33 et sqq.]. It seems that the entire scientific discussion about the dominating forces for human decision making can be placed into a continuum with the two extremes, the “homo oeconomicus” on the one hand, and the “homo irrationalis” on the other hand. Reducing human decision making solely to the one or the other end has been called an “act of schizophrenia of social science” by Herbert Simon [44, p. 29].

The state of the art of decision making research represents the notion that neither the entirely rationally acting homo oeconomicus nor the homo irrationalis, solely “inspired” by unconscious stimuli and emotions, do exist in “pure” form. However, it seems to appear plausible to work under the assumption that there are different “layers” of decision making behavior, varying in between the extremes of a 100% degree of rationality and a 100% degree of subconsciously driven conduct [35, pp. 67 et sqq.]. This presumption means that human behavior (in decision making processes) will never occur in form of a constantly complete rational design in the sense of “optimal conduct”, nor totally irrational in a sense of affect-driven actions.

To specify this notion, we have to determine more precisely the intension and the extension of the meaning of rationality. Simon says that the degree of rationality of an action depends “on the process which leads to it” [42, pp. 2 et sqq.].

In addition, following Max Weber, we understand “rational behavior” as an action based on consciousness, future orientation, critical reasoning, structuring of the problem and consistency of underlying norms of action [53].

In this context, still the question remains which role “intuition” and, on the other extreme, “discursion” actually play in decision making processes. “Discursion”-based behavior can be characterized as “passing from one topic to another” and - interestingly (!) – “proceeding to a conclusion through reason rather than intuition” [57].

Whereas the term “discursion” comes close to what we understand from “rational conduct”, the term “intuition” appears much more vague and undetermined. Indeed, intuition has been dealt within social sciences under a myriad of different and often contradictory perspectives, leading to Fiedler’s conclusion that “there are nearly as many definitions and (implicit) meanings of intuition as there are researchers involved” [17]. Moreover, Fiedler points out that intuition is supposed to imply meanings like unconscious, emotional and affective, spontaneous, without any external stimulus, and instinctive

[17]. Also, in recent times, frequently the idea of the “gut feeling” has been cited in order to describe and explain intuitive human behavior in decision making processes.

Fiedler tries to elaborate a scientific approach for the phenomenon of intuition as a behavioral pattern. In his explanation, intuition can be characterized as a “kind of a ‘hidden’ platform of informational knowledge, based on learning processes” [17]. In addition, he points out that the preciseness of intuition-based information activation is correlated with the volume of the “learning sample”. In this sense, intuition can be defined as “a small sample” of repeated learning processes. The Figure 1 illustrates Fiedler’s approach:

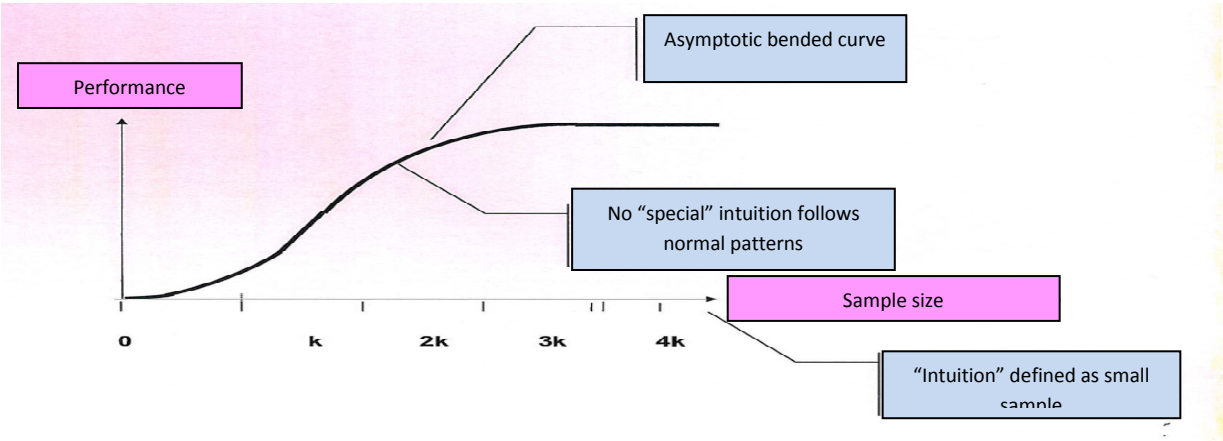


Figure 1. Fiedler’s approach (Fiedler, 2009)

Still, the question needs to be answered, when and why “intuition” occurs in decision making processes and research. In particular – in this context – it needs to be clarified whether individual personality respectively personal pre-disposition contributes to the degree of “intuitive” versus “discursive” behavior in decision making processes.

Kurt Lewin generally characterizes human behavior as an interplay between the person and its environment. These conjectures are summarized in his “psychological field theory”: “In psychology, one can primarily distinguish between a person (P) and its environment (E) in a situational context. The extent of one or the other element, which certain behavior depends on, varies tremendously. In principle, however, this psychological phenomenon depends on the predisposition of the person and its environment. So far, we can utilize the formula $B (=behavior) = f(S=situation)$. Behavior (B) can describe any psychological activity as the function $B=f(P, E)$.” [34, p. 34]

Based on this “programmatic equation”, we formulate a cause-effect-relation between behavior (as a dependent variable), and personality and its environmental context (as the independent variables). Given this notion, we can investigate whether and to which extent certain observable personal traits and observable environmental situations have an impact on the degree of rational decision making behavior.

Before we work deeper into the depth of this theorem, in the following we try to demonstrate the

relevance of the actual discussion, whether intuition and/or discursion as behavioral patterns in decision making processes should be researched into and should be further worked on, in order to improve human decision making and business transaction behavior.

The Centracon Study about strategic IT-decisions tries to find out about the impact of intuition on the actually chosen courses of action. In a sample of 288 organizations with revenues of more than € 100,000.- p.a., decision makers were asked, “how high they estimate on an average the portion of intuitive assessments in their decisions”. Nearly 60% answered that more than half or around half of their “final” decisions have been influenced by intuition [56]. In various other publications, intuition is considered as an important or even dominating element as far as the efficiency of decision making is concerned. Wunderlich points out that “intuition doesn’t have anything to do with emotional ‘fiddling’. Also it isn’t in any manner related to para-psychological competences” [55], just the opposite. Modern neurological research has found out that intuition is based on complex processes in the brain, which without “exact” consciousness can contribute to sufficient decisions and pertinent problem solving.

This leads to the conclusion that the “dictation of logic” should be seriously reflected and the “potentials of intuition” should be unlocked and discovered in order to come to sound decision making results [55]. Finally, Wunderlich quotes Albert Einstein: “An intellectual mind is basically not very active on our road of exploration. There is a phenomenon in our consciousness, call it intuition or whatever, and the solution comes to you, and you don’t know how and why.” [55].

Gerd Gigerenzer, a German business and economic psychologist, has done intensive research into “the intelligence of the unconsciousness and the power of intuition” [21]. He refers to the usual way of decision making in business transactions, where “pros” and “cons” have to be listed and weighed up against each other [21, pp. 49 et sqq.]. This approach, in his view, is logical, but assumes that human intelligence works like a computer [22]. In his opinion, logic is only one of many tools of intelligent problem solving. In many more cases, we rely on our “gut feelings”, meaning that we decide intuitively (ibid.). “Gut feelings are the result of simple heuristics. These heuristics often don’t come to our consciousness and quite often they are based on only one reason. Nevertheless, intuitive decisions are not only more economical and faster, but often also simply better” [22]. In addition, Gigerenzer clarifies that human decision making needs both, “the head and the tummy”. With “tummy”, he means intuition and with the “head”, he means discursion. Human decisions are based on different tools, which our brain provides. Some are more on the intuitive side, others are more on the discursive side [21].

On the other hand, there are also publications which represent a sustainably skeptical attitude towards the power of intuition in decision making processes. Straub raises the question, whether the belief into the efficiency of intuition can still be maintained at all [48, p. 3]. He also refers to the actual financial and economic crisis, asking whether the enormous dimension of the crisis could have been avoided or

reduced, if banks, organizations, managers, rating agencies, etc. would have had much better information platforms available [48]. In sum, Straub develops a plea for “management by mathematics”, based on the following rationale: Decision making needs better analytical fundamentals, and decision makers should much more frequently use mathematical methods and models, in order to improve the IQ of their organizations sustainably, ultimately meaning to strengthen their ‘empirical basis’ [48].

A study of Anderson analyses the question: “Intuition in managers – are intuitive managers more effective?” [2]. This study was comprised of a sample of 200 managers from 8 companies. The concept of intuition measurement in this study was based on Jung’s typology.

As a result, Anderson points out that intuition still appears to be related somewhat to organizational effectiveness, meaning that several managers are mostly intuitive decision makers. However, whether intuitive managers are more effective than discursive ones, “remains to be seen” [2].

Sjöberg conducted a study, labeled “Intuitive vs. analytical decision making: Which is preferred?” [45]. His investigation examines the preferences for intuitive against analytical decision making. The findings were related to perceived control, and into the risks and chances of negative and positive outcomes of the decision, respectively. Control was found to be positively related to the preference for an intuitive mode of making decisions. It was also found that the preference for an intuitive mode of decision making was mostly found in private consumer decisions, the outcomes of which were also seen by the decision makers as being most accessible to their own influence. In particular, judgments made by professionals, not directly affected by the outcome of decision were regarded as requiring a more analytical approach [45].

Finally, the latest publication of Dan Ariely with the title “Predictably Irrational” should be mentioned. He discusses “the hidden forces that shape our decisions”. Ariely strongly refers to those hidden forces as some of the causes responsible for the current economic crisis. He claims that irrational conduct is still a major driving force for human decisions. Ultimately, he tries to answer the question, how the world can recover from an economic crisis. He suggests being constantly aware of account potentially irrational elements of human conduct and, as a consequence, to introduce regulations, based on empirical research results, to further avoid continuous fallacies of scientific knowledge and actual behavior [3].

Last, but not least, Gaeth and Shanteau suggest to strengthen experts’ knowledge by reducing the influence of irrelevant information on experienced decision makers, by improving scientists’ judgments of risks and by improving expert judgment capabilities, in order to come to better decisions as far individual and societal utility and wealth are concerned [18].

Summarizing all the conjectures, hypotheses and research results mentioned above, we again refer to the primary research question of this paper: to investigate the impact of intuitive and discursive behavioral patterns on decision making outcomes.

In our sense, discursive decision making is characterized by logical and analytical conduct, moving step by step towards a problem solution, “where the steps are taken explicitly” [38]. Based on this, discursion is a purely fact-based and not at all psychologically or socio-psychologically influenced way of decision making, utilizing a high degree of information and proven knowledge for the problem solving process [35]. This notion, of course, is an ideal image, which to this extent, in all likelihood, never occurs in reality.

Intuitive decision making, on the opposite, “does not move ahead in clearly defined steps, but is much more based on an implicit recognition and insight into the entire problem.” [38, p. 42].

Westcot characterizes intuition as the “ability to come to pertinent and helpful conclusions, even on the basis of lower explicit information which would be usually necessary to come to this conclusion” [54, p. 98].

In analogy to our characterization of discursive decision making behavior, we can emphasize the following elements of intuitive decision making: Relatively low and small information basis for the problem solving procedure; relatively low transparency and comprehensiveness of the problem solving procedure; relatively short time for coming to a problem solution [35].

It is self-understanding that those typologies of discursive and intuitive decision making simply depict the “polar” ends of problem solving behavioral patterns, referring to a continuum of decision making attitudes in between, neither representing “complete discursion” nor “complete intuition” in decision making processes.

Based on this, we can formulate the following general hypotheses of cause-effect-relations between the degree of discursion/intuition and the degree of “rational” decision making behavior, itself again determining decision making efficiency.

The main research question, underlying this study, is a two-fold one: First, it tries to answer the question about the impact of intuitive vs. discursive (analytical) decision making behavior on the degree of rationality in decision making processes. Second, it is assumed that – based on the outcomes of an experimental study conducted by the main author in the 1980s – a higher degree of decision making rationality results in a higher degree of decision making efficiency.

The following complex of hypotheses sketches the presumed elements of influence on human decision making behavior. In accordance with Lewin, we suppose that decision making behavior is influenced by personality and situation (of the environment). From this statement we deduce the following basic sentence:

- Decision making behavior depends on the personality of the decision maker and the situational context of the decision making process.

By focusing on intuition and discursion as basically dichotomic variables of influence on the degree of rationality in decision making behavior, we develop the following basic hypothesis **A1**:

- If the intuitive personality disposition dominates, then the degree of rationality of decision making is significantly beneath average,

and consequently, basic hypothesis **A2**:

- If the discursive personality predisposition is dominant, then the degree of rationality of decision making is significantly above average.

Hypotheses A1 and A2 refer to the cause-effect relation concerning intuitive vs. discursive personal predisposition and degree of rationality in decision making processes.

In addition, we developed the following derivative hypothesis **B**:

- The higher the degree of rationality of decision making behavior, the higher the decision making efficiency.

This hypothesis B refers to the elementary cause-effect-relation we developed above, meaning that decision making efficiency ultimately depends on (more or less 'rational') decision making behavior in general [32, pp. 141 et sqq.] [1, pp. 13 et sqq.] [33, pp. 120 et sqq., pp. 252 et sqq.].

In compliance with the "best tradition" of Popper's "The Logic of Scientific Discovery", we believe that scientific research is not just comprised of the formulation of cause-effect hypotheses, but also of the attempt to empirically substantiate and/or falsify the respective conjectures [39] [10]. This is why in the following we introduce the research design of the empirical study which we conducted, based on an laboratory experiment.

Research design for the experimental investigation

In the early 1980s, the author conducted a laboratory experiment, using the business game FINIS as the experimental design. FINIS is a computer-based business simulation which demands periodical business decisions from the participants, competing with each other. At the end of each period, balance sheets, profit and loss accounts, cash statements and profitability indicators were developed to demonstrate the participants' decision making efficiency. Indeed we mean efficiency and not "just" effectiveness (as the degree of fulfillment of goals), because decision making efficiency ultimately, in our definition, pertains to "criteria of accomplishment" (like profitability, satisfaction, sustainability, etc.), occurring as decision outcomes, some of which may have been intended, others not so, explicitly. In addition, participants were asked for the degree of satisfaction they had gained with their own performance and the degree of compliance between their intended performance and the actual performance. As a result, a three-fold set of dependent variables, representing decision making efficiency, was developed.

Participants were observed by trained experimental supervisors in an anonymous manner, registering and documenting the following elements of rational decision making conduct: Goal-orientation,

utilization of available information, organization of the decision making process, utilization of decision making heuristics, and continuous reflection and controlling of the respective decision making performance.

As a result, the following “efficiency function”, was formulated:

$$\mathbf{DE} = \mathbf{f}(\mathbf{DDR}); \text{DE} = \text{Decision Making Efficiency} \quad (1)$$

DDR = Degree of Decision Making Rationality.

More precisely, in mathematical terms it reads [35, p. 309]:

$$\mathbf{b_1y_1 + b_2y_2 + b_3y_3 = a_1x_1 + a_2x_2 + a_3x_3 + a_4x_4 + a_5x_5} \quad (2)$$

[y_1 = formal efficiency, y_2 = material efficiency, y_3 = personal efficiency; x_1 = goal orientation, x_2 = organization of the decision making process, x_3 = utilization of available information, x_4 = utilization of decision making heuristics, x_5 = reflection and controlling].

Formal efficiency represents the degree of actual performance in comparison with the intended performance, the material efficiency represents indicators like profitability, solvency, rankings in comparison with competitors, and personal efficiency represents individual satisfaction of the participants with their performance.

The structural equation depicted above represents a canonical correlation, which was conducted as a statistical analysis of the collected data sets.

All together, 83 participants contributed to the laboratory experiment sample.

65 participants were advanced students of business and management, 18 participants were experienced practitioners.

The participants formed the competing “enterprises”, for which they had to make periodical decisions competing on a virtual market against three other “enterprises”. In sum, eight periods were conducted, finally leading to the entire data set which was subject to statistical analyses.

The statistical analyses delivered the following results, showing the relation between decision making efficiency as the dependent variable and the “rationality elements” of decision making behavior as the independent variables, achieved via a multiple regression analysis [35, p. 300]:

- Multiple correlation coefficient: 0,82041;

- Multiple coefficient of determination: 0,67307;
- F-value – (in order to find out the level of significance of the correlation coefficient and the coefficient of determination): 30,67558 (with a level of significance of 0,008).

The statistical analysis leads to the conclusion that there is a (statistically) positive relation between decision making efficiency and decision making rationality. However, it can definitely be stated that there is no linear functional dependence being observed, but an (estimated) depressive type of regression function.

The results of the multiple regression analysis were further supported by the procedure of the canonical correlation, showing the following canonical function combination [35, p. 312]:

$$V_1 = 0.12527x_1 - 0.50896x_2 - 0.12082x_3 - 0.38648x_4 - 0.21524x_5 \quad (3)$$

$$W_1 = -0.19679y_1 - 0.91849y_2 - 0.11450y_3 \quad (4)$$

$$r_{vw} = 0.81720; r^2_{vw} = 0.66781 \quad (5)$$

All those results allow for the conclusion that there is basically a positive correlation between all the elements of the canonical function $V_1(x_1, x_2, \dots, x_5)$ and the variable W_1 with its respective elements.

Again, it has to be pointed out that there is no linear function observable between the degree of decision making rationality and the decision making efficiency, but a “depressively bended” form of dependency.

The main research question of our empirical investigation, however, tries to discover a potential cause-effect-relation between intuitive vs. discursive decision making behavior and decision making efficiency. Since intuition and discursion are extremely hard to observe even in a laboratory experimental environment, we had to develop an “indirect” set of indicators, finally allowing some conjectures about the cause-effect-relation between intuition vs. discursion and decision making efficiency.

Before the beginning of the laboratory experiment, all participants were subject to the “Gray-Wheelwright-Test”, which is also called the Jungian Type Survey [26] [24].

The Gray-Wheelwright-Test is based on a questionnaire referring to personality characteristics in order to determine so-called Jung typologies of “bi-polar” attitudes, measured in the categories extraversion/introversion, intuition/recognition, thinking (discursion) /feeling.

The questionnaire consisted of 81 items. As a result, by combining the elements of intuition/discursion with the dichotomic auxiliary elements thinking/feeling and introversion/extraversion, the following scale of discursive vs. intuitive personal predisposition could be developed: Discursion 1st degree,

discursion 2nd degree, discursion 3rd degree, discursion 4th degree vs. intuition 1st degree, intuition 2nd degree, intuition 3rd degree and intuition 4th degree.

Those eight basic types of personality traits could be derived from the Gray-Wheelwright-Test scores.

Thus, independent variables could be operationalized and measured on a scale from 1 to 8 (1 meaning “full” degree of intuition, and 8 meaning “full” degree of discursion).

The dependent variable was represented by the degree of rationality gained from the data set of the experimental observation on a scale between 0 and 5 (0 meaning no rational decision making conduct at all, 5 meaning “total” rational decision making behavior).

Using the dependent and independent variables and their measurement described above, a correlation analysis was conducted to test hypothesis A1, leading to the following result (Table 1):

Table 1. Correlation Analysis [35, p. 281]

| | Degree of rationality | X₁ | X₂ | X₃ | X₄ | X₅ |
|---------------------|------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Coefficient | 0.0055 | -0.1266 | -0.0700 | 0.1656 | 0.0053 | -0.0158 |
| Cases | 160 | 160 | 160 | 160 | 160 | 160 |
| Significance | p=0.472 | p=0.055 | p=0.190 | p=0.018 | p=0.474 | p=0.421 |

The statistical analysis clearly shows there is no cause-effect relation between the increase of decision making rationality and the degree of intuition/discursion as a personality predisposition of the decision makers.

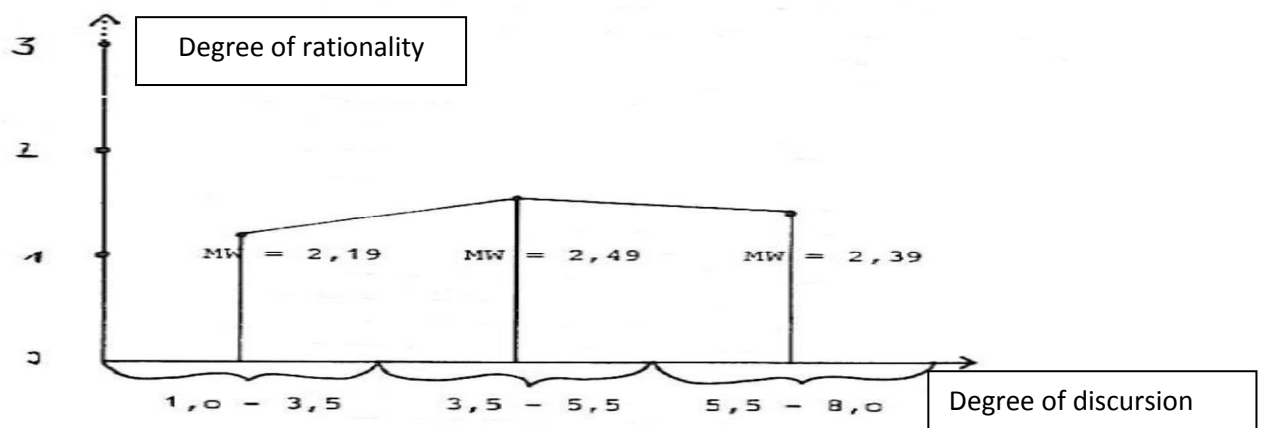
Moreover, a closer in-depth analysis shows that those participants (decision makers) demonstrated the highest mean concerning the degree of decision making rationality, who were placed nearly precisely in the middle of the spectrum between “complete intuition” and “complete discursion”. Table 2 depicts the respective data-set:

Table 2. Cause-Effect Relations [35, p. 282]

| Degree of intuition | Degree of rationality |
|----------------------------|------------------------------|
| 1.33 | 2.60 |
| 2.75 | 1.79 |
| 3.75 | 2.44; 2.09 |

| | |
|------|------------|
| 4.25 | 2.06 |
| 4.40 | 3.07 |
| 4.67 | 2.83 |
| 4.75 | 2.28 |
| 5.13 | 2.29 |
| 5.25 | 3.12 |
| 5.37 | 2.28 |
| 5.50 | 2.09 |
| 5.67 | 2.02 |
| 6.00 | 2.86 |
| 6.50 | 2.43 |
| 6,87 | 2.28 |
| 7.13 | 2.15; 2.16 |
| 7.25 | 2.63 |
| 7.63 | 2.37 |

In addition, a graphical figure also reports the described impression [35, p. 283]:



In sum, we could conclude from our 1980's laboratory experiment that neither "extreme" discursive decision making behavior, nor "extreme" intuitive decision making behavior contributes significantly to decision making rationality and via that to decision making efficiency.

Moreover, a "sane mixture" between intuitive and discursive elements in decision making processes appears to be a sustainably successful prerequisite for efficient decision making [35, pp. 281 et sqq.].

With a time delay of more than 20 years, in 2009, the laboratory experiment on the cause-effect-

relations between intuition vs. discursion in decision making processes and the respective decision making efficiency was repeated (based on a somewhat different lab experiment – design see below), trying to either replicate the empirical findings of 1980's study or to falsify them.

The empirical design of the 2009 experimental investigation was comprised of the following elements:

- Main research question: Is there an impact of intuitive vs. discursive decision making behavior on the decision making outcomes?
- Laboratory experimental sample: 115 graduate students in Master's programs of Business Administration, International Management, Sports-, Cultur- and Eventmanagement, Facility Management at a German University of Applied Sciences and an Austrian University of Applied Sciences.
- As the experimental design, the NASA game was utilized. The NASA game represents a decision making situation in an imaginative urgency (see attachment). The participants had to present their solution for this task, which was in the end "contrasted" with NASA's optimal solution.
- The participants had to act individually, independently and without any support and/or discussions with other participants. They were not given a time limit, but the actual time they needed to come to a complete solution was recorded.
- After the conclusion of the problem solving process, each participant was asked to fill in a questionnaire, either based on the Gray-Wheelwright-Winer 4-letter Type Indicator Test (based on Jung's typology theory) or the Myers-Briggs-Type-Indicator Test, which similarly deals with personality patterns like the Gray-Wheelwright-Winer-Test, as there are extraversion/introversion, sensing/intuition, thinking/feeling and judging/perceiving.

The Gray-Wheelwright-Winer 4-letter Type Indicator Test is a modified version of the Gray-Wheelwright-Test, which was used in the 1980s experiment, described above.

Recently, both test apparatuses were subject to reliability and validity investigations [12] [41]. Those studies came to the following main conclusions:

1. The study of Schaubhut/Herk (2009): The correlation coefficients as the test/re-test reliability indicator of the MBTI Test were higher than those of the Gray-Wheelwright-Winer Test, ranging from 0.61 to 0.89 with an 8-week time period [41, p. 6].
 2. Davis/Mattoon's study: The Gray-Wheelwright-Winer Test is one of the few tests especially designed to measure Jung's concepts of extraversion/introversion, sensing/intuition, thinking/feeling and judgment/perceiving. It can be regarded as one of the best test instruments available. But the T/H scale has limited reliability and validity [12, p. 238].
- Eventually, a correlation analysis was conducted to find out about a potential dependency between the decision making performances in the NASA game and the operationalized indicator results of the intuition/discursion personality tests. The analysis' results and their accordance or divergence from the 1980's empirical findings are reported in the following chapter.

Empirical findings and model refinement: the semi-discursive rationale - sdr

Once more, the basic hypotheses of the underlying research questions are formulated as follows:

- Intuitive/discursive personality traits do have an impact on decision making behavior and decision making efficiency.
- If decision makers show a significant intuitive/discursive personal predisposition, then the degree of rational decision making behavior is significantly below/above average.
- Since the hypothesis concerning the positive cause-effect-relation between rational decision making behavior and decision making efficiency in the business management context has been substantiated, we now propose that intuitive/discursive personal predisposition ultimately leads to a lower/higher decision making efficiency.

At first, referring to the experimental design (NASA game), we develop the indicator for decision making efficiency as follows (formula 6):

$$Efficiency = \frac{x_i/\bar{x}}{t_i/\bar{t}} \quad (6)$$

Where:

X_i – the sum of points (got in NASA play) of i-person

\bar{x} - average result (n=115)

t_i - total time needed for decision making by i-person

\bar{t} - average time (n=115)

$$X_i = \sum_{j=1}^{15} |X_j - X_{opt}| \quad (7)$$

X_{opt} – an optimal solution developed by NASA experts*

* The best result achievable is 0 points (if everything is right, that means NASA's optimal solution), the next best result is 2 points, the worst result is 112 points. Theoretically there are 15! combinations.

Secondly, we want to find out, whether the laboratory experimental design shows an acceptable level of empirical validity and reliability. To achieve that, we tested the empirical distribution of the variables “decision making results”, “time needed for decision making”, and “decision making efficiency” against the theoretical normal distribution. The procedure led to the following outcomes (Figures 2-4):

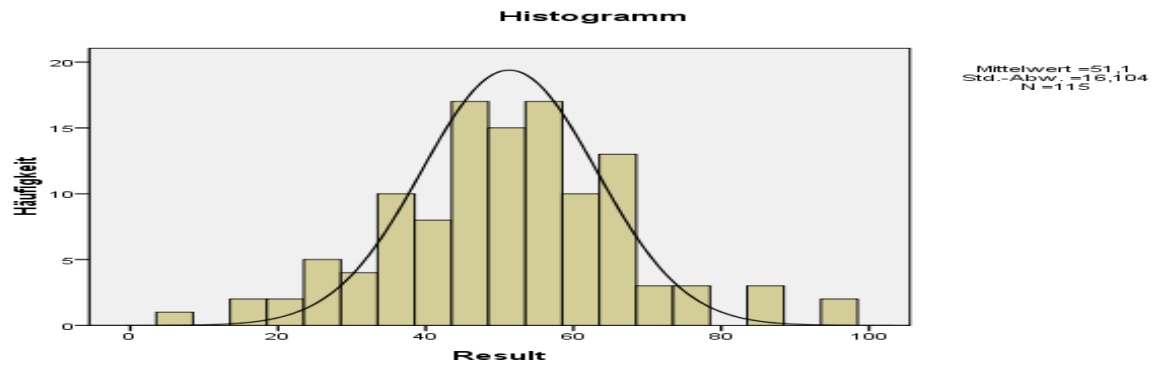


Figure 2. Distribution of variable “Result” (X_i)

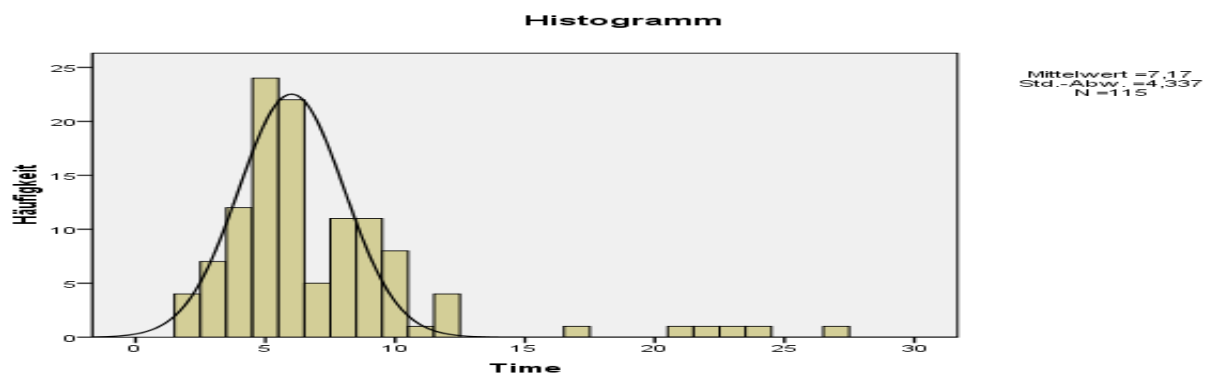


Figure 3. Distribution of variable “Time” (t_i)

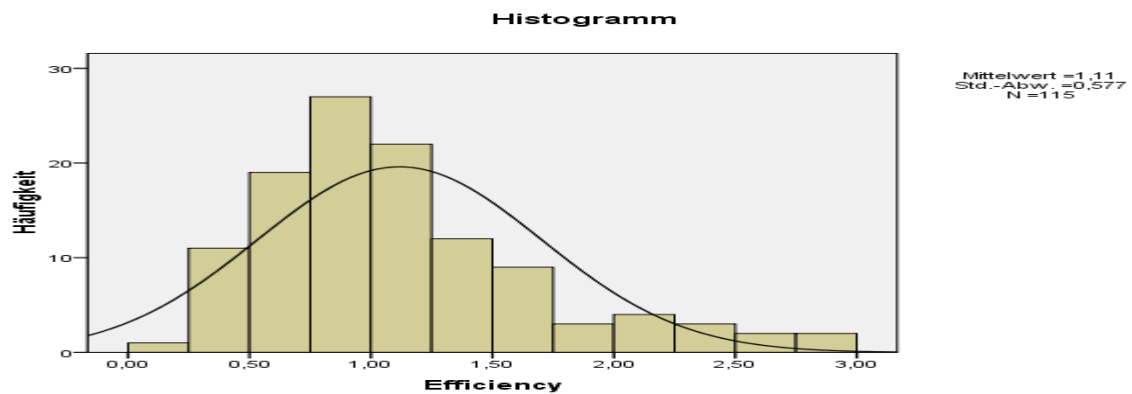


Figure 4. Distribution of “Efficiency”

(German “Haeufigkeit” = engl. Frequency)

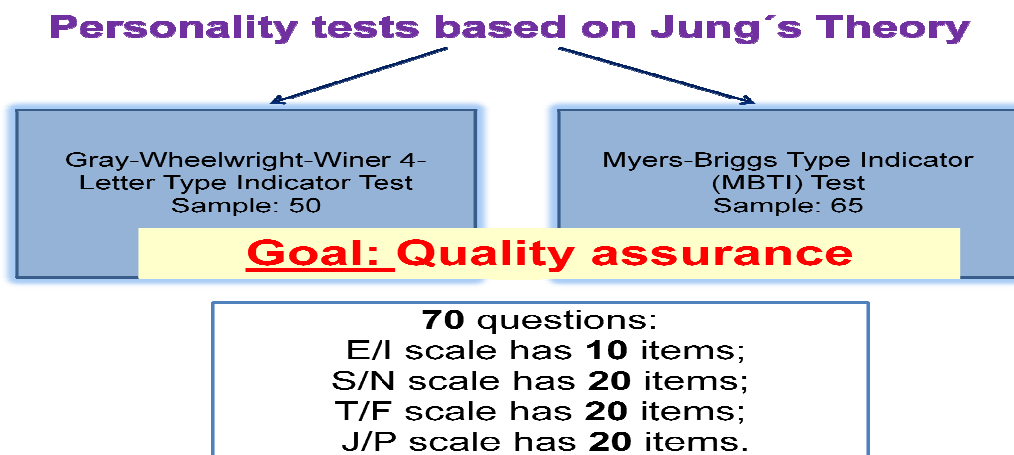
The empirical normal distribution against the theoretical normal distribution for the variables “decision making results” and “time needed for decision making” was tested for both questionnaire batteries, the Gray-Wheelwright-Winer-Test and the MBTI-Test (via Kolmogorov-Smirnov Test). As a result, it can be stated that the variables “decision making results” ($p=0,921$) and “decision making

efficiency” ($p=0,065$) demonstrate a sufficient pattern of a normal distribution (whereas this statement cannot be substantiated for the variable “time” – $p=0,000$).

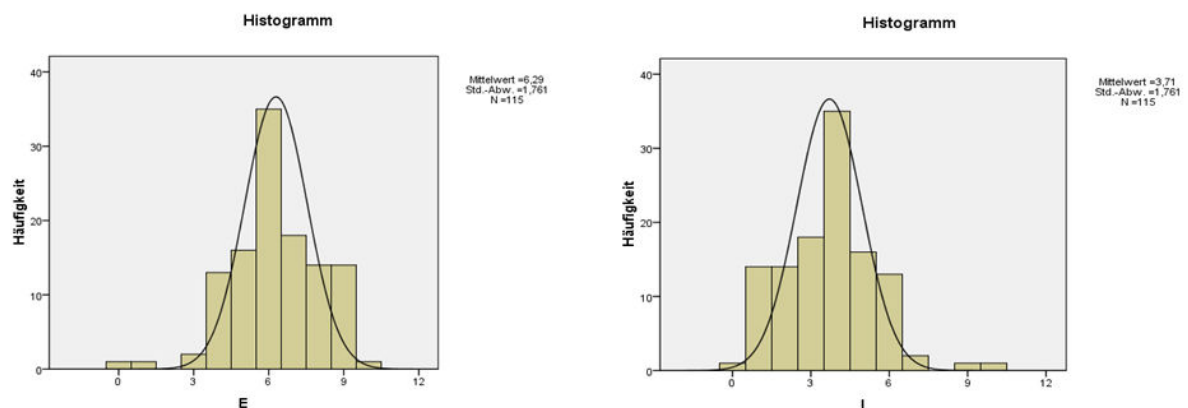
An identical procedure was conducted for the categories of the Gray-Wheelwright Test and the MBTI-Test, which are designed to identify the following personality characteristics referring to the determination of significantly strong intuitive or discursive individual predisposition:

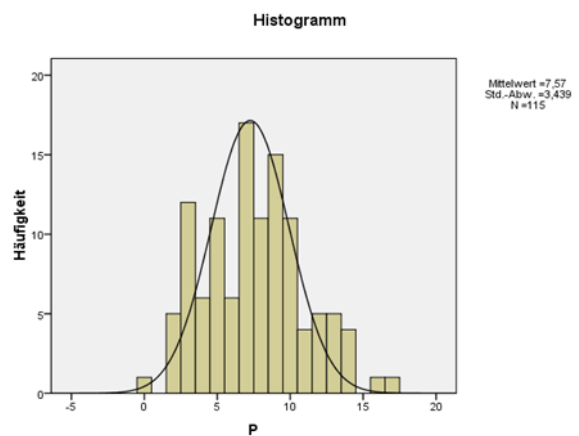
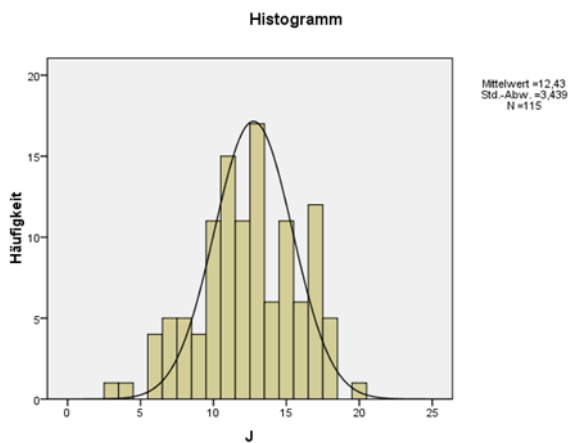
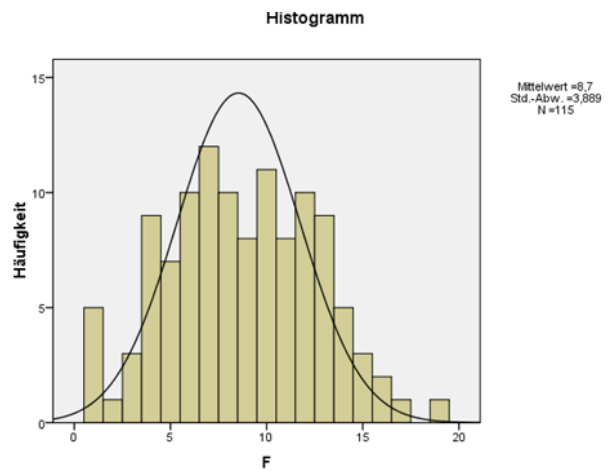
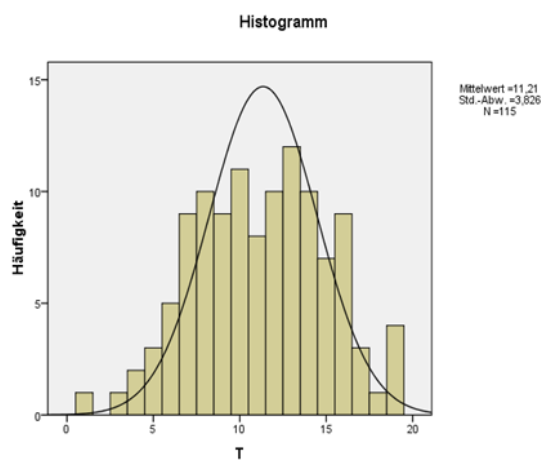
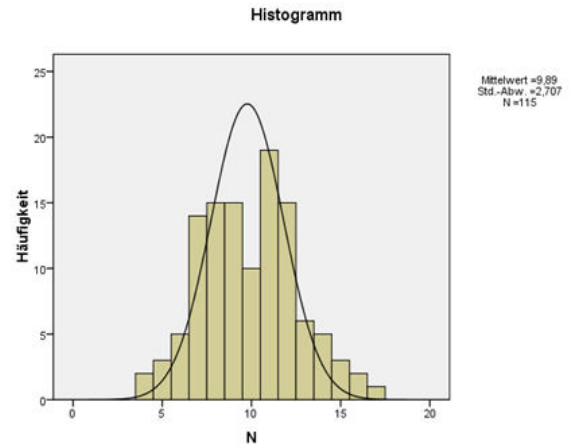
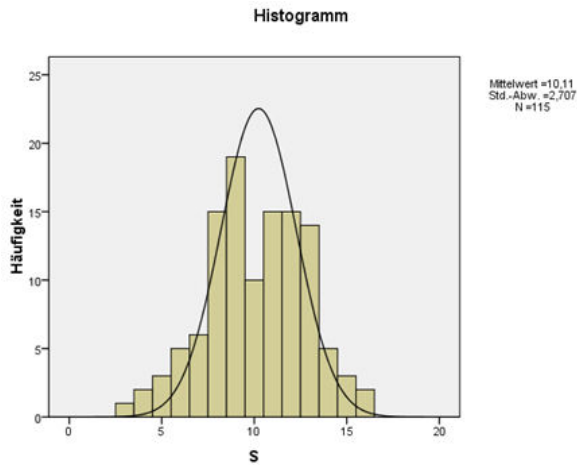
- Extraversion (E) vs. Introversion (I),
- Sensing (S) and Intuition (N),
- Thinking (T) and Feeling (F),
- and Judgment (J) and Perception (P).

The Gray-Wheelwright-Winer Test and the Myers-Briggs-Type-Indicator are both based on Jung’s personality theory. The underlying questionnaire battery can be characterized as follows:



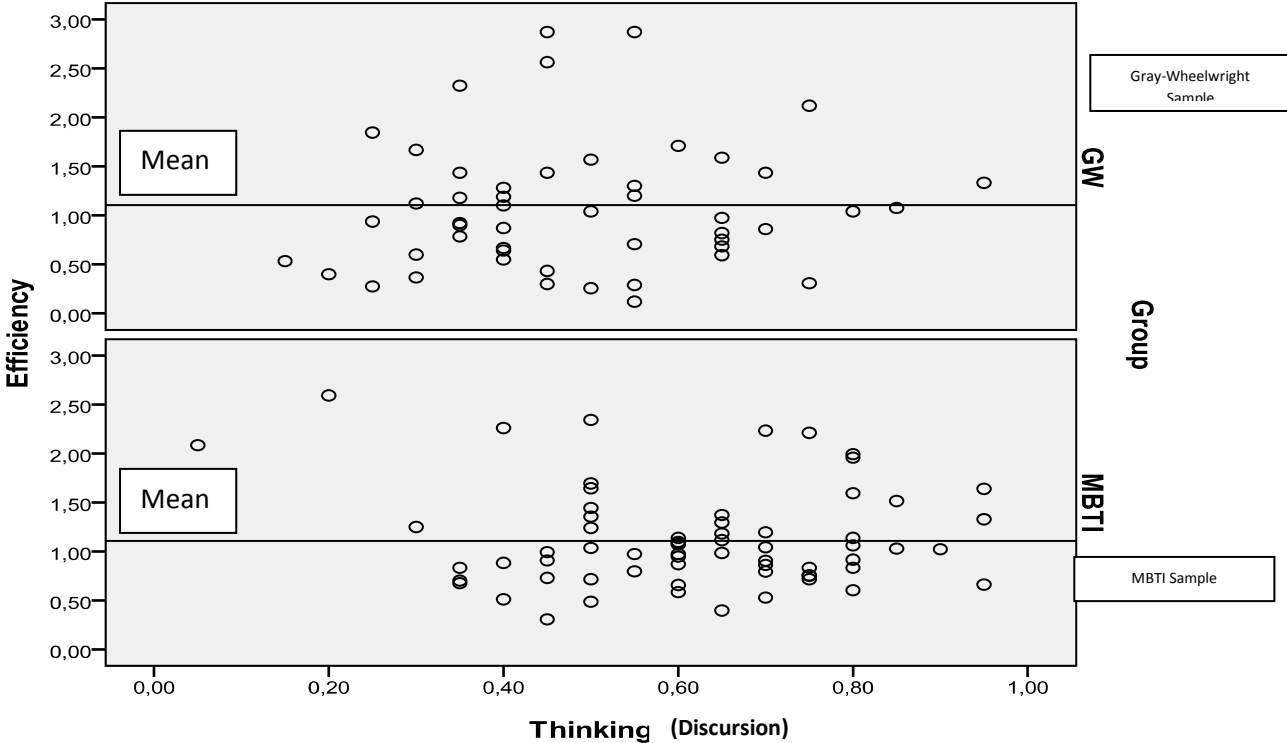
The test procedure of the empirical distributions against the theoretical normal distribution showed the following results:





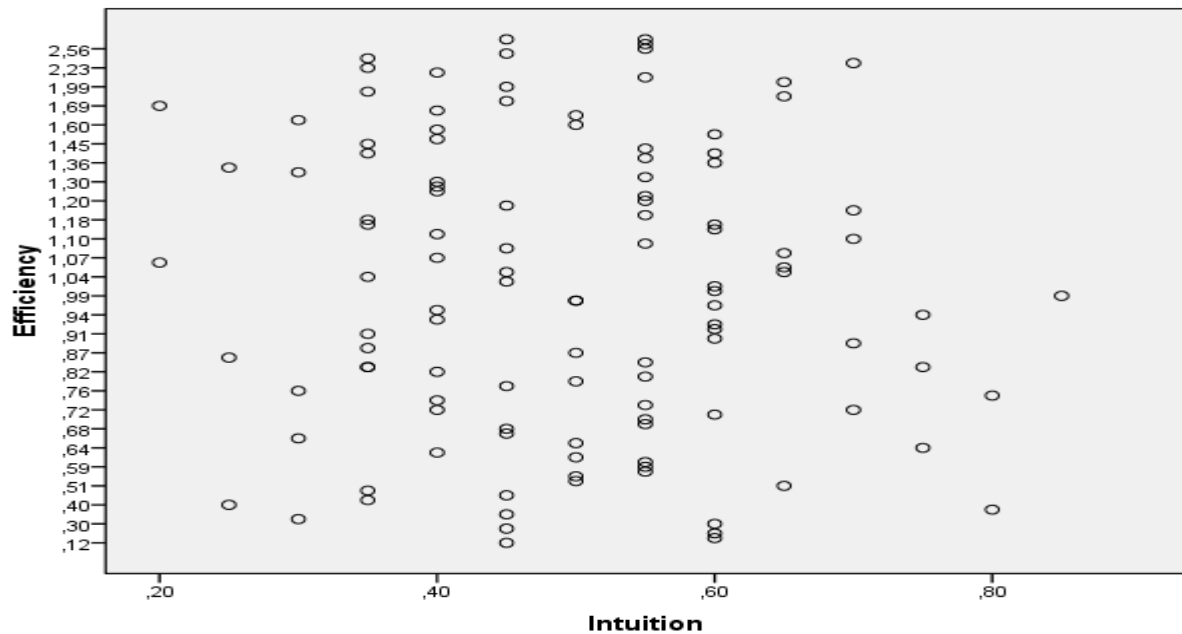
All of the categories tested via the Gray-Wheelwright-Winer Test and the MBTI (extraversion/introversion, sensing/intuition, thinking/feeling, judgment/perception) show a sufficient pattern of a normal distribution. It can be concluded that this result provides no reason to reject the basic notion of validity and reliability of both test procedures as far as the “discovery” of personality traits in the laboratory sample is concerned.

Finally, the “decisive” statistical analysis was based on a correlation analysis in order to find out whether there is a significant statistical relation between personality traits and decision making efficiency. First, the correlation analysis includes the independent variable “thinking” (as an indicator for discursive predisposition) in relation with “decision making efficiency” as the dependent one. The results are the following (depicted in a scatter diagram below):



The correlation analysis shows no statistical relation at all between “thinking” (discursion) and “decision making efficiency” (correlation coefficient is not significant: $r=0.008$; determination coefficient $r^2 = 0.000064$).

In addition, the correlation analysis was conducted for “intuition” as the independent variable and “decision making efficiency” as the dependent variable (depicted in a scatter graph below):



Again, there is no statistical correlation between intuition (feeling) and decision making efficiency ($r = -0.067$; $r^2 = 0.0045$).

This analysis substantiates our hypothesis that neither an intuition biased personality complex nor a discursion biased personality complex achieve the highest scores of decision making efficiency. Moreover, best efficiency scores are somewhat concentrated in the middle between intuition and discursion. Thus, the findings of the 1980s experimental study can be corroborated and considered as replicated.

Finally, a correlation matrix was developed in order to find out each single correlation coefficient between the personality trait categories as independent variables among the categories themselves. The results are as follows:

| | E | I | S | N | T | F | J | P |
|--------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| E Correlation (Pearson) | 1 | -1.000** | .063 | -.063 | .186* | -.154 | .156 | -.156 |
| Significance | | .000 | .503 | .503 | .046 | .100 | .095 | .095 |
| I Correlation (Pearson) | -1.000** | 1 | -.063 | .063 | -.186* | .154 | -.156 | .156 |
| Significance | .000 | | .503 | .503 | .046 | .100 | .095 | .095 |
| S Correlation (Pearson) | .063 | -.063 | 1 | -1.000** | .359** | -.336** | .450** | -.450** |
| Significance | .503 | .503 | | .000 | .000 | .000 | .000 | .000 |
| N Correlation (Pearson) | -.063 | .063 | -1.000** | 1 | -.359** | .336** | -.450** | .450** |

| | | | | | | | | | |
|---|------------------------------|-------|--------|---------|---------|---------|---------|----------|----------|
| | Significance | .503 | .503 | .000 | | .000 | .000 | .000 | .000 |
| T | Correlation (Pearson) | .186* | -.186* | .359** | -.359** | 1 | -.971** | .295** | -.295** |
| | Significance | .046 | .046 | .000 | .000 | | .000 | .001 | .001 |
| F | Correlation (Pearson) | -.154 | .154 | -.336** | .336** | -.971** | 1 | -.275** | .275** |
| | Significance | .100 | .100 | .000 | .000 | .000 | | .003 | .003 |
| J | Correlation (Pearson) | .156 | -.156 | .450** | -.450** | .295** | -.275** | 1 | -1.000** |
| | Significance | .095 | .095 | .000 | .000 | .001 | .003 | | .000 |
| P | Correlation (Pearson) | -.156 | .156 | -.450** | .450** | -.295** | .275** | -1.000** | 1 |
| | Significance | .095 | .095 | .000 | .000 | .001 | .003 | .000 | |

** . Level of significance is 0.01

* . Level of significance is 0.05

Interesting enough, there is a significant positive correlation between the categories sensing (S) and thinking (T), confirming that sensing is a sufficient indicator for discursive decision making behavior. Also, there is a significant negative correlation between “intuition” (F) and “thinking” (T), indicating that there is an obvious distinction between intuitive and discursive personal traits.

Those results allow confirming the plausibility of the correlation analysis results mentioned above.

Since the result of the 2009 laboratory experiment is in line with the outcomes of the 1980s experimental investigation, we can now try to develop a more reality-based scenario for efficient decision making in business transaction processes.

In the following, we outline a new model approach, labeled “**Semi-Discursive Rationale**” for the conduct of decision making processes.

This **SDR**-model is particularly designed for strategic and cost/benefit-oriented business decisions, i.e. personnel decisions, marketing decisions, investment decisions, financial decisions, logistical decisions, etc.

Given the empirical results that, in all likelihood, a pertinent “mixture” between discursive resp. analytical elements and intuitive attitudes contribute to a high degree of decision making rationality, and thus to a high degree of decision making efficiency, the **SDR**-model is comprised of the following elements:

- Neuert’s 1980s laboratory experiment has revealed that the utilization of (simple) decision making heuristics actually leads to a higher degree of decision making efficiency. [35, pp. 299 et sqq.]

The statistical analysis using multiple regression shows the following “weights of importance” of the rationality elements on decision making efficiency:

- Organization of the decision making process: 0.27281 (mean)
- Goal orientation: 0.2045 (mean),
- Utilization of available information: 0.0920 (mean),
- Utilization of decision making heuristics: 0.2720 (mean),
- Continuous reflection and controlling of the respective decision making performance: 0.1534 (mean).

The figures above show the “weights of impact” of the different elements of decision making rationality (leading to a higher degree of decision making efficiency) on a scale between 0.0 (no impact) and 1.0 (100% impact). The results say that the element “utilization of decision heuristics” (“Entscheidungskognitionsgrad”) shows an average weight of 0.2720 which is, together with the “degree of process organization” the most powerful element of rational decision making behavior, contributing to a high degree of decision making efficiency.

- Based on this, we propose to use the tool of the “decision matrix” as basic decision heuristics (Figure 5):

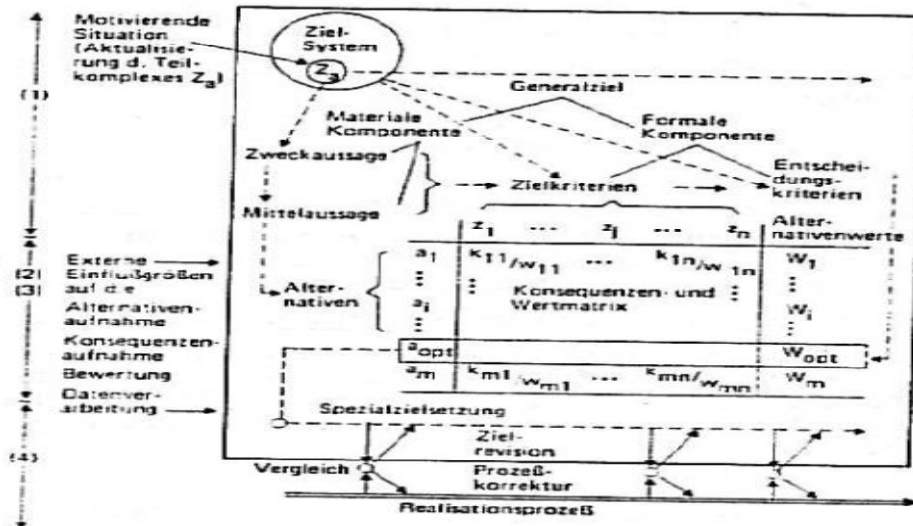


Figure 5. Formal structure of decision making process [13, p. 105]

The decision matrix is comprised of the following elements of “discursive” decision making:

- Set of alternatives,
- set of decision criteria,
- consequences (measures) of all alternatives in combination with the decision criteria,

- algorithm for the calculation of the optimal alternative.

The measurement of the consequences should be based on a decimal scoring system, either utilizing “subjectively” assigned scores between 0.0 and 1.0 or alternatively 0 to 10, or 0 to 100, etc. Thus, an “overarching” measurement can be achieved for alternatives with different consequences measures.

- In addition, as the second “discursive” element in the SDR model, the following criteria of rational decision making should be worked down on a checklist:
 - Organization of the decision making process,
 - goal orientation,
 - deliberate search for sufficient information,
 - utilization of decision heuristics and
 - continuous reflection and controlling of the decision making results.

Finally, a linear programming procedure, conducted by Neuert in the course of his 1980s laboratory experiment on the relationship between decision making behavior and decision making efficiency, led to the following results, emphasizing the “relevance” of each of the “rationality elements” of decision making, mentioned above [36, pp. 25 et sqq.] (The linear optimization model algorithm was conducted based on the following assumptions:

- Minimization of the decision making input (measured in time needed to come to a decision);
- degree of decision making behavior has to appear significantly above average;
- the given time frame for the decision making process should be standardized to 100 time units;
- since the elements “organization of the decision making process” and “utilization of decision heuristics” show an accumulated relevance weight of about 55%, the time units needed for the organization of the process and the utilization of the decision heuristics has to add up to 55% of the reserved time units).

The linear optimization goal function shows the following form [36, p. 26]:

$$Z = -6,25x_1 + 17,42x_2 + 22,97x_3 - 33,24x_4 + 50,83x_5 + 76,71$$

[Z = time set for decision making; x1 = goal orientation; x2 = organization, x3 = information, x4 = utilization of heuristics, x5 = reflection and controlling]

- The simplex procedure shows the following standardized results for the relevance of the various elements:
 - goal orientation 0.3536
 - organization of the decision making procedure 0.3768
 - information basis 0.8127
 - utilization of decision heuristics 0.6414
 - reflection and controlling 0.2280

Applied to the assigned decision time frame of 100 time units, this simplex algorithm results would suggest the following “time portions” being reserved to conduct the following procedures:

- Development and determination of a system of goal criteria: 15 time units
- Organization of the decision making process: 15 time units
- Creation of the information basis for the decision making process: 34 time units
- Utilization of decision heuristics: 27 time units
- Reflection and controlling: 9 time units

The computation of time portions represents the relative “weights” of each element.

The procedure described above represents the “discursive approach” in our SDR-model. The next question we will have to answer concerns the utilization of the “intuitive approach”, in order to come to an “optimal” solution (based on the experimental findings). Wunderlich points out that the “potentials” of intuition in decision making processes have be unlocked and utilized [55]. In other words, how can intuition or intuitive behavioral elements significantly contribute to the improvement of decision making efficiency?

In this context, we again refer to Fiedler’s scientific approach of intuitive decisions [17]. As a consequence of his conjecture that “rational” intuition is based on learning processes including small samples of learning procedures, he points out that “intuition is not contradictory to analytical decision making..., but intuition can be regarded as a useful benefit coming out of the empirical environment” [17].

Based on Fiedler’s works, we suggest the “utilization of intuition” via the following simple framework:

- Each element of the “discursive procedures” described above has to be concluded with the question to oneself based on a semantic differential:

How certain are you having done the procedure in a satisfactory manner?

| | | | | | |
|-----------------------|---|---|---|---|---------------------------|
| <i>very uncertain</i> | | | | | <i>absolutely certain</i> |
| | 1 | 2 | 3 | 4 | 5 |

- After having achieved a “first” optimal alternative, conducting the decision making process described above, the final question to oneself should be added:

How certain are you that you have come to the right decision?

| | | | | | |
|-----------------------|---|---|---|---|---------------------------|
| <i>very uncertain</i> | | | | | <i>absolutely certain</i> |
| | 1 | 2 | 3 | 4 | 5 |

As long as the answer to this semantic differential question does not reach either 4 or 5, the procedure should be repeated within a given time frame. The time frame should have been set at the beginning of the decision making procedure, again based on the intuitive question to oneself:

- How long will I need to come to a satisfactory decision and
- how long am I supposed to need to come to a satisfactory decision.

This **Semi-Discursive Rationale-Model** for decision making may not fulfill satisfactorily the scientific measures one wishes to make a decision subject to. Indeed, the SDR-model is just the first draft of an applied decision making concept, using empirically proven scientific approaches to improve decision making efficiency. Undoubtedly, much more research will have to be conducted in order to elaborately outline the substance of the SDR.

However, as Gigerenzer points out in his monograph “Reckoning with risk – learning to live with uncertainty” [19], “learning to live with uncertainty” may be a first step to at least somewhat enhance the readiness to accept our limited ability to produce “optimal” decisions and actions, individually and collectively.

Tentative conclusions

As a summary, we can draw the following tentative conclusions from our analytical and empirical findings:

1. Decision making processes and decision making behavior are still one of the most preeminent research topics in business management, economics and social sciences.
2. The neo-classical notion of the rational man – the homo oeconomicus – as the generally infallible decision maker does not comply with reality.
3. The degree of decision making rationality is limited and subject to individual and/or collective constraints, like insufficient cognitive competences, psychological predispositions, feelings and emotions, etc.
4. However, the degree of decision making rationality, in the context of business decisions, does have an impact on decision making efficiency. A “total” extent of decision making rationality, however,

can never be achieved in reality.

5. The degree of decision making rationality, and, indirectly, of decision making efficiency, also depends on individual personality traits like introversion/extraversion, thinking/feeling, sensing/intuition and judgment/perception.
6. Intuition/discursion (as a synonym for analytical decision making) can be measured as individual personality traits. However, intuition/discursion does not determine solely a lower/higher degree of decision making efficiency.
Moreover, a “sane mixture” between intuitive and discursive behavioral patterns tends to “produce” higher decision making efficiency.
7. Based on the experimental findings, the **Semi-Discursive Rationale-Model** has been developed as a set of heuristics in order to improve business decision making outcomes.
8. Further research needs to be conducted, following the so far unanswered question: “Why do economic transactions take place at all and what determines the terms of those transactions?” [47, p. 3].

APPENDIX 1

The main idea of NASA Play (crash on the mood)

15 Pieces of equipment must be positioned (1-the most important, 15 – the less important):

- Matches
- Food concentrate
- 50 foot nylon rope
- Parachute silk
- Portable heating device
- 2 pistols caliber 45
- Powdered milk
- 2-pound-tanks with oxygen
- Mood atlas
- Float for lifesaving
- Magnetic compass
- 5 gallons water
- Signal lamp
- First-aid case with injection needles

**Problem
Solving**

APPENDIX 2

| Gegenstände | Rangskala Einzel | Rangskala Gruppe | Lösung | Differenz Einzel | Differenz Gruppe |
|---|------------------|------------------|--------|------------------|------------------|
| Streichhölzer (funktionieren ohne Sauerstoff nicht) | | | 15 | | |
| Lebensmittelkonzentrat | | | 4 | | |
| Fünzig Fuss Nylonseil (zum Klettern oder als Hilfsmittel mit Verletzten) | | | 6 | | |
| Fallschirmseide (Sonnenschutz) | | | 8 | | |
| Tragbares Heizgerät (nur auf der dunklen Mondseite nötig) | | | 13 | | |
| Zwei Pistolen Kaliber 45 | | | 11 | | |
| Trockenmilch (nicht wichtig weil genügend Lebensmittel vorhanden sind, Wasserverlust beim Anrühren) | | | 12 | | |
| Zwei 100-Pfund-Tanks Sauerstoff | | | 1 | | |
| Mondatlas | | | 3 | | |
| Sich selbst aufblasendes Lebensrettungsfluss (CO2-Flaschen ev. als Antrieb) | | | 9 | | |
| Magnetkompass | | | 14 | | |
| Fünf Gallonen Wasser | | | 2 | | |
| Signalleuchtkugeln | | | 10 | | |
| „Erste-Hilfe“-Koffer mit Injektionsnadeln | | | 7 | | |
| Sonnenenergie-UKW-Funkgerät | | | 5 | | |
| Total Differenzen | | | | | |

Erkenntnisse:

In den meisten Fällen ist das Gruppenergebnis näher an der idealen Lösung als das Einzelergebnis.

Das zeigt uns, dass Gruppenarbeit einen klaren Vorteil bei der Beurteilung von Situationen bietet. Beim Austausch setzen sich die besten Argumente durch.



References

1. Albert, J. *Besser entscheiden - Gebrauchsanweisung für Unentschlossene*. Frankfurt am Main, Germany: Eichborn AG, 2006
2. Anderson, J.A. Intuition in managers. Are intuitive managers more effective? *Journal of Managerial Psychology*, 2000, Vol. 15 No. 1, pp. 46-67,
3. Ariely, D. *Predictably irrational. The Hidden Forces that shape our decisions*. New York, USA: HarperCollins Publishers, 2008
4. Arkes, H.R. / Hammond, K.R. *Judgment and decision making: An interdisciplinary reader*. Cambridge, Great Britain: Cambridge University Press, 1992
5. Asch, S.E. Studies of Independence and Conformity. *Psychological Monographs*, 70. Jg., Pittsburgh, 1956, pp. 1-70
6. Bales, R.F. *Interaction Process Analysis: A Method for the Study of Small Groups*. Massachusetts, USA: 1950
7. Bamberg, G. / Coenenberg, F. / Krapp, M. *Betriebswirtschaftliche Entscheidungstheorie*. München, Germany: Vahlen, 2008
8. Bolton, G.E. / Ockenfels, A. *ERC: A Theory of Equity, Reciprocity, and Competition*. *The American Economic Review*, March 2000, pp. 166-193
9. Camerer, F. / Loewenstein, J. / Rabin, P. *Behavioural Economics*. New York, USA: Princeton University Press, 2004
10. Chmielewicz, K. *Forschungskonzeptionen der Wirtschaftswissenschaft*. Stuttgart, Germany: Poeschel Verlag, 1979
11. Cyert, R. / March, J. *A Behavioural Theory of the Firm*. Engelwood Cliffs, USA: Prentice Hall, 1963
12. Davis M.F. / Mattoon M.A. Reliability and Validity of the Gray-Wheelwrights Jungian Type Survey. *European Journal of Psychological Assessment*. Vol. 22(4)., 2006, pp. 233-239
13. Dorow, W. *Unternehmenskonflikte als Gegenstand unternehmungspolitischer Forschung*. Berlin, Germany: Duncker & Humblot GmbH, 1978
14. Dürmeier, T. / Egan-Krieger / Peukert, H. (ed.) *Die Scheuklappen der Wirtschaftswissenschaft. Postautistische Ökonomik für eine pluralistische Wirtschaftslehre*. Marburg, Germany: Metropolis-Verlag, 2006
15. Eisenführ, H. / Weber, F. *Rationales Entscheiden*. Berlin, Germany: Springer, 2003
16. Fehr, E. / Schmidt, K.M. A Theory of Fairness, Competition and Cooperation. Working Paper No. 4. *The Quarterly Journal of Economics*, August 1999, pp. 817-868
17. Fiedler, K. *Warum sind intuitive Entscheidungen so oft richtig? Eine wissenschaftliche Erklärung braucht mehr als Intuition*. Lecture of the Carl von Linde Foundation. Heidelberg, 2009
18. Gaeth, G.J. / Shanteau, J. Reducing the influence of irrelevant information on experienced decision makers. *Organizational Behaviour and Human Performance*, 33, 1984, pp. 263-282
19. Gigerenzer, G. *Reckoning with risk – learning to live with uncertainty*. New York, USA: Penguin Group, 2002
20. Gigerenzer, G. Der Bauch wird unterschätzt. *Frankfurter Allgemeine Zeitung*, October 18/19, 2008
21. Gigerenzer, G. *Bauchentscheidungen. Die Intelligenz des Unbewussten und die Macht der Intuition*. München, Germany: Wilhelm Goldmann Verlag, 2008
22. Gigerenzer, G. *Das Einmaleins der Skepsis: über den richtigen Umgang mit Zahlen und Risiken*. Berlin, Germany: BvT Berliner Taschenbuch Verlags GmbH, 2009
23. Glimcher, P.W. / Camerer, C.F. / Fehr, E. / Poldrack, R.A. *Neuroeconomics: Decision Making and the Brain*. London, United Kingdom: Elsevier Academic Press, 2009
24. Gray, H. / Wheelwright, J.W. *Jung's Psychological Types, including the four functions*. Stanford, USA: 1945
25. Heinen, E. *Entscheidungsorientierte Betriebswirtschaftslehre*. Wiesbaden, Germany: Mohr, 1972
26. Jung, C. *Psychological types*. New York, USA: 1923
27. Jungermann, H. *The two camps on rationality*. in: Scholz, R.W. (ed.) *Decision Making under Uncertainty*. Amsterdam: Elsevier Academic Press, 1983, pp. 63-86
28. Kahneman D. / Tversky, A. Prospect theory: An analysis of decision under risk. *Econometrica*, Vol. 47, No. 2, 1979, pp. 263-291.
29. Kahneman, D. / Tversky, A. *On the reality of cognitive illusions*. New York, USA: Econometrica, 1996
30. Kagel, J.H. / Roth, A.E. *The handbook of experimental economics*. New Jersey, USA: Princeton University

- Press, 1995
31. Kant, I. *Kritik der praktischen Vernunft*, 1788
 32. Kast, B. *Wie der Bauch dem Kopf beim Denken hilft. Die Kraft der Intuition*. Frankfurt am Main, Germany: S.Fischer Verlag GmbH, 2009
 33. Lehrer, J. *Wie wir entscheiden: das erfolgreiche Zusammenspiel von Kopf und Bauch*. München, Germany: Piper Verlag GmbH, 2009
 34. Lewin, K. *Feldtheorie in den Sozialwissenschaften. Ausgewählte theoretische Schriften*. Bern/Stuttgart, Switzerland/Germany: 1969
 35. Neuert, J.O. *Planungsgrade: Eine experimentelle Untersuchung zum Zusammenhang zwischen Planungsverhalten und Planungserfolg*. Spardorf, Germany: Verlag René F. Wilfer, 1987
 36. Neuert, J.O. *Zu den praxeologischen und pädagogischen Implikationen einer empirischen Untersuchung zum Zusammenhang zwischen Planungsverhalten und Planungseffizienz auf der Basis von Management Lern-Labors. Band 2, EUROTOP GmbH*, 1994
 37. Neuert, J.O. *The logic of managerial decisions making processes – rational conduct in the context of multiple behavioural patterns: conjectures and refutations tested via an experimental investigation*. <http://www.lab.uni-koeln.de/gew2005/public/pdf.php/program.pdf>, 2005
 38. Pfohl, H. *Problemorientierte Entscheidungsfindung in Organisationen*. Berlin/New York, Germany/USA: 1977
 39. Popper, Karl *Logik der Forschung*. Berlin, Germany: Akademie Verlag, 2007
 40. Rustichini, A. *Neuroeconomics: Formal Models of Decision Making and Cognitive Neuroscience*. in: Glimcher, P.W./ Camerer, C.F./ Fehr, E./ Poldrack, R.A. (2009): *Neuroeconomics: Decision Making and the Brain*. New York, USA: Elsevier Academic Press, 2009, p. 33-46
 41. Schaubhut N.A./ Herk N.A. *Reliability of the MBTI Form Q Assessment*. CPP, Inc. In: Annual Convention of the American Psychological Association, Toronto, Canada, August 6-9, 2009
 42. Simon, H. On the Concept of Organizational Goal. *Administrative Science Quarterly* 9. New York, 1964, pp. 1-22
 43. Simon, H. *The New Science of Management Decision*. New York, USA: Evatson, 1977
 44. Simon, H. *Entscheidungsverhalten in Organisationen. Eine Untersuchung von Entscheidungsprozessen in Management und Verwaltung*. Landsberg am Lech, Germany: 1981
 45. Sjöberg, L. Intuitive vs. analytical decision making: which is preferred? *Scandinavian Journal of Management* 19, 2003, pp. 17-29
 46. Smith, A. *Wealth of Nations*. London, United Kingdom: 1776
 47. Sowell, T. *Economic Facts and Fallacies*. New York, USA: Basic Books, 2008
 48. Straub, W. (2009): Management by Mathe. *FAS Consulting* September 19, 2009, p.3
 49. Stüvel, H. Die heimliche Macht des Unbewussten. *DIE WELT*, March 21, 2009
 50. Szyperski, N. / Winand, U. *Entscheidungstheorie. Eine Einführung unter besonderer Berücksichtigung spieltheoretischer Aspekte*. Stuttgart, Germany: 1974
 51. Thaler, R.H. / Sunstein, C.R. *Nudge – Improving Decisions About Health, Wealth and Happiness*. New Haven/London, United Kingdom: Yale University Press, 2008
 52. Tversky, A. / Kahneman, D. *Advances in prospect theory: cumulative representation of uncertainty*. in: Kahneman, D. / Tversky, A. (ed.) *Choices, values and frames*, Cambridge, United Kingdom: Cambridge University Press, 1992, pp. 44-66.
 53. Weber, M. *Wirtschaft und Gesellschaft*. Stuttgart, Germany: 1964
 54. Westcott, M. *Toward a Contemporary Psychology of Intuition. A Historical, Theoretical and Empirical Inquiry*. New York , USA: 1968
 55. Wunderlich, J. *Bauchgefühl: mit Intuition wirksamere Entscheidungen treffen*. <http://www.businesswissen.de>, [April 09, 2009]
 56. Centracon Study: *Strategische IT-Entscheidungen beruhen zur Hälfte auf Intuition*. <http://www.openpr.de/news/160570/Centracon-Studie-Strategische-IT-Entscheidungen> [July 29,2009]
 57. <http://www.thefreedictionary.com/discursive> [September 17, 2009]

Overview previous Discussion Papers

- No 5: Boelsche, Dorit: Performance measurement in humanitarian logistics, 2013.
- No 4: Conrad, Peter; Hummel, Thomas R. Transitions: Individuelle Handhabung und Verarbeitungsformen institutionellen Wandels, 2012.
- No 3: Hummel, Thomas R.; Turovskaya, Maria S.: Project Studies in Specific Business, Legal and Economic Topics: video conference presentations, 2011.
- No 2: Hans, Lothar: Zur Konzeption eines Verwaltungscontrollings, 2011.
- No 1: not published

The discussion papers can be downloaded from the homepage of the Faculty of Business: www.hs-fulda.de/wirtschaft.