30 Years of Consulting and Developing for Food Processing

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Abstract: The paper gives an overview of the company I have been working at and the practical work I have been doing for some 30 years, as well as the impact of the practical work on my theoretical positions. The company is rather exceptional in its application of a broad scope of knowledge areas in a specialised market. At RBK we both design production facilities & technical installations, and develop and implement information systems for the food processing industry. Short descriptions illustrate some characteristics of our projects and systems, the problems we attacked and the solutions we found. The impact of the practical experiences on my theoretical insights is discussed in the last part.

1 INTRODUCTION

For the past thirty years I have been working at the RBK Group in Deventer in the development of information systems for the food industry. I have combined my work as a practitioner with research into the functioning of information systems in enterprises. In this paper I will give an overview of my experiences in practice through the years and what its influence has been on my theoretical insights. The always recurring confrontation with the physical reality of the shop floor and the wide range of perspectives (from process technology, technical processes, management sciences and information technology) have always provided a rich feeding ground to experience how people handle information in business processes. The cooperation with all kinds of departments at our customers (production, quality control, commerce, logistics and controlling) has also been an ongoing exercise in doing justice to various interpretations of 'the same reality', and an ongoing warning against reducing reality to a single perspective.

Below I will first provide a brief overview of the history of the company and the main characteristics of our customers and their products. This is followed by paragraphs exemplifying characteristics of our projects and systems over time. It will be concluded by an overview of how these projects and systems have contributed to a number of specific theoretical insights.

2 THE COMPANY AND ITS CUSTOMERS

2.1 Hans Kortenbach and RBK

The company RBK ("Raadgevend Bureau Kortenbach" = Kortenbach Consultancy) was founded in 1979 by Hans Kortenbach, a visionary and driven man. Kortenbach started out young as a refrigeration technician in the middle of the 1950s. About ten years later his employer tasked him with setting up a site in Emmeloord, which led to intensive contacts with fish processing companies in the pre-eminent and innovative fishing port of Urk. Here, Kortenbach gained management experience, both as director of the site and with the ways the customers conducted their business. In the second half of the 1970s this led to a management function in a meat processing company.

However, managing a production company is very different from the project-dominated environment of an installation company. Kortenbach decided in 1979 to set himself up as an independent

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consultant to apply his technical expertise, process knowledge and business knowledge to the fish and meat processing industries. The next year he hired an electro-technical engineer, because he saw opportunities in linking (semi-)electronic scales to computers (we are talking about a time in which Kraftwerk used a synthesizer and a soldering iron). The inventiveness and the results achieved by the new employee led to a long cooperation with the then pre-eminent supplier of scales in The Netherlands for the development of weighing/registration systems.

The 35-year history of RBK essentially shows the expansion of the knowledge areas mentioned above for food processing companies and for cold stores. Part of our company is about consultancy and design, part is about providing information systems for its business processes. Throughout these years we have wanted to contribute through our practice-oriented approach based on the integration of very different knowledge areas. We are specialised in terms of our market, but we are very broadly oriented in terms of our disciplines. The [added] value of our approach is illustrated by our approach to building and construction. New development projects tend to start with the architect and the general design of the building. However, at RBK we start with the design of the primary processes and their required large technical facilities (of which the refrigeration system in terms of complexity, of investment and of weight is often the main one) and then our building engineers ‘construct a building around it’ (and our architects ensure that it will be a nice-looking and well-designed building).

2.2 IT Systems in the Early Years

From the first years our computers would be connected to the outside world with peripheral devices (especially: electronic weighing scales), with product detectors, and with transport systems. Besides regular parallel and serial interfaces we had to find solutions for dealing with digital inputs and outputs. That is why we started with the ITT3030 microcomputer with a 4MHz Z80A processor, 16KB internal memory, two 560KB floppy disks for ‘mass storage’ and transferring data; operating system CP/M and BASIC as programming language. The modular architecture of the ITT3030 provided a good basis for connecting peripheral devices. An example from this period was a weighing system that could be wireless controlled by the driver on a forklift (this was in 1983).

From 1985 we used the IBM compatible PCs with MsDos as operating system and Pascal as programming language. For digital inputs and outputs these computers were much less suitable than the ITT3030, but we created our own solution via relay boxes (controlled via the parallel port) and via creative use of the control lines of the serial interfaces. From 1989 the system landscape for our shop floor control systems consisted typically of a Novell file server, a number of PCs connected in a local area network, and an AS/400 based system for purchasing, ordering and invoicing software (in 1989 we incorporated a software company with AS/400 software).

For process control we have used single-board computers in combination with in-house developed PCBs for about ten years starting from 1983. The single-board computers where initially bought from a supplier until a creative genius designed and built a single-board computer for us in 1987. A compiler compatible with Borland Pascal was also developed for this single-board computer. This had the large advantage of being able to perform a large part of software development and testing in a regular PC environment. The last of these systems still run at our customers today. However, this development for this system was discontinued in the early 90’s in favour of the application of industrial standard equipment for process control (PLCs). Now we use a very small model PLC controlled over Ethernet for controlling small scale digital inputs and outputs connected to our shop floor systems.

In a nutshell: from the beginning we have always been dealing with the connections to the physical world. In early times we had to create our own arts-and-crafts solutions, and later on we moved to the application of industrial standards.

2.3 Our Customers

The customers of RBK are chiefly production companies of fresh and perishable meat and fish products and cold stores for logistic services. The variability of the raw materials is an important property, at the same time the customers ask for standardised finished product with consistent characteristics. Both on the supply side and on the distribution side the typical lead times are one or two days. Due to these characteristics and due to often volatile demand, production schedules are often revised.

It has always been demanded of suppliers of fresh food products to deliver daily for a sometimes strongly varying demand. The phenomenon backorder is not applicable; a shortage one day cannot be compensated for by an extra delivery on the next. At a number of our customers the full supply of raw materials is processed to end products and delivered to their customers within 36 hours after arrival (at a daily capacity of 600 tonnes of raw materials, against ‘just’ 200 tonnes 25 years ago).

In general our customers have a flat organisation with a small number of experienced practitioners in key positions. This is necessary because of the complexity of the processes, because of the short lead times and because of the uncertainties both in the supply of raw materials and in the demand for finished products. Through the years the organisations have become larger and more formal, with a larger intake of higher and more broadly educated people.

2.4 Registration on the Shop Floor

The basic principle for the registration system and the databases it feeds has always been that it must be possible to register what actually happened, regardless of planning or norms. Of course systems must warn in case of deviations, but if an authority indicates that it should still happen then it must be registered. This is also the only reliable basis for traceability, a theme that has become increasingly dominant over the last few years.

From the early years our systems have had a real-time nature in two different senses. Firstly, the systems provide a view into the progress and actual yields in the production at any time, the essential basis for monitoring and adjusting production. Secondly, our systems are partly synchronised with events in the production lines and transport systems. ‘Real time’ in the first sense requires a typical cycle time of about one to five minutes, ‘real time’ in the second sense requires a typical cycle time of 0,2 – 1,5 sec. The interval between two consecutive registrations can be 5 seconds or less.

3 PROJECTS THROUGH THE YEARS

3.1 1980 – 1990: Realisation of the Vision of Hans Kortenbach

In the first decade of RBK’s existence there were two kinds of projects. Through the collaboration with a weighing scales supplier came orders for weighing registration systems for production companies, and later also for weighbridges. In short these were orders according to the specification of a customer, variations on a theme. The second stream of projects resulted from the innovative work of Kortenbach in the design of companies along with their technical installations. In Kortenbach’s vision large gains could be made by breaking through the traditional approach of fragmentary design per installation part. In the project of a factory for the production of dry sausages this approach was expressed in the design of the maturing and drying processes in climate chambers. Instead of a system with a closed air treatment unit for regulating temperature and humidity a system was used here that mixed in outside air, significantly reducing energy expenses. The control system is here tasked with regulating the intake of outside air based on the conditions in the climate chamber and the temperature and humidity of the outside air. Another aim of Kortenbach at the realisation of the new factory was the centralisation of all process installations (a number of cooking/smoking chambers, a number of climate chambers for maturing/drying, eight different process installations in total) to allow control and monitoring from a single point.

This vision was realised using a Compaq 286 PC (placed in a technical area) combined with a single-board computer for I/O processing (in-house developed) and a screen with a 4x4 keyboard in the (wet) production environment for control and monitoring of the processes. In our Borland development environment we made use of in-house developed multitasking on the application level: within a single application a number of different autonomous processes could be maintained in real-time (with a cycle time of at most 1 or 2 seconds). A conventional DOS-application waits for user input or it may be busy for an extended amount of time executing a procedure. In our DOS-applications the program never waits for anything, but is always cycling through a number of processes in an infinite loop which may or may not have events to be handled. A number of these applications are still in operation at our customers today, sometimes with more than 25 years of service.

A special challenge in this project was the user interface in the production area. How do you provide the user with insight into the current state of affairs in eight process installations (temperature, humidity, processing step, possible alerts) on a screen of 25 lines of 80 characters with a single glance and how do you organise the control of these installations on a keyboard of 4x4 keys? These limitations led to two views; one with an overview of all process installations with process parameters and the primary controls (starting/stopping a process, selection of process recipe in the foreground and a second view with the process data of the technical installations in the background. Everything was solved neatly in a controllable and clear system. I only realised the specialness of this approach years later when I visited another factory of sausages and I saw a tangled mess of local control panels and dial controls for all kinds of settings!

For the execution of the control system the customer was involved at only two points: before the start, when Hans Kortenbach had to persuade the customer of the value and feasibility of this approach, and nearly at the end to explain and check the control functions. Everything in between consisted of realising the views of Kortenbach based on: (1) the analysis of both the processes in the product itself (drying, maturing, cooking, smoking), (2) the analysis of the physical principles of climate control and of the relationships between pressure, temperature and humidity, (3) the analysis of the technical processes of the different components of the process installations, and (4) the mutual relationships between product, process installation and physical principles. For the development of the application with all process controls it was necessary to gain a lot of knowledge of the underlying principles (primarily based on the knowledge of Hans Kortenbach, supplemented by literature about the different subjects), and very little was written down (which was uncommon with automation projects within RBK at any rate).

3.2 1989 – 1995 Foundation for Shop Floor Control Systems

In early 1989 we realised our first weighing systems for shipping fresh meat. The first system with one weighing station in April, the second system with three independent weighing stations in a few months later, and the third system as a network solution at the end of that year. Each of these systems were connected via data transfer to a sales / invoicing system written in RPG on the IBM AS/400 platform. These systems were the start of a long and successful development with several offshoots. The variety of the offshoots eventually also led to major problems in the maintenance of the software, hurting both the customer (unexpected surprises with new versions) and for us as its supplier (more and more effort spent in maintenance, at the cost of new developments).

The first weighing systems for shipping were quickly followed by a variant system for the registration of production data and the calculation of deboning yields. This added an entirely new dimension to the package and to our expertise. Registration of shipping weights is relatively straightforward (registering the weights as basis for invoicing the customer), although the circumstances are rather special (time pressure, cold and wet environment, ensuring that everything is weighed exactly once). At the weighing for production the main process is also straightforward: weighing incoming and outgoing streams per production order, but there are a lot more dimensions than just the weights. Product coding and product recognition is an important issue, as well as quality control. An example is registering a product with some quality defect, no longer suitable for the continuation in the main process. For the evaluation of the production yields this product has to count as the main product that it should be, for the financial result it has to be valued at a reduced rate. Different stakeholders such as production management, external deboning crews (working at piece-rate), quality control, sales, and controllers may have very different views on the same products and the same calculations.

The development of this calculation system was accepted against a fixed-price (which was certainly not on the high side) but had eventually a turn-around time of over one year, due to all the additional aspects. The results of this system for the customer were good at first and eventually they became very good. The company was able to achieve significant improvements in process efficiency and product quality because the system gave detailed insight into the production results and into deviations from production norms. In this development I personally spend a lot of time near the production and with the production people, and I gained a lot of experience with the ins and outs of production itself, production registration and production accounting. The recurring themes in this process were: (1) how do the different departments of the production company look at the information and what do they do with it? (2) how do we achieve a reliable registration in such a production environment? (3) how can we explain the system to the weighers on the shop floor and to the users in the offices? In this project we had to learn the hard way how to deal with the physical production reality, the no-nonsense approach of dedicated production people and the multiformity of reality observed from different perspectives. As a ‘by-product’ we learned to act as a kind of intermediary between different stakeholders at our customers.

This lengthy project taught me something essential: the importance of a few people at key positions and the importance of an organisation that asks questions in the use of an information system. The physical position of the main user at the entrance of the production area was pivotal. He was in a position to have a good overview of the area with its various production lines, he could monitor the supply and availability of raw materials behind him, and he had an overview of the actual production yields in in real time on his screen and in case of deviations he could immediately enquire after them. On top of this he had the experience and knowledge to judge situations and he was an important information channel from production management to the shop floor. All of this was not based on some formal structure, but rather on a well-oiled organisation with a natural distribution of roles.

The large value of this was not immediately clear to me, but became clear years later when I saw how our system functioned a lot worse at other sites of the same company with identical production processes. This difference was mainly due to the quality of the local organisation, in which our system was just used as a machine to perform some specific task. When an information system is not used to evaluate situations and to ask questions, then it quickly degenerates to just an expense. On this second site office workers checked production yields once a week, while at the first site the yield of each and every production order was checked immediately upon completion of the order. The difference: a lot of money won or lost because of production yields.

3.3 2000 – 2010 Years of Renewal

During the period 1995-2010 the systems whose initial developments were described above were expanded upon, and a number of times they were drastically technically revised (e.g. the transition from DOS to Windows, a transition that will not be discussed further here).

For the process controls of refrigeration equipment there was an essential shift of emphasis from technical perfectionism towards orienting on the interests of all stakeholders. A quality inspector wants to see whether the temperatures remained within the agreed upon specifications, a general manager wants to see what his energy consumption has been, the technical service wants to quickly see what is going on in case of malfunctions, the same goes for the refrigeration technician, and our own consultants want to see how well the installation performs as a whole and where the settings may possibly be improved. This shift of focus at the same time reduced the complexity of our control systems and improved the performance for the stakeholders. An interesting instrument for the technical stakeholders is the so-called video recorder, which allows processes from the past to be viewed along with all logged process parameters and control actions. Because in case of trouble shooting ‘looking’ is often a much cheaper and a more efficient process than ‘thinking’, this is a highly valuable instrument for the technicians. This shift from complexity and perfectionism towards intelligibility and visibility of the behaviour of our control systems had much to do with internal personnel changes within RBK, where one of our refrigeration consultants was placed in charge of the software development for our process control systems.

For the weighing/registration systems there also was an essential change in how our systems were oriented (coinciding with the change from DOS to Windows). Traditionally our systems were based on production orders with input of raw materials or semi-finished products and output of (semi-)finished products. A conventional approach to stocks would mean that stocks are consumed on input to a process; and that stocks are created on output from a process. The disadvantage of the conventional approach, however, is that between input and output the goods are “absent”. Moreover, the modelling of some curing processes that last for days or weeks can be a burden. In these cases, the product is transformed (so it is an order) and the product is in storage (so it is a stock). As we are opposed to unwarranted reduction of reality, and we did not want to choose between production order and stock, we decided to have it both ways. Our new system was designed in such a way that everything can be considered as stock, all transactions are modelled as stock movements. Production orders are just a way of registration of inputs to a process stock and outputs from a process stock.

As a bonus, this approach also provided a neat foundation for another difficult issue: how to deal with the concept of “lot”. Lot management is an essential part of tracking and tracing. The problem, however, is that different stakeholders tend to have different ideas about what defines a lot. This is consistent with the OED definition of a “lot”: “A number of persons or things of the same kind, or associated in some way; a quantity or collection (of things); a party, set, or ‘crew’ (of persons); also, a quantity (of anything)”. This is a good definition and explains the multiformity of reality: different stakeholders will have different views on what qualifies as a lot. In our new system we dealt with this problem by using a system-defined concept of base-lot, and by having provisions for all kinds of external lot designations as extra references. Keep the internal world of your system consistent, and allow for multiformity of the external world(s)!

3.4 2010 – 2015 Architecture and Integration

Some years ago the need arose to modernise a third group of systems at our customers. We have had registration systems for individual products in a line process and control systems for internal transport of products for over 25 years at RBK. These systems had been the almost exclusive area of expertise of a single employee during this time. This held true both with regard to his process knowledge (what happens on the line?), to his mechanical-technical knowledge (how do the transport systems behave?), and also to his software and his IT toolbox for dealing with the real-time aspects, for handling the inputs and outputs, for data management, for visualisation, and for all kinds of communication with peripheral equipment and with other systems. Over the years, this employee has been assigned to different departments in our RBK organisation. In each department, however, the differences with its main activities were so great that in practice the development and support of these systems has effectively been a one-man department within RBK for 25 years.

As regards the contents of this kind of systems, an important issue is that across customers the same terms can have different meanings (homonyms), that the same thing can be referred to by different terms (synonyms), that this terminological ambiguity also regularly exists across departments within a single customer organisation. This phenomenon does not contribute to the entrance of newcomers to the field, and makes the transfer of knowledge difficult.

A further challenge in these kinds of systems is the coexistence of multiple methods to identify one individual product (tracking number from the supplier, tracking number from the process, RFID in the product carrier, RFID in the product itself), and that none of these methods is completely reliable in practice. The system has to be able to handle the various identifications concurrently and to use different identifications as a reference in the communication with other systems, also when identification may be missing or when some identification numbers are not unique. Incidentally, this problem of multiple and not fully reliable references is becoming an increasingly big problem in the external and internal supply chain. The supply chain seems increasingly to be a kind of dumping ground for uncoordinated identification systems of all kinds of partners in the chain.

We thus had a system issue to solve (a heterogeneous system landscape with our system containing elements of process control combined with elements from production systems, and to be integrated to several third party systems), a pre-existing issue to allow the employees of our various department to cooperate in a meaningful way, and, especially, to enlarge the group of people that could contribute to the development and maintenance of this kind of systems. Last but not least: RBK had to be able to apply the same standardised system to other customers with different configurations and terminology.

We found our solution for the system architecture and information architecture by an essential separation between the following system components: (1) a component for tracking the product during transport ('tracking system'), (2) a component for recording data of the individual product ('data system'), (3) a component to relate the physical and data system ('synchronisation system'), and (4) configurable control terminals for registrations in the production line. The tracking system is the first to detect the individual product, assigns to it a unique system token, and tracks this token throughout all transport movements. The terminals of the data system are configured to record certain characteristics with the individual product at their position on the line. The synchronisation system ensures that the characteristics are recorded with the correct individual and that actions on the individual are triggered at the right time. The work stations are configurable thin clients in the production line with a number of buttons on the touchscreen to record characteristics and a mechanism to show the movement of the product during registration. The work stations are connected to the synchronisation system. The individual system components would be developed by different software groups (the tracking system by process control group, and the data components and user interfaces by the shop floor group, and the synchronisation system with its messaging as a joint effort).

With this set-up we can fully meet the system requirements. Through the use of a unique system-generated token for identification we have disconnected ourselves from the dependence on existing external identifications and we are free to extend this for future identification methods. The physical tracking of the individual product is independent of the registration and management of the characteristics of the individual product. Because of the configurability of the terminals the terminology can be independent of the meaning of the data (which also forms a risk!). By the application of services in the data system a response time of at most 200 ms can be guaranteed in internal messaging. By using a monitoring tool for the messaging traffic (current traffic and traffic history) the system behaviour can be analysed both by the employees of the customer as by the employees of RBK.

To solve the organisational issue of "dividing labor and achieving coordination among them" (the terminology of Mintzberg) one aspect was crucial: mutual understanding and mutual trust as the foundation for mutual adjustment. Our past had taught us that a lack of cooperation often was due to a sense of ownership and responsibility of individual developers, and as a consequence a strong striving for independency. Someone wants to be able to solve problems in 'his' system and he does not want to depend on things of which he does not have a good grasp. This is exactly where the problem lies between different departments: they represent separate knowledge domains that do not sufficiently understand one another. This problem cannot be solved by integrating everything. This problem can however be solved by (1) clearly delineating the systems and responsibilities, (2) giving all parties sufficient overview of the system as a whole and the interactions between the components, and (3) giving all parties sufficient confidence that everything will work in practice even though there is no single person with an in-depth knowledge of all the details.

The preparation together with the customer was part of the process of building trust. This was a taxing process with an exhaustive analysis from all the information products (interfaces, screens, control actions, reports) back to the origin of the data and especially to the internal encodings of our subsystems that were to be created. After this analysis we had the system fully specified and testable on paper; and we were able to answer all questions from the practitioners at the customer and from within RBK. N.b.: a happy circumstance for this kind of system is that full analysis was indeed feasible, which is normally not the case.

A second part in the building of trust was an extended period of testing in the office, followed by a period of five weeks of pilot running in the actual production line along the operational system. During the pilot running, differences between the existing and the new system were subject to daily analysis. Eventually, the new system was put into operation a few days before the scheduled date, and needed very little aftercare.

4 THEORY & PRACTICE

The question how systems function has always interested me. For organisations, the assumption during my studies and the first years afterwards was that organisation theory should be the entry point to understand its inner workings. A definition like "organizations are (1) social entities that (2) are goal directed, (3) are designed as deliberately structured and coordinated activity systems, and (4) are linked to the external environment" (Daft, 2001) supports this assumption. However, I was unable to reconcile this theory with my practical observations in a satisfactory manner. The organisation of quite a few of our most successful customers are characterised by a flat, informal organisation, much more evolved over time than designed. Mintzberg's work The Structuring of Organizations" (Mintzberg, 1979) shed some more light on the understanding of real-world organisations ("the structure of an organization can be defined simply as the sum total of the ways it divides its labor into distinct tasks and then achieves coordination among them"). In comparison to the definition of Daft this definition leaves out the 'design' element; and it leaves much more room for developing patterns of specialisation and coordination.

The major shift came with the insight that the approach should be reversed. Instead of starting an analysis with the organisation of an enterprise, using the organisation as a basis to look at the business processes and finally looking at the environment, I had to start off with the environment. The rationale of an enterprise is after all the successful production and selling of products on its markets. Does it fail to do so, then the enterprise ceases to exist. This is why the analysis of an enterprise ought to start with its markets and products. The business processes then represent the actual behaviour of the enterprise in which the products are marketed and produced. Finally, the formal and informal organisation serves to stabilise the business processes in order to warrant the effectiveness and efficiency in the short term and the continuity in the long term. This last approach also combines much more easily with the mixture of societal norms and the informal development of patterns that characterises the social world. This reversed approach is warranted in various ways by economists like Coase (Coase, 1937), Kay (Kay, 1993), and De Geus (De Geus, 1997).

For the approach of enterprise information systems I needed a similar break with conventional modes of thought. No longer do I consider the computer-based information system as the starting point and goal of information analysis. The information system of an organisation in a broad sense encompasses all information to and from business processes and the computer-based information system is no more than a part of it. Computer systems should be viewed as just an instrument to support the effectiveness and efficiency of the business processes, and not as the only way of processing information in an organisation. This approach regularly clashes with the dominant view that has as its ideal that the information system within the computer should be a single whole in which all information is recorded in a centrally organised manner and where information has the same meaning to each of its users. In the majority of cases it is possible to demonstrate to the customer that this is an illusion, preferably by using examples from practice using their own processes. The bottom line of an information system is that the people and systems in the organisation (1) must have the information needed for their role in the business processes, (2) must generate information from their work for the subsequent business processes. It is a practical matter which information channels are best suited to record and communicate which kind of information.

Over the years I have started to pay increasing attention to the way in which people handle information. The basis for this lies in the research by De Groot into the thinking of chess players (De Groot, 1965). De Groot shows in his study Thought and Choice in Chess that a major part of the strength of the expert is found in his perception of the situation. An expert does not see anything that a novice does not see, but he sees it differently. Research by Weiskrantz (Weiskrantz, 1997) shows that an essential part of our perceptual processes are unconscious. This agreed with my experience in practice that experienced people react to sometimes seemingly small and insignificant deviations from habitual patterns and that it is at times hard to indicate why and based on what they react. For the design of information systems this means to me in practice that the adequate recording and presenting of the events on the shop floor to this kind of people is an important challenge. The goal of our information systems should be that the perceptive field of our users is enlarged, and not narrowed down by irrelevant and rigid categorisation of data that so often comes with computer systems.

In information system projects lots of translation issues are involved. As a specialist in our market we have learned which questions to ask, how to interpret the answers, and we have learned how to translate patterns into models and solutions. At the same time, we have learned to search for the specific details which make a company unique and which represent its competitive power on its market. One of the greatest risks as an external adviser is to reduce the situation of the customer to nothing more than an example of a predefined pattern. For information systems, heterogeneity and not homogeneity should be the norm, as is specified in the Reference Model for Open Distributed Processing (ISO/IEC1998).

In a project, the customer is transferred from an existing situation to a new situation. In the implementation of a new information system the individual employees should be guided by showing them how the same underlying processes are handled in new ways. Continuity and change must be shown. Last year, I discussed these matters a little with a researcher in Translation Studies, a field which might contain some useful theoretical views about this subject (Marais, 2014).

5 CONCLUSION

The combination of practical and theoretical work has always been a fruitful way of working for me. The problem of research in business is always how to get access, and how to evaluate situations. With my background at RBK I was in the very fortunate position to be able to observe and participate in many business situations.

Part of my theoretical background is in semiotics and in the philosophy of language. Talking about these theories does not in itself help in business analysis, but it certainly contributes to a sensitivity for meaning and interpretation issues. That sensitivity has greatly helped me in analysing processes and in looking for solutions. Respect for the heterogeneity of reality and avoiding reductive solutions is a result of both my practical work and my theoretical studies.

REFERENCES

Daft, R.L., 2001. *Organization Theory and Design*, South-Western College Publishing, Cincinatti, 7th edition.

Mintzberg, H., 1979. *The Structuring of Organizations*, Prentice Hall, Englewood Cliffs.

Coase, R.H., 1937. The Nature of the Firm. In Williamson O.E., Winter S.G. (Eds), 1993 *The Nature of the Firm*, Oxford University Press, Oxford.

Kay J., 1993. *Foundations of Corporate Success*. Oxford University Press, Oxford.

De Geus, A., 1997. *The Living Company.* Nicholas Brealy Publishing, London.

De Groot, A.D., 1965. *Thought and Choice in Chess.* Mouton Publishers, The Hague, 2nd edition.

Weiskrantz, L., 1997. *Conciousness Lost and Found.* Oxford University Press, Oxford.

ISO/IEC, 1998. *IS 10746-1 Open Distributed Processing – Reference Model: Overview.*

Marais, K., 2014. *Translation Theory and Development Studies.* Routledge, New York.