



UNIVERSITY OF SHEFFIELD MANAGEMENT SCHOOL

**SUPPLY CHAIN MANAGEMENT AND
INTER-ORGANISATIONAL ACCOUNTING:
A BRAZILIAN CASE**

*A thesis submitted for the degree of Ph.D. at the
Management School - The University of Sheffield.*

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This thesis is dedicated to the one I love, Keith Wicks, and our darling daughter, Sophia Meira-Wicks, who have brightened my days and have been major motivators in the conclusion of this challenging project.

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ABSTRACT

The main purpose of this study is to extend knowledge of inter-organisational accounting (IOA). The role of accounting in the development of a supply chain management (SCM) initiative is analysed through an actor-network theory (ANT) lens, which allows recognition of accounting as a non-human actor capable of influencing the outcome of social relations. ANT is used to understand how accounting can be an actor in contributing to the mediation, building, and shaping of a SCM project. The field research consists of an action research (AR) case study based on a Brazilian glassware manufacturer. AR involves both taking action and developing knowledge about action. AR was chosen in response to the call for further studies using this methodological approach according to the management accounting literature. Moreover, AR enhanced access to the case company and followed an ongoing situation, which is essential from the ANT perspective. The innovative combination of ANT and AR is a distinctive aspect of this research, facilitating its contribution to both the theory and practice of management accounting. Despite potential controversies that can arise, the findings of this research emphasise that the combination of ANT and AR is worth pursuing. This research brings new insights regarding resistance to change in the IOA context. It was observed that accounting can be, at the same time, a source of motivation and resistance to change. The findings also show that accounting may need to change in order to adapt to the SCM environment and reinforces that there is a strong and complex relationship between trust and accounting in this context. Moreover, this research confirms that accounting may play a constitutional, but controversial role in the development of inter-organisational relationships. Thus, this thesis contributes to the body of literature on IOA, highlighting new controversies and providing insights into the Brazilian context. Since Brazil is one of the 'BRIC' (Brazil, Russia, India, China) countries, it is anticipated that this research will help to inform the growing debates on the application of accounting and SCM practices in emerging economies.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	II
ABSTRACT	III
TABLE OF CONTENTS.....	IV
LIST OF TABLES	VI
LIST OF FIGURES	VII
LIST OF ABBREVIATIONS	VIII
CHAPTER 1: INTRODUCTION AND OVERVIEW.....	1
1.1 BACKGROUND OF THE STUDY	1
1.2 PURPOSE OF THE STUDY.....	6
1.3 RESEARCH QUESTIONS.....	10
1.4 STRUCTURE OF THE THESIS	12
1.5 SUMMARY	14
CHAPTER 2: LITERATURE REVIEW	15
2.1 SUPPLY CHAIN MANAGEMENT (SCM).....	15
2.1.1 <i>Supply chains, value chains and networks</i>	<i>17</i>
2.1.2 <i>SCM – definition and practical issues.....</i>	<i>23</i>
2.1.3 <i>The vendor managed inventory (VMI) tool</i>	<i>26</i>
2.1.4 <i>The value stream mapping (VSM) tool.....</i>	<i>29</i>
2.2 INTER-ORGANISATIONAL ACCOUNTING (IOA)	30
2.2.1 <i>IOA – tools and techniques.....</i>	<i>31</i>
2.2.2 <i>Theoretical approaches.....</i>	<i>39</i>
2.3 SUMMARY	54
CHAPTER 3: THEORETICAL AND METHODOLOGICAL CHOICES OF THIS RESEARCH 57	
3.1 RESEARCH PHILOSOPHY	58
3.2 ACTOR-NETWORK THEORY (ANT).....	63
3.2.1 <i>ANT – origin and concepts.....</i>	<i>63</i>
3.2.2 <i>ANT – translation</i>	<i>68</i>
3.2.3 <i>ANT – main criticisms</i>	<i>72</i>
3.2.4 <i>ANT and IOA.....</i>	<i>75</i>
3.3 ACTION RESEARCH (AR)	79
3.3.1 <i>AR – origin and concepts</i>	<i>80</i>
3.3.2 <i>AR – characteristics</i>	<i>85</i>
3.3.3 <i>AR cycle.....</i>	<i>86</i>
3.3.4 <i>AR – data collection and data analysis</i>	<i>88</i>
3.4 WHY ANT AND AR?	96
3.5 SUMMARY	99
CHAPTER 4: THE CASE COMPANY	103
4.1 COMPANY BACKGROUND	103
4.2 THE COMPANY’S STRUCTURE	106
4.2.1 <i>Physical structure.....</i>	<i>106</i>
4.2.2 <i>Organisational structure</i>	<i>111</i>
4.3 SUPPLY CHAIN/SUPPLY NETWORK.....	115
4.3.1 <i>Internal operations and logistics.....</i>	<i>119</i>
4.3.2 <i>Market and customers</i>	<i>120</i>
4.3.3 <i>Suppliers.....</i>	<i>116</i>
4.4 GM’S ACCOUNTING INFORMATION SYSTEM	124
4.4.1 <i>Structure of the Controllership Department.....</i>	<i>125</i>
4.4.2 <i>Main accounting reports</i>	<i>126</i>
4.4.3 <i>Problems in GM’s internal accounting system.....</i>	<i>136</i>
4.5 SUMMARY	140

CHAPTER 5: ACTION RESEARCH PROJECT	142
5.1 CONTEXT AND PURPOSE.....	144
5.2 DIAGNOSING	144
5.2.1 <i>The problem – theoretical and practical perspectives.....</i>	<i>144</i>
5.2.2 <i>The solution – theoretical and practical perspectives.....</i>	<i>147</i>
5.3 PLANNING THE ACTION.....	147
5.3.1 <i>Preparing to present the idea.....</i>	<i>148</i>
5.3.2 <i>Presenting the idea.....</i>	<i>149</i>
5.4 TAKING THE ACTION.....	151
5.4.1 <i>Slow progress and barriers to change.....</i>	<i>152</i>
5.4.2 <i>Informal information exchange.....</i>	<i>158</i>
5.4.3 <i>New customer selected.....</i>	<i>159</i>
5.4.4 <i>The development of VSM.....</i>	<i>159</i>
5.5 EVALUATING THE ACTION	164
5.6 SUMMARY.....	164
CHAPTER 6: DISCUSSION	166
6.1 TRACING THE ACTORS	167
6.1.1 <i>Global actors.....</i>	<i>168</i>
6.1.2 <i>Local actors.....</i>	<i>172</i>
6.1.3 <i>Local/global actor.....</i>	<i>173</i>
6.2 THE TRANSLATION – THE SUPPLY CHAIN AND ACCOUNTING NETWORK	176
6.2.1 <i>Problematism.....</i>	<i>179</i>
6.2.2 <i>Interessement.....</i>	<i>186</i>
6.2.3 <i>Enrolment and mobilisation.....</i>	<i>191</i>
6.2.4 <i>A new network.....</i>	<i>193</i>
6.3 ON THE LACK OF CHANGE	197
6.4 ON THE ROLE OF ACCOUNTING.....	206
6.5 ON THE ROLE OF THE RESEARCHER AND THE ANT AND AR COMBINATION.....	221
6.6 SUMMARY.....	233
CHAPTER 7: CONCLUSIONS, LIMITATIONS AND FUTURE RESEARCH	237
7.1 OVERVIEW OF THE STUDY	237
7.2 RESEARCH CONTRIBUTIONS	243
7.2.1 <i>Theoretical and methodological contributions.....</i>	<i>243</i>
7.2.2 <i>Practical contributions.....</i>	<i>247</i>
7.3 LIMITATIONS OF THE RESEARCH.....	249
7.4 SUGGESTIONS FOR FUTURE RESEARCH	250
7.5 SUMMARY	252
APPENDIX 1 – RESEARCH PROTOCOL	255
APPENDIX 2 – FIELD RESEARCH CONTACTS.....	262
APPENDIX 3 – PROJECT PRESENTATION	264
REFERENCES.....	270

LIST OF TABLES

Table 2.1: Contribution of TCE and early studies	48
Table 2.2: Limitations of TCE and early studies	49
Table 2.3: Contribution of structuration theory	52
Table 2.4: Contribution of evolutionary theory	54
Table 3.1: Summary of the contribution of actor-network theory	79
Table 3.2: Approaches to interventionist research and action research	81
Table 4.1: Sample of GM's Balanced Scorecard Targets and Indicators	134
Table 5.1: The AR cycle theory related to research findings (adapted from Coghlan and Brannick, 2001) and elaborated based on field research.....	143
Table 6.1: Global and local actors.....	175
Table 6.2: The four moments of translation (adapted from Callon, 1986)	176
Table 6.3: The role of accounting	210
Table 6.4: Action Research v Consultancy	230

LIST OF FIGURES

Figure 2.1: Levels of research in supply chain management	20
Figure 3.1: Research paradigms	61
Figure 3.2: The action research cycle	86
Figure 3.3: Spiral of action research cycles	88
Figure 4.1: Layout of GM's physical structure	108
Figure 4.2: Group organisational chart flow	112
Figure 4.3: Sales and Marketing organisational flowchart - Containers Segment.....	113
Figure 4.4: Factory organisational flowchart	113
Figure 4.5: Supply Chain Department organisational flowchart	115
Figure 4.6: Actors in action and the lack of change.....	117
Figure 4.7: Controllership Department organisational chart.....	126
Figure 4.8: Book of managerial information (BMI)	127
Figure 4.9: GM's Balanced Scorecard	131
Figure 5.1: Action research cycle.....	142
Figure 5.2: Production plan flow chart	157
Figure 6.1: SC&A network – Customer for AD	178
Figure 6.2: SC&A network – Customer for PI	195
Figure 6.3: Actors in action and the lack of change.....	199
Figure 6.4: ANT and AR combination.....	222

LIST OF ABBREVIATIONS

ANT – Actor-network theory

AR – Action research

BMI – Book of managerial information

BSC – Balanced scorecard

Customer for AD – Customer for Alcoholic Drinks

Customer for FI – Customer for Food Industry

Customer for PI – Customer for Pharmaceutical Industry

DRM – Daily routine management

EBITDA – Earnings before income tax, depreciation, and amortisation

EDI – Electronic Data Interchange

EVA – Economic value added

FA – Financial accounting

GM – Glassware manufacturer

IOA – Inter-organisational accounting

IT – Information technology

MA – Management accounting

NPV – Net present value

Sales Manager for AD – Sales Manager for Alcoholic Drinks

Sales Manager for ND – Sales Manager for Non-alcoholic Drinks

Sales Manager for PI – Sales Manager for Pharmaceutical Industry

SAP – Systems Applications and Products in Data Processing

SC&A – Supply chain and accounting

SCM – Supply chain management

VMI – Vendor managed inventory

VSM – Value stream mapping

WMS – Warehouse management system

CHAPTER 1: INTRODUCTION AND OVERVIEW

This chapter introduces the nature and scope of this thesis. It begins with a brief overview of how organisational boundaries are defined and a presentation of the key concepts of supply chain management (SCM). It also analyses the emergence of inter-organisational accounting (IOA). The second section presents the purpose of the study and introduces the theoretical and methodological choices of this research, which are actor-network theory (ANT) and action research (AR). As will be observed, the combination of ANT and AR is a new approach, and despite potential controversies, it can be a useful one. The following section presents the research questions of this thesis, and explains their importance to this study. The final section describes how the chapters of the thesis are organised.

1.1 Background of the study

Since Coase's (1937) seminal article 'The Nature of the Firm', there has been much discussion regarding organisational boundaries. At the beginning, two modes of governance were identified, namely market and hierarchy (Coase, 1937). With time, hybrids were also recognised, taking into account the existence of intermediary arrangements between market and hierarchy (Williamson, 1991, 1985; Richardson, 1972). Hybrids include relationships between firms which are developed when market or hierarchy are not suitable arrangements. However, it has been observed that there are also non-market and non-hierarchical modes of governance which cannot be classified as hybrid, due to the over-static perspective of this term (Powell, 1990). In this case, networks seem to be a more appropriate concept as they have a broader scope (Håkansson, Kraus and Lind, 2010; Miller, Kurunmäki and O'Leary, 2008; Harland, 1996b; Powell, 1990). According to Powell (1990), networks include hybrids, but networks correspond better to reality since they can incorporate more complex relationships in which resources and results are shared by organisations.

The management of these complex relationships has been addressed under the heading of SCM. SCM involves the management of inter-organisational

relationships (IORs), seeking to reduce costs and maximise performance (Seuring, 2008; Slack, Chambers and Myilibrary, 2007; Christopher, 2005; Harland, Lamming, Zheng and Johnsen, 2001; Lamming, Johnsen, Zheng and Harland, 2000; Christopher, 1998; Riggs and Robbins, 1998; Cooper, Lambert and Pagh, 1997; Copacino, 1997). IOR is another term used in this context that appears frequently in academic literature relating to accounting (Håkansson et al., 2010). IORs involve horizontal relationships and can include hybrids and networks. Examples of IORs are joint ventures, strategic alliances, technology licensing, supply chain relationships, and outsourcing relationships (Håkansson et al., 2010; Kraus and Lind, 2007).

SCM assumes that a company should consider the fact that it operates in a supply chain and, in order to maximise its individual results, it needs to take into account the performance of the other links in the supply chain (Seuring, 2008; Slack et al., 2007; Christopher, 2005; Harland et al., 2001; Lamming et al., 2000; Christopher, 1998; Riggs and Robbins, 1998; Cooper et al., 1997; Copacino, 1997). This model of management has been recognised for its potential to create competitive advantages for firms (Christopher, 2005, 1998; Harland, 1996a). It presupposes that the optimisation of results takes place when all the firms in the supply chain regard themselves as part of the same company (Copacino, 1997). Interaction with other links in the supply chain enables the reduction of costs and the maximisation of results throughout the chain (Christopher, 2005, 1998; Cooper et al., 1997).

In the SCM environment, changes in management accounting have become necessary, mainly because traditional management accounting does not recognise the potential of fully exploiting links with suppliers and customers (Håkansson, Kraus and Lind, 2010; Berry, Ahmed, Cullen, Dunlop and Seal, 1997). In this new environment, IOA has been developed. IOA refers to accounting information exchanged at the inter-organisational level (Cullen and Meira, 2010). This terminology can be used as an umbrella to encompass different names that appear in literature, such as supply chain accounting, inter-firm accounting, inter-organisational cost management and accounting in networks (Cullen and Meira, 2010; Håkansson et al., 2010). In developing IOA, existing accounting techniques, such as Value Chain Analysis, Activity Based Costing, Target

Costing, Kaizen Costing and Balanced Scorecard have been adapted in order to cross the companies' legal barriers. In addition, new accounting techniques, such as Open Book Accounting and Total Cost Control, have been developed. These changes have occurred both as a consequence of SCM and other inter-organisational arrangements (e.g. networks), and as a way of making management accounting information useful in the search for the optimisation of results in this new environment.

The number of studies about IOA has increased significantly in the last two decades (e.g., Chua and Mahama, 2007; Coad and Cullen, 2006; Mouritsen and Thrane, 2006; Kajuter and Kulmala, 2005; Cooper and Slagmulder, 2004; Dekker, 2004; Hakansson and Lind, 2004; Seal, Berry and Cullen, 2004; Dekker, 2003; Mouritsen, Hansen and Hansen, 2001; Tomkins, 2001; Cullen, Berry, Seal, Dunlop, Ahmed and Marson, 1999; Seal, Cullen, Dunlop, Berry and Ahmed, 1999; Berry et al., 1997). It might be said that this was a result of the growing number of both formal and informal alliances between companies (Chua and Mahama, 2007). One important issue arising from these studies is the concern with theoretical explanations in this field. This might be associated with Otley (1994) and Hopwood's (1996) call for a wider framework to explain management control in new organisational forms.

Initial research regarding IOA had been carried out based on transaction cost economics (Cooper and Slagmulder, 2004; Dekker, 2004, 2003; Seal et al., 1999; Gietzmann, 1996). Indeed, the dominance of the adoption of transaction cost economics in literature about IOA has been observed by Anderson and Dekker (2010) and Meira, Kartalis, Tsamenyi and Cullen (2010). However, due to the importance of considering political and social aspects of IOA, there was a need to "move from more neo-classical economics based explanations to more social theories such as structuration, actor-network and institutional theories" (Meira et al., 2010, p. 164). Studies based on these social theories have been quite widely disseminated. For example, Seal et al. (2004), Jack (2007) and Free (2008) all used structuration theory while Coad and Cullen (2006) adopted evolutionary theory in their research.

As will be observed in this thesis, previous empirical research has made a great contribution to the theoretical development of the field of SCM and IOA. The early studies grounded in transaction cost economics have recognised the need for accounting to change in order to adapt to the inter-organisational environment (Gietzmann, 1996). The studies based on more social approaches have also addressed the role of accounting in this context. They have found that accounting is both influenced by, and at the same time influences the way in which inter-organisational relationships are developed (Seal et al., 2004). However, there are still only a limited number of studies focusing on how accounting can be an actor in building and shaping inter-organisational relationships. For this, ANT has been regarded as a useful approach (Mouritsen, Mahama and Chua, 2010). Studies based on ANT have observed accounting as a non-human actor equally capable of influencing and shaping inter-organisational relationships (Chua and Mahama, 2007; Mouritsen and Hansen, 2006; Mouritsen et al., 2001). There is a call in literature for further research focusing on the role of accounting in the inter-organisational context (Mouritsen et al., 2010; Chua and Mahama, 2007).

In addition, many IOA studies were carried out in the international context, most of them in Europe (see details in chapters 2 and 3). In Brazilian academic literature, research work relating to the influence of management accounting on SCM and vice versa has not been found. A literature search carried out to date, although not exhaustive, has shown that in doctoral theses, masters' dissertations, scientific papers, and conferences in the accounting field, there are minimal studies of these aspects. One exception is the study by McCormack, Ladeira and Oliveira (2007) which considers performance and SCM. This thesis can be regarded as a pioneer in Brazilian research literature since it focuses on analysing the role of accounting in the development of a SCM initiative in a Brazilian organisation. Therefore, this thesis has the potential to contribute to the development of the body of literature about SCM and IOA, both in the (Brazilian) national and international contexts. As will be explained in the next section, the analysis of the role of accounting in the development of a SCM initiative is the main thrust of this investigation.

1.2 Research gap

As explained above, IOA can contribute to the successful development of SCM initiatives. In addition, IOA is an emerging and growing field of research. However, although IOA has become increasingly important in the management accounting literature, previous research has shown that it is a controversial area, and one worthy of investigation. While some authors (Mouritsen and Thrane, 2006; Seal et al, 2004) argue that accounting can play a constitutional role in the inter-organisational context, others (Free, 2008) have observed accounting as a hurdle in the development of SCM initiatives.

Previous research on the role of IOA has been approached from different theoretical perspectives, such as transaction cost economics, structuration theory, evolutionary theory and ANT. Although they all make an important contribution to the IOA literature, it has been emphasised that ANT can bring interesting insights regarding the role of accounting in the inter-organisational context. Indeed, there is a call in the IOA literature for the development of further studies using ANT (Mouritsen et al., 2010). Thus, this research addresses this theoretical gap in the IOA literature.

A further gap which this thesis focuses on refers to the use of AR as the methodological approach of the research. The expansion of the use of AR has been suggested in the management accounting literature (Baard, 2010b; Berry, Coad, Harris, Otley and Stringer, 2009; Scapens, 2008). It relates to the fact that AR creates the opportunity to work on a project which enables both theoretical and practical developments. According to Berry et al. (2009, p. 16):

By grounding research in organisational practices, it becomes legitimate to use a wide range of theoretical approaches in helping explain such activities. In addition, research also becomes enmeshed in the design process for management control systems, which exposes it to the crucial trade-offs that have to be considered at every stage. Finally, it opens the door to more dynamic, action research type activities which attempt to observe the consequences of management control systems design and use over a period of time following a change. This is likely both to enrich theory and to assist practice.

Thus, this thesis also attends to this methodological gap observed in management accounting research.

Moreover, limited research in management accounting and more specifically in IOA has, as yet, been conducted within emerging economies (Hopper, Tsamenyi, Uddin and Wickramasinghe, 2009). Brazil is one of the BRIC (Brazil, Russia, India and China) economies (O'Neill, 2001) which are expected to grow considerably in the next few decades (Wilson and Purushothaman, 2003). As this research presents a Brazilian case, it also deals with this research gap in the management accounting literature.

1.3 Purpose of the study

The main purpose of this study is to extend knowledge of IOA by using actor-network theory (Latour, 1987) to understand how accounting can be an actor in contributing to the mediation, building, and shaping of a SCM initiative. This research can be regarded as interpretive (Burrell and Morgan, 1979) since it aims to analyse the role of accounting in the inter-organisational context. ANT is the theoretical choice of this research due to its interpretive characteristic (Wickramasinghe and Alawattage, 2007) and the fact that it allows the consideration of accounting as a non-human actor capable of influencing the development of IORs (Mouritsen et al., 2010; Chua and Mahama, 2007).

Baxter and Chua (2003) point out that actor-network theory (ANT), or the Latourian approach, is a perspective that has been used in alternative management research. ANT is distinctive since it does not focus on how structures affect social relations, but on how actors may play a role in mediating, building, and shaping them (Latour, 2005, 1987). Indeed, ANT involves following the actors and the traces left behind them, instead of considering actors as mere placeholders (Latour, 2005).

From the ANT perspective, actors can be human and non-human and both are equally capable of acting. Hence, accounting can be considered to be a relevant

actor in building social relations (Mouritsen and Hansen, 2006; Mouritsen and Thrane, 2006; Briers and Chua, 2001; Chua, 1995). More specifically, ANT has become increasingly used in literature about IOA (Mouritsen et al., 2010). According to Mouritsen and Thrane (2006), ANT is a helpful approach because “it analyses not only whether accounting exists as a set of techniques, but also how accounting influences interactions in the network” (p. 247). Actors can also be divided into global and local (Wickramasinghe and Alawattage, 2007; Briers and Chua, 2001). This division has enabled the identification of the influence of global over local actors (Briers and Chua, 2001).

Another important concept of ANT which is used in this thesis is ‘translation’ or the ‘sociology of translation’ (Callon, 1986). Translation refers to analysis of the characteristics of the actors and their potential interactions in the network (Callon, 1986). It is divided into four phases, namely problematisation, interessement, enrolment and mobilisation (Callon, 1986). Problematisation relates to the identification of the actors, their roles and interests. Interessement consists of emphasising to the actors the benefits of engaging in the network. Enrolment takes place when interessement is successful, and involves the negotiation of controversies and the development of stronger relationships in the network. Mobilisation is achieved when the network is stable. It focuses on collective, instead of individual interests (Callon, 1986).

A further important aspect of this research is the combination of ANT with AR. AR is the methodological choice of this study and was used to carry out this case study in a Brazilian glassware company. AR involves both taking action and developing knowledge about the action (Cassell and Johnson, 2006; Reason and Bradbury, 2001; Baker, 2000; Eden and Huxham, 1996). It is important to consider that on the one hand, AR is focused on the solution of problems of genuine concern to the people involved in the project. On the other hand, the solution of these problems should also be relevant from the theoretical perspective. In addition, it is important to emphasise that AR and consultancy are not the same thing. The main difference, as highlighted by Harris (2007) is the role of theory, both to inform the action and to theorise about the effects of that

action. One advantage is that AR is not as prescriptive as consultancy (Eden and Huxham, 1996).

AR projects often take place in a cycle (Adams and McNicholas, 2007; Adams, Hoque and McNicholas, 2006; Rock and Levin, 2002). This research follows the cycle proposed by Coghlan and Brannick (2001), which includes a pre-step of context and purpose and four steps, namely diagnosing, planning the action, taking the action, and evaluating the action. The pre-step of context and purpose involves identifying the main drivers for the change. The first step, diagnosing, refers to the identification of the issues which will be addressed during the project development. The second step, planning the action, involves following the drivers for the change and preparing a strategic and operational plan with details regarding the expected situation after the change. The third step, taking the action, relates to the intervention and the implementation of the plans. The fourth step, evaluating the action, includes the evaluation of how the previous steps were performed and how a new cycle will be developed (Coghlan and Brannick, 2001).

AR has been widely used in the medical sciences (Schein, 1995) and in education research (Rock and Levin, 2002). In management research there is a growing interest in this methodological approach (Cassell and Johnson, 2006; Gummesson, 2000; Eden and Huxham, 1996). More specifically, in management accounting research there is a call for further research based on AR. Indeed, some studies have started to emerge (Baard, 2010; Liu and Pan, 2007; Coad and Cullen, 2006; Harris, 1999; Seal et al., 1999). This research intends to contribute to extending this list.

AR was undertaken for the purpose of this study in response to the call for further AR studies in management accounting (Baard, 2010; Berry et al., 2009; Scapens, 2008; Harris, 1999) and also because it was a way of obtaining access to the case company. The choice of AR can also be justified by the need to follow an ongoing situation relating to the development of a SCM initiative, and to facilitate the use of ANT in the theoretical analysis of the research. The combination of ANT and AR is still a new approach in the academic context and this may raise controversial issues concerning philosophical perspectives, since AR may be

carried out under the positivist philosophical paradigm and ANT may be regarded as postmodernist (Lewis, 2007). However, they can also both fit the interpretive paradigm (Burrell and Morgan, 1979), which is the case for this research. In addition, as will be observed in this thesis, the combination between ANT and AR can provide deeper and more valuable insights concerning the role of accounting in the inter-organisational context. Indeed, the combination of ANT and AR is pioneering in literature about the IOA field and brings new perspectives in relation to case study development and the analysis of results.

The case study company is a large Brazilian glassware manufacturer. Brazil is a developing country, but it is also commonly identified as one of the BRIC countries, which also include Russia, India and China. The BRIC acronym was coined by the American investment bank Goldman Sachs ten years ago (O'Neill, 2001). In 2003 there was a prediction that the BRIC economies would become a "much larger force in the world economy" (Wilson and Purushothaman, 2003, p. 3) capable of overtaking the G6 countries (United Kingdom, United States, France, Germany, Italy and Japan) in less than 40 years. Despite the 2007-2009 financial crisis, which has considerably affected the world economy, the BRIC and N-11¹ economies;

appear to have withstood the crisis better than many of their developed country counterparts. Indeed, their contribution to world economic activity has increased even more through the crisis, and since. This is likely to continue in the near, medium and long term (O'Neill and Stupnytska, 2009, p. 27).

More specifically, although less developed countries are experiencing, and are expected to continue experiencing, accelerated economic growth, in terms of management accounting research, there are still only a limited number of publications concerned with these countries. Hopper, Tsamenyi, Uddin and Wickramasinghe (2009) have found only one research paper published about management accounting in the Brazilian context (Guerreiro, Pereira, Frezatti and Bio, 2006). Thus, this research will expand the body of literature concerning

¹ The N-11 are the next 11 countries expected to grow considerably in economic terms. It includes countries like Bangladesh, Egypt, Indonesia, Iran, Nigeria, Philippines and Vietnam (O'Neil and Stupnytska, 2009).

research into management accounting in less developed countries. The study by Hopper et al. (2009) also emphasises that accounting research in these countries is increasing particularly in state-owned and privatised organisations, but there is still a need for further investigations in small and micro enterprises, agriculture, non-governmental organisations, and transnational institutions. This thesis focuses on a case study of accounting in a private (non-governmental) organisation.

The case company is a large supplier in the Brazilian glassware industry located in the Northeast region of Brazil, with customers in the food and drinks industry, pharmaceutical industry, and in the retail sector. The company is the third largest in its sector in Brazil and employs about 1,500 people, generating an annual turnover of over £100 million. As a supplier in the glassware industry, it is part of the supply chain of local and multinational companies, such as Coca-cola, Wal-Mart and Anheuser-Busch Inbev. Moreover, during the field research, the case company was part of a larger Brazilian organisation which had been in existence for over fifty years. Last year, GM was sold to one of its multinational competitors operating in Brazil.

1.4 Research questions

As mentioned above, the overall aim of this thesis is to understand how accounting can be an actor contributing to the mediation, building, and shaping of a SCM initiative. More specifically, and against the background outlined in the previous sections, the following research questions were developed:

- a) How are supply chain relationships being managed?
- b) How can organisations benefit from the implementation of a SCM initiative?
- c) How does accounting change in order to adapt to the SCM initiative?
and
- d) How does accounting contribute to the development of the SCM initiative?

The first two questions refer to the situation of the case company before the potential implementation of the SCM initiative. The first question is important because it will help to understand the situation of the company in relation to SCM before the AR project. It aims to find out whether any kind of long term relationship between the company and its external links in the supply chain is already in place. This question is important as AR projects presuppose analysing the initial situation in order to identify and address a problem which is of genuine concern to the parties involved (Eden and Huxham, 1996). This research question also contributes to extending the scope of literature relating to SCM, by applying SCM concepts to the example of an organisation located in Brazil.

The second research question involves the critical evaluation of SCM, in both theoretical and practical terms. It focuses on understanding the benefits that companies may obtain by engaging in closer, long-term supply chain relationships. According to literature about SCM, companies can reduce costs by working together and eliminating duplicate activities (Christopher, 2005), or improving the value of their products (Porter, 1985). The potential benefits of implementing a SCM initiative in the case company's supply chain are analysed according to these possibilities. Thus, this research question also contributes to understanding how SCM concepts are used in practice.

The third and fourth research questions are related to the effects of the AR project within the case company. The third question focuses attention on the nature of accounting itself, questioning how it might adapt, but also whether, and to what extent it adapts in practice. As mentioned in section 1.1, accounting may need to change to adapt to the inter-organisational environment (Håkansson et al., 2010; Berry et al., 1997). This research question intends to analyse how it happens in a Brazilian context.

The fourth research question relates to the main purpose of this research and refers to accounting's potential influence on the development of the project. It addresses the potential contribution accounting can make to SCM, and in doing so takes account of the growing awareness of the contribution of accounting, yet recognises its apparently limited use (Håkansson et al., 2010; Kraus and Lind,

2007). Based on current literature about IOA, it can be said that accounting can be a source of both order and conflict (Mouritsen and Thrane, 2006); it may have a low power in situations of normality, but it can play an important role in a crisis (Mouritsen et al., 2001). Accounting can also have a more symbolic than technical role (Seal et al., 2004). Moreover, while some authors argue that accounting can contribute to the development of inter-organisational relationships (Chua and Mahama, 2007), others have found that accounting may be an obstacle to enhancing trust between the parties involved (Free, 2008). Indeed, IOA is regarded as a new field of research (Håkansson et al., 2010) and by addressing these controversies, this research question can make a contribution to existing literature about IOA.

1.5 Structure of the thesis

In addition to this introduction chapter, the remainder of this thesis is structured as follows. Chapter 2 presents a literature review examining important concepts and terminologies used in the SCM context, such as supply chains, value chains and networks. The chapter also reports on current literature regarding IOA, its concepts, tools and techniques. The chapter then continues with a review of research conducted in the IOA field, according to the following theoretical approaches: transaction cost economics, structuration theory and evolutionary theories. Due the importance of these theories for conducting IOA research, a brief summary of each theory is presented before the specific literature is reviewed. ANT, which is the theoretical choice of this research, is reviewed in the following chapter.

Chapter 3 begins with a discussion of the philosophical considerations underlying this study, which fits with the interpretive paradigm. The chapter then explores the theoretical and methodological underpinnings of this investigation, which are ANT and AR respectively. The origin, concepts and main criticisms of ANT are discussed. Then IOA studies using ANT are reviewed. The need for further research using ANT in the IOA context is evidenced due to its potential to consider accounting as a non-human actor that is capable of acting and

influencing the development of inter-organisational arrangements. The chapter then moves on to a discussion of AR. This is done by reviewing its origin, concepts, characteristics and main critiques. The AR section also includes the methods of data collection used in this research. The chapter then presents a section discussing the reasons for the choice to combine ANT and AR. The chapter ends by presenting a summary.

Chapters 4 to 6 present the results of the field research. Chapter 4 describes the case company and its supply chain. The outline of the case company includes its background and its structure. The company's supply chain is divided into internal operations, market and customers, and suppliers. As will be observed in chapter 4, the company has a vertical hierarchical structure and its supply chain includes long term, but still arms-length relationships. The chapter also presents the company's internal accounting system and discusses some of the main problems which might have influenced the results of this research. A summary is presented at the end of the chapter.

Chapter 5 is a descriptive chapter that outlines how the case study was carried out based on the AR methodological approach. The chapter focuses on how the AR cycle was followed during the case study. The AR cycle includes the pre-step of context and purpose, and the steps of diagnosing, planning the action, taking the action and evaluating the action. The chapter reveals that following the AR cycle was problematic, as the proposed project was not implemented. The chapter then shows to what extent the AR cycle was followed in this research.

Chapter 6 includes a discussion of the findings of the field research grounded in an ANT perspective. The chapter starts by dividing the actors into global and local, human and non-human actors. It then moves to the analysis of the AR project according to the moments of translation depicted by Callon (1986), namely problematisation, interessement, enrolment, and mobilisation. Since the change did not happen, the chapter includes a section exploring the lack of change. It also discusses the role of accounting in relation to the project. As will be seen, accounting played a constitutional and controversial role, but in a different way to prior literature. In addition, the chapter analyses the role of the

researcher and the ANT and AR combination. It then finishes with the presentation of a summary.

Chapter 7 presents the conclusions of the thesis. The chapter begins with an overview of the study. It continues by analysing the theoretical and practical contributions of this investigation. It then recognises the limitations of the study and makes suggestions for future research.

1.6 Summary

In summary, the main purpose of this study is an investigation of SCM and IOA. The role of accounting in the development of a SCM initiative is analysed through an ANT lens, which allows recognition of accounting as a non-human actor capable of influencing the outcome of social relations. The field research is an AR case study carried out in a Brazilian glassware manufacturer. The combination of ANT and AR is a distinctive aspect of this research, and it is expected that this research will make a contribution in both theory and in practice. Although few studies have yet been conducted in developing economies, a review of relevant literature and academic research about SCM and IOA is presented in the next chapter.

CHAPTER 2: LITERATURE REVIEW

This chapter contains both a review of literature relating to supply chain management (SCM), presented in section 2.1, and inter-organisational accounting (IOA), in section 2.2. The chapter begins with an explanation of the terminology used in the area of SCM, such as supply chain, value chain and network (section 2.1.1). The concept of SCM is then discussed (section 2.1.2). In addition, section 2.1.3 outlines two SCM tools which are relevant to this research, namely, vendor managed inventory (VMI) and value stream mapping (VSM). The chapter then moves on to present the emergence of the concept of IOA, and its tools and techniques (section 2.2.1). It continues with an analysis of literature relating to IOA based on the theoretical approaches used in previous studies (section 2.2.2). The chapter ends by presenting a summary in section 2.3.

2.1 Supply chain management (SCM)

Supply chain management (SCM) has been recognised for its potential to increase companies' results (Christopher, 2005, 1998; Cooper et al., 1997). At first, it was viewed as a way of managing the flow of materials from suppliers to buyers for the purpose of cost reduction. With time, it developed into a more sophisticated approach, by including the flow of information between companies and the possibility of improvements in both quality and results. Currently, in addition to the focus on quality and profit maximisation, SCM is also used as a way of gaining and maintaining competitive advantage.

The origin of the term 'supply chain management' is associated with the early 1980s and discussions about the integration of companies' internal functions, such as acquisition, production, selling and distribution (Harland, 1996b). By the 1990s, SCM had gained more importance in the business context (Svensson, 2002) and the world-wide recession of the late 1980s and early 1990s made companies strategically review how they were able to reduce costs and add value as a whole (Harland, Lamming and Cousins, 1999). The Japanese automotive

company, Toyota, was one of the first companies to strategically manage an inter-organisational network (Harland et al., 1999).

A unique and comprehensive definition of SCM has not yet been developed, mainly because it can be approached from many different perspectives, such as purchasing, logistics and transportation, and marketing (Burgess, Singh and Koroglu, 2006; Cigolini, Cozzi and Perona, 2004). Despite this, it can be said that this model of management assumes that first, to assure its competitiveness, the firm must be seen as part of the supply chain in which it operates and, secondly, that the optimization of the efficiency of isolated links in that chain is not sufficient. Therefore, it is also important to take into account the results of the other chain links with which the firm participates (Seuring, 2008; Slack et al., 2007; Christopher, 2005; Harland et al., 2001; Lamming et al., 2000; Christopher, 1998; Riggs and Robbins, 1998; Cooper et al., 1997; Copacino, 1997). The achievement of synergy between all the chain links with which the company operates permits cost reduction and optimisation of results throughout the chain.

Nevertheless, it is important to highlight that the term 'supply chain' is not always considered completely adequate. The problem is that it refers to linear connections between companies, and in practice this is rarely the case. Owing to the complexity of the business environment and the way companies relate to each other, some authors (e.g. Christopher, 2005; Harland et al., 2001) believe that the term 'supply network' would be more appropriate. A network accommodates the variety of connections between different companies, in different directions (Berry, Cullen and Seal, 2005; Castells, 2000). There may also be confusion regarding the use of the terms 'supply chain' and 'value chain'. The latter refers to the value added to a product or service from the customers' perspective (Shank and Govindarajan, 1993; Porter, 1985). Differences between these terms will be discussed in this literature review (see section 2.1.).

Furthermore, as the term 'supply chain management' has started to appear frequently in literature about 'logistics', they might seem to be interchangeable. However, the term 'supply chain management' encompasses more activities than 'logistics' (see section 2.1.2). In fact, as will be observed in this chapter, the

management of ‘inter-organisational relationships’ (IORs) might be a more adequate term. IORs encompass a wide range of possible arrangements in the inter-organisational environment. Some examples of IORs are partnerships, strategic alliances, joint ventures, supply chain relationships and outsourcing relationships (Håkansson et al., 2010; Kraus and Lind, 2007). Despite these problems, SCM has become a very popular term and has frequently appeared in academic and business literature.

Although SCM has brought significant benefits to companies all over the world, including Benetton, Toyota and Nike (Harland et al., 2001; Harland, 1996a), managing inter-organisational relationships can be problematic. The use of SCM practices has created some tension and problems relating to information and power asymmetry between the links in the supply chain. These problems are related to the main concerns of any SCM initiative, which are appropriation, coordination, and adaptation (Knoppen and Christiaanse, 2007). A very significant and difficult problem concerns the new investments necessary to improve operations between companies.

As will be demonstrated in this thesis, management controls and accounting are considered to play an important role in the SCM environment. Although, sometimes, accounting has been a conduit of controversy, it has also been regarded as an important actor in developing and maintaining successful inter-organisational relationships. Furthermore, as observed by several authors, accounting has played a role that goes beyond the technical and can reach a far more symbolic level (Seal et al., 2004; Seal et al., 1999).

2.1.1 Supply chains, value chains and networks

There are a variety of terms used in the context of SCM which can potentially lead to some confusion or misunderstanding. In order to make things clearer, some definitions are presented and discussed here. First, it is important to clarify issues relating to the definition of ‘supply chain’, ‘value chain’ and ‘network’. For Christopher (2005, 1998), ‘supply chain’ refers to the network of companies

involved in processes and activities that produce value in the form of products and services. Nevertheless, it is important to highlight that other definitions have not always been as comprehensive as this. The definition has progressed from the inclusion of only internal processes and activities to the consideration of different groups of companies operating in a network.

Originally, when coined by the consultants Oliver and Webber in 1982, the term 'supply chain' referred only to the internal activities of a company (Harland, 1996b). According to Harland (1996b), it was used to describe "the internal supply chain that integrates business functions involved in the flow of materials and information from inbound to outbound ends of the business" (p.S64). For Harland (1996b), this definition did not differ significantly from Porter's (1985) concept of value chain. However, the term was certainly limited to the internal activities of the company. These concepts are further illustrated in figure 2.1.

The term 'value chain' supposes that a company is segregated into relevant strategic activities in order to analyse costs behaviour and identify possible sources of differentiation (Porter, 1985). Shank and Govindarajan (1993), drawing on Porter's idea, explain that from the value chain point of view, each company must be understood in the global chain of activities that generate value. Today, in engaging in a supply chain initiative, companies should be clear whether they wish only to reduce costs and optimise efficiency or whether they also wish to focus on adding value to their products and services. In order to accomplish the latter, value chain analysis is necessary. Thus, it can be said that the value chain perspective can be used in a supply chain context, depending on the companies' goals.

Since Porter's (1985) work, 'value chain analysis' has become very popular. However, there are authors, such as Peppard and Rylander (2006) who argue that the concept is inappropriate today. This is because products and services are becoming dematerialised and there is no physical dimension to the value chain. They stand out for promoting the use of the concept of a 'value network', because the "old linear models do not account for the nature of alliances, competitors, complementors and other members in the business networks" (p. 6). By adopting

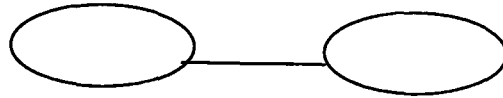
this approach, the focus is “not on the company or the industry, but the value-creating system itself, within which different economic actors – suppliers, partners, allies, and customers – work together to co-produce value” (p. 6-7). The authors add that in the past, the competition was between companies, but today it is between networks of interconnected organisations.

In fact, these changes have been recognised in the business environment and in relevant academic literature. Harland (1996b) explains that the use of the term ‘supply chain’ has, in a second stage, started to also include the lateral relations of the company, leading to the formation of dyadic linkages. Over time, the term ‘supply chain’ has expanded to include the suppliers of the supplier and the customers of the customers (see figure 2.1) (Harland 1996b). However, this was still a linear view and as business operations have become more and more complex, the idea of network has been incorporated (Harland, 1996b). The predominance of the term ‘supply chain’ is still noticeable, especially considering the number of text books that have been published in recent years (e.g. Blanchard, 2007; Mentzer, Myers and Stank, 2007).

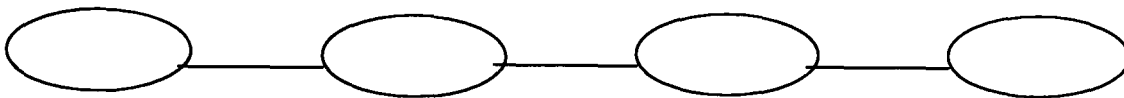
LEVEL 1 – Internal chain



LEVEL 2 – Dyadic relationship



LEVEL 3 – External chain



LEVEL 4 – Network

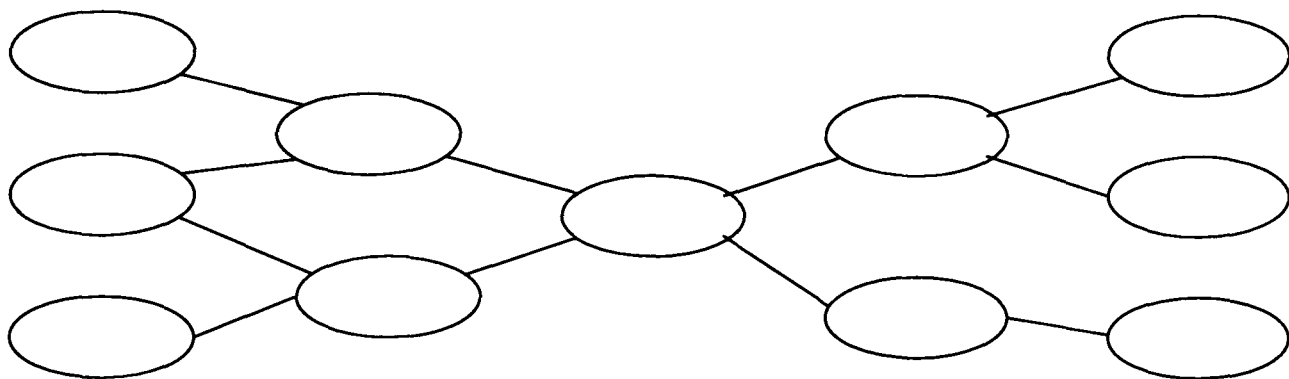


Figure 2.1: Levels of research in supply chain management
Source: Harland (1996b)

Despite this predominance, some believe that the term ‘supply chain’ should be replaced by ‘supply network’ (e.g. Christopher, 2005, 1998; Harland et al., 2001), especially because of the variety of transactions that take place and relationships that exist in the business environment. On the one hand, supply networks might be seen as an extension of supply chains or as sets of supply chains (Lamming, 2000; Christopher, 1998; Harland, 1996b). On the other hand, as Harland et al. (2001) explain:

The supply network concept appears to be more complex than the supply chain concept. Supply networks encompass the mess and complexity of networks involving lateral links, reverse loops, and two-way exchanges, and include a broad, strategic view of resource acquisition, development, management, and transformation (p. 22).

Although 'network' has no legal or completely established definition, the term has become more and more frequently used in the organizational environment (Castells, 2000) and in literature relating to accounting (Håkansson et al., 2010). Currently, it is recognised that companies are linked to each other in different directions and for a variety of reasons. "A network may be described as a set of nodal points (for example firms in an economy) interconnected by a series of linkages, whereby single firms are linked to every other firm" (Berry, 2005, p. 230). For Castells (2000, p. 171), the network enterprise refers to a "specific form of enterprise whose system of means is constituted by the intersection of segments of autonomous systems of goals". These definitions show that companies are not linked in a linear way. Indeed, in the complex business environment, they are linked and have common objectives with a variety of other companies. The complexities and the distinctive form of a network can be observed in Figure 2.1 above.

Owing to this increasing complexity in the business environment, the term 'network' seems to be gaining more and more relevance. For Miller et al. (2008), the emphasis on networks was intensified after Powell's (1990) argument considering it as a distinctive mode of economic activity. Before this, hybrids were considered to be the only possible alternative between markets and hierarchical modes of governance (Williamson, 1985, 1975; Richardson, 1972). According to its proponents, a hybrid refers to operations via a relationship or coordination and emerges in a situation where the benefits of either market or hierarchy are not sufficient for the companies to choose one or the other.

Nonetheless, Powell pointed out that 'hybrids' do not contemplate all possible modes of governance which are non-market or non-hierarchical. For him, this view is over static, unhelpful, inaccurate and does not correspond with reality. Thus, he considers the network to be a more useful and realistic perspective. It is important to highlight that this discussion is not a new one, it is on-going and there is still space for new developments. In fact, this discussion relates to decisions regarding the size of a company and how it should operate in the increasingly competitive market to maximise its results.

Issues related to the definition of companies' legal boundaries have been discussed frequently in literature. In fact, since Coase's (1937) paper 'The Nature of the Firm', a variety of views have emerged. For Coase, there were two possible modes within which a company might operate, namely a market or a hierarchy. Richardson (1972) and Williamson (1985, 1991) developed his ideas and identified, instead of two, three modes of coordination of economic activity, hierarchy, market and hybrids. Over time, operations have become more complex and Powell (1990) has emphasised that what had been recognised as hybrids between market and hierarchy, were, in reality, networks most of the time. He clarifies this by saying:

Networks are "lighter on their feet" than hierarchies. In network modes of resource allocation, transactions occur neither through discrete exchanges nor by administrative fiat, but through networks of individuals engaged in reciprocal, preferential, mutually supportive actions. Networks can be complex: they involve neither the explicit criteria of the market, nor the familiar paternalism of the hierarchy. Basic assumption of network relationships is that one party is dependent on resources controlled by another, and that there are gains to be had by the pooling of resources. *In essence, the parties to a network agree to forego the right to pursue their own interests at the expense of others* (Powell, 1990, p. 303, emphasis added).

From the discussion above, it might be suggested that networks, value networks, or supply networks would fit better with the current global and competitive business environment. Nevertheless, it might also be said that due to the complexity of networks, studying supply chains seems to be more popular. Actually, this may be one of the reasons for more frequent use of the term 'supply chain' rather than 'supply network', which in many cases would be more appropriate. However, it might be that the term 'supply chain' has progressed from representing an internal perspective to encompassing the much more complex approach, suggesting a network (as can be observed in Figure 2.1) (Harland, 1996b).

The definition of 'supply chain management' (Christopher, 1998) presented in the next section takes these complexities into account and regards SCM as "the management of relationships across complex networks of companies..." (p. 33). The next section also includes information concerning practical aspects of SCN.

2.1.2 SCM – definition and practical issues

Firstly, it is important to clarify the distinction between logistics and supply chain management. ‘Logistics’ refers to the strategic management of procurement, movement and storage of materials inside the company and through its marketing channels, while ‘supply chain management’ involves “the management of relationships across complex networks of companies that whilst legally independent are in reality interdependent” (Christopher, 1998, p. 33). From these definitions, it can be said that while logistics might go beyond the legal barriers of a company, SCM encompasses a still broader context.

It is accepted that the SCM model extends management focus far beyond a company’s legal limits, and includes the activities of other firms in the supply chain (Riggs and Robbins, 1998; Copacino, 1997; Poirier and Reiter, 1996). In addition, it is important to take into account that the great benefit of this model occurs when all the links of the chain (including supply, production, delivery and consumption) behave as if they were parts of the same company (Copacino, 1997). However, the term ‘supply chain management’ is not universal. It might be said that managing ‘inter-organisational relationships’ would be a more appropriate term. Inter-organisational relationships involve relations that go beyond companies’ legal barriers. This term has frequently been used in the accounting field (Håkansson et al., 2010; Hakansson and Lind, 2007; Kraus and Lind, 2007). With regards to how it has been used, Kraus and Lind (2007, p. 269) clarify:

Inter-organisational relationships are heterogeneous and involve several different forms of cooperation, which take place under names such as joint ventures, strategic alliances, technology licensing, research consortia, strategic partnerships, supply chain relationships, business relationships, and outsourcing relationships. The increased emphasis on inter-organisational relationships can arise as ongoing customer/supplier relationships evolve to become closer and more long-term in their nature. But, this emphasis can also originate from the formation of new inter-organisational units, such as joint ventures, and the establishment of new inter-organisational relationships through outsourcing (p. 269).

As pointed out by these authors, companies engage in inter-organisational relationships to develop long-term relations or to outsource certain activities. In practice, either one of these outcomes can occur for a variety of reasons. The dynamic aspects of companies and their need to innovate constantly have been emphasized in literature (Teece, 1996, 1992). For this reason, the transfer of knowledge and technology has been regarded as an important motivation for companies to engage in partnerships (Spekman, Spear and Kamauff, 2002). Over time, companies such as Toyota have observed that this also presents an opportunity to reduce costs and maximise results. They have also recognised that operating in partnerships, instead of traditional arms-length relationships, gives the opportunity for quality improvements (Harland, 1996a).

In fact, there is no consensus regarding the reasons why companies engage in inter-organisational relationships. Kraus and Lind (2007), suggest that three main drivers are:

- Globalisation: it increases competition on a world-wide basis, brings rapid structural changes and creates new business opportunities.
- Rapid technological transformation: technology is changing very quickly, and it is becoming more difficult for companies to maintain in-house expertise for every important area.
- Increased technical complexity of products: the need to coordinate many technologies makes it more difficult for a company to rely solely on its own research and development function (R&D).

Although SCM has become very popular (Burgess et al., 2006) and there is a wide range of literature available in connection with the topic, its stage of development both in the theoretical and practical fields can raise controversy. On the one hand, some authors believe that the lack of sufficient theoretical and practical development regarding SCM is a result of neither aspect having matured and being reliant on the other in order to do so (e.g. Storey, Emberson, Godsell and Harrison, 2006). In addition, Croom, Romano and Giannakis (2000) question the stage of development of SCM as a discipline. They observe that literature relating

to SCM is primarily empirical-descriptive and they acknowledge that, to become a proper discipline, a more structured approach to research is necessary to develop the theoretical groundwork of the field. Similarly, Harland et al. (2006) have argued that SCM is not yet a discipline because of insufficient theoretical underpinning.

On the other hand, this thesis is based on the premise that SCM is not a new research field, rather it is a new terminology used in the business context which include a variety of inter-related research. As New (1997, p. 15) puts it, SCM;

is far too important to be considered either a temporary fad or a parochial arena for a guild of specialist researchers. Instead, it is simply the most practically and intellectually significant theme within current managerial and economic research. It is not in any sense a new area; what is new is having a label ... under which diverse research can be connected.

Another relevant issue relates to the disadvantages of the SCM approach. In a situation where one company benefits at the expense of others, a conflict may take place. Thus, the management of inter-organisational relationships is essential to ensure that this kind of problem is avoided (Lancioni, 2000). Other problems that arise from using SCM are power asymmetry, appropriation concerns, decisions about investments, lack of trust, risk of the operations, need for detailed information, and issues related to difficulties in building strong social relationships (Knoppen and Christiaanse, 2007).

In relation to these problems, it is sometimes thought (e.g., Cooper and Slagmulder, 2004; Dekker, 2004; Seal et al., 2004; Tomkins, 2001) that accounting may play a powerful role in increasing trust in an inter-organisational context and improving the way that relationships are developed. Conversely, accounting has in some situations also been regarded as responsible for increasing tension between inter-organisational actors (e.g. Seal et al., 2004). Another issue is that the study of management controls and accounting in inter-organisational relationships has revealed that there are other forces or governance structures that influence the way relationships are deployed. Section 2.2 presents information

about the emergence of IOA, the role it has played in the inter-organisational context, and its most popular tools and techniques.

Before moving on to explore the literature about IOA, two SCM technologies are examined, the vendor managed inventory (VMI) and value stream management (VSM). Although there are several tools and technologies in the SCM context, only the VMI and VSM are explained in this thesis. This is due to their relevance in relation to the case study in this research, as will be explained in chapter 5.

2.1.3 The vendor managed inventory (VMI) tool

The vendor managed inventory (VMI) was first developed in the retail industry. Procter & Gamble and Wal-Mart were among the first companies to use the VMI. It has been observed that, subsequently, it has been adopted in various industries (Tyan and Wee, 2003). In addition, De Toni and Zamolo (2005) have emphasised that the VMI has strong potential to be applied in other different industries. The VMI can be seen as a customer-supplier collaboration that is established to seek to ensure dual access to products at the lowest cost (Elvander, Sarpola and Mattsson, 2007; Slack et al., 2007; Danese, Romano and Vinelli, 2006; De Toni and Zamolo, 2005).

As De Toni and Zamolo (2005) explain, in the VMI;

the manufacturer himself ... decides the quantity to be delivered on the basis of information about sales and the stock level in the distribution centre, taking into account the orders already acquired by outlets and following a pre-established programme of replenishment. The distributor, on the other hand, has to guarantee a continuous flow of information to enable the manufacturer to formulate realistic order proposals and make reliable provisions. The key characteristics of VMI are thus short replenishment lead times, and frequent and punctual deliveries that optimize production and transport planning (p. 64).

In addition, the VMI system presupposes that the customer sends information regarding inventories and future promotions to the supplier and the supplier suggests the purchasing order for the customer. As Lee and Chu (2005) explain: “under vendor managed inventory (VMI) process, downstream shares demand

information to the upstream who should then make stock level decisions for both the upstream and the downstream” (p. 159). In this way, the supplier has access to the customer’s future demand and is responsible for managing the inventory levels both at its manufacturing plant and with the customer.

According to academic and business literature (Elvander et al., 2007; Slack et al., 2007; Danese et al., 2006; De Toni and Zamolo, 2005), the main benefits of the VMI are related to potential reductions in the inventory levels for both supplier and customer, because the customer shares future demand information with the supplier. The supplier can have improved access to customer demand information, and therefore adjust the production plans and inventory levels accordingly. As a consequence, stock-outs can be minimised and a better service can be provided to the customer. The customer can also reduce the administrative costs relating to purchasing and inventory management. In addition, both supplier and customer can have more efficient operations and lower inventory levels.

A list of benefits of VMI presented by VendorManagedInventory.com² and supported by Intenia International AB (2001) is presented below.

Benefits for both parties:

- Data entry errors are reduced due to computer to computer communications and the speed of the processing is also improved.
- Both parties are interested in giving a better service to the end customer by having the correct item in stock when the end customer needs it. This benefits all parties involved.
- A true partnership is formed between the manufacturer and the distributor because they work more closely together and strengthen their ties.
- There is a stabilising in the timing of purchase orders because they are generated on a predefined basis.

² (<http://www.vendormanagedinventory.com/benefits.php>. Accessed 4th February 2010)

Benefits for the distributor/customer:

- The goal is to have an improvement in fill rates from the manufacturer and to the end customer. The fill rates refer to the percentage of customer orders satisfied from inventory available. In addition, there is a decrease in stock-outs and in inventory levels.
- Planning and ordering costs will decrease due to this responsibility being shifted to the manufacturer.
- The overall service level is improved by having the right product at the right time.
- The manufacturer is more focused than ever on providing a high quality service.

Benefits for the manufacturer/supplier:

- The visibility of the distributor's point of sale data makes forecasting easier.
- Promotions can be more easily incorporated into the inventory plan.
- A reduction in distributor ordering errors, which in the past would probably lead to a return.
- Visibility of stock levels helps to identify priorities (such as, replenishing stock or preventing a stock-out). Before VMI, a manufacturer had no visibility of the quantity and the products that were ordered. With VMI, the manufacturer can see the potential need for an item before the item is ordered.

Despite these advantages, the VMI also has drawbacks. One of the main obstacles to implementation of the VMI is that some organisations are reluctant to acknowledge the benefits of cooperation (De Toni and Zamolo, 2005). In addition, De Toni and Zamolo (2005) highlight the difficulties customers face in transferring replenishment responsibility towards suppliers and sharing information about sales plans and forecasts. Major issues are trust (or lack of

trust) and the fear which emerges as a consequence of concerns about a potential reduction in the customer's power.

2.1.4 The value stream mapping (VSM) tool

Value stream mapping (VSM) is one of the tools used in the SCM context. VSM presupposes that you can follow the flow of a product. It starts with the reception of materials from the suppliers, and finishes with the delivery of the final product to the customer. In addition, VSM includes the identification of value added and non-value added activities that are performed in order to have the product available to the customer. The key idea is then to minimise or eliminate the non-value added activities in order to reduce costs and maximise efficiency² (Lee and Chu, 2005; Rother, Shook and Lean Enterprise, 2003). A value stream consists of;

all the actions (both value added and non-value added) currently required to bring a product through the main flows essential to every product: (1) the production flow from raw material into the arms of the customer, and (2) the design flow from concept to launch (Rother and Shook, 2003, p. 3).

Although VSM includes actions and processes performed in the production of a product, it is important to differentiate it from the process mapping technique. While the former addresses material process sequences and flows, as well as information flows, that impact this movement, the latter focuses on tracing the sequence of events for a single item of a single product (Lee and Snyder, 2007). In addition, value stream maps usually reflect a broader perspective, as they consider the flows of materials and information from external supplier to external customer. It can also be extended to include an even broader view by incorporating tier two and tier three suppliers and distributors (Lee and Snyder, 2007).

Therefore, the value stream approach enables seeing the operations as a whole, which can be helpful to enable improvements in the SCM context. As Rother and Shook (2003) put it:

Taking a value stream perspective means working on the big picture, not just individual processes, and improving the whole, not just optimizing the parts. If you truly look at the whole and go all the way from molecules into the arms of the customer, you will need to follow the value stream for a product across many firms and even more facilities. But mapping this entire stream is too much for getting started! (p. 3).

(Håkansson et al., 2010; Caglio and Ditillo, 2008)As can be observed from the quote above, the main problem with VSM relates to the challenges of mapping a large number of activities that are performed by different organisations. Despite this, VSM has been regarded as an easy tool to use. According to Rother and Shook (2003);

Value-stream mapping is a pencil and paper tool that helps you to see and understand the flow of material and information as a product makes its way through the value stream. What we mean by value-stream mapping is simple: Follow a product's production path from customer to supplier, and carefully draw a visual representation of every process in the material and information flow. Then ask a set of key questions and draw a 'future-state' map of how value should flow (p. 4).

The key questions to which the authors refer are related to sources of waste in the production of the product, and to what extent the activities identified are value added or non-value added. The most common sources of waste as identified in the Toyota Production System (TPS) according to Hines and Rich (1997) are: (1) overproduction, (2) waiting, (3) transport, (4) inappropriate processing, (5) unnecessary inventory, (6) unnecessary motion and (7) defects.

2.2 Inter-organisational accounting (IOA)

Accounting and management controls were developed primarily for internal use in organisations (Håkansson et al., 2010). They focused only on companies' internal operations because they took into account the market-hierarchy dichotomy. Today, it can be said that accounting "is the result of a mixture of companies' experiences and normative advice and models originating from scientific studies" (Håkansson and Lind, 2007, p. 885). Closer relationships developed in the inter-organisational environment and the idea of managing operations beyond legal

barriers has brought the need for introducing new accounting tools and techniques. As a consequence, a new research field has started to emerge (Håkansson et al., 2010; Caglio and Ditillo, 2008).

The inter-organisational context imposes new demands on managers and impacts on management control. Indeed, the “recent emphasis on inter-organisational relationships and the significance that they have taken on have made it necessary for managers to extend management control beyond the company’s borders” (Kraus and Lind, 2007, p. 269). As a result of the need for change in the accountant’s role and in accounting tools and techniques, IOA has started to be deployed. IOA refers to an exchange of accounting information between companies in the inter-organisational environment. The next section of this thesis presents information regarding tools and techniques for IOA which have been used by companies in an inter-organisational context.

2.2.1 IOA – tools and techniques

In order to maximise the results of the supply chain as a whole and not only the results of one individual company, there is a need for information possessed by other firms further up or down the supply chain to be transferred. IOA tools and techniques can be used in this context. Popular IOA tools and techniques are;

- value chain analysis, which takes into account Porter’s (1985) value chain concept and suggests that companies should explore external linkages with suppliers and customers to maximise value;
- total cost control (or total cost of ownership), related to the purchasing function, which assumes that companies should identify all possible costs that can be associated with the purchase;
- target costing, which is based on the reduction of costs of the product from its conception to achieve the target cost (the difference between the possible sale price and the desired profit margin); and

- open book accounting, which consists of companies opening their accounting books to others, to share costs and strategic information (Berry et al., 1997).

As will be observed, a variety of terms have been used in this context, most of which are inter-connected. However, some tools or techniques can also be used in isolation. For instance, ‘value chain analysis’ or ‘target costing’ can either be part of the ‘open-book accounting’ (OBA) arrangement or be classified as ‘inter-organisational cost management’ (IOCM) practice. It should be emphasised that management controls and accounting tools and techniques in the inter-organisational setting might differ according to the type of relationship between the companies. This can be dyadic, divided into relationships, or networks (Håkansson et al., 2010; Håkansson and Lind, 2007; Kraus and Lind 2007).

Although the tools might be the same, for example, open book accounting, the way they are used varies according to the inter-organisational setting. In relation to the network context, it has been observed that “when relationships are considered to be part of a larger structure, accounting has to take on a new dimension” (Håkansson and Lind, 2007, p. 898). The main difference is that when dyadic relationships are developed and managed in isolation, as in the case of strategic alliances or joint ventures, the exchange of accounting information takes place only between the companies involved in the relationship. In a network, however, the relationships are not seen as isolated ‘islands’, but are viewed as interdependent. As a consequence, “interactions between companies A and B can have an influence through network effects on company C” (Kraus and Lind, 2007; p. 275). The most common tools and techniques are described below.

2.2.1.1 Value chain analysis

This tool is related to Porter’s (1985) concept of value chain, and further developments by Shank and Govindarajan (1993). It supposes that the value chain should be divided into strategically relevant parts in order to improve the understanding of cost behaviour and sources of differentiation (Porter, 1985). It

can be used “to analyse, coordinate and optimise linkages between interdependent activities in the value chain” (Kraus and Lind, 2007, p. 278). This tool represents an important innovation in the accounting field, as “traditional management accounting fails to recognise the potential for exploiting linkages with the firm’s suppliers and customers” (Berry et al., 1997, p. 74).

Dekker (2003) is the most cited example of an entity (the supermarket chain Sainsbury’s) using value chain analysis or value chain accounting. This study adds to the empirical evidence of the application of value chain analysis and is an example of a successful application of the technique. Nevertheless, the use of value chain analysis or value chain accounting has also brought some problems. Håkansson and Lind (2007, p. 891) claim that “the value-chain accounting model was mainly used to reduce value-chain costs”, whereas the focus should be on adding value, instead of only minimising costs.

2.2.1.2 Open book accounting (OBA)

Although this technique was initially associated with Japanese companies, it has gradually spread all over the world. This appears to be the most complete and, though logically simple (Kraus and Lind, 2007), the most complex technique to apply in inter-organisational settings. The logic of OBA is that one or both companies in a relationship ‘open their books’ to their counterpart (or counterparts) and disclose internal information. The development of reliable relationships between the links is necessary for this to occur. The idea is to facilitate cooperation in relation to the identification of critical areas, resulting in cost reduction throughout the supply chain (Carlsson-Wall and Kraus, 2010; Kajuter and Kulmala, 2010, 2005; Kulmala, Paranko and Uusi-Rauva, 2002; Mouritsen et al., 2001; Berry et al., 1997; Ellram, 1996; Kato, 1993).

An example of the use of OBA would be the supplier allowing the customer to have access to cost information. This was the most common situation observed in previous studies (Håkansson and Lind, 2007; Kraus and Lind, 2007) and happens as a result of power asymmetry in the supply chain. More specifically;

Major suppliers are, for example, involved in the product development process of manufacturing firms. In such close inter-firm relationships, information sharing between firms has become much more comprehensive. It may even include the disclosure of cost data that was traditionally kept secret (Kajüter and Kulmala, 2010, p. 211).

As a consequence, the supplier might also want to have access to cost information from the customer and may not find reciprocity. In a different situation, the supplier might gain access to the customer's cost information and find that the profits are being shared unfairly throughout the supply chain. This issue is related to the reflexivity between actors in the inter-organisational context (Seal et al., 2004).

Moreover, there were situations in which the establishment of a full and detailed OBA agreement did not happen, despite this being the initial intention of the firms involved in the inter-organisational arrangement (e.g. Seal et al., 1999). In spite of this, Seal et al. (1999) observed that accounting played an important role in the development of the inter-organisational relationship. The potential reasons for the failure of OBA arrangements were identified by Kajüter and Kulmala (2005). In fact, their work gives two examples, one of a successful implementation of OBA in a German car manufacturing company and the other in which a network of Finnish manufacturing companies failed to implement the OBA.

According to Kajüter and Kulmala (2005), the main problems were that;

1. Suppliers did not obtain any extra benefit from openness and there were no win-win solutions.
2. Suppliers thought that accounting information should be kept in-house.
3. Network members could not produce accurate cost information and did not want to share poor cost data.
4. Suppliers were afraid of being exploited if they revealed their cost structure.
5. Suppliers did not have reliable resources or resource support from main contractors for the development of accounting systems.

6. Network members could not agree on how open book practice should be implemented.

It seems that companies involved in the network were not sufficiently prepared for the implementation of the OBA agreement, as there were problems related to the poor state of the accounting systems and also relating to the clarity of the rules regarding the sharing of potential benefits. Another problematic issue that should be highlighted is related to insufficient trust among the participants. Berry et al. (1997) emphasise that for this kind of agreement to work, “there needs to be trust between the parties and this need for trust is important in understanding the whole philosophy of supply chain management” (p.75). Thus, trust is important not only because it is essential for the development of closer relationships and the sharing of strategic information, but also because it is involved in the constitution of SCM.

2.2.1.3 Target costing

Target costing was also first used in the Japanese context in order to improve the management of just-in-time (JIT) production systems (Carlsson-Wall and Kraus, 2010; Kato, 1993). Japanese companies had been motivated by the need to find new ways of reducing costs, following previous cost reductions at the production stage obtained by using JIT production systems. Target costing is not a costing system, rather it is a concept focused on “reducing the life cycle costs of new products” (Kato, 1993, p. 36). As such, it seeks to minimise “the overall cost of a product with the help of all the company’s departments and suppliers” (Kraus and Lind, 2007, p. 277). Nevertheless, it is important to ensure that quality, reliability and other requirements are not affected in order to achieve all the cost reductions.

Target costing and the functional analysis closely related to it are first used in the project stage of a product’s life, before its production. The key idea is to analyse possible cost reductions at all stages of a product’s lifetime, such as planning, research and development, and creating a prototype. As Berry et al. (1997) explain;

Target Cost (allowable cost) equals Target Sales Price minus Target Profit. The target sales price is determined primarily from market analysis. The target profit is derived from a view of the total profit requirements of the organisation which is then decomposed into a target profit for each product. For a particular product, any gap between the as-if cost and the target cost will then be the focus of attention using techniques such as value engineering (p. 75).

2.2.1.4 Total cost control – TCC (or Total cost of ownership – TCO)

Total cost control (TCC) or total cost of ownership (TCO) represents an extension of target costing. The idea spread following Carr and Ng's (1995) work relating to the development of this approach at Nissan Group, both in Japanese and British companies. Nissan Group's approach to cost control is a strategic one and uses some principles of target costing (Carr and Ng, 1995). The company had to pay attention to suppliers' costs as they accounted for more than 80 per cent of its production costs. With the aim of addressing the challenge of developing a way to control costs throughout the supply chain, Nissan Motor Company UK developed an approach to TCC that "whilst containing elements of a strategically orientated target-costing approach, pays particular attention to controlling costs throughout the supply chain" (Carr and Ng, 1995, p. 348).

Indeed this tool focuses on a structured approach to understanding the costs in the supply chain as a whole (Van Den Abbeele, Roodhooft and Warlop, 2009; Berry et al., 1997; Ellram, 1996; Carr and Ng, 1995). Ellram (1996), using slightly different terminology, namely 'total cost modelling', explains that "while other techniques focus on the supplier's cost structure, total cost modelling looks at the *cost of doing business* with a particular supplier for a particular item over the life of that item" (p. 16, original emphasis). Not only are the purchasing costs of the item analysed, but also costs of activities associated with the purchase that do not add value, such as service costs, inspection, losses of materials, waste of time, administration, maintenance, etc. The idea is to identify these costs and to reduce or even eliminate them (Berry et al., 1997; Ellram, 1996; Carr and Ng, 1995).

In addition, it is important to emphasise that this approach at Nissan was related to a philosophy shared by the buyer and supplier. This philosophy relates to the fact

that the development of TCC “requires a commitment by the customer and supplier to a long-term relationship based on clear, mutually agreed objectives to strive for world-class capability and competitiveness” (Berry et al., 1997, p. 75). Indeed, the idea of TCC can be seen as closely linked to the OBA perspective, because there is a need to share relevant and strategic information between different links in the supply chain (Berry et al., 1997).

2.2.1.5 Inter-organisational Cost Management – IOCM

Further developments in the exchange of cost and accounting information have resulted in the concept of Inter-organisational Cost Management (IOCM). While some believe that the focus of IOCM is to work together with suppliers to find potential opportunities for cost reduction (e.g. Kraus and Lind, 2007), others go beyond this and regard not only cost reduction as an important characteristic of the IOCM, but also the creation of value (e.g. Coad and Cullen, 2006). In other words, IOCM “involves cooperative actions between buyers and suppliers for the purposes of achieving cost reductions and creating value” (Coad and Cullen, 2006, p. 343).

Another interesting aspect of Coad’s and Cullen’s (2006) understanding of IOCM is the importance of cooperation between partners to improve costs and create value even in situations in which the involvement of management accounting or accountants is not completely clear. For them, “IOCM may or may not involve methods recognisable as management accounting, and may or may not involve management accountants. But, whilst its practices are varied, its central concern is with cooperative efforts by members of separate organisational units to modify cost structures and create value for its participants” (p. 343).

In relation to the use of IOCM practices, Cooper and Slagmulder (2006, p. 130) note that managing costs across the supply chain is “particularly important in lean enterprises that typically outsource a high percentage, sometimes as high as 70 per cent, of the manufacture and design of the total value added of their products” (p. 130). In their studies, Cooper and Slagmulder (2006, 2004) have emphasised the

relevance of target costing for IOCM and have identified three main techniques, functionality-price-quality (FPQ) trade-offs, inter-organisational cost investigations, and concurrent cost management.

The 'FPQ trade-off' is helpful when the supplier's cost of production is expected to be higher than its target costing, and the only way to bring its costs back to the target level is by relaxing the functionality and/or quality specifications of the product (Cooper and Slagmulder, 2006, 2004). After the relaxations are identified, the buyer and supplier's design teams meet to discuss the proposed changes. Generally, the relaxations are proposed by the supplier's team and must be approved by the buyer. Thus, to be successful, the supplier should ensure that it generates adequate returns. Cooper and Slagmulder (2004) emphasise that an effective value-engineering program is the key to the success of this IOCM technique. They add that "typically, an FPQ trade-off is an outcome of a first-look value-engineering project. However, it can be initiated at any time in the design process, up to the release of the item into mass production" (Cooper and Slagmulder, 2004, p. 6-7).

'Inter-organisational cost investigations' will be used when the FPQ trade-off is not sufficient to reduce the manufacturing cost to the target level. The main difference is that in this case, design engineers from more than two firms in the supply chain are involved in solving the problem. Normally there are two solutions, either the product is redesigned to avoid or minimise the need for some of the non-value added activities, or the activities might be performed in a different place in order to reduce costs. "However, just as with FPQ tradeoffs, the fundamental design of the end product still remains essentially fixed" (Cooper and Slagmulder, 2004, p. 7).

'Concurrent cost management' "aggressively reduces costs by increasing the scope of design changes that the supplier can undertake" (Cooper and Slagmulder, 2004, p. 8). It is suitable when fundamental changes in both the product and the components are needed (Kraus and Lind, 2007). Moreover, it is often initiated by the buyer, once it has been noticed that only sustained and coordinated cost reducing actions by both the supplier and buyer's design teams can achieve the

desired cost reduction. Although this technique is used in situations when more significant cost reduction is necessary, typically its use begins much earlier than the other two IOCM techniques (Cooper and Slagmulder, 2006).

2.2.2 Theoretical approaches

A number of studies have been conducted since Otley (1994) and Hopwood (1996) called for the development of theoretical explanations of accounting practices for new organisational forms, especially considering the inter-organisational field. Initially studies regarding the role of accounting in inter-firm relationships were developed on the basis of transaction cost economics (TCE) theory (Williamson, 1985, 1975). According TCE, the parties involved in the transaction may act opportunistically.

Thus some authors (Van Der Meer-Kooistra and Vosselman, 2000; Gietzmann, 1996) suggested that there was a need to extend the traditional make-or-buy accounting calculus, which only included costs directly related to the production of the goods or services in-house or by a supplier. They pointed out the need for adding the costs associated with coordination and control and with the potential opportunistic behaviour of the supplier.

Other studies (Cooper and Slagmulder, 2004; Dekker, 2004; Hakansson and Lind, 2004; Dekker, 2003; Seal et al., 1999; Seal and Vincent-Jones, 1997) have found that IOA may enhance trust between the parties involved in a relationship, although Tomkins (2001) suggests that the level of trust should be determined before the development of information systems, including the accounting system, in the inter-organisational environment. Unlike Seal and Vincent-Jones (1997), who have used trust and co-operation approaches, these studies used TCE to explain the relations between accounting and SCM.

However, some studies complemented this theoretical model with other considerations, such as trust (Van Der Meer-Kooistra and Vosselman, 2000; Seal and Vincent-Jones, 1997) and organisational theory (Dekker, 2003; Seal et al.,

1999). Furthermore, some authors have argued that TCE is insufficient to explain decisions related to forms of governance and types of management control or accounting control used in inter-organisational relationships (Coad and Cullen, 2006; Cooper and Slagmulder, 2004; Dekker, 2004; Hakansson and Lind, 2004).

As a consequence, other theoretical approaches, such as structuration theory (e.g. Seal et al., 2004; Free, 2008), evolutionary theory (e.g. Coad and Cullen, 2006) and ANT³ (e.g. Mouritsen et al., 2010; Chua and Mahama, 2007; Mouritsen and Thrane, 2006) have been used to analyse the role of accounting in the SCM environment. These theories go beyond the economic rationale for defining companies' boundaries and include sociological aspects that influence managers' behaviour in this context. The relevance of using theories derived from sociology in the accounting field has recently been recognised (Wickramasinghe and Alawattage, 2007). The next few sections examine literature in the IOA field in the light of the theoretical framework which has been used as an attempt to explain the role of accounting in this context.

2.2.2.1 Transaction cost economics and inter-organisational accounting

Transaction cost economics (TCE) has been associated with the work of Williamson (1985, 1975) who developed Coase's (1937) study on the nature of the firm. TCE regards human behaviour as more important than previous theories related to the study of markets and hierarchies. Indeed, one of the arguments is that "... more self-conscious attention to rudimentary human attributes is essential if we are to characterize accurately and more adequately understand many of the problems of markets and hierarchies" (Williamson, 1975, p. 2).

The human attributes to which Williamson refers are opportunism and bounded rationality. The combination of these attributes and certain characteristics of the transaction, such as asset specificity, uncertainty and frequency are essential to determine transaction costs. Although the term 'transaction costs' was not used by

³ Details regarding actor-network theory (ANT) are presented in chapter 3 because it is the theoretical choice of this research.

Coase (1937), Williamson argues that “Coase’s remarkable article is instructive in that he both posed the firm and market issues in a direct way and identified the transaction costs and contractual relations as the critical factors to be investigated” (Williamson, 1975, p. 6).

Transaction cost analysis replaces the previous focus on only costs of production with “examination of the comparative costs of planning, adapting, and monitoring task completion under alternative governance structures” (Williamson, 1985, p. 2,). Indeed, the transaction costs can be influenced by human factors, such as bounded rationality and opportunism and by characteristics of the transaction, such as asset specificity, uncertainty and frequency. These aspects are described below.

Firstly, TCE highlights that ‘bounded rationality’, as the rationality of economic actors, is intended but at the same time, is limited. Bounded rationality involves a human’s cognitive limitation to process information and to make decisions (Williamson, 1985, 1975). Before TCE, this idea was rejected by both economists and other social scientists. As Williamson (1985) states, for economists, “limits on rationality are mistakenly interpreted in nonrationality or irrationality terms”, and for other social scientists “reference to intended rationality makes too great a concession to the economists’ maximizing mode of inquiry” (p. 45). Therefore, the economists would object to the idea of bounded rationality because of the possible misinterpretation of limited rationality as nonrationality or irrationality, while the other social scientists would reject it because intended rationality reinforces the economists’ point of view.

Bounded rationality influences the way economic activities are arranged, as the parties will choose the forms of organisation (market or hierarchy) which allow the use of their limited competence to obtain the maximum results (Williamson, 1985). This choice will also be affected by the other behavioural assumption that determines human nature, ‘opportunism’. “Opportunism extends the conventional assumption that economic agents are guided by considerations of self-interest to make allowance for strategic behaviour. This involves self-interest seeking with guile and has profound implications for choosing between alternative contractual

relationships” (Williamson, 1975, p. 26). Thus, it is important to take into account the fact that humans may act opportunistically in the pursuit of their own advantage, “with every means at their disposal, including guile and deceit” (Powell, 1990, p. 297).

In addition to the behavioural assumptions, according to TCE there are also economic reasons for some transactions to be organised in one way or another. The main reasons are asset specificity, uncertainty, and frequency. Asset specificity is the most important aspect of TCE. As Williamson (1985) explains, in a contractual schema, parties can often choose between specific or general investments. If the specific option is chosen, ‘asset specificity’ arises. Indeed, ‘asset specificity’ assumes that the value of an asset is determined by a continuous specific transaction between parties and if the relationship ends, losses are likely to occur because the asset does not have value outside the relationship (Spekle, 2001; Gietzmann, 1996).

In relation to the two other reasons, “uncertainty refers to the degree of specificability of intended performance and predictability of (the influence of) the environment within which the contract is to be executed. Frequency can do without a definition; it has no peculiar connotation in TCE” (Spekle, 2001, p. 421). The main ideas underpinning TCE in relation to how these characteristics will affect organisational modes of governance, are that;

... transactions that involve uncertainty about their outcome, that recur frequently and require substantial ‘transaction-specific investments’ – of money, time or energy that cannot be easily transferred – are more likely to take place within hierarchically organized firms. Exchanges that are straightforward, non-repetitive and require no transaction-specific investments will take place across a market interface. Hence, transactions are moved out of markets into hierarchies as knowledge specific to the transaction (asset specificity) builds up (Powell, 1990, p. 297).

The early studies into IOA were mainly influenced by the application of transaction cost economics (Williamson, 1985, 1975) and the use of incomplete contracts. In relation to the inter-organisational environment, TCE can be helpful because it addresses the question of what determines which inputs will be

acquired by the company through exchanges in the market, and which will be produced within its legal barriers (Anderson and Dekker, 2010; Gietzmann, 1996). By applying TCE to analyse how European subcontractors of a Japanese assembler in the automotive sector develop their relationships, and how accounting is changing in this context, Gietzmann (1996) argued that changes in the traditional make-or-buy accounting calculus are necessary to minimise the opportunism problem and enhance trust between companies.

Accordingly, there is a belief that relationships might be problematic for accounting, as it has been developed taking into account the hierarchy-market dichotomy (Hakansson and Lind, 2004). The complexity of these relationships creates new demands for accounting and pushes the need for change (Cooper and Slagmulder, 2004; Hakansson and Lind, 2004). From the TCE perspective, trust is important as it is not possible to contract for every contingency and there is a fear in relation to opportunistic behaviour. Hence, to engender trust, companies should constrain their own behaviour and make clear that they do not have the intention to act opportunistically (Gietzmann, 1996).

As a consequence, the focus of accounting needs to move from only supporting the decision concerning which products to produce in-house and which to outsource (make-or-buy decision) to support more long-term decisions, such as decisions regarding which subcontractors are worth developing multi-year relationships with and promoting them to 'design approved subcontractors' (Gietzmann, 1996). In this way, Van der Meer-Kooistra and Vosselman (2000) proposed that the extended make-or-buy calculus should also include the coordination and control costs and costs related to the risk of the supplier acting opportunistically or performing poorly.

In relation to the relevance of the notions of 'trust' included in Williamson's incomplete contracts approach, Seal and Vincent-Jones (1997), regard them as only "residual devices and refuges of last resort when all else fails" (p. 427). Thus when analysing the role of accounting in long-term relationships, rather than using TCE concepts, they focus on trust and co-operation. They conclude that accounting has a constitutional role as a group of approved measures which

contributes to the achievement of agreements between the parties, and it may enhance trust. The problem is that this may depend on certain institutional and organisational conditions, such as those encountered in their analysis.

In the same way, Seal et al. (1999) found that accounting might contribute to the establishment of trusting and collaborative business relationships. They used TCE and industrial organization theory to study SCM practice in two UK (non-Japanese) manufacturing companies. They argue that accounting plays an important role in the establishment of a partnership because initially there are few sources of stability and neither company had clear authority.

Interestingly, the major finding of Seal et al.'s (1999) study is that accounting plays an important role, which goes beyond the technical to a more symbolic level, in building inter-firm relations based on trust and collaboration. They explain that for the initial establishment of the partnership, detailed documentation was developed, but after a period of time general agreements became more important.

In addition, Håkansson and Lind (2004) observed that accounting was a key player in the relationship between companies, this time in the telecom industry, despite the fact that collective accounting information, such as inter-organizational budgets, open book accounting and target costing were not used. As the authors stress, it is “through a systematic combining of accounting in the formation of organizational units with partly overlapping accountability that established accounting methods support the relationship formation” (p. 67).

Accounting may play an important role in the development of relationships, albeit not always in the same way. The kind and the amount of accounting information needed in this context might be related to the level of trust which exists between the companies involved. By using Tomkins' (2001) idea of the association between the level of trust and the information needed in a relationship to analyse Håkansson and Lind's (2004) findings, it can be argued that the need for detailed accounting information became less important because the level of trust had increased sufficiently.

According to Tomkins (2001), as closer relationships take time to build and are expected to exist for a certain period of time, the link between trust and information in long-term alliances can be illustrated by an inverse U-shaped curve. The most interesting aspect of his analysis is to emphasise that the relationship between the level of trust and information is different depending on the stage of development of the relationship. At the beginning of the relationship, both trust intensity and information need are low; at the next stage, there is a positive association between the level of trust and the need for information, as both increase simultaneously “simply because trust itself cannot be increased without further information” (Tomkins, 2001, p. 170); and as trust increases, the need for information becomes less important, and declines (Håkansson and Lind, 2004; Seal et al., 1999).

However, there might be a problem in Tomkins’ (2001) conclusions concerning the determination of the amount of information necessary in the initial stage of the long-term relationship based on the level of trust in existence. He points out that trust should be regarded as a fundamental factor for deciding the amount and type of information (including accounting) needed in developing relationships, alliances and networks. He argues that trust should be taken into account before all other factors and that trust will determine the focus of the information system and the intensity of information essential for the relationship.

If ... trust is defined to mean areas of life which one can take as given, trust must be a fundamental factor in deciding what amount and type of information should be presented. The consideration of trust is the fundamental consideration before all other determinants come into play. Trust as defined here will determine where the information system needs to focus and with what intensity (Tomkins, 2001, p. 185).

This means that the amount and the kind of information needed will be established according to the level of trust existent between the parties. At this point, the argument is not completely consistent with the idea that accounting may enhance trust and reduce information asymmetry (Cooper and Slagmulder, 2004; Hakansson and Lind, 2004; Seal et al., 1999; Seal and Vincent-Jones, 1997). Nevertheless, Tomkins also recognises the role of accounting information as the

relationship continues to develop and he defends the idea that trust increases as the amount of information also increases.

Clearly, there is a strong connection between trust and accounting information. However, another problematic aspect of Tomkins' (2001) argument that trust will determine the need for information at earlier stages, is the difficulty in measuring the level of trust between companies. Although the importance of trust in inter-organisational settings has been recognised in literature (Seal et al., 2004; Håkansson and Lind, 2004; Van der Meer-Kooistra and Vosselman, 2000), no study has focused specifically on the measurement of the level of trust.

Therefore, to use trust to determine the need for information might not always be appropriate. However, the connection between information and trust should not be disregarded, as Mouritsen and Hansen (2006, p. 278) clarify:

There is a relationship between information and trust: either information creates trust or trust creates information or some combination of this. The exact ways in which trust and information are related is difficult to unravel, but there are relationships.

Furthermore, some authors (Coad and Cullen, 2006; Thrane and Hald, 2006; Dekker, 2004, 2003; Van Der Meer-Kooistra and Vosselman, 2000) have also taken other issues into account, in order to investigate how accounting is both affected, and affected by, inter-organisational relationships. In addition to trust, they focused on how the governance modes of structure and the power to negotiate influences the way relationships are built up and accounting is shaped.

Van der Meer-Kooistra and Vosselman (2000) designed a model based on TCE, and the types of trust identified by Sako (1992) (contractual trust, competence trust and goodwill trust) in order to examine the factors impacting on the preferences for management control and accounting controls in inter-firm relationships. According to their model, there are three patterns of control in this context: a market based pattern, where control is exercised by the market; a bureaucracy based pattern, in which the existence of specified norms, standards and rules are crucial; and a trust based pattern, in which the most important

mechanism of control is the trust between the parties. They found that the institutional environment and the power to negotiate were important aspects in determining the kind of control used in the outsourcing transaction.

However, Van der Meer-Kooistra and Vosselman's (2000) analysis did not confirm that a high level of risk of opportunistic behaviour or poor performance led to the establishment of a trust based pattern of control, as predicted by their theoretical model. The model also failed to foresee that factors such as the organisation's culture and historical conditions also influenced the choice of management control pattern. Despite these drawbacks, Langfield-Smith and Smith (2003) applied this model. In contrast to other studies (Tomkins, 2001; Seal et al., 1999; Seal and Vincent-Jones, 1997), Langfield-Smith and Smith (2003) observed the development of detailed and tighter accounting control mechanisms in collaboration between the parties involved in inter-organisational operations where trust was already well-established. The divergence of this finding reinforces the complexity of the relationship between the level of trust and the amount and kind of information necessary in the SCM environment.

That TCE lacks the theoretical power to clarify how management control mechanisms are used in the inter-organisational context has also been recognised by other studies. Cooper and Slagmulder (2004) argue that there is a rich interplay between buyer and supplier to take advantage of their capabilities, which is not taken into account by this theory. These capabilities are related to the responsibilities of customers and suppliers. For example, one of the subcontractors studied by Cooper and Slagmulder (2004) had few internal design capabilities, but they were capable of manufacturing specialised items. As a consequence, this subcontractor only accepted responsibility for manufacturing, while the customers were responsible for design and specifications. Dekker (2004) explains that TCE focuses on the potential opportunistic behaviour of the suppliers to determine the type of control, but there are other factors that should be taken into account, such as the selection of a 'good' partner, the social context of the alliance, and the intention to guarantee stability and continuity of the alliance. In addition, he also found that control mechanisms and accounting could enhance trust in the relationship between partners. A summary of the main

contributions of the studies based on TCE and the other studies mentioned in this section is provided in Table 2.1.

Contribution of TCE and early studies	Authors
Accounting needs to change as companies cannot contract for every contingency.	Gietzmann (1996) Van der Meer-Kooistra and Vosselman (2000) Håkansson and Lind (2004) Dekker (2004) Cooper and Slagmulder (2004)
The traditional make-or-buy calculus should be extended to also include the coordination and control of costs and costs related to the risk of a supplier acting opportunistically or performing poorly.	Van der Meer-Kooistra and Vosselman (2000) Cooper and Slagmulder (2004)
Accounting may enhance trust.	Seal and Vincent-Jones (1997) Seal et al. (1999) Tomkins (2001) Dekker (2004)
Accounting can play an important role as, in the beginning of the relationship, there are few sources of stability and neither company has clear authority.	Seal et al. (1999)
Accounting can play an important role that goes beyond the technical to a more symbolic level.	Håkansson and Lind (2004) Seal et al. (1999)
With time, general agreements can be more important than detailed documentation. ^a	Håkansson and Lind (2004) Seal et al. (1999)

^aThe opposite was found by Langfield-Smith and Smith (2003).

Table 2.1: Contribution of TCE and early studies

As can be observed, the studies based on TCE have made an important contribution to the study of IOA. However, even those with a complementary perspective have raised controversial issues. As research has progressed TCE has been found to be insufficient to explain the complexities of the inter-organisational environment (Coad and Cullen, 2006; Cooper and Slagmulder, 2004; Dekker, 2004; Hakansson and Lind, 2004). As Coad and Cullen (2006, p. 343) stress: “whilst transaction cost economics supplied a valuable framework for early studies, it was found to have limitations regarding detailed exploration of inter-organisational phenomena”. A summary of the main problematic issues can be observed in Table 2.2.

Limitations of TCE and early studies	Authors
TCE did not explain why a high level of risk of opportunistic behaviour and poor performance did not lead to a trust based pattern of control.	Van der Meer-Kooistra and Vosselman (2000)
TCE does not account for other factors influencing the type of control in the inter-organisational relationship, such as the institutional environment, power to negotiate, cultural and historical conditions.	Van der Meer-Kooistra and Vosselman (2000)
TCE does not account for the rich interplay between parties to take advantage of their capabilities/responsibilities.	Cooper and Slagmulder (2004)
TCE does not account for the fact that the selection of a 'good partner', the social context, the intention to guarantee stability and continuity can also be important in decisions related to the type of inter-organisational control.	Dekker (2004)

Table 2.2: Limitations of TCE and early studies

It seems that although TCE was very helpful for the development of early research, it was not sufficient to explain further complexities of the inter-organisational environment. The aspects that could not be explained from an economics viewpoint, such as institutional and cultural influences, might be explained using theories derived from sociology. The next sections present brief evaluations of structuration theory and evolutionary theories and the studies that have used them in an IOA context. For example, Free (2008) and Seal et al. (2004) adopt the former, and Coad and Cullen (2006), the latter. These authors draw on these theories and make further contributions to the study of accounting and inter-organisational phenomena.

2.2.2.2 Structuration theory and inter-organisational accounting

From a structuration theory (Giddens, 1984, 1979) perspective, there is a duality of structure in which social institutions or structures give support to action, but may be modified by action (Seal et al., 2004). Human behaviour is a result of the interaction between structures and action. The main structures are signification, legitimation, and domination. Human agency gives continuity and modifies these structures through what Giddens calls modalities. The modality of interpretive schemes allows humans to use the signification structure and communicate; the resources modality links domination and power; and the norms modality enables humans to use the legitimation structure and sanction behaviour. Another important assumption of this theory is that human actions which result in

structural changes can be a result of either conscious or unconscious choices to act in a different way (Baxter and Chua, 2003).

It is important to highlight that structuration theory has been subjected to a variety of criticisms. The most problematic relates to the abstract nature of Giddens conceptualisation of the duality of structure which makes it more difficult to apply ST empirically. In order to respond to the criticism of ST, Stones (2005) proposes a ‘strong structuration’ theory. By narrowing and giving a more complete articulation of the duality of structure, strong structuration has improved and clarified Giddens’s theory. This strong structuration has also made the empirical application of the theory more feasible (Jack, 2007).

Seal et al. (2004) carried out a case study in a UK electronics company, which they called Dextron (an assumed name). This study focused on “inter-firm accounting as an expert system that is *produced and re-produced* through the interactions between supply chain actors and wider institutional influences” (p. 74, original emphasis). The main purpose of the study was to understand how inter-firm transactions and accounting can be analysed through the duality of structure. The authors found that the power/domination nexus had a great influence on the ability of the company “to enrich the modalities in its supply chain” (p. 88). This was related to the fact that Dextron was a small player in some situations and a dominant player in others.

In the same way as in the TCE perspective, issues concerning the relationship between accounting and trust have been addressed from the ST perspective (Free, 2008; Jack, 2007; Cullen et al., 1999). In Seal et al.’s. (2004) study, accounting was considered to enhance trust as it was regarded as an abstract system in a supply chain in which the parts have a faith, alongside other abstract systems such as marketing, purchasing and quality assurance. However, a tension between the trust constructed through these abstract systems and the risk associated with the increased reflexivity between the parties involved was observed in their study. As a consequence, accounting contributed to both dis-embedding and re-embedding processes (Seal et al., 2004). Seal et al. (2004) explain that if the former entails

unbundling and outsourcing, the latter may be related to inter-organisational relationships, such as strategic alliances and partnerships.

Other studies applying concepts of ST were developed by Jack (2007) and Free (2008). Jack (2007) analyses the use of accounting in agricultural networks that support food production. Gidden's (1984) concepts of allocative and authoritative resources are used in her study to analyse farmers' choices of inter-organisational arrangements. For example, she observes that in some situations the farmers need to work locally, instead of via the main supply chain in order to ensure cash flow.

The study by Free (2008) focused on the relationship between trust and accounting in the UK supermarket supply chain. He found that despite the 'trust talk' emphasised in the beginning of the negotiations between retailers and suppliers, during the project development accounting was used to maintain organisational boundaries. He believes that this might be a result of unrealistic expectations about trust-based benefits.

Although it can be said that the studies using ST make a positive contribution to the IOA field (see summary in Table 2.3), they have been criticised by authors who use different theoretical approaches. For Mouritsen and Thrane (2006), for example, this perspective is strongly based on structural principles and governance structures. Therefore it does not allow the understanding of how actors, such as accounting (a non-human actor), constitute and shape boundaries in inter-organisational relations.

Contribution of structuration theory	Authors
Accounting may enhance trust as an abstract system in which parts have a faith.	Seal et al. (2004)
Accounting might be capable of influencing both dis- and re-embedding processes because of the tension between the trust constructed through abstract systems (including accounting) and the risk associated with the increased reflexivity between the parties involved.	Seal et al. (2004)
Accounting systems are produced and reproduced as a result of broader institutional influences.	Seal et al. (2004)
Accounting may contribute to the maintenance of organisational boundaries and the 'trust talk' may be stronger than the trust per se.	Free (2008)
Accounting may motivate organisations to operate differently in the supply chain than previously expected.	Jack (2007)

Table 2.3: Contribution of structuration theory

2.2.2.3 Evolutionary theory and inter-organisational accounting

Evolutionary theories have been used in seeking to understand management accounting change (Scapens, 2006; Burns, 2000; Burns and Scapens, 2000; Scapens, 1994). More recently, they have been used in supply chain accounting (Coad and Cullen, 2006). Indeed, these authors use evolutionary theories on economic phenomena, which they suggest do not form a completely consistent outlook on business organisations. These theories are continuously evolving and there is no absolute consensus in relation to their main concepts. They draw on the biological theories of evolution which focus on studying processes from which innovation arises (Coad and Cullen, 2006).

There is a range of concepts in this theoretical perspective. For this reason, only the concepts used in the IOA context will be addressed in this thesis. The three main concepts from evolutionary thinking described here are related to institutionalisation, capabilities, and learning and change. Institutions are 'taken for granted' assumptions used by humans to engage in social relations; capabilities are related to the human capacity to make use of productive resources to supply goods and services; and, according to the learning and change perspective, the development of a company is seen as an "evolutionary and cumulative process of learning about organisational resources, in which increased knowledge creates opportunities for further growth of the firm" (Coad and Cullen, 2006, p. 346).

In fact, only one study using ET literature can be found in literature relating to IOA, namely Coad and Cullen (2006). These authors apply several concepts from this perspective in order to interpret a longitudinal case study of a small company in Sheffield, UK, which sells customised school wear to both primary and secondary school sectors. They use evolutionary theories to understand how inter-organisational cost management (IOCM) practices are deployed. Of the concepts they use, the three most important are those presented above, namely institutionalisation, capabilities, and learning and change.

Three main findings from their study are highlighted. Firstly, they found it important to describe cost management practices in the intra- and inter-organisational contexts, but they also emphasise that boundaries between the two are still not clear. They argue that the processes of institutionalisation, capabilities in resource utilisation, and learning and change will be mutually interchanged between intra- and inter-organisational domains. Secondly, they conclude that decisions related to how boundaries are established between companies are closely related to social relations affected by historical aspects of current institutions (Coad and Cullen, 2006).

This emphasises the relevance of social aspects (as opposed to just economic aspects) in influencing the way managers make decisions related to outsourcing and partnering. Thirdly, they regarded power and politics as important in the evolutionary perspective, as proposed by Burns (2000). Power may be used at three levels. At one level, it can be used to introduce new organisational rules. At a second level, power may be used in a subtler manner to introduce organisational routines (including management accounting) to favour particular groups. At a third level, power can be closely linked to institutionalised routines, which influence the way people act and think, in this way bringing stability and putting together organisational knowledge (Burns and Scapens, 2000).

As a consequence and, depending on the situation, power may make changes more difficult or may be an important factor in facilitating accounting change and bringing stability back (Burns, 2000). In relation to this, Coad and Cullen (2006) highlight that notions of power asymmetries in the organisational context give

support to the idea that institutionalised routines allow the establishment of a *truce* in contradictory situations. Consequently, they start to question the existence of trust in inter-organisational relationships (Cooper and Slagmulder, 2004; Dekker, 2004; Langfield-Smith and Smith, 2003; Tomkins, 2001; Van Der Meer-Kooistra and Vosselman, 2000). They believe the issue of truce instead of trust is one that warrants further research. The main contributions of their study are summarised in Table 2.4.

Contribution of evolutionary theory	Authors
Boundaries between cost management practices in the intra and inter-organisational contexts are not always clear.	Coad and Cullen (2006)
Decisions related to how boundaries are established between companies are closely related to social relations and affected by historical aspects of current institutions.	Coad and Cullen (2006)
Power and politics are important in the process of change and can influence the way new accounting practices are adopted.	Coad and Cullen (2006)
The issue of truce might be more important than trust in inter-organisational relationships.	Coad and Cullen (2006)

Table 2.4: Contribution of evolutionary theory

2.3 Summary

This chapter presented a review of literature related to SCM and IOA. The first part of the chapter analysed literature associated with SCM. The terminologies ‘supply chain’, ‘value chain’, ‘supply network’, ‘network’, ‘inter-organisational relationships’, and ‘supply chain management’ were discussed and compared. Although it has been observed that the expressions ‘supply network’ or simply ‘network’, and ‘inter-organisational relationships’ are more accurate expressions to represent the complexities of the inter-organisational environment, the terms ‘supply chain’ and ‘supply chain management’ still appear more frequently in published literature.

The chapter then introduced two techniques used in the SCM context that are relevant to this research, the VMI and VSM. The VMI refers to collaboration between customer and supplier, where the customer allows the supplier to manage and replenish its inventories. Trust and fear of losing power (from the customer side) are important issues to be considered when implementing the VMI. VSM

involves analysing the activities performed in order to produce a product, from the raw material to the final customer. The idea is to separate the activities into value added and non-value added activities and eliminate as much as possible of the second. It can be a helpful tool in order to understand the flow of a product and the activities that are performed in the production of a product across the supply chain.

The second part of the chapter refers to a review of literature relating to IOA. Firstly, the IOA tools and techniques were presented. These included value chain analysis, open book accounting, target costing, total cost control and inter-organisational cost management. Indeed, it was observed that different terms could be used to describe similar IOA tools or techniques. For example, inter-organisational cost management could be regarded as a form of open book accounting. Moreover, the development of new IOA tools and techniques could be an important step towards improving inter-organisational relationships because it could enable companies to exchange information in a more systematic way.

From the literature review, it can be argued that IOA is an emerging field of study, since the role of accounting in the inter-organisational context is approached from different theoretical perspectives. Although a number of field studies have been carried out, there is still no consensus in relation to the theoretical framework and the methods which should be used to analyse the role of accounting in this context. Actually, this choice is influenced mainly by the focus of the research.

Although some studies (Mouritsen and Thrane, 2006; Seal et al., 2004; Tomkins, 2001) have pointed out that accounting may play a constitutional role in enhancing trust and building inter-organisational relationships, others (Free, 2008) have found that accounting might undermine trust in the supply chain. Accounting may be seen as a source of stability at the initial stage of the relationship (Seal et al., 1999) and may play a role that goes beyond the technical to a more symbolic level (Seal et al., 2004). It can also be a source of order and conflict (Mouritsen and Thrane, 2006).

In order to analyse how accounting can contribute to the development of a SCM initiative, ANT can be a helpful approach. Currently, there are a growing number of studies focused on explaining the role of accounting in an inter-organisational context from the ANT perspective. These studies allow accounting to be seen not just as a set of techniques, but as an important actor in building, mediating and shaping inter-organisational relationships. They recognise that accounting can be a source of both order and conflict, that accounting can have low or high power depending on the stability of the relationship, that accounting numbers can be fragile as they are network effects, and that accounting plays a role that goes beyond the technical and helps to identify boundaries in the network.

Taking into account the focus of this research, which is to understand how accounting can be an actor that builds, mediates and shapes a SCM initiative, ANT seems to be a suitable approach for this research. Thus, ANT is the theoretical choice of this thesis. The next chapter presents arguments to justify the choice of ANT as a framework for developing this research. It also discusses the main problems and criticisms related to this theoretical approach and the responses that have been made to them. Other studies in IOA drawing on ANT are also presented. The other aim of the next chapter is to present information regarding the methodological choice of this research, and the development of an action research (AR) project.

Finally, there is a section with explanations about the combination of ANT and AR in this research. This is significant because this is a new approach, which might raise controversial issues. As pointed out by Lewis (2007), combining ANT and AR may be considered complex because different research paradigms may be used. As will be explained in the next chapter, this issue is not problematic in this research since ANT can be classified as interpretive, and AR is used as an interpretive approach in this research.

CHAPTER 3: THEORETICAL AND METHODOLOGICAL CHOICES OF THIS RESEARCH

As explained in chapter 2, inter-organisational accounting (IOA) studies have been approached from different theoretical perspectives. Chapter 2 reviewed literature relating to IOA, adopting transaction cost economics (TCE), structuration theory (ST) and evolutionary theory (ET). Chapter 3 moves on to analyse the use of actor-network theory (ANT) in IOA studies. These studies are presented in a separate chapter due to their relevance to this thesis, as ANT is the theoretical choice of this research. In addition, this chapter explains the methodological choice of this study, which is action research (AR). Before exploring ANT and AR, and the reasons for the combination them both, the epistemological and ontological assumptions of this research are analysed.

This chapter is structured as follows. Section 3.1 presents a discussion of research philosophy in social sciences and, more specifically, in management and accounting research. In particular, this section analyses the epistemological and ontological stances adopted in this research. The research paradigms proposed by Burrell and Morgan (1979) are also presented and the philosophical position of this research is stated. As will be observed, the research philosophy is closely related to the theoretical and methodological choices of this research.

Section 3.2 relates to ANT. The section begins by presenting the origin and the main concepts of this theory. It continues with an explanation of translation, a specific concept in the theory of ANT, which is used in this research. The section also discusses ANT's limitations and drawbacks and how they can be addressed. It ends with an analysis of some IOA studies which have used ANT. Section 3.3 refers to AR. This section is introduced with a discussion of the origin and the concepts of AR. It then discusses issues of ontology and epistemology specifically related to AR. In addition, characteristics of AR and the AR cycle are described and the methods of data collection used in this research are presented.

This chapter also contains a discussion of the reasons for combining ANT and AR in this study, which is presented in section 3.4. As will be observed, the main

reason for using both is that the AR project allowed access to the company and to follow an on-going situation. ANT can be very helpful in analysing on-going situations and describing how actor-networks are created and modified. Although controversy may arise because different research paradigms might be involved in the use of ANT and AR, this is not problematic for the development of this research. As will be observed in this chapter, while ANT may fit with Burrell and Morgan's (1979) interpretive paradigm, AR can be approached by considering the same or different philosophical assumptions. In this research, both ANT and AR are used within the interpretive paradigm, as the main aim of this study is to understand how accounting (a non-human actor) plays a role in the establishment of closer, long-term inter-organisational relationships (an on-going situation). Finally, section 3.5 summarises the chapter.

3.1 Research philosophy

For undertaking research in the management field, different philosophical assumptions and methodological approaches can be used. Since Burrell and Morgan (1979) outlined four paradigms for research in these contexts, there has been increased debate about the merits and appropriateness of different research approaches. Most of the debate is related to issues of epistemology and ontology (Saunders, Lewis and Thornhill, 2007; Easterby-Smith, Thorpe, Jackson and Lowe, 2008; Gill and Johnson, 2002; Johnson and Duberley, 2000). Thus, before discussing the theoretical and methodological choices of this study, aspects of epistemology and ontology will be addressed. This discussion of research philosophy is essential to this research because the combination of actor-network theory (ANT) and action research (AR) may raise controversial issues.

Epistemology concerns the analysis of the type of knowledge accepted in an area of study (Saunders, Lewis and Thornhill, 2007; Easterby-Smith, Thorpe and Lowe, 2002; Gill and Johnson, 2002; Johnson and Duberley, 2000). Epistemology profoundly influences the way research is conducted, as Johnson and Duberley (2002, p. 1) explain:

... how we come to ask particular questions, how we assess the relevance and value of different research methodologies so that we can investigate those questions, how we evaluate the outputs of research, all express and vary according to our underlying epistemological commitments.

In relation to the social sciences, one of the important aspects of epistemology refers to the decision of whether or not the natural sciences' approach should be used for the creation of knowledge. The natural sciences' main epistemological assumption is 'positivism', which proposes that the researcher will use an existing theory to develop hypotheses. Tests are conducted based on these hypotheses, the results of which can lead to partial or complete confirmation, or refutation of the hypotheses (Saunders et al., 2007; Easterby-Smith et al., 2002; Johnson and Duberley, 2000). Another important aspect of the positivist epistemology is that the research should endeavour to be conducted in a value-free way, that is, without the involvement of the researcher's feelings.

Indeed, the main idea of positivism is that the social world is an external concept, and it should be analysed objectively instead of subjectively "through sensation, reflection or intuition" (Easterby-Smith et al., 2002, p. 28). It should also be remembered that, although other epistemological assumptions have been used in management research, positivism has dominated and continues to dominate (Johnson, Buehring, Cassell and Symon, 2006; Easterby-Smith et al., 2002; Alvesson and Deetz, 2000; Johnson and Duberley, 2000).

Saunders et al. (2007) identify two other important epistemological stances in management research: 'realism' and 'interpretivism'. In contrast to 'positivism', 'realism' is focused on sensation. The truth is based on what is shown by the senses as reality and there is a belief that objects exist independently of human cognition (Saunders et al., 2007). Realism can be divided into 'direct realism' and 'critical realism'. The differences between them refer to the way the world is experienced. While for direct realists, the existence of the thing itself and the sensations transmitted by it are enough, for critical realists, this is just a first step in experiencing the world. The second step refers to how the mind retains the experience a while after the sensation is experienced (Saunders et al., 2007).

Furthermore, 'critical realism' can be seen as one variant of 'relativism'. With regard to 'critical realism', Easterby-Smith et al. (2002) adds that it compromises two extreme positions, namely, the idea that social conditions are determinant in the recognition of a social scientist and the belief that concepts are cognitive constructs. 'Relativism' proposes that different viewpoints can be obtained by different observers and the 'truth' can vary from place to place and from time to time (Easterby-Smith et al., 2002). ANT has a relativist perspective, the philosophical implications of which will be discussed in the next section (3.2).

'Interpretivism' proposes that differences in humans' roles as social actors should be taken into account. As a consequence, humans should not be studied in the same way as objects (Saunders et al., 2007). Indeed, it can be said that 'interpretivism' comes from two intellectual traditions: 'phenomenology' and 'symbolic interactionism'. The former is related to how humans make sense of the world around them, and the latter refers to the fact that people's meanings and actions are continuously adjusted because of their interpretations of interactions with others (Saunders et al., 2007). In fact, the challenge for the interpretivist researcher is to enter the social world of the research subjects and to focus on understanding their world from their perspective.

Ontology is about the nature of reality. "To a greater extent than epistemological consideration, this raises questions of the assumptions researchers have about the way the world operates and the commitment held to particular views" (Saunders et al., 2007, p. 108). Much of the philosophical debate arises from the discussion of ontological assumptions (Easterby-Smith et al., 2002). Two ontological perspectives are objectivism and subjectivism. 'Objectivism' "portrays that social entities exist in reality external to social actors" (Saunders et al., 2007, p. 108). 'Subjectivism' proposes that "social phenomena are created from the perceptions and consequent actions of social actors" (Saunders et al., 2007, p. 108). This subjectivist ontology associated with an interpretivist epistemology gives rise to what has been called 'social constructionism'. From this perspective;

... the task of the social scientist should not be to gather facts and measure how often certain patterns occur, but to appreciate the different constructions and meanings that people place upon their experience. The focus should be on what people, individually or collectively, are thinking and feeling, and attention should be paid to the ways they communicate with each other, whether verbally or non-verbally ... Human action arises from the sense that people make of different situations, rather than as a direct response to external stimuli (Easterby-Smith et al., 2002, p. 30).

Burrell and Morgan (1979) proposed one way of analysing epistemological and ontological assumptions, which has been used in literature relating to management research. They suggest that management research is developed according to four research paradigms, as shown in Figure 3.1: functionalist, interpretive, radical humanist and radical structuralist. The functionalist paradigm is the rational paradigm; from the interpretive perspective, the concern is to understand meanings related to organisational life; the radical humanist paradigm focuses on changing the status quo of the situation; and in the radical structuralist the aim is a fundamental change by viewing the “organisational phenomena as power relationships and patterns of conflict” (Saunders et al., 2007, p. 113).

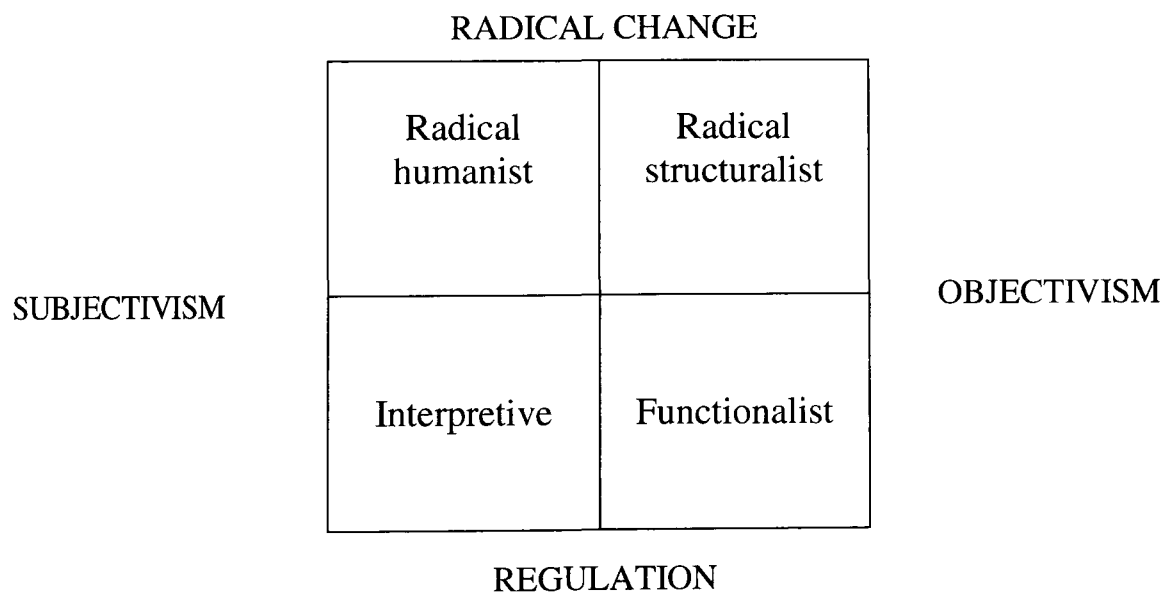


Figure 3.1: Research paradigms
Source: Burrell and Morgan (1979, p. 22)

The researcher is likely to choose the paradigm according to four dimensions. The first two are the ‘objectivist’ and the ‘subjectivist’ aspects, as discussed in relation to the ontological assumptions of the research. The other two are ‘radical change’ and ‘regulation’. The radical change dimension, as Saunders et al. (2007, p. 112)

put it, “relates to a judgement about the way organisational affairs should be conducted and suggests ways in which these affairs may be conducted in order to make fundamental changes to the normal order of things”. Regulation “seeks to explain the way in which organisational affairs are regulated and offer suggestions as to how they may be improved within the framework of the way things are done at present” (Saunders et al., 2007, p. 112).

In the accounting field, the paradigms suggested by Burrell and Morgan (1979) were adapted by Hopper and Powell (1985). The main difference is that they “collapsed the four dimensions of ontology, epistemology, human nature and methodology, into a single subjective-objective continuum...” (Ryan, Scapens and Theobald, 2002, p. 40). Their emphasis is not to see the extremes as dichotomised options, but as a continuum. Therefore, research can be conducted at various levels. Ryan et al. (2002) identify six ontological assumptions within the objective-subjective continuum: reality as a concrete structure; reality as a concrete process; reality as a contextual field of information; reality as a symbolic discourse; reality as a social construction; and reality as a projection of human imagination.

In this research, the model proposed by Burrell and Morgan (1979) is predominantly used. This research is based on ANT and AR. ANT may fit in the interpretive paradigm (Wickramasinghe and Alawattage, 2007) and AR can be approached from different research perspectives (Cassell and Johnson, 2006; Reason and Bradbury, 2001; Baker, 2000; Eden and Huxham, 1996). Despite the argument that the ANT and AR combination may raise controversy due to the possible use of different philosophical underpinnings (Lewis, 2007), in this research, this is not a problem. As will be observed in the remainder of this chapter, both ANT and AR are used in this study within Burrell and Morgan’s (1979) interpretive paradigm. This paradigm was chosen because, as explained in the introduction of this thesis (chapter 1), this is a qualitative study which aims to understand the role of accounting in the development of a SCM initiative. Thus, meanings regarding organisational life will be addressed (Saunders et al., 2007).

3.2 Actor-network theory (ANT)

This section explores the theoretical choice of this research, which is actor-network theory (ANT). ANT was chosen, as it was recognised in the review of literature relating to IOA (presented in chapter 2, section 2.2.2) that there is a call for further research using this theoretical approach. This will be analysed further in this chapter (section 3.2.4). As will be observed, ANT can be classified as interpretive, which fits the interpretive epistemological and ontological philosophical assumptions of this research. In addition, ANT is the theory chosen because it allows the analysis of accounting as a non-human actor capable of influencing the development of an inter-organisational relationship, which is the main purpose of this research (see chapter 1, section 1.3). The following sections explore the origins and concepts of ANT (section 3.2.1); Callon's (1986) moments of translation, namely, problematisation, interessement, enrolment, and mobilisation (section 3.2.2); the main criticisms of ANT, its limitations and problematic aspects (section 3.2.3); and the use of ANT in the IOA context (section 3.2.4).

3.2.1 ANT – origin and concepts

The origins of ANT are associated with the work of two French science and technology scholars, Michel Callon and Bruno Latour, and the British sociologist John Law. ANT has a different approach and is a distinctive form of developing social theory. One interesting metaphor is the observation that it is not like Euclidian geometry. Instead, it allows the perception of non-linear relations in the social world (Law, 1999). ANT is a post-structuralist approach, as it does not focus on social structures to explain social behaviour (Czarniawska, 2004). In addition, ANT attributes the same importance to both humans and non-humans in developing and shaping social relations (Latour, 2005; Law and Hassard, 1999; Callon, 1991; Latour, 1991, 1987).

It might be said that the two most distinctive and specific characteristics of ANT refer to its relativist perspective of analysing social relations, and its emphasis on

non-humans having the same capabilities to act as humans. The relativist aspect supposes that entities are created and re-created in relation to their interaction with others. The importance attributed to non-human actors might be one of ANT's main strengths, and at the same time be its most problematic aspect, because of insufficient acceptance of this idea. Details concerning the two distinctive characteristics of ANT mentioned in this paragraph are discussed below.

ANT has been described as “a ruthless application of *semiotics*. It tells that entities take their form and acquire their attributes as a result of their relations with other entities” (Law, 1999, p. 3). The word ‘semiotics’ derives from the Greek word *semeiotikos* which refers to the interpretation of signs. Semiotics, semiotic studies, or semiology is the study of signs and symbols, both individually and grouped into sign systems. It includes the study of “how meanings are made and how reality is represented” (Chandler, 2007, p. 2). In relation to ANT,

the word ‘meaning’ is taken in its original nontextual and nonlinguistic interpretation; how one privileged trajectory is built, out of an indefinite number of possibilities; in that sense, *semiotics is the study of order building or path building and may be applied to settings, machines, bodies, and programming languages as well as texts*; the word socio-semiotics is a pleonasm once it is clear that semiotics is not limited to signs; the key aspect of the semiotics of machines is its ability to move from signs to things and back (Akrich and Latour, 1992, p. 259, author's emphasis).

In this way, ANT may be understood as ‘semiotics of materiality’. Indeed, “... it takes the semiotic insight, that of the relationality of entities, the notion that they are produced in relations, and applies this ruthlessly to all materials – and not simply to those that are linguistic” (Law, 1999, p. 4). The non-linguistic materials to which Law refers are the non-human actors. Therefore, since ANT is a relativist approach, it sees entities as created through the relations between human and non-human actors. Latour (1987) explains that, in general, scientists might be realists or relativists. If they are realists, scientists “believe that representations are sorted out by what really is outside, by the only independent referee there is, Nature” (p. 98). On the other hand, if they are relativists, scientists “believe representations to be sorted out among themselves and the actants they represent, without

independent and impartial referees lending their weight to any one of them” (p. 98).

In other words, for realists, ‘nature’ or ‘society’ is seen as the cause that allows controversies to be settled, while for relativists, it is the consequence of the settlement. The choice between a realist and a relativist perspective depends on the situation under analysis. For Latour (1987), if there is no controversy, the realist approach can be chosen. He argues that in this situation it is not helpful to continue “talking about interpretation, representation, a biased or distorted world-view, weak and fragile pictures of the world, unfaithful spokesmen. Nature talks straight, facts are facts. Full stop. There is nothing to add and nothing to subtract” (Latour, 1987, p. 100). Nevertheless, when there is a controversy under observation, the relativist perspective is a superior choice because it enables an understanding of how social relations take place and how nature and society are consolidated.

Bringing these arguments to the inter-organisational context, it might be said that ‘nature’ or ‘society’ is related to the ‘business environment’. Thus, there are two options: (i) either seeing the ‘business environment’ and its social aspects as the cause that allows the settlement of a controversy; or (ii) seeing the ‘business environment’ as the result of the settlement of the controversy. In the first case, a realist perspective is most fitting as structures are most important to explaining how social relationships take place. The second case refers to a relativist perspective, in which both groups are created and re-created, and following human and non-human actors’ traces is more important in order to understand how relations are developed. Moreover, the main benefits of the relativist approach are emphasised in the explanation that “it allows us to trace with accuracy the sudden shifts from one face of Janus⁴ to the other” (Latour, 1987, p. 100).

⁴ Latour refers to the mythological Janus face to show the difference between ready made science and science in the making. In mythology, Janus has two faces, in this case, the ready made science refers to the realist approach and the science in the making to the relativist perspective.

Another interesting aspect of ANT is the focus on the actor, instead of on the structures or institutions. For Latour (2005), traditional sociological approaches are overly concerned with structures. As a consequence, the role of the actors in changing social reality is rarely remembered. ANT recognises both human and non-human actors as capable of changing reality (Latour, 2005; Callon, 1991; Latour, 1991, 1987). Latour (2005) clarifies that ANT is an approach which can be used to describe and understand how actors relate to each other instead of trying to explain the social forces that shape the actors' behaviour. For him, if the actor is not seen as capable of changing the situation and is seen as just a placeholder, there is no actor. "An actor that makes no difference is not an actor at all. An actor, if words have any meaning, is exactly what is *not* substitutable" (Latour, 2005, p. 153).

Furthermore, the belief that non-humans have the same influence as humans on social relations highlights that ANT has a very distinctive approach. Non-human actors can be objects, machines, calculations, and also accounting. "Heterogeneous actors may be human as well as non-human actors – people as well as machines – managers as well as information systems" (Mouritsen and Thrane, 2006, p. 247). Indeed, the key argument is that both people and things need someone to speak for them. The differences between them are not relevant (Latour, 1987).

Latour (1987) explains this argument by presenting an enlightening example. He refers to a professor presenting the results of a scientific discovery to a visitor. There is an audio-visual display. Indeed, there is a visual set of inscriptions and a verbal explanation and the visitor gets both together. It is not possible to distinguish what comes from the thing inscribed and what comes from the author. Thus, there is a striking effect on the perception of the visitor, but the cause for this is mixed. It can be either human, or non-human, or both. In academic literature relating to accounting, a recent publication emphasises the importance of ANT's relativist perspective and the inclusion of all human and non-human actors in analysing research (Mouritsen et al., 2010). In their explanation, the terminology 'performative' is used instead of 'relativist':

The performative approach suggests that all actors participate in forming the world. All actors, including researchers and non-human actors, interact and thus frame their specific segment of the world. All actors not only operate in the world; they also take part in framing it, translating it, making it accountable, and making it an accomplishment. They all thus take part in defining its boundaries and power (Mouritsen et al., 2010, p. 294).

In addition, the performative approach, as opposed to the ostensive view considers that if actors cannot act and are dominated by external forces, such as institutions, then they should not be included in the analysis (Mouritsen et al., 2010).

A further way of analysing the actors when using ANT involves classifying them as either global and local actors (Wickramasinghe and Alawattage, 2007) case study analysis, dividing the actors into global and local was a helpful approach. Indeed, the authors adopted the concept of cosmopolitan actors, instead of global actors. They define one in relation to the other: “cosmopolitans are global actors in the sense that they are adept at penetrating spatial and cultural boundaries; they possess this particular competence and orientation” (Briers and Chua, 2001, p. 241). In addition to this, for the authors, cosmopolitans are global actors as they are linked to global organisations, and they possess what can be called boundary objects. Boundary objects can unify actors with different goals, as they refer to concepts used by different groups and can have different meanings for each of them (see Briers and Chua, 2001, for further details). As cosmopolitans can be defined as also being global actors, in this analysis, these terms are used interchangeably.

Briers and Chua (2001) studied the implementation of activity-based costing (ABC) in an Australian manufacturing company. The division of actors into cosmopolitan and local enabled the authors to find out that “... change is the outcome of many, varied and fluid interconnections between local and cosmopolitan networks of actors and actants” (Briers and Chua, 2001, p. 263). They observed that local actors sometimes acted as global, and vice-versa. One of the problematic consequences of this was the fact that when the cosmopolitan actors, who were global consultants, left the company, the ABC model struggled to survive. However, with time, as a result of the interaction between human and

non-human actors, it managed to become successful. As the authors observe, “the ABC model that finally worked, like the technologies before it, was a ‘monster’; a hybrid of human and non-human elements, and it was made to succeed” (Briers and Chua, 2001, p. 266).

In this research, ANT’s relativist perspective is used because the potential implementation of an important change in the business environment, the controversial situation, is analysed. This change refers to the development of the SCM initiative. In addition, the actors are divided into global and local, human and non-human actors. This division enables an understanding how global actors influence local actors and also the observation of the role that accounting as a non-human actor can play in the inter-organisational context.

In addition, the concept of translation is used to analyse the research findings of this study. The next section explains the four moments of translation, namely, problematisation, interessement, enrolment and mobilisation (Callon, 1986).

3.2.2 ANT – translation

'Translation' or 'sociology of translation' is a core concept of ANT (Callon, 1986). It was chosen in this thesis because it gives more structure to the analysis of the findings through an ANT lens. The translation provides a basis to divide the analysis into stages (the moments of translation) according to the actors’ interactions in relation to the network. ANT has been used in the study of IOA and the development of supply chains or supply networks (Mouritsen et al., 2010; Chua and Mahama, 2007). More specifically, the sociology of translation is a useful approach for this thesis because the supply chain/supply network goes through phases which can be related to Callon’s (1986) moments of translation, namely problematisation, interessement, enrolment and mobilisation

As will be observed in this section, the sociology of translation observes that the actors engage in the network for different reasons at different moments or stages. Moreover, the translation enables the identification of the relevant actors and their

roles and interests in relation to the network. It is also a helpful approach to understand how human and non-human actors interact and to examine the potential conflicts and controversies between them; and how their interests can be aligned for the achievement of success of the network (Callon, 1986).

Translation can be explained as a “general process ... during which the identity of actors, the possibility of interaction and the margins of manoeuvre are negotiated and delimited” (Callon, 1986, p. 6). During the translation, the actors are expected to agree that the network is worth building and defending, and this happens when the actors believe that their interests are better achieved through the network than individually. As mentioned above, the translation takes place in four phases (problematization, interessement, enrolment and mobilisation), which can in reality overlap (Callon, 1986).

Problematization consists of identifying the actors and their roles and interests (Callon, 1986). It can be divided into the inter-definition of the actors, and the identification of obligatory passage points (OPPs). As Callon (1986, p. 8) puts it, the problematization “indicates the movements and detours that must be accepted as well as the alliances that must be forged” since the actors “cannot attain what they want by themselves. Their road is blocked by a series of obstacles problems”. In order to overcome these problems, the focal actors in the network attempt to become indispensable to the network and to establish themselves as the obligatory passage points (OPPs). The OPPs seeks to align the actors’ individual interests to the network aims. However, to become the network’s OPP, the focal actors have to convince the other actors that their individual interests are best achieved by engaging in the network. The main idea is to make sure the actors have an interest in the network formation. This will, therefore, contribute to the translation, that is, the establishment of change (Callon, 1986).

Interessement relates to the translation phase which focuses on emphasising the benefits of the network to the actors. As Callon (1986) explains,

Each entity enlisted by the problematization can submit to being integrated into the initial plan, or inversely, refuse the transaction by defining its identity, its goals, projects, orientations, motivations, or

interests in another manner. In fact the situation is never so clear cut... it would be absurd for the observer to describe entities as formulating their identity and goals in a totally independent manner. They are formed and are adjusted only during action (Callon, 1986, p. 8).

Once the actors are identified and conflicting interests are observed, the OPP seeks to find ways of aligning actors' interests and resolving controversies. Indeed, by focusing on the network's aims, the OPP attempts to impose the desired identities on the actors. For this, intersement devices are developed and used. From the translation perspective,

Intersement is the group of actions by which an entity attempts to impose and stabilize the identity of the other actors it defines through its problematisation. Different devices are used to implement these actions (Callon, 1986, p. 8).

The intersement devices or mechanisms are built and placed between the actors and the other entities (visible or invisible) who want to define the actors' identities differently. Indeed, "to interest other actors is to build devices which can be placed between them and all other entities who want to define their identities otherwise" (Callon, 1986, p. 9). The case present by Callon (1986) is about scallop producers in France. In his example, the devices were the towlines and its collectors which allowed the larvae to anchorage and the scallops to multiply, and the scientific publications and conversations regarding the lack of knowledge about scallops. While the towlines enable the *Pecten maximus*⁵ non-human actor to engage in the alliance, scientific knowledge base is more relevant to the fishermen and the scientific colleagues groups of human actors.

In academic literature relating to accounting, accounting and cost information have been recognised as useful intersement devices in locking allies into place. For example, in Chua's (1995) ethnographic study carried out in the Australian health sector, initially cost information was a key intersement device. As the author explains, "the generation of product cost information thus became a key "intersement" device, which would tie together the Team's interests in development and research and also enrol strategic others" (Chua, 1995, p. 123).

⁵ The *Pecten maximus* refer to a particular species of scallops produced in the St. Brieuc bay in France.

However, during the project development, specific interests of the different groups of actors became more evident. For example, whereas the Commonwealth officials wanted more detailed knowledge about cost calculations in the hospitals; the University team believed in the cost calculations, but they also wanted funding for research and development. In fact, in maintaining the network links, the money allocated to the project was the most important interest device. In the author's own words: "the single most important interest device in this case-study was the Commonwealth's approval of the consortium submission. Once the money came, the network was secured at least for two years" (Chua, 1995, p. 126).

Another example is the case presented by Ezzamel (1994) which analyses budget and organisational change. This study was carried out in a U.K. university and relates to the reduction of funds by the state. At this university, it was observed that "for the Arts-based members the device of interest was the use of The University's reserves to overcome the externally imposed cuts. For the Centre and the Science-based groups the device of interest was technical, knowledge-based discourse relating to the revaluation of the University's assets, reserves and costs of compulsory redundancies" (Ezzamel, 1994, p. 225). As can be observed, different groups of actors may have different interests in relation to the network, and that will make things work (Latour, 1987).

However, accounting technology is not always sufficient to interest all actors. Alcouffe, Berland and Levant (2008) have analysed two cases of the diffusion of accounting innovations in France. While the adoption of activity-based costing (ABC) was successful, the Georges Perrin method (GPM)⁶ seems to have failed due to problems with interest devices. In relation GPM, the authors have observed that:

Georges Perrin was convinced that, in and of itself, his method would be of interest to other actors, without understanding that he had to

⁶ The focus of the GPM is on defining a standard for the unification of production. As Alcouffe et al. (2008, p. 5) explain, "Whatever the mix of products manufactured, the goal was to use a common unit of measurement called the 'GP'. Choosing it was arbitrary; it could correspond either to a specific machine or to a specific part that would be called a 'basic item'".

construct this intersement. Indeed, from Perrin's point of view, this intersement could only be linked to such exogenous factors as the necessity to improve productivity, the liberalization of prices, and the increase in competition due to the rebuilding of Europe (Alcouffe et al., 2008, p. 5).

Following a successful intersement, enrolment is achieved. Enrolment includes "multilateral negotiations, trials of strength and tricks that accompany the intersements and enable them to succeed" (Callon, 1986, p. 10). This moment of translation takes place when the obstacles for the actors to engage in the network are successfully overcome. Enrolment is then followed by mobilisation, which consists of ensuring that the network's spokesperson is sufficiently reliable to represent it. The spokesperson, who is also the OPP, is responsible for ensuring that the network's collective interests are achieved, instead of focusing on some actors interests only (Callon, 1986).

3.2.3 ANT – main criticisms

Latour (1999) recognises four main problems with ANT: the word 'actor', the word 'network', the word 'theory' and the hyphen. In the beginning, the word 'network' was used to explore transformations and translations from traditional social theories that were not captured by other terms. However, "with the new popularization of the word network, it now means transport *without* deformation, an instantaneous, unmediated access to every piece of information" (Latour, 1999, p. 15). The second problem is related to the word 'actor' linked to the word 'network' by a hyphen. The expression 'actor-network' has created some controversy because of the apparently inevitable association with the structure and agency dichotomy (Latour, 2005).

Although proponents of ANT had no intention of addressing or unravelling this contradiction, the expression has been misunderstood and misused. Latour (1999) believes that the use of the hyphen between the two words 'actor' and 'network' is to be blamed for inflating this confusion.

From day one, I objected to the hyphen because inevitably it would remind sociologists of the agency/structure cliché, or, as we say in French, of the '*pont aux ânes*' of the social theory. Most

misunderstandings about ANT have come from this coupling of terms, one that is much too similar to the traditional divides of social theory” (Latour, 1999, p. 16, original emphasis).

In this way, Law (1999) argues that, indeed, the terminology ‘actor-network’ embodies a tension between the centred ‘actor’ and the decentred ‘network’. To some extent the expression is a way of distinguishing what in English is called ‘agency’ and ‘structure’, but it is at the same time a form of identity (Law, 1999). It is argued that the initial concern “was not to occupy a position in the agency/structure debate, not even to *overcome* this contradiction” (Latour 1999, p. 16, original emphasis). For Latour, attempts to overcome a paradox like this, which are related to a modernist dilemma, are unproductive; rather this conflict should merely be ignored or bypassed. In relation to ANT’s attempts to bypass the agency/structure dichotomy, he explains that,

by topicalizing the social sciences’ own controversies, ANT might have hit on one of the very phenomena of the social order: may be the social possesses the bizarre property of not being made of agency and structure at all, but rather of being a *circulating* entity ... If this bypassing strategy is accepted then perhaps a few things are clarified: *ANT concentrates attention on a movement – a movement well demonstrated by the successive shifts of attention of the dissatisfied social scientist* (Latour, 1999, p. 17, emphasis added).

By the ‘dissatisfied social scientist’, he means those who sometimes prefer the structure and at other times focus on the agent. Indeed, to study the social phenomena, Latour (2005) argues that there are two options: (1) we could follow social theorists and begin our travels by setting up at the start which kind of group and level of analysis will be the focus of the study; or (2) we could follow the actors’ own ways and begin our travels with the traces left behind by their activity of forming or dismantling groups. The first option refers to the use of traditional social theories, in which the social scientist has pre-established groups to analyse and sometimes focuses on structures and other times on agency. With a different approach, the second option is related to the use of ANT, as a way of omitting pre-established groups, and observing how groups are created and re-created.

Furthermore, from the ANT perspective, traditional sociological theories are seen as problematic, especially because they do not take into account social and

scientific changes. “Translated from both the Latin and Greek, ‘socio-logy’ means the ‘science of the social’” (Latour, 2005, p. 2). However, “few social scientists have drawn the extreme conclusion that the object as well as the methodology of the social sciences should be modified accordingly” (Latour, 2005, p. 2), despite the metamorphosis in both science and society since the term was coined.

Instead, Latour argues that the social should not refer to the structures shaping behaviour. He defends another approach to sociology, which claims that:

... there is nothing specific to social order; that there is no social dimension of any sort, no ‘social context’, no distinct domain of reality to which the label ‘social’ or ‘society’ could be attributed; that no ‘social force is available to ‘explain’ the residual features they are doing even if they don’t articulate it to the satisfaction of the observers; that actors are never embedded in a social context and so are always much more than ‘mere informants’; that there is thus no meaning in adding some ‘social factors’ to other scientific specialities; that political relevance obtained through a ‘science of society’ is not necessarily desirable; and that ‘*society*’, *far from being the context ‘in which’ everything is framed, should rather be constructed as one of the many connecting elements circulating inside tiny conduits* (Latour, 2005, p. 4-5, emphasis added).

Moreover, in relation to the other social theories, Latour (2005) continues to argue that they are good at saying what the social world is made of, but this is not sufficient in a world in which changes are happening at an increasingly fast; rate. Actually, he says that it is not good for “organization studies, information studies, marketing, science and technology studies or management studies, where boundaries are so terribly fuzzy. *New* topics, that’s what you need ANT for” (Latour, 2005, p. 142, original emphasis).

Taking into account what has been presented in this section, it can be observed that ANT is appropriate for analysing the social context in a different way, by following the actions of both human and non-human actors. It is useful for analysing new and on-going situations (not past situations), especially when there is a scientific controversy. It helps to analyse how one trajectory among other various possible trajectories happens and how actors influence the selection of this privileged trajectory. Therefore, ANT can be regarded as a suitable theory to

contribute to understanding the role that accounting can play in the development of inter-organisational relationships.

3.2.4 ANT and IOA

Since the study by Preston et al. (1992), ANT is increasingly being used to study changes in the management accounting field. These authors have noticed the potential of ANT for following actions in order to analyse how things happen in the business environment. Today, ANT is recognised as a perspective of alternative management research (Baxter and Chua, 2006, 2003). From an ANT perspective, accounting can be viewed as a non-human actor capable of influencing and shaping relations in the business environment.

Indeed, accounting can be considered a relevant actor in building social relations (Mouritsen et al., 2010; Mouritsen and Thrane, 2006; Thrane and Hald, 2006; Briers and Chua, 2001; Chua, 1995). According to Mouritsen and Thrane (2006, p. 247), ANT is a helpful approach because “it analyses not only whether accounting exists as a set of techniques, but also how accounting influences interactions in the network”.

In relation to the study of accounting in the inter-organisational context, ANT can be used to analyse *how* accounting can be a ‘force’ – an actor – in shaping and building inter-organisational relationships (Chua and Mahama, 2007; Mouritsen and Thrane, 2006; Thrane and Hald, 2006). According to Mouritsen and Thrane (2006), the actor-network is a helpful approach because it sees accounting as more than a group of techniques, but as capable of influencing relations in the network. They add that the literature related to accounting and inter-organisational relationships;

typically adopts a structural approach to explain the *existence* of forms of governance rather than a process approach to explain how the mechanisms of governance *work*. Governance mechanisms are described, but little is said about how they initiate action, prohibit action, and therefore are involved in constituting the action that develops in the inter-organisational relation. In a sense, the structural approach relates accounting to its conditions, but de-emphasises the role of accounting in developing the activities that make up an inter-

organisational arrangement (Mouritsen and Thrane, 2006, p. 242, original emphasis).

Research using ANT carried out in a small high-tech producer in Denmark found that accounting had a low power in situations of 'normality', while it was a central actor in a situation of 'crisis', allowing the distinction between the company's network and the environment (Hansen and Mouritsen, 1999). Later, Mouritsen et al. (2001) used ANT in a study in two other Danish companies, which were outsourcing some of their activities. One of the companies used open book accounting and the other target costing. The authors observed that inter-firm management controls or accounting can be related to different characteristics of organisational practices and they make things work.

More recently there have been other studies using ANT to increase understanding of the role of accounting in building inter-organisational relationships (Mouritsen et al., 2010; Chua and Mahama, 2007; Hald, 2007; Mouritsen and Thrane, 2006; Thrane and Hald, 2006). Mouritsen and Thrane (2006) advocate that accounting calculations, such as transfer prices and intellectual capital statements, contribute to the establishment of the boundaries of the network. For them, management controls help to constitute the networks' boundaries because they make clear how relationships do and should happen. They state that accounting can be an actor in the development and maintenance of networks, either operating through self-regulating or orchestration mechanisms.

Self-regulating mechanisms stabilise the interaction between partners, by making the money flow predictably, while orchestration mechanisms change the structure of the network and may produce conflict. While orchestration mechanisms are a result of decision-making for the entire network and are prepared specifically in time and space (at the board meetings), self-regulating mechanisms operate more freely. Conflict caused by the orchestration mechanisms (can lead to a lack of trustworthiness which is the basis for the claim that the 'operating principles' of the network are not 'respected' in the decision-making process (Mouritsen and Thrane, 2006).

In their study, Mouritsen and Thrane (2006) found accounting was important in managing the conflict between the goals of each organisation and those of the network as a whole. Rules about good behaviour in the network can be built on the basis of the expected cooperation, trust and fast communication between partners. However, the network enterprise is fragile because trust is problematic rather than being an actual practice. They found tensions between firms' individual goals and the dependence on others resources.

Mouritsen and Thrane (2006) add that management controls allow partners to increase the confidence between them and let the network operations happen. However, this is not always sufficient, as trusting people in the network is problematic, especially when the individual's goals contradict those of the network. In fact, management controls help to constitute the networks' boundaries because they make clear how relationships happen and show what they should do. Indeed, it can be said that Mouritsen's and Thrane's (2006) work gives rise to a "more radical proposal that network enterprises *are* their system of accounting calculations and controls" (Mouritsen and Hansen, 2006, p. 281, original emphasis). Nevertheless, it is important to emphasise that, as the boundaries allow changes in the enterprise network instead of individual firms, they are seen as hopeful and frightening at the same time by the partners (Mouritsen and Thrane, 2006).

In the same way, by applying ANT to a case study in the Australian telecommunication industry, Chua and Mahama (2007) observed that on the one hand, "accounting numbers are network effects" (p. 33). This finding confirms the previous suggestion that accounting numbers are fragile devices (Baxter and Chua, 2003). This fragility is related to the fact that accounting numbers are built for bending interests from different groups to influence organisational operations (Latour, 1987). On the other hand, Chua and Mahama (2007) found that accounting can lead to both order and conflict. Finally, in a similar way to previous researchers (Seal et al., 2004; Seal et al., 1999), they state that "accounting does not play a 'technical' or diagnostic role in the management of performance. Accounting control was very much part of processes of identity construction" (Chua and Mahama, 2007, p. 33).

ANT was also the theoretical choice of Hald (2007) in his PhD thesis. Hald (2007) presents a Scandinavian case of the Logistical Performance indicator system (LKP-device). In his case, the LKP-device was developed by the Supply Chain Director and his departmental staff. The Supply Chain Director regarded it necessary to have a device which could be used to easily communicate the supply chain performance to superiors and to externals. The implementation of the project was initially successful and, in ANT terms, translation took place initially. However, with time, the project failed to convince organisational actors to continue using the system. In addition, the lack of involvement of accountants was observed by Hald (2007).

Another study using ANT was undertaken by Thrane and Hald (2006). They used ANT together with TCE (transaction cost economics) and the symbolic perspective. They argue that decisions regarding companies' boundaries are the result of the interactions between the rational, non-rational considerations (e.g. cultural symbols) and accounting. These are the identified forces of change. They see accounting and context/boundary as a duality – “they mutually condition each other in a dynamic, emerging process shaped and developed by interdependencies, the structuring of field, accounting devices and local learning processes which structure relations within the supply field” (p. 312).

The combination of theories might be an interesting path to increased understanding of inter-organisational relationships. However, as Latour (2005) points out, ‘structuralist’ approaches, even those based on sociological concepts are not compatible with ANT. He clarifies that ANT is an approach used in a much freer way to describe and understand how actors relate to each other instead of trying to explain the forces that shape the actors' behaviour. Thus, Thrane and Hald's (2006) approach might not be completely accepted. A summary of the main contributions of studies based on ANT is presented in Table 3.1.

Contribution of actor-network theory	Authors
Accounting has a low power in situations of 'normality', while it is a central actor in a situation of 'crisis', allowing the distinction between the company's network and the environment.	Hansen and Mouritsen (1999)
Inter-firm management controls/accounting can be related to different characteristics of organisational practices and they make things work.	Mouritsen et al. (2001)
Accounting can be an actor, sometimes operating as a self-regulating mechanism (stability) and on other occasions as an orchestration mechanism (changes that may produce conflict).	Mouritsen and Thrane (2006)
Management controls allow partners to increase confidence between them and let the network operations happen; however, this is not always sufficient because of problems with trust.	Mouritsen and Thrane (2006)
Management controls help to constitute the networks' boundaries because they make clear how relationships happen and show how they should be formed.	Mouritsen and Thrane (2006)
Accounting and context/boundary are seen as a duality – they mutually condition each other.	Thrane and Hald (2006)
Accounting numbers are fragile because they are network effects.	Chua and Mahama (2007)
Accounting can lead to both order and conflict.	Hansen and Mouritsen (1999) Mouritsen and Thrane (2006) Chua and Mahama (2007)
Accounting's role goes beyond the technical; it is very much part of processes of identity construction.	Chua and Mahama (2007)

Table 3.1: Summary of the contribution of actor-network theory

In this thesis, ANT is used as a result of both the need to develop theory identified in literature about IOA, and the call in this literature for further studies analysing the role that accounting may play in the inter-organisational context. ANT is more suitable than the other theoretical approaches addressed in chapter 2, namely, transaction cost economics, structuration theory, and evolutionary theory, because it focuses on how accounting can be an actor in building, shaping, and maintaining inter-organisational relationships, rather than considering accounting as being affected by structural aspects of these relationships. The next section moves on to explore the methodological approach of this study which is AR.

3.3 Action research (AR)

This section explains the methodological approach adopted in the development of this study: action research (AR). AR is the methodological choice of this research for two main reasons. The first is to address a gap in literature about management accounting using this methodological approach (e.g. Baard, 2010). The second

refers to the fact that an AR project can be used to enhance the chances of obtaining access to the case company. As will be explained in the following sections, access to the field for conducting empirical studies can be a major issue in management research (Johnson, Duberley, Close and Cassell, 1999). In addition, it has been recognised that AR projects enable enhanced access to the company's backstage which is essential in management studies (Easterby-Smith et al., 2002; Gummesson, 2000; Johnson and Duberley, 2000).

This section is divided as following. It starts by exploring the origin and concepts of AR (section 3.3.1). It also shows that AR projects can be approached using different research paradigms. Section 3.3.2 examines some of the main characteristics of AR, which are related to the engagement of the parties involved in the project. Section 3.3.3 explains the AR cycle proposed by Coghlan and Brannick (2001) which is followed in undertaking this research. Section 3.3.4 is more specific in describing the development of this AR project and explains the methods of data collection and data analysis.

3.3.1 AR – origin and concepts

Since Lewin and Cartwright (1952) used the term, the number of works based on the 'action research' (AR) method of inquiry has grown considerably. It is a widely accepted approach in various fields, such as education and teaching (e.g., Rock and Levin, 2002) and in medical sciences (e.g., Schein, 1995); and has gained credibility and importance in management research (Cassell and Johnson, 2006; Coughlan and Coughlan, 2002; Coughlan and Brannick, 2001; Gummesson, 2000; Eden and Huxham, 1996). Although in management accounting research the number of studies based on AR is still limited, there is a call for further development (Baard, 2010; Berry et al., 2009; Scapens, 2008) and publications have started to emerge (e.g., Liu and Pan, 2007; Coad and Cullen, 2006; Nicolini, Tomkins, Holti, Oldman and Smalley, 2000; Seal et al., 1999).

The term AR can be used to cover different research perspectives (Cassell and Johnson, 2006; Reason and Bradbury, 2001; Baker, 2000; Eden and Huxham,

1996). It can be seen as “an approach to research that aims both at taking action and creating knowledge or theory about action” (Coughlan and Coughlan, 2002, p. 220). Because of this focus on action, it can also be regarded as a type of interventionist research (Jönsson and Lukka, 2007). Reason and Bradbury (2001) suggest that AR can be a comprehensive term which can include various types of interventionist research, “as the term to describe the whole family of approaches to inquiry which are participative, grounded in experience, and action-oriented because, practically speaking, it is generally recognizable and not exclusively ‘owned’ by one tradition” (p. xxiv). Therefore in this study the term AR will be used predominantly.

Table 3.2 shows three examples of the variety of possible approaches associated with AR. The differences appear as a consequence of the use of different epistemological and ontological philosophical assumptions. The concepts of AR will be discussed below taking into account these approaches.

Interventionist research Jönsson and Lukka (2007)	Types of action research Baker (2000)	Categories of action research Cassell and Johnson (2006)
Action research Clinical research Action science Design science Constructive research approach	Positivist Interpretive Critical	Experimental Inductive Participatory Deconstructive

Table 3.2: Approaches to interventionist research and action research

The focus on intervention in the real world, rather than just a theoretical understanding of a situation, is what makes AR a distinctive approach in relation to the traditional positivist perspective concerned only with the creation of knowledge (Cassell and Johnson, 2006; Coughlan and Coughlan, 2002; Coughlan and Brannick, 2001). AR can also be regarded as “the origin of all interventionist research in the social sciences” (Jönsson and Lukka, 2007, p. 376). In turn, ‘interventionist research’ can be viewed as:

...a kind of field experimentation where the researcher, not having complete control over the design of the experiment, seeks to determine the experimental situation through observation, acts on that situation in concert with the host organisation, observes process and outcome, and analyses findings in view of the relevant literature (Jönsson and Lukka, 2007, p. 374).

In addition to AR, the other types of interventionist research, as identified by Jönsson and Lukka (2007), are clinical research, action science, design science and constructive research approach (see Table 3.2). These approaches derive from AR as proposed by Lewin, and some of the terms are sometimes used interchangeably. For instance, Gummesson (2000) uses the term ‘action science’ instead of ‘action research’. The reasons for his preference are based on the observations by Argyris et al. (1985) that AR has been criticised for being just a form of consultancy or journalism; and secondly, for the fact that the positivist paradigm is frequently used by action researchers, despite it being possible to use more interpretive approaches.

Although Jönsson and Lukka (2007) see blurred boundaries distinguishing these types of interventionist research from AR, some of the differences highlighted by them are presented below. ‘Clinical research’ is related to an approach derived from the medical context (Schein, 1995, 1987). The key focus is on the involvement of the client in order to solve a perceived problem. In fact, Schein (1995, p. 15), by addressing the distinction of this mode of intervention with AR, explains that “this clinical model is often also lumped into ‘action research’, but is fundamentally different in that the initiative remains at all times with the client”.

‘Action science’ was proposed by Argyris et al. (1985) because of the concern with scientific rigour. As such, ‘action science’ is strongly related to positivist AR as initially developed by Lewin. ‘Design science’ is a new kind of interventionist research that seeks to “form a prescriptive-driven alternative to the explanation-driven ‘normal’ way of conducting management studies” (Jönsson and Lukka, 2007, p. 377). According to Jönsson and Lukka (2007), the ‘constructive research approach’ has been proposed and adopted by Finnish accounting researchers (e.g. Labro and Tuomela, 2003). This approach is concerned with the balance between problem-solving and theory development.

The differences between these types of interventionist research are not always easy to recognise. Actually, they appear as variations to AR and, apart from the clinical approach, they have been developed for two main reasons (Jönsson and Lukka, 2007; Reason and Bradbury, 2001; Baker, 2000; Eden and Huxham,

1996). One is related to derogatory views of AR as a sloppy approach to support consultancy-based research. Concerns with the scientific aspects of AR have been pointed out in academic literature:

While consultancy settings may be a valuable source of 'real' data, unless these are entered with a more sophisticated view of action research there is a danger that sloppy research will result. The 'action research' label is often used as a way of excusing sloppy research (Eden and Huxham, 1996, p.76).

The other reason is related to the fact that Lewin's initial proposal for AR was focused on a positivistic paradigm. Currently it is possible to observe that different epistemological and ontological assumptions are applied in AR projects. Baker (2000) maintains that there are two other possibilities for AR in addition to the positivist perspective, namely, the interpretive and critical approaches. In the interpretive approaches to AR "problems are defined after extensive discussions between the researcher and the organizational participants" (Baker, 2000, p. 372). The critical approaches are often related to Habermas's 'critical theory' (e.g. Johnson et al., 2006; Gill and Johnson, 2002; Johnson and Duberley, 2000). "A primary goal of the critical approach to action research is to increase the understanding of participants concerning the linkage between social problems and the underlying theory used to explain and resolve the problems" (Baker, 2000, p. 372).

Cassell and Johnson (2006) argue that different types of AR arise because different philosophical commitments take place. Their key concern is related to the fact that if these differences are not taken into account, AR might be evaluated inadequately. They say that:

... the range of forms that action research takes is not haphazard and that we must be cautious about developing all-embracing standards to differentiate the 'good' from the 'bad', the 'scientific' from 'pseudoscience', and so on. Rather the emergent diversity is inspired by different philosophical stances, in the main driven by varying core assumptions about epistemology and ontology, which normatively inform their practitioners in terms of aims and requirements. Yet the impact of such philosophical variation usually remains unnoticed in published accounts thereby fuelling ambiguity and controversy about what action research should entail in practice and as to its 'scientific' status (Cassell and Johnson, 2006, p. 785-786).

Cassell and Johnson (2006) divide AR practices in the following way:

- **Experimental action research practices** – This category can be related to Baker’s (2000) positivist type of action research. This approach is based on objectivist epistemology, realist ontology and methodological monism (positivism).
- **Inductive action research practices** – This approach is similar to Baker’s (2000) interpretive category of action research. The ‘inductive’ label is because of the generation of theory from data and the focus on “the development of thick descriptions of the patterns of subjective meanings that organizational actors use to make sense of their worlds” (Cassell and Johnson, 2006, p. 793).
- **Participatory action research practices** – This approach has similar characteristics to Baker’s (2000) critical type of AR. It involves the engagement of people in the organisation at all stages of the project. The main bases are critical theory and the democratisation of social practices, which attack positivist epistemology. Thus, reality is seen as a result of human cognition and the subjective meanings that humans attribute to it. This approach has been used more often in studies involving communities than those conducted in organisations. In this case, “... the role of the action researcher is fundamentally reconstructed to one of facilitating democratic agreement and the evolution of a critical consciousness amongst participants” (Cassell and Johnson, 2006, p. 802). Indeed, there is a focus on emancipation through democratic arrangements.
- **Deconstructive action research practices** – This perspective does not correspond to any of Baker’s (2000) types of AR. It includes postmodernists who often believe that critical theorists’ main assumptions are related to ‘essentialism’. This accusation is because critical theorists seem to believe that oppression and exploitation are always behind external appearances. On the other hand, postmodernists express distinctive epistemology and

ontology. For them, “knowledge is produced by particular language games or discourses which, via their own rules and structures, produce plurality of localized understandings and practices which offer no epistemological basis for preferring one such manifestation over alternatives” (Cassell and Johnson, 2006, p. 803).

From the above, it can be seen that in published literature AR is approached from different perspectives and can involve different ontological and epistemological commitments. As mentioned in the research philosophy section (3.1), this research fits in the interpretive paradigm. The most important characteristics of AR are briefly presented below.

3.3.2 AR – characteristics

One important aspect of AR is the fact that the issues under observation are related to problems identified by the parties involved. Indeed; in AR carried out in the management field, “... the research output results from *an involvement with members of an organization over a matter which is of genuine concern to them*” (Eden and Huxham, 1996, p. 75, original emphasis). As the parties are engaged in the solution of problems of their interest, their commitment and their willingness to change are stronger (Coghlan and Brannick, 2001). Thus, the implementation of the change can be more successful. Indeed, according to Schein (1995, p. 14):

When Lewin first formulated action research it was clearly a case of the researchers wanting to figure out how to be more successful in implementing some changes that the researcher desired. He found that by involving the targeted population in the research process, they become more amenable and committed to the desired change.

Coghlan and Brannick (2001, p. 4) believe that “the key idea is that action research uses a scientific approach to study the resolution of important social or organizational issues together with those who experience these issues directly”. Therefore, working in concert with people in the organisation seeking to identify important issues to be addressed and having their collaboration during the development of the project are, indeed, very important issues. However, Eden and

Huxham (1996) “do not accept that action research *must* be collaborative” (p. 78, original emphasis). In addition, it is essential to emphasise that the role of AR is not limited to the solution of practical problems. AR is also focused on the creation of knowledge about the subject of study (Eden and Huxham, 1996; Gummesson, 2000; Coghlan and Brannick, 2001; Coughlan and Coughlan, 2002; Cassell and Johnson, 2006; Baker, 2000; Jönsson and Lukka, 2007).

3.3.3 AR cycle

It has been recognised that AR projects are often developed in a cycle of four intentional steps: planning, taking action, evaluating that action, leading to further planning and so on (Adams and McNicholas, 2007; Adams et al., 2006; Rock and Levin, 2002). This study will follow Coghlan’s and Brannick’s (2001) suggestion that the AR cycle should comprise a pre-step of context and purpose and four steps, namely, diagnosing, planning action, taking action, and evaluating action. Figure 3.2 shows the AR cycle.

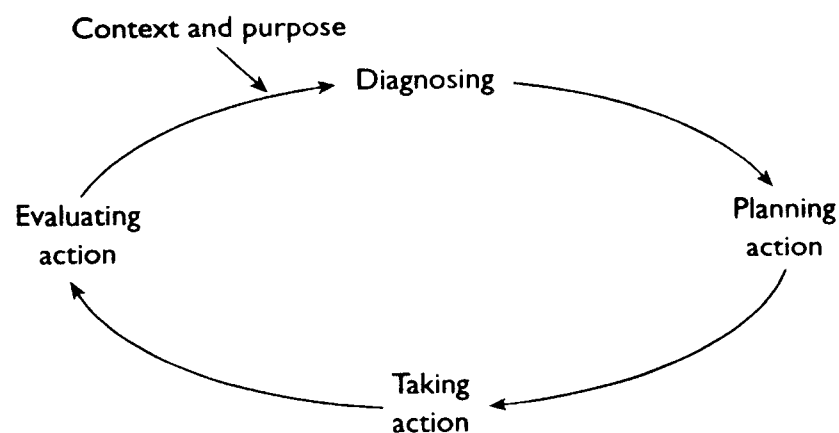


Figure 3.2: The action research cycle
Source: Coghlan and Brannick (2001, p. 17)

Pre-step: context and purpose – Consists of identifying the reasons for developing the AR project and evaluating the main economic, political and social drivers for the change. It also involves the definition of the expected situation after the development of the project.

Main steps

- **Diagnosing** – It “involves naming what the issues are, however provisionally, as a working theme, on the basis of which action will be planned and taken” (Coghlan and Brannick, 2001, p. 17). If the diagnosis is modified in later stages, it is important to track the changes and the consequences of the changes clearly.
- **Planning action** – The planning activity follows the defined drivers for the change and the diagnosis. At this stage, it is important to have a strategic and operational plan containing “goals, activities, structures projects and experiments that will help achieve the desired state” (Coghlan and Brannick, 2001, p. 88). A commitment plan is also essential. This will identify people in the organisation who must be engaged with the change.
- **Taking the action** – At this stage, “the plans are implemented and interventions are made” (Coghlan and Brannick, 2001, p. 88).
- **Evaluating the action** – The focus of the evaluation is on seeing if the previous stages were performed correctly and how the next cycle of diagnosis, planning and taking action will be developed.

Coghlan and Brannick (2001) believe that two cycles operate in parallel, as can be observed in Figure 3.3. One is the cycle described above and the other is:

a reflection cycle which is an action research cycle about the action research cycle. In other words, at the same time as you are engaging in the project action research cycles, you need to be diagnosing, planning, taking action and evaluating how the action research project itself is going and what you are learning (Coghlan and Brannick, 2001, p. 19).

This leads to what Coghlan and Brannick (2001) call the ‘meta learning’. ‘Meta learning’ refers to the fact that the researcher will at the same time be engaging in the AR project and performing the activities of diagnosing, planning, taking action and evaluating how the AR project is being developed and what is being learnt. This learning about learning is the ‘meta learning’.

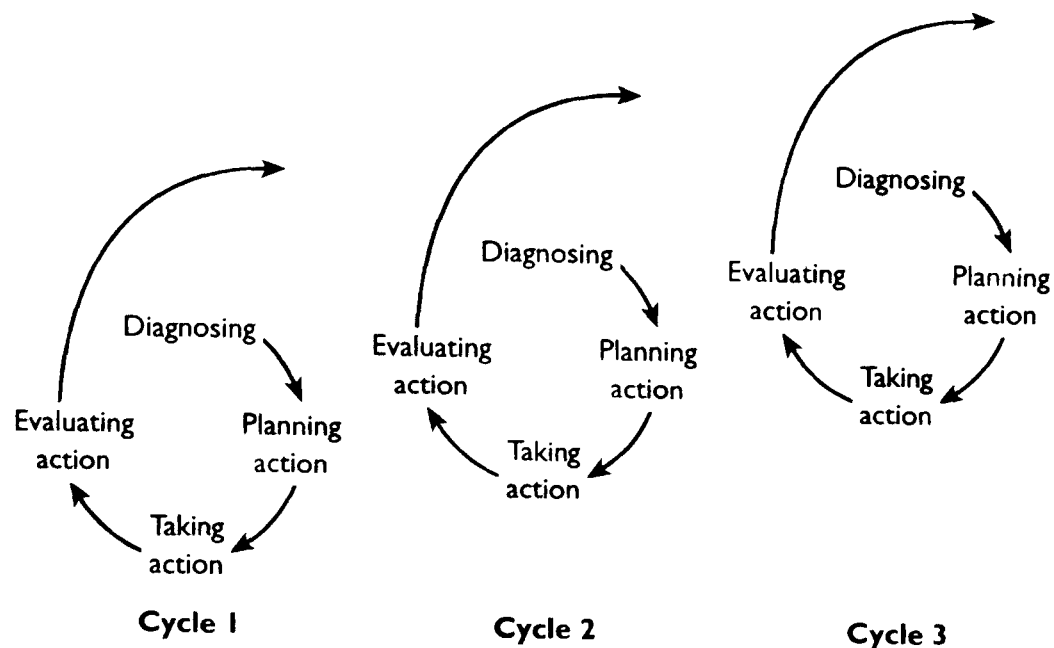


Figure 3.3: Spiral of action research cycles
Source: Coghlan and Brannick (2001, p. 19)

The field research was carried out considering the AR cycle presented in this section. In addition, methods of data collection, such as observation, interviews and analysis of documents were used. These methods and the access to the company are described in the next section.

3.3.4 AR – data collection and data analysis

3.3.4.1 Access to the company and initial contacts

“The great advantage of action science is that it provides the researcher with substantially improved access” (Gummesson, 2000, p. 125). In order to gain access to the company and the target setting for the research, the development of an action research project was proposed. The company was a large Brazilian glassware manufacturer located in the Northeast of the country, with sales turnover of around £100 million per year (see further details in chapter 4, section 4.1). The possibility of the researcher making a contribution to the company was seen as a positive factor and access was granted. Initial contact was made with the Finance Director, via a Management Accounting Consultant with whom the researcher has a good relationship. This consultant had been working for the company for more than a year on projects related to cost and management

accounting. In April 2007, the researcher sent a formal letter to the Finance Director asking permission to carry out the research, and her PhD Supervisor sent another letter supporting the enquiry. The Finance Director agreed to allow and support the research and replied with a formal letter sent by post to the UK.

To develop the field research, before going to Brazil, the researcher contacted the Financial Controller of the company. He had been working for the company for about 2 years. Preliminary questions were sent to him by email before the beginning of the field research. The questions were about the company in general, and, in particular, the external relations with customers and suppliers. He sent his reply by email to the researcher in December 2007. A research protocol (appendix 1) was then sent to him in February 2008. The protocol included the aim of the research and a plan for its development. The main intention was to show how the research was expected to develop at a practical level. In summary, at a practical level, the aim of the research was to contribute to the development of an inter-organisational relationship, while analysing the role of accounting in this context. In March 2008, he replied saying that the research would be supervised by the Supply Chain Manager. The researcher went to Brazil and the research started in April 2008. Despite changes in the contact person, the Supply Chain Manager seemed to be interested in the research, especially because of the potential positive outcomes for the company. A room with internet and printer access was allocated to the researcher.

It is important to add that before going to Brazil, the researcher visited a glassware factory in the UK. This visit was arranged by her PhD supervisor who had worked previously for this company. The aim of this visit was to learn about glassware production and to see an example of how inter-organisational relationships were conducted in this sector. Taking into account that Brazil is a developing country, the expectation was that there was much to learn from a British example. Indeed, employees from the Brazilian company had previously visited this company. However, their focus had been more technical, rather than managerial. This visit was very important because it enabled the researcher to compare glassware manufacturing companies in different parts of the world.

3.3.4.2 Methods of data collection

Most of the data were collected from April to September 2008, which is the period that the researcher spent in the case company in Brazil. In this thesis, this six-month period is called the field research period. However, the researcher also kept in touch with the company for further follow-up contacts via email between October and December 2008, and a face to face follow-up interview carried out in March 2010 with the Supply Chain Manager. During the field research, the main methods of data collection adopted were observation, interviews, discussions and documentation analysis.

As the methodological approach was AR, observation was the main source of data. This is in line with Jönsson and Lukka (2007). They argue that:

as the interventionist researcher conducts her study along the real-time flow of life of the case, observation in the participant mode often dominates the collection of empirical research materials (p. 383).

As can be observed from the quote above, the authors regard observation as the most important source of data in AR projects. Indeed, this research confirms this argument. Much of the interplay between actors in the company and the role that accounting may play in the context of the research was understood through observation, rather than other methods of data collection. Although the AR project did not progress as planned (see details in chapter 5, section 5.4), it created the opportunity for the researcher to observe the desired setting for the research analysis.

A field diary was used to systematically document the observations and the data gathered. For the development of the field diary, data was recorded in chronological order and references to relevant documents like interviews, meetings and protocols were made (Jönsson and Lukka, 2007). The meetings attended were both at operational and managerial levels. Regular meetings took place with the Supply Chain Manager. However, the frequency varied according to his availability and his interest in the 'Collaboration with Customers' project (chapter 5). These meetings were more frequent at the beginning of the research

(sometimes twice a week). This was when the researcher was preparing a PowerPoint presentation for the project. In fact, the researcher asked several times to be involved in the supply chain department's other projects, but the Supply Chain Manager refused. Consequently, these meetings were on a one-to-one basis and were only arranged to discuss the 'Collaboration with Customers' project and the researcher's interests in gaining access to other actors in the company and its supply chain. As the project did not progress, these meetings became less frequent. In addition, over the six month period of the research, it could be observed that the Supply Chain Manager became much busier with various other managerial issues. Two examples of strategic managerial activities he was involved with, and which dominated his time, were the 2009 Planning Review and the 2008 Budget Review.

The researcher also participated in a few other business meetings. Meetings at the operational level were, for example, meeting to discuss inventory arrangements before external audits; to define machine setups; and regarding the monthly performance of the supply chain department. There were monthly performance meetings in most departments, but the researcher only attended two of them in the supply chain department. The researcher also attended a managerial meeting in May 2008 called the S&OP (Sales & Operations Planning)⁷ meeting. The researcher was there because she had prepared the PowerPoint presentation introducing the 'Collaboration with Customers' project. This was a monthly meeting, but when the researcher asked to participate in the following meeting in June 2008, the Supply Chain Manager said that there were other more important things to be discussed in the meeting rather than the project. For example, an important discussion for them, which was started during the previous meeting, was whether or not to write-off the inventories which had not been sold in the past

⁷ Sales and Operations Planning or S&OP is a strategic initiative in SCM that aims at enabling a business enterprise to respond effectively to the demand and supply variations with the application of optimal market deployment and most profitable supply chain mix by using appropriate technologies and bringing about radical changes in business processes. S&OP is the process with which all the plans for the business (customers, sales, marketing, development, manufacturing, sourcing, and financial) are brought together into one integrated set of plans. http://it.toolbox.com/wiki/index.php/Sales_and_Operations_Planning Accessed 4 April 2011.

and were unlikely to be sold in the future, and to which department the cost of them should be allocated.

As well as observation and records of them in the field diary, other methods of data collection, such as interviews, discussions and the analysis of documents were used. Jönsson and Lukka (2007) defend the use of other sources of data, such as interviews and documents and recommend the triangulation of data. Triangulation consists of collecting data from multiple sources of evidence to improve the validity of the data (Ryan et al., 2002). Thus, data triangulation was also used in carrying out this project.

Interviews were carried out with various staff in different departments of the company, for different purposes. For example, at the start of the project, employees and managers were interviewed in order to understand the internal operations of the company and the employee's and managers' roles in their specific departments. Managers and directors were asked about their perception of the possible contribution of accounting to the development of closer inter-organisational relationships. On the factory floor, the employees were interviewed in order to understand their job roles and the operations in their respective departments. An example of this was an interview carried out in the factory, which had the intention of understanding the employee's job role, obtaining access to other employees in the factory and enabling the arrangement of observations of production processes.

In addition, at the beginning of the research period, the researcher tried to prioritise more informal conversations, in an attempt to build more trust. However, the Supply Chain Manager requested that the researcher present the interview questions to the directors of the company, before he tried to arrange the interviews. Despite presenting the questions, there were problems in setting up interviews with the directors. Because of these difficulties, the researcher also looked for other ways to contact the directors. For example, the Logistics Supervisor helped the researcher to set up the interview with the Sales and Marketing Director and the Finance Director was contacted directly by the researcher via email.

The interviews were not recorded, as requested by the Supply Chain Manager.⁸ He thought that because of the nature of the research, the staff at GM would feel more comfortable answering questions if they were not being recorded. The interviews were between forty minutes and three hours long, depending on the employee. A list of the people contacted during the field research for interviews, discussions, or both is provided in appendix 2. Most of the staff working in the supply chain department and in the manufacturing department were contacted more than once. At the beginning of the fieldwork, interviews were unstructured or semi-structured with the intention that employees could feel more comfortable talking to the researcher and feel like she was a new person working in their environment, rather than an outsider. In these interviews and discussions the employees were asked by the researcher to speak about their work and their responsibilities in the company. This enabled the researcher to learn about the company's internal processes and the way business was conducted in relation to suppliers and customers.

However, it is important to emphasise that getting access to information about internal relations was much easier than information about external relations. In order to learn about external relations, specific people such as the Supply and Purchasing Supervisor and Sales Managers had to be contacted. In addition, the physical location of the departments (see details in chapter 4, section 4.2.1) also influenced access to people in the company. The Supply and Purchasing Supervisor and his team worked in the same building as the Supply Chain Manager (where the researcher was located during the data collection). The Sales and Marketing Director and his team and the Controllershship team worked in a different building, five minutes away by car, which was called the head office. As a result of the different building locations, the researcher had less contact with people working in the head office building.

The documents analysed were both related to accounting and to operations. Examples of documents concerning accounting were the financial accounting

⁸ One exception was the interview with the Finance Director which was carried out via Skype, a software application to make voice calls over the internet. This interview was recorded with the interviewee's permission because it was not face to face.

consolidated report (called the Book of Managerial Information – see details in chapter 4, section 4.4.2.1), and the balanced scorecard (BSC) model (see details in chapter 4, section 4.4.2.2). Operational documents were, for example, the sales report, which included information regarding forecast and real sales in volume and in Reais (the Brazilian currency). These documents were helpful during the practical development of the AR project and also in order to understand the company's accounting system which was relevant at the theoretical level.

Moreover, the researcher also used external sources of data in order to understand the case study. In August 2008, the researcher went to the XIV International Forum of Logistics and Supply Chain in Rio de Janeiro and talked to managers and consultants working in the logistics and supply chain area in Brazil, including one of the managers who had worked on the implementation of a SCM project with Nike in Brazil.

During the six-month field research period, the researcher visited a cardboard manufacturer which was the case company's supplier and was using the Vendor Managed Inventory (VMI) tool. In this company, the VMI was implemented at the request of one of the cardboard manufacturer's biggest customers. The researcher interviewed the Sales Manager who participated in the implementation of the tool about a year before and was responsible for using it. Although the use of the VMI was seen as a positive issue in the cardboard company, it was not used exactly in the same way as described in the literature.

The VMI system creates a situation where the customer sends information regarding inventories and future promotions to the supplier and the supplier suggests the purchasing order for the customer. As explained in chapter 2 (section 2.1.3), the VMI presupposes the management of the customer's inventories by the supplier (Lee and Chu, 2005). In the case of the cardboard company, instead of the supplier suggesting new orders to the customer, this was calculated by an automated system that was updated by the customer. Therefore, the supplier did not take part in the decision-making process. Indeed, this may be an indication that managerial tools are sometimes used in different ways in the Brazilian context.

3.3.4.3 Data analysis

According to Yin (2008, p. 127), “the analysis of case study evidence is one of the least developed and most difficult aspects of doing case studies”. In this research, several challenges were faced during data analysis. Due to the varied nature of the data collection, analysing the results was also carried out in different ways. A general strategy adopted was to *rely on theoretical propositions* (Yin, 2008). This was done by considering the main proposition that *accounting can play a role in the development of inter-organisational relationships*. This proposition guided the data analysis which was conducted as follows.

Initially, data was structured according to the AR cycle, and the reflection cycle proposed by Coghlan and Brannick (2001) (section 3.3.3). As will be shown in chapter 5, the AR project did not progress as initially expected and the intervention did not take place. However, reflection on how the AR project unfolded is essential in terms of data analysis. To this end, chapter 5 explains how the first AR cycle was followed and chapter 6 presents a reflection on how the AR cycle was followed, and why change did not take place in the case company.

The reflection presented in chapter 6 takes into account Yin’s (2008) analytical strategy *explanation building*. According to Yin (2008) the aim of this analytical strategy is to analyse the case study data by “building an explanation about the case” (p. 141). This author adds that “to ‘explain’ a phenomenon is to stipulate a presumed set of causal links about it, or ‘how’ and ‘why’ something happened” (Yin, 2008, p. 141). In this research, the analysis of ‘how’ the AR project unfolded and ‘why’ the change did not take place is based on ANT concepts. Firstly, the actors followed during data collection are divided into global and local, human and non-human; and secondly, the ANT translation is used to analyse the AR project. The ANT concepts contribute to the explanation of the reasons why the AR project did not progress as initially planned. Following the analysis using ANT, further reflection is presented regarding the lack of change, the role of accounting and the role of the researcher within the ANT and AR combination.

3.4 Why ANT and AR?

Previous sections addressed important aspects of the research philosophy, ANT and AR. This section moves on to explain the reasons why combining ANT and AR in this research. Firstly, the justification of ANT and AR in their own is discussed. Secondly, the combination of ANT and AR is examined. As explained in section 3.2, one of the reasons for choosing ANT relates to the call for further research using this theory identified in the literature review regarding IOA. The choice of AR was influenced more by the practical aspects, in order to make the case study possible, and to explore *how* research questions (as presented in chapter 1, section 1.3). It is also possible to justify the need for more studies using AR to expand the scope of management accounting research literature, as pointed out in section 3.3.

ANT was chosen because it appears to be the most suitable theoretical approach to address the main aim of this thesis, namely to understand how accounting can be an actor contributing to the mediation, building, and shaping of a SCM initiative. As explained in the literature review regarding the other theories adopted in the IOA context, which were presented in chapter 2 (section 2.2.2), TCE, ST and ET are not suitable to achieve the aims of this study. Although TCE has influenced early research into IOA (Gietzmann, 1996; Van der Meer Kooistra and Vosselman, 2000), it has been observed that this theory focuses on the impacts of the inter-organisational context on accounting, but not the contrary (Cooper and Slagmulder, 2004). In addition, TCE fails to consider social aspects of inter-organisational relationships, such as institutional and cultural influences (Cooper and Slagmulder, 2004; Dekker, 2004). Thus, TCE is not appropriate for this study.

The other two theories, ST and ET, have made important contributions to literature about IOA. However, they are also not superior choices for the purpose of this study. Despite taking into account the reflexive role of organisational and inter-organisational actors (Seal et al., 2004; Free, 2008), ST has been criticised for still having a strong focus on structure and governance aspects of inter-

organisational relationships (Mouritsen and Thrane, 2006). ET has contributed to understanding how IOA can be developed (Coad and Cullen, 2006). Nevertheless, ET also focuses on how social and historical aspects of institutions can influence IOA (Coad and Cullen, 2006).

On the other hand, ANT focuses on accounting as an important actor in building, shaping, and maintaining inter-organisational relationships (Mouritsen et al., 2010; Chua and Mahama, 2007; Mouritsen and Thrane, 2006). From the ANT perspective, accounting can be seen as more than just a set of techniques, since it is regarded as a relevant non-human actor which is capable of influencing the outcomes of inter-organisational projects (Mouritsen et al., 2010). In addition, it has been observed that accounting numbers can contribute to the establishment of boundaries between companies, since they make clear how relationships take place and how they should do (Mouritsen and Thrane, 2006). Therefore, ANT is considered a superior theoretical choice in this thesis, since its aim is to analyse the role of accounting in the inter-organisational context.

AR was selected for the field research for two main reasons. Firstly, it aims to address the call for further research using AR in management accounting research (Baard, 2010; Berry et al., 2009; Scapens, 2008), as explained in section 3.3. Secondly, the AR project can be justified as a way of gaining access to the business environment. In addition, this kind of research can make a contribution to both practice and theory. AR is currently being encouraged in the accounting field (Scapens, 2008). In the IOA context, an AR project can be a helpful approach because it creates the opportunity both to intervene and observe the role of accounting during the implementation of inter-organisational relationships. By using this method of inquiry, an on-going situation can be studied and the actions of human and non-human actors followed. Indeed, the traces left behind the actors can be followed, which is essential from an ANT perspective (Latour, 2005).

As identified by Johnson et al. (1999), gaining access to a company can be a very complex issue. The authors find it important to make a clear distinction between the consultant and the researcher roles. Another aspect that needs attention is related to “a danger that exists during any social interaction with members, which

is probably exacerbated by greater involvement in their problems, is that members often seek to convert the researcher to their particular points of view and definitions of the situation” (Johnson et al., 1999, p. 1244). However, without getting involved in the company’s problems, gaining access to the ‘backstage’ of the situation becomes much more difficult, and at the same time essential for an in-depth study. By using AR, better access to the ‘backstage’ of the company will be gained (Johnson and Duberley, 2000; Easterby-Smith et al., 2002; Gummesson, 2000).

In relation to the use of ANT and AR at the same time, it can be said that this is an emerging possibility which has been defended by Lewis (2007) and Lewis and Townson (2004). The key argument is that by using both:

we are moved towards the richer and more interesting alternative of collaborative research being the result of a complex nexus between various actors (human and non-human) that includes the researcher, sometimes coloured by the promotion of personal interests, and in a flux of changing circumstances and context (Lewis, 2007, p. 18).

Lewis (2007) also argues that using ANT and AR provides valuable tools for ensuring that both intended and unintended changes do not modify the desired outcome of the research. This is a very interesting point, because in the development of an AR project many possible trajectories may be chosen. However, by using ANT, the focus of the research will remain the same, as there is an interest in following the actors whatever their actions are. Thus, the on-going situation can be followed independently of the outcomes being either expected or different from what was expected. Indeed the key purpose of ANT is to explain how social relations take place and groups or networks are created and re-created, instead of focusing on predicting how the relationships should happen (Latour, 2005, 1987). On the other hand, using ANT and AR might raise controversy, with regard to aspects of their philosophical assumptions and the “researched-researcher relationship” (Lewis, 2007, p. 20). He does not explore these potentially problematic aspects in his work, but emphasises that they deserve future discussion and debate. Comments regarding this debate are presented in the following paragraphs.

In relation to the philosophical debate, it could be argued that the combination of ANT and AR is a deconstructive approach (Cassell and Johnson, 2006), because the literature published about ANT is dominated by postmodernists and is concerned with the importance of language and discourses in the creation of knowledge. As AR can be approached from different epistemological and ontological perspectives (Cassell and Johnson, 2006; Baker, 2000), the theory can be determinant in the philosophical choice of the study. Thus, the combination of ANT and AR could be considered as deconstructive.

However, as pointed out by Wickramasinghe and Alawattage (2007), in the management accounting research field, ANT has been used within Burrell's and Morgan's (1979) interpretive paradigm, since it focuses on the researcher entering the business context and attempting to understand the world from the research subject's perspective (Saunders et al., 2007). In this thesis, Wickramasinghe and Alawattage's (2007) classification is followed, and ANT is used within Burrell and Morgan's (1979) interpretive paradigm. In addition, AR is also used as interpretive, since there is a concern with understanding meanings related to organisational life (Saunders et al., 2007) and the practical problems are greatly discussed with organisational actors (Baker, 2000). Thus, both theory and methodology are addressed considering the same philosophical underpinnings, and in this thesis the combination between ANT and AR is interpretive.

3.5 Summary

This chapter was initiated with a discussion about research philosophy. It was observed that in management research, different epistemological and ontological perspectives can be used. Instead of the dominant 'positivist' epistemology in management research, this research adopts an 'interpretive' stance. In relation to ontology, the 'subjective' perspective was chosen. Indeed, the combination of ANT and AR can be classified as 'interpretive' according to Burrell and Morgan's (1979) research paradigms.

The following section (3.2) concerned ANT, which is the theoretical choice of this research. It was suggested that ANT contributes to the development of social theory in a different way. ANT has a relativist approach that can also be designated as performative. This approach considers that entities are created and re-created through social interaction. Callon's (1986) four moments of translation were also explained, namely, problematisation, interessement, enrolment and mobilisation. Problematisation involves the inter-definition of actors (human and non-human) and the definition of the OPP. The OPP attempts to become indispensable to the network by emphasising to actors that their interests are better achieved through the network instead of other associations. For this, interessement devices are developed and used in the next stage of translation (interessement). If interessement is successful, the enrolment then takes place. Allies are then locked into place and the network is secured. However, the stability of the network takes place in the final stage of translation, namely mobilisation. At this stage, the spokesperson represents the network and provides evidence that the actors' interests can be achieved via the network.

The main drawbacks of ANT were then discussed. They are related to the interpretation of its purposes as a consequence of inadequate understanding of the term actor-network theory. These terminology problems have led ANT to be viewed as being focused on addressing the agency/structure dichotomy embedded in traditional sociology. However, the intention of ANT's proponents is to bypass this conflict and to see the 'social' in a different way, by following the actors, instead of being concerned with pre-established social structures. Moreover, ANT can be useful for contemporary situations, as things are changing fast and society is continuously changing too (Latour, 2005).

The chapter then moves on to analyse the methodological choice of this research, which is AR. It was observed that AR can be approached from different epistemological and ontological perspectives. This research refers to interpretive AR research. AR has been recognised as an interesting approach in management research because it contributes to the reduction of the distance between theoretical and practical developments. It is concerned with changes in the practical world via intervention and the creation of knowledge. Therefore, AR can be regarded as a

helpful approach for this research. The AR cycle shows that the steps of an AR project are usually diagnosing, planning, taking action, and evaluating the action. Diagnosing refers to the identification of the problem, which is of both theoretical and practical interest. Planning includes the development of strategic and operational plans in order to implement the change. Taking the action is the interventionist stage of AR. Evaluating the action involves analysing how the previous steps took place and how a new AR cycle can be performed (Coghlan and Brannick, 2001).

The AR section also included an outline of the methods of data collection and data analysis used in this research. The main strategies for collecting data were observation, interviews and discussions and document analysis. Observation is often the main source of data in AR projects and was widely used in this research. Observation took place at both administrative and operational levels. The interviews were very diverse and were conducted with actors in different departments of the company. The documents analysed included accounting, sales and operations documents. Data was analysed by using both ANT and AR concepts. In order to structure the analysis, firstly data was described according to the AR cycle. Secondly, ANT concepts were used. The actors were divided into global and local, human and non-human, and ANT translation was used to reflect on how the AR project unfolded. In addition, the reasons for the lack of change, the role of accounting, the role of the researcher and the combination of ANT and AR were analysed.

Finally, the initial reasons for the combination of ANT and AR were discussed. AR was chosen as a way of obtaining access to the company and its backstage, while ANT enables the analysis of accounting as a non-human actor that is capable of influencing the development of an inter-organisational initiative. Although Lewis (2007) has pointed out that this combination can raise controversial issues regarding the philosophical approach, this is not a problem in this research. As explained in this chapter, AR can be approached from different epistemological and ontological perspectives and ANT can be classified as interpretive. Thus, in this research the combination of ANT and AR can be

classified as interpretive. The next chapter moves on to presenting the results of the field research.

CHAPTER 4: THE CASE COMPANY

Chapters 4 to 6 describe the results of the field research conducted in the Brazilian glassware manufacturing company. Chapter 4 outlines the case company and its supply chain, while Chapter 5 explains how the action research project unfolded. Chapter 6 then analyses the empirical findings by relating them to the academic literature. This chapter introduces the research by describing the case company, in particular, its background, and its physical and organisational structures. The chapter then moves on to describe the company's supply chain relationships, and its internal accounting system. It concludes with the presentation of a summary.

4.1 Company background

The Glassware Manufacturing company is identified by the initials GM and, for reasons of confidentiality, the real name of the company will not be given. In relation to its competitors, the company is the third largest in the sector in Brazil and the first maintained solely by Brazilian capital⁹. The suppliers to the glassware industry operating in Brazil have capital from both national and international shareholders. GM has four manufacturing plants located in the Northeast of Brazil. However, two of them have been closed for more than five years. Despite the fact that only two of them are active, GM is considered to be a large company in Brazil, as it has about 1,500 employees and a turnover of around £100 million¹⁰. In Brazil, according to the Brazilian Institute of Geography and Statistics classification, a manufacturing company is regarded as large when it has over 500 employees. GM produces more than 200 products divided into two main categories: glass packaging and glassware. The former includes bottles for alcoholic and non-alcoholic drinks, food containers, and pharmaceutical containers, and the latter category is composed of glassware items. These

⁹ GM was sold to one of its multinational competitors after the completion of the field research, in August 2010.

¹⁰ For reasons of confidentiality, this number is not exact. It was obtained by converting the value of the company's turnover in Brazilian currency, that is the Real or, plural, Reais, into British Pounds (Pounds Sterling) using the exchange rate at 31st December 2008. The exchange rate was R\$3.38 for each £1.00.
(http://www.xe.com/ict/?basecur=BRL&historical=true&month=12&day=31&year=2008&sort_by=name&image.x=27&image.y=16. Accessed 17th February 2010)

glassware items are mainly drinking glasses, jars and pots. GM is a large supplier in the packaging industry and its customers vary from very small local producers to multinational companies such as Coca-cola, Wal-Mart and Anheuser-Busch Inbev.

GM was founded during the Brazilian Industrial Revolution in the late 1950s (Baer, 2001). It was established as a private limited company by a British family who had moved to Brazil at the beginning of the 20th century. GM contributed to the process of industrial development in Brazil and has been profitable for over half a century. However, the group that GM is a part of has experienced considerable changes in the last decade. The changes were necessary because of a need to redistribute control among family members and to increase the level of professionalism of the business activities. The structure of the group was redesigned, and currently GM is the principal company in one part of the group, which also includes an electricity company, an investment funding company, and a property development company. Although, the companies are managed as separate entities, they share some resources, as will be outlined below¹¹.

GM has also been affected by changes in the packaging industry that have taken place during the last 10 to 20 years, particularly concerning the increased use of alternative packaging materials. With the increased popularity of tetra pak packaging, PET bottles,¹² and aluminium cans in the food and the beverage industries, GM's relationships with customers¹³ have become complex, largely due to the lower costs of production and the prices of alternative products in the packaging industry.

¹¹ The group structure and GM's new organisational structure is described further in section 4.2.2.

¹² Polyethylene terephthalate (sometimes written poly(ethylene terephthalate)), commonly abbreviated PET, PETE, or the obsolete PETP or PET-P), is a thermoplastic polymer resin of the polyester family and is used in synthetic fibers; beverage, food and other liquid containers; thermoforming applications; and engineering resins often in combination with glass fiber. (Wikipedia, 2010, http://en.wikipedia.org/wiki/Polyethylene_terephthalate. Accessed 26th January 2010) Research and development relating to the use of PET (polyester) for commercial plastic bottle applications began in the late 1960's and intensified during the period 1971-1975. http://www.plastictechnologies.com/company/history/pet_industry. Accessed 26th January 2010.

¹³ Customer relationships are discussed further in section 4.3.2.

Three other major changes at GM are related to the following factors: the new production mix, the improvement of information technology systems, and increased concerns with quality levels. In relation to the first factor, at the beginning of the 21st century, a new product line, the glassware line, was introduced. The glassware line includes glass homeware products, such as drinking glasses, jars, and pots. According to the Supply Chain Manager, this line of products is oriented towards customers from low income groups. This market has increased considerably because of the improvement of low income groups' purchasing capacity in Brazil. In addition, the pharmaceutical container product lines were expanded in national and international markets. GM invested in infrastructure (e.g. buildings and equipment) and staff training in order to obtain relevant quality certificates (e.g. the Drug Master File issued by the Food and Drug Administration) that are demanded by the American market. As a result, the export of pharmaceutical containers has increased significantly.

The major change concerning the second factor, the improvement of information technology systems, was the implementation of the Systems Applications and Products in Data Processing (SAP).¹⁴ This system was introduced due to the need to integrate isolated Enterprise Resource Planning (ERP) systems, and to improve the quality and the speed of information generation, especially for the managers and directors. The implementation of the SAP started in October 2007 and is one of the newest initiatives at GM. Despite the fact that SAP is not yet fully implemented, the change has affected everyday activities in all departments, as will be observed in the remainder of this thesis.

Finally, another change relates to increased concerns with product quality because of higher quality requirements from GM's customers. The need for higher quality can be related to both changes in the market and changes in the technology used

¹⁴ Headquartered in Walldorf, Germany, SAP is the market leader in enterprise application software. Founded in 1972, SAP (which stands for "Systems, Applications, and Products in Data Processing") has a rich history of innovation and growth as a true industry leader. SAP applications and services enable more than 109,000 customers worldwide to operate profitably, adapt continuously, and grow sustainably. With revenue (IFRS) of €12.4 billion for the year 2010, SAP has more than 53,000 employees and sales and development locations in more than 75 countries worldwide. <http://www.sap.com/corporate-en/our-company/index.epx> Accessed 21 April 2011.

by customers. The market today requires lightweight glass products, with material of good resistance capable of meeting high quality standards.

4.2 The company's structure

4.2.1 Physical structure

As mentioned earlier in this chapter, GM has four manufacturing plants in the Northeast of Brazil. The main site is situated in one of the central states of the region. This site is called, hereafter, Factory 1. The head office of the group to which GM belongs is also located at this site. The second plant is located in the same state, about 30 miles away from Factory 1, and is hereafter designated as Factory 2. The third, Factory 3, is located south of Factory 1, and the fourth plant, Factory 4, is located north of Factory 1. Both are around 500 miles away, but still situated in the Northeast of Brazil. As stated earlier, Factory 3 and Factory 4 have been closed for more than 5 years.¹⁵ Despite this, the owners and managers of GM are considering re-launching them because business activity may expand. In fact, the space available in Factory 4 is used largely for warehousing and as a mini-distribution centre for customers that are located closer to it than to Factory 1. In addition, by the end of the field research period (September 2008), there was a clear intention to restart using one of the furnaces at Factory 4, because of an expected sales increase.

The field research was conducted mainly at Factory 1, which is located in one of the five largest metropolitan areas in Brazil with around four million inhabitants. The site is located less than 10 miles away from the city centre in this metropolitan area. Despite its proximity to the city centre, the site's surroundings are mainly rural, and very close to an untouched green area that is part of the coastal Atlantic Forest. As GM operates on a large site, the physical structure of its location is illustrated in the map of the site shown in Figure 4.1. The site is

¹⁵ For public information (for example the company's website and news release information), the company says that there are four factories.

divided into three main areas: (a) the head office, (b) the production area, and (c) the raw materials warehouse and IT.

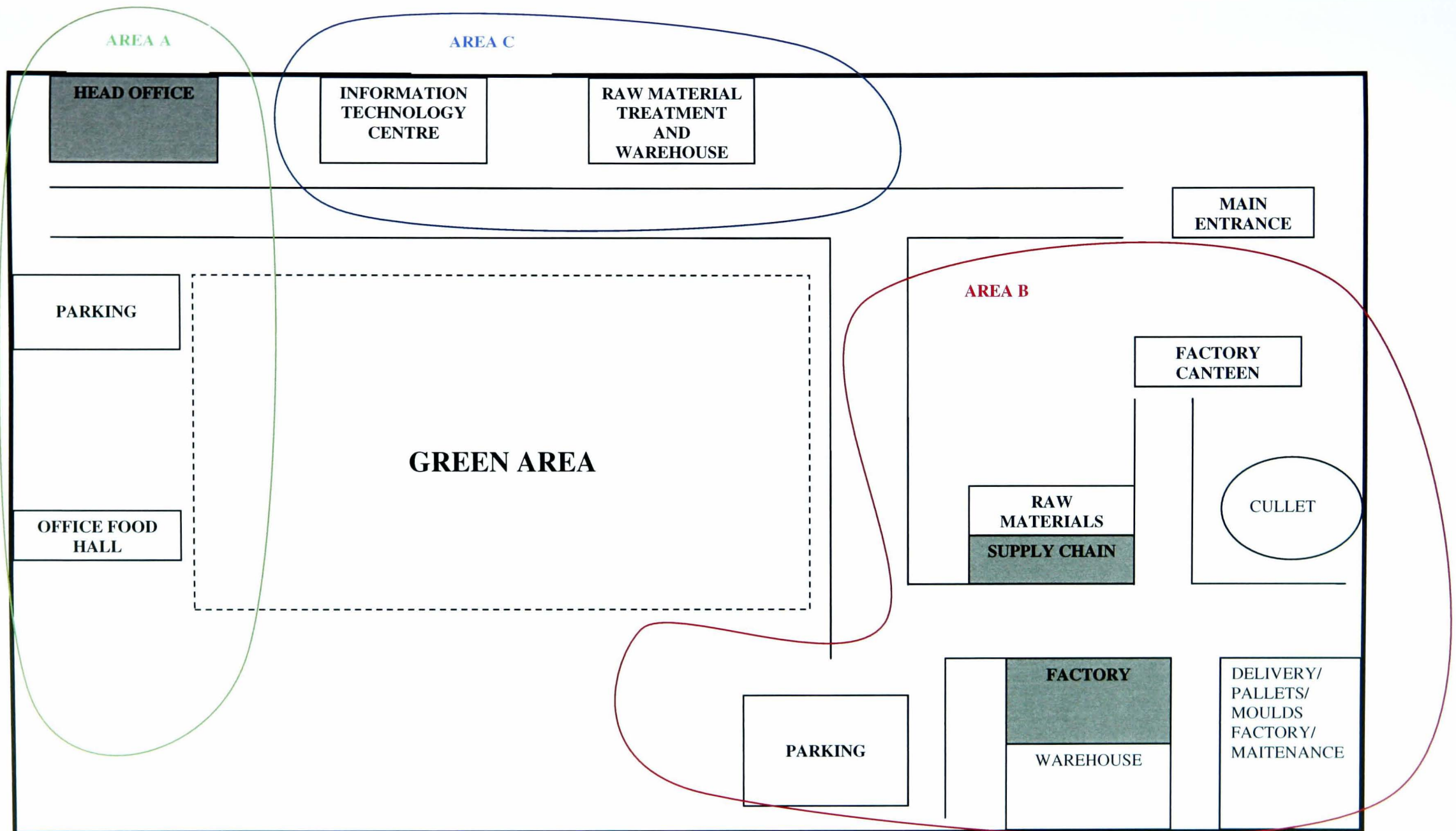


Figure 4.1: Layout of GM's physical structure

Area A is the head office area, where most of the administrative staff work. It is located about one kilometre away from the production area. Usually, employees from the head office were not seen in the production area and meetings, for staff from both the factory and the administration departments, took place in the head office building. The head office area includes the head office building, a car park for top level managers, a car park for staff and visitors, a porter's lodge, and a canteen. In the head office building, people work for all four companies in the group. It is where the staff of the following departments are situated: Sales and Marketing, Controllership, Human Resources, Legal and part of Information Technology (IT). The IT staff are divided into two parts: support staff and software development staff. While the former are located in the head office building, the latter work in the raw materials warehouse and IT area. This area is situated between the head office building and the production buildings. The raw materials warehouse holds part of the raw materials, but also finished products that cannot be held at the main warehouse. Due to lack of sufficient physical space, the software development staff are located in the production area.

The production area includes the factory and warehouse building, the raw materials building, a porter's lodge, a canteen, a moulding building, and a pallet recovery building. The factory and warehouse building is the largest building on the site. The factory has two furnaces in operation and an installed production capacity of 1,000 tons of glass a day, which is equivalent to 1.5 billion units¹⁶ per year. The warehouse is at the rear of the factory building and despite its large size, it is insufficient for storing all the inventories of finished products. The raw materials building is where raw materials are stored and prepared for production. In this building, the raw materials are received either from the raw materials warehouse or directly from suppliers and stored in silos.

The raw materials building has silos for each of the raw materials (sand, limestone, feldspar, and soda ash) in the upper part of the building. One exception is the cullet,¹⁷ which is initially stored in the open air in an area located between

¹⁶ The units are, for example, bottles, glasses, jars, and food containers.

¹⁷ The word cullet refers to broken pieces of glass which are melted down and used in the production of new products.

the composition building and the factory canteen. The cullet is divided according to its colour (e.g. white, green, amber) and its level of cleanness. Depending on the latter, it passes through a cleaning process at the cullet treatment area. The cleaning is repeated until the required level of cleanness is achieved. In addition to storing the raw materials, in the raw materials building, the mixture for glass production is prepared. The mixture or composition preparation consists mainly of weighing and mixing the raw materials including the cullet, and other chemical ingredients that are relevant to the process. The materials are weighed, mixed and transported via belts passing underneath the road to the factory.

The Supply Chain Department is located in front of the raw materials building. Most of the employees working in this department are from the Purchasing Section.¹⁸ In addition, the Process Analyst, the Production and Operations Planning Supervisor, and the Logistics Supervisor are based in this department. In the production area, there are also buildings parallel to the factory and warehouse building in which several activities, such as mould production, pallet recovery, maintenance, and delivery take place.

As can be observed in Figure 4.1, the site has one main entrance to all three areas. At this main entrance, there are two security porters in charge of controlling the flow of vehicles (cars, motorbikes, bicycles and lorries) and pedestrians. They ask entrants to the site for identification before allowing them access. The flow of lorries is usually intense and the drivers have to park the lorries and wait in a queue on the way into the production area. The lorries may be from suppliers who deliver materials, from customers collecting a delivery, or GM owned lorries used for the internal movement of materials or products between the various sites.

During the field research, on some days this flow was much more intense than others. In fact, on some days several lorries could be seen parked outside the main entrance due to the lack of appropriate space inside GM's site. After waiting, sometimes for hours, or up to a whole day, the lorry drivers are called by the porter via a loudspeaker to enter the production area. A few metres after this on

¹⁸ The sections are sub-divisions within the departments (see details of the company's organisational structure in section 4.2.2).

the right there is a scale to weigh the vehicles. All of the freight vehicles have to stop on the scale. In addition to checking the weight of the lorries, this stop is important for fiscal purposes since it is where the tax invoice is emitted. It later emerged that the queue of lorries was due to a lack of efficiency when receiving customers and suppliers. For example, the reception of raw materials was prioritised due to the urgent need for materials in the factory – with suppliers being given priority ahead of customers.

4.2.2 Organisational structure

GM is part of a family business group, which is organised in a vertical hierarchical structure. The board of directors and departments such as Controllershship, Legal, Human Resources and Information Technology operate for all four companies in the group. This can be observed in the organisational chart presented in Figure 4.2. It is important to highlight that the Controllershship and the Information Technology Departments are subordinated to the Finance Director and work for all four companies in the group.¹⁹ To some extent, it might be said that most of his time is spent on activities related to GM. However, there is a need to share resources such as electricity, investment funding and the property development company.

¹⁹ The Controllershship department is further detailed in section 4.4.

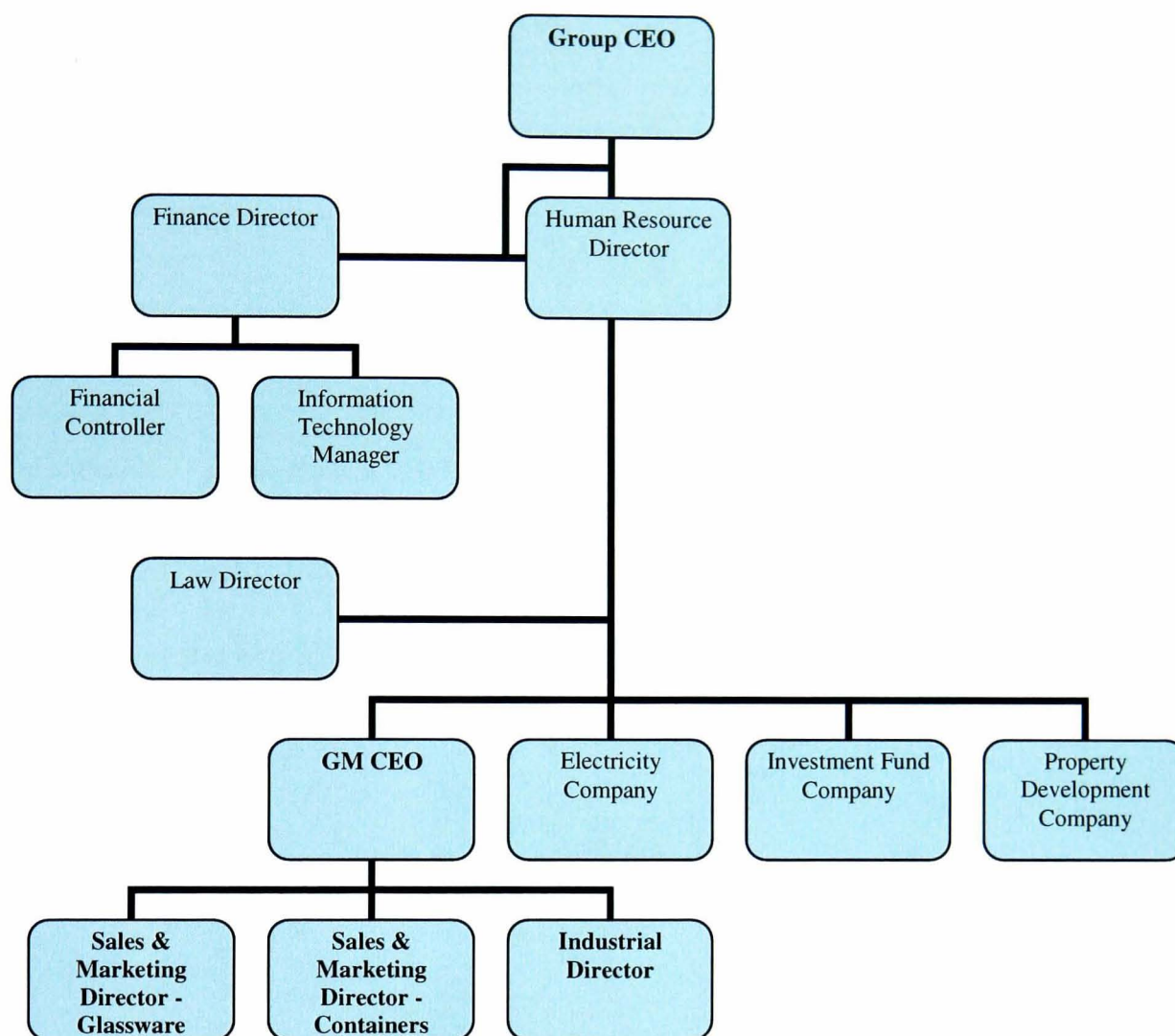


Figure 4.2: Group organisational chart flow

The chief executive officer (CEO) of the whole group was the president/CEO of GM until 2007. When he became CEO of the group, the Sales and Marketing Director of the glass company became its new president/CEO of GM and the Sales Manager became the new Sales and Marketing Director of GM's containers segment. There is also a Sales and Marketing Director for the other major segment, glassware. These directors work alongside the Industrial Director to whom the Supply Chain Manager reports.

As the field research focused on the glass containers segment, only the structure of the Sales and Marketing Department of the containers segment is presented in Figure 4.3. The department is firstly divided into sales and marketing. The sales division is sub-divided into sections according to product lines, namely, alcoholic containers, non-alcoholic and food containers, pharmaceutical containers and

small customers (e.g. small local producers of food and drink). Each section has a sales manager who is responsible for dealing directly with their customers. The marketing division works for all products.

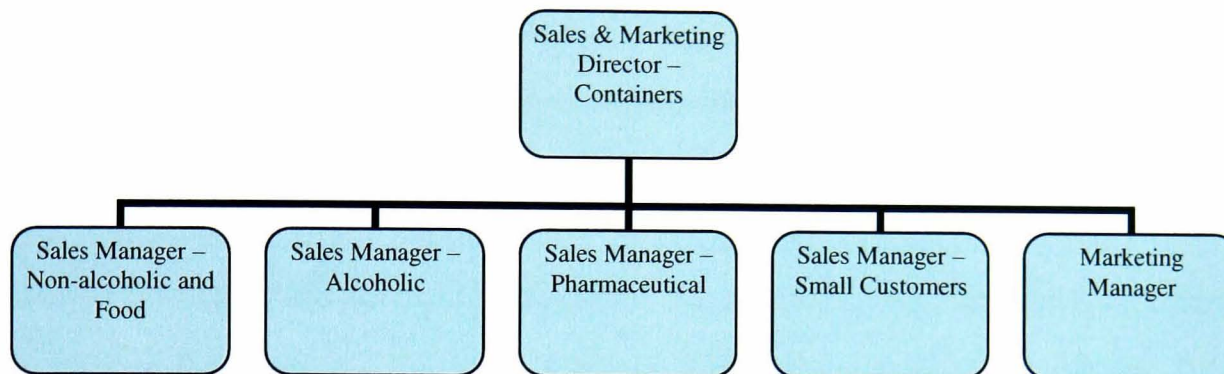


Figure 4.3: Sales and Marketing organisational flowchart - Containers Segment

In addition to the Supply Chain Manager, a number of other middle managers are also subordinated to the Industrial Director, as can be observed in Figure 4.4.

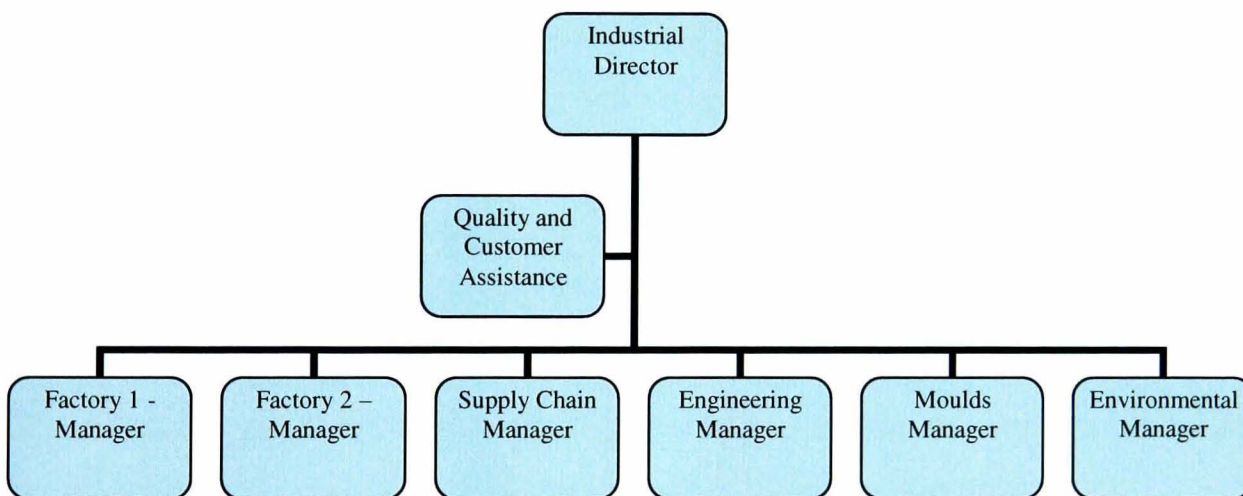


Figure 4.4: Factory organisational flowchart

The field research was carried out in the Supply Chain Department. This department was created in 2007 when a Supply Chain Manager was recruited by GM. Previously, he was employed as one of the owners of a consultancy firm in Sao Paulo which works with logistics and SCM. He carried out some consultancy work for GM and highlighted how GM could benefit from the implementation of SCM initiatives, such as the use of the warehouse management system (WMS).²⁰

²⁰ A Warehouse Management System, or WMS, is a key part of the supply chain and primarily aims to control the movement and storage of materials within a warehouse and process the

The Supply Chain Department was created by him. Although the Supply Chain Department is not yet fully operational, its structure is presented here based on the Supply Chain Manager's implementation plan.

The main sections of the Supply Chain Department are illustrated in Figure 4.5. The Process Analyst is the most important employee in the Supply Chain Department after the Supply Chain Manager. She works on most of the projects in this department. Some examples of her responsibilities are to consolidate the Daily Routine Management (described in section 4.4), to prepare detailed processes mapping for the Supply Chain Manager, and to work on the supply chain operations reference-model (SCOR)²¹ and the VMI (see details in chapter 5) projects. In addition, the Supply Chain Department is divided into the following sections: Sales and Operations Planning (S&OP), Logistics, Services Centre, and Purchasing. While the S&OP and the Services Centre sections are new and they are still being developed, the Logistics and Purchasing sections are fully functioning. The Sales and Operations Planning (S&OP) section is headed by a Demand Planning Supervisor. This section provides the link between the Sales and Marketing Department and the Production function. While the former calculate expected demand, the latter is responsible for providing products to meet customers' demands. The expected demand data is included in the demand planning system and analysed in conjunction with the inventory levels data to determine the production plan. Due to the relevance of the Demand Planning Supervisor's job, this role is described further in chapter 5 (section 5.4.1).

The Logistics Department is responsible for the activities related to the warehouse, the moving of finished products, and the deliveries to customers. In the glass containers business, most of the deliveries are made by a third party.

associated transactions, including shipping, receiving, putaway and picking. The system also directs and optimises stock putaway based on real-time information about the status of bin utilisation (Wikipedia, 2009, http://en.wikipedia.org/wiki/Warehouse_management_system, accessed 4th February 2010).

²¹ The Supply Chain Operations Reference-model (SCOR) is a process reference model that has been developed and endorsed by the Supply Chain Council as the cross-industry standard diagnostic tool for supply chain management. SCOR enables users to address, improve and communicate supply chain management practices within and between all interested parties. <http://www.supply-chain.org/resources/scor> Accessed 27 February 2010.

Usually, the third party is a logistics and transportation company that is hired by the customer and is responsible for collecting the glass containers at GM and delivering them to the customer's production plant. GM's role is to load the lorries according to the customers' orders. Initially, the service is provided on a first come, first served basis. According to the Process Analyst, this causes a lot of operational problems and long hours are necessary to load all of the lorries at GM's site. This is particularly busy at the end of the month when a high concentration of sales and deliveries is usually the norm. In May 2008, a scheduling scheme was implemented. With this new scheme, the customer has to inform GM at least 48 hours in advance of collections that will be done by the third party. Although this change brought several improvements to the delivery activities, until the end of the field research period (September 2008), disruption and long waiting hours were still faced by lorry drivers.

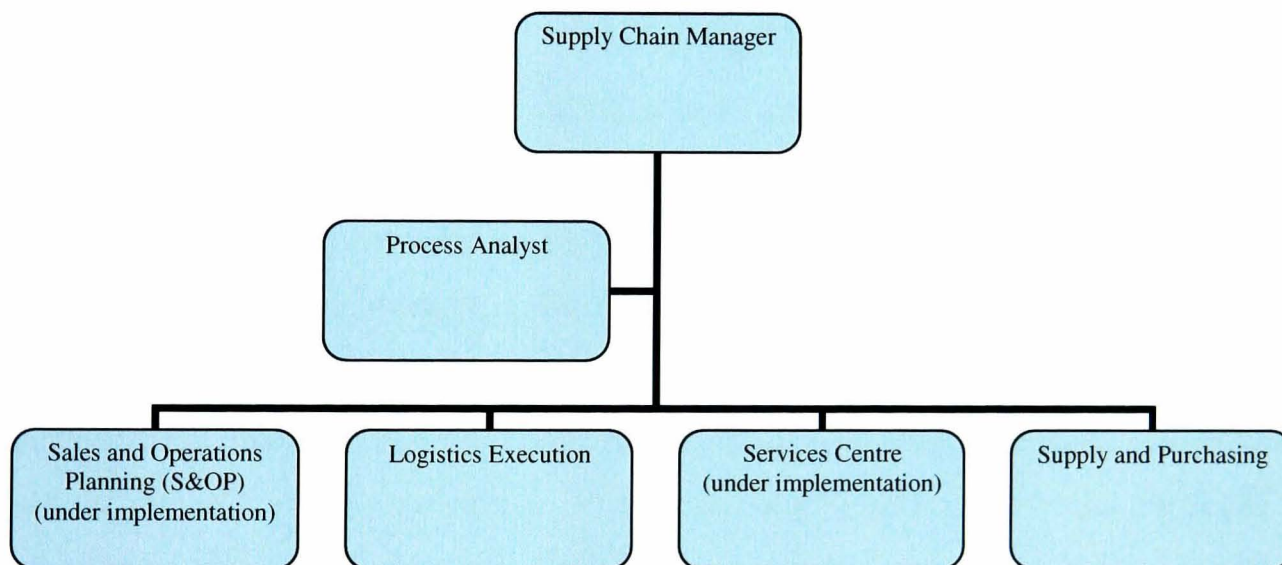


Figure 4.5: Supply Chain Department organisational flowchart

4.3 Supply chain/supply network

Figure 4.6 below shows a diagram of GM's supply chain/supply network. The diagram is based on the field research observation according to the purpose of the analysis of this thesis. Thus, it provides an overview of the company's most important inter-organisational links. It contains the GM's first tier suppliers (on the left side) and first, second and third tier customers (on the right side). GM's

suppliers, internal operations and customers are described in the following sections.

4.3.1 Suppliers

GM has a great influence over its suppliers of raw materials. GM owns land and carries out some of the operations for the extraction of raw materials (e.g. the sand dunes are owned by GM, and, hence, the extraction of sand is done by GM). The power of GM in relation to its suppliers is associated with GM's management policies, and results in the storage of a high quantity of materials. The level of materials stored is determined by a rudimentary process. The silos of materials should be full most of the time. Every morning they are measured with a rope, which aims to estimate the empty area. The rope is used to measure how much material is inside the silo and the difference between this and a full silo is the amount of materials necessary for the day.

The sand is supplied from dunes located near the factory (about 45 minutes by road). The extraction and treatment process of the sand (mainly the removal of iron and humidity) are conducted by GM. The sand is received 3 times a week at GM's site. According to the Composition Supervisor, sand is brought to GM on Mondays, Wednesdays, and Fridays, in about 30 to 35 journeys per week. On each journey, the lorries each carry around 20 tons of sand, giving an inflow of 600 to 700 tons of sand per week. Part of the sand is taken to the raw materials warehouse and is then transported internally around the factory site for use in the manufacturing process, as required by the composition staff. In addition, part of the sand is carried straight to the factory site and placed in an open air area of the raw materials building. Although the space is covered, if it rains, the humidity of the sand is affected, and it is necessary to wait for the sand to dry. The quantity of sand required depends on the production planning and control needs and the level of inventory available. This results in repetitive work, duplication of resources, and non-value added activities.

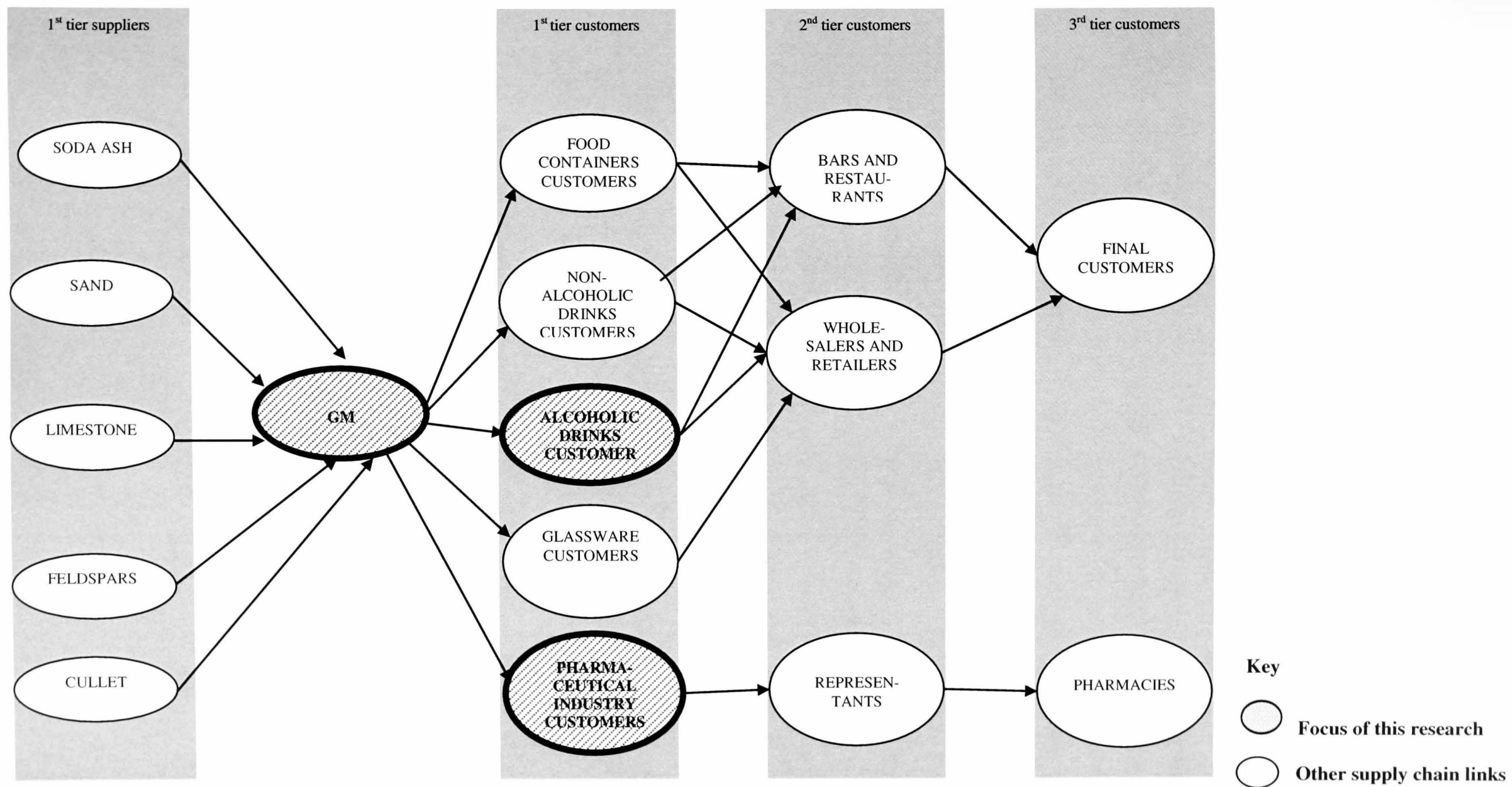


Figure 4.6: GM's supply chain/network
Elaborated based on the field research

GM owns the limestone and feldspar mines used for its factories. The mines are situated in different states of the country, but in the same geographic region. The transportation of the materials from the mines to the GM factory site is less than 6 hours by road. Despite the ownership of the mines, the extraction of limestone and feldspars is done by third parties. GM gives a concession for the extraction to a few suppliers. Both the sedimentary rock and the mineral are taken to GM in stone format. The final stage of the preparation of limestone and feldspar used in the production of glass (the conversion from stone to powder) is carried out at the GM site, in the warehouse located in Area C. These materials are then internally transported to the raw materials building as required by the composition staff.

In relation to the cullet, there are two sources, internal and external. Part of the cullet comes internally from glass manufacturing which is rejected because of quality problems or because it cannot be sold in the market. In addition, cullet is brought to the factory by several suppliers on a daily basis. As a cullet buyer, GM is a monopsony because it is the only factory in the region interested in buying cullet. The prices of the cullet brought by the suppliers are set according to the colour of the cullet (white cullet is more valuable) and its level of cleanness. The main colours are white, green, blue, amber, and mixed cullet. If necessary, the cullet is treated in the raw materials building. The treatment of the cullet consists of washing and cleaning before storing it in containers.

In addition to the suppliers of raw materials, GM deals with suppliers of machines and mouldings. The factory machines are provided by a German manufacturer, which is a leader in the manufacture of high performance glass technology. Employees from GM were trained in Germany and technicians from the machines manufacturer visited GM's plant to adjust the machines and give further information regarding their use. It is important to mention that the moulds used in the glass production are both manufactured inside GM and imported from various international suppliers.

1.3.2 Internal operations and logistics

The internal activities at the GM site start with the receipt of materials. As mentioned in the description of the site, on arrival all lorries are weighed and directed to the appropriate area in the site. The materials are received either at the warehouse site (where in the past there was a ceramic manufacturing plant and currently the limestone and the feldspar are converted from rocks to ground) or at the raw materials building on the factory site. The materials are transported to the raw materials building as required and are stored in the silos, as explained above. From the silos, the materials are weighed and mixed in the composition process and taken to the furnaces in the factory across the road. The glass products are then manufactured, palletised, and taken to the warehouse. There are also two mini-factories, one to provide moulds, and the other to organise and repair the pallets returned from the customers. Despite the existence of a moulding mini-factory, most of the moulds are, in fact, imported, as the products are delivered to multinational companies.

Inside the finished products warehouse, a lot of product movements take place and the WMS system is used. This system automatically identifies available space in the warehouse for placing the new pallets coming from the factory. It also suggests where to pick up the pallets for loading the lorries. Despite the benefits to organisation and speeding up operations, there are drawbacks to the system. Sometimes, there are free spaces in the warehouse, but the pallets are placed outside the warehouse in open air areas. This situation happens when special rearrangement of pallets inside the warehouse is necessary in order to create space for new pallets, but the system sometimes fails to recognise this possibility. Another problem is the interface between the WMS and the SAP system, which has frequent break-downs. As a result, to update information, the warehouse employees have to either wait for the interface to be in operation again or add the data manually.

1.3.3 Market and customers

GM's customers are mainly from the food, drinks, pharmaceutical and retail sectors. To the food and drinks industry, GM is a supplier of glass containers, while to the retail sector, it is a supplier of glassware for household usage. Customers in the food industry include businesses producing olives, olive oil, honey, coconut milk, conserved fruits, jam, and pickled vegetables. The packaging produced for these customers is known as food containers. The second major group of products is glass bottles for drinks. Purchasers of this type of packaging include multinational giants such as Coca-cola, Anheuser-Busch Inbev, and Pernod Ricard.

These customers purchase glass bottles for non-alcoholic and alcoholic drinks. While Coca-cola is a customer of bottles for non-alcoholic drinks, Pernod Ricard purchases bottles for alcoholic drinks, and Anheuser-Busch Inbev is an important buyer of both non-alcoholic and alcoholic drinks bottles. However, as Anheuser-Busch Inbev is the only customer of both types of drinks, the Sales and Marketing Department is divided according to the types of products (non-alcoholic and alcoholic drinks bottles) because they attend different customer markets.

The other customers are in the pharmaceutical and in the retail industry. The customers from the pharmaceutical industry are both national and multinational. Multinational customers in the pharmaceutical industry include, for instance, GSK and Bayer. The customers in the retail industry purchase home glassware products, and they are both small local shops and large multinational firms such as Wall-Mart and Carrefour, and Brazilian national customers such as Lojas Americanas and Magazine Luisa.

4.3.3.1 Food container customers

Two examples of food container customers are described here. One of them produces coconut milk, a very popular ingredient in Brazilian food recipes, especially in the Northeast of the country. This customer is located about 4 hours

south of GM by road. The demand for coconut milk is particularly high in June when there is a large folk festival celebrating 'Sao Joao', and coconut-based products are traditionally consumed. This festival is observed more intensely in the Northeast of Brazil than in other regions. Therefore, sales to this customer are highly affected by seasonality.

Another customer in this industry produces pickled vegetables. This customer is located in another region of Brazil, about 1,000 miles away from GM. One of the Sales Managers mentioned that this customer also buys from other glass manufacturers located in the South of Brazil (even further away from the customer). She said, however, that GM is their preferred choice. Indeed, GM is usually chosen as its glass supplier. However, when the costs of GM glass become too high, this customer buys from GM's competitors. Suppliers in the South Region of Brazil can be competitive in terms of price, carrying empty containers of glass for a much longer distance (this can be more than 2,000 miles). It is problematic for GM when these suppliers can provide glass containers to the customers located close to GM at the same or a cheaper price.

4.3.3.2 Non-alcoholic drinks customers

Two major customers of bottles for non-alcoholic drinks are Coca-cola and a local customer. In Brazil, Coca-cola opened industrial plants in Recife and Natal (both in North-East Brazil) in 1942. They were among the first factories introduced into the country and they have contributed to Brazil's industrial development. GM has operated as Coca-cola's supplier since the beginning of its own operations. Indeed, Coca-cola was one of GM's first major customers of bottles for non-alcoholic drinks in Brazil. In Brazil, Coca-Cola sells fizzy and soft drinks, juices, and bottled mineral water. However, GM is a supplier only of glass bottles for fizzy drinks, such as Coke, Diet Coke, and Coke Zero. GM supplies glass bottles of several different sizes to Coca-cola. However, competition from other types of packaging suppliers is fierce. Coca-cola also uses aluminium cans and plastic bottles. Therefore, GM is just one of the packaging suppliers to Coca-cola and price comparisons with other suppliers are common.

The glass bottles are often returnable, as with milk bottles in the UK. Returnable bottles of Coca-cola were very popular in Brazil in the 1980s. They were used in bars, restaurants and hotels, and by final customers for home consumption. However, after the introduction of the other types of packaging and with the increasing popularity of this alternative packaging, the demand for returnable bottles declined. The introduction of the 2 litre plastic bottle of Coke changed the consumption of Coke in Brazil. Prices are generally much cheaper for one large 2 litre plastic bottle than for two 1 litre glass bottles.

The other important customer of glass bottles for non-alcoholic drinks is a Brazilian producer of tropical fruit juices. Their major product is concentrated fruit juice, which is sold in glass bottles. Tetra pak and aluminium can packaging have become very popular in Brazil and glass bottles of juices are now in the minority on supermarket shelves. Despite this, it is important to emphasise that according to the Sales Manager of this segment, GM has a good and long-term relationship with this customer, and they have worked together on the development of new products. From discussions with GM's Sales Manager responsible for this customer, joint-action was taken for the development of a new glass bottle for peach and lime ice tea. In this initiative, GM's Sales Manager mentioned that the local customer's employees were very open to GM's suggestions. However, one of the problems identified in relation to this joint-action was the fact that it was more reactive than proactive. As the Sales Manager mentioned, the customer was contacted when the level of the drink's sales was decreasing, instead of at pre-established scheduled visits from GM's sales staff.

4.3.3.3 Alcoholic drinks customers

As explained in section 4.1, following the emergence and growth of alternative packaging materials in the food and drinks industry, such as tetra pak packaging, PET bottles, and aluminium cans, GM has experienced a reduction in the share of sales of glass bottles in the non-alcoholic drinks market. As a consequence, customers of bottles for alcoholic drinks are increasingly important. According to

he Sales and Marketing Director, operations with these customers are both continuous and profitable. Most of the customers in this sector are large ones, including: Anheuser-Busch Inbev, Pernod Ricard, Ypioca, Diageo, and Campari, with Anheuser-Busch Inbev being a customer of bottles for both alcoholic and non-alcoholic drinks. This latter customer is located one hour by road south of GM. Anheuser-Busch Inbev produces beer and fizzy drinks and has been quite an influential customer for a long time. Other fizzy drinks customers include Pepsi and Guarana Antarctica. The latter is a very popular fizzy drink in Brazil. Both are important competing products to Coca-cola. Customers who produce beer include Brahma, Skol, Antarctica, and Bohemia.

The relationship with Ypioca is interesting because, according to the Sales Manager for Alcoholic Drinks (Sales Manager for AD) this customer sends accurate forecasts for the monthly demand and is committed to purchase the amount of products forecasted. Consequently, Ypioca's purchasing staff buy bottles even when they are no longer necessary for the company's monthly production. However, they maintain high stock levels of empty glass bottles at their manufacturing plant and GM also maintains a large number of their bottles in stock. In addition, according to the Sales Manager for AD they could send earlier forecasts more often in order to improve GM's sales plan and production plan. Despite these inefficiencies, the Sales Manager for AD sees this relationship as unproblematic.

In contrast, Campari uses the just-in-time approach to inventory control, and has very low levels of inventories in its factory. The stocks are held at GM and at the Campari plant, but Campari holds only the units necessary for short-term production. Campari is located only about one hour south of GM's plant, and there is insufficient physical space in its plant to store many empty glass bottles which will be used in its production process.

4.3.3.4 Pharmaceutical industry customers

GM has invested a large amount of money in the structural development of physical premises and equipment to meet the requirements of customers in the pharmaceutical industry and create a sterile environment for their production. All of the glass containers for these customers are produced in Factory 2 and, according to the Supply Chain Manager, quality is always a major concern. The main advantage of these products is that they occupy much less physical space than the others and can be exported to different countries, such as the United States and Europe.

4.3.3.5 Glassware customers

Glassware products are sold directly to retailers in different geographical regions of Brazil. The transportation is conducted using GM's own fleet of lorries. The production of glassware is carried out in Factory 2, and requires more intense use of human resources. Extra workers are necessary for carrying out quality checks, for putting the lids on the top of food pots, and for preparing kits, such as sets of six glasses, or mixed size containers. GM has started to produce large vacuum flasks for dispensing coffee as well, which are a very popular product in Brazil.²²

4.4 GM's accounting information system

This section presents information about GM's internal accounting system, including its problems. This section is important since this research found a significant relationship between GM's internal accounting system and the action research project (see chapter 6). In addition, this section also reveals that at GM, management accounting was regarded as being less relevant than financial accounting. The section is divided into three parts. It begins by describing the organisational structure of the Controllership Department which is responsible for accounting information at GM. It then goes on to describe the main accounting

²² Usually, the coffee is prepared and kept in a large pump-action vacuum flask for consumption in small portions.

and accounting-related reports used at GM. It finishes by examining the main problems of GM's internal accounting system.

4.4.1 Structure of the Controllership Department

At GM, the Controllership Department is responsible for the production of accounting reports. This department is subordinated to the Finance Director and serves all the companies in the group by providing accounting and taxation information.²³ The Financial Controller left the company in April 2007, one month after the beginning of the field research. The vacancy was filled by the Cost Consultant who acted as Interim Financial Controller until the appointment of a permanent replacement. By the end of the field research, the vacancy had not been filled.²⁴ The Controllership is divided into three main sections: Financial Accounting, Cost Planning and Control, and Taxation (see figure 4.7).

The Financial Accounting Section is supervised by the main accountant in the group. She is responsible for gathering data and preparing accounting reports for all four companies in the group. The main report is the book of managerial information (BMI), which includes, amongst other things, the profit and loss account, the balance sheet, and the cash flow statement (see details below). The Cost Planning and Control Section is also supervised by an accountant, who is responsible for the generation of cost and management accounting information in the organisation. The section's main activities are gathering information to calculate the costs of production and the preparation of cost reports. The main problem identified in this section seems to be the focus on reporting on past events instead of preparing future forecasts. The Taxation Section is mainly concerned with issues related to tax payments.

²³ The Finance Director is also responsible for the Information Technology (IT) Department and is the President of the Investment Fund which is part of the group.

²⁴ By March 2010 the Financial Controller vacancy was filled.

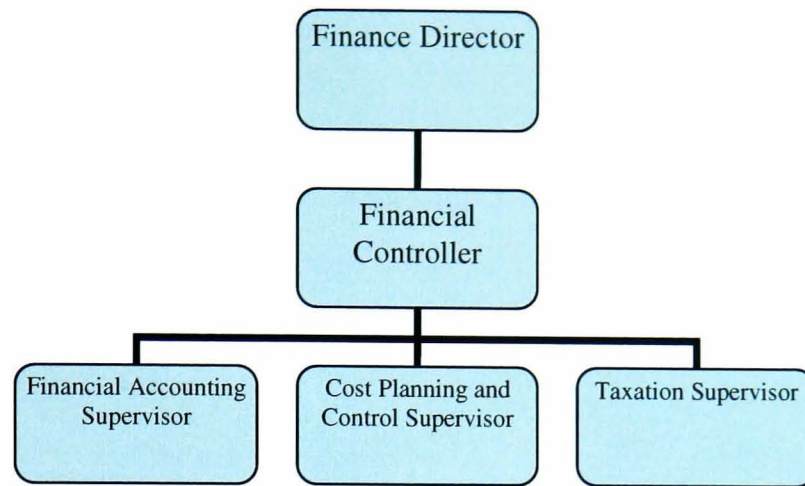


Figure 4.7: Controllership Department organisational chart

4.4.2 Main accounting reports

4.4.2.1 Book of managerial information (BMI)

GM's most important accounting report is the BMI. It is a monthly report that includes GM's financial results and is prepared for Board meetings. Although the name of this report includes the expression 'managerial information' and it is used for planning and decision making, the BMI contains predominantly financial accounting information. It consolidates information regarding accounting, sales and production. It consists of Microsoft Excel spreadsheets grouped into three main categories: Financial and Administrative Statements, Commercial Statements, and Industrial Statements. A translated version of the contents page of this report is presented in Figure 4.8 below.

GM – Glassware Manufacturer	
BOOK OF MANAGERIAL INFORMATION (BMI) - INDEX	
Financial and Administrative Statements	
Name of person Responsible – Finance Director	
	Page
<u>Preliminary comments</u>	04
<u>Balance Sheet</u>	05
<u>Profit & Loss Account</u>	06
<u>Cash Flow Statement</u>	07
<u>Financial Statement - 1st page</u>	08
<u>Chart - Profit & Loss Account</u>	09
<u>Profit & Loss Account including tax effects</u>	10
<u>Other Generic Expenses</u>	11
<u>Other Tax Expenses</u>	11
<u>Exchange Rate Income</u>	11
<u>Interest on Short Term Loans</u>	11
<u>Exchange Rate Expenses</u>	11
<u>Depreciations</u>	11
<u>Accounts Receivable</u>	12
<u>Stock Turnover</u>	13
<u>Wages and Salaries</u>	14
<u>IT Expenses</u>	15
Commercial Statements	
Name of person Responsible – Sales and Marketing Director	
<u>Preliminary Comments</u>	17
<u>Operational Planning December</u>	18
<u>Sales Returns</u>	18
<u>Sales</u>	19
<u>Chart 1 – Evolution of Sales, Production and Costs</u>	20
<u>Chart 2 - Revenues per Line of Product, Cost of Production, and Cost of Sales</u>	21
<u>Travel Expenses</u>	22
<u>Transportation Expenses</u>	22
<u>Commercial Discounts</u>	22
<u>Export Expenses</u>	22
Industrial Statements	
Name of person Responsible – Industrial Director	
<u>Preliminary Comments</u>	24
<u>Natural Gas</u>	25
<u>Furnace and Electricity Consumption</u>	26
<u>Raw and Secondary Materials</u>	27
<u>Maintenance and Repairs</u>	28
<u>Moulds and Accessories</u>	29
<u>Intermediate Materials</u>	30
<u>Operational Expenses</u>	31
APPENDIX	
<u>Appendix 1 – Financial Statement</u>	37
<u>Appendix 2 – Other Expenses and Operational Expenses</u>	38
<u>Appendix 3 – Financial Waiver</u>	39
<u>Appendix 4 – Accounts Receivable Report</u>	40
<u>Appendix 5 – Evolution of Accounts Receivable per Superior</u>	41
<u>Appendix 6 – Sales Chart per Product Lines</u>	42

Figure 4.8: Book of managerial information (BMI)

As can be observed in Figure 4.8, the Financial and Administrative Statements spreadsheets include the main financial reports, namely, the balance sheet, the profit and loss account, and the cash flow statement. In addition, they contain the

following spreadsheets prepared using accounting information, namely, the profit and loss account including taxation effects, other generic expenses, other tax expenses, exchange rate income, interest on short term loans, exchange rate expenses, depreciation, receiving accounts, stock turnover, wages and salaries, and IT expenses.

The profit and loss account includes the effects of taxes and shows how national and regional taxes influence the results of the company. The company pays taxes to the local and national governments. GM receives a discount and is allowed a delay in payment of local taxes to the state government of the state in which it operates. This benefit creates an increase of about 5% in earnings before income tax, depreciation, and amortisation (EBITDA) calculated in relation to the operational results of GM.

EBITDA is a profitability indicator which has become very popular with international companies (Busco, Giovannoni and Scapens, 2008; Malmi and Ikäheimo, 2003; Malmi, 2001). It is one of the most important indicators used in the BMI and one of the most utilised by managers and employees to refer to GM's performance. At GM, the EBITDA measure was displayed on the walls of every department, together with the balanced scorecard (BSC). However, GM's staff were more concerned with EBITDA results. According to the Supply Chain Manager, since its introduction EBITDA has become more important than the BSC. He said:

In the last couple of years we stopped using the BSC. Now the focus is on three indicators: EBITDA, the Net Operating Revenue, and the EVA. Each department has specific measures which help us to control or influence the direction of the department in relation to these performance indicators.

GM's Supply Chain Manager, March 2010

The Commercial Statements focus on the operational results and include reports such as operational planning, sales, sales returns, travel expenses, discounts, and export expenses. The main Industrial Statements are natural gas consumption,

electricity consumption of the furnaces, raw and secondary materials, repairs and maintenance, moulds and accessories, other materials, and operational expenses.

Although the BMI focuses more on financial accounting (FA) than management accounting (MA) information, it also has some managerial aspects that are relevant to this research. For example, in the preliminary comments of the Commercial Statements, there is information about sales revenues for each operating factory by product line segment, that is, alcoholic, non-alcoholic, food, and pharmaceuticals. The data is compared to the sales forecast, and the percentage of accuracy of the demand forecasts are also presented and commented on by segment. The percentage difference between the forecasts and the actual data are explored by highlighting the products that had greater discrepancy. For example, in one of the reports more discrepancy was observed in the data for the alcoholic drinks industry than the other industries. The demand forecast for one of the customers in the alcoholic drinks industry was underestimated by 62%.

The Operational Planning Sheet shows the total sales in units, in tonnes and in the Brazilian currency (The Real or Reais). The sales returns are also presented in this sheet. Two other managerial sheets are: Chart 1 – Evolution of sales, production and costs, and Chart 2 – Revenues per product line, cost of production and cost of sales. They show a comparison between sales, costs of production and costs of sales. While the former shows the totals, the latter shows the values per unit.

4.4.2.2 Balanced Scorecard (BSC)

Balanced Scorecard (BSC) is a performance measurement system developed in the United States by Kaplan and Norton (2001) which aims to align an organisation's strategy with its business activities. BSC has been widely used in different regions of the world, ranging from Scandinavia (Ax and Bjørnenak, 2005; Malmi, 2001) to the Middle-East (Busco, Quattrone and Riccaboni, 2007). However, it has been criticised in academic literature due to the difficulties in linking strategy with operations (e.g. Norreklit, 2000). At GM, similar problems can be observed, as will be discussed in this thesis.

BSC provides evidence of the use of an advanced management accounting technique (Burns and Vaivio, 2001) at GM. The BSC system was developed and implemented by an external consultancy organisation in 2007. The model is based on Kaplan and Norton's (1996) work and was introduced in conjunction with the daily routine management (DRM) which refers to a set of performance measures, which will be explained in section 4.4.2.3.

Kaplan and Norton (1996) suggest that BSC is divided according to the following perspectives; financial, customer, internal processes, and learning and growth (illustrated in Figure 4.9 below). As can be observed in Figure 4.9, a lot of emphasis is given to the internal processes perspective. Another interesting aspect of the model used by GM is the clear distinction between measures according to the main product lines, packaging and glassware. This distinction is clear in both the customer perspective and the internal processes perspective. Indeed, it might be said that the financial and the learning and growth perspectives present more generic indicators, whereas the customer perspective and the internal processes perspective include more specific measures, as some of them are closely related to either packaging or glassware. In addition, they seem to be more driven by the internal managerial needs of GM than the other two.

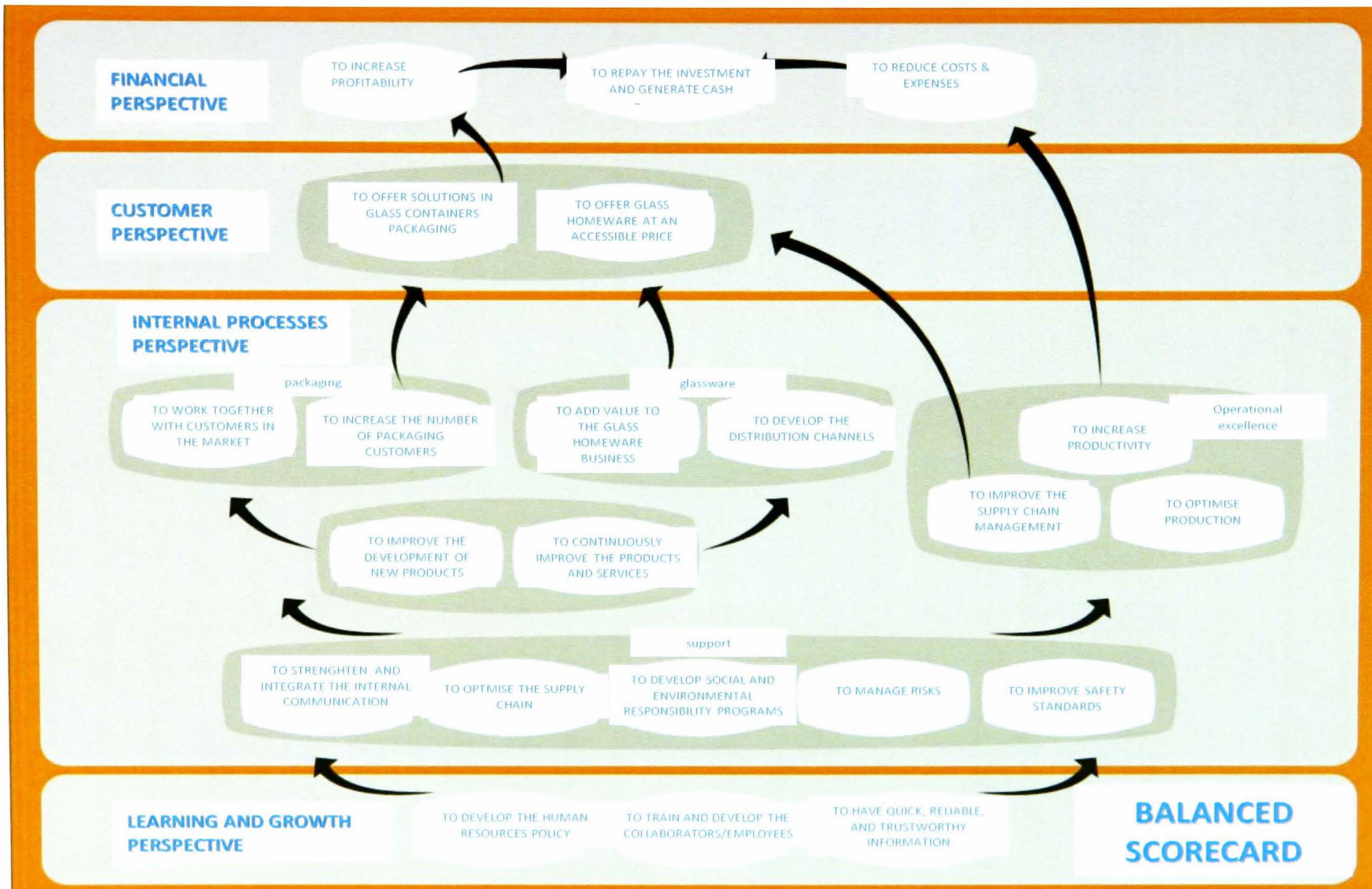


Figure 4.9: GM's Balanced Scorecard

Targets for the financial perspective are growth, profitability, investment repayment and cash generation, and reduction in costs and expenses. The strategic goals of GM include the profitable expansion of its activities. There is a requirement to repay the investment and to generate cash from the company's own operations. Moreover, the control of costs and expenses, and possible reductions in these is also taken into account in the financial perspective of GM's BSC.

The perspective focused on customers is divided according to the two main product lines, packaging and glassware. This perspective does not provide detailed evidence, however, of GM's aims in relation to their customers. Two broad objectives underpin this perspective. These are to offer innovative solutions in glass container packaging, and offer practical glass homeware products at an accessible price. The lack of sufficient development of this perspective is evidenced by the fact that there are no indicators relating to the Supply Chain Department. Indeed, according to the Sales and Marketing Director, his department uses the DRM measures more often than the BSC.

The internal processes perspective is related mainly to the Production and Supply Chain Departments. It has a larger number of aims, but the main aims relate to the two main lines of products, packaging and glassware. For packaging, the goals are to work together with customers in the market and to increase the number of packaging customers. For glassware the focus is on improving the perceived value of the business and on the development of the distribution channels. The other aims of the internal processes perspective are related to operational excellence and support activities. The former includes goals concerned with the improvement of operations, such as increases in productivity, improvements in SCM, and production optimisation; while the latter involves improvements that will enable the other aims to be achieved, such as strengthening and integrating internal communication, optimising the supply chain, developing social and environmental responsibility, risk management, and the improvement of work safety standards.

Finally, the learning and growth perspective, which is related to the development of human resources, includes the development of the human resources policy as a

whole, training and development to improve the skills of collaborators and employees, and having quick, reliable, and trustworthy business information.

The BSC targets are linked to operational measures that are structured in the Daily Routine Management (DRM) system that is explained in the following section. Table 4.1 presents a sample of this relationship. It contains some of the targets identified by the Supply Chain Department, which are part of the financial and the internal processes perspective. The table also shows a description of the targets and presents the DRM indicator followed by the way it is measured at GM. For example, the first target presented in the table is ‘to reduce costs and expenses’. It is in the financial perspective of GM’s BSC and its description is ‘to reduce costs and operational expenses, while maintaining quality excellence and the level of customer service’. The DRM indicator which assesses the achievement of this target is ‘logistics expenses’ and is measured by the ‘total expenditure on logistics operations’.

In relation to SCM operations, the last target presented in table 4.1 is ‘to improve supply chain management’, which is described as: (1) ‘to improve logistics through improving the level of accuracy of the demand forecast, and by completely meeting the sales orders from customers; (2) to control distribution, meet deadlines and speed up deliveries; and (3) to be a forceful actor in the supply chain’. Two corresponding DRM measures are ‘accuracy of demand forecast’ and ‘lack of products ratio’. They are measured by taking the ‘percentage of correct volume of demand forecast’ and the ‘percentage of missing products’ respectively.

Perspective	Target	Description of the target	Indicator	Measurement
Financial	To reduce costs and expenses	To reduce costs and operational expenses, while maintaining quality excellence and the level of customer service.	Logistics Expenses	Total expenditure on logistics operations
Internal Processes	To increase productivity	To reorganise processes with the aim of increasing the production per employee vs number of hours worked and utilise production resources most efficiently, diluting fixed costs.	Overtime	Total expenditure on staff overtime
Internal Processes	To continuously improve products and services	To have the best product quality (packaging and homeware), with the aim of reducing market returns and raise customer's quality perception.	Logistics Returns Ratio	Percentage of products returned due to logistics problems
Internal Processes	To increase productivity	To reorganise processes with the aim of increasing the production per employee vs number of hours worked and utilise production resources most efficiently, diluting fixed costs.	Furnace Productivity	Percentage of usage of the furnaces
Internal Processes	To improve supply chain management	To improve logistics through improving the level of accuracy of the demand forecast, and by completely meeting the sales orders from customers. To control distribution, meet deadlines and speed up deliveries. To be a forceful actor in the supply chain.	Accuracy of demand forecast/ Lack of products ratio	Percentage of correct volume of demand forecast/ Percentage of missing products

Table 4.1: Sample of GM's Balanced Scorecard Targets and Indicators
Source: Elaborated based on the field research

4.4.2.3 Daily Routine Management (DRM)

Daily Routine Management (DRM) is the performance measurement system used by GM. DRM was implemented in conjunction with balanced scorecard (BSC) by an external consultancy in 2007. It consists of a set of measures regarding daily operations that are related to the BSC perspectives. In order to achieve the BSC targets, DRM measures were developed, as shown in the final column of Table 4.1.

The DRM measures are both financial and nonfinancial and are used to assess the performance of each department. Accounting is used as a source of information for the DRM system. However, only the financial measures are regarded as accounting information. For example, in the Supply Chain Department the logistics expenses and overtime expenses indicators are based on accounting information, but the logistics returns and the furnaces productivity which this information relates to are not regarded as accounting information at GM. Evidence of this is the fact that the staff in the Supply Chain Department are responsible for the collection of data and the calculation of the nonfinancial DRM ratios.

The monthly results of the DRM measures are printed on A4 sized paper and displayed on the walls of each department. This report contains tables, graphs and charts printed in colour to improve the visual impact of the results. The targets are defined and revised in monthly meetings, known as DRM meetings. During these meetings, the results are presented and the problems relating to under-achievement of the targets are discussed. These meetings are helpful in improving communication between different employees within the same department. However, the results and the problems are usually known before the meetings. Therefore, the discussion of future action and revision of the targets when necessary are the more relevant outcomes of these meetings.

DRM is part of the everyday conversation throughout the company, especially at managerial levels. During the interviews, DRM was mentioned by employees from different departments of the company. As mentioned before, the Sales and Marketing Director said that it is used more frequently than BSC. In the Supply Chain Department, the feeling before DRM meetings was a mixture of anxiety for those who had negative results, and of a lack of power, as there was little that could be done to change or improve the results. This can be observed in the following comment from the Purchasing Supervisor:

This month Purchasing staff are under a great level of pressure since we have started measuring not only the amount of purchases finalised within the available budget, but also the amount of time spent to close the deal with our suppliers. In this way, it will be evident who is working well and who is not. At the moment, there is a lot of tension among the Purchasing group, especially because the DRM results will be exposed on the walls and will be discussed in the monthly DRM meeting.

GM's Purchasing Supervisor, June 2008

Negative results meant the non-achievement of the established targets. Whether the targets were set according to the working conditions, or were very easy or very difficult to achieve was not addressed very often. Despite this, sometimes the targets were modified to enable potential for future positive results for the employee responsible. On the other hand, the revision or modification of the targets still had to follow the board's guidance, and be in line with the aims of the organisation as a whole. These aims were defined in the BSC at the top management level. Therefore, changing the target figures was not easy or not always seen as the best alternative.

4.4.3 Problems in GM's internal accounting system

Although most of the accounting information is produced by the Controllershship department, managers from other departments, such as Sales and Marketing, Production, and Supply Chain also report on their own performance. This is in line with what has been observed by Burns (1996) in one of his case studies. However, whereas in Burns' (1996) case study, the reports prepared by managers were also used by the accounting staff, at GM, there is some duplication of effort in the production of accounting information. The main issue at GM is related to difficulties in consolidating information from the different departments. To try and address these difficulties, the SAP was implemented in October 2007.

The SAP is an important part of GM's accounting system. Since its introduction, information seems to flow faster and more easily. Before SAP's implementation, different types of 'enterprise resource planning' (ERP) systems were used by different departments. This meant that data from the different departments

presented in the Board meetings did not reconcile. Each department tended to have different numbers in relation to costs and profits at the meeting. Disagreements were common and the decision making process was disrupted. These problems were described by the SAP Project Manager who said:

During the board meetings each department of the company [Sales and Marketing, Production, and Controllershship] used to bring different reports.²⁵ The reports were prepared separately and the numbers simply did not match. Half or more than half of the meeting time was spent on trying to reconcile the numbers and discussing the reasons for the differences. Important decisions were not made due to the lack of consistency between the reports.

GM's SAP Project Manager, May 2008

The implementation of the SAP has improved the accuracy and speed of accounting information, and has made communication between the departments easier. In addition, despite the improvements needed, SAP has contributed to enhancing the perceived importance of accounting at GM. As the Industrial Manager stated:

Today, more than ever, cost is part of our day-to-day routine. With the implementation of SAP, and the adjustments which are being undertaken, we analyse the costs and the main variances monthly. Cost and accounting information has been more appreciated recently and this is changing the culture of the company. In fact, there is still a long way to go, but with SAP an increase in the level of trust in the numbers can already be seen.

GM's Industrial Manager, September 2008

The improvements were developed by a team of SAP consultants who have worked at GM on a daily basis since the beginning of the implementation of the system. The SAP consultants work with the staff of the specific departments. For example, improvements are being made to the cost system and some staff of the Cost Planning and Control Section of the Controllershship Department are working on these improvements with the SAP consultants. Their task is to bring together data from different departments of GM in order to produce faster and improved cost reports.

²⁵ The reports include for example sales, costs and inventories data.

Another example is related to the work which was carried out in order to develop simulation tools for budget preparation. Whenever any change is due to take place, a lot of time is required, in the form of managerial meetings. In relation to this issue, the Supply Chain Manager said:

The accounting staff are preparing a simulation tool to make it easier to adjust the budget to unexpected change. However, they have not finished it yet. They have been working on it over the last year. It is a bit complex, since it puts together information from different departments, but hopefully they will complete this task soon.

GM's Supply Chain Manager, March 2010

The fact that accounting information is not always rapidly available has been recognised by managers as an essential area for improvement. It is regarded as one of the major challenges for the Controllership Department. As the Financial Controller said:

The major challenges for the Controllership Department today are the need to train and qualify the staff and to improve agility in the production of accounting information. I would say that the staff are not sufficiently prepared to deal with cost and accounting technologies. They need training in order to improve the quality of their work. In addition, we need to produce faster accounting information in order to provide GM's directors with strategic information.

GM's Financial Controller, May 2008

Moreover, the issue of availability of timely information has also been recognised as relevant in other departments, such as the Supply Chain Department. This can be observed in the Logistics Supervisor's comment:

I would like to receive more and faster information from the Controllership Department. It could be helpful indeed. However, when we receive the information, such as the cost of the logistics operations, it is related to what happened in the past, and there is nothing we can do to change the situation.

GM's Logistics Supervisor, August 2008

The quote above also shows the need to improve the interaction and communication between accounting and other departments, a need which has also

been observed in previous studies (e.g. Burns, 1996). To some extent this poor communication is related to the fact that accounting information at GM is aggregated and not sufficiently detailed. For example, the costs of the warehouse are reported in conjunction with delivery costs. In this way, it is difficult to understand the cost of providing logistics services to different customers.

In addition, accounting reports are more oriented to top managers than to middle and lower level staff. This was a result of the emphasis given by managers to financial accounting (FA) instead of management accounting (MA). At GM, the terminology 'accounting' is often used to refer to FA only. Moreover, although DRM has several links to BSC, it is regarded as an operational report and it is not recognised as a MA report. On the other hand, the BMI is based on FA information, but it is seen as a managerial report. The BMI is used in conjunction with BSC as the main sources of information at board meetings. However, more importance is given to the BMI than to BSC. Arguably at GM, MA is subservient to FA (Johnson and Kaplan, 1987).

Although it has been observed that the requirements for external financial accounting reports do not necessarily affect managerial reports and decisions (Skærbæk and Tryggestad, 2010; Granlund and Lukka, 1998; Joseph, Turley, Burns, Lewis, Scapens and Southworth, 1996), the problem at GM is the lack of sufficient development of MA reports. Evidence of this is the importance given by managers to EBITDA as a major source of accounting information for decision making, despite also using advanced management accounting technologies (Burns and Vaivio, 2001), such as BSC. This can be a result of the limitations in links between strategic goals and daily operations, as was also observed by Norreklit (2000). At GM, this could be a result of limited links between BSC and DRM. For example, although the Supply Chain Manager aims to improve services to customers, there are no DRM measures for the Supply Chain Department relating to the customer perspective of the company's BSC.

4.5 Summary

The chapter aimed to outline the case company and its supply chain relationships. In addition, due to the relevance of accounting to this thesis, this chapter also described the company's internal accounting system. The case company is a Brazilian Glassware Manufacturing company, referred to as GM. It is a large producer and supplier of glass containers and glassware located in the Northeast Region of Brazil. GM has undergone considerable changes in the last century. The changes were a consequence of modification to the family business structure, and also a reflection of changes in the consumption and market for glass caused by the introduction of alternative packaging materials. While the former affected GM's organisational structure and the distribution of control among family members, the latter has increased competition for GM and has impacted considerably on GM's operations with customers.

GM has a vertical hierarchical structure and shares resources with three other companies in its group. In addition, top managers at GM also work for the other companies. The Supply Chain Department is a new department at GM and is still being established. For example, the Services Centre Section was still to be established in 2007. In March 2010, the Supply Chain Manager stated that this section had now been established and a new supervisor for this section was hired in 2009.

With regards to supply chain relationships, it can be said that the internal operations include a high number of activities which could be outsourced. For example, GM finalises the preparation of raw materials (i.e. conversion of rocks of feldspar into the ground product) internally and also works on cleaning the cullet, manufacturing moulds, and manufacturing and repairing pallets for the transportation of finished products. In addition, there is a lack of efficiency in the internal logistics and in the relationships with external links (customers and suppliers). Although most of the external relationships are long-term, they are still arms-length. However, there is some evidence of attempts to develop closer interactions. This is the case in relation to the joint-action mentioned by the Sales

Manager for Non-alcoholic Drinks that was carried out with one of GM's customers.

GM's internal accounting system has an emphasis on traditional, financial accounting oriented performance measurements, especially EBITDA. However, the company also uses advanced management accounting tools, such as BSC. The main problems with GM's internal accounting systems are related to poor communication between the departments and the importance given to FA rather than MA. The relationship between GM's internal accounting system and the results of this research will be discussed further in chapter 6. Before this, the next chapter describes the development of the action research project.

CHAPTER 5: ACTION RESEARCH PROJECT

The previous chapter described the case company, its supply chain, and its accounting system. This chapter moves on to describe the development of the ‘Action Research’ project. The initial designation used by the researcher was ‘Supply Chain and Accounting’ project since it was about supply chain management (SCM) and accounting (see research protocol in appendix 1). However, as will be observed in this chapter, other names, such as ‘Collaboration with Customers’ and ‘Vendor Managed Inventory (VMI) project’ have become more popular in the case company. The term ‘Action Research project’ is more generic and encompasses all the possibilities, and is consequently used as the title of this chapter.

As discussed in chapter 3, action research (AR) was the methodological approach adopted for data collection in this research, and the AR cycle proposed by Coghlan and Brannick (2001) was expected to be followed. According to these authors, AR projects take place following a pre-step of context and purpose, and the steps of diagnosing, planning the action, taking the action, and evaluating the action. Due to its importance to this research, the AR cycle proposed by Coghlan and Brannick (2001) previously presented in chapter 3 is repeated in figure 5.1. In addition, table 5.1 relates the AR cycle, correlating it with relevant literature, and the findings of this research. The chapter is then structured according to how the steps of the AR cycle were followed at GM and what happened subsequently.

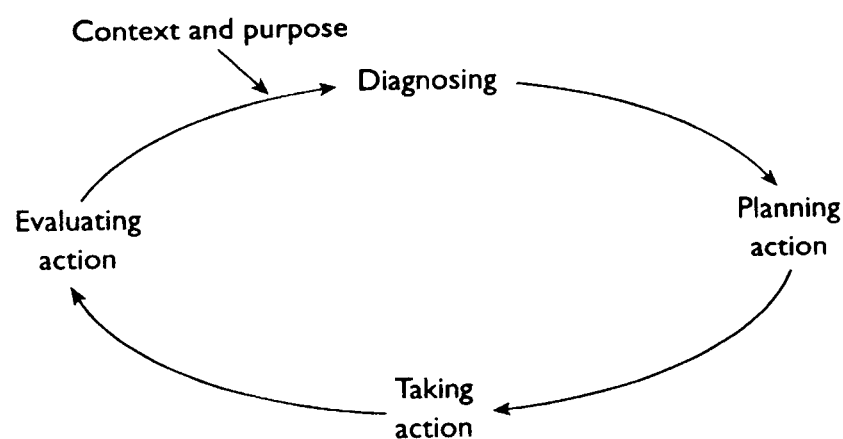


Figure 5.1: Action research cycle
Source: Coghlan and Brannick (2001)

AR cycle	AR literature (Coghlan and Brannick, 2001)	GM (research findings)
Context and Purpose	Involves the identification of the reasons for the AR project and evaluation of the main drivers of the change. In addition, it requires the definition of the expected situation after the project.	At GM, the need to reduce the high levels of inventories was identified as the main driver of change. The need to improve customer relationships and satisfaction were also regarded as relevant. The main potential outcomes of the project were lower levels of inventories with higher customer satisfaction.
Diagnosing	Requires naming the issues and identifying the actions that will be taken.	The important issues were problems with communication with customers. Developing the 'Collaboration with Customers' project using vendor managed inventory (VMI) was seen as a potential solution.
Planning the action	Consists of the development of strategic and operational plans. At this stage, a commitment plan is prepared with details about who is engaged with the change.	There were problems at this stage due to the lack of full support from GM's staff and the lack of engagement of accountants in the project. Despite this, there was an attempt to continue the project with the first customer chosen for a pilot of the 'Collaboration with Customers' project. Informal information exchange with this customer took place at an informal level. After a while, the project implementation with the first customer did not progress to the formal level and a second customer was selected.
Taking the action	Embraces the implementation of the plans.	With the first customer, the project did not progress. There was further progress with the second customer, as their staff agreed to take part in the 'Collaboration with Customers' project. However, for various reasons, the project was once again suspended.
Evaluating the action	Involves the evaluation of the previous stages and the analysis of how the next cycle will be developed.	Despite the fact that the project was not implemented at the formal level, the AR project is analysed through the ANT lens (see chapter 6).

Table 5.1: The AR cycle theory related to research findings (adapted from Coghlan and Brannick, 2001) and elaborated based on field research

5.1 Context and purpose

The pre-step of context and purpose refers to the identification of the main reasons for the AR project and the expected results after the change (Coghlan and Brannick, 2001). The project was carried out in a manufacturing company in Brazil and the main justification for its development was the need to improve the company's supply chain operations. The main drivers of the change were the need to reduce the levels of inventories and improve customer relationships. Initially, it was expected that with the project, GM could benefit from a reduction in the levels of inventories and an increase in customer satisfaction.

5.2 Diagnosing

Diagnosing involves identifying the problem to be addressed and proposing how it is going to be solved. The problem should be of both theoretical and practical interest and should be identified with the parties involved (Harris, 2007; Eden and Huxham, 1996). The identification of the problem for this research and the discussion of potential solutions are explained in the following.

5.2.1 The problem – theoretical and practical perspectives

As discussed in chapter 2, the literature review highlighted that there is a need for further research seeking to understand the role that accounting can play in inter-organisational initiatives. More specifically, this research focuses on analysing the role of accounting in the development of a SCM initiative. Due to the epistemological and ontological interpretive philosophical assumptions of this research, the idea was to identify the relevant issues with the parties involved in the project, instead of implementing a specific tool or project, as in a consultancy project (Baard, 2010; Harris, 2007; Reason and Bradbury, 2001; Eden and Huxham, 1996).

Indeed, the problem of both theoretical and practical interest, namely, the existence of high levels of inventories, was identified during the first few contacts

with the company in April 2007, one year before carrying out the field research. However, the way the problem would be tackled was not discussed until the beginning of the field research period in April 2008. Initially, the focus was on identifying a project with the parties involved, which would be of theoretical interest and, simultaneously, would contribute to the solution of a practical problem. The key idea was to analyse with employees of the organisation what their needs were, and the researcher could be involved in a team for the development of action to address these needs (Reason and Bradbury, 2001; Eden and Huxham, 1996). This approach was chosen taking into account the validity criteria regarding the purpose of the AR. This criteria is related to how valuable and worthwhile the project is for those involved (Reason and Bradbury, 2001).

From the theoretical side, the researcher had reviewed literature relating to inter-organisational accounting (IOA) and had the intention of pursuing the development of a closer inter-organisational relationship, in order to follow the actors and understand the role of accounting in building, shaping and maintaining this type of relationship. According to this literature, as explained in chapter 2, accounting may play an important role in the development and maintenance of inter-organisational relationships (Mouritsen and Hansen, 2006; Mouritsen and Thrane, 2006; Briers and Chua, 2001; Chua, 1995). Remembering the aim of addressing a problem in this context which was also of practical interest, the selection of the type of inter-organisational relationship was then guided by practical needs.

At a practical level, the visible problem at GM was that despite the existence of high levels of inventories, there was a lack of customer satisfaction as their demands were not always met on time and effectively. According to the Management Accounting Consultant in a comment before the beginning of the field research:

They have really high levels of inventories spread all over the place and sometimes still cannot meet customers' demand. It is unbelievable how much money is invested in maintaining those inventories, but the managers don't seem to be aware of savings they could have in reducing the [levels of] inventories.

GM's Management Accounting Consultant, March 2008

In addition, during a visit to the warehouse,²⁶ the Supply Chain Manager commented on the recent heightening of part of the warehouse ceiling in order to have more covered space for the inventories of finished products.

All those pallets are the finished products. As can be observed, we have high levels of inventories which need to be reduced. We have recently refurbished the warehouse in order to increase the height of the ceiling to fit an extra layer of pallets. In this way, we have more space to fit a higher number of finished products in the covered area. As a consequence, we have less problems with the rain, which usually damages part of the products stored outside the warehouse in open air areas.

GM's Supply Chain Manager, April 2008

In this context, the possibility of developing a closer inter-organisational relationship as a way of contributing to the reduction of the level of inventories – as proposed by the researcher, based on the theoretical groundings of the research – was seen as an interesting solution. Despite this, it is important to mention that, in practice, the accounting area appeared to have little engagement in this type of initiative. Although the initial contact was made with the Controllership Department through the Management Accounting Consultant, during the development of the AR project, the researcher was asked by the Financial Controller²⁷ to work in the Supply Chain Department, under the supervision of the Supply Chain Manager. He was considered to have more knowledge of SCM, and therefore, he was the most influential actor in the AR project.

²⁶ This visit was carried out at the beginning of the field research, when the Supply Chain Manager gave the researcher an overview of GM's factory 1 site.

²⁷ The Financial Controller left GM soon after the beginning of the field research in April 2008.

5.2.2 The solution – theoretical and practical perspectives

Although the identification of the problem was a common place to start from both the theoretical and practical perspectives, different solutions emerged from each perspective. From the theoretical side, there was a need to analyse and understand the supply chain in which the company operated as a whole, whereas, on a practical level, there was a need for more immediate action. The researcher proposed the use of the value stream mapping (VSM) tool in order to obtain a detailed understanding of the company's internal and external value chain. The Supply Chain Manager did not deny the importance of this tool. However, he had more interest in more specific applied projects, such as the 'Collaboration with Customers' initiative using VMI.

At this point, the practical approach started to predominate. Although the researcher did not completely put aside the idea of preparing the company's VSM, most of the initial effort was oriented to the 'Collaboration with Customers' project. As there were barriers to change, the project progressed very slowly and the researcher redirected her efforts to preparing the VSM. However, due to the lack of full support from the Supply Chain Manager for the VSM preparation, and difficulties in contacting people inside and outside the company, this part of the project also did not progress as expected. Therefore, even though the AR project might have influenced the supply chain activities of the company, as it was not fully implemented there was no clear evidence of the specific benefits the project might have brought to practice. Moreover, by the end of the field research period, the problem was not solved and the levels of inventories were still high.

5.3 Planning the action

According to the literature which defines AR (Coghlan and Brannick, 2001), the next step is planning the action. In this step, strategic and operational plans are defined. It was recognised that the approval of managers and staff of other departments, such as Sales and Marketing and Production was essential for the

successful development of this AR project. The attempt to obtain such approval is described below.

5.3.1 Preparing to present the idea

The project designed by the Supply Chain Manager and agreed by the researcher was named 'Collaboration with Customers'. The key idea was to enhance the interaction with customers in order to improve information exchange about their future demand that would lead to improved production plans and lower levels of inventories at GM. From the first day of the field research, the Supply Chain Manager had selected two glass container customers for the pilot project. One of them was from the food industry and the other from the alcoholic drinks industry. However, the Supply Chain Manager explained to the researcher that this project was his idea and it was necessary to obtain support from other managers in the company before contacting the customers. The first step was then to prepare to formally present the idea to other departments.

The Supply Chain Manager was interested in the use of the VMI tool for the improvement of relationships with external links. Initially, he mentioned this idea to some members of the staff in the Sales and Marketing Department, including the Sales and Marketing Director. The Supply Chain Manager believed that the idea had the potential to be accepted, therefore, he suggested preparing PowerPoint slides outlining the project to present at the next Sales & Operations Planning (S&OP) meeting. He provided material about the VMI and collaborative projects to the researcher and asked her to prepare this presentation.

The main topics of the presentation (see appendix 3) were the definition of VMI, the benefits of the project, the steps for its implementation (roadmap of the project), and examples of cases of success. One interesting issue in relation to this presentation was the need to present successful cases of implementation of the VMI in Brazilian companies, or at least multinational organisations operating in Brazil. The example used was of Shell, which had been using the VMI successfully in Brazil.

5.3.2 Presenting the idea

The idea of using the VMI in order to enhance collaboration with customers was presented during the Sales & Operations Planning (S&OP) meeting that took place on 29th May 2008. The meeting was held at the head office building in the presence of staff from the Sales and Marketing, Production, and Supply Chain departments. The sales staff were the Sales and Marketing Director, the Sales Manager for AD, the Sales Manager for Non-alcoholic Drinks, and the Demand Planning Supervisor. The supply chain staff were the Supply Chain Manager, the Process Analyst, the Production Planning and Control Supervisor and the Logistics Supervisor. The Production Manager of Factory 1 and the researcher were also present.

At this meeting, the Sales and Marketing Department staff appeared interested in the tool, but they raised the concern that this would not bring many benefits to the customers selected. Regarding the customers, they agreed to try to pursue development of the project with the customer in the alcoholic drinks industry, designated Customer for Alcoholic Drinks or Customer for AD, but they did not think the project was suitable for the customer in the food industry (Customer for Food Industry or Customer for FI). Their argument was that, as the food customer buys a non-personalised container that can be bought by other customers, it would be much more complex to manage inventories. The Sales and Marketing Director said:

I don't think that Customer for FI is a good idea because the products sold to this customer are also commercialised to other customers. The 200ml white glass bottles are generic products of GM. Therefore, I believe it will be more difficult to control the levels of inventories of this product.

GM's Sales and Marketing Director, S&OP meeting, May 2008

The Supply Chain Manager did not react or respond to this comment, despite the fact that he had good access to Customer for FI, as he had previously worked for them, and he thought he had a good chance of convincing the customer to take part in the 'Collaboration with Customers' project. These controversies, which are

discussed further in chapter 6, were reinforced by the comments of the Sales Manager for AD who questioned the benefits of the project from a customer perspective. He argued he could not see the benefits to the customer and said:

I cannot see the benefits to the customer. If we suggest this to the customer, the first thing which the customer will ask will be: What are the advantages for us? We at GM need to be able to tell the customers the benefits of the project.

GM's Sales Manager for AD, S&OP Meeting, May 2008

This comment contradicts the argument stated in literature that with the VMI there are more evident benefits to the customers than to the suppliers (Danese et al., 2006). The lack of sufficient knowledge about the VMI to counter this objection, in both the researcher and the Supply Chain Manager, was unhelpful at this point, as the customer benefits did not seem to be clear enough or sufficient to start talking to the customer. Despite this, it is important to emphasise that the presentation included the use of the VMI by Shell and highlighted the benefits to its customer, as well as the benefits to the suppliers.

After the end of the S&OP meeting, the researcher tried to make direct contact with the Sales and Marketing Department staff, but the Supply Chain Manager stopped her and said that there were other issues to be addressed before contacting them again. However, he did not name those issues. He may have been disappointed with the initial reaction from the staff in the meeting. The impression was that the Supply Chain Manager was not happy with the reaction to the presentation of the project, particularly the response of the sales staff. Their reaction did not match the interest that had been shown previously in informal conversations. Before the presentation of the idea, the Supply Chain Manager had spoken to some of the managers, such as the Sales & Marketing Director, and they had shown an interest in the project. Nevertheless, the questions and opposition to the project which emerged during the meeting were contrary to his initial perception.

Indeed, there seemed to be problems in the relationship between those working in the supply chain department and those in sales. The initial negative reaction from the sales staff during the meeting, after some initial interest in previous informal

talks, and the lack of communication after the end of the meeting might reflect a 'poor' interaction between those departments. The problems in their interactions were even more evident during the attempts to develop the project further. For example, there were difficulties in accessing the Sales and Marketing Department staff in order to raise awareness of the current stage of the relationship with the selected customer for the pilot project.

Another issue was the fact that even the sales staff did not know which customer should be contacted first to carry out the pilot project. They were not completely in favour of the two customers suggested by the Supply Chain Manager (Customer for AD and Customer for FI), but they did not suggest any other options. In addition, they were unsure how Customer for AD could be contacted to talk about the project, or whether the customer's local factory would be capable of making a decision about the project or if the parent company in Sao Paulo would have to authorise it. Moreover, the informal exchange of information (to be explained in section 5.5) shows further evidence of the poor communication and overlapping efforts between the Sales and Marketing and Supply Chain departments.

5.4 Taking the action

According to Coghlan and Brannick (2001) the step of taking the action involves the implementation of the strategic and operational plans. At this stage, the intervention takes place and, as a consequence, the main proposed change happens. As will be observed in this section, at GM there were barriers to the change and the project was not implemented. The lack of full support from the Sales and Marketing staff was problematic for the project's development. Although their resistance was not completely clear and evident, it affected the project considerably. In addition, problems in the communication between the Supply Chain Manager and the staff in other departments (i.e. Information Technology) also hampered the development of the project.

Further details regarding these problems and the slow progress of the project are provided below. In addition, the informal information exchange which took place at an operational level is described. The selection of a new customer is also discussed. With Customer for FI, a different Sales Manager was involved and the project progressed further. However, as will be observed, once more change did not take place. This section also includes information about the tentative development of VSM conducted by the researcher. Although it was also not fully developed, it is included in this section because of its importance in inter-organisational relationships (as previously discussed in chapter 2, section 2.1.4) and its potential to contribute to the AR project.

5.4.1 Slow progress and barriers to change

Despite the initial internal reaction to the project, where staff raised concerns about the viability of the initiative, it was agreed among the staff present in the meeting that it could be carried out. The Sales and Marketing Department's interest in developing closer relationships with customers was emphasised in a later interview with the Sales Manager for Non-alcoholic Drinks (Sales Manager for ND) when she said:

In general we have a good interaction with most of our customers. In addition, we are constantly seeking the development of closer relationships with customers. Indeed, I would say that there is a strong interaction with customers and products and promotions are frequently suggested by GM. These suggestions are well received by the customers. For example, this bottle [she showed the bottle] was mainly designed and developed by GM. The customer took part in these processes as well, but they accepted most of our suggestions.

GM's Sales Manager for ND, July 2008

The next steps agreed between the Supply Chain Manager and the researcher involved obtaining more information and raising awareness of the benefits to the customer, and contacting Customer for AD to discuss the project. The Supply Chain Manager then told the researcher he would contact the parent company of the customer in order to present the project. He said it would be done during his next business trip to Sao Paulo. However, despite the Supply Chain Manager

going to Sao Paulo a few times to deal with GM's business related activities, this did not happen during the field research period.

In addition, he asked the researcher to obtain more information regarding the possible benefits to the customer of this type of project. The researcher suggested that it would be interesting to measure the cost reduction that could be obtained by the project. In this way, the Supply Chain Manager could have more information when presenting and negotiating the changes with the customer. Initially, he considered this calculation interesting. However, he did not agree when the researcher suggested that this information could be used to offer discounts to the customer during the negotiation process. Discounts could be considered as a relevant benefit to the customer, and are common in this type of project according to literature relating to VMI (Elvander et al., 2007; Slack et al., 2007; Danese et al., 2006; De Toni and Zamolo, 2005). Despite this, he fully rejected the idea:

No, no, no way. Forget this idea. Calculating what we [GM] could get in terms of cost reduction is OK, but to pass this margin immediately to the customer in the initial negotiation, no, no way.

GM's Supply Chain Manager, May 2008

In spite of this negative perception of offering discounts to the customer, the Supply Chain Manager found the idea of calculating potential cost reductions as a result of the project implementation interesting. He saw it as important information in order to obtain full support from managers and staff in other departments of GM. For this calculation, the researcher asked to have access to the logistics and warehousing costs. The Supply Chain Manager agreed and told the researcher to talk to the Logistics Supervisor to get access to the necessary data. The researcher received cost data from the Logistics Supervisor. However, data was aggregated and there was insufficient information to make appropriate calculations. At the end of the data collection period the researcher had not been given access to sufficient details to enable the separation of the logistics and warehousing costs by customer. For example, information about the average number of pallets stored monthly per customer was not made available to the researcher.

The researcher was also asked by the Supply Chain Manager to prepare a plan of action for the development of the 'Collaboration with Customers' project, and for using the VMI tool. Issues regarding the compatibility between the current Information Technology (IT) system and the VMI tool were raised. The Supply Chain Manager then asked the researcher to find information about the viability of the next steps of the project. For example, to discuss with the IT Department whether the VMI was compatible with the company's SAP system. The researcher contacted the SAP Project Manager. It transpired that he did not know about the proposed project or have sufficient information about the VMI tool. At the same time he was trying to implement another tool to improve the exchange of data with customers, the EDI – Electronic Data Interchange. In his opinion, it seemed that the projects would conflict. He said:

Don't you see? The VMI is a competitor of the EDI. It doesn't make sense to try to implement the VMI. I am sorry, but I can't understand what the Supply Chain Manager's intention is.

GM's SAP Project Manager, May 2008

During this meeting, he called the Supply Chain Manager using the internal telephone system and asked why the researcher was visiting him. After this, the Supply Chain Manager asked the researcher to be more careful when talking about the project with other departments of GM. In fact, it seemed that his concern was that the researcher was spreading sensitive information about the Supply Chain Department to other departments. Moreover, the potential development of the 'Collaboration with Customers' project was seen as a problem by the SAP Project Manager, as he had not been aware of it, it may conflict with an existing project to install the EDI, and the use of the VMI would impact on the IT Department.

In addition, in order to develop the project, the researcher was keen to contact further people from the Sales and Marketing Department. The Supply Chain Manager arranged for her to meet the Sales Manager for ND instead of the Sales Manager for AD despite the fact that the customer selected was in the alcoholic drinks industry. According to the Supply Chain Manager, it would be preferable, since the Sales Manager for ND would be more likely to answer the questions and

to contribute to the project. The interview with the Sales Manager for ND lasted for a whole afternoon.

The Sales Manager for AD, who is responsible for the sales to Customer for AD, works alongside the Sales Manager for ND. He also answered a few of the researcher's questions towards the end of the interview since the Sales Manager for ND was not sure of the answers. It was noticeable that the Sales Manager for AD had many concerns about the change, probably because he would be the member of staff most affected, as he was responsible for this customer. For him, the project was only likely to work at a theoretical level, and would not be practicable. He did not seem to appreciate the benefits of the change, despite all of the researcher's efforts. He said:

This is very beautiful in theory, but I doubt it would work in practice. At least not here in Brazil. Even if it works in other countries, I think it is very difficult to implement in the Brazilian reality. In fact, I think it would be very difficult for our customers to send extremely detailed information to GM if they don't have any additional benefits. Moreover, once the customer has access to the levels of inventories at GM they would try to obtain benefits in the negotiation of our prices.

GM's Sales Manager for AD, June 2008

His comments may be due to the fact that most of the literature about IOA and the VMI used by the researcher was grounded in international cases, and he doubted their relevance in a Brazilian context. As the project was based on cases from companies in advanced economies, the project was sometimes seen as global and distant from the local reality by some actors (Sales Manager for AD). Indeed, the idea the researcher and the Supply Chain Manager were trying to put forward was regarded as too innovative and difficult to be implemented locally. However, it emerged later that potential changes in the role of the Sales Manager for AD had an impact on how he related to the project (see discussion in chapter 6). Thus, details regarding his role are described below.

Each Sales Manager is responsible for preparing the annual and monthly customer sales forecast. This forecast is prepared by the Sales Managers for each industry, namely, alcoholic drinks, non-alcoholic drinks, food, and pharmaceutical and

includes GM's expected level of sales to each customer. As can be observed in Figure 5.2, the forecast is prepared based on the purchase plan sent by the customer, the previous year's sales, the market expectations (the expected economic growth or decline) and, wherever necessary (due to the lack of sufficient available information), the 'intuition' of the Sales Manager. The forecast is then used as a basis for the sales demand plan prepared by the Demand Planning Supervisor, which is one of the most influential inputs into the production plan prepared by the Production Planning Supervisor. The other relevant inputs for the preparation of the production plan are; GM's production capacity, GM's level of inventories, GM's inventories policies and other information (e.g. which product is already being produced in the factory).

The main challenges for the Demand Planning Supervisor are related to the fact that sometimes the information he requires is delayed. For example, sometimes the customer sends the purchase plan after the effective purchase takes place. During a discussion about the 'Collaboration with Customers' project with the researcher, the Sales Manager for AD explained:

This email has Customer for AD's purchase plan for the current month. It provides the products and the expected monthly purchase volume. There may be some variation between this plan and the actual monthly purchase. However, usually this variation is not significant. The main problem happens when the customer sends this information to GM too late. GM's customers have agreed to send their purchase plan before the end of each month. However, this is not always the case. As you can see, this email was sent a couple of days after July's purchase order was placed by Customer for AD. Another problem happens when the customer purchases much less than we were informed in the monthly forecast. I have the impression that sometimes they don't update their plans before they send them to us. They know we will provide the products ordered. In fact, in this case, there is little we can do. We accept the situation and do everything possible to meet the customers' demands.

GM's Sales Manager for AD, July 2008

As a consequence of the lack of sufficient information available on time, the Sales Manager's professional expertise and experience had a lot of value as an input in the sales forecast preparation. The project implementation would improve information exchange with the customers and preparing forecasts would be simplified. Therefore, his inputs would probably lose relevance.

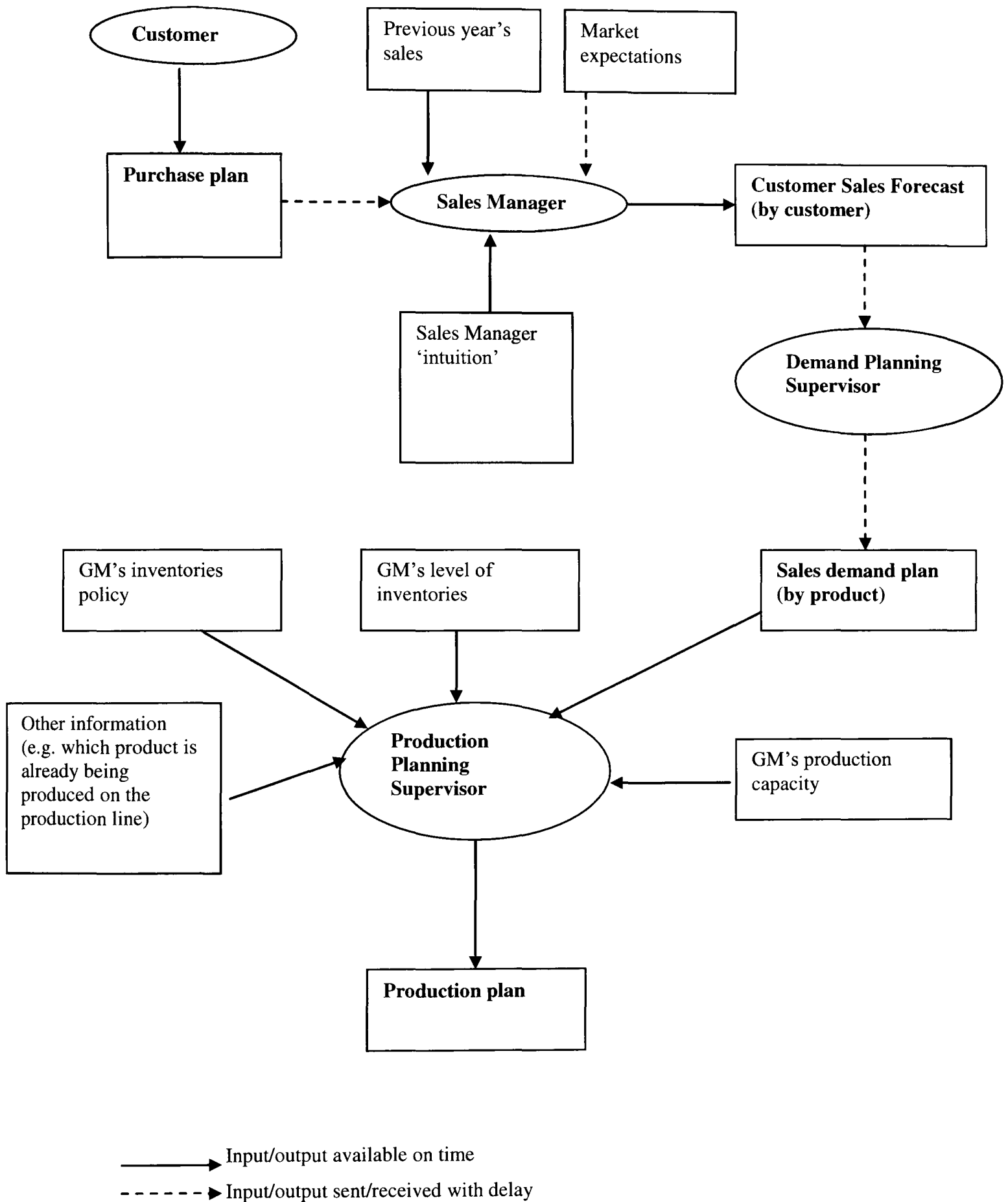


Figure 5.2: Production plan flow chart

Thereby, a problematic aspect of participating in the project for the Sales Manager for AD was a potential threat to part of his job role. With the project implementation, predicting the customer's sales forecast would be simplified and his professional expertise and experience (or 'intuition') would be less relevant because GM would have access to the customer's levels of inventories and future demands in advance, in order to replenish necessary inventories (Lee and Chu, 2005). Moreover, more efficient operations could mean a lower level of opportunistic sales, rather than repeat orders, and hence, lower commission on sales. As a possible consequence, he did not show an interest in the project's development from the beginning, and showed resistance to the proposed change (Burns and Scapens, 2000). This issue is further discussed in chapter 6 (sections 6.2.2 and 6.3).

5.4.2 Informal information exchange

After the S&OP meeting, the Demand Planning Supervisor visited the Customer for AD and talked about the 'Collaboration with Customers' project. He showed the PowerPoint presentation (the same used at the S&OP meeting) and explained how the project could be developed. After this visit, he told the researcher that employees at Customer for AD liked the project and were keen to share data regarding their future purchasing needs and inventory levels. However, this took place at an operational and informal level. Staff at Customer for AD's manufacturing plant located in the Northeast of Brazil needed the approval of the Board of Directors who worked in Sao Paulo, in the Southeast of Brazil. As far as the researcher is aware, until October 2008, these Directors were not contacted by GM's staff. Despite this, data relating to future purchases was exchanged with GM on an informal basis. The Demand Planning Supervisor used to work for this customer before working at GM and had good access to people in the plant. He showed the researcher a small piece of paper with notes he had just brought from the customer and said laughing:

I will show you, I have got a very small piece of paper with notes about the customer's future needs. It looks like the papers used in bakeries!

GM's Demand Planning Supervisor, June 2008

5.4.3 New customer selected

In July 2008, a new customer was selected to take part in the project. This customer was from the pharmaceutical industry (Customer for Pharmaceutical Industry or Customer for PI) and seemed very interested in using the VMI tool for the 'Collaboration with Customers' project. However, the customer is located in the Central region of Brazil and products are sold via the GM distribution centre, which is located in Sao Paulo (more than 2,000 miles away). This made communication slightly more complex. According to the Supply Chain Manager, very early in negotiations the customer published details of the plans to implement the VMI with GM in their internal newspaper. Despite Customer for PI and GM's interest in the project, it was not until late October that the customer asked the Supply Chain Manager and the Process Analyst to meet them to discuss the implementation of the project. After the selection of this new customer, it was decided that the previous customer (Customer for AD) was unsuitable for the project. The Supply Chain Manager even said that Customer for AD was not suitable for the project because of their seasonal demand.

5.4.4 The development of VSM

As discussed in chapter 2, the first step in the development of VSM is to observe and follow a product's production. At GM, it was possible to follow the internal actions related to the product's production. However, as a result of the difficulty in accessing the company's external links, such as suppliers and customers, and the difficulties in engaging more people in preparing the VSM, the mapping of the current production process was tentative and incomplete.

As already mentioned, the idea of VSM was presented at the beginning of the field research to the Supply Chain Manager as a way of understanding GM's

supply chain and addressing the high levels of inventories. He had already noticed the difficulties in running the internal supply chain smoothly. He said:

The major challenge of the Supply Chain Department today is the synchronisation of the activities throughout GM's [internal] supply chain. Today, the focus is still on the internal stops to sorting out problems. Do you know the pit stops in Indycar racing? I compare what happens in GM's supply chain with them. There is a lot of stop and continue, stop and continue, and so on... I believe it is important to reduce the number of stops and to minimise the time and increase the efficiency of the necessary stops.

GM's Supply Chain Manager, April 2008

VSM was presented as a tool that could be helpful in enhancing the understanding of the internal flow of activities, and improving them accordingly. The stops, like the Indycar racing pit stops seemed to be a result of non-value added activities being carried out. These activities led to unnecessary waste in the product's production. Therefore, the aim was to prepare the VSM, identify those non-value added activities and reduce or eliminate them.

The Supply Chain Manager's initial reaction was one of both interest and scepticism. One of his comments in relation to the development of VSM by the researcher was:

I wish you good luck in raising the data and understanding the internal activities of GM. You will confront a big puzzle when you go to the factory site.

GM's Supply Chain Manager, May 2008

Initially, he granted access to the process mapping which the Process Analyst had prepared after the inauguration of the Supply Chain Department. In relation to this existing process mapping, it can be said that it was more concerned with the reception of materials and payments, than with the activities related to the manufacturing process.

Despite initially being supported in the preparation of VSM by the Supply Chain Manager, access to employees in the factory was granted by the Production Planning Supervisor, who had been working at GM for a longer period than the

Supply Chain Manager and had a better relationship with employees in the factory. The researcher then could arrange appointments with those employees to obtain information regarding the operations in the manufacturing plant. In addition to talking to those employees, the researcher could also measure timings of the operations in the composition site and in the manufacturing plant.

During the development of VSM, the researcher had the opportunity to meet people from different departments of the manufacturing plant. She met staff who worked on activities ranging from the reception of raw materials, from suppliers, to sales, and the delivery to the final customer (or to the third party transportation company). She was also able to observe production operations and measure the time taken to perform activities at the factory site.

Even though the VSM was incomplete and not perceived as a very useful tool by the Supply Chain Manager, developing the VSM created opportunities for the researcher to better observe GM's operations. For example, from the VSM it could be observed that the production of bottles for Product Z takes less than 3 hours, while it takes about 45 days for the product to be delivered to the customer. Another interesting aspect observed was the use of manual palletisation, which can be regarded as out of date and time consuming. However, it is important to add that this bottle has a quite unusual shape. It is slightly squared, a model no longer produced in the factory visited in England, for example (see details regarding this visit in chapter 3, section 3.3.4.1). The CEO of the English company said they would play a role in deciding the design of a new bottle and that rounded bottles are easier to produce than squared ones. The squared ones are more difficult to palletise and require a lot more manual work for both quality checks and palletisation.

In relation to this, it might be argued that, despite the enhanced opportunities for observation created by preparing the VSM, the role of the researcher may have been confusing for people in the organisation. This could be the case because of the lack of managerial support for the research, and the employees' lack of knowledge about the VSM tool. At this point, it might be said that the researcher was not completely perceived as an action researcher. If a team had been created

for the development of VSM, the perceptions would probably have been different. This reflects the need to work on issues of genuine interest for those being researched, as expected in AR projects. However, as the Supply Chain Manager was not fully convinced of the benefits of the VSM tool, he gave little importance and little support to the researcher's work. As a consequence, it seemed to be less relevant for the parties involved than it would have, had he seen the VSM tool as relevant. Indeed, if the Supply Chain Manager had been more interested, at the very least there would probably have been easier and faster access to data.

A significant issue with VSM which was highlighted by this research is the importance of the existence of a team in order to develop the mapping. There is a need to involve people from different departments of the company to obtain information regarding different activities and work on different aspects of the operations and processes. People from different departments would know in detail which activities are performed and which might be regarded as non-value added activities. For example, people with knowledge about engineering can tell where the activities can be stopped without affecting the quality perceived by the final customer. Indeed, the engagement of people from the quality department would have been really relevant, as the standard of quality has increased considerably over the last few years. As the one of the people responsible for quality put it:

During the last couple of years, the level of quality demanded by the customers has increased considerably. A major distinction can be observed especially in the last three years. GM's customers are much more demanding today than, say, ten years ago. As a result, a lot of work is being done at GM to meet the new quality requirements asked for by customers. The quality has become a major issue and improving the level of quality and the customers' perceptions in relation to GM's products is currently the major challenge of the Quality Department.

GM's Quality Supervisor, July 2008

Indeed, for a VSM initiative, the integration of people from different departments of the company and from outside the company (suppliers and customers) is fundamental for a fully developed VSM. As could be observed during the case study, the links between the internal departments were not sufficiently strong to improve the operations and increase efficiency.

One important issue for discussion here is the fact that Quality and Engineering were seen as two fundamental departments to be involved in the development of VSM. For example, during the observation of the production of the bottles of Product Z, an intense use of manual labour in the palletising stage of production was recognised. This meant there was a need for a higher number of employees to perform the task. One of the reasons for using this method was that there was a need to cool down the bottles and, if the palletising was performed manually, it gave more time for the cooling down process. However, from the efficiency perspective, a lot of time was wasted in the process.

In relation to the quality, it could be observed that the amount of bottles rejected because of quality issues was not controlled adequately. The rejection of the bottles is significant as it would affect the pack to melt (which measures the weight of packed glass to the molten glass) and consequently the EBITDA. But there was no immediate control or recording of the quantity of bottles rejected. The finished bottles were inspected visually (at the end of the production line) and the rejected ones were broken in the same place as the electronically rejected ones. As a consequence, these bottles did not count as rejected by inspection, but, in fact, they affected the pack to melt and the cost of production. During one of the observation days, the researcher could see how the quality inspection took place and what was done with the rejected bottles. On the shop floor, the dialogue was as follows:

Quality inspector: “Here we go, this bottle has got a small scratch which can cause it to crack later on, so we have to reject this bottle”

Researcher: “What do you do with this bottle?”

Quality inspector: “I just add it to the other ones rejected by the electronic visual Inspection to become cullet with the others”.

He then went to the production line and threw the bottle in the cullet.

5.5 Evaluating the action

Evaluating the action refers to the assessment of how the previous steps of the AR cycle were performed and the consideration of how the next cycle will be developed (Coghlan and Brannick, 2001). Although, as explained in the previous sections, several problems were encountered in the development of the AR project at GM, and the steps did not progress as planned, the evaluation of what happened is important in order to understand the reasons why change did not take place. The analysis of the findings of this research, which was carried out using actor-network theory (ANT), is presented in the next chapter.

5.6 Summary

This chapter described how the AR cycle was followed at GM and what happened afterwards. Initially, there was agreement between the researcher and the Supply Chain Manager and a problem of both theoretical and practical interest was identified. Two of the challenges facing the company were agreed to be the high levels of inventories held at GM due to poor communication with customers regarding their purchasing plans. Although information was exchanged with customers on a regular basis (yearly, monthly and sometimes weekly), there were problems in relation to the timeliness and the accuracy of the information customers sent to GM.

The idea was to develop the 'Collaboration with Customers' project with selected customers. Initially the project was presented to other staff at GM in order to obtain internal approval before contacting the customer. Despite a positive reaction to informal conversations that the Supply Chain Manager had with sales staff, during the formal presentation of the project there was scepticism and a lack of sufficient support. After the presentation, the project did not progress as expected. Indeed, as will be discussed in the next chapter, resistance to change was observed (Burns and Scapens, 2000).

Despite this, an informal information exchange took place as a result of trust between staff of GM and Customer for AD. As will be analysed in chapter 6, it later emerged that, in contrast to the literature (e.g. Tomkins, 2001), both trust and accounting information needs were high at the beginning of the relationship. As a consequence, accounting numbers, such as the customer's demand forecast, were shared at an informal level, but not at a formal level.

After some time, a new customer was selected to take part in the project. Customer for FI was contacted and was interested in the 'Collaboration with Customers' project. There were implementation plans, and information regarding expected volumes of purchases started to be exchanged. The VMI was going to be implemented, however, due to structural organisational changes in Customer for FI's business group, the implementation was suspended. Once more, the project was not fully implemented.

The other initiative, VSM, was also not fully developed. Despite this, the attempt to prepare the VSM for the bottles of Product Z highlighted inefficiencies in the production process and gave the researcher the opportunity to observe more of the daily activities at GM, and to meet other members of the staff, that is, other organisational actors of different hierarchical levels. The actors who were expected to be followed and the actors which were actually followed during the AR project are analysed in the next chapter. In addition, the next chapter presents the analysis of how the project unfolded, using an ANT perspective.

CHAPTER 6: DISCUSSION

This chapter presents the analysis and discussion of the field research. It aims to interpret the data, outlined in chapters 4 and 5, from the description of the case company and the action research project respectively. In addition, the chapter aims to explain the development of knowledge regarding a key research question of this thesis, namely: *How can accounting be an actor in mediating, building and shaping the development of a supply chain management (SCM) initiative?* As will be observed, the influence of accounting was different from what was expected based on other academic and research literature related to inter-organisational accounting (IOA). In interpreting the findings, the chapter draws on actor-network theory (ANT) and relates the findings to previous literature about IOA. The interpretation of the findings considers the key aspects of ANT, as described in chapter 3.

The first section of this chapter outlines the actors which became part of the analysis. These actors are described and divided into global, local, human, and non-human actors. Initially, as this research relates to SCM and accounting, all the actors potentially capable of contributing to the formation of the supply chain and accounting (SC&A) network are considered (section 6.1). The section explains why particular actors were selected for more detailed analysis. The next section (6.2) discusses the SC&A network formation according to Callon's (1986) four moments of translation: problematisation, interessement, enrolment, and mobilisation.²⁸ Due to the fact that the project was not fully implemented, section 6.3 moves on to present a reflection about the possible reasons for the lack of change. In addition, since accounting is the main focus of this thesis, section 6.4 presents further discussion on the role of accounting during the field research. As a result of the theoretical and methodological combination of ANT and AR, there is a need for in-depth analysis of the role of researcher, which is presented in section 6.5. Finally, in section 6.6, a summary of the chapter is presented.

²⁸ The moments of translation have been explained previously in chapter 3 (section 3.2.2).

6.1 Tracing the actors

As described in chapter 5, the action research (AR) project was selected and initiated by the Supply Chain Manager and the researcher. As the AR project was related to SC&A, the actors were selected by identifying potential participants and enablers for the project. Latour (1987) argues that we should be open in relation to the range of actors we pursue. Therefore, at the beginning of the research, as many of the actors that could form part of the SC&A network as possible were included in the analysis. Following the ANT perspective, they were divided into human and non-human actors (Latour, 1987), and global and local actors (Wickramasinghe and Alawattage, 2007). The actors which could be part of the AR project were those related to both SCM and accounting.

As explained in the literature review, supply chains have progressed from including not only the internal chain of activities in a company, but also external links such as suppliers, and suppliers of suppliers, customers, and customers of customers (Harland, 1996b). Moreover, the concept of SCM also refers to the need to look at network relationships (Christopher, 2005, 1998). Networks include suppliers, partners, allies, customers, and may also take into account competitors, all working together to increase value and improve business operations (Miller et al., 2008; Peppard and Rylander, 2006; Christopher, 2005, 1998; Harland, 1996b; Powell, 1990). Therefore, a large number of actors could be involved in the development of a SCM initiative.

In addition to these concepts, as the purpose of this thesis is to understand the role of accounting in the development of inter-organisational relationships, actors such as the balanced scorecard and IOA were also investigated. As explained in chapter 3, according to Latour (1987), enrolling symmetrically both human and non-human actors is essential, as the latter is as equally capable of acting as the former. Accounting technologies have been recognised as non-human actors capable of influencing both the intra- and the inter-organisational domains (Mouritsen et al., 2010; Chua and Mahama, 2007; Briers and Chua, 2001). The actors were divided into global and local, as it helps to understand how global

influences affect the local situation. As explained in chapter 3, this division has enabled the understanding of change as the outcome of complex relationships between global and local actors (Briers and Chua, 2001).

6.1.1 Global actors

While the global human actors identified were external links to GM, the global non-human actors were managerial technologies used inside GM. The global human actors were external actors who were included in the analysis due to their potential participation in the SC&A network. They were the multinational customers, the competitors in the glassware industry, and the competitors in the alternative materials industry. Although no direct contact was made with these actors, and they were not directly engaged in the network, their influence was noticeable and will be discussed in this chapter. Taking the ANT perspective into account, this research reflects on the traces left behind by these actors and their network effects (Chua and Mahama, 2007).

The global non-human actors regarded as relevant to this research were inter-organisational accounting (IOA), balanced scorecard (BSC), earnings before income tax, depreciation, and amortisation (EBITDA), economic value added (EVA), Systems Applications and Products in Data Processing (SAP), the warehouse management system (WMS), Zementer, the vendor managed inventory (VMI), and value stream management (VSM).

As explained in chapter 4 (section 4.3.2), GM divided its 1,800 customers according to its product lines. Of the total, around 1,200 were customers of glassware products, the remainder were customers of glass containers. The glass container product lines were divided into non-alcoholic drinks, alcoholic drinks, food, and pharmaceutical containers. It is also interesting to consider the customer base, which consisted of multinational and local customers. Although multinational customers were in the minority, it is important to highlight that they were regarded by GM as very important. Indeed, they had a major influence on inter-organisational relationships with GM. At GM, most of the employees and

managers felt that little could be done to influence the relationship with these global actors. As pointed out by one of the employees in the Sales and Marketing department:

The large multinational customers are not open to our suggestions. For example, in the development of new products, usually, they bring their own projects and we at GM have to adjust our operations to meet their requirements.

GM's Sales Manager, June 2008

In addition, contrary to the literature which suggests that SCM creates closer and more long-term relationships (e.g., Lamming et al., 2000; Christopher, 1998; Harland, 1996a), although the relationships with customers were long-term, they stayed at arms-length. This reflected the lack of development of SCM at GM. The relationships that GM's customers had with GM's competitors, which will be discussed later, reinforce this point.

The second and the third groups of global actors were the competitors in the glassware industry, and the competitors of alternative packaging materials. The competitors in the glass containers industry, which GM regarded as important, were the multinational companies located in the South and Southeast regions of Brazil. Usually they do not sell to GM's customers who are located in the Northeast due to the high cost of transportation. Nevertheless, at times, when price increases are necessary, some customers check prices with these competitors in order to add pressure in the price negotiations with GM. Despite this, the high transportation costs often make the transaction uneconomic, and the customers end up negotiating new prices with GM, instead of purchasing from these multinational suppliers located in the South and Southeast of Brazil.

The competitors of alternative packaging materials are included in the analysis because they can also influence price negotiations between GM and its customers. In addition, the Supply Chain Manager indicated that they had affected GM's market share. He said:

A high percentage of the glass containers market share was lost to suppliers of plastic, aluminium, and tetra pak. For example in the juice industry, we lost a considerable part of our market share to those substitute products between 2008 and 2010.

GM's Supply Chain Manager, March 2010

The next group of global actors are the non-human actors. As explained earlier in this thesis, accounting and management controls have been recognised as non-human actors capable of influencing business relationships (e.g., Briers and Chua, 2001; Preston et al., 1992). In this research, the focus is not only on the accounting and management controls used inside the company, but also on IOA. As explained in chapter 2, IOA refers to the accounting information used in the inter-organisational context. In this thesis, IOA is regarded as a global non-human actor because it has been developed in an international context. Examples of studies involving IOA found in academic research literature are from developed countries, such as the UK (Free, 2008; Coad and Cullen, 2006; Seal et al., 2004; Dekker, 2003; Seal et al., 1999; Berry et al., 1997), and Japan (Cooper and Slagmulder, 2004). At GM, no form of IOA (e.g. open book accounting, inter-organisational cost management, target costing) was initially observed. However, IOA was included in the analysis due to its potential to contribute to developing the SC&A network.

From the discussions with managers and initial observations, the relevant global non-human actors in terms of the internal accounting system followed were BSC, and the key performance indicators EBITDA and EVA. In relation to BSC, similarly to what has been observed by Norreklit (2000), at GM there were problems in relating the company's strategic objectives with operational measures. As described in chapter 4, there was a lack of consistency between the Supply Chain Department and the customer perspective of GM's BSC. The department's targets and performance indicators were related to operational and logistics efficiency, but not to customer satisfaction. Indeed, maintaining good customer relationships was an issue that seemed only to concern the Sales and Marketing Department.

As explained in chapter 4, EBITDA is a financial measure used in international financial markets, and in multinational companies (Busco et al., 2008; Malmi and Ikäheimo, 2003). This measure can usefully show the profitability of the company before taxation, depreciation and amortisation. However, it does not take into account the amount of capital invested in order to obtain profit. For this, EVA has been regarded as a more useful measure (e.g., Pohlen and Goldsby, 2003). EBITDA was used heavily at GM and there were plans to implement EVA in order to help demonstrate the cost of maintaining high levels of inventories.

The next global non-human actor included in the analysis was the Systems Applications and Products in Data Processing (SAP). SAP has been regarded as a global actor that influences relationships and is closely related to accounting and management controls (Quattrone and Hopper, 2005, 2001). In addition, adopting SAP can be regarded as a consequence of 'new' managerial technologies to which companies were exposed in the 1990s (Briers and Chua, 2001). In general, it is embedded in 'management accounting' technologies or 'management controls' such as activity-based costing, balanced scorecard and target costing (Briers and Chua, 2001).

The Warehouse Management System and Zemeter were also considered by the researcher to be important in relation to the AR project. Both systems were global information technologies introduced by the Supply Chain Department. The WMS is a global system used to manage inventories in the SCM context which helps to manage and control inventories. Zemeter helps in preparing future customer demand forecasts. Whereas the WMS would include changes in inventory levels, Zemeter would be affected by changes in the sales operations. The integration of these systems with SAP could increase the speed of generation of management control and accounting reports (Quattrone and Hopper, 2005, 2001). Due to the relevance of the WMS and Zemeter to supply chain operations and their potential impact on accounting, they were included in the analysis as global actors.

The other two global non-human actors followed were the VMI (Elvander et al., 2007; Slack et al., 2007; Danese et al., 2006; De Toni and Zamolo, 2005) and VSM (Slack et al., 2007; Rother et al., 2003). As explained in chapter 5, the

former was the SCM tool chosen by the Supply Chain Manager, while VSM is commonly used in SCM projects. In this research, they are both regarded as global actors since they were developed and previously used in several countries outside Brazil.

6.1.2 Local actors

In relation to the local actors, it can be said that the majority were human actors. From outside the legal barriers of GM, the relevant actors who could be enrolled in the network were the local small- and medium-sized customers. There were more of them than large multinational customers and, in general, GM appeared to have better relationships with them. Indeed, the local customers were more open to GM's suggestions than the multinational customers, as illustrated by the sales manager:

See this bottle; its design was developed in collaboration with the customer. We [GM] participated actively in the development of the design of this bottle and the customer was very open to our suggestions in relation to the most effective solutions.

GM's Sales Manager, July 2008

The other local human actors who would be likely to affect or be affected by the AR project were managers and employees working in the following departments of GM: Controllershship, Supply Chain, Sales and Marketing, and Information Technology. In the Controllershship department, the relevant actors were the Finance Director and the Financial Controller because of their strategic role in the company. The actors selected from the Supply Chain Department were the Supply Chain Manager, the Demand Planning Supervisor, and the Logistics Supervisor, which was due to their involvement in activities related to (or which affected) customer relationships. The Supply Chain Manager was responsible for providing the right products at the right time to the customers. The Logistics Supervisor's duties were related to the management of inventories and the delivery of products to the customers. The Demand Planning Supervisor's responsibility was to prepare GM's sales demand plan.

In the Sales and Marketing Department, the actors who could be involved in the development of the project were the Sales and Marketing Director and the Sales Managers. While the former was an influential actor in determining customer relationships, the latter were closely involved with customers in order to pursue sales of GM's products. In the Information Technology Department, the Information Technology Manager, and the SAP consultants were also potential actors in the SC&A network because the project implementation required changes to GM's systems.

The last two local actors taken into account were daily routine management (DRM) and the book of managerial information (BMI). As explained in chapter 4 (section 4.4.2.3), DRM was the performance measurement system used at the operational level. Each department had its specific performance measures. It was developed by a consultancy group and there was an attempt to relate DRM to the global actor, BSC. Although DRM was not seen by managers and employees as a management accounting technology, it included accounting related measures, such as the logistics expenses. The BMI contained a summary of the accounting information for the company (see details in chapter 4 – section 4.4.2.1).

6.1.3 Local/global actor

A further actor was the researcher. The researcher is Brazilian and is a lecturer at a local Brazilian University, but doing a PhD at an international university. Thus, arguably the researcher was a local actor, but with a high level of global influence, hence the phrase local/global actor. The researcher was included within the analysis because the methodological approach was AR, and the thesis draws on ANT (Lewis, 2007). In employing AR, the researcher was engaged in developing the project and could also influence its outcomes, while the use of ANT requires that all actors capable of influencing the network should be included in the analysis (Latour, 2005, 1987; Callon, 1986).

Studies using ANT often do not include the researcher as an actor equally capable of acting in the network development (Chua and Mahama, 2007; Briers and Chua,

2001; Ezzamel, 1994; Callon, 1986). Indeed, as explained in chapter 3, including the researcher in the analysis can be seen as a problematic aspect of combining ANT and AR (Lewis, 2007). However, in this study, the dual role of the researcher was clear to members of staff at GM. On a practical level, the researcher was regarded as a ‘temporary member of staff’, who was working on one specific project, but was not engaged in other daily activities of the company. On the other hand, on a theoretical level, as it was an overt AR project, members of staff were aware of the fact that the researcher was in the company not only to help, but also to carry out her research. Thus, although staff saw the researcher as a collaborator, they also knew about the theoretical and academic needs of the research.

Due to the importance of reflecting on the role of the researcher, which is significant when using the combination of ANT and AR, the advantages and disadvantages of considering the influence (or potential influence) of the researcher on the project’s outcomes are discussed further in section 6.5.

A summary of the global and local actors is presented below, in Table 6.1.

Global and local	Human and non-human	ACTORS	ROLES AND INTERESTS
Global	Human	Customers – multinational companies Competitors in the glass industry Competitors of alternative materials	To maintain the prices and the levels of service To increase their market share as much as possible To increase their market share as much as possible
	Non-human	Inter-organisational accounting (IOA) Balanced scorecard (BSC) Earnings before income tax, depreciation and amortisation (EBITDA) Economic value added (EVA) Systems Applications and Products in Data Processing (SAP) Warehouse management system (WMS) Zemeter Vendor management inventory (VMI) Value stream management (VSM)	To provide information regarding inter-organisational relationships To translate the business strategy To measure the profitability of the business To measure the wealth of the business To provide faster and more accurate information To contribute to managing inventories To contribute to the preparation of the customer demand forecast To manage customers' inventories and contribute to production planning To analyse the value added activities in supply chain operations
Local	Human	Local small customers Accounting staff (Finance Director and Financial Controller) Supply Chain staff (Supply Chain Manager, Logistics Supervisor, and Demand and Planning Supervisor) Sales and Marketing staff (Sales and Marketing Director and Sales Manager Alcoholic Drinks) IT staff (SAP Project Manager and SAP Consultants)	To maintain the prices and the levels of service To provide accounting information and to contribute to the manager's decision making To provide the products at the right time as required by the customers To sell the products and to improve GM's image in the market To integrate information from different departments of the company
	Non-human	Daily routine management (DRM) Book of managerial information (BMI)	To measure operational performance indicators To report on business performance
Local/global	Human	Action researcher	To contribute to both practice and theory regarding inter-organisational accounting (IOA)

Table 6.1: Global and local actors

6.2 The translation – The supply chain and accounting network

The previous sections have described the range of different actors. This section moves on to discuss how the global human and non-human actors, and the local human and non-human actors, described above, interacted in the SC&A network. As explained in the introduction of this chapter, the formation of the SC&A network is analysed according to the four moments of translation, namely, problematisation, intersement, enrolment, and mobilisation (Callon, 1986). A summary of the concepts of translation stages and the findings of this research are presented in Table 6.2.

MOMENTS OF TRANSLATION	THEORY/CONCEPTS	THIS RESEARCH
Problematisation	Consists of the ‘interdefinition’ of the actors, that is, naming the actors and identifying their roles and interests, and the potential for conflicting interests. It also relates to the identification of obligatory passage points (OPP) which refers to the indispensable actors in the network in order for the change to take place.	Actors were identified in relation to the SC&A network and their importance to whether the change took place – or did not take place. In this research, conflicting interests were found.
Intersement	Actors’ roles and interests are considered and ‘intersement’ devices are created. One of the key aspects of the intersement is to reinforce to the actors that their individual interests are best achieved through the network.	Conflicting interests between actors were observed. However, the importance of ‘intersement’ devices seemed to be either ignored or not known.
Enrolment	Takes place when intersement is successful. It involves engaging allies and dealing with the obstacles which may stop the network from being successful.	Engagement was limited. However, enrolment appeared to happen, at least partially, at an informal level.
Mobilisation	Aims to ensure that the network’s spokesperson adequately represents the collective interests of the actors engaged in the network without deceiving them.	As a consequence of the lack of enrolment, the mobilisation also did not happen and the translation through the four moments failed to take place.

Table 6.2: The four moments of translation (adapted from Callon, 1986)
Source: Elaborated based on field research

As will be observed, not all actors described in section 6.1 were engaged in the SC&A network. Therefore, in this section, only the actors involved in the SC&A

network are included in the analysis. The network initially observed is represented in Figure 6.1, below. It is called 'SC&A network – Customer for AD' as it refers to the actors and relationships related to the potential implementation of the project with a customer of bottles for alcoholic drinks. The figure was prepared based on ANT concepts, and more specifically, was adapted from Callon (1986). It includes the actors, the obstacles they encounter, and their goals in relation to the network. Whereas the actors' goals are related to their aims and interests concerning the network formation, the obstacles refer to the restrictions on the actors engaging in the network.

It was initially expected that the formation of the SC&A network would happen in collaboration with the customer of bottles for alcoholic drinks (Customer for AD), culminating in the translation, that is, the implementation of the AR project (see SC&A network – Customer for AD in Figure 6.1). However, as will be explained in section 6.2.3, the enrolment and mobilisation failed to take place due to problems in the intersement, and the translation was not completed. As detailed in section 6.2.4, a new SC&A network was formed with Customer for Pharmaceutical Industry (see SC&A network – Customer for PI in Figure 6.2 in section 6.2.4). However, once more, the change did not happen.

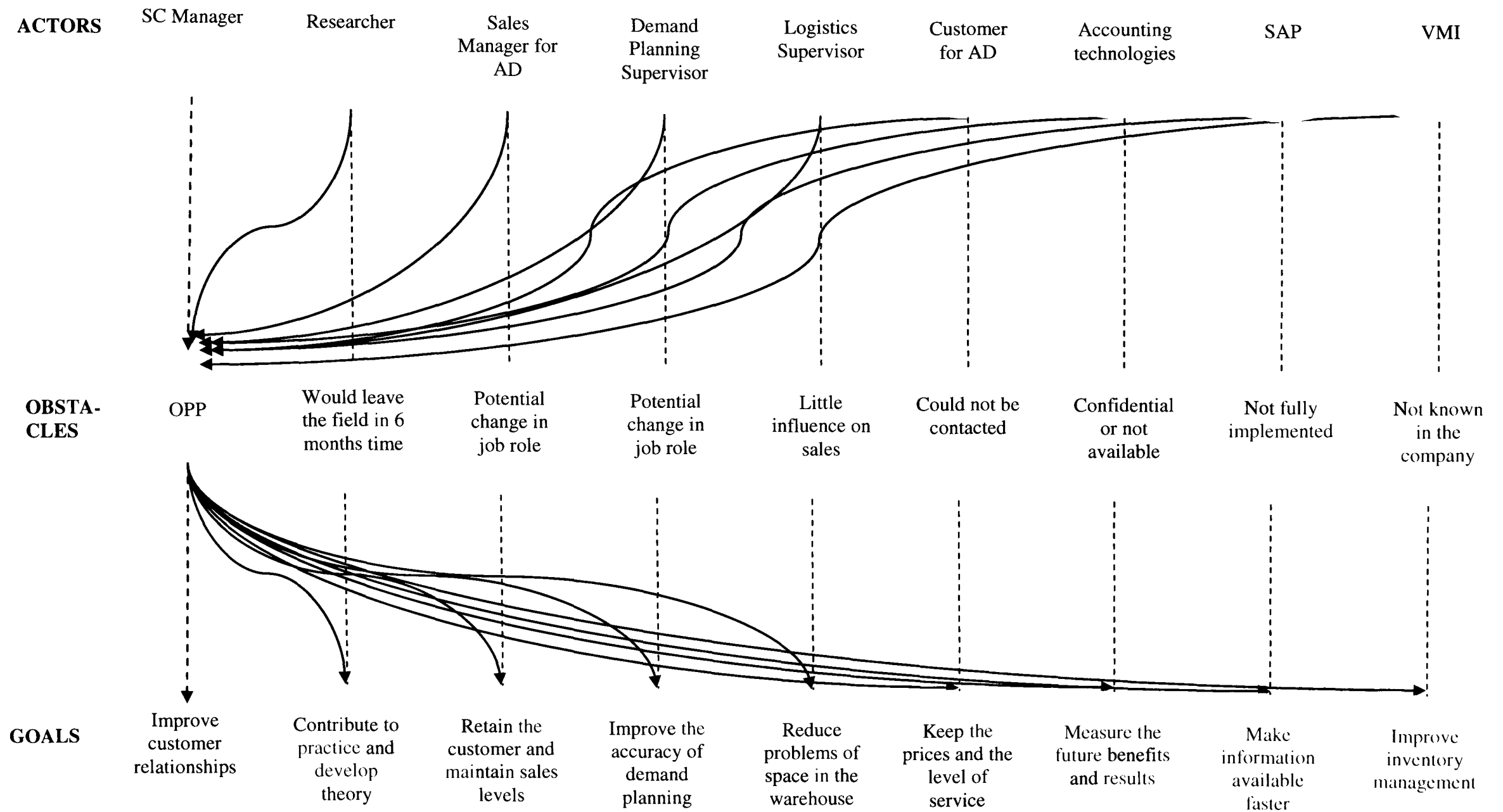


Figure 6.1: SC&A network – Customer for AD
 Source: Adapted from Callon (1986)

6.2.1 Problematisation

As explored in chapter 3, problematisation consists of explaining the actors' roles and interests and identifying the network's obligatory passage point - OPP (Callon, 1986). The actors involved were those within the SC&A network, but directly engaged in the process. In order to evaluate the actors' roles, it is useful to engage in the interdefinition of the actors, in other words, naming them, and explaining their roles and interests in relation to the network (Callon, 1986). Arguably, the most important actor was the Supply Chain Manager. As can be observed in Figure 6.1, he was responsible for the achievement of the main goal of the network which was the improvement of customer relationships.

6.2.1.1 The interdefinition of the actors

Whereas in the case presented by Callon (1986), the researchers were the starting point of the project, in GM it can be said that the SC&A actor-network was initiated by the Supply Chain Manager. In certain respects, the role of the Supply Chain Manager in this study replicates that of the Supply Chain Director in a case reported by Hald (2007) in that both protagonists were affected by global influences. As explained in chapter 3 (section 3.2.4), in the case presented by Hald (2007), as a result of the influence from balanced scorecard (BSC) learnt in his MBA studies, the Supply Chain Director developed a new performance measurement system to improve communication regarding supply chain.

Although at GM the Supply Chain Manager was a local actor, he was also affected by global influences from his training and his participation in international conferences relating to SCM in the United States and India. Moreover, as explained in chapter 4 (section 4.2.2), before working at GM, he was one of the owners of a consultancy firm concerned with SCM and was careful to maintain an awareness of global innovations in this field. For example, one innovation he introduced at GM was the warehouse management system (WMS), which he had used when providing consultancy work to GM. As a result of the

success of this project, he was invited to work for the company and to become its Supply Chain Manager.

The second actor who was influential in this project was the researcher. She was interested in contributing to both the practical development of the project and exploring the theoretical implications. However, as can be seen in Figure 6.1, her engagement in the network was restricted, as she left the field after the 6 month field research period. The researcher had an overt role, and she attempted to go beyond participant observation (Whyte, 1989). The intention was not only to blend with other actors, as in participant observation, but also to have explicit objectives and a commitment to carry out the project by actively engaging with other members of the organisation (Whyte, 1989). Despite the fact that the researcher was working in the Supply Chain Department instead of the Controllershship Department, the actors were informed that she was conducting research related to SCM and management accounting. The actors were usually informed that she was an accounting lecturer at a local university and studying for a PhD in management accounting in the United Kingdom.

The researcher intended to help the Supply Chain Manager introduce innovation to the Supply Chain Department and to engage accounting in this process of change. However, as mentioned above, the researcher had a dual role, with a concern for both theory and practice (Harris, 2007; Jönsson and Lukka, 2007; Jönsson and Lukka, 2006; Eden and Huxham, 1996). As previously indicated in research literature, the need to achieve a balance between theory and practice was very demanding (Noffke and Somekh, 2005). While being interested in the practical development of the project, she also had a reflective role that was not essential to the other actors.

A further complexity for the researcher was her desire to engage accountants in the process, due to her disciplinary background in this area. Accountants or finance managers are often engaged in IOA or supply chain and accounting projects (Chua and Mahama, 2007; Seal et al., 2004). However, as has previously been observed, the engagement of accountants in the development of new organisational designs may be problematic (Berry et al., 2009). For instance, in

the research carried out by Hald (2007) such professionals were not directly involved in the network, in spite of the fact that performance measurement was important. At GM, the lack of involvement of accountants was also observed.

Indeed, from the Supply Chain Manager's perspective, actors other than accountants were initially regarded as more important. The human actors involved in the SC&A network were the ones related to the 'Collaboration with Customers' project. They were the Sales Manager for Alcoholic Drinks (Sales Manager for AD), the Demand Planning Supervisor, the Logistics Supervisor, and the Customer for Alcoholic Drinks (Customer for AD).

The third actor, the Sales Manager for AD, was keen to retain relationships with GM's customers and also to maintain the level of sales. However, one problematic aspect for him in enrolling in the network was the potential change in his job role. As described in chapter 5 (section 5.4.1), he was responsible for the customer's monthly and yearly sales forecasts, and the project's implementation would considerably affect the preparation of these forecasts. With the project implementation, predicting the customer's sales forecast would be simplified and his personal experience (or 'intuition') would be less relevant. GM would have access to the customer's levels of inventories and future demands in advance in order to replenish necessary inventories (Lee and Chu, 2005). Moreover, the more efficient operations could mean a lower level of sales, and hence, lower commission on sales. As a probable consequence, from the beginning, he did not show an interest in the project's development because of the potential impact on his own role and on sales. Indeed, he was resistant to the change (Burns and Scapens, 2000). This issue is discussed further in sections 6.2.2 and 6.3.

Meanwhile, although the fourth actor, the Demand Planning Supervisor might also have anticipated changes in his job role, he was positive about the project. He was responsible for the preparation of GM's demand plan and one of his main sources of data was the sales forecast prepared by the Sales Managers. Apparently, the Demand Planning Supervisor was dissatisfied with the difficulties he encountered in preparing the sales demand plan due to delays in receiving information and problems relating to the inaccuracy of the reports. He was

interested in the project as it could be helpful for improving demand planning activities. After the project's implementation, he would receive more accurate information, faster. Therefore, his sales demand plan report would be ready earlier and would be more accurate. As his performance was assessed by the level of accuracy of the sales demand plan, the project would bring better evaluation results for him. The level of accuracy of the demand plan was a performance measure included in the daily routine management (DRM) which referred to the percentage of actual demand relative to the demand forecast. The accuracy of the demand forecast was equal to the percentage difference between the actual sales and the sales forecast (predicted in the sales demand plan). That is:

$$\text{Accuracy of demand forecast} = (\text{Real sales} - \text{Sales Forecast}) / \text{Sales Forecast} \times 100$$

As this measure was part of the DRM, which is considered in this analysis as accounting information, it can be said that accounting was an influential motivation for him to be interested in the project.

The fifth actor referred to in Figure 6.1, the Logistics Supervisor, was also an important actor in the network. Although he could not affect the levels of sales, as his responsibilities were related to inventory management and the delivery of products, he was interested in reducing problems relating to lack of space in the warehouse for the high levels of inventories of finished goods. The space was insufficient because of the need to keep high levels of inventories in order to be prepared to meet customer demand. As there were problems in predicting the demand from customers, GM's policy was to keep more inventories than the customers were expected to purchase. Therefore, if the project had succeeded, it would have helped the Logistics Supervisor to improve inventory management. Despite the fact that he could not affect sales directly, he interacted closely with the Demand Planning Supervisor and the Sales Manager for AD and tried to emphasise the problems he was having with inventory management.

The sixth actor, Customer for AD, could not be observed directly. However, it can be said that because it was a multinational customer, this global actor was in the most influential customer group. In fact, as explained in chapter 4 (section

4.3.2.3), customers of bottles for alcoholic drinks were increasingly important to GM. According to GM's managers, the customer was satisfied with the availability of products and the level of service provided by GM. Although no demand reduction was expected by GM's managers, the customer had expressed dissatisfaction in relation to price increases. Despite the fact that this customer operated in the alcoholic drinks industry and, therefore, had a preference for glass packaging, they also used alternative packaging materials, such as aluminium cans. Hence, price increases in glass could result in fewer sales to this customer.

Further actors who were involved directly in the process include non-human actors. These include the accounting technologies, SAP, and the VMI. The accounting technologies are included in the analysis due to their potential to contribute to the 'Collaboration with Customers' project. SAP is regarded as an important actor because of its influence on GM's accounting system (see details in chapter 4 – section 4.4.3). The VMI is relevant since the project focuses on its potential implementation to exchange information with customers.

The accounting technologies which were expected to have a role in the project were both global and local ones, namely, IOA, BSC, EBITDA, EVA, DRM, and the BMI. However, they did not contribute as expected to the formation of the SC&A network. The role of accounting is discussed further in section 6.4. As explained in chapter 4 (section 4.4.3), the accounting information system at GM was due to have further improvements made to it. As a result, accounting was an actor that was not as directly engaged in the project development as might have been expected by the researcher. However, it can be argued that accounting was one of the motivators of the project because cost information made it evident that unnecessary production was expensive. This was particularly the result of problems with maintaining high levels of stock due to a lack of sufficient physical space, the need to re-work damaged stock, and the need to destroy unused stock.

The lack of involvement of accountants and accounting in the project contradicts previous research literature about IOA, which has suggested that their involvement is essential to the effective deployment of inter-organisational relationships (Mouritsen et al., 2010; Chua and Mahama, 2007). However, in

GM's case, the lack of involvement could be related to problems in the internal accounting system. For example, BSC was due to be developed further and links between operational measures (used for DRM) and the BSC's perspectives were necessary.

In relation to SAP, it can be said that after its implementation, information was more readily available than in the past, but there were still a number of problems related to the fact that the system did not communicate well with other systems, such as the WMS and Zementer, the demand planning software (see section 6.1.1). In fact, as mentioned earlier, SAP was not implemented fully and it was sometimes seen as problematic. It enhanced control for managers, but also caused a number of problems for employees in GM, such as delays in getting access to information, and frustrating waiting times for SAP Consultants to sort out the problems.

As explained in chapter 5, the vendor managed inventory (VMI) was a system that could potentially have been useful to GM by reducing inventory levels. However, most of the staff at GM were not aware of how it could be used (Burns and Scapens, 2000; Scapens and Roberts, 1993). Moreover, due to problems experienced in the use of SAP, the addition of a new information technology was seen as potentially problematic. As a consequence, the VMI was regarded as another technology likely to fail and its introduction was not desired by some of the managers (e.g. the Sales Manager for AD). This can be related to the idea of a manager's perception of change being a negative development, which has been observed in previous studies of management accounting change (Burns and Vaivio, 2001; Scapens and Roberts, 1993). This issue is discussed further in section 6.3.

6.2.1.2 The definition of the OPP

Callon (1986, p. 8) states that problematisation entails the identification of the formation of alliances which will help actors to overcome barriers and achieve their aims. In order to overcome these problems, the focal actors in the network attempt to become indispensable to the network and to establish themselves as the

obligatory passage points (OPPs). The OPP seeks to align the actors' individual interests to the network aims. However, to become the network's OPP, the focal actors have to convince the other actors that their individual interests are best achieved by engaging in the network. The main idea is to make sure that the other actors have an interest in the network formation. This will, therefore, contribute to the translation, that is, the establishment of change (Callon, 1986).

As shown in Figure 6.1, the Supply Chain Manager was initially placed as the OPP of the SC&A network, because he was the mentor of the project and had better access to the actors in the network. The figure shows that the main aim of the network was to improve customer relationships. Despite the obstacles encountered by each actor, this can be achieved if the actors accept the OPP. As can be observed in Figure 6.1, the actors engage in the network through the OPP, seeking to advance their individual interests, and in this way, they also contribute to the achievement of the network's aim. However, obstacles can prevent them from seeing the network as the best way to reach individual goals. For example, as illustrated in Figure 6.1, although the researcher faced the obstacle of leaving the field after 6 months, she could achieve her individual goal of contributing to practice and developing theory if she accepted the Supply Chain Manager as the network's OPP and the network was successful. Similarly, despite the fear of the potential change to his job role, the Sales Manager for AD could accomplish his individual objectives, that is, to retain the customer and the level of sales, through the OPP and acceptance of the network.

Due to the difficulties in dealing with individual obstacles and aligning the interests of some actors (for example, the Sales Manager for AD) with the SC&A network, the Supply Chain Manager did not manage to become the OPP and render himself indispensable to the network (Callon, 1986). As will be suggested, this can be regarded as one of the most problematic aspects in the formation of the SC&A network.

6.2.2 Interessement

Interessement consists of the attempt to emphasise to actors the benefits of the network for them. It also aims to prevent actors from engaging in alternative relationships (Callon, 1986). For this purpose, interessement devices are created and the OPP attempts to use them in order to enrol the actors into the network. Furthermore, the interessement moment of translation highlights controversies between actors. Within ANT, it is suggested that any potential disagreements between those involved in the network might become more apparent at this stage (Callon, 1986).

As mentioned in the previous section, the Supply Chain Manager failed to become the OPP, and to ensure the interest of the other actors in relation to the network. The network failed to align contrasting or conflicting interests. As pointed out by Chua and Mahama (2007, p. 53), "... conflicts and controversies may arise in the exchange process. ANT seeks to explore how these conflicts and controversies are resolved or managed, albeit temporarily in many cases". In this research, the main controversy was related to the different interests of the Supply Chain Manager and the Sales staff. While the former was interested in reducing the levels of stock in order to reduce costs (mainly the logistics costs), the latter's preference was to maintain high stock levels to guarantee having the products when requested by the customers.

The Sales and Marketing Director's argument was that GM should hold high levels of inventories in order to meet the customers' seasonal demands. He commented:

I think that this is one of the years in which GM is going to start the third and fourth quarters, when sales are much higher, with the lowest level of inventories. In my opinion, this can be risky as we might not be able to meet customers' demands on time. I think that we should expand the warehouse capacity in order to guarantee having the products for customers when required.

GM's Sales and Marketing Director, September 2008

Meanwhile, the Supply Chain Manager's aim was to implement the 'Collaboration with Customers' project, using the VMI, in order to improve inventories management and to reduce the levels of inventories held by GM.

In relation to the different views that were held, the Supply Chain Manager took a passive role and did not confront them, as he did not try to convince the Sales staff of the worthwhile nature of the project (see details in chapter 5). He seemed to take it for granted that the benefits of the change were apparent to the other actors, as the project would bring more efficiency to operations. He also seemed to take it for granted that other actors would accept the need to keep lower levels of inventories, which would lead to lower costs. Despite his apparent lack of awareness of these controversies, the Supply Chain Manager did show a concern with engaging internal actors. For example, he sought to find a 'Brazilian case' when explaining the VMI to the other actors through a presentation to the S&OP group (including the Sales and Marketing Director, the Sales Managers, and the Production Manager). The use of national, Brazilian case examples was usually regarded as important at GM. This was because examples of countries other than Brazil (such as the advanced economies) were considered to be potentially difficult to implement in a developing country. Due to the lack of more local examples, the case used by the Supply Chain Manager was of Shell, which is a multinational company operating in Brazil.²⁹

However, although he seemed to acknowledge the need to persuade other actors of the benefits of the project, no attempt was made to show the internal actors how the change, that is, the project implementation, would affect their roles at GM. As discussed, during problematisation (section 6.2.1), for some actors, such as the Sales Manager for AD and the Demand Planning Supervisor, the main problematic aspect of engaging in the network was the potential change in their job roles.

As explained in chapter 5, during the presentation of the project, the Supply Chain Manager emphasised the benefits of the proposed change, which he called the

²⁹ The SCM asked the researcher to find a Brazilian example, and the suggestion of Shell was accepted. A translated copy of the presentation is included in Appendix 5.2.

‘Collaboration with Customers’ project. The focus was on increasing customer loyalty to GM by improving levels of service and at the same time decreasing the levels of inventories for the customer and GM. This would lead to higher customer satisfaction and lower costs for both GM and the customer. Hence, the benefits seemed to be clear and cost reduction was a potential interest device. The way in which costs were used as an interest device is similar to the use of costs by Chua (1995). However, in the case cited by Chua (1995) the interest device was cost information, whereas at GM it was the potential for cost reduction.

In previous studies accounting technologies have been recognised as a key interest device (e.g. Chua, 1995; Ezzamel, 1994). However, perhaps surprisingly, given its potential to add value, accounting seems to have had a stronger role in reinforcing the controversial aspects of the project within GM rather than in promoting it. The performance of the sales staff was evaluated by EBITDA (the accounting measure used to calculate the difference between revenues and costs). For example, the Sales Manager for Non-alcoholic Drinks (Sales Manager for ND) was evaluated by EBITDA for her segment. If the revenues were increased or the costs reduced, this would improve the EIBTDA result. However, the sales staff appeared to be more concerned with revenues than with costs. In contrast, the Supply Chain Manager was trying to squeeze costs. To some extent, this seems to reflect the circumstances within one of the cases presented by Alcouffe et al. (2008), where accounting failed to be sufficient as an interest device per se. As discussed in chapter 3, the adoption of the George Perrin method (GPM) in France was problematic due to the failure of its proponent to recognise the importance of developing interest devices to enhance others interests. The main problem seems to have been the assumption that the accounting technology, that is, the GPM, would be sufficient for this (Alcouffe et al., 2008).

It might have been possible for the Supply Chain Manager at GM to find additional interest devices. However, he seemed to ‘ignore’ or to give little importance to the development of other devices. For example, he rejected the idea of using discounted prices for customers who would be involved in the project.

This option was suggested by the researcher, based on her knowledge of research literature (Gümüs, Jewkes and Bookbinder, 2008; Toptal and Çetinkaya, 2008; Elvander et al., 2007; Pohlen and Goldsby, 2003). The difference in price would not affect the Supply Chain Manager's function directly, but the sales staff were assessed by profit margins (i.e. EBITDA), and therefore this might have influenced his decision to reject this option. He was probably concerned with the potential reactions from the Sales and Marketing personnel who would not have been favourable to discounts. However, he did not explicitly give reasons for his rejection of this option.

The lack of additional interestment devices may also have been a result of the difficulty the Supply Chain Manager had in accessing relevant data. For example, two potential attempts to develop interestment devices were made by the Supply Chain Manager and the researcher. One was to calculate the net present value (NPV) of the project, and the other to develop customer accounting techniques. Both could be used to measure the financial benefits of the project. The Supply Chain Manager proposed calculating the NPV of the project to compare the current and future situation, while the use of customer accounting was the researcher's suggestion. However, the development of these interestments did not progress due to limited and slow access to the necessary data.

Although the NPV is not always used in inter-organisational projects, it has been recognised for its potential to measure the effectiveness of IOA tools and techniques (Cooper and Slagmulder, 2004). As these authors state, "the effectiveness of an IOCM [inter-organisational cost management] technique is captured by the net present value of the savings derived from all suppliers using the technique during a given time frame, minus the cost of establishing and maintaining the technique and its associated relational context" (Cooper and Slagmulder, 2004, p. 22). Therefore, it would be necessary to calculate the net present value of the savings that could be made with the project implementation minus the cost of implementing the tool.

For calculating the NPV of the potential savings of the project, data regarding past and projected future sales to the customer are important. It can be used as a basis

for preparing a new projection of future sales, and subsequent expected cash flows from the sales to the customer after the project's implementation. However, past and future sales data were not easily available at GM. The company's sales reports which were available to all departments were structured according to the sales per product and not sales per customer. The sales per customer were monitored by the Sales Manager responsible for that customer relationship. The Supply Chain Manager did not have direct access to this report and would need to ask permission to view it. This did not happen during the field research period and the reasons for this are unknown to the researcher.

Two other possible interest devices could have been the use of economic value added (EVA) and customer accounting. EVA considers the cost of the capital invested by the business in obtaining profits (Malmi and Ikäheimo, 2003). It could have contributed to convincing the managers (i.e. the Sales and Marketing Director, and Sales and Marketing Manager) of the high cost of maintaining inventories, and the benefits of working more closely with customers in order to improve information exchange and reduce the levels of unnecessary inventories.

Customer accounting has been addressed more often in marketing and management than in management accounting literature (Cäker and Strömsten, 2010). However, there is a call for the use of customer accounting in the inter-organisational context (Cäker and Strömsten, 2010; Lind and Strömsten, 2006). This relates to the use of accounting to measure how customers contribute to a firm's profit ((Cäker and Strömsten, 2010; Lind and Strömsten, 2006). This contribution is measured by the difference between the customer's revenues and costs (accrual based) during a certain period of time (Lind and Strömsten, 2006). At GM, as discussed in chapter 5 (section 5.3.2), one of the problematic aspects of the 'Collaboration with Customers' project was the lack of agreement on which customers should be contacted initially. Arguably customer accounting had the potential to highlight which customers were more profitable and which ones would be worth involving in the project. In addition, information about customer profitability had the potential to be used to persuade managers in the Sales and Marketing Department to support the project, as the potential cost reduction would be clearer with these accounting calculations.

Customer accounting could also have been used to assess the internal impacts of the change. It could have been used to calculate expected costs and revenues after the project's implementation. Usually full product costing, where costs are allocated to a customer according to the volume of products purchased, is used, but activity based costing (ABC) can provide a more sophisticated analysis (Lind and Strömsten, 2006). Although ABC was not used at GM, customer accounting could have been applied by using full product costing, but this did not happen.

6.2.3 Enrolment and mobilisation

Enrolment involves engaging allies and dealing with the obstacles which may stop the network from being successfully developed, and mobilisation embraces the stability of the network. If the translation is successful, alliances are formed and the network becomes more or less stable (Callon, 1986). It could be argued that the problems found at the interessement stage of translation did not enable enrolment and consequent mobilisation. As Callon (1986) puts it, enrolment and mobilisation will only take place when interessement is successful. At GM, the interessement devices failed to be developed successfully and this created problems in relation to enrolment. On the other hand, interessement devices are not always a guarantee of the translation's success. "No matter how constraining the trapping device, no matter how convincing the argument, success is never assured. In other words, the device of interessement does not necessarily lead to alliances, that is, to actual enrolment" (Callon, 1986, p. 10).

More specifically, at GM, it could be said that the project failed to convince the Sales staff of the benefits to them. It was not completely clear what the new roles of the sales staff would be after the change, and how their activities would be affected by the change. In arguing that there would be no benefits for the customer with the project, presumably the Sales Manager for AD was, in fact, more concerned with the lack of benefits for himself and his department.

Problems with the translation have also been observed in other studies in research literature related to accounting (Hald, 2007; Briers and Chua, 2001). In contrast to

GM, in these two studies the translation took place at the beginning, but became problematic over time. In Hald (2007), the Supply Chain Director initially implemented the new performance measurement system. However, over time he failed to convince the actors to continue using the new system and hence, enrolment was challenging. In contrast, in the case cited by Briers and Chua (2001) the main difficulty appeared when global (or cosmopolitan) human actors left the field and local human actors had to adjust to using the ABC system (a global non-human actor) which had been implemented. The key issue was the fact that the global human actors acted as local human actors during the implementation of the new accounting technology. In contrast, at GM, problems were found before the enrolment moment of translation because actors' individual interests were not aligned with the network's aims, as shown in section 6.2.2.

Further reasons for the lack of translation could be attributed to a general lack of interest in the project at GM. The Sales Manager for AD was not totally interested in the project. This was reflected in his initial reaction during the S&OP meeting, which is when the departments' plans are consolidated (see chapter 5), and also by the fact that he did not contribute to the project's development after the idea was initially presented. As explained in chapter 5, he argued that the project was too theoretical and was very unlikely to work in practice. This lack of interest from the Sales Manager for AD was confirmed by the Supply Chain Manager during a follow up interview. He said:

I think that one of the major obstacles we had in relation to the attempt to implement the VMI with the customer from the alcoholic drinks industry was the lack of interest from the Sales Manager for AD. Although the VMI implementation was not yet possible either with the alcoholic drinks industry customer or with the pharmaceutical industry customer, I would say that there is still a chance for future implementation. Today, it is noticeable that the Sales Manager for AD is much more open and interested in the project. I would say that now, due to all the market difficulties we have been through in the last couple of years he is much more flexible to the potential implementation of the project.

GM's Supply Chain Manager, March 2010

As can be observed from the Supply Chain Manager's comment above, in March 2010 the Sales Manager for AD seemed to view the project more favourably due

to a decline in sales caused by the financial crisis that affected the Brazilian economy at the end of 2008 and during 2009.

Despite the lack of translation at the formal level, it could be argued that it was achieved at an informal level. As explained in chapter 5 (section 5.4), the Demand Planning Supervisor asked the customer directly for future purchase plans. The customer gave him this information as they trusted that he would not use it opportunistically, for example, to modify prices. They did this because they had worked together for a long time. The project would not have achieved this exchange of information at a formal level (as explained in section 6.2.2), whereas it was achieved informally. However, the Demand Planning Supervisor did not inform the Supply Chain Manager of his approach to the customer, nor obtained his approval to ask for purchase plans from Customer for AD. He used his inter-personal relationships in order to get access to this information.

An informal information exchange has also been found in other cases (Cäker, 2008) where it was based on enhanced trust due to inter-personal relationships. In Cäker (2008), the VMI was implemented at the formal level, but there was still informal information exchange in order to speed up the exchange of information when problems arose, or there were last minute changes to orders. In contrast, at GM, information exchange took place only informally. Arguably, this informal information exchange bypassed the controversies, at least temporarily. However, it was not converted into a formal information exchange.

6.2.4 A new network

New actors were added to the network towards the end of the field research period. As suggested in literature about ANT, every time a new actor is added to the network, the relationships are changed (Latour, 2005, 1987; Callon, 1986). When new actors were engaged, such as the Sales Manager for Pharmaceutical Industry (Sales Manager for PI), the Customer for PI and the Process Analyst (who worked very closely with the Supply Chain Manager), some actors from the initial network came to be regarded as less important (the new network can be

seen in Figure 6.2 below). This was the case especially in relation to the Sales Manager for AD and the Customer for AD. In contrast to the Customer for AD case, this time, there was a clear interest from the Sales Manager for PI, and also from the Customer for PI:

The Customer for PI has already published in their internal newsletter about their intention to implement the VMI with GM. This time their interest is very high, and the Sales Manager is also very interested in the project. All we need to do is to provide support for the project to be implemented.

GM's Supply Chain Manager, August 2008

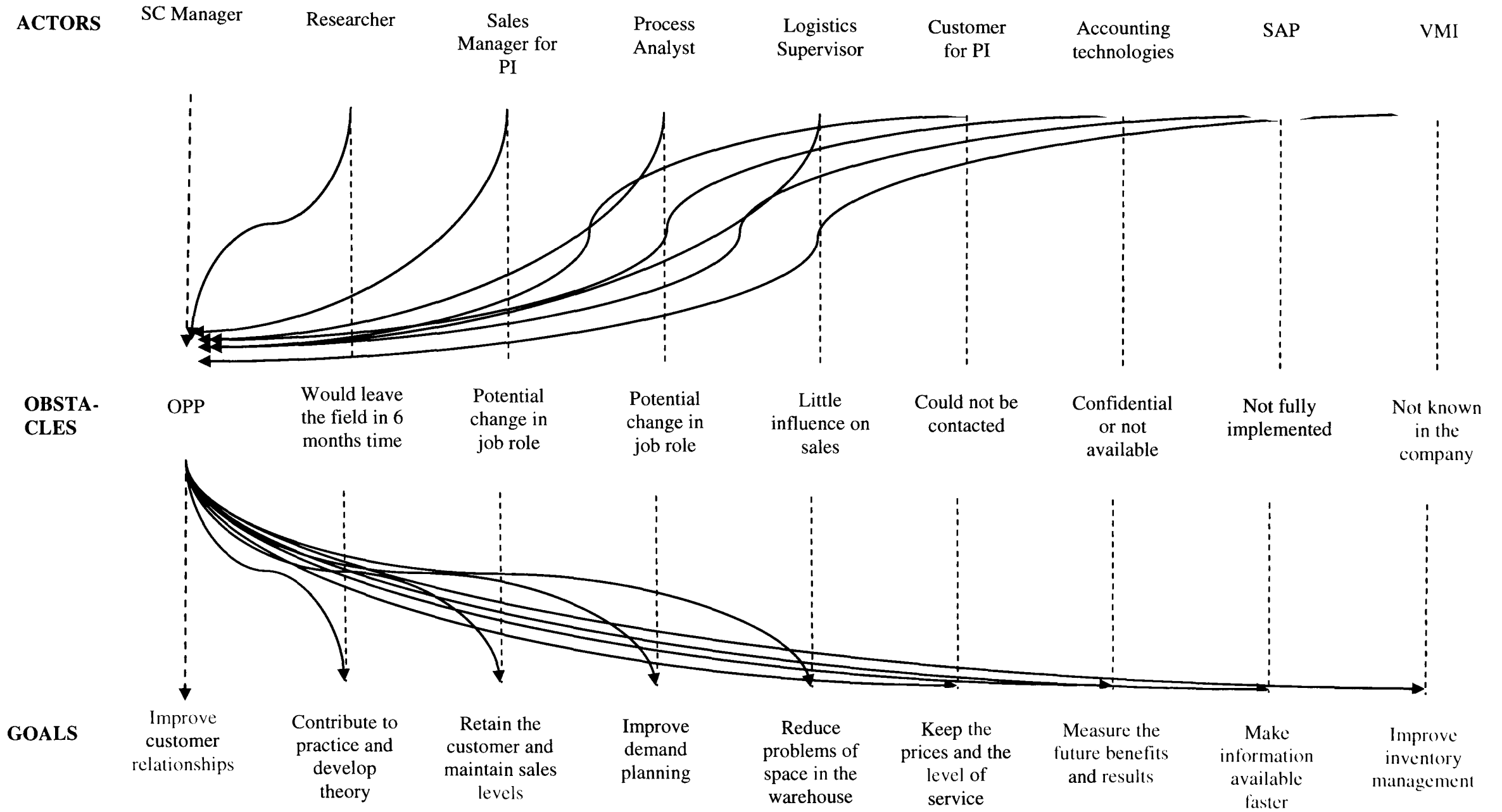


Figure 6.2: SC&A network – Customer for PI
Source: Adapted from Callon (1986)

The implementation of the project was expected to start in December 2008. In November 2008, the Supply Chain Manager and the Process Analyst were contacted by the researcher, in order to obtain updated information on the project. They confirmed that the project had developed further as a result of ongoing communication with the customer, and they intended to start implementing the project during the following month. The Supply Chain Manager explained:

Basically we are working with the annual demand, divided by month, the supply lead time (from GM to the customer) and we have agreed that the reposition lots will be multiples of lorries, that is, each reposition should be equivalent to one full lorry load.

GM's Supply Chain Manager, November 2008

Despite the interest from both parties and the agreements that had already been made, the project did not progress. This might have been due to the addition of a new important actor to this network. According to the ANT point of view, every time a new actor is included in the network the relationships can change considerably (Latour, 2005, 1987; Callon, 1986). The new important actor was added to the network when a larger Brazilian group bought Customer for PI, and they were not interested in the 'Collaboration with Customers' project (the reasons are unknown to the researcher). In addition, the financial crisis that was being experienced globally affected the Brazilian economy, especially at the end of 2008 and during 2009. This was mentioned by the Supply Chain Manager as a major obstacle to the progress of the project. He said:

The survival of GM became a major issue and innovations like the VMI had to wait to be implemented. The 'Collaboration with Customers' has not been stopped though. One of our new ideas is to negotiate with the third party logistics companies which provide the transportation of our products to the customers. We plan to become an intermediary in the negotiation, so our customers can have better service for lower prices. Despite this, the VMI idea is still alive and a new customer should be selected in the future for a new attempt.

GM's Supply Chain Manager, March 2010

Therefore, although the project had not been fully implemented during the field research period, the dissemination of the VMI idea took place and the use of this SCM tool might still happen in the future.

6.3 On the lack of change

Previous sections have discussed the role and interests of the actors in relation to the progression of the project. Conflicts were observed and analysed. This section explores the reasons why the change did not happen at GM in more detail. The lack of change is discussed through the ANT lens to help understand the role and influence of the global and local, human and non-human actors in relation to the project.

Overall, it can be argued that the lack of alignment of interests among the actors and the lack of enrolment and mobilisation (Callon, 1986) of the SC&A network were the main reasons for the lack of change. The Supply Chain Manager and the researcher did not manage to convince other actors, such as managers and employees to become sufficiently interested in the project and to enrol in the SC&A network. The Supply Chain Manager failed to become an OPP and they both failed to create intersement devices that were likely to contribute to aligning interests in order to form the network.

Although the development of intersement devices does not always lead to enrolment and mobilisation (Callon, 1986; Ezzamel, 1994), accounting has the potential to be helpful in providing detailed information about the impacts of the change. Indeed, accounting had the potential to be useful for the development of intersement devices in the SC&A network.

The role of accounting, and of the other actors in relation to the lack of change are further explored in Figure 6.3, below. As the focus of this research was on the development of the 'SC&A network – Customer for AD', Figure 6.3 includes the actors expected to be engaged in this network (section 6.1) and the actors actually involved in it (section 6.2). The additional figure is necessary since it contributes to understanding the reasons why change did not happen at GM. The figure provides a consolidated overview of how the global and local, human and non-human actors interacted and related to the SC&A network. It shows which actors

had closer relationships and how they positioned themselves in relation to the project.

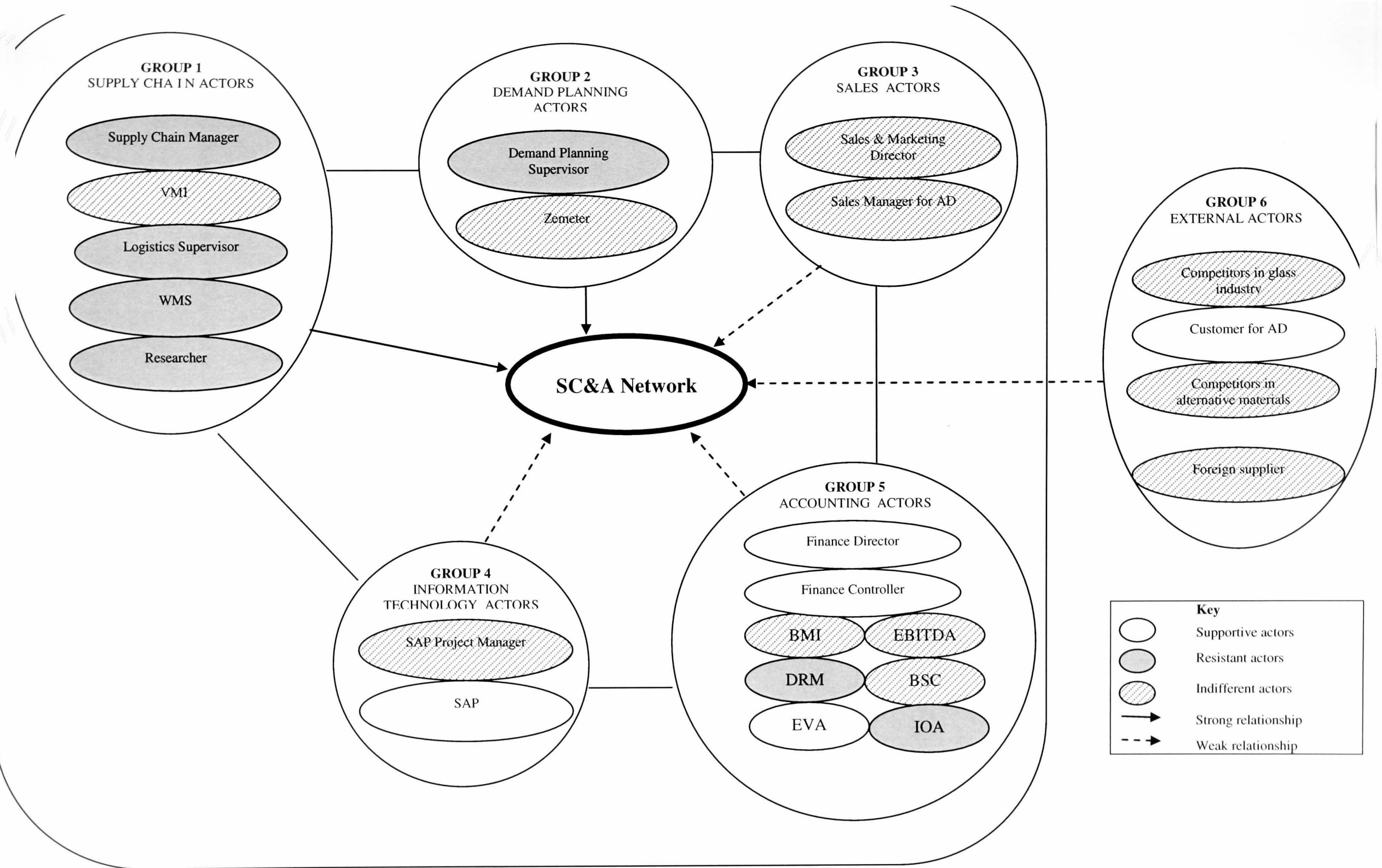


Figure 6.3: Actors in action and the lack of change
 Elaborated based on the field research

Figure 6.3 shows the actors in action and the lack of change in relation to the 'SC&A network – Customer AD'. More specifically, the figure shows that human and non-human, global and local actors influenced the SC&A network in various ways. The arrows connecting each group to the project are either strong or weak influences. Also, because it is a network there are interconnections among the groups. In other words, the actors do not operate in isolation. It is therefore argued from figure 6.3 that the actions of one actor group influence other actor groups. Moreover, the way the network operates is shaped by external actors. In Figure 6.3, the actors are divided into 6 groups. Groups 1 to 5 are made up of internal actors and Group 6 is made up of external actors in relation to GM's organisational boundaries. The internal actors are classified according to the departments in which they operate.

Group 1 – Supply Chain Actors is made up of the Supply Chain Manager and those actors that have a close relationship with him. These are the VMI, the Logistics Supervisor, the WMS, the Researcher, and the VSM tool. Group 2 – Demand Planning Actors refers to the Demand Planning Supervisor and Zementer. Although they were hierarchically subordinated to the Supply Chain Manager, they are shown separately due to their integrative role between the Supply Chain Department and the Sales and Marketing Department. Group 3 –Sales Actors includes the Sales and Marketing Director and the Sales Manager for AD. Group 4 – Information Technology Actors comprises SAP and the SAP Project Manager. Group 5 – Accounting Actors consists of the Finance Director, the Financial Controller, and the accounting technologies (BMI, EBITDA, BSC, DRM, EVA, and IOA). Group 6 – External Actors takes account of the external actors, namely Customer for AD, Competitors in the glassware industry, Competitors in alternative materials, and the Foreign supplier.

As explained in the previous sections of this chapter, the figure shows that the interactions between internal and external actors were weak. In addition, there were problems in the interactions within internal actors. The interactions between actors of the same department were stronger than the interactions between actors of different departments. Despite this, there were close relationships between supply chain actors and sales actors, for example. As mentioned above, the main

link between these two departments was the Demand Planning Supervisor who worked in both departments. Regarding the weak links between actors of different departments, one example shown in the figure is the link between VMI and SAP at GM. The VMI is a tool which can be used in SAP systems. However, at GM, the link between these actors was weak. Arguably, this was a consequence of the SAP Project Manager's weak link with the Supply Chain Manager and lack of interest on the 'Collaboration with Customers' project which would lead to the implementation of the VMI.

In relation to the external links, as mentioned earlier (section 6.1.1), the competitors in the glass industry could provide similar products to GM while the competitors in alternative materials could provide substitute products usually cheaper than GM's products. This influenced the customers' decisions and price negotiations with GM. Thus, it can be argued that the competitors had network effects on GM's operations (Chua and Mahama, 2007). The Foreign supplier had a similar influence on GM's operations. Although the Foreign supplier was not initially considered in the analysis of the case study, it is included here because it is a global actor that put additional pressure on GM's operations. Price variations in their materials affected GM's product prices and, hence, this could be incorporated within the network effects (Chua and Mahama, 2007).

The actors are also coded according to their influence in the SC&A network. For example, in Group 1, the Supply Chain Manager, the Logistics Supervisor, the WMS, and the Researcher have the same colour code because they are supportive to the change. On the other hand, the VMI actor was coded differently because it acted as resistant to the change. As can be observed in the diagram, some actors (e.g. the researcher, the Demand Planning Supervisor, and DRM) were supportive of the change, whereas others (e.g. the Sales and Marketing Director, and the Sales Manager for AD) were resistant to the change, while others (e.g. the Finance Director, and the Financial Controller) were indifferent to the change. In fact, Figure 6.3 highlights that the majority of the actors were resistant or adding resistance and indifference to the change. In addition, as will be noticed, while the internal controversies or lack of interest in the network from actors inside GM were major obstacles to the project's development, the customer was being

influenced by other external, global actors, especially the competitors in the glass industry and the competitors in the alternative materials industry.

Moreover, as can be observed in the diagram the human actors supportive to the project were those working closer to the Supply Chain Manager. They were the Logistics Supervisor, the Researcher, and the Demand and Planning Supervisor. Despite their interest, the project did not progress as expected. The human actors who were resistant to the change were working in other departments. They were the Sales and Marketing Director, the Sales Manager for AD, and the SAP Project Manager.

As explained in chapter 2 (section 2.2) and chapter 3 (section 3.2.4), literature about IOA usually refers to cases related to change, that is, the implementation of inter-organisational initiatives (Chua and Mahama, 2007; Coad and Cullen, 2006; Seal et al., 2004; Cooper and Slagmulder, 2004; Dekker, 2004, 2003; Gietzmann, 1996). Although the lack of change has been addressed in some cases due to suppliers resistance (e.g. Kajüter and Kulmala, 2005), internal organisational resistance to change has received scant attention in literature about IOA. Exceptions are the studies by Coad and Cullen (2006) and Van der Meer Kooistra and Vosselman (2000). In fact, in these studies the resistance was only a minor issue, and did not prevent the change from taking place. For example, in the study described by Coad and Cullen (2006), the employees were concerned with the potential impact of outsourcing part of the company's operations. However, the company's policies (see more details below) helped the staff to overcome their fears and the project was implemented. Similarly, Van der Meer-Kooistra and Vosselman (2000) observed resistance to change at the beginning of the partnership they studied. In their case, the resistance was reduced greatly through the development of trust between the parties involved and, hence, the project could be executed. Unlike these studies, at GM, resistance to change appears to have been a major issue.

Like the study by Coad and Cullen (2006), this discussion draws on the Burns and Scapens (2000) framework to analyse resistance to change. In their framework, resistance to change has been divided into three interrelated elements: "1. formal

and overt resistance due to competing interests; 2. resistance due to a lack of capability (knowledge and experience) to cope with such change; and 3. resistance due to a ‘mental allegiance’ to established ways of thinking and doing, embodied in existing routines and institutions” (Burns and Scapens, 2000, p. 17). The results of this research are contrary to 1, but seem to correspond broadly with 2 and 3. Although the resistance to change was not formal and overt, it was arguably due to a lack of knowledge about the project and difficulties in accepting new ways of doing and thinking.

Indeed, the staff feared the impact of the change on their jobs in the same way as observed in previous IOA studies (Coad and Cullen, 2006; Van der Meer-Kooistra and Vosselman, 2000). In the case analysed by Coad and Cullen (2006), it was found that:

Employees in the embroidery department spoke of their fears when it was announced that the intention was to significantly reduce staff numbers working in that department. Many had previously been made redundant from other organisations working locally in the clothing industry and were worried about further redundancies. However, they were comforted by the fact that School Trends Ltd. operated a “no redundancy” policy, and were reassured that jobs would be made available for them in other departments. Many of the staff involved commented that nobody really liked change and they were settled in the jobs they were doing. Sadness was expressed regarding the break-up of a well-established team (Coad and Cullen, 2006, p. 360).

The main differences seem to have been that, at GM the fears were not overt and that GM did not have a “no redundancy” policy. The fact that the impacts of change were not completely clear to the staff only served to reinforce the resistance to change.

In addition to the potential impact on jobs, the lack of knowledge about the VMI appeared to be problematic. In contrast to other case studies (e.g., Elvander et al., 2007; Danese et al., 2006), the VMI was not helpful because the staff, especially the Sales and Marketing Director, the Sales Manager for AD, and the SAP Project Manager, did not have sufficient knowledge about it. The importance of a high level of know-how for introducing the VMI was recognised in the case study of implementing this tool at Electrolux (De Toni and Zamolo, 2005).

It might be argued that at GM the VMI had a similar role to accounting in the case presented by Ezammel (1994). In this case, accounting was expected to have a disciplinary role and to contribute to the change, which was the introduction of a new budget to university in a financial crisis. The university staff did not accept the budget implementation immediately. Instead they used accounting knowledge to present alternative solutions to the budget, reflecting their resistance to the change (Ezzamel, 1994). At GM, it was expected that the use of the VMI could contribute to establishing the change, that is, to making things work (Latour, 2005, 1987), but it had a negative effect, since the staff did not have sufficient knowledge about it (Burns and Scapens, 2000).

The global non-human actor VSM, neither contributed to the change or added to the resistance to change. It had the potential to be useful in identifying non-value adding activities and making the need for more efficient operations more apparent (Slack et al., 2007). However, the Supply Chain Manager's lack of sufficient knowledge about the potential benefits of VSM was problematic, as he consequently did not give it the appropriate level of importance. Three other global non-human actors, namely, SAP, WMS and Zementer also did not contribute to the change. Indeed, they had a negative impact on the project development since their implementation was problematic and incomplete.

Difficulties in the implementation of SAP has been observed previously (Quattrone and Hopper, 2006; Dechow and Mouritsen, 2005; Quattrone and Hopper, 2005, 2001). At GM, SAP was not fully implemented and there were problems in integrating SAP with both the WMS and Zementer. According to the Supply Chain Manager, after the end of the field research, Zementer was replaced by Excel spreadsheets due to difficulties in connecting it with SAP, and the interface between the WMS and the SAP had been done manually. He said:

The electronic interface between the WMS and SAP was disconnected in 2009 and the interface was carried out manually. In 2010, an improved electronic interface started to be used, but it was still in need of further improvements.

GM's Supply Chain Manager, March 2010

These problems made access to relevant and updated information that could have been useful for the project more difficult. Moreover, the problems with the WMS and Zemeter appear to have made the staff more sceptical in relation to the potential implementation of new IT technology, specifically the VMI. As observed previously, past negative experiences can add to resistance to change (Burns and Scapens, 2000), because managers feel they will have similar problems once more.

Furthermore, accounting also did not contribute to the change, as would initially have been expected, based on literature (Chua and Mahama, 2007; Seal et al., 2004, 1999). In fact, the human actors related to accounting, that is, the Finance Director and the Financial Controller, did not show an interest in working closer to inter-organisational links. As explained in chapter 5, they found closer inter-organisational relationships too risky and were against the idea of exchanging accounting information with customers or suppliers. Although this perception has been recognised in other studies (Kajüter and Kulmala, 2005), the accounting staff's lack of interest in the project seems to have been more pronounced at GM.

The accounting technologies had an even more contradictory role, as most of them contributed to the lack of change, by reinforcing the maintenance of the current situation. As a consequence of the problems in GM's internal accounting system and the way the BSC was structured, and also used at GM (see details in chapter 4, section 4.2.2), the BMI was orientated to financial results, instead of managerial information. One of the main outcomes of the BMI was the calculation of EBITDA that was used on many occasions by GM's managers and staff. As found by Malmi and Ikäheimo (2003), EBITDA had an important influence on managers, as it was used as the basis of calculating their bonus salaries. As the operations were profitable, EBITDA results were good, therefore, there seemed to be no need to change and to have more efficient operations. Thus, at GM, EBITDA contributed to the resistance to change.

As observed by Norreklit (2000), problems in integration between operational measures and BSC were present at GM. The operational measures were included in the DRM, but the links between them and BSC were not fully developed. On

the other hand, arguably the DRM contained two measures that contributed to encouraging the project's development. The first is logistics expenses, which were the responsibility of the Supply Chain Manager. These included palletising, warehouse costs, and delivery costs. Although the results of the logistics expenses indicator were under the expected targets, cutting costs down seemed to be a relevant issue. Evidence of this could be observed in the S&OP meeting. There was a major discussion regarding how to reduce the cost of the material used in palletising and the impact on GM's profits. The Sales and Marketing Director said during the S&OP meeting: "If we can reduce the cost of palletising by 5%, this can lead to a 10% increase in EBITDA".

The second indicator was the accuracy of the demand forecast. As explained in section 6.2.1.1, this indicator was arguably the Demand Planning Supervisor's major motivator because improving the level of accuracy of the demand forecast was essential to his job. Therefore, it can be said that although some of the accounting indicators (i.e. EBITDA) contributed to the lack of change or to stability (Burns and Scapens, 2000), others (i.e. logistics expenses and the accuracy of the demand forecast) were major motivators for the project to proceed.

Due to the importance of accounting to this thesis, the next section further explains the role of accounting in this research.

6.4 On the role of accounting

Accounting was arguably an influential actor in this research project. However, the role accounting played in relation to the development of a SCM initiative at GM was not completely the same as observed in previous studies (Chua and Mahama, 2007; Seal et al., 2004, 1999; Håkansson and Lind, 2004; Cooper and Slagmulder, 2004; Van der Meer-Kooistra and Vosselman, 2000; Gietzmann, 1996). This section discusses the role of accounting in this context. It compares and contrasts the findings of this research with other literature about IOA.

The discussion in this section is structured according to table 6.3 below. The table shows a comparison between the role of accounting previously observed in literature (chapter 2 – section 2.2.2 and chapter 3 – section 3.2.4) and the findings of this research. The first column contains the role of accounting. The second column includes comments about the role of accounting based on the IOA literature. The third column refers to the role of accounting observed in this research. As can be observed in Table 6.3, previous research related to IOA (chapter 2) has found that in relation to the inter-organisational context accounting may: (a) need to change; (b) enhance trust; (c) have a different role depending on the stage of development of the relationship; (d) affect and be affected by context/boundaries; (e) have a controversial role; (f) play a constitutional role.

ACCOUNTING ROLE	LITERATURE ABOUT IOA	THIS RESEARCH
<p>Accounting may need to change Cooper and Slagmulder (2004) Hakanson and Lind (2004) Dekker (2004) Van der Meer-Kooistra and Vosselman (2000) Gietzmann (1996)</p>	<p>Accounting needs to change as companies cannot contract to every contingency (Dekker, 2004; Van der Meer-Kooistra and Vosselman, 2000; Gietzmann, 1996)</p> <p>The traditional make-or-buy calculus should be extended to also include the consideration and control costs, and costs related to the risk of a supplier acting opportunistically or performing poorly (Cooper and Slagmulder, 2004; Van der Meer-Kooistra and Vosselman, 2000).</p>	<p>GM's accounting systems need to be improved in order to provide more useful accounting information regarding inter-organisational relationships. For example, customer accounting could have been used in order to analyse the impact of the SC&A project and to negotiate with customers.</p> <p>As the project focused on customer relationships, this research advances existing published literature by recognising that not only the accounting used to evaluate suppliers' relationships needs to be changed, but also the accounting used to analyse customer relationships.</p> <p>In addition, it was observed that the focus on FA (financial accounting) at GM was not helpful in developing the project. Therefore, the findings of this research suggest that focusing on MA (management accounting) might enhance accounting's contribution to the development of inter-organisational relationships.</p> <p>It was also observed that the improvement of IT systems could lead to the enhanced involvement of accounting in relation to the inter-organisational project.</p>
<p>Accounting may enhance trust Mouritsen and Thrane (2006) Tomkins (2001) Dekker (2004) Seal et al. (2004, 1999) Seal and Vincent-Jones (1997)</p>	<p>Accounting may enhance trust as an abstract system in which parties have a faith (Seal et al., 2004).</p>	<p>At GM, the need for trust was higher than the need for accounting information, contradicting the argument by Tomkins (2001) that at the beginning of the relationship both trust and information needs are low. Evidence of this was the lack of development of the project at the formal level where trust did not exist, and the sharing of accounting information at an informal level in which there was inter-personal trust between the parties.</p> <p>Problems in the internal accounting systems and difficulties in accessing accounting information, either because it was not available or was seen as confidential, did not allow accounting to enhance trust at GM.</p>

	Management controls allow partners to increase confidence between them and let the network operations happen; however, this is not always sufficient because of problems with trust (Mouritsen and Thrane, 2006).	At a formal level, this was not tested at GM, as the project was not developed. At an informal level, the opposite was observed. The information shared between Customer for AD and the Demand Planning Supervisor was a result of interpersonal trust. Therefore, trust was more important at the beginning than accounting.
The role of accounting may be related to the stage of development of the relationship Håkansson and Lind (2004) Tomkins (2001) Seal et al. (1999)	Accounting can play an important role at the beginning of the relationship, as there are few sources of stability and neither company has clear authority (Seal et al., 1999).	Initially accounting could have played an important role as trust levels were low and detailed accounting information could have been useful. However, this was not observed.
	With time, general agreements can be more important than detailed documentation ³⁰ (Hakanson and Lind, 2004; Seal et al., 1999).	As the relationship did not progress, this could not be observed in this research.
Accounting and context/boundaries can be a duality – they can mutually condition each other Chua and Mahama (2007) Mouritsen and Thrane (2006) Thrane and Hald (2006) Mouritsen et al. (2001) Van der Meer-Kooistra and Vosselman (2000)	Accounting and context/boundaries are seen as a duality – they mutually condition each other (Thrane and Hald, 2006; Van der Meer-Kooistra and Vosselman, 2000).	It can be argued that accounting was influenced by GM’s organisational boundaries and at the same time contributed to the maintenance of such boundaries more than to the development of inter-organisational relationships.
	Inter-firm management controls/accounting can be related to different characteristics of organisational practices and they make things work (Mouritsen et al., 2001).	As the relationship did not progress, this could not be observed in this research.
Accounting can have a controversial role Chua and Mahama (2007) Thrane (2007) Mouritsen and Thrane (2006) Mouritsen and Hansen (1999)	Accounting has a low power in situations of ‘normality’, while it is a central actor in a situation of ‘crisis’, allowing the distinction between the company’s network and the environment (Hansen and Mouritsen, 1999).	At GM, the situation was of normality, there were no internal or external crises, and accounting had a low power.

³⁰ The opposite was found by Langfield-Smith and Smith (2003), as discussed in chapter 2.

	Accounting can lead to both order and conflict (Chua and Mahama, 2007; Thrane, 2007; Mouritsen and Hansen, 1999;). It can be an actor, sometimes operating as a self-regulating mechanism – stability – and on other occasions as an orchestration mechanism – changes that may produce conflict (Mouritsen and Thrane, 2006).	While some accounting technologies (e.g. logistics expenses, accuracy of demand forecast) contributed to the project development, others (e.g. EBITDA, BSC) reinforced the maintenance of the current situation and, therefore, added to the resistance to change. In addition, there were contradictory perceptions amongst managers regarding GM's high levels of stocks and the related costs.
Accounting may play a constitutional role in inter-organisational relationships Chua and Mahama (2007) Thrane (2007) Håkansson and Lind (2004) Seal et al. (1999)	Accounting can play an important role that goes beyond the technical to a more symbolic level (Chua and Mahama, 2007; Thrane, 2007; Håkansson and Lind, 2004; Seal et al., 1999).	Although there were problems in the accounting systems, cost and profit were part of the managers' discourse. In addition, a bonus system relying on EBITDA results made accounting more relevant at GM. However, the lack of knowledge about IOA did not allow further use of accounting information in the development of inter-organisational relationships. In addition, the fear of sharing accounting information with external links created tension in relation to the potential use of IOA.
	The role of accounting goes beyond the technical; it is very much part of processes of identity construction (Chua and Mahama, 2007).	Due to the lack of involvement of accountants and accounting, this was not observed at GM.
	Accounting is more than a set of techniques; it is also capable of influencing network relationships (Mouritsen and Thrane, 2006).	Although the techniques were evidence of the role of accounting at GM, this research confirms that accounting is more than a set of techniques. This is due to the managers and staff perceptions of accounting.

Table 6.3: The role of accounting
Source: Elaborated based on literature about IOA and the field research

The first argument is that accounting may need to change. Early research (Van der Meer-Kooistra and Vosselman, 2000; Gietzmann, 1996) has pointed out that accounting may need to change in order to adapt to the inter-organisational environment. The main issue is that changes in accounting calculations are necessary because a company cannot contract for every contingency (Dekker, 2004; Van der Meer-Kooistra and Vosselman, 2000; Gietzmann, 1996). For example, costs associated with potential opportunistic behaviour or poor performance by a supplier should be added to the traditional make-or-buy accounting calculus (Cooper and Slagmulder, 2004; Van der Meer-Kooistra and Vosselman, 2000; Gietzmann, 1996).

This research confirms that accounting needs to change. However, as the case study focused on the development of closer relationships with customers, instead of suppliers, different concerns were raised. The main concern was arguably the need to improve and expand GM's internal accounting system in order to provide faster and more detailed information about supply chain relationships. The relevance of a company's internal accounting system for the development of inter-organisational relationships has been recognised previously in research literature (Coad and Cullen, 2006; Thrane and Hald, 2006; Mouritsen et al., 2001).

It has been found that intra-organisational accounting can have a spill-over effect on supply chain operations and vice-versa (Coad and Cullen, 2006). In Coad and Cullen (2006), search routines developed within the case company were also used in the implementation of IOCM (inter-organisational cost management); and information collected from the use of IOCM influenced the company's production strategies. More relevant to the GM case study, the effect of insufficient development of the internal accounting system on the lack of implementation of open book accounting (OBA) has been observed by Kajüter and Kulmala (2005). They recognised that one of the reasons that suppliers were not willing to share accounting information was due to their poor cost data.

In the case of this research, arguably improvements and the expansion of GM's internal accounting system had the potential to contribute to advancing the project. As explained in chapter 4 (section 4.4.3), several improvements were

needed. Firstly, the consolidation of accounting reports from different departments and the elimination of duplicate efforts in producing accounting information. Also, as outlined in chapter 4 (section 4.4.3), the implementation of SAP was helpful and further improvements were being deployed. As a consequence, it is also expected that accounting information will be more readily available and communication between accounting and other departments will improve even more. The fact that financial accounting was given more attention than management accounting is also an issue which needs improvement in GM's internal accounting system. In addition, accounting information was not always easily available or accessible. Thus, several opportunities for improvements can be found at GM. In relation to the expansion of GM's internal accounting system, as discussed in section 6.2.2, three accounting technologies seemed to be relevant for the project development, namely, net present value (NPV), economic value added (EVA) and customer accounting.

The second issue, as presented in Table 6.3, refers to the relationship between accounting and trust, which is widely discussed in literature relating to IOA (Mouritsen and Thrane, 2006; Seal et al., 2004, 1999; Håkansson and Lind, 2004; Tomkins, 2001; Seal and Vincent-Jones, 1997). The importance of addressing the issue of trust in the inter-organisational context has more recently been emphasised (Scapens and Varoutsas, 2010; Caglio and Ditillo, 2008). While Scapens and Varoutsas (2010) raise questions about the trust and/or power necessary in inter-organisational relationships, Caglio and Ditillo (2008) highlight that:

The extant literature has shown how difficult it is to build trust in supply chain relationships and that there can be mutually reinforcing links between the sharing of accounting information and the establishment of trusting relationships (Caglio and Ditillo, 2008, p. 894).

Indeed, as explained in the literature review (see chapter 2) the importance of considering the level of trust and the amount of accounting information shared between inter-organisational links is both essential and complex (Mouritsen and Hansen, 2006; Tomkins, 2001). As will be discussed, this research adds to existing published literature by demonstrating that accounting information may be

exchanged by inter-organisational actors as a result of inter-personal trust rather than trust in abstract systems, as observed previously (Seal et al., 2004).

At GM, the trust between local actors (the Demand Planning Supervisor and Customer for AD local staff) was used to obtain informal access to accounting information (the future customer's purchase orders). However, this inter-personal trust was not sufficient for sharing accounting information at the formal level. This finding is in line with Cäker (2008). In his study, trust was not essential to motivate the strategic development of inter-organisational relationships, but it was the basis of sharing information informally. The main difference between GM and Cäker (2008) is that while in the former information exchange took place only at an informal level, in the latter it took place at both formal and informal levels.

Indeed, the relationship between accounting and trust can raise controversial views. Tomkins (2001), for example, has argued that the relationship between trust and changes in accounting depended on the stage of the relationship. Tomkins (2001) argues that initially both trust and information needs are low, as the consequences of breaking the relationship are not significant. With time, as the amount of information increases, trust does also. As the relationship matures, trust becomes greater and less information is necessary.

Although there is empirical evidence of the decline in the importance of detailed accounting information as the relationship progresses (Håkansson and Lind, 2004; Seal et al, 1999), as discussed in chapter 2, the link between trust and accounting at the beginning of the relationship is controversial. While Tomkins (2001) believes that both information (including accounting) and trust needs are low at the beginning of the relationship, and that trust should exist before the determination of information needs, Seal et al. (1999) and Håkansson and Lind (2004) have found that accounting may play a particularly important role in enhancing trust at this stage of the relationship. A more recent study has taken the perspective that;

... control and trust are not just substituting or adding, but that they interact. Their common goal is the establishment and maintenance of positive behavioural expectations. In order to achieve a positive cognitive state of mind regarding future behaviour, control must be exercised and trust must be built. Accounting can serve both control practices and trust building (Vosselman and Meer-Kooistra, 2009, p. 279).

At GM, although the customer relationship selected was long-term and there was trust between the parties at an informal level, at the formal level, trust was regarded as nonexistent or insufficient to approach the customer. Following Tomkins's (2001) argument, accounting information (i.e. levels of inventories and purchase forecast) was shared with GM's actor (the Demand Planning Supervisor) as a result of previously existing trust. However, this was done on an informal and temporary basis. At the formal level, this inter-personal trust was not used as the basis to approach the customer about the project's development. Arguably, accounting had the potential to be useful in enhancing trust between GM and the customer at the formal level, in the same way as it was in the study by Seal et al. (1999).

Once more, accounting (i.e. customer accounting) had the potential to be helpful by providing detailed information about the change and how it could affect the customer. However, GM's internal accounting information system was not fully developed and sometimes accounting information was not available or was seen as confidential, making it more difficult to use accounting information to enhance trust.

From Table 6.3, the third item relates to the fact that the amount of detail in the accounting information shared may depend on the stage of the relationship (Håkansson and Lind, 2004; Tomkins, 2001; Seal et al, 1999). As discussed in the previous paragraphs, while Tomkins (2001) argues that at the beginning of the relationship both trust and information needs are low, Seal et al. (1999) found that at this stage accounting can play an important role in enabling trusting relationships due to the limited number of sources of stability and the lack of clear authority between companies. Although in this research it was not possible to follow the role of accounting at different stages of the relationship, it was

observed that at the beginning of the relationship the need for both accounting information and trust were high and that accounting did not contribute to enhancing trust. Thus, this research confirms that even at the same stage of the relationship, the role of accounting can be different from one inter-organisational relationship to another.

The fourth issue relates to the fact that accounting and context or boundaries can be a duality, as they can mutually condition each other (Thrane and Hald, 2006; Van der Meer-Kooistra and Vosselman, 2000). It has been observed that historically accounting has focused on reinforcing the internal organisational hierarchy (Hopwood, 1996; Otley, Broadbent and Berry, 1995). However, according to Hopwood (1996), Otley et al. (1995), and more recently Håkansson et al. (2010), the contemporary organisational arrangements, which are based on horizontal relationships among companies, create the need for innovation in accounting as well. In addition to this view, Thrane and Hald (2006) emphasise that accounting can also influence the establishment of organisational boundaries. They have argued that:

the relationship between accounting and context/boundaries is not unidirectional. Accounting and inter-organizational control patterns are not a direct function of relationship characteristics (the outside-in perspective) nor is accounting an actor that emerges independently of the relationship and its boundaries (the inside-out perspective). Accounting and context/boundary is a duality—they mutually condition each other in a dynamic, emerging process shaped and developed by inter-dependencies, the structuring of field, accounting devices and local learning processes which structure relations within the supply field (Thrane and Hald, 2006, p. 312).

This research corroborates the view that accounting can influence the development of inter-organisational relationships (Chua and Mahama, 2007), as it considers accounting as an influential actor in the project. At GM, institutional influences were observed and arguably accounting (e.g. EBITDA, BSC) contributed more to the maintenance of organisational boundaries, than to the development of closer inter-organisational relationships.

The controversial role that accounting played in the fifth item in Table 6.3 is now analysed. At GM, accounting played a role as one of the motivators of the 'Collaboration with Customers' project. For example, as explained in the previous section (on the lack of change), performance indicators, such as logistics expenses and the accuracy of demand forecast have influenced the level of interest of two organisational actors, the Supply Chain Manager and Demand Planning Supervisor respectively.

On the other hand, at GM, accounting seems to have contributed to the resistance to change, contradicting most of the previous studies about IOA (e.g. Chua and Mahama, 2007; Seal et al., 2004), but agreeing with what was suggested by Thrane (2007). In this research, accounting is a source of instability, rather than stability (Burns and Scapens, 2000; Burns and Vaivio, 2001). At GM, like in the study by Thrane (2007), accounting was a source of unintended order rather than planned or institutionalised change, as measures such as EBITDA were contributing to the lack of change by emphasising GM's profitability (see details in section 6.3).

In addition, managers' perceptions of the high levels of inventories held by GM and the related costs were controversial. While the Supply Chain Manager had the intention of developing the 'Collaboration with Customers' project to reduce GM's high levels of inventories and avoid unnecessary storage costs and re-working of inventories, the Sales and Marketing Director argued that such levels could be even higher to ensure meeting customer demand on time (see details in section 6.2.2). Contrasting views amongst managers from different departments have been discussed in literature about management accounting (e.g. Burns, 2000; Scapens and Roberts, 1993). However, unlike what has been previously observed (Burns and Scapens, 2000), although the Sales and Marketing Director was concerned with optimising the service to customers, he did not recognise the importance of flexible production.

To reinforce these differences, in line with the Sales and Marketing Director's argument and contrary to existing literature about SCM (Christopher, 2005; Cigolini et al., 2004; Laming et al., 2000; Harland et al., 1999), other managers,

such as the Factory Manager and the Financial Controller also shared the view that high levels of inventories were unproblematic. From their perspective, production levels should be as high as possible in order to optimise cost results. They argued that reducing the level of activities in the factory could lead to higher costs. Moreover, they shared the belief that closing one of the furnaces could result in higher costs if they decided to restart this furnace's operations again in the near future. Therefore, economies of scale and high levels of inventories were the preferred choice. However, according to the Supply Chain Manager's point of view, stock levels should be kept as low as possible. For instance, it has been observed that companies can reduce their prices before competitors if they keep lower inventories of finished goods (Cigolini et al., 2004).

Despite this, at GM a great deal of importance was given to economies of scale and holding high levels of inventories seemed to be a policy widely accepted by managers. Indeed, this view was at least partially supported by the Finance Director. Although he was aware that high levels of inventories are costly and destroy EVA (economic value added), he agreed that the need for scale was characteristic of the business in the same way as the Factory Manager and the Financial Controller. Some of his comments regarding this issue were:

Look, what I think is that the glass business needs scale of operations. The glass needs scale of production in order to be profitable. On the other hand, high levels of inventories destroy EVA, and destroy the wealth of the company... Here at GM we have been trying to draw an equation which shows how important it is to have a high scale [of production] due to cost and how much it compensates eventually to carry a higher stock for a few periods [of time] ... What I believe in relation to the stock policy is that this will start to be improved as soon as EVA is implemented ... This will generate tougher stock policies which we don't have today. But this should not leave behind two things: the market supply and the issue of scale... I believe that if the current policy is loose, it is because we don't take into account the cost of maintaining stock from one period to another in relation to the company's results and also to remunerate the executives.

GM's Finance Director, October 2008

From this, it can be seen that he would support changing the situation, once EVA was implemented. As in previous studies, this reflects the importance given to accounting calculations (Chua and Mahama, 2007). However, he agreed with the

potentially contradictory belief that scale of production should be maintained in order to reduce costs of production. Thus, the Supply Chain Manager was alone in his concern about the high levels of inventories and the consequent costs. While previous research has found conflict between members of different departments in the company, such as engineering, procurement, marketing, and finance (Chua and Mahama, 2007; Seal et al., 2004; Mouritsen et al., 2001), this research adds to existing research literature by revealing that different actors within the same department (i.e. Supply Chain Manager and Factory Manager; Finance Director and Financial Controller) may have conflicting views on accounting issues.

Finally, the last item in the table concerns the constitutional role that accounting can play in inter-organisational relationships. It has been argued that in addition to being an essential part of managerial knowledge and capable of changing management orientation and strategy, accounting can play a 'vivid' and 'active' role in the in the inter-organisational environment. As Mouritsen et al. (2010) state:

The conclusions [from previous studies] make accounting calculations, and inscriptions more generally, much more vivid and much more active than is usually suggested. This means that accounting calculations are not primarily to be thought of as tools that managers can use; instead, they have a more important role as they represent the knowledge managers possess. Managers become powerless without the knowledge that they obtain from these calculations; furthermore, when this knowledge changes, the managers also change orientation and strategy. However, management accounting calculations are strong only within a situation where they are given power. This means that the contribution accounting system will probably only be strong if, generally, it is recognised that the firm may have a cash flow problem or other concerns that will make the contribution accounting problem relevant (Mouritsen et al., 2010, p. 310).

Arguably, accounting played a constitutional, vivid and active role in this case study. However, it was different from previous published studies relating to IOA (Chua and Mahama, 2007; Thrane, 2007; Håkansson and Lind, 2004; Tomkins, 2001; Seal et al., 1999). Instead of contributing to enhancing the change in the same way as observed previously (Chua and Mahama, 2007; Håkansson and

Lind, 2004; Seal et al., 1999), accounting influenced the inter-organisational project in contradictory ways.

In addition to the controversial influence of accounting calculations that were given power by managers, such as EBITDA and the logistics expenses, managers' opinions on sharing accounting numbers were also controversial. While the Finance Director and the Financial Controller saw the idea of exchanging accounting information as too innovative or too risky, the Supply Chain Manager thought that this possibility could enhance the inter-organisational relationship and be more beneficial than harmful. For the Finance Director, open book accounting was too innovative and distant from the local reality. He said:

I think that in terms of culture, we are a bit distant from this model [OBA]. However, the purchasing department has been wanting to know the costs of the suppliers for a long time. This works backwards in the supply chain, and to some extent it also works with customers. For example, we will soon have an important rise in the price of one of our raw materials. So, this information will need to be used by the Sales staff for future negotiations. I would say it is still not an open book and I would not say it is only in our business group. We try to understand our suppliers' costs in the same way that our customers attempt to understand our costs, but it is not open book accounting. In my opinion, not only here [at GM], but to any business, it [OBA] depends on your [the supplier] bargaining power in relation to your customer or supplier. I believe that at some point it turns into an open book because there are few other implications in relation to the [market] pressures. However, perhaps it works against the supplier. I think this will always depend on the issue of bargaining power.

GM's Finance Director, October 2008

For the Financial Controller, sharing accounting information was highly risky. He said:

No, no, sharing accounting information sounds crazy. It would be too risky to share our accounting information with external links. It would be the same as shooting my own feet.

GM's Financial Controller, May 2008

This thought is in line with what has been previously been noted in literature about IOA. According to Kajüter and Kulmala (2005),

suppliers are afraid of being exploited if they reveal their cost structure. It was felt that firms receiving cost data might use the information against the firms that provided this data (Kajüter and Kulmala, 2005, p. 196, original emphasis).

Although the Supply Chain Manager was keen on the idea of sharing accounting information, one of the problems from his perspective was the fact that he was more concerned with the internal benefits to GM. Despite being responsible for SCM operations at GM, he seemed to be less concerned with the benefits to the customers. Indeed, arguably he was forgetting the importance of the win-win situation emphasised in literature about SCM (e.g., Cigolini et al., 2004; Harland, 1996b). This was evident when he rejected the idea of offering discounts to Customer for AD in order to enhance the customer's interest in the project (see details in chapter 5, section 5.4).

In addition, arguably accounting played a constitutional role despite the lack of engagement of management accountants in the inter-organisational project. Although a number of studies in literature about IOA (Seal et al., 2004, 1999; Coad and Cullen, 2006) have shown an active role for accountants in the development of inter-organisational relationships, Berry et al. (2009) have considered limiting the involvement of management accountants "... in the processes of design, adaptation and abandonment of new organisational forms" (p. 11). These authors explain that this can be either due to the lack of interest from other more powerful organisational groups, such as marketing, information systems, and strategic management; or because management accountants do not completely understand hybrid organisational forms. At GM, the latter seemed to be the case, since accountants were not involved or interested in the project. In addition, this research observed that the accounting staff were not fully aware of IOA tools and techniques and, according to the Financial Controller, they needed more training (see his quote in chapter 4, section 4.4.3).

6.5 On the role of the researcher and the ANT and AR combination

Reflecting on the field research after analysing the results, a number of issues can be raised in relation to the role of the researcher and the combination of ANT and AR. Although from the AR perspective, the change did not happen and from an ANT approach the translation was problematic and incomplete, there were still benefits in combining the two approaches. This section discusses this combination along with the complex role of the researcher. While AR was helpful in describing what happened in this case study (chapter 5), the use of ANT to theorise about the case (as discussed in this chapter) was valuable in order to explain how and why it happened (or did not happen). Arguably in this research, the ANT translation was helpful in understanding what was behind the actions taken, according to the steps in the AR cycle (Coghlan and Brannick, 2001). The combination of ANT and AR is shown in Figure 6.4.

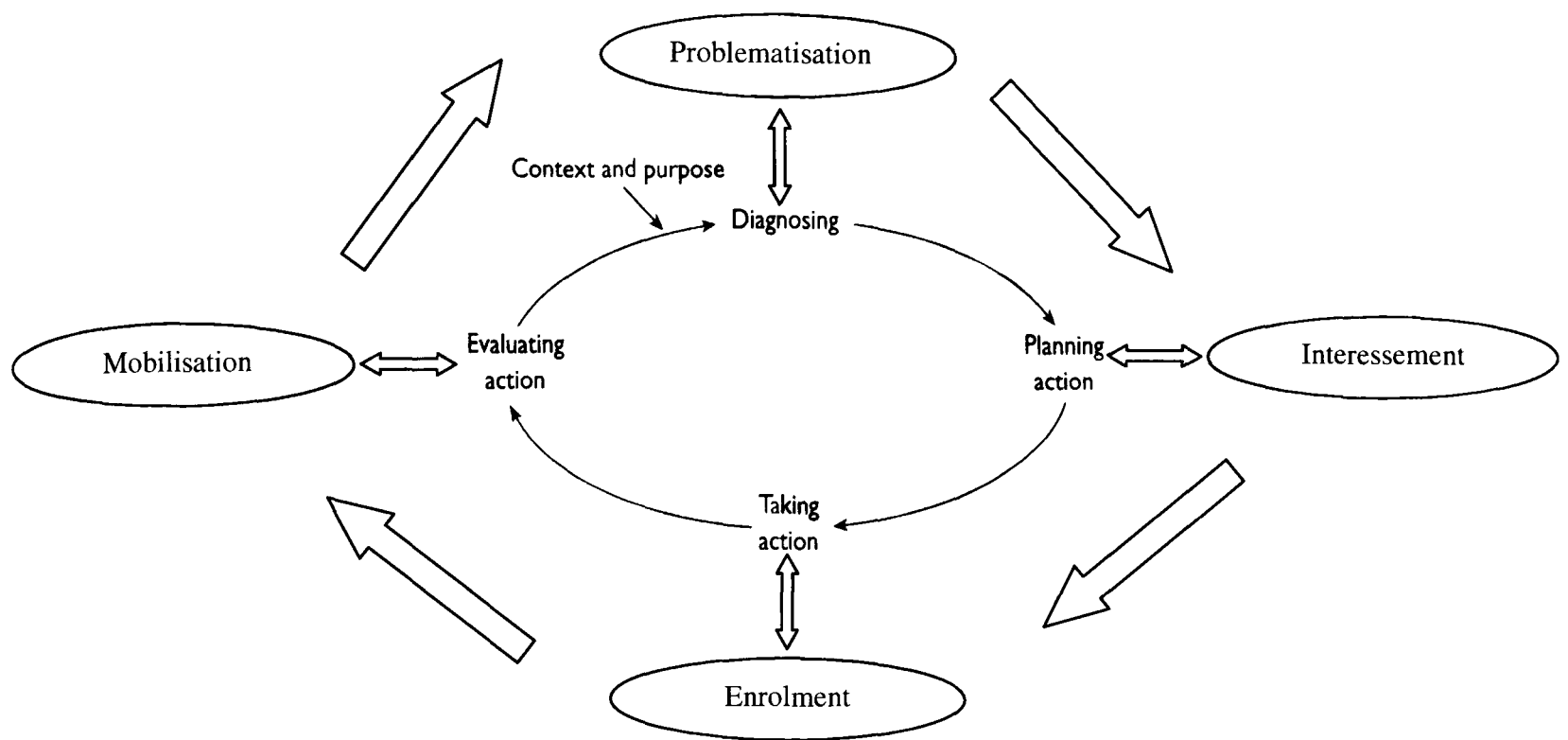


Figure 6.4: ANT and AR combination

The diagram shows that the diagnosing step of the AR cycle can be related to the problematisation stage of the ANT translation, planning the action to interessement, taking the action to enrolment, and evaluating the action to mobilisation. A comparison between each step of the AR cycle and each stage of the ANT translation and how they relate to GM's case is presented below. This analysis is based on what has been described and discussed previously in this thesis (mainly in chapter 5 and in this chapter).

The first stage of the AR cycle, diagnosing, can be related to the first stage of the ANT translation, problematisation. Whereas diagnosing is focused on naming the issues and identifying the actions that will be taken, problematisation considers the identification of the actors, their roles and interests and how they may be engaged in the network. In other words, the former relates to what has to be done and the latter to who will be doing what, and why they will be doing it. At GM, diagnosing found that the 'Collaboration with Customers' project using the VMI was the solution to the problem of high levels of stock. Problematisation identified the human and non-human actors to be involved in the project (e.g. Supply Chain Manager, Researcher, Sales Manager for AD, Customer - Alcoholic

Drinks, Accounting Technologies, the VMI). Their roles and interests were recognised, but conflicting views about the problem were observed.

With regard to the second step of the AR cycle, planning the action, it can be associated with the interessement stage of the ANT translation. Planning the action involves preparing a plan of action that follows the defined drivers of the change, while interessement takes into account the actors' roles and interests and interessement devices are created in order to engage the actors in the network. This means that the former is concerned with defining what exactly will be done and the latter with how the actors will engage in taking the action. In GM's case, planning the action involved proposing to a selected customer (Customer for AD) that they participate in the 'Collaboration with Customers' project and implement the VMI in order to improve the information exchange and reduce the levels of inventories both at GM and with the customer. The interessement moment of translation highlighted that, at GM, it was not completely clear how the actors would be involved in the project and what the consequences of the change would be after the project's implementation. In addition, it identified that interessement devices were not fully developed in order to address the controversies between the actors.

The third step of the AR cycle, taking the action, can be linked to the third moment of ANT translation, enrolment. Whereas the former is about implementing the plans, the latter focuses on how alliances are developed between actors by taking into account their obstacles to engagement in the network. In other words, taking the action refers to what was done (the action) and enrolment is about understanding how the actors reacted to the action taken. In this case study, plans were not implemented, that is, no action took place and the AR cycle was not completely followed due to barriers to the change. The ANT theory of translation helps to identify that the lack of change was because of problems in the development of interessement devices, so they did not contribute to the enrolment of actors to the network.

Evaluating the action is the last step in the AR cycle and it can be associated with the last moment of ANT translation, mobilisation. Whilst evaluating the action

involves analysing the project development and defining how the next cycle of diagnosing, planning the action, taking the action and evaluating the action will be performed, mobilisation refers to the achievement of stability in the network. In different terms, the former is concerned with how well the project was carried out and what needs to be done in the future and the latter is about how the actors react to the change implemented and how their reactions affect the network. Since the project was not implemented, evaluation of the action was not possible and the mobilisation could not be observed. However, from a theoretical perspective, ANT contributed to understanding why the change did not happen.

In relation to the role of the researcher, it can be argued that in this project, she had little, but some influence on the project's development. The fact that the researcher was in the company and available to assist with the 'Collaboration with Customers' project may have influenced the Supply Chain Manager to speed up the project's execution. On the other hand, this might have put undesired pressure on the Supply Chain Manager to start the project earlier than he had initially planned. Although he already had the idea before the researcher's arrival at GM, as he mentioned from the beginning of the field research, the inclusion of the researcher in this project may have been influenced by the lack of other interesting opportunities for the researcher. As it was an AR project there was a need to develop both theory and practice (Harris, 2007; Jönsson and Lukka, 2007; Jönsson and Lukka, 2006; Eden and Huxham, 1996) related to IOA. At the beginning of the field research period, this was the only project that could be relevant to the researcher's theoretical and practical needs. Since the Supply Chain Manager had no specific timescale in which to begin the project, the presence of the researcher certainly influenced its initiation.

The need to develop both theory and practice is related to one of AR's most problematic and most interesting aspects. On the one hand, it creates extra demands on the researcher (Noffke and Somek, 2005). In AR, it is expected that the researcher will be concerned with developing theory and also influencing the practical outcomes of the project (Harris, 2007; Eden and Huxham, 1996), making it more difficult to achieve a balance between theory and practice (Noffke and Somek, 2005). On the other hand, this is one of the most remarkable aspects of

AR, as it contributes to the integration of both theory and practice in a cyclical process (Westin and Roberts, 2010; Coghlan and Brannick, 2001), as discussed in chapter 3. As Westin and Roberts (2010, p. 9) note: “The location of interventionist research is at the meeting between theory and practice, attempting to make it a melting point where an increased understanding of practice resulting from continuous detailing of the ontological categories at stake, produces new knowledge”.

The AR project could also help fulfil the need to follow the actors in action as required from an ANT perspective (Latour, 2005, 1999; Law and Hassard, 1999; Latour, 1987; Callon, 1986). Indeed, following the traces left behind by the actors is essential from the ANT perspective (Latour, 2005, 1987). This might have influenced the way access to the company was granted and might have reinforced the need to develop an AR project. From the ANT point of view, this enabled having access to the actors from the beginning of the project. In order to follow the actors and the traces left behind them, the researcher arrived in the field before the beginning of the action.

This can be a distinctive aspect of the combination ANT and AR. One of the main difficulties presented by ANT is the requirement to follow the actors in action, instead of explaining the action that has already taken place. For example, in the case presented by Chua and Mahama (2007), the researchers arrived in the field during the development of the project. In the study of GM, the fact of it being an AR study helped create an opportunity to follow the actors from the beginning of the project. Therefore, in relation to this aspect, it can be argued that the combination of ANT and AR can bring benefits to the research.

However, the need to include the researcher as one of the actors in the analysis, as a result of the ANT and AR combination, put extra demands on the researcher. As explained in section 6.1.3, since from the ANT perspective all human and non-human actors are equally capable of acting (Latour, 2005, 1987), and as this is an AR project, the researcher was also regarded as capable of influencing the results of the research. It was part of the researcher’s role to attempt to follow the traces left behind by her, in addition to the traces left behind the other human and non-

human actors related to the project. Although Lewis (2007) combines both ANT and AR, this author does not present a reflection on how it works from the researcher's point of view, both in relation to practical and theoretical perspectives.

It can be said that although, in practice, the consequences of the researcher's influence were not as evident, the need to reflect on the researcher's own role created higher demands on the researcher. The initial intention, to influence the implementation of a SCM initiative and to observe the role of accounting in this context, created extra pressure for the researcher when compared to non-interventionist research. Thus, combining ANT and AR can be even more demanding on the researcher who, in addition to having to balance the practical and theoretical outcomes of the project (e.g. Harris, 2007), needs also to be concerned in self-assessing the impact of her presence in the field.

Furthermore, the Supply Chain Manager obtained little support for the development of the project at GM due to a resistance to change (Burns and Vaivio, 2001; Burns and Scapens, 2000) and, consequently, the implementation of the change did not take place. This meant that the potential for the researcher to influence the outcomes of the project was reduced. In fact, in relation to the practical aspects of the project, it can be said that the researcher had more of an assisting role than an active role and, hence, the potential influence of the researcher was limited. Indeed, noticing this inability to exert an influential role on the implementation of the change was a frustrating experience for the researcher, intensified by the need to reflect on her own influence on the lack of change due to the ANT approach (Latour, 2005, 1987). Moreover, as the project did not progress as initially planned, during the field research there was a feeling of failing from the researcher's point of view which created additional pressure on her (Noffke and Somekh, 2005).

The limited influence of the researcher might be associated with some of the researcher's personal characteristics. The most relevant ones seem to be her academic background, her age, and her gender. The researcher had academic expertise in terms of IOA projects, but no practical experience of the

implementation of those projects. In addition, she was young relative to the age of the top managers at GM. These issues potentially decreased her credibility in developing the project. Previous studies have recognised the relevance of both academic and practical expertise in the development of AR projects (Dumay, 2010). However, with regards to age, no evidence of this discussion was found in management accounting literature. At GM, although there was no explicit objection to younger staff, the dominance of older staff at the top managerial level was noticeable. The age of the researcher, along with her lack of practical experience of the implementation of IOA projects might have influenced the results of this study. Although this issue goes beyond the scope of this thesis, it may be suggested that this issue deserves attention in future investigations.

The lack of practical experience implementing the VMI was also unhelpful for the researcher as an actor. It made it more difficult and more time consuming to understand the tool and to plan for its practical implementation. Moreover, evaluating the impact of the change could have been easier if the researcher had previous experience of the practical implementation of the VMI. Indeed, because of the researcher's academic background and the need to theorise about what was being observed, the researcher was seen as theoretical at times. In order to overcome this problem, ideally the researcher should be part of an experienced team of researchers (Coughlan and Coughlan, 2002; Eden and Huxham, 1996). Unfortunately this is not always possible, as in the case of a PhD student.

Another issue might be related to the gender of the researcher. Male dominance, in both number and higher positions in the workplace has been observed in countries like the UK (Walker, 2003; Walker, 1998) and Japan (Komori, 2008, 2007). In addition, the restriction of women from working in the accounting profession took place until the early 1900s in Britain (Lehman, 1992). However, during the twentieth century major changes took place and women have taken more active roles in accounting (Kirkham and Loft, 1993). Moreover, in Japanese companies it has been noticed that, in fact, "interdependent cultural underpinnings have played a more important role than gender differences" (Komori, 2008, p. 534). Although no equivalent studies were found in Brazilian literature, being a

woman might have influenced the researcher's role at GM. Therefore, this would certainly be an interesting area for future research.

More specifically, in literature about AR, the feminist perspective has been recognised as relevant and as one which warrants further research (Waring, 2002; Maguire, 2001; Reason and Bradbury, 2001). Indeed, gender reflexivity has been considered as a missing element from AR in the information systems field (Waring, 2002). In relation to this research, a few comments are presented regarding this discussion. On the one hand, as the change did not take place, it might be argued that being a woman in a male-dominated business environment might have decreased the researcher's chances of success at GM. On the other hand, as observed in this discussion chapter, there were other relevant issues, such as the lack of development of interessement devices (see section 6.2.2), which might better explain the lack of change.

As compensation for the frustrating lack of change observed in this research, the researcher could direct attention to the theoretical aspects of the research, by focusing on the contribution to expanding the body of literature related to IOA. This was important in relation to both ANT and AR. Whereas from the AR perspective, the theoretical development is as important as the practical aspects of the project (Harris, 2007), from the ANT perspective, theory can be developed regardless of the outcomes of the project. Indeed, any trajectories which the project may take can be followed (Latour, 1987). Hence, despite the frustration at the lack of change from the practical aspect of AR, from the ANT point of view, this situation could be expected and easily accepted. Therefore, through combining ANT and AR, theorising about this case can still be regarded as possible.

Two other positive aspects of the combination between ANT and AR were that the AR project enabled access to the company and its backstage (Easterby-Smith et al., 2002; Gummesson, 2000; Johnson and Duberley, 2000) and enhanced the access to actors that is essential from the ANT perspective (Latour, 2005, 1987). It can be argued that the level of trust and openness in relation to the researcher was higher than it would have been using other methodological approaches, since the

researcher was also working on the company's project. Although the project did not progress as expected, this research corresponds to previous studies in relation to the improved level of trust in the interventionist researcher, as can be observed in the following quote: "If this were a fairy tale, the researcher would be seen as knight in shining armour, coming to save the day, requisite with the tools of trade – a sword, body armour, a trusty steed and the courage and determination to win the day" (Dumay, 2010, p. 57). Although due to the lack of practical development of the project, sometimes the researcher was seen as an outsider, most of time the researcher was treated as an insider. It is very unlikely that organisational actors would have told the researcher about the informal information exchange (see details in chapter 5, section 5.4.2), if they did not find her trustworthy.

More specifically, in relation to the AR project, it is also important to emphasise that it was not based on a consultancy project. Although this deals with one of the major critiques of AR (Eden and Huxham, 1996), the open nature of AR and the role of the researcher can lead to different outcomes. One of the problems was the fact that the project was not implemented. A consultancy project might have had more chance of implementation, despite the fact that in some cases the implementation can also be problematic (Schmolze, 1999). However, the AR approach has a number of advantages. In comparing AR with consultancy a number of issues can be raised. By analysing research literature and the findings of this research, the issues which will be considered here are summarised in Table 6.4 below. They are project focus, expertise, money orientation, theory and practice balance, insider-outsider view, influence, and research v consultancy dichotomy.

ISSUES	ACTION RESEARCH	CONSULTANCY	THIS RESEARCH
Project focus Baard, 2010; Harris, 2007; Reason and Bradbury, 2001; Eden and Huxham, 1996.	Focus on the needs raised in conjunction with the parties involved	Focus on the implementation of a specific tool or project	The project was of interest only to the Supply Chain Department
Expert knowledge Baard, 2010; Kaplan, 1998; Eden and Huxham, 1996.	Broad scope	Specific scope	The researcher had expert knowledge at the theoretical level only
Money orientation Baard, 2010; Kaplan, 1998.	Money is not the primary interest	Money is important	Money was not important
Theory and practice balance Harris, 2007; Noffke and Somekh, 2005.	Need to balance theory and practice	Oriented to the practical development	The need to balance theory and practice was very demanding on the researcher
Insider-outsider view Dumay, 2010; Jönsson and Lukka, 2006; Coghlan, 2003, 2001.	Researcher may be seen as an insider	Consultant is seen as an outsider	The researcher was seen as a 'temporary' insider
Influence Jönsson and Lukka, 2006.	May depend on the specific situation	Usually high	The researcher had limited influence on the project's implementation
Research v consultancy Eden and Huxham, 1996.	The work can be a form of free consultancy	The work may result in action research	The work of the researcher might have been seen as a free form of consultancy, but it lost relevance as the project did not progress

Table 6.4: Action Research v Consultancy

The first issue is the project focus. It can be argued that whereas the action researcher is concerned with recognising problems and solutions in conjunction with the parties involved (Harris, 2007; Reason and Bradbury, 2001), the consultant arrives at the company with a specific proposal to implement a tool or project (Baard, 2010; Eden and Huxham, 1996). In this research, as explained in chapter 3, the researcher interacted with actors in the company in order to select the project that would be of both theoretical interest to the academic public and of practical interest to GM. In a consultancy project, the focus would be oriented to implementing a more specific project and having a specific desired outcome. The main problem with this research in this respect seems to have been that, in addition to the researcher, only actors in the Supply Chain Department were interested in the project (as explained in section 6.4).

As can be observed in table 6.4, the second issue relates to the type of expertise used in AR and in consultancy projects. While AR usually has a broader knowledge of the subject area and is concerned with knowledge development (Baard, 2010; Kaplan, 1998; Eden and Huxham, 1996), consultancy is more specifically oriented. The importance of taking into account the consultancy style and the consultancy skills in AR projects has been emphasised in literature about AR (Dumay, 2010; Eden and Huxham, 1996). However, problems may arise when using consultancy work as a form of AR, due to a lack of sufficient attention to the theoretical aspects of the research (Eden and Huxham, 1996). At GM, the expert knowledge of the researcher enhanced access to the company (Dumay, 2010), however, a lack of consultancy skills was problematic for the researcher.

The third issue considered is money orientation. In consultancy projects, payment for the work is the rule. However, in AR projects the money issue can raise controversies. The sources of money are often from academic sources, such as research grants, or from the company in which the AR is taking place. Eden and Huxham (1996) consider that there is a danger that the researcher receiving grants to conduct AR projects is motivated to improve their individual and institutional curriculum vitae and may forget the wider implications of the research. Meanwhile, Kaplan (1998) believes that if no payment is given to the action researcher, the project is less likely to be successful. According to Kaplan (1998), a small payment is acceptable, since it is a way of avoiding the company viewing the acceptance of the AR project as a favour they are doing for the researcher. In this research, money was not of primary interest to the researcher, GM did not make any small payment and the consequent 'favour' problem was noticed by the researcher. Because the project did not progress, sometimes it was felt by the researcher that staff in the company were doing her a favour in agreeing to talk to her.

The fourth relevant aspect in the comparison between AR and consultancy in this research relates to the need for both practical and theoretical developments in AR (Jönsson, 2010; Harris, 2007; Noffke and Somekh, 2005) and the focus only on practical outcomes in consultancy. Usually problems are found when a consultancy project is presented as a form of AR without careful consideration of

the research requirements, and sloppy research may arise (Eden and Huxham, 1996). However, in this research, the main problematic aspect, as discussed earlier in this section, was that the need to balance theory and practice was very demanding on the researcher (Noffke and Somekh, 2005), especially due to the lack progression of the project.

Another issue, in Table 6.4, is the insider-outsider view. Although the consultant is usually seen as an outsider, in AR projects, some authors (Dumay, 2010; Jönsson and Lukka, 2006) believe that the researcher has to be viewed as an insider. For example, it has been argued that “in order to carry out an interventionist research project, the researcher must gain further in-depth access to the organisation and become a member of a team in order to get the insider view of the organisation” (Dumay, 2010, p. 55). However, special attention needs to be given when carrying out the project as an insider manager in the organisation (Jönsson, 2010; Harris, 2007; Noffke and Somekh, 2005; Coghlan, 2003, 2001). Despite having previous knowledge of the organisation, they need to articulate and combine their organisational roles with the action researcher role and this can be very complex (Coghlan, 2001). As explained previously in this section, due to the lack progress with the project, the researcher was seen as a ‘temporary’ insider, and sometimes as an outsider.

The sixth aspect refers to the level of influence of the action researcher and of the consultant (Jönsson and Lukka, 2006). The level of influence of a consultant is usually high. However, problems are sometimes faced during the project’s development (Ezzamel, 1994) or after the consultants leave the field (Briers and Chua, 2001). According to Jönsson and Lukka (2006, p. 19), “the interventionist approach implies that the chosen path towards knowledge is that the researcher tries to influence the host organisation towards improvement”. Although the action researcher attempts to influence the company, the level of influence may depend on the specific situation, as observed in this research.

Finally, in relation to the AR versus consultancy dichotomy it has been observed that, while the former may become a form of free consultancy, the latter can also result in AR. Indeed, they can be closely related. On the one hand, it has been

emphasised that it is important for the action researcher to draw on a consultancy style (Baard, 2010; Eden and Huxham, 1996). On the other hand, although consultancy work may result in AR, and vice versa, it is important to avoid using the AR label to justify loose research (Eden and Huxham, 1996; Gummesson, 2000). Arguably at the beginning of this research, the work of the researcher might have been seen as a free form of consultancy, but it lost relevance when the project did not develop as expected.

6.6 Summary

This chapter discussed the role of accounting in the potential development of an inter-organisational relationship in a Brazilian glassware company. The chapter was introduced by presenting the global and local, human and non-human actors which could potentially be related to the SC&A network. Whereas global actors were mainly external human actors, such as multinational customers, and non-human actors used or expected to be used by GM; local actors consisted of local small customers and managers and employees of GM. The researcher was also added to the analysis, as a local/global actor, due to the need to reflect on the researched-researcher nexus (Lewis, 2007) outlined in chapter 3 (section 3.4). Then the relationships between the actors were discussed and the difficulties encountered in the development of the project were highlighted.

The discussion was then based on the four moments of translation as proposed in ANT, namely, problematisation, interessement, enrolment and mobilisation. At the problematisation stage, the actors more closely related to the SC&A network were selected. In addition, the Supply Chain Manager was identified as the OPP of the network. It was observed that the project failed in relation to the interessement, as there were actors with different interests in the network. Local human actors (i.e. The Supply Chain Manager and Sales Manager for AD) had different perspectives on the importance and the potential implementation of global non-human actors, such as the VMI and IOA. The lack of interest and support from the Sales Manager for AD seemed to be the main obstacle to the project's progression with Customer for AD. Moreover, interessement devices did

not seem to be sufficient to engage the actors in the network. Accounting technologies, such as NPV and customer accounting had the potential to contribute to the project development. However, access to accounting information was difficult and sometimes restricted. As a consequence these interestment devices could not be sufficiently developed. Despite this, information exchange took place at an informal level, as a result of inter-personal relationships. A second customer was selected (Customer for PI). However, despite the interest of the Sales Manager for PI in relation to Customer for PI, the translation also failed to take place.

Further reflection with regards to the lack of change is then presented. This section shows how internal and external actors to GM positioned themselves in relation to the inter-organisational project. In this section, it can be observed that several internal human actors, such as the sales staff and the SAP Project Manager added resistance to the change. The accounting staff, that is, the Finance Director and the Financial Controller, were indifferent to the change and did not seem to be sufficiently interested in the project. Despite this, some accounting technologies, such as the DRM contributed to motivate the project development. While these internal conflicts and lack of support for the project were taking place, the customer was being influenced by GM's competitors in the glass industry and the competing alternative packaging materials. The Foreign supplier was also added to the analysis because of the influence one of the imported raw materials had on the definition of the cost and the price of GM's products. Thus, the Foreign supplier also influenced the relationship with Customer for AD.

Although different from accounts found in previous research literature, the findings of this research show that accounting can play a constitutional role in relation to the development of closer inter-organisational relationships. In literature relating to IOA, accounting has contributed to enhancing trusting inter-organisational relationships (Tomkins, 2001; Håkansson and Lind, 2004; Free, 2008). Controversially, accounting was an important source of motivation for the project's development, but also added resistance to the change. Accounting motivated the project due to the influence of indicators such as logistics expenses and the accuracy of the demand forecast on actors such as the Supply Chain

Manager and the Demand Planning Supervisor. On the other hand, accounting added to the resistance to change because of its lack of sufficient development at the managerial level and the relevance given to financial indicators, especially EBITDA.

In relation to the main findings and contributions of this analysis, a number of interesting issues can be raised in this summary. Firstly, it might be argued that although the combination of ANT and AR can bring challenges, as suggested previously (Lewis, 2007) it can be regarded as a suitable approach to qualitative research in management accounting. This is because the combination creates the possibility of following actors and the traces left behind them from the beginning of the project, as indicated in literature about ANT (Latour, 1987). In addition, it also creates the opportunity for enhanced access to the parties involved in the project, which is one of the main benefits of the AR approach (Harris, 2007). As presented in this thesis, this access allowed observation of what was happening (or not happening) at both the formal and informal levels.

Secondly, from the perspective of ANT, the main benefit of the combination seems to be the possibility of following any trajectory that may take place (Latour, 2005). Therefore, the lack of change, as observed in this case study, does not invalidate the analysis. As Alcouffe et al. (2008, p. 14) say:

Attention should not be focused on the concept of success/failure but on the description of the network that supports the innovation, i.e. the enrolment of human and non-human actors, allies and spokespersons. Success and failure are only rhetorical constructions of the network...

The main outcome of this analysis is the combination of ANT translation and AR cycle which was discussed in section 6.5. The first step of the AR cycle, diagnosing, can coincide with the first moment of translation, problematisation. While the former focuses on what needs to be done, the latter refers to which actors will be doing it and why. The second step of the AR cycle involves identifying what exactly will be done. It can be compared to the intersement moment of translation which focuses on how the actors will be taking the action. Taking the action, in turn, is the next AR step and includes the implementation of

the plans. It can be related to ANT enrolment, which is about how actors overcome barriers and engage in the network. The last AR step, evaluating the action, can be combined with the last moment of translation, mobilisation. Whereas the former is concerned with assessing the results of the project and reflecting about the next steps, the latter focuses on the actors' reactions to the change and how these reactions may impact in the network.

Finally, the role of the researcher was discussed. It was observed that the researcher had little, but some influence on the inter-organisational project. For instance, the presence of the researcher might have motivated the Supply Chain Manager to speed up the beginning of the project. In addition, this research confirms that the need to reflect on her own role creates additional demands on the researcher (Noffke and Somekh, 2005). On the positive aspects, the combination between ANT and AR enables the researcher to have the opportunity to follow the actors in action (Latour, 2005) from the beginning of the project and to have better access to the company's backstage (e.g. Easterby-Smith et al., 2002). Furthermore, issues related to the researcher's personal characteristics were raised. Although only an initial reflection is presented in this thesis, academic background, age and gender of the researcher might warrant future research.

A comparison between AR, consultancy and the results of this research was also presented. One important aspect in this discussion is the fact that AR projects, as it is the case with this research, are concerned with identifying the specific needs in conjunction with the parties involved, whereas in a consultancy, a specific project or a specific tool is implemented. Another issue relates to the expert knowledge of the consultant being more specialised than that of the researcher. This was observed in this research, as the researcher had theoretical knowledge regarding SCM and IOA, but had no practical experience in the implementation of VMI projects. Other issues are also analysed and this research confirms that AR is a distinctive approach from consultancy. The next chapter presents further conclusions regarding the findings of this research.

CHAPTER 7: CONCLUSIONS, LIMITATIONS AND FUTURE RESEARCH

This chapter highlights the main conclusions and implications of this thesis. It also refers to the research limitations and makes suggestions for future research. The chapter is divided into four sections. First, an overview of the thesis is presented. Second, there is a discussion of the main theoretical, methodological and practical contributions of the research. Third, the limitations of the research are analysed. Fourth, recommendations for further investigation are presented.

7.1 Overview of the study

This study draws on actor-network theory (ANT) to understand how accounting can be an actor in mediating, building and shaping inter-organisational relationships. More specifically, this research has observed the role of accounting in the potential development of a supply chain management (SCM) initiative. The importance of this study is related to the some potentially controversial findings regarding the role of accounting in an inter-organisational context, and, as explained in the literature review, the need for further research.

While, according to some studies about inter-organisational accounting (IOA), accounting can have an important role in an inter-organisational context (Chua and Mahama, 2007; Seal et al., 2004), other studies have found that this role can be controversial (Mouritsen and Thrane, 2006; Mouritsen et al., 2010). The importance of extending knowledge about the role that accounting can play in the inter-organisational environment has also been recognised (Mouritsen and Thrane, 2006; Chua and Mahama, 2007) and more recently emphasised (Håkansson et al., 2010). Thus, this thesis makes a contribution to existing knowledge by addressing this gap in research. In addition, this research is relevant because of a more general increased interest in IOA studies (Håkansson et al., 2010).

The field research consisted of an in-depth case study conducted in a Brazilian Glassware Manufacturing company (referred to as GM) during a research period

of six months. Brazil can be regarded as an important site for the research since previous research about IOA has been carried out in developed countries and there are currently a very limited number of studies (with the exception of McCormack et al., 2007) in the Brazilian context. The case study was developed based on the action research (AR) methodological approach. As explained in chapter 3, AR involves both taking action and developing theory about the action (Harris, 2007; Reason and Bradbury, 2001; Eden and Huxham, 1996). In addition, AR projects often take place in cycles, including a pre-step of context and purpose, and the steps of diagnosing, planning the action, taking the action and evaluating the action (Coghlan and Brannick, 2001).

Considering the main aim of this study and drawing from the literature review, research questions were elaborated and presented in Chapter 1. The following shows a reflection on how these research questions were addressed in the results chapters of this thesis (Chapters 4, 5 and 6). The first research question was: *How are supply chain relationships being managed?* As explained in Chapter 4 (section 4.3), GM's relationships with suppliers and customers are mostly long-term, but still arms-length. From the suppliers' side, GM dominates the relationships. It has a strong influence on their operations, since it owns most of the land from which raw materials are extracted. With regards to the customers, the relationships are varied. They depend on the size of the customer, and whether it is a global or local customer. GM can have some influence on local small customers, but it has little impact on large global multinational customers.

More specifically, as a result of the AR project, as described in chapter 5, GM's relationship with two customers was observed more closely. As discussed in chapter 6, Customer for AD was a global customer which was not formally contacted with regards to the 'Collaboration with Customers' project. There was internal opposition, mainly from the Sales Manager for AD to introducing the project to the customer. However, some sort of informal information exchange took place at an informal level. This shows that the external relationships with customers were contradictorily managed. The second customer selected, Customer for PI, was highly interested in the project, but again the project failed to take place. The Sales Manager for Pharmaceutical Industry (Sales Manager for

PI) seemed to have a better relationship with the customer than the Sales Manager for AD. Thus, arguably GM's relationships with customers were managed differently, depending on the internal staff and the specific customer.

The second research question was: *How can organisations benefit from the implementation of a SCM initiative?* This was a controversial issue at GM, since different organisational actors did not agree on the benefits of implementing the project. As shown in Chapters 5 and 6, while the Supply Chain Manager was interested in developing closer relationships with customers in order to reduce the costs of storing high levels of inventories, the Sales and Marketing Director preferred maintaining the levels of inventories and having the products available to the customers whenever required. In addition, the Finance Director and the Financial Controller had little or no influence on the company's inventory policy and were not engaged in measuring the potential benefits of the project.

Chapter 5 showed that the 'Collaboration with Customers' project was identified as potentially relevant by the Supply Chain Manager because he saw the opportunity for GM to work more closely with customers and reduce GM's high level of inventories. In addition, he considered the project important since it could enhance the quality of the relationship between GM and its customers and maintain or even increase the levels of sales. GM had lost a considerable market share to alternative packaging products, such as tetra pak and aluminium cans, and changes seemed necessary in order to retain the customer base. The Supply Chain Manager clearly saw the benefits for both GM and the customers in engaging in the 'Collaboration with Customers' project. For GM, the main benefit was related to improvement in the management of inventory levels and consequent cost reduction. For the customers, the project could be beneficial in terms of improvement of the level of services and reduction of costs of managing the glass packaging inventories in their factories.

However, the Sales Manager for AD did not agree on the benefits of the 'Collaboration with Customers' project. Although the project could lead to closer relationships with customers, arguably he was concerned with potential changes in his job role. These changes were not sufficiently clear and might have

influenced the resistance from the Sales Manager for AD. Therefore, arguably, in addition to organisational benefits, it is also important to consider the benefits for individual actors, as suggested in literature about ANT (Callon, 1986). The development of interessement devices is essential for engaging individual actors and reassuring them that their individual interests are better achieved through the network (Callon, 1986). As discussed in chapter 6 (section 6.2.2), arguably accounting had the potential to be useful for the development of interessement devices. However, limitations in GM's internal accounting systems did not contribute to fully exploiting accounting's potential.

The third research question was: *How does accounting change in order to adapt to the SCM initiative?* Although in the case company accounting did not change, the findings of this research reinforce the need for adaptation and improvement in accounting systems for the development of an inter-organisational initiative. There was a need for considerable changes to GM's internal accounting systems in order to progress the project. More specifically, as discussed in chapter 6 (section 6.4), there was a need to expand and improve the company's internal accounting system. For example, the focus on financial accounting instead of management accounting was not helpful to the project. In addition, the introduction of accounting technologies, such as net present value (NPV), economic value added (EVA) and customer accounting had the potential to contribute to the project's progression.

Despite the need to change in order to be more useful to the project, accounting did not change. In fact, accountants were not engaged or even interested in the project. In relation to the accounting technologies which could have been potentially useful, it can be said that the idea of using EVA predated the 'Collaboration with Customers' project. Although the project did not develop, EVA was implemented in 2009. The NPV of the project was not calculated and, as discussed in chapter 6 (section 6.2.2) customer accounting seemed to be too complex in relation to the accounting information available.

The last research question relates to the main aim of this thesis: *How does accounting contribute to the development of a SCM initiative?* As observed in this

thesis, and as will be analysed further in section 7.2, accounting played a constitutional, but controversial role in relation to the project development. It was a source of both motivation and resistance. Whereas some accounting indicators, such as logistics expenses and the accuracy of demand forecast influenced the conception of the project, others, such as EBITDA contributed to the maintenance of the status quo, adding resistance to the change.

This research also confirms that the relationship between trust and accounting information shared in inter-organisational projects is complex. Although interpersonal trust led to some sort of accounting information sharing at an informal level, it was not sufficient for the formal development of the project. On the other hand, as mentioned in relation to the previous research question, accounting technologies had the potential to be useful in convincing organisational and inter-organisational actors of the benefits of the 'Collaboration with Customers' project and enhancing trust between them. Thus, arguably accounting had the potential to contribute to increased trust between supply chain actors.

The study was conducted using AR, paying attention to both taking action and developing theory about the action. The research was conscious of the steps of the AR cycle though in this case the project did not progress to the 'taking the action' stage. As explained in chapter 5, the AR cycle was not completely followed and the implementation of the proposed project did not happen during the field research period with the first customer selected, there was an attempt by the company to continue the project with a second customer after the researcher left the field. With the first customer, the pre-step of context and purpose and the steps of diagnosing and planning the action were followed. However, action was taken only at an informal and operational level, and the project was neglected before its formal and strategic implementation.

Although the project also failed to be completed with the second customer, this time it progressed further. The customer was very interested in the project and was engaged in initial negotiations. Therefore, the taking the action step in the AR cycle was followed at least partially (see details in chapter 3, section 3.3.3 and chapter 5). Thus, this research may have had some practical impact on the case

company and its supply chain relationships. This issue is further discussed in the practical contributions section of this chapter (section 7.2).

ANT was used to analyse the research findings and to develop theory about the AR project. Firstly, all of the actors who could potentially take part in the AR project were included in the analysis (as outlined in chapter 6, section 6.1). They were divided into global and local, and human and non-human actors. The network thus included local human actors (GM's staff) and a global/local human actor (the researcher). It also included global non-human actors such as the vendor managed inventory (VMI) and inter-organisational accounting (IOA), in addition to a global human actor (Customer for AD). The inclusion of a broad range of actors enabled reflection on how actors related to the inter-organisational project. Although the implementation of the change did not take place, network effects (Chua and Mahama, 2007) were observed, since global actors, such as competitors, influenced the relationship between the local company and its global and local customers.

Secondly, as also explored in Chapter 6, Callon's (1986) moments of translation (section 6.2), that is, problematisation, interessement, enrolment and mobilisation were used to reflect on how the AR cycle was followed and how global and local, human and non-human actors, including accounting, interacted in the potential development of the inter-organisational initiative. The researcher attempted to help the Supply Chain Manager in the formation of the supply chain and accounting (SC&A) network. However, he failed to become the network's obligatory passage point (OPP) and the formation of the network was problematic. The problems were arguably related to the lack of development of interessement devices in which accounting had the potential to be useful. The Supply Chain Manager did not seem to give appropriate consideration to the development of interessement devices and arguably took it for granted that other organisational actors would be sufficiently interested in the project. As a consequence, the closer inter-organisational relationships with customers did not happen and enrolment and mobilisation did not take place in this case study.

Despite the problems observed in the development of the proposed AR project, the analysis of the findings through the ANT lens reveal how this study has contributed to the body of literature exploring IOA and SCM. This is discussed in the next section.

7.2 Research contributions

This section includes the implications of this research. Firstly, the main theoretical and methodological contributions are analysed and, secondly, the potential practical outcomes of this research are discussed.

7.2.1 Theoretical and methodological contributions

At the theoretical and methodological levels, this research makes a contribution in relation to the following: (1) the study adds to the body of research literature about IOA, (2) the study is based on the combination of ANT and AR, and (3) the study was carried out in a developing country. These contributions are discussed in more detail below.

Firstly, this study contributes to literature relating to IOA by discussing resistance to change in an inter-organisational context. This issue has previously received scant attention in literature (exceptions being Coad and Cullen, 2006; Kajüter and Kulmala, 2005; Van der Meer-Kooistra and Vosselman, 2000). Analysis of the findings revealed interesting insights into resistance to change. The findings are similar to other studies in identifying the association between a lack of knowledge and resistance to change (Coad and Cullen, 2006; Burns and Scapens, 2000), but different regarding the transparency of the resistance. Although resistance to change has been referred to in some areas of literature (Burns and Scapens, 2000), in the GM case study the resistance to change was not explicit. However, in common with Burns and Scapens (2000), it did relate to a lack of knowledge regarding the change. In this research, the proposed change involved implementing the ‘Collaboration with Customers’ project using the VMI technology.

In the analysis of the findings in chapter 6, it was observed that this research bears some similarity to the cases presented by Coad and Cullen (2006) and Van der Meer-Kooistra and Vosselman (2000). As in those studies, this research showed how internal staff, such as the Sales Manager for AD, were afraid of the potential change. Employees were not informed of how their jobs could be affected and changes in role or being made redundant were possibilities. In addition, like in one of the networks analysed by Kajüter and Kulmala (2005), the resistance stopped the change from happening at GM.

This research also facilitates a greater understanding of how accounting can be an actor in the development of a SCM initiative. In this study, accounting played a role that had similarities and differences to the role outlined in previous research literature. In particular, the findings of this research confirm that accounting needs to change in order to be helpful in the development of an inter-organisational relationship. Since this research focused on the development of closer relationships with customers, the findings cannot necessarily be directly compared with previous studies that focus on supplier relationships (Gietzmann, 1996; Cooper and Slagmulder, 2000; Van der Meer-Kooistra and Vosselman, 2000). However, in examining the relationships with customers, the findings help to extend knowledge. In particular, it was found that the use of customer accounting had the potential to contribute to calculating the benefits of the change for both the company and its customer. However, this did not happen in practice.

This research also contributes to previous debates about the relationship between trust and accounting (Cäker, 2008; Mouritsen and Hansen, 2006; Håkansson and Lind, 2004; Seal et al., 2004, 1999; Tomkins, 2001; Seal and Vincent-Jones, 1997). Contrary to Cäker (2008), although there was inter-personal trust between inter-organisational actors, it was used to share accounting information informally at the operative level, but was not sufficient to enable the project to progress either strategically or formally. Moreover, unlike previous studies (Håkansson and Lind, 2004; Tomkins, 2001; Seal et al., 1999), this research highlighted the need for both trust and accounting information in the initial stage of the inter-organisational relationship.

Another issue analysed in this thesis relates to the argument that accounting and boundaries mutually condition each other (Thrane and Hald, 2006; Van der Meer-Kooistra and Vosselman, 2000). As discussed in chapter 6, on the one hand, accounting reinforced the hierarchical structure of the case company, instead of contributing to the development of the inter-organisational relationship. For example, the use of EBITDA showing the company's profitable results did not contribute to emphasising the lack of efficiency in carrying high levels of inventories. On the other hand, accounting was one of the motivators of the project and, therefore, contributed to the attempt to develop a SCM initiative.

These findings reflect the controversial role that accounting can play in an inter-organisational context. Arguably, in this study, this role was also different from previous research. Although accounting played a contradictory role, which has some similarity with that observed previously in literature about IOA (Mouritsen and Thrane, 2006; Mouritsen et al., 2010), it was also a diverse and unusual role. Whereas in previous research about IOA, accounting has been recognised as a source of both order and conflict, in this research accounting played a somewhat contradictory role in being both a source of motivation and prevention in relation to the development of the SCM initiative. As discussed in chapter 6, whereas accounting was one of the important motivators for the 'Collaboration with Customers' project, it also played a negative role by increasing resistance to the change. As a consequence, it can be argued that accounting played a constitutional role since it influenced the beginning of the inter-organisational project, but also contributed to the lack of engagement of other organisational actors.

A further contribution of this thesis relates to the use of both ANT and AR – each in their own right, and also in combination. The relevance of interventionist research, such as AR, has been emphasised recently in literature about accounting (Jönsson, 2010; Westin and Roberts, 2010). As explained in chapter 3, although AR is a well-known and widely used approach in education and teaching (e.g., Rock and Levin, 2002) and in medicine (e.g., Schein, 1995), a limited number of AR projects have been carried out in the area of management accounting practice (e.g., Liu and Pan, 2007; Coad and Cullen, 2006; Nicolini et al., 2000; Harris,

1999; Seal et al., 1999). Thus, this research adds to existing literature by using the AR methodological approach in the business context.

This research also makes a contribution by using the AR methodology to develop both practice and theory. Although the AR project was not fully completed, this methodological approach enabled enhanced access to the research site. From the practical side, the AR created the opportunity for the researcher to interact closely with actors who could potentially be involved in the inter-organisational project. From the theoretical perspective, the AR methodological approach was also important, since it contributed to the theoretical development of the practice observed.

To some extent the development of the AR project has influenced the company's practices and it enabled a greater engagement between the researcher and the company. Arguably, using AR has contributed to the attempt to develop the project and has influenced the way organisational actors viewed the project. As a result of this research taking place, the case company has focused attention on inter-organisational issues. Evidence of the influence of the research on the case company is the fact that the 'Collaboration with Customers' project continued to be developed with the selection of a second customer, after the researcher left the field.

From the theoretical side, the use of ANT to interpret the findings of this research helps to build on the existing body of literature that has used this approach (Mouritsen et al., 2010; Chua and Mahama, 2007; Mouritsen and Thrane, 2006). The importance of carrying out more studies using ANT to develop theory in relation to IOA has been emphasised, especially due to the role that accounting can play in shaping, developing and maintaining inter-organisational relationships (Mouritsen et al., 2010). This research contributes to knowledge about IOA by focusing on understanding the role of accounting in the development of a SCM initiative through the ANT lens.

Moreover, the combination of ANT and AR is not common in literature about IOA, and this study is one of the first to draw attention to the benefits of this

combination. As discussed in chapter 6 (section 6.5), this research makes a theoretical contribution by suggesting that the steps of the AR cycle can be related to the ANT moments of translation. It has been observed that diagnosing can be linked to problematisation, planning the action to interessement, taking the action to enrolment and evaluating the action to mobilisation. This combination enables improved understanding of the findings of this research. According to Coghlan and Brannick (2001) once the AR cycle starts, a new cycle of diagnosing, planning the action, taking the action, and evaluating the action also begins at the theoretical level. This cycle is referred to as the reflection cycle and allows the achievement of 'meta-learning' (Coghlan and Brannick, 2001). The reflection was carried out based on ANT.

Lastly, this research also adds to existing literature because it was carried out in Brazil. The limited number of IOA studies in developing countries has been highlighted in the introduction to this thesis. Few studies related to IOA in emerging economies can be found in the academic literature (for an exception, see McCormack et al, 2007), and there is a lack of research regarding IOA in these countries. Indeed, from carrying out this research, it seems that the concept of IOA is new and not yet well known in the Brazilian context. Thus, this research has contributed to the dissemination of the concept of IOA in the Brazilian company. This issue is discussed in the next section.

7.2.2 Practical contributions

This research has implications for policy and practice. The first implication refers to the fact that the development of this research has contributed to the propagation of the concepts of IOA and SCM in Brazil. Although IOA has been developed in companies throughout the world, it was not yet well known or well accepted in the case company. Evidence of this is the Financial Controller's quote cited in chapter 6 (section 6.4) which is repeated below due to its relevance to this argument. He said:

No, no, sharing accounting information sounds crazy. It would be too risky to share our accounting information with external links. It would be the same as shooting my own feet.

GM's Financial Controller, May 2008

The Financial Controller's view was corroborated by other managers, such as the Finance Director and the Sales and Marketing Director, who were also sceptical of open book accounting agreements and IOA in general (see details in chapter 6). Therefore, the development of this research arguably makes a contribution towards the dissemination and clarification of what IOA means and how it can be used by companies in the business environment.

In addition, the practical development of this research involved the potential use of SCM tools, such as the VMI and VSM. Although these tools were not implemented in the case company, this research has raised awareness and enhanced knowledge about them. As explained in chapter 5 (section 5.3.2), the VMI concept was introduced to the company's staff (i.e. the Demand Planning Supervisor) and managers (i.e. Sales Manager for AD) by the Supply Chain Manager. VSM was brought to the attention of the Supply Chain Manager by the researcher. Despite the fact that these SCM tools were not used fully in the case company, arguably, the development of this research has contributed to their dissemination in a practical context.

In terms of policy, the lessons from this research include the need for professional accounting bodies to more widely extend their remit in developing countries such as Brazil, which is one of the BRIC countries (Brazil, Russia, India and China) and moving from the status of a developing to an advanced economy. The results of this research show that accounting tools need to be explained more carefully to people in SCM. Accounting professionals should work on disseminating the potential benefits of using IOA tools, such as open book accounting (OBA), inter-organisational cost management (IOCM) and target costing, in the development of new inter-organisational initiatives in emerging economies.

In addition, people in SCM need to be aware of the complexities involved in implementing new initiatives in this area, as it involves staff from a number of departments in both the company and external business links. The findings of this research show how complex SCM relationships can be in practice and how internal relationships can be important in relation to the development of closer inter-organisational relationships. Therefore, this research suggests that SCM staff should seek internal support and collaboration before thinking of external collaboration with customers or suppliers.

7.3 Limitations of the research

The limitations of this research are related to the fact that the study relies on subjective interpretation of the actors. This is because of the philosophical position taken in this thesis, which as explained in chapter 3 (section 3.1) is an interpretive perspective. The interpretive perspective is based on the assumption that the network is socially constructed. It is not an objective view of reality which is outside the existence of the actors. In other words, this subjective view fails to quantify the outcome of the supply chain/supply network. However, the ontological and epistemological assumptions adopted in the development of this research are justified by the research questions which were set up in chapter 1 (section 1.4). Taking into account the fact that the research questions refer to 'how' questions, a subjective analysis is more adequate than an objective one. Thus, the findings of this thesis are limited by the subjective nature of this study.

One main limitation is the fact that the field research is based on a single case study. Although it is an in-depth study and it is suitable to meet the purpose of this thesis, the results cannot be generalised to other organisations, as in quantitative studies. In order to reach more generic conclusions, replication of the study would be necessary. Despite this, single case studies can provide a basis for analytical or theoretical generalisation, as suggested by Yin (2008). In addition, this research provides unique insights that are a result of the unique nature of interventionist research, as recently emphasised by Jönsson (2010). This makes the findings difficult to compare, but emphasises the innovative nature of the study.

Another limitation of this research relates to the lack of progression of the inter-organisational project. Because the field research did not progress as initially expected by the researcher, the observations regarding the role of accounting in the IOA context were limited. It was only possible to analyse the influence of accounting at the beginning of the development of the inter-organisational relationship. As a consequence, there were difficulties in accessing certain organisational and inter-organisational actors, such as the sales staff and the customer's staff. The project seemed to be of interest only to the Supply Chain department, and little support was obtained from other departments, including the Controllership.

Despite the limitations presented above and the fact that the intervention did not take place and the project was not fully implemented, this research highlights important implications for undertaking AR studies. Moreover, the findings of this study revealed insights into resistance to change and the role of accounting in the IOA context which are still relatively underdeveloped areas of research literature.

7.4 Suggestions for future research

The first suggestion for future studies refers to the continuation of the AR project in the case company. Expanding the timeframe of the research could enhance the chances of success in the implementation of the change. Changes take time to happen (Burns and Scapens, 2000) and, therefore, a longitudinal case study might bring different results. In addition, it could be relevant to increase the number of companies involved in the research. Despite the unique nature of AR projects (Jönsson, 2010), the attempt to replicate this project in different companies could enable the observation of how the AR case study presented in this thesis would progress in other companies.

A second avenue for future research concerns the intensification of the use of ANT to explore and understand the role of accounting in the inter-organisational context. Of particular relevance, it may be suggested that Callon's (1986) moments of translation can bring interesting insights regarding accounting's role.

The use of ANT in analysing the findings of this research has enabled an improved understanding of the contradictory role of accounting. As discussed in chapter 6, accounting may play a constitutional role like that found in some studies of IOA (Chua and Mahama, 2007; Håkansson and Lind, 2004; Tomkins, 2001; Seal et al., 1999) and this role can be controversial, which is in line with other studies of IOA (Chua and Mahama, 2007; Mouritsen and Thrane, 2006; Seal et al., 2004, 1999).

However, the controversies found in this research were different from the previous literature mentioned above. Whereas previous research has observed accounting as a source of both order and conflict, this research found that accounting can be a source of both motivation and resistance to the development of an inter-organisational project. Thus, using ANT to analyse the role of accounting in the inter-organisational context can bring new insights to knowledge and literature about IOA. It is therefore suggested that new studies in the area of IOA could use ANT to understand the complex role of accounting in the inter-organisational context.

There could also be more investigation of the diverse views regarding accounting in different departments of the company, such as Supply Chain, Controllershship and Marketing, and how they impact on the establishment of inter-organisational arrangements. Conflicting perceptions of accounting issues have been previously recognised (Burns, 1996), however, there is a lack of research on how this affects the development of inter-organisational relationships. This research found that actors having diverse or conflicting views had a negative impact on the inter-organisational project, since some actors (the Supply Chain Manager) were favourable to the implementation of the 'Collaboration with Customers' project in order to reduce the levels of inventories and others (the Sales and Marketing Director) did not see the high levels of inventories as problematic.

In addition to these suggestions, as explored in chapter 6, the findings of this research suggest that there might be some relationship between the personal characteristics of the researcher and the results of the AR project. As this discussion was not one of the aims of this study, the analysis of this issue in this

thesis is only preliminary. It can be suggested here that future business-based AR case studies should take into account the impact of the researcher's individual characteristics on the results of the research.

7.5 Summary

This chapter presented the conclusions, the main contributions and limitations of this research, and suggestions for future research. Firstly, an overview of the study was presented. It included a reflection on how the research questions of this thesis were addressed and how the main aim was achieved. The thesis focused on understanding the role of accounting in the development of an inter-organisational relationship. The research was carried out using the AR methodological approach and was analysed through the ANT lens. Despite the lack of implementation of the inter-organisational project, and consequent lack of change, the analysis of the findings using ANT revealed that accounting was an influential actor, but in a different way to that observed in prior research (e.g. Chua and Mahama, 2007).

The second section discussed the theoretical, methodological, and practical contributions of this research. The theoretical and methodological contributions are related to expanding the body of literature about IOA, the ANT and AR combination, and the fact that the research was carried out in an emerging economy. The research adds to literature about IOA since it confirms that accounting may need to change in order to adapt to an inter-organisational initiative. In contrast to previous studies, however, this research observed trust leading only to information exchange at an informal level, but not at the formal level. Also contrary to previous literature, the need for both trust and accounting information at the beginning of the relationship is identified. This research also observes fear and resistance to change, and that accounting can play a constitutional, but controversial role in the inter-organisational context. Despite the similarities with previous literature, this study finds a different and controversial role for accounting (a source of both motivation and resistance). Thus, it contributes to academic literature about IOA.

The use of AR is also innovative in the management accounting field. Although the project was not fully implemented, the AR approach created the opportunity to obtain access to the company and its organisational actors. In addition, arguably the research had some practical impact on the business operations of GM since an attempt to develop the project with a second customer happened after the end of the field research. ANT was then used in order to develop theory about practice, which is also essential in AR projects.

The use of ANT to interpret the findings contributed to understanding the role of accounting in developing a SCM initiative. This research found that accounting can play a constitutional role in the inter-organisational context and this role might be controversial. However, the accounting role may be different from the role observed previously. While prior studies have found that accounting can be a source of order and conflict, this research observed accounting as a source of both motivation and resistance to the inter-organisational project. This research also makes a theoretical contribution in relating ANT and AR, which is a new approach in IOA studies. The steps of the AR cycle were seen to have a one to one relationship with the ANT moments of translation.

This research also contributes to the theoretical and practical development of IOA in the Brazilian context. It was observed that there is a lack of research related to IOA in Brazilian organisations, and limited knowledge regarding IOA was noticed in the case company. Thus, this study contributes to literature about IOA in developing countries, since it presents a theoretical account of the use of IOA in a Brazilian company. In addition, it contributes to the dissemination of IOA concepts in practice.

This study also recognises the importance of professional accounting institutions expanding their concern with emerging economies, such as Brazil. There seems to be a need to explain and disseminate the concept of IOA and its tools and techniques. As a consequence they might create wider acceptance in developing countries. Moreover, this research shows the importance of taking into account organisational actors from different departments when developing SCM projects.

Internal collaboration is essential before any sort of external collaboration with customers or suppliers can take place.

Following the contributions, the limitations of this research were presented. One of the main limitations was the fact that the research was based on a single case study. Despite it not being possible to generalise the results of this research to other companies, single case studies can enable analytical generalisation. The other main limitation of this study relates to the limited progress of the AR project. Although the implementation of the 'Collaboration with Customers' project did not take place, interesting insights such as the relevance of resistance to change in IOA projects could be obtained.

The chapter then finished with recommendations for future research. These were to extend the timescale and the number of organisations involved in the AR project; to continue using ANT to analyse the role of accounting in inter-organisational settings; to study how a company's internal staffs' views of accounting may affect the development of inter-organisational projects; and how the personal characteristics of the researcher may affect the outcomes of AR projects.

It is expected that by combining ANT and AR this research has provided an innovative approach for management accounting research. Despite the challenges faced, the results of this research show it is a combination worth pursuing. This research has addressed SCM and IOA which are growing areas of interest in management research and, more specifically, in management accounting research (Håkansson et al., 2010). Although several controversies in relation to IOA were recognised by this research, hopefully a contribution has been made to the existing body of literature about IOA, since the controversies observed here are different from those previously identified (Chua and Mahama, 2007; Mouritsen and Thrane, 2006). In addition, this research was carried out in Brazil, one of the BRIC countries, which are expected to become the largest economies in the world in the near future (O'Neill and Stupnytska, 2009). Thus, it is hoped that this research will be of interest as less developed countries become more important on the international agenda.



PROJECT

SUPPLY CHAIN MANAGEMENT AND MANAGEMENT ACCOUNTING

RESPONSIBLE PERSON:

Juliana Matos de Meira

SUPERVISORS:

Professor John Cullen

Dr. Jane Frecknall Hughes

February, 2008

³¹ This research protocol was written in Portuguese for the company and then translated into English.

1. OVERVIEW

This research protocol includes information which may be of interest to the glassware company. It is divided into the following sections:

SECTION	CONTENTS
Aim and research questions	Main aim of the project and the research questions
Justification	Main motivations and reasons for developing the project
Outcomes for the company	Main benefits the company will obtain by taking part in the project
Methodology	Information regarding the way the research will be conducted and the steps which will be followed
Resources and collaboration	The resources and collaboration necessary for the development of the project
References	A list with the bibliography used in the project

2. AIM AND RESEARCH QUESTIONS

The main aim of the project is to implement a supply chain management (SCM) initiative between the glassware company and one (or more) of its customers or suppliers.

In order to achieve the main purpose, the study seeks to answer the following research questions:

- a) How are supply chain relationships being managed?
- b) How can organisations benefit from the implementation of a SCM initiative?

- c) How can accounting be used for the development and maintenance of a SCM management initiative?
- d) How does accounting change in order to adapt to the SCM initiative?
- e) How does accounting contribute to the development of the SCM initiative?

3. JUSTIFICATION

Supply Chain Management - SCM has been recognised for its potential to create competitive advantages for firms. This managing model proposes that firstly, to assure its competitiveness, the firm must be seen as part of the supply chain in which it operates, and secondly, that the optimization of the efficiency of isolated links in that chain is not sufficient. Therefore, it is also important to consider the results of the other links in the supply chain in which the firm operates (Christopher, 2005; Harland et al., 2001; Lamming et al., 2000; Riggs and Robins, 1998). (Christopher, 2005)(Christopher, 2005)The achievement of synergy with all links in the chain in which the company operates permits cost reduction and optimization of results throughout the chain. In this context an environment of trust is needed, with relevant and strategic information exchange between the chain links. Management Accounting may play an important role in increasing trust in inter-firm relations (Seal et al., 2004).

On the other hand, management accounting may also have a negative influence, mitigating trust between partners, as suggested recently by Free (2008). Currently, there is no consensus in academic literature regarding the role of management accounting in the inter-organisational context. However, there is strong indication of a need for further research in relation to this discussion. Therefore carrying out this research may contribute to a better understanding of the role of management accounting in the inter-organisational context. In addition, it might contribute to better use of accounting information in this context.

4. OUTCOMES FOR THE COMPANY

- Diagnosis of the company's inter-organisational relationships with customers and suppliers.
- Proposal for improvement of inter-organisational relationships.
- Improvement of the level of stocks and of inter-organisational relationships.

5. METHODOLOGY

The research will be developed through an action research (AR) project. This method has been more and more used in the international context in Management and Accounting fields. The AR method involves both taking action and developing knowledge about the action. It is a method that brings benefits both to theory and practice and is capable of bringing improvements to companies.

Projects based on the AR method are developed in the following four stages: diagnosing, planning action, taking action and evaluating action, which leads to a new planning and so on (Adams and McNicholas, 2007; Adams et al., 2006; Rock and Levin, 2002). In this project the AR cycle proposed by Coghlan and Brannick (2001) will be used. It also includes a pre-step of context and purpose and a diagnosing stage. This cycle can be observed in the following diagram.

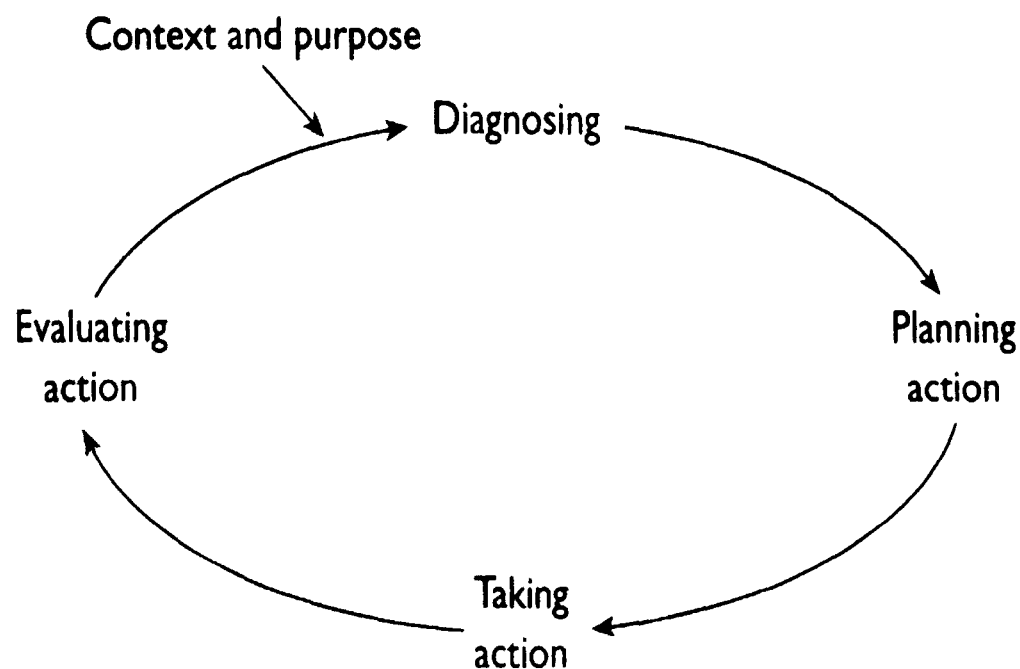


Figure 1: Stages of the project
 Source: Coghlan and Brannick (2001, p. 17)

The main activities planned for these stages are the following:

Context and purpose – Initially the production activities of the company and the inter-organisational relationships with customers and suppliers will be observed. By the end of this stage, a diagnosis will be made and presented to the company. This diagnosis will focus on understanding problems and presenting possible solutions.

Planning – In this stage, the strategic and operational plans will be presented. These plans will contain the objectives, and the activities required to achieve the desired state after taking the action (implementation of the SCM initiative). During this stage, people who will be involved in the change process will be identified.

Taking action – After the strategic and operational plans are approved, the activities protocol will be presented. This protocol will include information regarding the implementation of the action. In this stage, the plans will be implemented and the intervention will happen.

Evaluating action – The focus of the evaluation will be to verify if the previous stages were performed appropriately and how the next cycle of diagnosis, planning and action will be developed.

Throughout the Project, the role of management accounting will also be analysed.

6. RESOURCES AND COLLABORATION REQUIRED

In order to carry out the project, it is expected to have some support from the company. The support necessary is in relation to the provision or contribution to the provision of:

- Space for the researcher during some phases of the project.
- Collaboration with employees of the company related to the project.
- Engagement and collaboration with customers and/or suppliers interested in the research.

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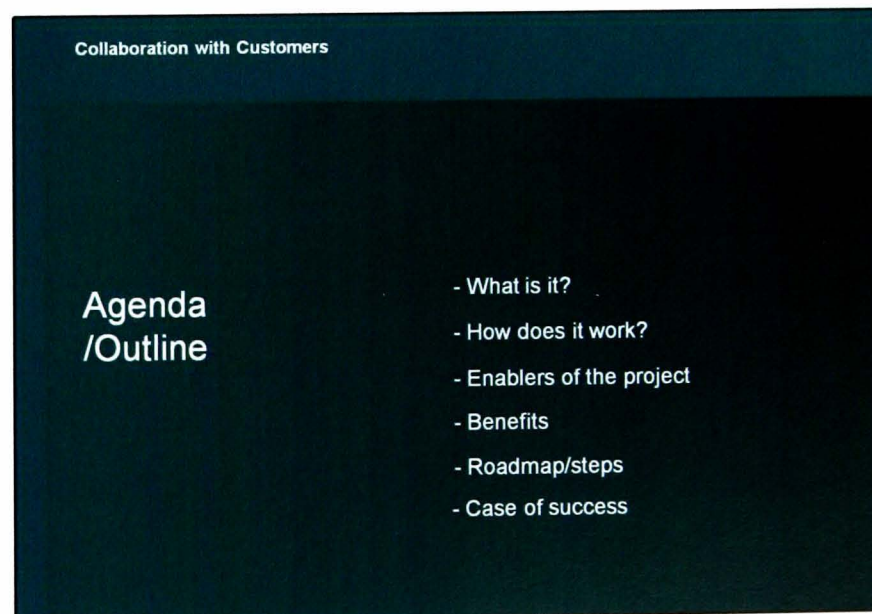
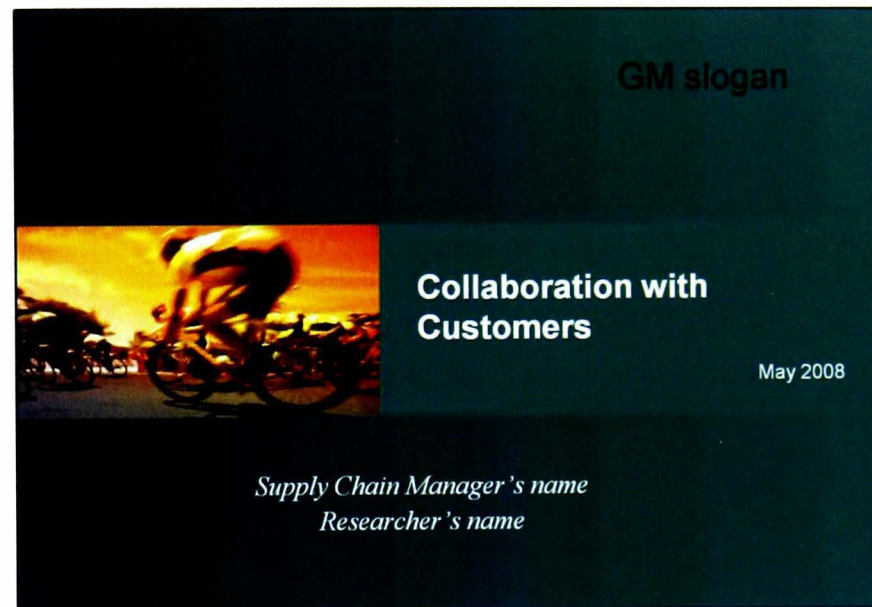
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APPENDIX 2 – FIELD RESEARCH CONTACTS

Department/Function	Contacted for
Supply Chain Department	
Supply Chain Manager	Interview/discussion
Process Analyst	Interview/discussion
Supply and Purchasing Supervisor	Interview/discussion
Production Planning and Control Coordinator	Interview/discussion
Production / Selection Coordinator	Discussion/Observation in the factory
Sales & Operations Planning Coordinator	Interview/discussion
Logistics Coordinator	Interview/discussion
Purchasing Team Leader	Discussion
Controllership Department	
Finance Director	Interview on Skype
Financial Controller (left the company in April 2008)	Interview via email /discussion
Interim Financial Controller (temporary - previously he used to be a consultant in the cost area)	Interview/discussion
Accountant Manager	Interview
Management Accounting Consultant (left the company in April 2008)	Interview/discussion
Budget and Cost Coordinator	Interview
Budget and Cost Analyst	Interview
Sales and Marketing Department	
Sales and Marketing Director - Containers	Interview
Sales Manager Non Alcoholic Drinks	Interview/discussion
Sales Manager Alcoholic Drinks	Interview/discussion
Production Development Coordinator	Interview
IT Department	
SAP Project Manager	Interview/discussion
IT Assistant	Discussion
Factory and other departments staff	
Industrial Manager - Recife Plant	Interview
Quality Coordinator	Interview/Observation in the factory
Team Leader - Factory	Discussion/Observation in the factory
Equipment and Machines Maintenance - Team Leader	Discussion
Materials Team Leader	Discussion/Observation in the factory

Expedition and Warehouse Team Leader	Discussion/Observation in expedition and warehouse
Line Chef	Discussion/Observation in the factory
Quality Chef	Discussion/Observation in the factory
Human Resources Employee	Discussion

APPENDIX 3 – PROJECT PRESENTATION



What is the Collaboration?

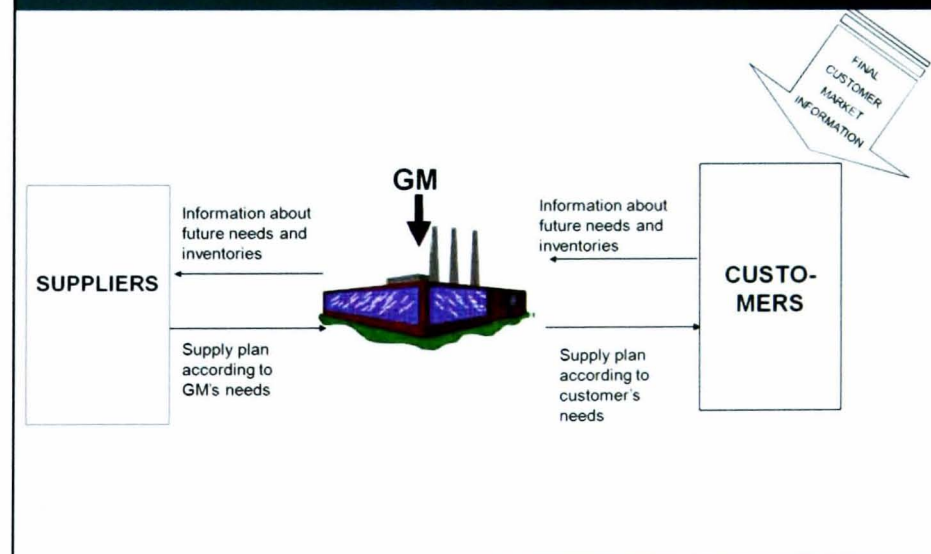
- Collaboration means that two or more companies work together, making joint decisions, sharing logistics and commercial information and costs and benefits. It has the aim of meeting customers' needs faster and more efficiently.

- Basis of the collaboration

- Trust
- Flexibility
- Reciprocity
- Inter-dependency
- Commitment
- Open communication
- Knowing the partner and
- Long term activities

Source: paper by Hugo Yoshizaki and José Geraldo Vida – Colaboração: uma alternativa para eficiência logística [translation of the title - Collaboration: one alternative to improve logistics efficiency] published in the Revista Tecnológica – April 2007.

How does it work?

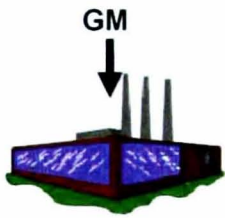


What are the enablers in a collaboration project?

- Collaborative sales forecast
 - Market sensibility
 - Promotion plan
- Inventories information exchange – VMI
 - Available stocks at the Customer
 - Inventory needs forecast
- Loading report
 - Scheduling of deliveries
 - Timetable of deliveries

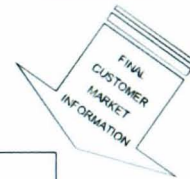
VMI – Vendor Managed Inventory

Basic assumption – Supply Contract: supply bundle definition, maximum and minimum levels of inventories and ruptures



- 1) Forecast – data of sales, future promotions and inventories
- 2) Supply Plan (volume and frequency of delivery)
- 3) Supply Plan Approval
- 4) Delivery of products

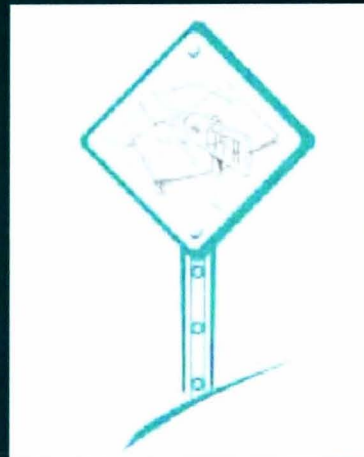
CUSTOMERS



What are the benefits of the collaboration?

- Customer loyalty, specially due to:
 - reduction of possible ruptures
 - improved communication and relationship with the customer
 - detailed knowledge of customer's needs and demands
 - faster response to customer's orders
- Homogenisation of the flow of materials over time
- Reduction of the inventories investments at GM and at the customer with consequent reduction of administrative costs and storing costs

Roadmap / Steps of the Project



- Diagnosis – analysis of how information is currently being exchanged
- Definition of scope and aims in conjunction with the customer (contract preparation)
- Preparation for the Collaboration – meetings with the staff who will be involved in the project in order to establish ways of initiating the collaboration
- Development of the enablers
- Begin of the Collaboration/Pilot Project
- Evaluation of the results and identification of future improvements

Shell Case – Aims

Aims which Shell intended to achieve with the VMI

- Seek the petrol stations' loyalty
- Reduce stock out
- Facilitate and optimise the service to the reseller
- Create a channel of mutual responsibilities

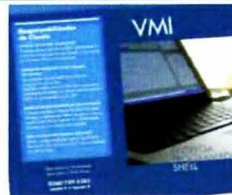
Basic assumption

Re-supply stock of the petrol stations according to their sales patterns.

Shell Case – VMI Design

SHELL'S RESPONSIBILITIES :

- Supply the petrol stations according to demand
- Avoid stock outs at the petrol stations



- 1) Send daily information of the levels of stocks
- 2) Generates Sales of Products patterns reports
- 3) Projects future sales within the patterns
- 4) Generates automatic orders
- 5) Supplies the petrol stations

CUSTOMERS' RESPONSIBILITIES:

- Send stocks data
- Inform about exception sales events, such as promotions or maintenance of the petrol station
- Maintain the agreed levels of stocks
- Don't change the orders processed




Shell Case - Results

BENEFITS TO THE CUSTOMERS

- Savings of time and money
- Avoid charges of urgent orders
- Avoid the product stock out
- Balance of the stocks

ACHIEVED RESULTS

- Value: levels of stocks reduction; stock outs reduction
- Perception: loyalty, customer satisfacion, etc



"In addition to the delivery commitment, Shell (...) added value and simplified our work"

Flávio Campos
Shell Reseller

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