Difficulties of translation: Making *action at a distance* work in ERP system implementation

**Abstract**

This paper presents a case study of the production and use of management accounting inscriptions. It presents a story of the implementation of an ERP (enterprise resource planning) system, showing the uncertainties and dilemmas faced in moving from a hands-on form of management to an *action at a distance*. The study shows how the production of accounting inscriptions compresses the space between different parts of the organization, how a new ERP system is made to work in an organization, and how an organization’s members cope with unstable inscriptions in different ways. We show how the complexity of producing accounting inscriptions makes the translation of the world into inscriptions problematic. It raises questions about the flexibility and customer relationships of the firm. As a consequence of maintaining the flexibility of the firm, an accounting inscription becomes instable – it has links to local setting, but no isomorphic relation to it. We show that part of acting at a distance is frequently tracing back to the world where the inscription is produced. A network of communication needs to be maintained that allows two-way movement – from the local to the inscriptions, and from the inscription back to the local setting.

**Keywords:** Accounting inscriptions, Enterprise Resource Planning (ERP) system, Circulating reference
INTRODUCTION

In this paper we investigate the production of accounting inscriptions, such as inventory accounts, cost accounts and product margins in a food production company. We show the various issues that occur when producing accounting inscriptions and trying to act at a distance. Translating the world into numbers involves technologies that enhance and structure the process of producing the accounting inscriptions. These technologies are important to consider since management control “cannot be studied apart from technology” (Dechow & Mouritsen, 2005). Thus, in this paper we provide a story of a firm moving from hands-on and communication-based management to an action at a distance and rational management, through a human-technical production of accounting inscriptions. We show that the move from hands-on and intuition-based management towards an ERP technology-driven production of inscriptions and action at a distance involves choices and dilemmas that affect wider affairs of the firm, such as customer relationships and flexibility in the market.

Our study follows the studies of Robson (1992) and Dambrin & Robson (2009). Whereas Robson (1992) shows how inscriptions, being mobile, stable and combinable, allow action at a distance, we show how the complexity inherent in the production of management inscriptions and the need to be flexible can create problems with the stability of inscriptions, bringing a wider set of issues for the organization. Dambrin and Robson (2009) show how in the case of performance measurement, the world may not be directly available to inscribe, and accordingly how different allies and arguments need to come together to make the meaning of inscriptions stable. We show different kinds of instability and different sources of the problem. In our case study in a food production company, the organizational world is readily available to inscribe, stable enough to be observed and contoured in signs. The need for detailed management accounting information by those wishing to act at a distance and the mediation of ERP technology imposes certain rules and structures on the actors who produce the inscriptions. This brings about a situation where inscriptions become unstable. However, instead
of making inscriptions stable, the need to be flexible in the market compels the firm to choose unstable accounting inscriptions.

In this study we show that reducing the world to accounting inscriptions, reduces some of the complexities and diminishes some of the richness of the world, but at the same time, creates new kinds of complexities between the world of “objects” and the worlds of “signs”. Our case study shows that when maintaining the flexibility of the firm, accounting inscriptions became unstable – as a consequence of being flexible an inscription has links to a local setting, but no isomorphic relation to it. Even if the world is relatively stable and available to inscribe, accounting inscriptions are never stable enough to permit complete certainty. To cope with that and pursue \textit{action at a distance}, actors frequently need to trace actions back to the local setting, where the inscriptions are produced. This is the idea of the “circulating reference” (Latour, 1999), where movement in both directions has to be maintained in order for the \textit{action at a distance} to be viable.

The existing understanding of \textit{action at a distance} (Hopwood, 1990; Robson, 1992) presents the inscription as a strong amplification, based on which a global actor can act on a local actor. In our case study, we show that that is not necessarily so. The case study demonstrates that people using accounting inscriptions have to constantly turn to local actors (the locals) who have the knowledge of what it is that an inscription actually refers to. Our claim is that having an inscription, does not necessarily facilitate the ability to \textit{act at a distance}, for the amplification may not be strong enough to allow managers to act with confidence. When an inscription is produced and it travels across the organization, it does not automatically become a solution for its users, but it can generate lots of movement, forging new links to the locals. We show that part of acting at a distance is constantly tracing actions back to the local setting (to the particular). Thus, while Robson (1992) shows the movement from the particular to the amplification, and Dambrin & Robson (2009) show the movement between different types of amplification and interests of network participants, we show that, in order
for the inscriptions to work, it is necessary to move both ways between the global and local – from the particular to the amplification, and from the amplification back to the particular.

Our study bears some similarities to that of Preston et al (1992) in showing how a management accounting system is “put together in a changing and fragile manner”. We follow the development of ERP implementation, use and modification in the firm over six years. Our study tells the story of how the system of creating management accounting inscriptions is put together in the firm, how it is questioned, continuously modified and how it finally becomes working practice. It reveals the uncertainties and dilemmas that arise during this process.

This study differs from that of Preston et al (1992) by placing less emphasis on institutional settings and the social context of the new accounting system. Preston et al (1992) rely on Latour (1987) to show how different institutional forces shape the emergence of a management accounting system and how the system moves towards becoming an accepted fact, a “black box”, in the organization. Instead of focusing on definitions, interpretations and meanings of the new accounting system, our study concentrates more on the effects that the new system has on the organizational practices and how the system is made to work. It shows how the system moves people around and makes them do things, and how inscriptions – as non-human actors – can create different problems and also induce emotional responses within the organization.

A growing body of work in accounting has been informed by the sociology of translation (e.g., Briers & Chua, 2001; Ezzamel, Willmott, & Worthington, 2008; Miller & O'Leary, 2007; Preston et al., 1992; Quattrone & Hopper, 2001). Scholars explaining the technology of action at a distance have drawn on the sociology of translation in particular (see e.g., Dambrin & Robson, 2009; Robson, 1992). We seek to add to this literature by using the notion of the “circulating reference” (Latour, 1999). The notion of the “circulating reference” helps to explain the actors’ movements as instances of tracing back and forth between the world of objects and the world of signs as a part of acting at a distance.
This paper also adds to the literature discussing the various roles of ERP systems and their implementation (see e.g., Dechow & Mouritsen, 2005; Quattrone & Hopper, 2005, 2006; Scapens & Jazayeri, 2003). It is aligned with the studies of Dechow & Mouritsen (2005) and Quattrone & Hopper (2005) in showing that visibility and control are not predetermined as a part of the ERP technology, but have to be made to work in an organization. Quattrone & Hopper (2005) have shown that an ERP system can be operated from different places. Our study adds to this, presenting another account of the issues and the complexity of an ERP system. It shows that any place operating an ERP system has to create its own network around the system. People across the organization have to input new items to the ERP system to make the system work.

The remainder of the paper is organized as follows. The next section provides the theoretical background of the study. It discusses the production of management accounting inscriptions as examples of a “circulating reference” (Latour, 1999) and the complexities of translating the world into accounting inscriptions. The third section introduces the research approach and empirical setting. It introduces the method of the longitudinal case study and the roles of the researchers in the field. The fourth section tells the story of how Microsoft’s Axapta application was introduced to and developed in the firm. It shows that to produce inscriptions for cost accounting, it is necessary to capture the mobility of the objects in the local setting, inscribing lots of context with all the linkages between the entities of the local setting. Through this complexity, the case study shows how ‘broken’ inscriptions came to pass, how they travelled across the organization creating different problems and uncertainties for global actors – for both accountants and those who wanted to act at a distance. It shows how people who want to act at a distance so often have to seek help from the local setting where the inscriptions were produced. The final sections of the study include a discussion, draw conclusions and suggest future avenues for research.

THEORETICAL BACKGROUND
Accounting as a calculable practice has an ability to reflect the things that are not directly available for decision-making. Hopwood (1990, p. 9) explains the accounting role drawing on the works of Bentham (1791):

“Bookkeeping, according to Bentham, enables an indirect means of visibility to be created where the eye could not otherwise see. Records can be kept of what is happening on the other side of the wall [Bentham originally refers to prison walls], or indeed on the other side of the world. A possibility for an ever-present observability thereby can be created.” (Hopwood, 1990, p. 9)

Management control is usually exercised in the arrangement of social and spatial dichotomy between the controlling centre and the controlled peripheries (Carmona, Ezzamel, & Gutierrez, 2002). The existence of such a dichotomy creates a need for management control, because the centre needs to maintain order in the organization and be able to make decisions across different parts of the organization. Creating visible representations of the physical processes and circumstances makes it possible for managers to make decisions and guide manufacturing processes without being located in the midst of those processes. With the help of accounting inscriptions, it becomes possible to act at a distance (Hopwood, 1990; Robson, 1992).

Accounting numbers have been related to a perception of objectivity and fact-building, reducing the ambiguities of the world into manageable quantities. Management by numbers is assumed to introduce certainty and rationality into decision-making. The economic reality of that controlled is brought to the present through the use of numbers, where accounting knowledge is awarded a privileged position among other more implicit types of knowledge.

“The calculative practices of accountancy have one defining feature that sets them apart from other forms of quantification: their ability to translate diverse and complex processes into a single financial figure. Whether the processes are automobile manufacture, the assembly of electrical goods, or the administration of health care, management accounting can reduce them to a single figure, thus making comparable activities and processes whose physical characteristics and geographical location are widely dispersed. The labor efficiency variance, the return on investment of a division, and the net present value of an investment opportunity all share this elegance of the single figure.” (emphasis in the original) (Miller, 2001, p. 381)
These elegant figures are mobile, being able to travel across different spaces to permit *action at a distance* (Latour, 1987; Robson, 1992). By reducing the ambiguity of the phenomena and making things combinable (Robson, 1992), these figures are considered to provide clarity, revealing the necessary elements of the world to those who want to act upon that world. It is assumed that by reducing ambiguity, we gain certainty - “The realm of information is now acted upon as if it was the realm of facts” (Hopwood, 1990: 13). The assumption is that after producing accounting numbers, one can rely on those numbers. They become a solution for the need for acting at a distance.

Certainty is generated as a result of a chain of translations. Translation is the chain of associations between the objects and events of the world and inscriptions (Callon, 1986). Translation of the world into signs is made through the various intermediaries, transformations, and activities of building the links between the elements of the world and signs. Latour (1999) relates a story of a “circulating reference”, where the forest and savannah in the Amazon “are brought” into the laboratory in the form of graphs and signs. In his story, scientists are on a field expedition in the Brazilian jungle, trying to understand whether the savannah is advancing into the forest or the forest onto the savannah. To do so, they need to reduce the rich world of the forest and savannah down to signs, so that the botanists and pedologists might discuss and analyse the signs as if they were talking about the real plants and soil of the forest and savannah. Throughout this journey various associations and links between the world of objects and the world of signs are made. This is how the careful process of creating a reference works:

“She has therefore placed tags at regular intervals so as to cover the few hectares of her field site in a grid of Cartesian coordinates. These numbers will allow her to register the variations of growth and the emergence of species in her notebook. Each plant possesses what is called a reference, both in geometry (through the attribution of coordinates) and in the management of stock (through the affixing of specific numbers).” (Latour, 1999, p. 32)

Through this process, scientists are able to name and index the plant and record the number and location of the plants in a space. A notebook used in the forest and savannah could be a book of accounts in production. In the organization, in order to *act at a distance* and decide upon the profitability of each product, the system needs to record and index the types and stocks of raw
materials, record their location at different times and link them to the products and processes thorough the production, resulting in a set of signs that could bring the world of production closer to the “centres of calculation”.

According to Latour (1999) we can bring a particular organizational world to ourselves if we maintain the traceability of inscriptions back to the world. We need reversibility, traceability and the possibility of travelling in both directions. Travelling in both directions is possible when links along the chain of translations remain intact. By placing the inscription against a new background, we have to be sure that the links between the inscription and the original world remain in place. In Latour’s (1999) story, the plants and soil are travelling through the space, from the savannah and forest to the laboratory. They have to travel through the space without further alterations and to remain intact through the time. All the stages of transformation from things to signs can be distinguished and are visible to scientists. He specifically insists on the alignment of stages and resemblances at each stage,

“… all the types of transformations through which an entity becomes materialized into a sign, an archive, a document, a piece of paper, a trace. Usually but not always inscriptions are two-dimensional, superimposable, and combinable. They are always mobile, that is they allow new translations and articulations while keeping some types of relations intact. Hence they are also called “immutable mobiles”, a term that focuses on the movement of displacement and the contradictory requirements of the task. When immutable mobiles are cleverly aligned they produce the circulating reference”. (Latour, 1999, p. 306-307)

Immutability is necessary in order for an inscription to be able to travel. Law (2002) explains that in order for an object to be able to travel in Euclidean space, it needs an immutable network that holds it together. Accounting inscriptions, in turn, have to have an immutable network in order to be able to travel across the organization.

In producing accounting inscriptions, the visibility of such travels and the links along the journey from the world of objects to the world of signs may, however, become corrupted. Measurements are never purely mechanical, but always need some judgment of quality (Porter, 1992, p. 640). For instance, the stability of performance measures can be quite problematic because of the complexity and varying
availability of the phenomena measured (see e.g., Dambrin & Robson, 2009). Inscriptions are produced through the technology of abstraction, where the complexity and richness of the world is reduced to signs (Robson, 1992). In reducing the world to signs, we always lose something. In order to regain mobility and combinability, we have to lose considerable amounts of context (Latour, 1999). This, however, means that instead of producing certainty, we create uncertainties – that the phenomena that we act upon are not entirely reflected in our inscriptions, and that the inscriptions have weak links to the world that we want to act upon (see e.g., Dambrin & Robson, 2009). Scholars have pointed out how accounting representations are incomplete (see e.g., Hirst, 1981; Otley, 1978; Vaivio, 1999), which makes the use of accounting inscriptions open-ended, uncertain and context-dependent (Ahrens & Chapman, 2007).

Whether something is immutable is also defined by the physical space in which it travels. Objects are “dependent for their constancy on the intersection of different spaces” (Law, 2002, p. 98). “One never travels directly from objects to words, from the referent to the sign, but always through a risky intermediary pathway” (Latour, 1999, p. 40). In a modern organization, inscriptions travel through information system pathways, where the human-technical systems of translation facilitate the travel of the inscriptions across the organization. The ERP system is a tool for the production of inscriptions, containing “empty compartments” to be filled in (Latour, 1999, p. 49), and protocols that allow them to travel and make them available in different parts of the organization. Its role, however, is not neutral and the questions around its functions and applicability are open to debate and transformation (Bloomfield & Vurdubakis, 1997; Dechow & Mouritsen, 2005; Quattrone & Hopper, 2005).

The following case study tells the story of a food production company setting up an ERP system and starting to inscribe its production processes. The world is available for them to inscribe, but the process of translation and action at a distance is not easy or straightforward to implement. We look at how the translation of the world into accounting numbers is made to work along the human-technical pathways of ERP technology. We look at how the problems are identified and solved, making action at a
distance. We investigate the practice of food production where the items being inscribed are highly mobile, and the organizational world, in which the objects of production are constantly placed and replaced, is dynamic and flexible. To make inventory accounting work and the profitability of products visible to the managers, the role of accounting inscriptions is not only to show the objects (both their quantity and quality), but to make it possible to see the relationships between the mobile objects in different settings. This makes the production of accounting inscriptions complex. Thus, the case study aims to show how the translation of the mobile objects is made to work, how the complexity of producing accounting inscriptions is managed and various dilemmas solved, how the traceability and links between the local setting and the inscription are managed, and action at a distance made to work.

RESEARCH APPROACH AND EMPIRICAL SETTING


The field data has been collected during a six-year longitudinal field study of a small food-manufacturing firm, which is given the pseudonym FoodLight this study. McKinnon (1988: 40) has suggested that “the longer the period of interaction, the larger will be the number of events that form the data set for analysis”, so significantly affecting the validity of the study. Considering the very good access and long-term presence in the firm, the researchers were able to observe the historical development of the accounting system in the field, rather than merely relying on the respondents’ descriptions. The time frame of the present case study gave a reasonably long period of contact, allowing the researchers to investigate the ongoing processes in the firms. The researchers had an opportunity to observe the issues from their emergence through to their solution. This allowed the collection of “fresh” data and discussion of the issues while they were still “hot”.

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The data collection in our study has similarities with that in the study by Rowe et al (2008), in terms of the relative length of the study and the different roles of the researchers. As in Rowe et al (2008) the analysis in our study relies heavily on observations, of which many are participant observations. Since one of the researchers was working in the field, we had constant access to the events in the firm. This granted us access to multiple sources of evidence: relevant people, events and documents in the firm. It allowed us to directly access data in the ERP system and follow the management accounting inscriptions. It also allowed us to understand the backgrounds of the employees and to organize interviews based on the “hot” topics and ongoing issues. The excellent access to multiple sources of evidence allowed us to increase the construct validity of the study (Eisenhardt, 1989; Yin, 2003).

In order to diminish the possible observer bias of any one researcher (a participant observer) on the constructs of the study in the field, the data collection was divided into two stages (see Table 1). In the first stage of data collection, the tasks of data collection and data analyses were divided between two researchers. Researcher 1, who was working in the field, was collecting the data but did not take part in the analysis of the data and the development of theoretical constructs. Researcher 2 was analysing the data and instructing Researcher 1 on the important topics and issues to pay attention to in the firm. This was to make sure that Researcher 1 was not affecting the decision making in the field by imparting their awareness of the theoretical constructs of the study. In order to make sure that this setting did not generate blind spots for the researchers and misunderstandings, the second stage of the study was organized with the roles of the researchers changed around. Researcher 1 joined in with the analysis and interpretation of the data and Researcher 2 joined in with the observations. In addition, a third researcher joined as an external observer and investigator, helping to analyze the collected data and pointing out potential gaps in the data to be filled with additional observations and interviews. The differing roles of the researchers allowed us to approach the data from different standpoints and repeatedly question the emerging constructs in the field from different angles, improving the data collection techniques and analysis thorough the study.
The observations of the study refer to different meetings, corridor discussions and processes in the production department (see Table 2). Available time was particularly allocated to the production department to understand how the inscriptions were produced. Researchers were allowed to freely observe the production processes from beginning to end. Observations in the production department were conducted in stages. First, the researcher (or sometimes two researchers together) stood and quietly observed the room. In the second stage, the researcher started to walk around the room, taking a closer look at the activities going on and the things that people were handling. At the final stage of observation (which usually took more time than the previous stages), the researcher talked to people while they performed their tasks, asking “why” and “how” questions. During the observations in the production department, employees were often asked probing questions, such as:

- How do you know that you have to enter this code into this field?
- Where did you get that number?
- How do you know that this number is correct?

During the observations, the situation-specific questions helped us to understand the context better and increased the validity and reliability of the study (McKinnon, 1988; Yin, 2003). It helped to diminish the risks of filling the gaps in data with the researchers’ own assumptions and false interpretations. At the same time, the researchers tried not to obstruct the normal flow of production activities. Since the company is well-known for its high-technology production facilities, it has welcomed many guests and observers. Therefore, production department employees were used to having outsiders walking around and asking questions. People were very willing to explain what they were doing, and also to reveal the mistakes (we call them breakdowns in this paper) that happen while entering data into the system.

All interviews were digitally recorded and transcribed in full (see Table 3). Since much of the information was gathered through observations, the interviews were usually well-prepared allowing researchers to focus on the core problems and “hot” topics in the organization. This allowed us to gather relevant information during relatively short interviews. Throughout the field study, data was
chronologically organized into catalogues containing the observations, interviews, notes, and copies of the documents. Real-time and archival documentary material, such as company reports, internal memos and records, PowerPoint presentations, and a history of electronic correspondence were collected (see Table 4).

To satisfy the tests of reliability, the interviews were tape-recorded and transcribed instantly, and notes were made about the observations. The reasonably long time period of the case studies helped to detect anomalies in the data, and misleading or flattering responses in the interviews (McKinnon, 1988: 38-39). The long stay in the case organization and high number of participant observations allowed the researchers to diminish any such bias. In addition, the ability to analyse the themes in various meetings and through occasionally asking probing questions during the observation, allowed researchers to improve their understanding of the issues. Any apparent contradictions that emerged between the participant observations and interviews were marked, discussed among the researchers and considered during the interpretation of the data.

The transcripts were continuously coded and analysed in NVivo 8.0. Codes were post-defined, in the sense that codes were not predetermined but emerged during the data collection and analysis (Corbin & Strauss, 1990; Miles & Huberman, 1994, p. 61-62). The ideas emerging through coding were captured with memos that allowed the revision of the emerging actor-networks through the study. The researchers were open to what was received in the field, constantly extending the coding system and redefining the constructs of the study. The observational, methodological and theoretical notes were separated to allow reuse of original data if necessary (McKinnon, 1988: 46).

CASE STUDY

Situation before the adoption of Axapta technology

The worlds of “upstairs” and “downstairs”
Founded in 1992, FoodLight is a small food production company operating in the Baltic States and Finland. The company is known for its high-technology production facilities, a strong brand, high-quality products, and relatively high prices. Having a strategy of innovativeness and an open mindset, the company has been implementing many new production technologies, developing a number of new products and significantly increasing the production capacities through the years. Its market share and revenues have been growing consistently year on year.

FoodLight operates from its own renovated and adapted office and manufacturing facility. Although the entire building has only two floors, there has been a clear distinction of the two worlds: the world of “upstairs” and the world of “downstairs”. The world of “downstairs” is the world of production. The world of “upstairs” is the world of offices. When people in the organization talk to each other referring to “downstairs”, they usually mean the production department; when they mention the word “upstairs”, then they mean accounting, finance and marketing. Part of this is a physical separation of two floors, people wearing different clothes and following strict rules of hygiene that prevent them from moving unhindered between the two “spaces”. Part of it is more than just a physical separation of departments, signifying the social structure of the organization. For instance, the canteen is physically located upstairs, but it is usually referred to as “downstairs”.

Until 2003, people in these two worlds lived in different realities with different information settings. They had different knowledge, goals and relationships. People upstairs were responsible for organizational growth and sustainability. Their life was related to the markets, financial resources and profitability figures. They got their information from customers, partners, and the financial accounting figures of the firm. Sales volumes and the bottom line were important to them. People downstairs, on the other hand, did not know about financial figures, but they were aware of inventories and production runs that had to be completed on time. They had their world of raw materials, machines, and production technologies. They were the ones who knew how to make sausages, ham, pâtés and salami.
They knew how to cut, salt, dose, tumble, autoclave, boil, and cool the materials in order to produce high-quality meat products.

These two worlds were separated but not independent of each other. Each had to rely on the actions of the other to sell the products and make new plans for growth in the market. In 2003, communication between the two worlds was largely based on institutional settings of information exchange. Management control was executed by contact. People “upstairs” could only see numbers on inputs and outputs. Anything that happened in between was under the control of people “downstairs”. Managers could sometimes see that the input-output comparison indicated waste in production, but looking at the input-output data, they could never be sure what had actually happened, why the output was low compared to the inputs. The only way to know what happened “downstairs” was to ask somebody “downstairs” or go and take a look.

There was a culture of trust in FoodLight. When planning the marketing and sales activities, sales people gave verbal orders to “downstairs”, based on which a production manager further planned all the raw materials, production processes and inventories,

“Sales people gave us forecasts of sales. I made sure that the sales department would get the completed products. […]Based on this, I had to plan everything….I mean literally everything in production, all the menus, materials etc. […]Meat cutting had to be organized based on that. You planned all the processes based on that. I told meat cutting in the morning, how much and which kinds of meat they should cut today. Then, I had to plan salting etc. “ (Production Manager)

Management control was a verbal practice, relying on trust and given responsibilities. People “upstairs” had to trust that the Production Manager would be able to keep things under control. They had to rely on the Production Manager’s word about the timescale in which the necessary products would be ready for sale. Things that actually happened “downstairs” were not visible for them. In making the sales decisions, they could not get appropriate information about the stocks of a particular product without making phone calls “downstairs”. In order to make decisions about how much of a particular product they could sell to a customer, who might often be waiting for a quick answer over
the phone, they needed to talk to people “downstairs”. They could not see which products were about to come to into stock, and which products were waiting in stock to be marketed;

“I did not know the stock levels. I had to ask some people who could go and visually detect how much is in stock. You had to call downstairs to someone who could tell you that ‘yes, we have this product in stock’ or ‘no, we do not have it’ ” (Sales Secretary)

Each part of the organization tried to cope with its own information inside its own department. Pieces of software used in the firm were not linked, preventing information exchange between different parts of the firm. The accounting department used their own DOS-based accounting software, PEAX, where they entered invoices. The sales department used MOX software to keep track of their sales orders. The production people “downstairs” used one reporting tool of a system called MultiFlex, which collected input and output numbers in one small part of the production environment. Information was only monitored by one technician. Most of the transactions in the production department were reported manually, if reported at all.

Operating in two separate “spaces” made sales and the execution of growth plans quite problematic, however. Things were easy to handle with a limited product range and number of customers for some time, but not after a significant increase in product and customer portfolios. The widened product portfolio of 230 products in the local market and aspirations to expand to new foreign markets, threatened to come into conflict with the internal setting of the organization. In addition, strict terms of shipment and the strategy of not producing for stock, required more careful attention to inventory flows. The observation of inventory flows through 19 inventory storerooms (locally referred to as ‘storages’) was, however, problematic in this hands-on management setting.

Managing the product portfolio was also problematic because of not knowing the specifics of the bottom line – which products actually contributed to the company’s profit, and to what extent. There was no information about how much was spent to make each end-product. The portfolio management and pricing decisions were largely based on market information (comparisons with competitors) and some rough ideas about the profitability of the products. Market price was not necessarily a good
indication either, because the company often led in the creation of new segments rather than following the market. In preparing the marketing campaigns, the marketing department used their intuition and business relationships. In most cases the price was a result of negotiations and analysis of its suitability for the particular supply chain, without the appropriate information about the production costs and profitability of the product.

When organizing sales campaigns, no analysis was possible of whether the campaign price was reasonable or what margin was available on each product in the campaign. The product portfolio consisted of 230 products with unknown margins. FoodLight’s profitability in general was not a problem, but with such a large number of products, managers found it difficult to see the impact of their product portfolio and marketing decisions. It was possible to follow the sales numbers, but not to analyse the actual impact of each product on the bottom line. This information was hidden “downstairs”.

In 2003, low visibility and the absence of real-time information led the CEO to decide to link the two worlds with the help of information technology. The agenda was to move from financial accounting information setting and person-to-person information exchange to the use of management accounting information and action at a distance. Instead of intuition and faith, managers wanted to use rational decision-making based on numbers. The idea was that the sales people could get operating information about the inventories from the computer, and the decisions on products, prices and campaigns could be made by relying on definite cost values. With the help of ERP technology, the CEO wanted to shift from the use of a few financial accounting indicators and a lot of guessing to the use of management accounting numbers.

Microsoft Axapta was chosen for the firm’s needs because of its options for client-originated customisation and software extensions. The initial ERP system development team was composed of IT people and managers of different departments. Training of employees was performed at the end of 2003 and Axapta went live on January 1st, 2004. In order to open the black box of “downstairs”,
special attention was paid to the production module of the software. The milestones of the implementation are listed chronologically in Appendix 1.

The production of inscriptions in the new ERP system

The world of “downstairs”: meat cutting

After Axapta went live employees in the production department had to start inscribing their world into the new system. All meat cutting and weighing activities had to be recorded in the system. The Production Manager had to start to issue digital job orders. The recipes became digital and employees had to weigh and dose raw material according to those recipes.

We will describe the sequence of events of how inscriptions were produced in the system, how the uncertainties emerged and how the staff of FoodLight coped with these uncertainties, while maintaining and stabilizing the link between the “downstairs” and “upstairs”. Our story starts in the section of production where all the products are initiated - the meat cutting room. Meat cutting, with 10 employees, is the first production process following receipt of animal carcasses. This is also the part of production where the role of humans is greatest, since the quality of meat cutting relies heavily on tacit knowledge and experience. At later stages of production, the role of many types of machines is more relevant to carry out the tasks of dosing, slicing and packaging meat of different shapes and weights.

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FIGURE 2.1. Meat cutting

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Observation in cutting room\(^1\) (see Figure 2.1). 6 people are around the table cutting up the carcasses. Another 4 people [not pictured] are finishing their cutting tasks by transporting the

\(^1\) Researcher is standing and observing close to the one end of the cutting table. Thereafter, the researcher is starting to walk in the room, taking a closer look at activities and things in the room. At the final stage of observation, the researcher is talking to people while they are doing their tasks, asking questions of “why” and “how”.
boxes of meat to storage areas or doing other tasks in the room. This is the world of “downstairs”, the beginning of the production processes.

This is a world of carcasses, different types of knives on the table, boxes on the floor where the pieces of meat are placed after cutting. The aim is to cut the body carcasses in a way that delivers the maximum amount of higher quality meat [which is more expensive in the market and thus valuable for the firm] from each carcass.

At first, it seems [to the researcher] that the pieces of meat are literally scattered everywhere with no logic. People are doing something in the midst of all kinds of body parts. Further on, the rhythm and structure of actions and things in the meat cutting room starts to make sense. Everything is actually placed in order. The tools can be easily reached. The boxes of meat are organized on their right and left hand according to their movements, in a way that makes them easy to reach. The pieces of meat are located and relocated in the room according to a specific logic. People around the table focus on the knife they are holding, almost intuitively knowing the right moves and angles when they make a cut. After each cut, they instinctively place the piece of meat either into the boxes around them or on the end of the table for the three employees who process bones and rinds.

While doing the cutting each employee places the meat removed into boxes according to the cut of meat. Figure 2.1 shows that the boxes around the employees already contain different pieces of meat that have been cut. This is the place where the first physical categorization of meat takes place. Now it is time to weigh the boxes of meat and enter the information into the system. The world of meat has to be translated into a world of signs that will further become visible for the people “upstairs”.

*Observation. Terminal in meat cutting room* (see Figure 2.2). Next to the main table where the meat cutting takes place there are two screens attached to the wall with big scales installed on the floor. In order for the employee to know how his world of meat should be linked to the world of signs, there are all kinds of written instructions about the links between the boxes of meat and certain signs. Various sheets of instructions, printed and handwritten, with the list of product codes, inventories and the types of empty containers available hang on the wall next to the computer. For instance, the instruction on the wall says that if you weigh a certain type of meat, then it should go to the warehouse that has a certain code. It also notes the empty weights of the various boxes used: a small blue metal box, weighs 11.6 kg; a small red box with a plastic base is 4.6 kg whereas the same box with a metal base is 11.8 kg, and so on.

After filling the boxes with meat, an employee leaves the table taking the boxes with him. He has to record the cutting activities that he has just performed. He puts some of the boxes of meat onto the huge scale on the floor and turns towards the screen.
There are many fields to fill out. Everything has to be entered in codes. While looking at the screen, he starts entering the numbers by heart. First he enters the number 21 which is the primary warehouse where the body carcass was taken from (the freezer designation); then he enters the destination warehouse number 20, where the meat will go next; then the code 4017 which is the type of product the piece of meat is destined for; then the batch number 505; and the boxes used to transport the meat. The number of kilos, which is 75.80, is taken automatically from the scale. After typing the numbers in he quickly pushes the “register” button and starts loading new boxes onto the scale.

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FIGURE 2.2. Place of translation
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After the key information is registered, the pieces of meat start their travels through 19 different storerooms and up to 20 processes. Some of the meat will go through salting, dosing or tumbling, or autoclaving (for pâtés), or pre-maturing and post-maturing (for salami), and/or smoking and boiling, finally ending up in cooling, slicing, and packaging. In order to record the entire path – all the twists and turns on this journey through the storerooms and processes – it is necessary to repeatedly register the weight and status of the meat at a number of locations “downstairs”. These places of registration are similar to the terminal shown in Figure 2.2.

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FIGURE 2.3. Numbers “between” the two worlds
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Now, apart from the world of meat, another world is being created, the world of mobile inscriptions. Figure 2.3, illustrates the server where all the inscriptions are gathered together, stored in rows and columns. This is the database of all the collected details, codes and quantities together. Every day up to 3500 rows of numbers are added. This is the stop in the middle of the ERP system, a place where the inscriptions start travelling, separated from the actual pieces of meat, to all kinds of accounts and books, so that people upstairs can, based on these numbers (physical and monetary values), track the status of products in all kinds of locations “downstairs”.

20
Sudden problems “upstairs”

Soon after the introduction of the new system, financial accountants started to complain about the problems that suddenly emerged and intruded into their world, messing things up. Suddenly there were errors in ledger accounts that came from “nowhere”. First, inconsistencies emerged in inventory flows, from where these problems ended up in the finance module of the system, showing up on inventory accounts. Further on, unexplained variances occurred in contribution margin reports and monthly income statements (see also Appendix 2). The world of financial accounts that had previously been exact and comparable was suddenly messed up.

The same inventory accounts started to create problems in the sales and marketing department, creating concerns in customer relationships. For instance, there were several cases when the Sales Secretary looked at an amount of stock on the screen, made a promise to the customer to deliver the products, filled in the sales order in Axapta so that people “downstairs” could see it on their screens and make a shipment; subsequently however, the Sales Secretary would discover that the products were not shipped because there was simply no such product in the warehouse. Later, the production department would explain that the amount of stock shown on the screen did not correspond to the actual stock downstairs.

The emerging problems with inscriptions were of different kinds. Sometimes it appeared that inventory numbers were correct, but for some reason, the batch number of the particular stock was wrong in the system. Batch numbers were, however, related to the realization period (a wholesale equivalent of the ‘best before date’ familiar to consumers) of the products. One big customer, sent an entire shipment back to FoodLight because it had too short a realization period. This situation, as in the previous one, required a considerable effort on the part of the sales staff to maintain good customer relations.

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2 Minimum realization periods of products delivered are determined in customer contracts.
Incorrect numbers in inventory accounts also created a double effect – a circle of erroneous value chain. When people “upstairs” saw on the screen that there were enough products in stock, they thought they had a safety margin sufficient to satisfy customer orders, so they did not release a production order requesting production of more of that particular product. Later on, it often transpired that the number on the screen was too high in relation to the actual products in stock. Since the production department did not get a production order on time, there was not enough product in stock and it was too late to produce that product in time to satisfy the orders for it.

This all made the lives of the sales staff very complicated. Some irate customers threatened to activate penalty clauses. Sales staff had to make special efforts to maintain customer relationships; apologising and offering various types of compensation until the products could be delivered, and relationships restored;

“It is very important for the customer that we propose some solution. For instance, the simplest thing is that we can agree with the customer is that we will ship the product later in the evening or next morning. It depends, how the client wants to have it, but well...yes, it really depends how quickly we can get the product ready. [...] Sometimes, we can offer a similar product, but we have to make sure that the price would be the same for the customer, even if it is actually more expensive for us to produce. [...] We lower the price or do anything to make them feel better. The saddest situation is when the customer orders a similar product from our competitor”. (Sales Secretary)

One of the compensating techniques included shipping an analogous product. This, however, caused other kinds of issues, such as problems with waste management and additional work load, for the customers;

“In this kind of situation the best option is when we have a similar product in stock, but it is, for instance, in a smaller package. Then we offer this to the customer at a lower price, for instance. Despite the lower price, however, the customer may not be satisfied with that, because he gets lots of waste packaging. You see, if he usually gets two kilos in one package, then he now gets one kilo in three packages. It means that he has lots of garbage and that is not good. They need to open the extra packages, so first, they need to have an employee who opens the

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3 In all contracts with big customers there is a penalty specified if FoodLight is not able to make a shipment.
packages. Later there is the extra garbage for them and that brings worries over waste management” (Sales Secretary)

In addition, the confusion over numbers did not allow profitability and product portfolio analysis. It was still difficult to figure out the costs of each product. The prices of raw materials did not seem reliable because of the unexplained variations in the numbers. Therefore, in making all kinds of decisions “upstairs” people often had to say that "Well, we have information….but it may not be correct.”

Managers, of course, realised that these kinds of problems originated neither from accounting nor sales departments but must have came from “downstairs”. In order solve the issues it would be necessary to go back “downstairs” and trace the source of the problems.

*The complexities of producing accounting inscriptions*

It appeared that describing the world of meat in the language of signs was not an easy task “downstairs”. In entering the data, people generally knew what should be entered into the system; they knew that there must be a certain number in each field. They always filled in the blanks, but sometimes they mixed up the codes of products. Sometimes they forgot to log in with the right employee code, thus cutting and weighing meat in somebody else’s name. Sometimes, when they entered all the correct codes, they forgot to click one box on the screen. Sometimes the batch numbers were mixed up.

In principle, each body carcass should be related to a specific batch. An employee is expected to enter the right batch number, but sometimes they enter the batch number which was used on a previous day. Since each batch had its own price, consequently the prices of the inputs were mixed up later on and it took time to figure out whether the cost of a product was affected by the fluctuation of prices in raw materials market or if there was some waste in production.

Before Axapta, operatives only had to specify the type of meat and an amount in kilos (see Figure 2.2B). People improvised and used their intuition. Now it was like an explosion of details that could no longer be improvised around —things had to be precise.
"From one product-in-process you produce 4-5 different products. You need Farmer’s Ham 1004 and also Farmer’s Slices 8004, and you mess up these two." (Production Specialist)

“Somebody is weighing into the wrong storeroom [entering the code of another storeroom], and entering details under the wrong job order. Inventory accounts become unreliable due to these mistakes" (Head of Technology)

When producing inscriptions there were many fields to fill in. Operatives had to know a great number of codes and the links between the codes and their world of raw materials, inventories and production techniques. It was difficult to pay attention to all the codes and the rules according to which the codes were related to their world. People faced a complex system with lots of new attributes that had to be specified for every task while entering the data. There were lots of blanks to fill in, lots of places where an operative had to click and add a tick or not add one. And then there were many places where there was a drop-down menu to specify discount groups, product families etc. The Head of Technology complains;

“The software is constructed in a weird way. There are so many additional codes for the products.[…] It is difficult and complex. Why can’t the system be that I just open the reporting tool and start using it. […] It is too complex.”

FIGURE 2.2B Old reality versus new reality: Handwritten job order versus Ax screenshot

While making the entry operatives had to be able to pay attention to all the details at the same time. People had the lists of codes that they had to be able to link together. Thus, while making the entries into the system, they did not just have to know the codes, but be able to link those codes together according to the real world around them.

“Before Axapta we did not have recipes in front of us, we were cutting and weighing approximate amounts. […] It was much easier; I used my intuition, a gut feeling. Now you have to consider the detailed recipe for each product. In opening the new batch you have to use the right job order. For instance, for Filled Breast you have to add the job order of salting. You do not only give the job order for the cutter but also for the salting process. You have to take into account the entire list of things when starting one product in the system…., all the things with codes of 900 and 1000” (Production Specialist)
The problem was that the objects of inscription to be recorded into the system were highly mobile. Each piece of meat had connections with other things and it was necessary to record all those connections in the system. People “downstairs” creating each inscription had to be able to put a mobile element into a context of other mobile components (other raw materials, salt, sugar, and people, and packages) and less mobile things (storerooms) at each point in time.

If we want to build a system of management accounting inscriptions that would allow accountants and managers to implement different kinds of product profitability analysis, then the production of inscriptions becomes detailed and complex. In order to allow cost accounting and trace the inventories, people who produce accounting inscriptions have to know many links between their world and the accounting signs. FoodLight staff needs to know not only the world of body carcasses, types of meat, cutting, dosing and salting, but also to pay attention to the codes for each entity and the links between all the entities.

This kind of complexity in producing the inscriptions led to all kinds of breakdowns in the system. The inscriptions became unstable. Things were being placed in locations by different people and relocated to different places “downstairs”, but recorded as being placed by other people and in other areas. For instance, a person “downstairs” took a particular type of meat from one storeroom, performed the necessary procedures, such as cutting, and placed the pieces of meat into another storeroom. The inscription, however, showed that a different type of meat was cut from another batch, or by someone else, or transported to some other storeroom. The inscriptions were unstable—the link between the world and the inscription could have easily been broken. The inscriptions had started telling a different story from that actually unfolding “downstairs”.

In order to improve the stability of the inscriptions, more training was commissioned and tighter controls on the generation of the inscriptions were applied. Managers were also tracing back the sources of broken inscriptions and identifying the people responsible for the break. This led, however, to accusations and consequently created a blame culture with its negative pressure on line workers.
People “downstairs” suddenly felt that their world had moved “closer” to the world of “upstairs” – they realised that their activities suddenly ended up “upstairs”, causing all sorts of problems. The Production Manager says;

“It is impossible not to consider others [pointing to accountants] now. Accountants always come and tell you if there is something weighed in a wrong way and because of that some numbers are waiting to be fixed. Especially at the end of month, there is so much trouble. If anything goes wrong “downstairs”, it means trouble “upstairs”. [...] Small mistakes, but huge consequences!”

The fear of adverse consequences became a significant one and increased the stress level of people cutting and weighing the meat. Many line workers were terrified – suddenly realising that their actions had consequences “upstairs”. They became more careful and various routines surrounding the notification of the right code were developed. For instance, in order to ensure the correct batch number of body carcasses was used, operatives often attached a post-it note close to the terminal screen, so that colleagues could immediately pick the correct number when filling in the fields. At the same time, several people became afraid of producing inscriptions. They were trying to concentrate only on their main tasks of production and avoid making the inscriptions, asking constantly their colleagues to make the inscriptions for them,

“There are people who whenever possible avoid weighing and entering the data. They ask me to do it”. (Production Manager)

Because of this, the Production Manager was often fighting with line workers to persuade them to complete their tasks by entering inscriptions into the system:

“Last week I was really angry at one of them. I literally grabbed his neck, and towed him to the machine. I do not know, whether it was because of fear or something else, but he eventually did his job fine” (Production Manager)

Production people also devised ways to hide mistakes in the system.

"Line people have a possibility to add additional products by stocktaking procedures. In addition, there is always the possibility of hiding your mistakes as meat desiccation losses. It is difficult to check it.” (Head Accountant)

*The dilemma between stability of inscriptions and flexibility of the firm*
To cope with the situation, senior managers hired new people, and tasked them with finding the broken inscriptions and correcting them in the server, before they ended up in the accounts and reports. Correcting the mistakes often helped but sometimes generated even more errors in the system and made the situation worse. Therefore, in order to increase the stability of inscriptions managers worked out another solution. They reorganized the work of line people in a way that only two people would produce the inscriptions relating to meat weighing and cutting. Indeed, accountants started to see that the number of broken inscriptions was decreasing. The rising cost of salaries, however, made the Financial Manager question the new system:

Managers are discussing the budget in a meeting:

Managing Director: “I wonder about the payroll.... it is becoming quite large for our company..... How come we have so many people at the moment?” [turning to the Financial Manager]

Financial Manager: (with a slight irritation) “Well, if a production company hires people with only 9th grade education, people who know nothing about production, then it cannot be expected that they would contribute as much as the employees who have 5-10 years experience in production. Consequently, we have to hire 1.5-2 people instead of one in order to get the necessary work done in production.”

The real problem suggested by managers was that people did not recognize their “mistakes” while entering the numbers. They did not recognize that they entered something wrong into the system. One of the managers explains,

“The problem is that an employee can choose between all the parameters in a way that the system does not tell him that he is not allowed to weigh an incomplete product into the inventory of final products. They can do this. For them, it is like ‘gone from the picture’ and they think it is ok and they start a new task”

Therefore, the question was constantly raised, of whether the problem of instable inscriptions is not human but technical. Previous means of dealing with the inscriptions had all been directed towards people. It had been constantly asked: “Whose fault it is?” Top managers usually saw people as the ones resisting change because of their unwillingness to change and adapt to the new system. After some time, this issue was transformed into a problem of the increased payroll. It was no longer a question of
whose fault it was, but a question of whether the solution should be human or technical. Is it easier and more economical to fix the human behaviour or the technology involved in producing inscriptions? The human solution increased monthly salaries, but the technical solution could be a one-off investment.

Thus, in 2008, the IT manager was instructed to initiate a technical solution to increase the stability of inscriptions – to restrict certain actions of the operatives while they created inscriptions in the system that is, to inscribe and fix the translation of the world into numbers by way of the technology (Joerges & Czamiawska, 1998; Latour, 1992). The project involved the development of a terminal system that would send a feedback-loop of data between the Axapta database and MultiFlex terminal, and automatically reveal inconsistencies between the recipes and the weighed meat, and between the stock storage levels. For instance, if there were a recipe chosen in MultiFlex, then the system would check whether a user was adding the weight of meat according to the chosen recipe, or if the user was taking raw materials from an inventory store containing the appropriate stock. If a user tried to enter a code contrary to the logic written into the software, for instance, to take raw material from stock that did not exist in the stock account, the system would automatically produce an error message. In this way a broken inscription could be flagged before it was registered in the system. In 2009, several test versions failed to work because of the complexity of the production processes and the large array of possible codes and links in the system. By the spring of 2010, the new terminal system was finally launched.

After a couple of months of working with the new terminal system, in the summer of 2010 FoodLight analysed the results. There were significantly fewer broken inscriptions but the picture was still not as good as they had expected. The system displayed an error message to the line worker as promised, but it appeared that the operative often just ignored it. The problem was that the line workers needed to get things done, not to waste time on figuring out the correct inscription;
“The new terminal allows mistakes just as the previous one did. The idea was that when entering the weights into the system the software would block the products that are out of stock. Now when entering the wrong product code, the system realises that there is no such product and asks: ‘Are you sure you want to weigh this product?’ Despite that, it is still possible to reply ‘yes’ and enter the product into the system anyway. The thing is that an employee needs to do his real job – he needs to weigh his meat. It takes an enormous amount of time for him to figure out where the mistake could be. In order to do that, he has to go to the Weighting Specialist. Then it takes time for the Weighting Specialist to find the problem in the system. The line worker does not have time to wait that long. It is much easier to just enter ‘yes’.” (Head of Technology)

The issue was that the system gave the employee a choice of whether to produce a broken inscription or not, and the employee would rather produce a broken inscription than waste time figuring out what might be the correct inscription.

The fact that the inscription and the world did not correspond was not a problem for the people “downstairs”. It was only a problem for those who wished to use the inscriptions in order to act at a distance (Latour, 1987; Robson, 1992). Production people just did their job of cutting the meat and then filling in the blanks on the screen in the best way they could.

This led to the question of flexibility. The Head of Technology would have preferred to inscribe all the activities through the system (Joerges & Czamiawska, 1998) – to restrict all the fluctuating actions in the system, allowing employees to weigh the raw materials only according to the given recipes and rules in the system. However, other managers realized that “we cannot handicap production, we will lose our flexibility”. Production needed to have flexibility built in. If the required raw materials were not in stock, the Production Manager needed to be able to make quick decisions and switch from one raw material to another. There were usually 20 components or more in one recipe. If one of those raw materials was out of stock, for example, a particular flavouring, production operatives had to be able to dip into the flavourings assigned to an alternative product. Removing the possibility of entering a “wrong” inventory account or the “wrong” raw material would have taken away the option of adjusting the production processes to suit the availability of raw materials to complete customer orders on time.
A choice had to be made between the stability of inscriptions and retaining flexibility in the market. Flexibility of production was highly important because the sales and marketing department had to change their orders practically every day in order to meet the needs of the market. Since the company was continuously operating with a low reliability of supply (approximately 80%) and changes in the market were sometimes dependent on the weather\(^4\), the production department had to be ready to change from one product to another, or from one raw material to another. Making the production of inscriptions rigid would have placed significant constraints on production. Hence, there was a choice – have instable inscriptions in the system with all the consequent problems for accounts and risks to decision making “upstairs” – or lose flexibility.

Managers chose flexibility, because during the four years following the introduction of Axapta, alongside the search for a technical solution by the managers, other routines and practices were gradually developed in the organization that allowed the use of even broken inscriptions and preserved the capability to act at a distance. Managers left the production department with the option of producing broken inscriptions, allowing them to enter codes that could possibly contradict the logic in the system and create unstable inscriptions. Those who needed to act at a distance were forced to develop their network or relationships to cope with the unstable inscriptions. It had become possible to live with instability and do so quite well. This will be described in the next section of the case study.

**Making “action at a distance” work**

*The changing roles of accountants*

Despite of the instability of accounting inscriptions, the firm was actually doing rather well. In the six years following the introduction of the new ERP system, sales volumes and profits increased

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\(^4\) During the summer the sales of products for barbecues was highly dependent on the weather. Fortnightly sales forecasts were made based on the continuous monitoring of weather forecasts. The forecasts were then adjusted on a daily basis.
constantly. The firm had extended its product portfolio to 290 products, extended its activities to new foreign markets and recruited more staff. Internally, uncertainties related to the production of inscriptions did crop up, but in general things were kept in order – at the end of the day, broken inscriptions were corrected in the system and the uncertainties related to the accounting reports were kept under control by combining numbers in different ways and/or using detours. This was not easy, as it required the adaptation of different roles and networks of activities in the firm.

People “upstairs” sensed the problem of unstable inscriptions in different ways. The solutions for the problems were also different. For accountants, the problem of instability relied in incompatibility of numbers. For the accountants, checking the errors and repairing the broken links every month required a great deal of effort and additional tasks to those they had before the advent of the new ERP system. Since all the inscriptions travelled through the accounting department, accountants were basically the first to deal with the numbers. They were the ones who were responsible for providing correct data at the end of each period; they were the ones who had to anticipate the possible problems in the system, to make the information reliable and to keep processes moving. In order to address all the errors and balance the accounts, accounts staff had to spend hours and hours checking and comparing data. This was, of course, additional routine work that the accountants were not happy about;

“Finance data and production data are together now – it is really bad. All the mistakes [that are made in production] end up in the accounting books. It takes a lot of time to get a correct income statement at the end of the month, to correct all these broken transactions of production. […] It is checking [the accounts] all the time. It is a waste of time, [but] without the checking, things will be a mess!” (Head Accountant)

As much as they would have liked to change the situation, accountants did not have the power to intervene in the processes “downstairs” or change the technology. Having found the inconsistencies and restated the accounts, they could only raise the issues, leaving the question of the causes of the broken inscriptions unresolved.

The main issue that irritated accountants the most was that they were correcting someone else’s mistakes. They wanted the problems to stay “downstairs”, not become integrated into the “upstairs”
world. To cope with the new situation, accountants tried to find solutions in the software. The idea was to control the integrative ability of the ERP system and eliminate the impact of the production department from their lives. Thus, they asked the IT manager to prevent the integration of data before the production people had corrected their mistakes. The Head Accountant explains her logic;

“Everything starts from there [the production department]. All the mistakes come upstairs from there. My idea was that nothing could be integrated into the accounting books before things are correct. This is the reason why I have such problem, problems that I do not need. These problems could be solved before they come upstairs”.

In this way accountants expected to cut the link between their department and that of production until the latter solved what were seen as their own problems. This would have prevented the inscriptions from travelling across the organization. In the words of the accountants, that would have forced the production staff to “take care of their own problems” and freed the accountants from the burden of correcting the broken inscriptions. For many technical reasons, that proposal was not implemented and accountants kept checking the accounts and correcting the errors.

Axapta’s own mechanisms and automatic entries added to the accountants’ problems. Accountants claimed that Axapta did strange things of its own volition. The head accountant lists the problems;

“It is difficult to check the accounts. There is always uncertainty, when does the software change some number in the system […] For some reason it doubles the cost of sausage crust. The finishing job order has a wrong number. It acts in weird ways. […]Then, he (it) automatically adds the transactions of currencies into the previous period. On what basis does he (it) do that?” (Head Accountant)

The technical rigidity and automated entries of the system interfered with the actions of human beings. For instance, when someone mixed up product codes, the system just froze. When someone weighed additional meat to an outdated batch number, Axapta made the physical entry to the production module, but not an accounting entry, eventually not showing that weight of meat in the operating profits at the end of the month. Or, sometimes Axapta had an ability to block some actions if it detected inconsistencies, not allowing accountants to get a report or calculate the cost of a product if the numbers in different modules did not add up.
One example reported was a problem with production orders that disrupted the numbers in an inventory flow report. Axapta allowed line workers to weigh additional raw material onto an old production order (although it was an action against the logic of the system) even though the production order had been completed “downstairs” long before. A line worker could mistakenly enter the order number relating to a completed production as a current order. Axapta held the production orders in the module, allowing neither completion nor removal. As a result, 10 production orders dating from the year 2007 were still “hanging” in the system in 2010, and so adversely affecting all subsequent reports. Every time accountants checked the inventory flow reports they had to take account of those 10 production orders. In fact, they could have manually deleted those production orders from the production module of the system. This would help to correct the inventory flow reports in 2010, but at the same time, adversely affect the numbers in the financial module of the system. Therefore, accountants just had to live with knowing that 10 production orders must always be taken into account when using the production flow report.

In coping with the new situation, accountants could not do anything about translation but only ask management to hire an extra accountant to take care of some of the routine work, and to increase their salaries to compensate them for their additional work under the new system. In 2009, an additional accountant was hired and the salaries increased, but the Managing Director wanted something in exchange from the accountants – a greater contribution to the improvement of the system. Therefore, he called a meeting with four accountants and the finance manager.

Meeting: Present are the Managing Director, Financial Manager, Head Accountant and three accountants.

It is a light, airy and spacious office. People are sitting around a big table, which is connected to the Managing Director’s desk. The Head Accountant is sitting at the right hand of the Managing Director; the Financial Manager is sitting on the left hand side. The accountants are sitting right across the table looking directly to Managing Director.

The Managing Director starts the meeting with a joke, trying to warm people up. He smiles. The accountants, on the other hand, are sitting quietly, looking apprehensive.
Managing Director:

“Why do you look so afraid? There is no problem, nothing is wrong... You know I am aware of the routine work in this company, which I generally do not like. But you know, if I had such routine work to do, then it would probably take ten times more time than it takes for you. On the first day I would probably do the job. On the second day I would start thinking, and on the third day I would find a solution“.

(Everybody listens quietly. The tension in the air is palpable.)

Managing Director continues: “Well, we have been discussing this a little [with the Financial Manager] and analysing the situation... Starting from the beginning of the previous month, I raised your salaries, but ... I want to get something in return... *(He is smiling contentedly).* I expect you to make a contribution by suggesting the ways that your work within our ERP system could be improved. Please generate ideas, how to make your work better. Make your suggestions, and we will discuss things through later on.”

Head Accountant: “But this is not possible to make anyhow. They have too much work already [referring to the lack of time]. Accounting for empties does not work, documents do not get back on time..., sales documents have wrong number of empties..., it is not possible to compare the accounts of different clients....., an accountant has to spend too much time on entering the data in Axapta...”

The meeting turned into an argument between the Head Accountant and the Financial Manager, with the accountants trying to explain that they could not do anything to improve the system, but only focus on their existing job. Later, this attempt to get suggestions from the accountants was described as like being “pushed into a corner” and became a very emotive topic. An hour later, the Financial Manager went back to the accountants’ office (due to a matter unconnected to that above) and senses that something is wrong;

*Accountants’ office. The Financial Manager stands in the centre of the room. Accountant1 is sitting behind a desk on the left. Accountant3 is sitting on the right.*

Financial Manager: “What is wrong?”

Accountant1 (close to tears): “What do you want? I do not understand what I have to do? What have we done wrong?“

Financial Manager: “No no, nothing is wrong. Nobody is telling you that you have done anything wrong. We are just trying to make things better“

Accountant3: “You know, we think about the system all the time while we are working, it’s not fair that you ask this especially of us“
These episodes illustrate some of the drama of the period and reveal the emotions of the accountants, who felt constrained by the new system and had to cope with the broken inscriptions inside their system of numbers. Since the power and knowledge of the accountants did not allow them to get to the problem of translation, their final propositions about the system were focused on the procedures and information flow between the accounting department and other departments.

During the four years after initial introduction of the new system accountants developed their routines to manage the uncertainties caused by unstable inscriptions. They learned quickly which reports could, and which could not, be used to inform decision-making:

“Since the software often gives me incorrect results, I am in a very difficult situation. It accounts for the opening account twice. I have wanted to use an inventory flow report, but I know that the data are wrong [...] It automatically adjusts the records, but does not fix the opening balance. Because of these mistakes, one has to know which reports to look at or not to look at.” (Head Accountant).

In the accounting and finance department, superposing numbers in different ways became routine practice. Often it was difficult to say whether information was correct or not, since it was difficult to trace the source of inscription. It took lots of time to figure out the cause of fluctuations in numbers, because it was difficult to determine which of the broken inscriptions had originated in the production department and which were a result of Axapta’s automatic entries and quirks, such as the “hanging” production orders. Financial Manager had to make regular inquiries of the server, combining the data in a way that the broken inscriptions became visible. By using various kinds of filters to retrieve the data it was possible to uncover whether the problem was due to a broken inscription or something else. For instance, making a data enquiry with a product code or the identifying code of a particular employee, make it possible to retrieve data on the amounts that the particular employee has cut and

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5 In Latour (1999) scientists use two maps instead of one. Latour says (1999): “A single inscription would not inspire trust, but the superposition of the two allows to a quick indication of the exact location of the site. [...] Edileusa’s right hand must continually smooth the corners of the map, otherwise the comparison would be lost and the feature they are trying to find would not appear. [...] Scientists master the world, but only if the world comes to them in the form of two-dimensional, superposable, combinable inscriptions”. Here Financial Manager compares the inscriptions of different job orders to uncover the broken inscription.
weighed. Without adding further checks, the amounts cut and weighed could only indicate the quality of cutting, a performance measure of the line workers. Management could multiply the volume of weighed meat by the price of each piece at the end of the month and pay the line worker based on that, without even noticing issues that did not relate to the quality of cutting but to something else hidden in the midst of the numbers. When the Financial Manager used a production job order as a filter, he saw all the weights in kilos categorized by job order, and could then see issues other than those related to the quality of the cutting, for example, if the meat had been weighed against the wrong job order. Often Financial Manager was used like a guarantor (Latour, 1999) who vouched that the numbers were correct.

People “upstairs” also developed routines to contact the appropriate people from “downstairs” to explain or correct the numbers. So information relationships in the firm (Cross & Sproull, 2004) provided the required knowledge. Often, in order to find and correct a mistake, the entire chain of people involved traced the inscription back, as far as the source if necessary. For instance, when the Head Accountant saw an abnormal fluctuation in material costs, she usually went to the Financial Manager and asked him to check the production orders. Sometimes, if the mistake was made in production, he could not fix it himself, because, for instance, there was not the relevant raw material in stock or because of the complex links between numerous production orders or for some other reason. In that case, the Financial Manager would direct the orders in question to the Data Verifier (hired specifically to observe and check the data). After the Data Verifier had corrected the broken inscription, the Financial Manager could recalculate the inventory, and so the cost of a product became correct.

Making “action at a distance” work in the sales and marketing department

For sales and marketing people, the problem of instability was different. It was about satisfying the customers’ needs and making the choices between different customers. After implementation of the
new ERP system, the 6 staff of sales the department were generally happy to receive lots of new information that became available “upstairs”.

“The old software was easy to use, but it did not give information. Now I can get so much data, which is highly relevant for making sales. For instance, it shows how much is in stock. It also shows stocks in monetary value, with VAT and without VAT. The latter is important for the clients. And Axapta is so much faster than the previous software.” (Sales Secretary)

However, the instable inventory accounts made it sometimes difficult to satisfy the needs of the customers. The sales secretaries had to be careful with numbers;

“Well, the problem is that……. the stock balance is not correct. The computer does not give me the right number. (Sales Secretary)

Sometimes it appeared that the inscription of the inventory account did not show the right amount of stock, and they were not able to deliver the promised products to the customer,

“I think about the reaction of customer. When doing my job I think that when I cannot bring the product to him, then the next time I call him, he will be so negative that I cannot even start a discussion. This negative voice and feeling is so unpleasant. If I cannot make a delivery, then next time the customer is in a bad mood, then I will be in a bad mood. Everything is bad then.” (Sales Secretary)

These kinds of situations sometimes forced sales people to choose between the customers. FoodLight makes 80% of its sales to its four biggest clients plus three new clients (supermarket chains) in neighbouring countries, which are new markets for the company. The big four customers are particularly well taken care of in terms of satisfying their orders and sending shipments on time. If there is a problem, the big 4 customers are always prioritized if there is a lack of products in stock. Sometimes, however, if there is not enough product in stock it is necessary to make some choices between those priority clients. In such situations, the first question is about the country – which country gets the product first. Then, it is the question of which supermarket chain will get the product. The decision making, however, also depends on recent relationships with the customer.

If the customer did not get the product last time and threatened FoodLight with penalty clauses, then that customer’s needs are considered critical. Sometimes, the decision making was like a battle
between the sales secretaries, as they had to compete with each other to get the product and satisfy their own customers. One of the managers describes it thus;

“Three sales secretaries share the office, working next to each other. I sometimes see how they bargain. The one who cries more tears, gets the product. Or sometimes, the one who becomes more angry and has more authority, gets the product. Or, the one who figured out first that they are lacking one of the products. It may sound funny, but it is actually a sad picture”.

When operating in an environment characterised by low supply reliability, the accounting inscriptions were especially critical. The institutional settings of person-to-person communication and management-by-contact were applied to trace the inscriptions back to “downstairs” when making action at a distance. Use their network around the ERP system helped them to cope with instability of inscriptions. These person-to-person communications were made tenser by the extended product and customer portfolios;

“We need to be in close contact with them [people “downstairs”] by phone all the time, because we have such a low supply reliability rate. I believe that if they could make things right [enter the right numbers into the system], then the computer would give me correct information and I would not need to annoy these people [production people] with my questions all the time.” (Sales Secretary)

Since it would have taken too much time to check the stock level of each of the 290 products, the sales staff traced back those inscriptions that seemed to be more “risky”. They had to use inventory accounts for sales decisions and the planning of campaigns, but they had to do it carefully, relying on their experience, gut feeling and verbal information available. In the morning they always opened the system and looked at the stock numbers, but they were afraid to trust numbers that seemed to them to be too low or too high;

“In the morning, I always keep the inventory account open on the screen, I see all the gaps in these accounts. Then I ask about the gaps, whether there is really a gap or the number is just wrong. I do all this checking in the morning. I cannot even start the day without checking these numbers and figuring out what we actually have [in the warehouse]. It can always be that for some reason, the product is not visible in the inventory account, but it exists in the warehouse. There can be many reasons that affect these numbers, because we have many people and everybody can make mistakes.”
Later on, during the day, they did not have to check all the numbers anymore. They had checked the opening balance, so they calculated the rest of the inventory flows during the day. Why did they do that while all the activities (completed product, shipments to the customers) were continuously being entered to the system? This was not only due to the possibility of having a broken inscription, but also because of the second uncertainty, the technological functionality of Axapta, according to which the system did not recalculate the inventory balance before the invoice was sent to the customer. A number of shipments from the warehouse were done daily based on delivery orders. These delivery orders did not change Axapta’s information on the inventory balance. Under the contracts with the customers, the invoice was not issued before the end of the day, that is, it was issued after all the shipments had been made. The problem for the sales staff was that the inventory balance remained unchanged until the invoice was finally sent. This meant that during the day, the numbers that they saw on the screen did not reflect the real amounts in the warehouse. Therefore, sales people learned the right moment when inscriptions were correct and when they were not correct in the system;

“The stock balance is only correct when the delivery orders are printed, but operating information about the stocks is not correct. But at least is shows me one important thing – it shows whether there is or is not product in stock”. (Sales Secretary)

During the day, they knew that inscriptions could not reflect the real quantities. Therefore, when making the sales decisions, they just memorized the shipments made earlier in the day, talked to their colleagues in the same department or made several phone calls downstairs to make sure that the number, which they thought was correct, would actually conform to the real quantities in the warehouse;

“Usually when using these numbers…. I decide based on what I have done on that day. I know more or less how much I have sold on that day, whether I have sold that particular product or not. If I am not entirely sure I can also talk to my colleagues… […] This is quite difficult. Since the invoices are sent at the end of the day, I can never know for sure whether we have this product or not. It is like a game of a cat and mouse….. This is why, during the day, it is still easier to call the guys downstairs and ask “How much product is in the warehouse? Or, how far along are you guys with completing this product?” When they say that they still have this product in the warehouse, then I can rely on that. […] I really talk to them a lot. I have to communicate with production people many times a day. I have to ask about the products that
are coming into stock. I have to say that we need this product and ask, how far along are things”. (Sales Secretary)

The process works as a culture of trust, culture or responsibility. In coping with the uncertainty, people often used some person as a guarantor. It was always important for the sales people to have “somebody responsible for each number”. Different people were used as a guarantor of the link between the inscription and the world (Latour, 1999). Without a guarantor, using the incorrect number taken from the screen would have made sales people responsible for the wrong decision. Therefore, it was important to get a verbal confirmation from somebody who could later be held responsible for their words;

“When he [production planner, “downstairs”] says that yes, there will be a product in stock, then he really takes responsibility for that. For instance, last Thursday, I talked to the guys [production guys, via phone] and heard that the product was not completed and shipped to the customer. I called him [production planner], he replied ”my mistake, I forgot, I am sorry”, and then he did everything, literally everything, to make sure the customer would get the product. He used his own car and took the product to the customer. He knew I needed this product, and he did it. He just felt guilty.” [Sales Secretary]

Sometimes, however, people could not keep their promises, due to problems with machinery or other issues in production. Then they would clarify whether it was a problem of a wrong number in the system, or if somebody could just not keep their promises. There were several confrontations in the corridors close to the sales department or during occasional meetings at the printer; these often started with the Production Manager being accused of giving the sales department incorrect stock levels;

“If they say a wrong number, it will appear next morning. During the previous day I get information from them that there is a product in the warehouse. Then I tell my customer that we will make a shipment. Then the next morning, it appears that there was no product actually. Of course I make a phone call and say “Perhaps you were wrong or what!” [with a very angry tone] Anyway, this does not help me much at that point, but I tell him “please be cautious next time and check these things more carefully!” […] What can I do, but to trust them, that they are correct next time. I just have to hope that things are correct. I know that it is not easy for the

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6 Latour (1999) talks about maintaining links between the reference and referent. In Latour’s (1999) story scientists collect and store the samples of plants that would prove that the link is stable between the world and the inscription. This is a “representative guarantor”. In our case, various people in the organization are used as guarantors.
guys [in production] either, because every morning we put pressure on them [by starting with all the phone calls]. If they really have some problem in production, and they could not finish the product, how could we blame them…. […] It is tense, but in general, we do have a good relationship with them. Of course, we say it directly, what we think about each situation, because we, in turn, get the negative reaction from the customer…. We need to say things to them [production people], in order to make sure, that, for God’s sake, this will not happen next time….at least not with this customer”. (Sales Secretary)

Building the degree of certainty in these settings was generally working, but was also a time-consuming practice;

“It takes time to call. I make the call, but in order to actually get what I want [a final inventory level], I have to make four or five phone calls. I have to make all these phone calls to make sure that I really get what I asked for– to have a clear answer, ‘yes, there is’ or ‘no, there is not’ [product in stock]. […] Especially now, when the product portfolio is big…..when I want to get information about one product, they [people of production department] answer that I have to call that person, and then that person and that person…. You know, you have to take so many steps.” (Sales Secretary)

There was also the question of who had the better relationship with the production planner. Having a good relationship with the production planner could be leveraged to influence him to quickly rearrange something in production or to get “instant access” to a product about to be processed and made ready for sale;

“Well, if I go and ask “Peter, please, could you make this product for me. I really need this product, please….please” [imitating a very appealing tone]. It usually goes in such a way that the one who is whining the most, gets the product. This is about how much are you able to push him with this matter.” (Sales Secretary)

Knowing that numbers may not be correct, makes sales people become very cautious and sometimes overreact to situations. It also makes communication with people “downstairs” and constant tracing of inscriptions back to their originators highly important;

“On Monday morning I checked the inventory account [as every morning when they start working in sales department]. Smoked ragout was zero. Since I knew that the customer really needed the product I called to our sales manager right away and reported that smoked ragout is zero we cannot ship it to the customer, so that he could talk to the customer. She says “Wait, wait, wait…..I call the Production Manager first”. After she had called the Production Manager, he calls me back and says “What do you mean by zero? It cannot be. There is enough smoked ragout in the warehouse”. The situation was that I still saw zero on the screen. The product was
completed but the system [Axapta] did not show it on the inventory account yet. To be sure I also made a call and asked production people “where is the product, I see only zero in the inventory account?”. They said “Do not worry, it will appear on the account soon. It is coming, it is coming”. Well, good that it is coming [ironically] but I want to see it! Only then can I believe that we really have it! […] Actually, the irony of the situation was that the customer had already got the shipment with that particular product. I drove our sales person crazy with my phone calls….for nothing. I was really worried that the client would not get the product, because I thought we did not have it in the warehouse. After sales managers had called the Production Manager and figured out that there was enough product in the warehouse, I checked the invoices from the screen [from Axapta], and saw that, yes, the customer had already received the shipment. At the same time, the inventory account was still wrong.” (Sales Secretary)

“I made two phone calls, our sales manager also made two phone calls. […] I am really glad that she [sales manager] did not call to the client but called our production first. You know all this mess because of the wrong number! To be honest, I could have checked the invoices right away and saw that the customer actually got the smoked ragout, but I was also a bit like “wearing lenses”….. I was panicked…… I just felt like making the call right away. It was really, really crazy…..” (Sales Secretary)

This situation shows that it was not the “centre of calculation” as intended, that exerted a power over the local, but the people “downstairs” who had the power to resolve issues, because they had knowledge about what was actually there in stock. Sales people were powerless to resolve the situation. The only thing the Sales Secretary could do was to make phone calls and ask people for information.

The problems with accounting inscriptions were not restricted to FoodLight. The company’s main customers also had problems with their accounting inscriptions, especially with inventory accounts – the numbers in their ERP systems did not reflect the real stocks in supermarkets. Sales people needed to maintain an additional network of activities in order to manage the unstable inscriptions of customers;

“For some reason…..they [customers] have wrong numbers. There is some kind of mess with their numbers. Whether it is because they have large shipments and when they unpack the shipment, they enter it to their system forgetting to deduct the weight of empties…they might just enter the weight with the boxes. […] For instance, one customer who orders from us……. There is a lady sitting behind the computer, she makes the order without going and taking a look whether they actually have a product. The situation often is that there is no product in
stock but she does not make the order either, because she sees some number on the screen. And then important products will be missing from the order……especially during sales campaigns.”

(Sales Secretary)

In recent years, there has been a clear movement among the customers towards updating their ERP systems and starting to make automatic orders – a technical solution involving the software automatically sending an order to FoodLight when a set minimum inventory level is reached. If the numbers were not correct in the customer’s system, they did not order additional amounts from FoodLight on time and sometimes the most popular and profitable of FoodLight’s products were missing from supermarket shelves simply because of the broken inscriptions in the customer’s own ERP system.

For this reason, FoodLight sales people had to operate between two worlds of broken inscriptions – they not only had to check FoodLight’s own inventory accounts by calling “downstairs”, but also to check the inventory accounts of their customers. Checking the customers’ inscriptions was continuously executed by visiting the supermarkets and checking the shelves. Sometimes, when they could get permission, FoodLight’s sales people photographed the shelves in a supermarket so they had proof when they had to tell their customers that their inscriptions were incorrect.

“When we visit supermarkets, sometimes just to buy some food in the evening, we check it and then tell to the others [in FoodLight] the next morning. Then we will figure out, what the problem is. Sometimes our Sales Director also says that today, let’s check and photograph these supermarkets, tomorrow we will take the next ones. And then we show them the photos….”

(Sales Secretary)

By communicating with the customers with the help of photos they can point out that the customer has incorrect stock numbers. Next time, in turn, it may be that it is the customer pointing out FoodLight’s problems caused by some broken inscription of an inventory account.

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7 This was especially done when there were sales campaigns, since FoodLight had to pay fees for campaigns and according to the contract the customer had to guarantee that the necessary products were available in the supermarket.
DISCUSSION AND CONCLUSIONS

Our study shows the dilemmas and difficulties involved with translating the world into accounting inscriptions. We show how difficulties of translation create instability of inscriptions, which occurs in different parts of the organization in different forms and ways. According to Latour (1999), creating a reference (i.e. producing an inscription) is a “production of certainty”. In our case study, the instability of inscriptions created uncertainty. In each situation, people “upstairs” had to figure out whether they were facing a broken inscription, real waste and a quality problem in production, or a fluctuation in the price of raw materials. They could not be sure what it was that the inscriptions referred to. We show how people cope with these problems by making improvements to the system and developing practices around the ERP system.

The complexity and human-technical pathways of producing management accounting inscriptions make the translation problematic. If we want to build a system of management accounting inscriptions that would allow accountants and managers to implement different kinds of cost analysis, then the production of inscriptions becomes detailed and complex. It is shown in our case study how people started to inscribe the world according to the very detailed structures (categories of codes and given structures hanging on the wall). In order to produce inscriptions for cost accounting, it is necessary to capture the mobility of the objects in the world. It is necessary to inscribe lots of context – all the linkages between the entities of the local setting. The details to inscribe are not just different parts of one object (a piece of meat) or the different colours of an object, but they are about different dimensions and linkages that the object has with another objects. In producing the inscriptions, it is not just that we inscribe that there are 50 kilos of meat in the box, but we also need to inscribe which kind of box it is, which kind of inventory storage the box is in, where those pieces of meat were located before (the previous inventory storage), where did these pieces of meat come from (the batch number), who put the pieces of meat into the box, why and when (based on which production order). Thus, a large part of producing inscriptions is to describe the network of links that an object is related to in a
certain timeframe i.e. not only to describe what the object is, but where is the object placed and displaced among other mobile objects in an organization.

When people are discussing the problem of stability of inscriptions across the organization, they arrive at the conclusion that something is wrong with the inscriptions, but they reach the conclusion from different angles and in different ways. Accountants find the problem when looking at numbers, whereas sales people find the problem when something happens with the shipment to the customer. In cases where some of the links are broken in a chain of translation, it emerges as a problem of comparability in the accounting department, as a problem of profitability fluctuations for the Financial Manager and/or as a problem of customer delivery in the sales department. The problems that unstable inscriptions create for each of them are quite different. For instance, when the weight of the meat was correct, but the actual location inscribed was wrong, it showed up to the accountants as negative numbers in some inventory accounts, and for sales people as non-existent stocks that led to problems with shipments and the need to adopt compensating strategies in customer relationships. Given that the problems are different, the solutions to the problems are also different across the organization. Through all the problematization they are forced to undertake and the consequent reactions to the problematic inscriptions, accountants are the ones who care about the numbers and look for a solution from the numbers, but sales people care about the product and the customer and go back to the local setting. Whereas accountants deal with the problem of translation in the frame of calculations, the sales people use and deal with the problems of translation in the frame of reproduction (Vollmer, 2007). As a result, accountants look at inscriptions, whereas sales people look at the translation between the world of meat production and the inscription.

The study also shows that the instability of inscriptions is part of being flexible. A firm may choose to live with the instability of inscriptions to maintain flexibility in the market. Since FoodLight needed to maintain the flexibility (the ability to switch between different raw materials), then its staff could not entirely fix the production of inscriptions via software technology. It was necessary for the firm to
keep the production of inscriptions flexible to be flexible in the market. This consequently generated many loose ends in the system and possibilities of broken inscriptions. Thus, as a consequence of maintaining flexibility, an inscription had links to the local setting, but not an isomorphic relation to it. Part of maintaining flexibility was having unstable accounting inscriptions.

The existing understanding of management control (Hopwood, 1990) assumes that an inscription empowers global actors to make decisions affecting local actors. We show that it is true that while some people can act at a distance, they do not necessarily get power through it. In our case study, the sales people were the weaker parties, not the most powerful, because they needed to go back to locals who had the power, owing to their knowledge of what was actually in the warehouse. We show that in order to give that power to the global, locals need to understand the demands of the global setting while producing the inscription. In our case study, for sales people, instability of inscriptions forced them to make the choices between the customers. The local actors did not understand that; it was not their worry (Robson, 1992). Therefore, in order to make the system work, the global actors had to constantly communicate their world to their local counterparts, by explaining that an important customer was waiting etc.

Our study shows that since an inscription may not have an isomorphic relation to the local setting, it does not necessarily constitute a solution for the need to act at a distance. Part of making action at a distance work is maintaining the network of activities around the technology of producing inscriptions and constantly moving (by making phonecalls and/or tracing inscriptions back) between the local and the global. In existing literature, production of accounting inscriptions is assumed to meet the need to act at a distance (Hopwood, 1990; Robson, 1992). Our claim is that problems of translation make the inscriptions a less than perfect solution to the issue of acting at a distance. Amplification is simply often not strong enough. Managers may not want to act on the inscription, because the inscription is unstable, and so acting on it without tracing it back to the local setting may have various undesirable consequences. Therefore, when an inscription is produced, it is not the solution in itself, but may be the
stimulus for lots of movement (phonecalls, discussions with colleagues) and for issues to start to be addressed while trying to act at a distance. Our case study shows how people are constantly working in the other way – “going back” to the local where the inscription was produced. These movements are part of the process of tracing inscriptions back to the local. Thus, in order to manage and act at distance, the global has to go back to the local (or to the particular i.e. to “downstairs”). In order for the inscriptions to work, it is necessary to move in both ways – from the particular to the amplification, and from the amplification back to particularity. These movements between the locality and the amplification become a natural part of management. This does align with idea of “circulating reference” (Latour, 1999), where the movement in both directions has to be maintained if action at a distance is to be made to work.

It is not always possible to trace inscriptions all the way back to the local originator, however, and that was the situation facing the accountants in our case study. Our case study shows that accountants were not the “centre of calculation” (Latour, 1987). Accountants were confronted with inscriptions (as non-human actors) but they were not able to trace them back to the local, because they lived in their “world of numbers” and lacked a network of relationships with production people. Broken accounting inscriptions, as non-human actors, had a great potential to create problems and to compel people to act in the accountants’ world, but the accountants did not have the network to assist them counter that influence, or the option of going around the system to solve the problems of incompatability in the accounts. This part of the case study shows how the ERP system and inscriptions as non-human actors can induce so much emotion. Accountants feel constrained by inscriptions. They have to rectify the inscriptions, while they are not able to redesign the system itself to solve the problem. The problem with translation is beyond their control.

In general, the movement generated around the production of accounting inscriptions shows another way in which an ERP system can work. Quattrone & Hopper (2005) have shown that the system can be operated from different spaces. Our study adds to that finding, showing that any place where it is
operated from has to have a network of its own. We show that any section in the organization wishing
to benefit from the system has to input new items in order to make the system work. In other words,
the people “upstairs” had to create a network around the system. When producing inscriptions in a
technological system, there is a considerable risk of falling out the elements that hold the translation
together. These fallouts have to be managed by a network built around the ERP system, a network that
is likely to involve the efforts of a financial manager, and sales people constantly tracing inscriptions
back to the world of objects.

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Table 1 Roles of researchers in data collection and analysis

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<th>Researcher 1</th>
<th>Stage 1</th>
<th>Stage 2</th>
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<tr>
<td></td>
<td>Conducting observations &amp; participant observations.</td>
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<td></td>
<td>Interviewing employees.</td>
<td>+ Taking part in development of theoretical constructs.</td>
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<tr>
<td>Researcher 2</td>
<td>Coding and analysing the observations, interviews and documents.</td>
<td>+ Conducting observations.</td>
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<tr>
<td></td>
<td>Selecting the themes and events to follow in the firm.</td>
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<td></td>
<td>Preparing interview themes and questions.</td>
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<td></td>
<td>Developing theoretical constructs.</td>
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<td>Writing up the case study.</td>
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<td>Researcher 3</td>
<td>External analysis of collected data.</td>
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<td></td>
<td>Developing theoretical constructs.</td>
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<td>Pointing out the gaps in the data to be filled with additional observations and interviews.</td>
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<td></td>
<td>Developing theoretical constructs.</td>
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<td>Writing up the case study.</td>
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Table 2 Observations

<table>
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<th>Number of observations</th>
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<td>Observer</td>
<td>10</td>
<td>2005-2010</td>
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<tr>
<td>A meeting of ERP modifications</td>
<td>Participant</td>
<td>15</td>
<td>2005-2010</td>
</tr>
<tr>
<td>Managerial meeting - discussing problems of ERP software</td>
<td>Participant</td>
<td>20</td>
<td>2005-2010</td>
</tr>
<tr>
<td>Managerial meeting - results of the firm, issues of ERP software</td>
<td>Participant</td>
<td>10</td>
<td>2005-2010</td>
</tr>
<tr>
<td>Meetings of the terminal project</td>
<td>Participant</td>
<td>3</td>
<td>2008-2010</td>
</tr>
<tr>
<td>Meeting of accountants</td>
<td>Participant</td>
<td>1</td>
<td>Feb, 2010</td>
</tr>
<tr>
<td>Budgeting meetings</td>
<td>Participant</td>
<td>8</td>
<td>2006-2010</td>
</tr>
<tr>
<td>Episodes in accountants' room</td>
<td>Participant</td>
<td>9</td>
<td>2005-2010</td>
</tr>
<tr>
<td>Interactions with production &amp; sales people in the corridor</td>
<td>Observer</td>
<td>7</td>
<td>2010</td>
</tr>
<tr>
<td>Interaction in sales and marketing department</td>
<td>Observer/Participant</td>
<td>28</td>
<td>2010</td>
</tr>
<tr>
<td>Sales meetings</td>
<td>Participant</td>
<td>12</td>
<td>2005-2010</td>
</tr>
<tr>
<td>Episodes with Head Accountant</td>
<td>Participant</td>
<td>20</td>
<td>2005-2010</td>
</tr>
<tr>
<td>Discussions with IT-expert</td>
<td>Participant</td>
<td>12</td>
<td>2005-2010</td>
</tr>
<tr>
<td>Production meetings</td>
<td>Participant</td>
<td>7</td>
<td>2005-2010</td>
</tr>
<tr>
<td>Meeting with ERP developer</td>
<td>Participant</td>
<td>10</td>
<td>2005-2010</td>
</tr>
<tr>
<td>Accountants &amp; sales people interaction in the corridor</td>
<td>Observer</td>
<td>7</td>
<td>2005-2010</td>
</tr>
<tr>
<td>Discussions with Head of Technology on production effectiveness and ERP</td>
<td>Participant</td>
<td>15</td>
<td>2005-2010</td>
</tr>
<tr>
<td>Discussions with Chief Executive on results, future plans etc</td>
<td>Participant</td>
<td>40</td>
<td>2005-2010</td>
</tr>
<tr>
<td>New product development meetings</td>
<td>Participant</td>
<td>7</td>
<td>2005-2010</td>
</tr>
<tr>
<td>Task-meetings</td>
<td>Participant</td>
<td>14</td>
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</tr>
<tr>
<td>ISO implementation meetings</td>
<td>Observer/Participant</td>
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</tr>
<tr>
<td>ISO regular meeting</td>
<td>Participant</td>
<td>3</td>
<td>2010</td>
</tr>
<tr>
<td>Internal audit of ISO</td>
<td>Participant</td>
<td>2</td>
<td>2010</td>
</tr>
<tr>
<td>Occasional discussions in the corridor/kitchen with production personnel</td>
<td>Participant/observer</td>
<td>12</td>
<td>2010</td>
</tr>
</tbody>
</table>

Total: 225

Table 3 Interviews

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Number of interviews</th>
<th>Time (in hours)</th>
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<tbody>
<tr>
<td>Production Manager</td>
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<td>2.67</td>
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<tr>
<td>Head Accountant</td>
<td>4</td>
<td>2.03</td>
</tr>
<tr>
<td>Head of Technology</td>
<td>5</td>
<td>3.26</td>
</tr>
<tr>
<td>Sales Secretary1</td>
<td>2</td>
<td>1.10</td>
</tr>
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</table>

Total: 15 9.06
Table 4 Documents collected

<table>
<thead>
<tr>
<th>Documents collected and analysed</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminals and screens of production inscriptions</td>
<td>Screen prints and photos</td>
</tr>
<tr>
<td>Instructions of line people</td>
<td>Photos</td>
</tr>
<tr>
<td>Job orders</td>
<td>Printed documents and screen prints</td>
</tr>
<tr>
<td>Letters of accountants directed to managers</td>
<td>Electronic letters printed</td>
</tr>
<tr>
<td>Inventory flow reports</td>
<td>Screen prints</td>
</tr>
<tr>
<td>Statements of inventory balance</td>
<td>Printed and problematized by accountants highlight problems to managers</td>
</tr>
<tr>
<td></td>
<td>Screen Prints</td>
</tr>
<tr>
<td>Meat cutting reports (Pivot Tables)</td>
<td>Screen Prints</td>
</tr>
<tr>
<td>Profit margin statements</td>
<td>Printed documents</td>
</tr>
<tr>
<td>Customer contracts</td>
<td>Presentation slides</td>
</tr>
<tr>
<td>Monthly sales analysis</td>
<td></td>
</tr>
</tbody>
</table>

Figure 2.1 Meat cutting
Figure 2.2. Place of translation

FIGURE 2.2B Old reality versus new reality: Handwritten job order versus Ax screenshot
Appendix 1  Chronology of ERP implementation

2003 January-April  Negotiations with IT company about Axapta implementation
2003 May          The beginning of the Navision Axapta implementation project
2003 June –December  Analysis of the organization, designing and implementation
2003 October-December Training of employees for the new ERP system
2004 January       Dropping the old ERP software. Axapta goes live.
                  Starting to record the production processes in Axapta
                  Specification of the ERP outputs (reports): Pivot tables
2005 August        Hiring Financial Manager
2005 September     Meeting: discussion of Pivot Tables. Discussion of meat cutting report
2008 January-June  The idea and discussions of terminal system
2008 December      The official start of the terminal project
2010 January       The first Beta-version of the terminal system
2010 February      New specialization system in production
2010 April         Finishing the terminal project: Terminal system starts working
Appendix 2 Travel of inscriptions

"Downstairs"

1. Meat cutting room
2. Place of production of inscriptions
3. Inscriptions in the server

"Upstairs"

4. Meat cutting report
5. Inventory accounts
6. Profit margin