

The Agora of Techno – Organisational Change

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Abstract

This thesis seeks to enhance our understanding of the Technology-Organisation (T-O) relationship by developing a novel theorization, based on the concept of the Agora of Techno-Organisational Change (ATOC). This concept is developed and examined in relation to detailed studies around a Greek Bank (GB) and a systems supplier (SIF). The thesis starts by exploring various approaches to analyzing the T-O relationship articulated from different disciplines. It identifies a number of shortcomings - linked to key theoretical distinctions/debates in social sciences (action-structure, micro-macro, global-local, T-O) and around specific issues relevant to analyzing the shaping of T-O – in relation to undertaking an interdisciplinary study of the T-O relationship. These include inconsistencies, partial perspectives and lack of conceptual integration.

Building on the Social Shaping of Technology perspective, an alternative analytical focus is suggested to capture and theorize the shaping of the T-O relationship in a more complete manner, integrating different analytical levels and perspectives of actors in differing positions and roles. Specifically, a focus on “instances of T-O change” is proposed capturing the social choices during their initiation, design and implementation, within the space between local change environments and wider socio-economic relations amongst actors (firms) within a global knowledge economy. The ATOC is approached methodologically by paralleling the analyst’s view with the actors’ views addressing the diverse ways that different actors conceive, interpret and act on options for T-O change, through social choices.

Two detailed longitudinal studies - one of a large restructuring program in GB as a particular T-O change instance and one of the involvement of SIF in the initiation, design and implementation of various T-O change instances - help explore these concepts empirically. The cases examine how instances are initiated, designed and implemented, their links to the wider ATOC environment and how they become a terrain for the emergence of social choices and viewpoints.

Empirical findings elucidate the operation of the ATOC as a practice/action space for T-O change, conceived as a networked, heterogeneous, complex multi-

actor and multi-level environment governed by market dynamics and actors' politics and actions. This highlights a set of challenges for T-O change management (complexity, distributed control, uncertainty, etc.), framed by and managed through actors' viewpoints of the ATOC. The viewpoint approach to strategic T-O change management offers a basis for the generation, rationalization, legitimation and promotion of choices, but also the foreclosing of choice (non-choices) as possibilities for action. It is also shown that such choices and non-choices arise through and contribute to processes of ATOC "particularization" and "abstraction" that link local, particular change instances with the abstract, global knowledge economy. In addition to exploring the empirical context, this thesis contributes to the analytical, theoretical and epistemological advances in the study of T&O by theorizing the action-structure and technology-organisation relationships as they are captured by the multilevel analytical framework the ATOC concept offers. Finally, given the changing epistemic as well as empirical realities, this study points towards the direction of a new sociology of T&O that embraces interdisciplinary research and epistemologies, provides the basis of building a solid academic identity for analysts and a more complete and reliable source of self-reflexive planning for industry practitioners and policy makers.

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Declaration

I declare that this thesis was composed by myself, that the work contained herein is my own except where explicitly stated otherwise in the text, and that this work has not been submitted for any other degree or professional qualification except as specified.

(Antonios Kaniadakis)

To Irene Kaniadaki

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“All knowledge of cultural reality, as may be seen, is always knowledge from particular points of view”

Max Weber, 1949: 81

CHAPTER 1

EXPLORING THE TECHNOLOGY - ORGANISATION RELATIONSHIP

1.1 INTRODUCTION

This thesis is an exploratory study on the relationship between technology and organisation (T&O) within the interdisciplinary field of Science and Technology Studies (STS). Based on two empirical case studies on techno-organisational (T-O) change in the banking industry in Greece, the thesis develops a novel theorisation, which explains the relationship between T&O as it is shaped in the space between local instances of T-O change and the global knowledge economy. This new theory is based on the concept of Agora of Techno-Organisational Change (ATOC), which represents and analytically captures a multi-actor, multi-level socio-economic environment within which actions, interactions and social choices contribute to the social shaping of T&O. With the development of this alternative theorisation of the T-O relationship the thesis aims at integrating existing analytical approaches and issues into an interdisciplinary framework in a way that would capture the changing socio-economic developments in the shaping of T&O. Therefore, this chapter sets the grounds in order to form a basis and explain the rationale and motives behind this study.

1.2 BEING A SOCIAL SCIENTIST

Based on the Weberian teachings (see Weber, 1949) that see scientists as members of the society they live in and as products of a specific historical era unable to free themselves from the values they carry, it could be argued that it is each historical era and its socio-economic circumstances that pose the important questions that analysts work to answer. The emergence of “hot” and “popular” empirical

questions and contexts and their problematisation by various theoretico-analytical academic paradigms evolves in parallel with the history of society (-ies) they emerge into. However, the way academic research and scientific paradigms shift, evolve and interact with each other during this social process of knowledge production make the relationship between the empirical context of study and the relevant theoretico-analytical and conceptual development appear extremely complex as they co-evolve throughout history. The recent focus on interdisciplinarity as a popular trend in academic research has influenced the organisation of knowledge production. The idea that each academic discipline should have their own separate research topics (i.e. social scientists should study social phenomena while natural scientists should study natural phenomena) seems to be shifting towards the idea that each topic, important enough to be scientifically addressed, should be examined by the employment of a variety of disciplines, or disciplinary paradigms. In this way many different aspects relevant to the topic in question would be addressed and explored. This also shows a direction towards the idea that a “phenomenon” that can be scientifically addressed and investigated is not only social or natural, rather it has many important aspects. Recent developments in the field of genetics constitute a relevant example. For instance, research on stem-cells is done by biologists, biochemists, genetic engineers, but also by social scientists that explore the social, economic, cultural, historical, ethical and legal implications of these developments. In general, the whole field of STS as it was developing was linked to the promotion of the idea of interdisciplinarity by aiming to show that science and technology can be interestingly studied by social scientists.

The relationship between T&O is such a research topic that has been studied in many diverse ways by a variety of disciplines and has been conceptualised in many different ways. More recently it has been placed under the interest of more interdisciplinary research frameworks, given the recent trends in the re-organisation of academic knowledge production. Analytically, throughout the years (since Marx, I may arbitrarily suggest) the T-O relationship has been empirically identified and illustrated in diverse ways, also in relation to the material and socio-economic changes in societies. Up to the 1980s, for instance, the T&O relationship was studied in relation to the activity of manufacturing - see for example from Braverman (1974),

Noble (1984) and the work of Fleck on robotics in the 1980s (1983;1984) – while more recently there is a shift towards studies on high-tech and service sectors (Fincham et al, 1994), as they have come to gain increasing importance for the economy due to the development and expansion of technology supply and its application to service industries. Additionally, the theoretical and analytical value of the T-O relationship for the understanding of socio-economic developments in contemporary societies was constructed by the involvement of diverse epistemologies (sociology, management, economics, STS, organisation studies).

Given the above developments on knowledge production and on socio-economic relations, the relationship between T&O has been discussed and explored within a variety of empirical contexts (industrial, organisational, national, international, technological, regional) and has been understood and theorised in many different ways based on various disciplinary and interdisciplinary insights, concepts and epistemologies. Although different aspects on the topic have indeed been addressed and explored by research based on different paradigms within different empirical contexts, as the socio-economic context historically evolves the study of T&O for an analyst of the present suffers from various problems. These are: conceptual disintegration, inconsistency and the knowledge that is produced is incomplete in the sense that different aspects on T&O which are addressed and explored in interdisciplinary research are not effectively integrated in order to constitute a resource of concrete scientific knowledge on a research topic. At the present time, interdisciplinary and multi-aspect understanding of a topic is a requirement that the present system of knowledge production is based upon. Studying the T-O relationship in an interdisciplinary manner, then, given the way past studies and epistemologies have evolved while socio-economic relations are historically transforming, require a reflexive examination and integration of relevant existing studies within an interdisciplinary framework. This means that there should be an attempt for theoretical, analytical and epistemological developments informed by current pragmatic trends in socio-economic relations shaping T&O.

In stating this at a more personal terms, being an active member myself of the society I live in and influenced by the socio-economic and historical circumstances of the era while in the process of shaping my academic identity, I cannot stay

unaffected by the recent developments in interdisciplinary research as well as developments in the social and economic relations I am part of. My personal journey of exploring the relationship between T&O, given my previous background as a sociologist, was characterised by confusion stemming from the diverse interdisciplinary research I encountered as part of my post-graduate training at Edinburgh University while trying to familiarise myself with the contemporary trends in the interdisciplinary field of Science and Technology Studies as they were trying to explain social and economic changes around Science and Technology. The present study, then, constitutes the documentation and elaboration of this confusion.

1.3 INTERDISCIPLINARITY IN TECHNOLOGY AND ORGANISATION

I started my PhD studies by reading the variety of available literature trying to formulate a focus of analysis for my study and possible research questions and issues of enquiry. Coming from a “pure” sociology background and a Master’s thesis on the sociology of work, technology and organisation, I first came in contact with studies on technology and society, where organisation appears as a more specific, meso-context of enquiry (macro being the societal level and micro the individual level). Issues relating to historical changes in the systems of industrial organisation and management systems (Fordism, post-Fordism, lean production, flexible specialisation, Taylorism, human resources approach) and the effects of these changes on issues interesting mostly to labour process research and organisational sociologists studying the workplace (de-skilling, unions, control, negative effects of Taylorism, workplace surveillance and control, management and politics in work organisation, etc.). In addition to the above, more issues on wide or narrow definitions of technology and on the question of technological determinism at both societal and organisational levels, came to my attention, as I was slowly exploring fundamental studies in the STS field.

Thus, I became aware of more general shifts in the understanding of technology and society and in particular a number specific contexts. From deterministic views that see technology as autonomous systems that shape social relations to more constructivist approaches that explore technologies as socially constructed and shaped. From more structural, macro understandings of technology and its relationship with society to more action-oriented, micro approaches that illustrate the actions and choices of social groups, actors and players in the shaping of technologies within certain contexts of design and implementation. From more rationalistic and managerial understandings of technology and society (organisation) to more political and processual models of inquiry. As the topic of T&O started to become the centre of more interdisciplinary research (STS, economics of innovation, theories of the firm, organisation studies and sociology, management, etc.) another distinction was brought to my attention. This distinction was between studies that focused on technological artefacts and studies that focused on organisation, whatever that meant (firm, organisational processes, organisational structure, work organisation, business models) in the context of each study. All the above dichotomies reflect differences in analytical foci and approaches to the study of technology and society in general and of T&O in particular.

Within a more interdisciplinary framework, different disciplinary commitments were making their appearance in the study of T&O. For example, some research focuses on the shifting boundaries of organisations and their external environments (organisation studies), other research focuses on markets, technology supply and the relationships between supply and use (economics, economic sociology). Other research focuses on the relationship between design and use of technologies in organisational contexts (STS). Others focus on the organisational politics of innovation (STS, technology management). Others on the role of knowledge and expertise in the shaping of technology (sociology of knowledge, STS). Others on actors' strategies (strategic technology management), and so on. This diverse attention to various issues in relation to the shaping of T&O seem to be bound to previous commitments of disciplinary research brought into an interdisciplinary framework. Their importance is undisputed for the shaping of T&O, however, for a present student of T&O within an interdisciplinary framework such

diverse studies create confusion in the sense that they are not integrated under a new interdisciplinary knowledge map supporting a solid academic and epistemic identity.

1.4 MOTIVATION AND AIMS OF THE THESIS

This analysis of relevant literature on the study of technology and society in general and technology and organisation in particular has caused me great confusion and uncertainty in relation to whether it was worth it to pursue a PhD degree in the field and become part of this perceived “chaos”, or not. I had started losing my identity and I was confused about my place within this ambiguous interdisciplinary field. Everything seemed relevant but yet vain and hopeless at the same time. In search of a theoretical and analytical approach to become a basis for a PhD study on the relationship between T&O things became increasingly confusing. The SST approach itself, although it provided some sort of integration between sociological and economic approaches, suffers from conceptual disintegration (Sorensen & Williams, 2002), which makes it difficult to proceed to concrete and confident research design decisions. This frustration pointed in the direction of trying to provide such an integration which would lead to a more complete exploration of the relationship between T&O. In doing so, original research and analysis tools would have to be developed, based on shortcomings in existing approaches, that would somehow integrate theoretical-analytical approaches into a consistent and complete template for the study of T&O. Therefore, the motivation to proceed with this study was the challenge to try to integrate previously inconsistent and disintegrated literatures within an emerging interdisciplinary field. Some initial original research design and methodological choices were made (see chapter three) but as the research was unfolding various other important issues emerged and were crystallised into what is termed here as a new sociology of T&O, in which innovative research design and methodological steps were integrated with research findings towards the building of a new theory to approach the study of T&O, from an analyst’s point of view. This new theory also provides useful insights and resources for practitioners to understand

this relationship and be able to manage the strategic challenges associated with this relationship as they emerge and are revealed by this study. In other words, the motivation and objectives of this study were to integrate previously inconsistent research, on the basis of developing a new knowledge map that would provide the basis for a new sociology of T&O that would reflect the changing socio-economic environment and present developments in T&O.

In summary, the research topic shaping the relationship between T&O as explored through a personal journey in relevant so-called multidisciplinary and multi-approach literature appears quite heterogeneous, inconsistent, unfocused, analytically distracting and with incompleteness. There is a great challenge in integrating and resolving those inconsistencies requiring innovative methodological, theoretical-analytical and conceptual advancements. This task, if achieved, will enhance the academic, analytical, epistemological and methodological identity of researchers studying T&O in an interdisciplinary manner. It will link the empirical socio-economic relations and developments with analytical transformations in knowledge production and it will also provide a more unified, complete, unbiased and reliable source of influence of industrial practice, decision making, strategic and policy planning in issues relevant to the shaping of T&O.

1.5 RESEARCH CONTEXT, METHODOLOGY AND OBJECTIVES

Speaking of socio-economic transformations and the inability of existing research to effectively and consistently link with them and address them within an interdisciplinary framework, this section will start by referring to the socio-economic and empirical context that this study will be based on. More particularly, recent developments in the banking industry and the parallel development and commoditisation of the banking technology supply industry and the way these emerge in the Greek context offer a good opportunity to study the shaping of T&O in the making. Access to a large restructuring program in a Greek Bank (GB) offered

the ground in which one case study could be designed and conducted. Later on, and while the first case was unfolding, access was gained to a systems supplier firm (SIF), around which a second case study was designed and carried out. The particular national and organisational context, its historical development and evolution and the particularities or similarities with other contexts and international trends were important and need to become visible in the course of this study. These empirical cases which refer to large or smaller scale T-O change instances reflect wider transformations in the social and economic relations around which the T-O relationship may be analytically captured and understood.

In terms of the methodological approach to the empirical field and based on the literature that I have come across, I realised early on that I had to try new things in order to move away from previous inconsistencies characterising STS as a developing field. Literature on the notion of space and time in the context of innovation (Clausen & Koch, 1999; Jorgensen & Sorensen, 1999; Heiskanen, 2003), and insights from the Social Shaping of Technology perspective (Williams & Edge, 1996; MacKenzie & Wajeman, 1999), which point to the direction towards the exploration of social and economic choices that, consciously or not, become inherent in technologies, systems or directions of innovation programs (Williams & Edge, 1996), provided a source of inspiration. I realized that I had to shift the direction of research focus away from artifacts, organizations, actions or structures and instead try to identify a new socio-economic space that would incorporate all these and make visible a more complete view of the social and economic relations that are involved in the shaping of T&O from which choices emerge. I therefore suggested a focus on “instances of T-O change” as they rise from a wider environment of socio-economic relations within the so-called global knowledge economy. Placing the social situation of T-O change instance at the centre of attention would first help develop an unbiased sampling strategy as important actors would emerge from within the instance and not chosen arbitrarily, and second, such a focus would make more visible the social and economic choices (herein identified as “social”) that shape the relationship between T&O as it appears in the empirical context of a particular T-O change instance. Methodologically and analytically, then, the shaping of the relationship between T&O was looked for in social choices made during the

initiation, design and implementation of local, particular T-O change instances as they emerge from social and economic relations of an increasingly globalised knowledge economy. In capturing the space between T-O change instances and the global knowledge economy, the concept of “Agora of T-O Change” (ATOC) was introduced.

The concept of social choice as an action influencing the relationship between T&O should not be confused here with managerial understandings of choice and action that refer to decision making. It includes decision-making and managerial choices of course but it is rather based on a more political view of social choice on the social shaping of T&O (see for example Williams & Edge, 1996; McLoughlin et al, 2000 on the role of ‘change agents’). It is examined “in the making” rather than a definite event as some constructionist (or rather de-constructionist) approaches would suggest. This way the motivations, the negotiations, the final decisions taken within a certain social situation and their legitimization and justification will be revealed in relation to social choices as actions. In other words, although it is assumed that the shaping of T&O is a product of choice and negotiation by actors, the key point is to focus not just on the outcomes of T-O change and choice but also on the processes by which these come about (see, for instance, McLoughlin & Badham, 2005:836). Based on the SST teachings, therefore, the concept of action (choice) and actor will be explored in this study in relation to the shaping of T&O.

After identifying the empirical context that was available and appropriate for the study of T&O and after developing an alternative methodological and analytical approach to it so as not to fall into the inconsistencies of previous research in the field, more particular research objectives had to be formulated that would take into consideration the particular research context. The main objective of this study is to develop a conceptual understanding of the manner in which innovation occurs in spaces between rather than within organizations. In doing so, the concept of ATOC is explored towards two directions: Firstly, as a new kind of innovation space. The two case studies empirically demonstrate the utility of the ATOC concept to revealing key dynamics, challenges, actions and choices of actors within this space ranging from local T-O change instances to the global knowledge economy. Secondly, the analytical and theoretical capabilities and potential of the ATOC

concept are explored towards the achievement of a new multilevel, integrated, interdisciplinary sociology of T&O where actors, actions and structures become more visible in the shaping of T&O.

In summary, this study suggests and empirically explores a new approach to the study of T&O with the purpose to move away from inconsistencies of previous research approaches caused by diverse analytical foci and disciplinary commitments and biases. In doing so, a more integrated and complete approach in the study of T&O is pursued by identifying and exploring a new social space (ATOC) that captures the social choices emerging from the social and economic relations between actors. In response to its initial motivation, this study points in the direction towards a new sociology of T&O. On one hand, this new sociology will provide a more solid basis for the formulation of academic identities by developing a new analytical and knowledge map for the study of T&O, while on the other hand it will provide a more complete, consistent and reliable resource of scientific knowledge for reflexive thinking, strategic and policy planning and action by industry practitioners.

1.6 THESIS STRUCTURE

Chapter two is devoted to reviewing the relevant literature in the study of T&O. Due to the epistemological and analytical objectives of this thesis various epistemologies will be examined with studies from a variety of disciplines. The review of the literature will be driven by the concerns of my integrating point of view and the changing epistemological frame in the study of T&O. This revolves around various analytical distinctions that make possible the classification of the literature in a certain manner. The criteria of reviewing the literature, then, will not be based so much on comparing findings on different empirical contexts, although this issue will be touched peripherally especially when talking about different aspects on the shaping of T&O. The criteria of reviewing the relevant literature will be based on revealing how a certain mapping of relevant literature might create inconsistencies and incompleteness in the study of T&O.

In chapter three, new analytical concepts and new methodological approaches are introduced, based on the particular reading of existing literature on T&O. It is explained how these new innovative conceptual and methodological developments will fill the gaps identified in the literature. Additionally, the research questions are presented and discussed, as well as the methods of data collection and analysis.

In chapter four, the particular industrial, international and national context of the study is discussed. Developments in international banking as well as developments in the global development and supply of banking technologies are briefly presented. Additionally, the extent to which these international developments have influenced the national environment of Greece and the Greek banking and technology supply industry is examined.

Chapters five and six are devoted to the presentation of the empirical data from the two case studies conducted in this study. In chapter five, a large restructuring effort in a Greek Bank (GB) is at the centre of analytical focus, as an instance of T-O change, while in chapter six the involvement of a systems integration firm in the initiation, design and implementation of T-O change instances is explored. In these chapters, the voices of certain actors are becoming more visible (or better, audible) in the way they develop and promote social choices.

Chapter seven revisits the empirical data and attempts an analysis of the cases and an integration of the findings. New analytical concepts are put to use and bring the empirical material in line with the purposes of the thesis. Certain issues that emerge from the case studies on the initiation, design and implementation of T-O change instances are discussed under the new suggested methodological and analytical grounds, the challenges for actors and the way they face them are also discussed and, finally, the new social and economic space linking T-O change instances with the wider environment of the global knowledge economy, captured by the notion of ATOC, is identified and explained.

In chapter eight, the conclusions that this study has reached are presented. Developments on the concepts of technology, organisation and the concept of techno-organisational are discussed, the process of managing the challenges of T-O change is theorised and finally the possibility of entering a new dimension in the

study of T&O is examined by pointing to the direction of a new sociology of T&O that integrates and embraces interdisciplinary research and epistemologies, provides the basis of building a solid academic identity for analysts and also a more complete and reliable source of knowledge for industry practitioners and policy makers.

CHAPTER 2

EMBRACING INTERDISCIPLINARITY IN THE STUDY OF TECHNOLOGY AND ORGANISATION

2.1 INTRODUCTION

This chapter will be devoted to the review of relevant literature in relation to the interdisciplinary study of T&O. The aim is to explore how empirical, but most importantly, theoretical, analytical and epistemological developments in various disciplines and research traditions in social sciences can be brought into the interdisciplinary study of the relationship between T&O. I am questioning whether existing research and analytical approaches from various disciplines that have been (or could be) seen as part of the interdisciplinary field of STS is adequate in addressing current issues and developments regarding social and economic relations involved in the shaping of T&O. The literature reviewed here does not necessarily address the T-O relationship. The issues it raises, however, and the way technology or organisation analytically appear in various approaches, as well as the way contexts and actions are addressed, are very relevant in understanding the T-O relationship and its shaping. A student of the present that wants to study T&O in an interdisciplinary manner within STS comes across these issues and approaches, which should be integrated, into a new interdisciplinary knowledge map pointing towards a new sociology of T&O.

The purpose of this literature review is not to criticize existing literature on the grounds of identifying certain flaws and suggest an alternative way in which certain studies could have been conducted. The purpose is rather to provide a certain reading of the existing relevant literature available to a student within the STS discipline in order to illustrate the need for a changing epistemological frame, a theory that integrates the inconsistencies identified by such a reading. This, in turn, will provide a basis for addressing and exploring recent developments on the social

and economic relations that shape T&O in an interdisciplinary manner. Thus, the value of the literature reviewed here is not questioned *per se*. Rather I aim to add value to existing and future literature by emphasising the need to place the issues that they raise within a new knowledge map that theorises, analytically captures and empirically addresses current social and economic developments. In this way, the concept of interdisciplinarity will be embraced and treated as an analytical tool in itself, rather than treating it as a 'ghost concept' or as a 'black-box'.

The exploration of the relevant literature will be linked to key theoretical and analytical distinctions/debates in social sciences. More particularly, issues on action-structure, micro-macro, global-local as well as the 'technology-organisation' distinction are discussed and the way they appear in STS literature. In addition, attempts for transcendence of such dichotomies towards their more efficient use is also examined. Finally, special attention will be given to the ways social choice, action and actors appear in this literature.

2.2 ACTION-STRUCTURE, MICRO-MACRO or GLOBAL-LOCAL?

Given my sociology background, in the beginning of this research and with a wide understanding of literature in the area of sociology of work, organizations and ICTs, I had a relatively weak engagement with the bulk of interdisciplinary research on technology and organizations. Inevitably, my first reading of the relevant literature was based on "pure" sociological analytical distinctions of action-structure and micro-macro.

The action-structure dichotomy constitutes a criterion of differentiation between grand theoretical traditions in social sciences as they developed based on opposing principles and perceptions relating to action-structure and micro-macro distinctions. Examples of such opposing traditions are structural-functionalism, which focuses on structure and the macro level, symbolic interactionism focusing on action at the micro level of interaction between individuals, while more recent paradigms, such as postmodernism, tend to neglect any kind of analytical distinctions of that kind (see

Craib, 1984). Apart from the theoretical perspectives focusing on agency, those that emphasize structures and those that completely ignore the action-structure dichotomy, there are also theoretical attempts to study action and structure together as important elements to the constitution of “the social”. Such a perspective is the so-called “structuration theory”, the brainchild of Anthony Giddens (1976; 1979; 1984).

Giddens’ overall purpose and ambition has been to “put an end” to each of the “empire-building endeavors” of functionalism/structuralism on one hand and hermeneutics/interpretivism on the other (Giddens, 1984:2). In other words, Giddens believes that functionalism/structuralism is too macro and hermeneutics/interpretivism too micro (Taylor et al, 2001:31) and therefore, his major purpose was to integrate and unite these two different grand paradigmatic epistemologies into a more holistic analysis of social phenomena. In doing so, Giddens develops a theoretical scheme that describes the constitution of the social as a process in which both structure and human action are involved and produce and reproduce each other. Thus, he rejects the *dualism* (separating the macro from the micro world) as a basic principle of sociological theory development and he replaces it with *duality*¹. The term structuration signifies the process by which structures lead to the constitution of social systems (Mouzelis, 1995:118). In this research the issue of theorising action and structure in a specific context of research, will be explored. Besides Giddens, other contemporary theorists have produced significant accounts on the production and reproduction of social relations based on some interpretations of the action-structure dichotomy (see for instance Bourdieu, 1977 and Habermas, 1984; 1987).

In Giddens’ work the action-structure dichotomy has been closely associated with the micro-macro analytical distinction, thus, identifying structural accounts as more macro while action-oriented accounts are more micro. However, Mouzelis (1995) gives a more sophisticated explanation of the need to link micro and macro sociologies. He argues that the attempts to bridge the micro-macro gap in sociology, like that of Knorr-Cetina (1981), are “a truthful reflection of the overall failure of

¹ The constitution of agents and structures are not two independent processes, as dualist accounts would argue, rather the *duality of structure* implies that structures are not external to individuals (Taylor et al, 2001:34), in other words, they are inseparable from the agent's conduct (Mouzelis, 1995:118).

theoretically oriented micro-sociologists to deal satisfactorily with the major flaws of Parsons' middle and late work, particularly with its under-emphasis on macro actors" (Mouzelis, 1995:24). This failure, Mouzelis continues, is due to not taking into serious account (a) macro actors, whose unequal access to the major economic, political and cultural means of social construction enables them to take decisions stretching widely in time and space; and (b) the complex social hierarchies that, via formal organisations or otherwise, link micro, meso and macro actors and encounters (ibid.). Mouzelis does not demonise the distinction itself, as long as micro is not linked to agency nor macro to structure (ibid:155). As he puts it, "whether we are dealing with actors/interactions or institutional structures, macro refers to cases where the impact of institutionalised rules (when instantiated) or actors' practices stretch widely in time and space; micro applies where this impact is very limited" (ibid.). Mouzelis, then, identifies correctly the differences between macro and micro levels as differences in the scope and range of influence that a social whole might project and not as differences between action and structure. The hierarchical nature of social wholes is, according to Mouzelis, what links the micro, meso and macro levels. They must be viewed both from a systemic/institutional and agency perspective (ibid:26). The hierarchical nature of social wholes that Mouzelis suggests as an alternative focus of research, might be seen as referring to the different positions of different actors within a social whole and their access to rules and resources and to mechanisms of power.

The tension between the micro and the macro, within the frame of SST and in the sociology of technology in general has been associated with the distinction of *global-local* (MacKenzie, 1988; Williams, 1997a; Law & Callon, 1992). Academically, global-local has been conceived both as an analytical but also as a practical issue and has taken the form of a paradox in STS, the so-called: *global-local paradox*, which has been flagged as follows:

"In the recent past, attention has been focused on Information Technology (IT) which offered powerful tools for rationalisation and automation of work activities, based upon 'universal' mathematical principles, that were expected to have widespread applicability across the widest array of firms and occupations. In contrast to such expectations, recent empirical research points to the continued

importance of contingent and local factors, arising for example from specific features of the organisational setting, which impede the search for universal solutions” (Williams, 1997a:170).

There is an emphasis on the local construction of the world the same time that globalisation have made some kinds of technologies, management techniques and economic forms and relations more or less universally available. In general, the micro-macro analytical distinction in the age of globalisation and in the field of STS appears in the form of global-local where micro is associated with local circumstances and settings and global with elements and contexts of universal range and scope. It is challenging both to try to conceptualise how the global and the local might be usefully incorporated in an analytical framework and also to practically manage it in relation to the management of technical change (MacKenzie, 1988).

In the field of STS, more particularly, influences by the action-structure and micro-macro debates can be identified, meaning that some works have followed a more macro, structural approach to the study of technology and its contexts, while others have followed a more action-oriented, micro approach. Intellectual traditions in the study of T&O, therefore, have also inherited the challenges posed by the dichotomies discussed above. Studies influenced by the neo-institutionalism tradition, for example, could be seen as structural, macro or meso approaches, while studies following a more constructivist approach, such as Social Construction Of Technology (SCOT) and Actor-Network Theory (ANT) could be seen as actor-oriented approaches.

2.2.1 Neo-Institutionalism

An epistemology departing from a structure-oriented focus is the so-called neo-institutionalism, which refers to the revitalisation of institutional theory in the past few years and it has claimed attention from a large and growing circle of organisational researchers (Scott, 1994:81). Neo-institutional theorists agree with Weber's observation on the homogenisation of institutions and support the view that

bureaucracy has spread continuously since he wrote. They argue, however, that the engine of organisational rationalisation has shifted from: competition among capitalist firms in the marketplace; competition among states, increasing rulers' need to control their staff and citizenry; and bourgeois demands for equal protection under the law, the most important of which was the competitive marketplace to: the *structuration of organisational fields*², a process that is affected largely by the state and the professions, which have become the great rationalisers of the second half of the twentieth century (DiMaggio & Powell, 1983:147). Homogenisation, then, comes from powerful forces that lead organisations to become similar to one another once they are structured into an actual field (ibid.). Neo-institutional theory, thus, was developed out of the need to explain the identified process of homogenisation, and not variety among organisations, which process is best captured by the concept of *isomorphism*. The above ideas are conveyed on the assumption by neo-institutional perspective that in modern societies, cultural beliefs are more likely to be promulgated by specialised bodies such as professionals and by formalised agencies of the state (DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Scott, 1994), although the centrality of the role of the state as a source of institutional innovations promoting economic growth has been questioned in search of other regional and local factors that affect the institutional environment (Hopcroft, 1998).

Also, recent neo-institutionalists have come to acknowledge the importance of both formal and informal rules and relationships in economic action. Mark Granovetter (1985), argues that economic action is embedded in interpersonal relations and subject to informal rules. However, increased recognition of the role of formal rules is essential, neo-institutionalists argue, for the analysis of economic action (Brinton & Nee, 1998). In an attempt to summarise the main observation within the neo-institutional perspective, Meyer (1994) argues: "Overall, the institutional image of modern organisational life suggests organisations that are (a) somewhat ritualised; (b) internally decoupled; (c) isomorphic with environmental patterns and rules in their identities, structures, and activities; and (d) showing

² By organisational fields, Powell and DiMaggio mean those organisations that, in the aggregate, constitute a recognised area of institutional life, such as, key suppliers, resource and product consumers, regulatory agencies, and other organisations that produce similar services or products (1983:148).

broadly isomorphic patterns of change over time following very general environmental rules" (Meyer, 1994:34).

One problem with neo-institutionalism has to do with their methodological approach. Since they focus on the institutional level, they do not give emphasis on the role of actors, rather they emphasise rites and symbols as more powerful, that they go beyond conscious choices of rational actors (Clausen & Koch, 2002). They see concepts and stable "recipes" as important in their analysis and for the process towards isomorphism (ibid.). Finally, the main bulk of the resources that they use in their analysis comes from literature studies, as they argue that a literature review will quickly reveal a bundle of elements which is recurring in most contributions and which can be claimed to be the core of the concept that they study (ibid.). Neo-institutionalism, then, is a theoretical perspective that places emphasis more on the structures and institutions, or better on the process through which structures and institutions are crystallised and become similar to one another. On the other hand, they neglect actors as not being very important in the process towards isomorphism. A more elaborate critique of neo-institutional perspectives in relation to the concept of organisation, its environment and how actors can become more visible in innovation processes will be attempted here.

2.2.2 Social Construction Of Technology

Actor-centred theories have a different focus. SCOT, for instance, evince a general commitment to "opening the black box" of technology for sociological analysis (Grint & Woolgar, 1997:19). This means that social analysis must take into account the technology itself or take seriously the content of the technology (ibid.). In terms of methodology, then, the SCOT approach proceeds with its analysis "outwards", from a specific technology to the context shaping it (Williams & Edge, 1996:870). The SCOT approach, therefore, is an artefact-based approach, which focuses on the developmental process of a technological artefact, described as an alternation of variation and selection, where the crucial role is played by the "relevant social groups" that are concerned with the artefact (Pinch & Bijker,

1984:411-414). In other words, technological artefacts are described as social constructs. The key requirement, Pinch and Bijker argue, is that all members of a certain social group share the same set of meanings, attached to a specific artefact (ibid:414). Typical social groups that are associated with the development of a technological artefact may include engineers, advertisers, consumers etc. (Kline & Pinch, 1999:113).

SCOT emphasizes the "interpretative flexibility" of an artefact, meaning that different social groups may associate different meanings with artefacts leading to interpretative flexibility appearing over them. The same artefact can mean different things to different social groups or users (ibid.). Interpretative flexibility, however, does not continue forever, rather "closure" and "stabilisation" occur such that some artefacts appear to have fewer problems and become increasingly the dominant form of the technology (ibid:113-114).

The SCOT perspective is influential to studies of use and implementation of technologies within organisations (Jackson et al, 2001). Scholars from various disciplines employ constructionist approaches in order (a) to provide a framework for understanding ICTs in the workplace and (b) to provide guidance for designing and implementing ICTs in organisations (Jackson et al, 2001). Some major assumptions of SCOT, common in all of these studies are: (a) Constructionism denies technological determinism; (b) Constructionism recognises the interplay and interdependence of social and technical elements; (c) Constructionism denies that technologies are ever complete - this is valid also when talking about organisation; and (d) Constructionism redirects attention from products to processes (Jackson et al, 2001).

SCOT approach also reveals weaknesses. As Kline and Pinch (1999) argue "...SCOT, as originally conceived dealt mainly with the design stage of technologies. The notion of closure was a little too rigid. What was missing was a sense of how and in what circumstances the 'black box' of technology could be reopened as it was taken up by different social groups"..."SCOT, as many commentators have remarked, said little about the social structure and power relationships within which technological development takes place. A related concern is the neglect of the reciprocal relationship between artefacts and social groups. We agree that it is

important to show not only how social groups shape technology, but also how the identities of social groups are reconstituted in the process" (ibid:114).

2.2.3 Actor-Network Theory

ANT refers mainly to the research program led by Michel Callon and Bruno Latour at the Ecole des Mines in Paris (Williams & Edge, 1996:870). ANT like SCOT is focused on the local actors and how they create social structures. This approach, then, focuses upon the practical constructions (through negotiations) of the alignments between social and technical aspects where analytic divisions between the social and the technical are explicitly prohibited (Grint & Woolgar, 1997:28). ANT proposes that power entails the construction and maintenance of a network of actors, which networks involve both human and non-human actors, or "heterogeneous entities that constitute a network" (ibid.). Thus, both humans and non-humans are to be included in the analysis. The Actor-Network approach to technology, as Grint and Woolgar argue, attempts to transcend the distinction between the social and the technical, which re-emerges in the guise of technicism in many of the attempts to fashion alternatives to technological determinism (ibid:30).

There is a great volume of studies based on the assumptions of the ANT. While the early studies of ANTists³ involved micro-level studies focusing upon R&D and scientific laboratories where the broader institutional context is fluid, more recent work has shown interest in the relative stability of certain structures, fact that reveals the need of the ANT approach to engage with other traditions in the field (ibid.). On such example is given by Law & Callon's (1992) study on the Tactical Strike and Reconnaissance 2 (TSR.2) project where the authors allow space for structural factors that influence the shaping of the examined technology. Law & Callon refer to the issue of micro-macro in the form of linking the global with the local. Their actor-network template attempts to capture the tensions between the

³ Early studies are often based on "invented" cases (see for instance Latour, 1988) and they announce a scepticism about the nature and influence of broader social and economic structures of power and interests, insisting that actors create the world anew and that technologies are malleable to local actors (Williams & Edge, 1996:870).

global and the local and explain how these two levels can be linked in the development of a technology by using a network vocabulary. They speak of “global network” and “local network” and of “obligatory point passage” linking them. Although this template tries to incorporate a more multilevel conception of the world, it is rather limited as there are many things that remain unexplored, such as actor’s decision-making processes. Additionally, they do not capture the limits or the boundaries of an actor-network leaving the impression of uncontrollable and unlimited expansion. As Russell & Williams say: “When implementation and use are taken into account, the range of social groups involved and affected by technological change expands enormously, going far beyond anything recognisable as a technological community” (Russell & Williams, 1988:6)⁴. This means that the actor-network expands in a way that makes it difficult to handle analytically within an ANT framework. There is also a danger in projecting the relationships found in a R&D laboratory, that is to say into the micro level of analysis, more widely than appropriate onto the broader structure of society, that is onto the macro level of analysis (ibid:7). For ANT, macro-structures can only be explained by extrapolation from micro-processes of interaction between individual social actors, thus, society and the analysis of society is constructed from the bottom upwards (Russell & Williams, 1988:1). This theoretical and methodological approach of the ANTists has been highly criticised as carrying all the problems and dangers of an approach that attempts to explain the macro through the micro. There is nothing wrong to study the micro and try to explore how the macro can be found within the micro, but one needs to realise that not the whole macro can fit into a particular micro. An account of the whole macro and how some of it can be seen as enacted at a micro level is, therefore, needed, something that ANTist studies do not do.

2.2.4 Attempts to Resolve Analytical Dichotomies

Epistemologically speaking, the tensions and inconsistencies between actor centred and structurally oriented accounts or accounts focusing on the micro or

⁴ The same can be argued against SCOT in that it cannot delineate ‘relevant social groups’ in any but artefact-centred way and basically becomes a ‘stakeholder influence’ analysis of artefacts.

macro levels, or global-local, initiated work that attempts to transcend such dichotomies or make a more efficient use of them. There are examples of different engagements with the above distinctions which seek to achieve a more fruitful accommodation of such distinctions. Such attempts were developed based on their criticisms on more traditional work in the field, which appears as inconsistent and incomplete due to a unilateral focus on certain levels or actions and structures. One example from organisation studies is the adaptation of Giddens' structuration theory to the analysis of technology development and use in the context of organisations. Two significant works in this tradition are from Orlikowski (1992; 2000)⁵ and DeSanctis & Poole (1990; 1994) and their Adaptive Structuration Theory⁶. Additionally, Edinburgh based SST work has been developing by stepping on analytical flaws of previous, early studies on technologies and their context of design and use. Their treatment of such analytical issues along with the emergence of new hot topics in social sciences, such as globalisation, knowledge economy and society and so on, has given them a new context of conceptual development and empirical use. Russell & Williams (1988), for example, in their attempt to establish the SST approach and differentiate it from other approaches in the sociology of technology, criticise heavily the ANT approach in terms of its methodological and analytical focus, thus, revisiting the issue of micro-macro. They suggest an "interactive model" of the relation between general context and action. As they say, this is the key to overcoming the separation of micro and macro approaches to understanding technology as a social product, with different but consistent forms of analysis appropriate to each, rather than an application of the same action concepts regardless of level (ibid:26). The micro-macro problem is a fundamental one. Explaining the macro through the micro and the opposite involves risk when happening without

⁵ Wanda Orlikowski (1992; 2000) stresses that structures emerge from repeated and situated action and that structures are enacted in recurrent use of the technologies. With the term "technology-in-practice" (2000) she also suggests that the design of technologies is continuing when technologies are used in various organizational settings since new structures are enacted in different use contexts.

⁶ "Adaptive structuration theory" (AST), introduced by DeSanctis & Poole (1990; 1994), outlines a set of appropriation processes through which a technology comes to be constituted differently by different groups of people. The terms *faithful appropriation* and *ironic appropriation of technology* for instance refer to the difference between intended and unintended uses of technologies in different environments.

specific limits and conditions under which some structures and relations are explainable through some others that can be identified into different contexts. Russell and Williams are right in their critique but micro-level studies and attempts to extrapolate from the micro in order to explain the macro should not be rejected all together as long as this extrapolation takes place within certain conditions and limits even if these conditions are constructed in order to serve analytical purposes. A more sophisticated integration of these levels is sought in this study.

2.2.5 The Social Shaping of Technology

The above distinctions and their analytical interrelation creates problems with the theorisation and identification of social action and social structure, in terms of the difficulty and the inconsistent way of identifying and accounting for different actions or structures. The Social Shaping of Technology (SST) approach attempts to combine accounts like SCOT and ANT with structural accounts in highlighting the social choices and options, as well as the structural and cultural constraints, in the development, adoption and use of technology (Graham et al, 1999:2). SST emerged from a convergence of various different analytical traditions e.g. technology policy studies, Sociology of Scientific Knowledge, Labour Process theory and Industrial Sociology, Evolutionary Economics all involving a common concern that the form of technologies were amenable to and indeed required socio-economic analysis and explanation (Williams, 1997a:171). Hughes (1983), for instance, in his attempt to explain his notion of *socio-technical systems*, stressed the socio-economic influences upon technical choices and the material basis of social action (Williams, 2002:5). This multiplicity of disciplinary traditions that SST derives from, however, has not yet been integrated into a single, unified explanatory schema (ibid.) in a way that efficiently incorporates concepts of action and structure, micro and macro. Reasons for this lack of integration include the rate of change in our understanding of the relationship between technology and society; the variety of concepts that are not characterized by general applicability; the search for more comprehensive accounts

of the settings of innovation; and the variety of authors from different backgrounds that have been drawn to contribute to the field internationally (ibid:5-6).

The conceptual gap between actor-centred and structural accounts that the SST approach attempts to bridge by the articulation of a variety of new concepts appears disjointed since the field suffers from a lack of integration in its overall conceptual development (ibid:8). In recent accounts within the SST approach, for instance, authors attempt to address the interplay between local actors and broader structural conditions in technological innovation, but in distinctive ways given their intellectual traditions (ibid:7). Rip & Schot (2002), for example, deriving from generalised evolutionary economic accounts of 'selection environment' focus 'down' from recognition of broad technology regimes to see how the circumstances for regime shifts are created (Williams, 2002:7). Jorgensen & Sorensen (1999) drawing on ANT seek to retain its focus on local negotiability while extending it to understand technology development within globalised settings where a number of actor-worlds and networks interact (Williams, 2002). The attempt of studies within the SST approach to integrate structural with action-oriented accounts appears to be difficult. This is because of the intellectual and conceptual confusion and different foci of research on different spaces, occasions, social situations. These bring about different issues but without providing a model that could capture social action and social structure within a multilevel and multidimensional environment in a consistent way away from further disintegration.

There is a gradual realisation and maturity of the idea that the development of analytical templates and accompanying concepts and metaphors are needed in order to capture social and economic relations in the development and use of technologies. These new templates will prevent analyses from falling into the traps of dualistic distinctions; rather, use them more effectively. In technology studies, in particular, there is also the distinction between the "social" and the "technical" that new concepts are trying to capture. Concepts and theories are developed, conceptual boundaries, actors and contexts are re-defined, social, technical elements and resources are identified and socio-economic relations re-examined. Such concepts include: "regime" (see Nelson & Winter, 1982; Geels, 2002), "socio-technical ensembles" (Bijker, 1995), "socio-technical constituencies" (Molina, 1990), "socio-

technical systems” (Hughes, 1983), “technological frames”(Bijker, 1995), “development arenas” (Jorgensen & Sorensen, 1999). These are just some of the terms that capture and integrate different actions, structures, levels and resources. They also pattern various diverse processes in the development of technologies.

The action-structure, micro-macro and global-local debates have been associated, although not exclusively, with the study of T&O posing challenges to analysts. It seems that in the STS field the current milestones for a successful research are: to take into account both the significance of action and relevant actors but also structural constraints and contexts, to produce a multilevel analysis by both accommodating macro and micro approaches and also capturing the processes that link global trends and developments with local settings and circumstances. Such requirements accompany current interdisciplinary research in SST that point towards multilevel, multidimensional and multi-aspect research.

2.3 TECHNOLOGY – ORGANISATION RELATIONSHIP: DECISION-MAKING AND SOCIAL CHOICE

In this section, the discussion on social action and structure is deepened by exploring social choice and how it has been accounted for by various theoretical approaches in relation to the shaping of T&O. At this point, social choice is conceived as a particular conception and expression of social action in the context of shaping of T&O. The diverse ways various approaches treat social choice and action in relation to T&O illustrates the need for conceptual and analytical integration. The section will refer to managerial approaches, their shift towards more political and processual approaches, the strategic management of technology literature and theories of the firm.

2.3.1 Managerialism

This tradition can be seen as a number of finite programs of work transformation that have been produced and applied in industries and other workplaces in order to achieve the best way of organising the labour process and make the best out of the various resources available to firms, such as technology, the human factor, etc. The major characteristic of this tradition is *rational efficiency*, which implies that the logical basis of action is held to reside with management. Effectiveness becomes synonymous with management effectiveness, while employees who restrict or oppose such action are frequently held to be acting irrationally, governed by a 'logic of sentiment' rather than one of efficiency (Thompson & McHugh, 1995:12). In this context, social choice could be considered as a top-down rational process of decision-making. The so-called "scientific management" or "Taylorism", as well as more human-centred views regarding work organisation such as the "Human Relations" and the "Human Resources" approaches up to the post-Fordist and post-Taylorist models of lean production and flexible specialisation, may be considered as finite programs within the managerialist tradition (for all these see Kaniadakis, 2001).

More recently, new management programs such as Business Process Reengineering (BPR), emerge (Hammer & Champy, 1993) following strategies widely espoused within Business Schools and promoted by consultancy firms (Clausen, 1996). It has been argued that BPR has been practiced as a formal discipline since the early 1920's when it was known as "Methods and Procedures Analysis" and that it has been recently re-invented under a new title becoming very fashionable (Strassmann, 1995).

As is evident, a shift in management thinking has been identified. The mainstream organizing principle, which used to be *efficiency* has now changed to more processual models. The new principle is *innovation-design* with efficiency considered as a significant subset (Clark & Staunton, 1989:19). Along with the development of this new mainstream, organizational scientists have come to acknowledge the balancing and interpretation of various levels of analysis as methodological and analytical tools. Clark & Staunton (1989) argue:

"...organizational scientists have to extend their analysis from the micro level of the organization into the institutional and international levels, and to consider the impacts of long-term techno-economic paradigms" (ibid:45). Despite this shift, traditional managerialism is considered with structural changes in the dominant models and programs of T&O that are reflected into management's actions, while local action and particularities have come to gain importance only recently.

2.3.2 Linking Strategic Technology Management and Corporate Strategy

The tension between micro-macro and action-structure in managerialism, and more particularly, in the strategic technology management and policy literature, takes the form of trying to align technology strategy and policy with the overall business strategy of a firm. Strategic management of technology literature has been struggling since the 1980s to incorporate technology strategy into the overall corporate strategy of a business organization. In doing so, these literatures try to find ways to account for the role of technology and technological innovation within the organizational structure and processes of a business firm in their attempt to conceptualize strategic technology management as part of the overall business management of the firm. Robert Cooper (1984) was one of the first researchers in the early 1980s to provide a link between corporate strategy and company innovation performance, while most previous studies focused on the relationship between the actions firms took and innovatory outcome (success or failure), and paid little attention to the strategies underlying these actions (Rothwell, 1992:230). Cooper's integrated strategy account concludes that there is not a single strategy but a packet of strategies, a marriage of technological prowess, a strong marketing orientation, the search for differentiated advantage and a willingness to accept risk, are strategic attitudes that appear to be the key to a high performance program (Rothwell, 1992:231-232). Other writers started following this approach. Steele (1991), for example, argues that technology strategy is a central and pervasive ingredient in the concept of an enterprise, meaning that technology must play a central role in strategic planning, addressing the fundamental

questions of how to establish a sustainable competitive advantage and how to ensure the survival of an enterprise (in Rothwell, 1992:233).

As the importance of an integrative approach to strategy was becoming commonplace, various studies were conducted supporting it. Different authors, however, have different views and focus on different aspects of technology and corporate strategy. Ford (1988), defines the task of technology strategy as the exploitation, development and maintenance of the sum total of the company's knowledge and capabilities (in Husain & Sushil, 1997:541), Roberts (1989), however, focuses on the importance of linking and leveraging internal technology with an increasing number and variety of external technology sources (in Husain & Sushil, 1997:544). Also, Prahalad & Hamel (1990) see technology as one new dimension of the core competencies of a company (in Husain & Sushil, 1997:545), while Langowitz (1992) focuses on the long term discontinuities from consecutive changes stressing the inevitability of change and how firm leadership should adapt to that inevitability (in Husain & Sushil, 1997:544). Finally, Green (1995) stresses the role of management in supporting R&D projects as part of technology strategy while Pavitt (1990) suggests that the successful management of technology requires the capacity to orchestrate and integrate functional and specialist groups for the implementation of innovations, continuous questioning of the appropriateness of exploitation of existing technology and willingness to take a long view of technological accumulation within the firm (in Husain & Sushil, 1997:541).

All authors above stress different aspects of strategic technology management. All of them, however, try to see it as part of the overall business and corporate strategy of the firm. Despite the fact that this integration is desirable, the above accounts still view technology as analytically distinct from the organisation although they define it in different ways and even though their definitions include organisational elements. In the context of technology strategy, social choice and action is diffused amongst various organisational contexts and activities of the firm. There is an issue of legitimization of choice in this context, which could provide the link between technology strategy and overall business strategy.

2.3.3 Politics and Organisations (Political Process Approach)

The shift in management thinking towards more processual understanding of organizations has led to the development of work that focuses on the political nature of these processes. This can be traced back to the sociological approach to organizational studies articulated from the 1950s by Burns & Stalker (1961). Their research on the management of innovation sets the grounds for a more contingent and political understanding of organizations and innovation. Burns & Stalker questioned traditional understandings of management, based on a hierarchical, functional division of labour and knowledge, termed as “mechanistic organization” and highlighted the importance in innovatory settings of “organic organization” models where tasks are more fluidly defined and communication between individuals and groups can be direct, across organizational boundaries rather than being channeled through the organizational hierarchy (Burns and Stalker 1961). In this model, they placed attention to the role of organizational politics. Burns & Stalker understand organization as ‘work organization’ consisting of system management and the activities carried out and a political system and a status structure (1961:97). More generally this work signifies a more complex understanding – criticizing dominant unitary conceptions of the firm with a single shared managerial goal, and recognizing the existence of political interest groups with different agendas. Political behaviour is here seen to have its roots in the management system (demands for resources and control of other people) as well as in the status system (promotion, rewards, etc.) (1961:144-145).

A further important contribution to analyzing social choices in the midst of organizational politics is the work of Child (1972), who criticized attempts to find a simple fit between organizational tasks and management structure and instead points to the source for strategic choice. Child sees strategic choice as an interpretive process by organizational leaders who possess the power to enact their interpretations as plans and directives that structure the organization. He points that organizational leaders are as likely to be affected by broadly normative, ideological and political considerations as are that of any other organizational group or member.

This suggests a notion of politics that goes well beyond simple self-interest to include distinctive perspectives or beliefs about how people and organizations 'should' work. Child, then, includes the external social and political environment as influencing strategic choice through its interpretation and its political enactment through organizational leaders. In this sense, the external factors influence strategic choice not in a determining way; rather, they act as contextual referents for decision makers (McLoughlin & Harris, 1997:9), bringing the external environment into organizational politics. Later research tends to emphasize the importance of choice in the social shaping of technological change with attention to questions concerning the nature and role of management strategy, the influence of trade unions and collective bargaining, and the capacity of workgroups to influence changes in the organization (see Boddy & Buchanan, 1983; Wilkinson, 1983; Child, 1984; Clark et al, 1988).

Based on such studies, there has been a recent revival in interest in the subject of organizational power and politics opposing to more technocratic views and approaches which neglect conflicts, hierarchical power, managerial control, effects of networking (Hislop et al, 2000). This has been crystallized into a new approach emphasizing the role of politics and political processes in innovation, which in turn draws on a variety of disciplines. This has been termed as "political process approach" under the common research theme of social and political shaping of technology, which has produced studies on choice, design, development, implementation and operation of new technologies and working arrangements (Dawson et al, 2000:5). The political process approach is attempting to reveal the "political" processes of innovation management, the unseen power-plays in arenas of conflict and resistance, by employing a broad definition of politics. Such a definition includes elements of culture, historical legacy of past events, and the social construction of a dominant discourse around technology and change, as opposed to traditional notions of politics as class division and control, or representations of manipulation, vested interests and consents (Dawson et al, 2000:5).

This approach draws on various traditions of research. The Scandinavian tradition for working life research represents an action-oriented approach to political processes oriented towards strategy and on the facilitation of a 'democratic dialogue' on the design and use of technology at work (Dawson et al, 2000:6). The industrial

sociology tradition, which was caught in the struggle created between the works of people such as Blauner (1964) and Woodward (1958) on one hand and Braverman (1974) on the other in regard to the up-skilling and de-skilling theses (see Kaniadakis, 2001:39-46). Wilkinson (1983) and his followers, industrial sociologists and labour process adherents, began, however, to consider technological developments as a political process in their own right (Dawson et al, 2000:7). Another tradition the political process approach draws on is organizational theory and management studies, which characterize workplace change as a rational staged series of events or posit contingency views on technology and change (Dawson et al, 2000:7). Finally, it has been influenced by the developments in the area of sociology of technology and the emergence of constructivist and actor-network approaches and their constant and persistent critique of technological determinism (Dawson et al, 2000:7-8). These approaches see politics as negotiations between diverse actors across established organizational borders and also as transformation and development of actants/actors (Dawson et al, 2000:8).

The work of Pettigrew (1985) falls into this category. Apart from its general magnitude in the field of organization science, this is also a work illustrating the importance of organizational politics and political processes in organizational change and development. Pettigrew discusses decision-making in the context of organizational change by distinguishing between a strategic level of change and an operative level of change, where the former sets the constraints of the latter. He sees change events as part of '*ongoing processes of continuity and change*' (Pettigrew, 1985:26). He argues that strategic change flows in waves whose peaks are short periods of major reorientation followed by long stretches of institutionalization and relative stability (Barley, 1987:177). This periodicity of organizational transformation, on one hand, along with the *ad hoc* nature of changes, on the other, questions the role of managers as foresighted planners of strategic direction (ibid.). What makes the political character of organizational development more visible is that Pettigrew views it as a "social movement", where consultants, for instance, appear as opportunists who know how to work the political system and exploit the openings that change provides (ibid:178).

Similarly, Knights & Murray (1994) produced a study on organizational politics in information technology management. They review and classify various theoretical and analytical traditions according to their focus of research (global-local) and according to their understanding of politics either as disruptive of the 'smooth' and 'rational' management of an organization or as an inescapable 'fact' of organizational life (Knights & Murray, 1994:3). Their own suggested approach tends towards the latter where they seek to study the use and development of IT in a political context through detailed and localized studies of management practice that are understood to be influenced by, and have consequences for, broader socio-political and economic, organizational, technological and what they call security conditions (Knights & Murray, 1994:xii). Their notion of politics refers to the concerns of individuals in contemporary society to secure a symbolic and material sense of themselves in historically particular conditions of uncertainty and competition (Knights & Murray, 1994:xiv). In the context of IT management, therefore, by politics they mean the "managerial and staff concerns to secure careers, to avoid blame, to create success and to establish stable identities within competitive labour markets and organizational hierarchies where the resources that donate relative success are necessarily limited" (Knights, & Murray, 1994:xiv). This critical processual perspective (Dawson et al, 2000:7), by conceiving politics as "the very stuff, the marrow of organizational process" (Knights & Murray, 1994:xiv), they state that organizational politics are embedded and inescapable in organizational processes and actor's strategies. Nevertheless, it could be argued that by doing this, it is difficult to separate the "political" from the "non-political" and thus it is more difficult to be engaged with analytical games of this kind, and operationalise concepts as such.

In relation to the shaping of T&O, recent work by McLoughlin & Dawson (2003) distinguishes between material and social in relation to technology. They seek to reveal an analytical space that integrates the materiality of technology as a 'hard place' and the 'interpretive flexibility' of technology as a social construct (McLoughlin & Dawson, 2003:21). McLoughlin & Dawson suggest a "mutual shaping of T&O approach". It views technologies as socially constructed material artefacts, while organisation is the social context within which these artefacts are

interpreted and acquire meaning. In the mutual shaping process, technology shapes organisation in the sense that the characteristics and capabilities of a technology may enable and constrain organisational transformation in particular circumstances, while the organisation shapes the technology in the sense that within certain organisational contexts, the interpretive flexibility of the “technical” as it is configured, re-configured in cycles of adoption, adaptation in use, redevelopment and application in other organisational settings, acquires different meanings (McLoughlin & Dawson, 2003:32). This approach recognises that while technology is designed and developed by a range of individuals and groups, these and others also engage in constructing meanings of technology within a changing social context (ibid.). McLoughlin and Dawson link the ‘materiality’ and ‘sociality’ of the technology with ‘obduracy and stability’, on one hand, and ‘openness and re-interpretation’, on the other. In doing so, they stress the importance of temporal contextual influences and how, over time, there may arise a common understanding among different groups and individuals on what constitutes a particular technology (ibid.). They see a “duality of technology” in which the social shaping of technology may at certain periods add to the obduracy of technology and there may be certain reconfigurations of technology in use which present a challenge to previous agreements on what constitutes technology (ibid.).

In this scheme, choice emerges when in periods of technology obduracy the materiality of technology may serve to enable and constrain the social process of choice and negotiation in the uptake and use of technology (McLoughlin & Dawson, 2003:32-33). Choice appears as emerging from local, contextual contingencies of particular, temporal circumstances. Its direction depends on how the relationship between T&O appears within a temporal, contingent organisational context. Choice is seen as a political action within the adopting organisational context where ‘change agents’ negotiate the meanings and the legitimacy of technological change in organisations (see McLoughlin et al, 2000).

In the mutual shaping of T&O approach the term “technological frames” (Bijker, 1995) is used to explain T-O change as a process of shaping socio-technical configurations. The possibilities and constraints that obdurate or more open frames might offer in this shaping are illustrated (160). Following Bijker (1995), McLoughlin distinguishes between ‘semiotic power’ which refers to the power of

fixed meanings and 'micro-political power' which refers to the variety of practices that transform and structure the actions of actors (McLoughlin, 1999:161). These two forms of power are different sides of the same entity, as the dominant technological frame constraints the actions of its members and thus exerts power through the fixity of meaning (semiotic power) and also enables its members by providing problem-solving strategies, theories and testing practices (micro-political power) (ibid:161-162). It is argued that by both enabling and constraining micro-political activity, frames can be seen to exert a 'disciplining power' since they govern the way in which thinking and action take place (ibid:162). This analysis successfully highlights action as part of micro-political activities alongside the construction of meanings at an organisational level, while possibilities and constraints for action refer to the openness or fixity of a technological frame, which represents a metaphor for T-O change. This is a restricted view of action and the motivation for action as it is reduced to conflicts of political interests within organisations.

There are studies on politics, organizations and technology that have expanded, or cross-fertilized their approaches with other interesting issues and concerns. Hislop et al. (2000), Swan et al. (1999) and Swan & Scarbrough (2005), for example, examine innovation and organizational politics by introducing issues about networks and networking, knowledge management and decision-making. Additionally, Suchman & Bishop (2000) focus on the discourses and associated practices of innovation in studying the relations between technology and labour. They see innovation not simply as a process, but as a highly politicized construct taken up by specific actors and made to work in particular ways by the use of cultural frames within certain cultural imaginaries (Suchman & Bishop, 2000:331). They conclude that innovation can be understood as a construct activated in the service of what is a fundamentally conservative project, in the sense of the reproduction of existing orders (ibid.). This view questions what really constitutes innovation. For example, "resistance to change, in the sense of resistance to the premises and consequences of agendas initiated under that banner, may in fact be a requirement for long-term, substantive innovation" (ibid:332).

The political process perspective stresses the need for theorization of choice, of constraints and opportunities, possibilities to act and freedom to choose alternative

paths for technological development, decision-making. It theorizes choice by taking into consideration the duality of possibilities-constraints. Authors, however, are restrained in presenting them as “unseen power-plays in arenas of conflicts and resistance” (Dawson et al, 2000:5). This is due to the broad definition of politics as including many things such as culture, historical legacy of past events, dominant discourses around technology and change (ibid.). Decision-making and choice are, therefore, seen as overly political processes. Through choice either some political game will be affected and find its winner and loser or some options will be eliminated, thus, closing the contested terrain of change options. The political nature of the socio-economic relations involved in the shaping of T&O in various contexts is undoubtedly important. A broad definition of ‘politics’, on one hand, and the variety of contexts of research and perspectives, on the other, creates confusion. It is necessary, therefore, to be clear about how the notion of politics is used.

A more recent special issue in *Human Relations* also discusses the political process approach. McLoughlin and Badham (2005), after illustrating the evolution of the political process approach since its emergence in the 1970s through two generations of studies, they point towards the development of a “3rd generation”. They seek an integrative, multidimensional approach to study technological change integrating distinctions such as the “technical” and the “social” into a more sophisticated understanding of the socio-technical. This suggestion shifts the focus from the question of whether technology causes social change or the opposite. Both things surely happen. Attention should be given to the circumstances of such changes (McLoughlin & Badham, 2005:839). It is suggested that the social-technical integration could happen through a “three-dimensional approach”, as opposed to one-dimensional focus on either the technical or the social, or two-dimensional models, which are softer versions of the impact and agency approaches seeking to identify the mutual shaping effects of the technical and the social on each other (ibid:838-839). The three-dimensional approach should problematize the social-technical distinction itself by viewing it as ‘made up of complex interwoven combinations of human and non-human elements’ a better integration of which should be sought after by future political process approach studies (ibid:839).

2.3.4 Theories of the Firm and Organisational Boundaries

The context of the firm is and has been important in relation to the discussion on T&O and social choice. Developments in theories of the firm that illustrate the firm as a basic unit of capitalist production, as important economic agents and portray the relationship between the firm and its environment and how this could be useful analytically are discussed here. The concept of action and choice appears in the context of firm behaviour within a certain environment. In theories of the firm the historical shift identified is from neo-classical microeconomic theories of production which have been criticized as lacking realism and reducing firms to epiphenomena of markets, to the so-called “realist theories” (Coombs et al, 1987:29).

In relation to producing a theory of the firm, a central issue was that of ‘divorce of ownership and control’ in industrial firms, which elevated the scope of managerial action and its motivations as a central theoretical concern in explaining the behaviour of firms, during 1950s and 1960s (ibid.). It established that managerial action is an important influence on firm behaviour and that such action is logically and practically distinct from that implied by the owner-entrepreneur model in traditional theory (ibid:31). This debate is concerned with the locus of control where some authors (i.e. Crosland, 1952) believe that managerialism marks a fundamentally different type of capitalism, while others (i.e. Berrett-Brown, 1958) argued that various practical and ideological considerations meant that the supposedly autonomous managers still represented the interests of the capitalists (Coombs et al, 1987:31). Finally, Tomlinson (1982) suggests that we should conceive managers as owners and not shareholders, thus, not seeing ownership in its strict legal sense (Coombs et al, 1987:32). More recent work has also emphasized the importance of corporate decision-making in the shaping of the markets, which is seen as important as the regulatory forces (see Gordon, 1996).

Upon the realization of the importance of managerial action, there are two types of theories of the firm that have been produced. One is based on *managerial motivation* (i.e. Penrose, 1980; Marris, 1964) and examines how firms are motivated to pursue growth and size as intrinsic objectives, while profit, sales, market share and other goals are seen as instruments to achieve those ends: all subject to a constraint

framed in terms of the continued existence either of the firm itself or of the managerial team which controls the firm (Coombs et al, 1987:33). The other type is based on the *firm structure*. There are numerous traditions in this area of study, the most significant are: a) The transaction-cost (TC) approach (Williamson, 1975), b) the behavioural approach (Cyert & March, 1963) and c) the historical approach (Williamson, 1962, 1967; Chandler, 1962)⁷. Coombs et al (1987) stress the need to combine managerial motivation models with firm structure models in order to be able to explain the behaviour of different firms in different circumstances (1987:36). Also, technical change should be seen as an active component of firm behaviour, as allowed by managerial theories of the firm (Coombs et al, 1987:40).

Sociological approaches focusing on the form of industrial organization have produced accounts on the nature of the firm as an agent within a market structure and how changes in the market environment and the models of industrial organization affect the role and the organizational structure of the firm. Such theories usually come from organizational sociologists who respond to Weberian studies on bureaucracy and the structure of industrial capitalism and the nature of the actors within it. After the 1970s the idea that firms are changing as organizations and becoming more open, more flexible, more networked with a temporary character, contrary to more rigid, hierarchical organizational models of modernity. Alvin Toffler for example in his 1971 book, *Future Shock*, suggests that the model of bureaucracy is to be replaced with that of adhocracy (Toffler, 1971). Also, Henry Mintzberg (1991) discusses organizational configurations referred to as “the innovative organization”. It represents an organic structure, while its opposite would be a process of standardization, which would prevent innovation. This discussion about increasing flexibility in organizational models as a move away from more rigid and permanent structures of the past, was systematically “confirmed” by the seminal work by Piore & Sabel *The Second Industrial Divide* (1984), where they argue on the emergence of a new form of industrial organisation, the “flexible specialisation”, through a historical rupture of the past mass production model. Additionally, the discussion on the transition from Fordist and Taylorist models of industrial

⁷ For an overview see Coombs et al, 1987:34-39.

organisation and management models to post-Fordist, lean production models of more humane management (i.e. from direct control to responsible autonomy - Friedman, 1977) has produced work on the nature of organisations and firms. This relates both to their structure and their role in a system of industrial organisation, where traditional conceptions of the firm as a central production unit are seriously questioned⁸.

Such accounts have produced terms in order to capture the changing nature of the firm. One example is the firm-in-sector perspective (see Whipp & Clark, 1986; Child & Smith, 1987), which attempts to move outside firm boundaries and conceptualise organisations as part of the sector they are active in. Fincham et al, more recently (1994), use the firm-in-sector idea to show how the firms as actors negotiate the sector rather than being involved in a transmission of 'recipes' and assimilation in organisations (see also Fincham et al, 2005). The conception of a firm's environment as a 'sector', however, is rather restricted nowadays, with the convergence and consolidation of diverse organisational fields that were traditionally classified in different sectors. Although the firm-in-sector perspective is a dynamic and multilevel analytical approach, it offers a limited conception of the firm's external environment as a sector. Also, some sectors have more defined boundaries than others. For instance, sectors like the automotive sector, or the financial services sector have clearer boundaries since they are heavily regulated.

Other concepts that have been produced to explain the changes in our understanding of firms and their environment include: the flexible firm (Pollert, 1987; 1988), the network firm (Castells, 1996), the virtual organisation (DeSanctis & Monge, 1998), the firm as a distributed knowledge system (Tsoukas, 1996), and so on. There are differences and different starting points or objectives among the conceptions of firms discussed herein as changing organisations and organisation as an action. Reference is made to them as a trend stemming from the realisation that organisations and firms are changing roles and forms within an also changing environment of industrial organisation and economic markets. The underlying idea behind these theorisations of the firm is that firms as organisations have been

⁸ For a review of the discussion on the transition from Fordism to post-Fordism, as well as, a critique to post-Fordism claims for more efficient and humane management see Kaniadakis (2001).

historically differentiating from what an ideal-type Weberian model of bureaucracy would describe. Authors describe firms as opening their boundaries, becoming more active within their environment and hierarchical structures. Also, management methods are re-evaluated and the value of various resources and organisational practices is re-considered. For instance, the customer base has now become an integral part of a firm's organisational structure.

The developments in the nature and role of firm within its environment can be associated with the discussion of changes in the model of industrial organisation. There is a debate about what kinds of different models can and have been developed in various countries and industries. Sturgeon (2002), for example, presents the "modular production networks"⁹, as a new American model of industrial organisation emerging in the case of contract manufacturing in the US electronics industry. Innovation management literature of the early 1990s also acknowledged the importance of networks in innovation and saw them as a new emerging model of industrial innovation (Rothwell, 1992). With the "5th generation model", innovation is becoming faster and it increasingly involves inter-company networking; that is, innovation is increasingly becoming a multi-firm networking process, and it employs a new electronic tool-kit (Rothwell, 1992:221).

Furthermore, Langlois (2003), tried to incorporate Alfred Chandler's *The Visible Hand* (1977) - who argued that the visible hand of managerial coordination has replaced Adam Smith's invisible hand on the market - argues on the vertical disintegration beginning to replace the classical multi-unit managerial enterprise, at the end of 20th century as the dynamics of industrial capitalism change through changing historical circumstances (Langlois, 2003:351). Under such developments in the industrial organisation models and the role of firms as economic agents, questions are raised regarding the role of innovation or T-O change. How does it happen in such a changing model of industrial organisation? What does it involve? How is it managed? Various authors have started talking about "networked

⁹ Sturgeon explains it as follows: "Lead firms in the modular production network concentrate on the creation, penetration and defence of markets for end products - and increasingly the provision of services to go with them - while manufacturing capacity is shifted out-of-house to globally operating turn-key suppliers. The modular production network relies on codified inter-firm links and the generic manufacturing capacity residing in turn-key suppliers to reduce transaction costs, build large external economies of scale and reduce risk for network actors" (Sturgeon, 2002:451).

innovation” (Swan & Scarbrough, 2005), “distributed organising” (Orlikowski, 2002) and “distributed innovation” (Rammert, 2003). These terms refer to the structure of innovation process and the various activities associated with it as dispersed in space, connected in diverse and asynchronous ways and involving heterogeneous actors. Innovation processes are seen as occurring within networks of diverse and heterogeneous actors, as opposed to happening internally to organisational boundaries of a firm. Additionally, the networked and dispersed character of innovation poses challenges for the management of firms (Orlikowski, 2002).

All these approaches that have some sort of conception of action as decision-making and social choice need to be integrated as they add to the analytical confusion in relation to the interdisciplinary study of T&O. A close look at the empirical field will shed some light on how such diverse approaches could be integrated towards a shift in the epistemological frame that embraces interdisciplinary research without losses in the academic identity. The space where social and economic relations, actions and interactions contributing to the shaping of T&O is also something controversial. Questions also rise in relation to what the focus of analysis should be. Where should action and choice looked for? Within organisational hierarchies? Within firm structures? Within markets? This is also something that needs to be theoretically addressed.

2.4 DESIGN, IMPLEMENTATION AND USE: FOCUS ON ARTEFACTS OR ON ORGANISATION?

The way the field of social studies on technology has been developed, based on the purpose of identifying and illustrating the “sociality” of technologies, as opposed to more technical and deterministic accounts that treat technologies as “black boxes”, analysts started studying various processes associated with the design and development of new technologies (see SCOT tradition for example – bicycles, refrigerators, etc.). Further work has pointed to the direction of the phases of implementation and use of technologies as also important for the shaping of

technologies and artifacts. Fleck (1988), for example, with the concept of “innofusion” identifies innovative processes during phases of implementation and use of technologies. More recent research has focused mainly in linking design, implementation and use with studies emphasizing the importance of users in technology development (Oudshoorn & Pinch, 2003) and the relationships between designers and users (Hyysalo, 2004). Such studies on the design, implementation and use of technological artifacts, along with the attempts for their integration have come with studies that try to capture the broader structure of the socio-economic context where technologies are designed, implemented and used. By reviewing this literature where different phases in the development, diffusion, implementation and use of technologies in different socio-economic contexts is studied, further inconsistencies and gaps based on the diverse foci and diverse contexts of these studies can be identified for the student of the T-O relationship. This particular reading of the literature reveals them.

Some STS literature focuses on particular technologies or particular artifacts and how these are shaped during processes of design, implementation and use in particular organizational, sectoral or national environments. Such analysis takes into consideration various constructs and socio-economic relations in relation to one case of a technology or an artefact. The technology is kept constant, that is, at the centre of analysis while organizational elements and socio-economic relations are seen as factors that might contribute to the development of that technology. The focus on particular artifacts was initiated by early STS studies on the Social Construction of Technology (SCOT) (Pinch & Bijker, 1984), which emerged as a programmatic response to technological determinism. SCOT’s legacy was taken up by more recent research in a wide interdisciplinary field of Science Technology and Innovation literature. For instance, we have the development of concepts like “biography” of an artefact (Pollock et al, 2003), “innovation journey” (Rip & Schot, 2002; Van de Ven et al, 1999), “trajectory” (Dosi, 1982), which refer to the development and shaping of technologies, over one or more product cycles and try to conceptualize and theorize the transformations that certain technologies go through in a non-linear course of development where different processes and contexts of design, implementation and use might change the direction of the shaping of the artefact. Also, concepts such as

“script/inscription” and “vision” (see Akrich, 1992) refer to how technological artifacts may embody certain rules and preconceptions, which have been put there through social processes during phases of design, implementation and use.

An Edinburgh based research project, for example, examines the “biography of standard software packages” (Pollock et al, 2003). This project shifts the focus away from snapshot studies that provide limited information on particular phases of the development of a technology (i.e. implementation studies). The research team conceives and theorizes a more complete process of development and evolution of software packages and they overcome dichotomies such as universal-local and rational-political. The notion of biography is an analytical novelty fitting socio-economic relations shaping a technology into an evolutionary and unified conception of the process of software package development.

The same research team uses the concept of “generification” (Pollock et al, in press) to describe how standard software packages are able to “travel” from one context to another. The authors stress the importance of the interaction between supplier strategies and users’ influence in how they are combining their particular user requirements with collective requirements while negotiating with the suppliers. The generification concept is useful because it theorizes the organizational and market environments within which artifacts travel. More work is needed, however, to theorize the “routes” and “journeys” certain technologies follow within socio-economic environments. In this way, the limits and possibilities of generification (or of customization) could be accounted for. Pollock et al, correctly link the generification process with its understanding by strategic management of suppliers and users but they do not say how actors can also strategically construct the scope of their actions and give meaning to distinctions such as global-local or generic-particular.

The opening of the black box of technologies meant that people started finding all sorts of things in it. The notions of “inscription” and “visions” mentioned above refer mostly to immaterial elements that are associated with particular artifacts and have been put there during processes of design, implementation and use. Recent work on elderly care technologies, for example, examines how social practices are combined with professional practices in the development and use of a technology

(Hyysalo, 2004; 2006). The concept of “Practice Bound Imaginary” (PBI) is used to describe the way that different social and professional practices are blended and cross-fertilized with others as sources of representation of use in the development and use of a technology. Hyysalo believes that in the process of technology design, the development of user representations is a process that occurs with the involvement of a PBI. This PBI accounts for a continuous change in the various pre-existing professional and social practices the merging of which informs technological design. In this sense, user representations are not only imagined by the designers but also rooted in the practices that are mobilized for a particular technological configuration. Although he discusses instantiation of PBIs, in the sense that different combinations of practices might take place as well as different interpretations and ways of participation in these practices (Hyysalo, 2006), he attributes the choices that emerged only to local contingencies. This makes the actors and factors visible retrospectively and only after they have acquired an important role for the future of a technology. Hyysalo acknowledges the significance of particular historical moments as important decision-making instances for the development of a technology where designers meet the users and negotiate the PBIs, but he does not pay much attention to the choices themselves and how they emerge from such instances. It might be argued, therefore, that “social choice” in Hyysalo’s work is viewed as open in terms of the resources and the practices that will be configured, but it is examined as such only after configuration took place. This highlights choice as an empirical issue but without allowing a possibility of a theory of social choice.

Apart from the literature focusing on technologies and artefacts, there is another strand of interdisciplinary research in STS focusing on the context of design, implementation and use and how this context is historically shaped by its interaction with technologies and processes of incremental or radical innovation. In search of a concrete context that could be conceived and analyzed in relation with technologies, one is offered by the concept of organization. At the start of the debate about new technology, studies stressed more the influence of design and how it could incorporate conscious social objectives and choices (see Noble, 1984). Later implementation studies (Webster, 1990; Fleck et al, 1990) revealed organizational

aspects as important in the shaping of a technology which has initiated work focusing on the exploration of organization and its transformation during implementation, as opposed to a focus on technological artifacts and design processes exclusively.

The concept of organization has been used as having many different meanings. Nonetheless, studies focusing on organization in relation to the design, implementation¹⁰ and use of technologies and in parallel with the focus on specific technologies or artifacts have shown that organization, however conceived methodologically, is held analytically central in such studies. Other factors, such as technologies, are seen as having influence on the shaping of the structure or formation that the concept of organization represents. Besides, organization is the context within which technologies are designed, implemented and used¹¹. Current research on T&O has been stressing the concept of organization in relation to the introduction, adoption, implementation and use of new technologies. This particular focus on organization has shown that organizations have biographies and histories too, which are shaped by their interaction with technologies.

Relevant concepts have been produced in this strand of research emphasizing the importance of the organization in the shaping of technology. The notion of organization is directed towards “the firm” and its constituting elements, in contrast to artefact-centered research that has not considered firms. The concept of “Company Social Constitution” (CSC) (Hildebrandt & Seltz, 1989; Koch, 1997; Clausen, 1997) captures the “frozen politics” of the firm and how they historically constitute, through conflict and conflict-solving activities, a particular set of rules, norms and principles that governs the attitudes to work and the working conditions of the employees (Koch, 1997:131; Clausen, 1997:174). These elements are important for

¹⁰ It is more common for studies focusing on organization to be also part of implementation studies as this is when technologies and organizational environments interact in a more dynamic way and changes happen on either side. See for example Williams (1994) and the notion of “implementation arena” or Fleck (1988) and his notion of “innofusion”.

¹¹ In such studies, one is able to make distinction between action and structure-oriented explanations. German research, for instance, tends to primarily stress structural oriented explanations of the shaping of technology, for example, focusing on distribution of qualifications, management/labour relations, product market characteristics, company size, etc. (Clausen & Williams, 1997:4), while Scandinavian research has been engaged in action research with experiments and demonstrations to improve technology and working conditions but there is a neglect in structural limitations (see Clausen & Langaa Jensen, 1993).

the shaping of technology and organization, especially during the phase of implementation (ibid.). Important elements of a CSC are described through the norms of a) policies for work performance and principles regulating performance, b) industrial relations at company level and the regulation of these and c) attitudes towards work among the different actors of the company such as workers, management, technical departments (Clausen, 1997:174). Such norms are seen as specific for a firm depending upon the original founding idea, the regional integration of the plant and the culture and education of the workforce and management (ibid.). The fact that CSC are historically constituted point to the idea that organizations, in this case organizational rules and norms within a firm, also have a history or a biography throughout time. Although it is not clear whether the CSC and the firm is the same thing, the CSC concept shows how certain organizational aspects and arrangements within the firm might be products of long-term historical processes or that certain attitudes towards work might be a result of the historical evolution of a specific CSC. Not only technologies but also organizations have histories and biographies. The concept of CSC captures the internal to the organization environment as a dynamic one where politics and conflicts define its form. It helps understand technological innovation as an ongoing social and political process occurring, not only during design, but also during implementation and use. It has been empirically used to study the implementation of CAPM, CIM and production management systems (PMS) in Denmark (Clausen, 1997; Koch, 1997). It is also a concept that maps the user environment as challenging and significant during innovation processes and it also makes visible the relations between suppliers and users as social and political relations. Finally, it directs research away from snap-shot studies of particular moments by stressing the importance of organizational history in how firms adopt innovations, either successfully or not. What has not been examined is whether the CSC of the supplier could influence innovation. One could also explore whether CSC constitutes a conscious conception of the firm's history by the firm's management and how is it treated strategically during innovation.

Further STS literature, captures the dual but inseparable character of technologies and the processes shaping them. Various authors incorporate the context of design, implementation and use of technologies in newly formulated hybrid concepts and theories¹². Technological artifacts, then, appear in a more active mutual relationship with contexts of design, implementation and use, all of which are considered as important in the shaping of technology. Such concepts, therefore, aim to capture the interaction of technologies with the social environment within which they are designed, implemented, and used. Methodologically, the constructionist, or rather de-constructionist, approaches discussed earlier, aimed to explore how the “social” or the “non-technical” was embedded within the artefact through processes of design, implementation and use all of which had an influence on the shaping of the biography of the artefact studied. The studies focusing on organization as the context of design, implementation and use aimed at showing that technologies are not shaped only in the design phase but also in the implementation and use phases, as the social (organizational) interacts with the technical. Furthermore, the latter literature aims to explore how an artefact or a technology may be seen as one entity with the social environment it interacts with during processes of design, implementation and use. Instead of looking at processes through which social contexts and elements are embodied into artifacts, or processes through which such contexts and elements historically evolve through incremental innovation, they look at the “interaction” between analytical categories that represent technical and non-technical elements. They focus, then, on the interaction between two analytical categories rather than on a linear conceptualization of shaping processes of these categories, (i.e. linear models of innovation). Such analytical categories can be captured by the concepts of technology and organization.

Studies that explore the development of technology and work organization for instance have emphasized the need that these entities should be analyzed as a unity (Fleck et al, 1990). The work of Robin Williams (1997a; 1997b) points towards this direction in his study on the social shaping of industrial technologies where he

¹² A few of such concepts which have become quite popular in the field are: “socio-technical systems” (Hughes, 1983), “actor-network” (Law & Callon, 1992), “configurational technologies” (Fleck, 1988), “artefact-activity” (Fleck, 2000), “technology-in-practice” (Orlikowski, 2000), “co-evolution”, “co-production”, “mutual shaping” (Williams, 1997) etc.

addresses the concept of “mutual shaping of technology and organization” (Williams, 1997a; 1997b; Webster, 1990; Fleck et al, 1990).

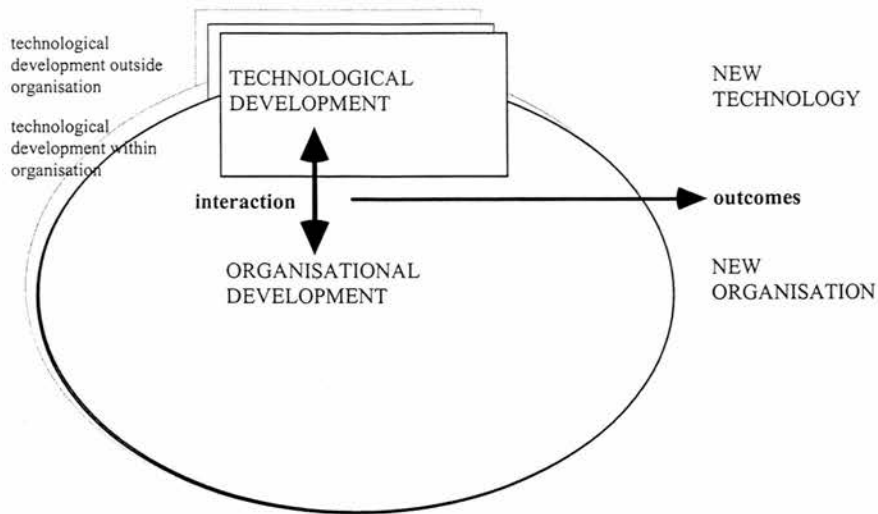


Figure 2.1: Schematic Model of the Development of Technology and Organisation (Source: Williams, 1997b)

Williams explores the relationship between design/supply of a technology and its implementation and use over the life history of an innovation by employing Fleck’s (1988) “innofusion” model (Williams, 1997:110). He identifies the concepts of technology and organization as representing two socio-technical systems: One of which is “organization”, a configuration that often proves remarkably stable in terms of established divisions of labour and knowledge, technologies and product markets, many of which features are captured by the concept of CSC (Williams, 1997:111) stressing their historical development and evolution. The other socio-technical system is “technology” which also has a history through the subsequent updates by the suppliers, due to incorporation of features and presumptions from the context in which they had previously been developed and used (ibid.). Williams argues that previous research has taken the first or the second as the starting point in ways that have shaped their understanding of their respective importance and he suggests an alternative focus on the interaction between them. More particularly, he claims that “the implementation of a technology that is new to the firm represents a collision

between these two sets of institutions – with their own historical roots and presumptions which may be more or less in conflict” (ibid.). The figure above illustrates how this interaction takes place and how technological and organizational change is produced. Empirically used to explore the social shaping of CAPM, the above model supports the idea of a mutual shaping of T&O where the biography of the artefact as it unfolds through successive organizational implementations and generations of technological supply is addressed. Furthermore, the way these implementations were patterned by the broader context of changing practices and beliefs about business organization is also illustrated (ibid:123).

The problem with Williams’ model and the rest of the similar implementation studies, is the lack of realization that the concepts of “technology” or “technological artefact” and “technological solution” have less similarities among them than they seem to have. Do organizations adopt technologies or technological solutions? Technologies have been described as configurations of various elements, more or less unique assemblies of, material, organizational, procedural components, some standardly available, others specially developed, built up to meet the particular requirements of user organizations (Fleck 1988). This makes it more difficult to distinguish when such a configuration could be conceived as a technological artefact or as a technological solution. It is very rare that an organization adopts a single technological artefact; rather, they adopt configurational technologies in the form of technological solutions, developed to solve particular, local organizational problems.

The above model of the mutual shaping of technology and organization criticizes approaches that view technologies as an external factor that “causes” organizational change, or approaches that view technology as a purely local construct. Nonetheless, it also tends to identify technology with technology supply and the strategies of suppliers, with off-the-shelf, black-boxed packages, while organization is identified with the ‘implementation arena’ (see Williams, 1994), in the context of a clearly defined CSC. This model, then, uses relatively closed concepts instead of allowing for some “space for meaning” that would make such concepts meaningful in different contexts. Finally, this model cannot account for actors’ decisions and choice very effectively because any information on choices are obtained “on the side”, while identifying mismatches and conflicts between

technologies and institutions. A focus on choice and decision-making could be more useful in helping to reveal arenas and fields of conflict between different actors.

A more recent paper by Clausen & Koch (1999) could be seen as an attempt to integrate technology and organization as an analytical focus by searching for spaces and occasions open for negotiating technologies. Clausen and Koch take the Social Shaping of Technology (SST) as their theoretical starting point and focus on the decisions and choices that shape a technology. They argue, however, that a comprehension of technological choice as being social is not enough. One needs to understand how, where and when and under what circumstances the choice is taking place (Clausen & Koch, 1999:463-464). They also emphasize the political characteristic of these negotiations since the heterogeneous players involved in them express diverse interests. As they state: "A space for shaping implies a social context, where socio-technical ensembles can be addressed and politicized" (Clausen & Koch, 1999:465). By studying the development and transformation of ERP systems in Denmark, they identify and explore three spaces and occasions, which also reflect different moments in the transformation of IT systems: segments of IT-suppliers and their customers; company internal dynamics; and design for mass production of software and customization (Clausen & Koch, 1999:464). Through their analysis, the authors are led to very useful conclusions regarding the actors' strategies, the instability or stability of their relations as well as the dynamics of the market in relation to the process of shaping of ERP systems in Denmark (Clausen & Koch, 1999:479-480). Although this study brings out different contexts and occasions for social choice generation, the complexity of the actor that produces and promotes legitimate social choices is lost within the analytically disintegrated spaces and occasions they suggest and within arenas of political negotiations. The authors illustrate the context of generation of choice as important but, in turn, they lose the rationale and legitimacy mechanisms driving the actions of complex actors.

In terms of the relationship between T&O, the artefact-based research seems to involve any social or organizational arrangements as the context within which technologies are shaped, the organization based approaches tend to emphasize the fact that this context is shaped historically along with the shaping of technologies

and the last strand of literature seems to perceive this context as an entity with the technology and see them as analytically inseparable. This segmentation of analytical foci, however, creates confusion and inconsistencies to the study of T&O in an interdisciplinary, multi-level and multi-dimensional manner and therefore needs integration.

2.5 THE ROLE OF KNOWLEDGE AND EXPERTISE

There is a preoccupation with a focus on knowledge and expertise and their networks in some STS research that draws upon the intellectual background of the Sociology of Scientific Knowledge (SSK) (see Bloor, 1976) as well as from the Bravermanian tradition on skills (Braverman, 1974). Influential studies have shown that knowledge can be codified and embodied in machines. Codified knowledge is the knowledge that has been (or can be) converted into symbols for easy transmission, replication and storage (Noble, 1984; Boisot, 1995; Saviotti, 1998; Langlois, 2001). Not all knowledge can be codified, however. As Polanyi (1966; 1967) first showed, not all knowledge can be put into words, as we know more than we can tell. This phase of knowledge was termed as 'tacit knowledge'. Since Polanyi, there are numerous studies in different disciplines illustrating the importance of the tacit elements of knowledge for a wide range of activities (see MacKenzie, 1996). The acquisition and employment of tacit knowledge in designing technologies is quite crucial. This has also been shown in relation to the role of tacit knowledge in organizations. Baumard (1999) for example, highlights that strategic success seems to exist more in top managers' ability to use tacit knowledge than in gaining or upgrading explicit knowledge.

The identification of the mobile character of knowledge, both tacit and especially explicit, made scholars realize how knowledge may be dispersed across various boundaries and that its mobilization and use require the development of networks and contacts. Many authors have commented on the distributed character of knowledge and that technological and organizational change and innovation needs to emerge through collaborations of groups and organizations (Alter & Hage, 1993;



Powell et al, 1996, Tsoukas (1996); Owen-Smith & Powell, 2004). Since knowledge is increasingly dispersed across organizational boundaries (e.g. across professions, organizations and specialized practices) it is at these interstices that distributed knowledge can be brought together and integrated into new products, processes and services (in Swan & Scarborough, 2005). Opportunities for networked innovation are, therefore, seen as increasingly important to organizational performance facilitating the creation of new knowledge rather than just the transfer of existing knowledge (Gulati, 1999). This realization shows that knowledge can not only be transferred from one context to another; rather, the activity of re-contextualization itself constitutes a knowledge producing activity with the involvement of different contingent elements, which give innovative value to these attempts. Of course, “networked innovation” might pose constraints and cannot only give positive outcomes (Barley, 1990).

Apart from the distinction between explicit and tacit knowledge there is another concept attributed to knowledge that is embodied in local working and organizational environments. This has been termed as ‘contingent knowledge’. As Fleck (2002) argues “important elements of knowledge can be recognized as embodied in the very working environment itself, even in the structure of the organization, with its elaborated and emergent division of labour (or knowledge)”. Knowledge can also be embodied in people and organizational structures (Blacker, 1995; Sorensen & Levold, 1992). This form of concealed and embedded knowledge has seen as making a huge difference in the effectiveness with which different organizations can achieve innovation (Fleck, 1997). Contingent knowledge, then, is local knowledge with doubtful transferability (Williams & Edge, 1996: 887) and its proven significance for innovation processes creates questions on how this type of knowledge of local character and scope can be combined with other types of more mobile knowledge of universal availability and generality.

There is another distinction between abstract and particular or concrete knowledge. Arora & Gambardella (1994) stressed the role of abstract and general knowledge for innovation. Abstract knowledge is understood as the ability to represent phenomena in terms of a limited number of ‘essential’ elements, rather than in terms of their ‘concrete’ features. General knowledge is one able to relate the

outcome of a particular experiment to the outcomes of other, more 'distant' experiments (Arora & Gambardella, 1994:524). They argue, then, that there is an increasing trend for the emergence of generality and abstractness of knowledge during innovation, where technological change is not so much tied down to trial-and-error processes at a local, tacit level. Scientists and technologists are able to distill abstract ideas and general principles from their experiments, which they can apply successfully in other concrete circumstances (Arora & Gambardella 1994; Langlois, 2001:82). The use of both local concrete knowledge and abstract, universal knowledge in innovation opens up the possibility, Arora & Gambardella argue, for a division of innovative labour.

The importance of knowledge and expertise of various kinds in innovative processes has been further explored in studies of technology and organization. Fincham et al (1994) have produced a relevant and seminal study exploring the role of expertise in the IT-based innovation process in the Scottish retail financial services sector. This interdisciplinary study contributes to the strategic co-ordination of expertise, and more particularly, co-ordination of technical specialists in the arena of information systems. The study demonstrates the complexity of the relationships involved in such innovation processes and the extent to which expertise within organizations is itself a product of a number of organizational, strategic, technological and sector-specific factors (Crede, 1996:837). Despite its intellectual contribution, this study has been criticized as lacking a clear theoretical focus because authors have tried to combine too many theoretical lines of discussion without combining them into a unified whole, and also that they fail to use theoretical insights in their full effect (Crede, 1996:837).

The interest in knowledge and expertise in studies of T&O has been steady for many years and was supported by the discussion about knowledge economy and society (Drucker, 1993a; Drucker, 1993b; Neef, 1998) stressing the increasing importance of knowledge both scientific and specialist in contemporary societies¹³. In respect to the notion of the knowledge economy there is much debate and

¹³ Despite the theoretical and conceptual debates over the concept of knowledge economy and society, hard evidence on the economic importance of knowledge has also been produced (for example see OECD, 1996).

ambiguity in relation to what it includes, how it is challenging for firms or whether we should be talking about knowledge economy at all. The Department of Trade and Industry (1998) defines a knowledge driven economy as one in which “the generation and exploitation of knowledge has come to play the predominant part in the creation of wealth” (in Gelauff, 2003:7-8). Some underlying trends of the knowledge economy have been identified: internationalisation, liberalisation of international trade, technological change, ageing and increasing heterogeneity in worker types and preferences (Gelauff, 2003). The challenges for firms in terms of managing innovation within a knowledge-based economy have been associated with the management of their own interdependencies between their own and external tacit and codified knowledge bases; assessing knowledge competencies by reviewing knowledge related sources, incentive structures and communication channels (Gelauff, 2003). Finally, firms would have to realise that modes of knowledge production no longer only consist of entrepreneurship, links with universities and vertical integration, rather two new modes of knowledge production are emerging, namely technological cooperation and market for knowledge around knowledge intensive business services, which would require firms to increase their knowledge potential by connecting to external knowledge bases (Gelauff, 2003).

The notion of knowledge economy, or global knowledge economy given that it is associated with globalisation trends, whether an undisputed fact (Dankbaar, 2003) or an early scenario (Vissers, 2003) or a questionable and empirically ungrounded claim (Smith, 2000) is, nevertheless, present and used in research as a point of reference for many studies, even though there is not consensus on what it is and how it is important for social and economic actors. Given this ambiguity of the term, I am making analytical use of it in reference to the abstract socio-economic environment of technology supply and use on a global scale.

2.5.1 Markets and Networks

Relevant to the knowledge and expertise literature is the one that explores in more structural terms the markets and the institutions within which innovation, as a

knowledge-intensive activity, takes place. Such studies do not focus on particular technologies or organizations; rather they examine the structural characteristics of supply and demand and the institutional arrangements, such as market structure and firm size. Interesting questions are: how new industries are created from innovation? What is the ideal market structure to stimulate innovation? What is the best firm size to stimulate innovation? What is the relationship between invention and demand? (Coombs et al, 1987:95-96).

Various debates emerged from this interest on markets in relation to innovation. The “technology-push/demand-pull” debate is one of them. It is rooted in the economic theories of Schumpeter (1934; 1943) and Schmookler (1966)¹⁴, but also in later works of various authors that contributed to the debate (see Pavitt, 1980; Freeman et al, 1982). Nonetheless, as Mowery & Rosenberg (1979) argue, both supply and demand, as well as the coupling of technology and market, are important in determining the success of innovation (Coombs, et al, 1987:102). Moreover, innovation is a very complex process and it is hard to pinpoint to one factor as the most essential (Coombs et al, 1987:102).

Another economic approach constituting a revolutionary reformulation of the neo-classical paradigm (Liebowitz & Margolis, 1995:99) is the so-called “path dependence” approach (Arthur, 1983; 1987; Liebowitz & Margolis, 1995). The path-dependence literature is accompanied and motivated by mathematical literature of non-linear dynamic models. It claims that a minor or fleeting advantage or a seemingly inconsequential lead for some technology, product or standard can have important and irreversible influences on the ultimate market allocation of resources, even in a world characterized by voluntary decisions and individually maximizing behaviour (Liebowitz & Margolis, 1995:205). Much of that literature has been pre-occupied with explaining “historical accidents” or “market failure”. The work of

¹⁴ What makes Schumpeter an advocate of the technology-push thesis is his belief that whether the central character is the entrepreneur or the large firm, it is only by introducing radically new ideas into the economic life that whole new industrial sectors can be generated. Therefore, technology whether generated outside the economic system or in the large R&D laboratories of a monopolistic competitor, is for Schumpeter the leading engine of growth (Coombs et al, 1987:95). On the other hand Schmookler (1966) did not argue that the demand forces and the structure of demand were the only determinants of inventive activity, but he placed some additional focus on demand factors because he was trying to correct the opposite imbalance according to which it was only the exogenous flow of inventions that could generate new investments and new economic activities (Coombs et al, 1987:96).

W.B. Arthur (1983; 1987; 1989; 1999), is a good example of how path-dependence theory might work.

The path dependence studies, along with providing a critique of neo-classical theories of equilibrium have also elevated the importance of history, although in a limited manner. The importance of history is related to what have been called “non-ergodic” properties of the economy (Liebowitz & Margolis, 1995:222). In Arthur’s analysis for example, history is important only because the sequence of events determines current values, while if the sequence does not determine the end result, then there is little place for history (ibid:223). History then is the “mere carrier - deliverer of the inevitable” (ibid.). Apart from efficiency explanations of history where economic history is trying to find purpose to past actions there is also history where agents, for one reason or another, do not successfully optimize, making history the tool to understand what rationality and efficiency cannot explain; that is, the random sequence of insignificant events that are not addressed by economic theory (ibid.).

As a random or patterned sequence of significant or insignificant events, history is a context-bound concept conceived only *a posteriori*. In other words, history is bound to the context of its conception and is re-enacted at certain moments and places. A question would be: Can we study history in the making while it is unfolding? A more active role and conception of history is needed as opposed to something examined *a posteriori* as a completed sequence of historical events. In order to do so, “social choice” needs to become more visible and theorized in a way that reveals how history, organizational or technological is re-enacted during particular situations.

Although the path dependence approach offers an explanation that captures the important, general characteristics of competition between technologies with increasing returns (Arthur, 1987:595), it has a number of flaws. It gives the impression that technologies are adopted “by chance” without theorizing processes of strategic planning and policy initiatives. Furthermore, choice seems to have been left entirely up to “mimesis” (imitation) while the negotiation terrain or sphere is not at all visible. Although technologies improve with adoption improvement processes or even mimetic behaviour of users remain a mystery. The path dependence thesis

offers the lenses for an alternative, more critical interpretation of economic history but choice in this model is simplified while the complexities of negotiations and social interaction are only implied in the background.

Apart from the evolutionary economics and economics of innovation tradition, there is also a more sociological approach to the markets within the so-called “new economic sociology” (Granovetter, 1985; Smelser & Swedberg, 1994). Its contribution to the understanding of the markets is mostly because of the shift away from a conception of purely rational action and away from the methodological individualism of mainstream economics. Economic sociologists view markets as networks of social relations rather than as just a transaction terrain (see Granovetter, 1973). The work of Mark Granovetter, for example, constitutes an attempt to theorise economic action in between under-socialised economics accounts and over-socialised sociological accounts of economic action (Granovetter, 1985). His notion of “embeddedness” refers to the idea of economic action and economic rationality as embedded into networks of social relations, as opposed to stand-alone rationality and methodological individualism. Also his notion of ‘strong and weak ties’ (Granovetter, 1973) is an attempt to capture the informal characteristics of these relationships and networks between economic agents. Finally, Callon (1997) has stressed the complexity and heterogeneity of market networks by highlighting the diverse interests of agents within markets, how they pursue them and how conflicts between them are arranged. Markets then, have been seen as phenomena socially constructed and politically maintained (Clark, 2000:103).

2.5.2 Commoditization & Commercialization

The various taxonomies of knowledge and expertise and their important role in innovation, but also in science, technology and society more widely, have raised questions on how this knowledge can be transferred and used, in what form and through what processes. The realization of the increasing importance of knowledge in society and the parallel development of ICTs has allowed the increasing codification of different kinds of knowledge. This makes possible the

commoditization and commercialization of knowledge (OECD, 1996:13).

Knowledge, expertise and experience can be recorded and expressed into an explicit form which means that it can be easily transformed, sold and bought. Business organizations, with variations amongst different industries, tend to move away from the traditional way of acquiring and maintaining knowledge through the 'professional model' that involves specialist functions within hierarchies (Scarborough, 1999). The in-house generation and maintenance of specialist knowledge is too expensive for most organizations which instead choose to outsource knowledge in different forms, either by adopting new IT, relevant services and some more or less critical organizational processes. Business firms, instead of developing and maintaining in-house knowledge, they choose to turn to networking and alternative market-style arrangements (Whittington, 1991:43-53; Scarborough, 1999) while "knowledge workers" on the other hand have been subjected to forces of marketization and outsourcing (Whalley, 1986). Commoditization has transformed user firms into consumers and purchasers of knowledge and firms that produce and develop knowledge and technologies into suppliers that offer such commodities. For user organizations, choosing whether to develop in house or buy and use such commodities becomes a highly strategic issue with political and economic implications. Political implications might relate to the situation where management aims to reduce their dependence on certain groups of labour. Economic implications are related to the achievement of economies of scale, both for users who reduce cost and suppliers who expand their markets (Tierney & Williams, 1990:4).

The idea of commoditization of knowledge and information into artefacts and organizational processes and hierarchies has produced research resembling the unfocused emphasis on artefacts or organizations discussed earlier. Studies exploring the commoditization of IT (Swann, 1990; Swann & Lamaison, 1989) and accounts that argue on the commoditization of organizational processes (Davenport, 2005) have been conducted. Alongside there is literature that explores processes and strategies of commoditization and commercialization of technologies stressing the challenges of such processes for the actors involved and also the limits of commoditization. Tierney & Williams (1990), for instance, explore the process of

black-boxing¹⁵ of technologies as a commoditization process which is amenable to strategic planning by both developers of such technologies and user organizations. They suggest that the occupational and industrial division of labour in advanced industrial societies makes possible the specialization and intensification of expertise needed to develop complex technologies. Nonetheless, this division creates problems of exchange of information between specialist firms and difficulties for maintaining control (Tierney & Williams, 1990:3). Although black-boxing is a strategy for the management of uncertainty and complexity, although it has obvious economic benefits for both suppliers and users, is a challenging and difficult process because it occurs within the framework of this particular division of labour. For example, industry standard solutions emerging from black-boxing might offer users a greater choice of suppliers and confidence that the product will not become obsolete (Swann, 1990), however, the socio-economic relations between suppliers and users make that process a little problematic, in terms of its strategic significance. The so-called “package paradox”¹⁶ gives an idea of why black-boxing of technologies is a rather difficult and contradictory process.

Brady et al (1992) explore the extent to which commoditization will expand to include those industry-specific applications which have characterized the bulk of in-house or customized software development, during the 1980s, especially in the financial services industry (Brady et al, 1992:489). They identify an uneven and limited commoditization process in software packages despite the enormous economic incentives for commoditization and large scale supply of standard software packages (ibid:490). They suggest that wholesale commoditization of industry applications software is unlikely to emerge in the same way as it has for operating systems and utilities; rather it will occur by means of the emergence of ‘compromise’ software commodities in two main forms: semi-generic applications and niche-specific applications (ibid:491). Finally, work by Eric von Hippel (1994) illustrates the difficulties of acquiring and transferring certain pieces of information, termed as

¹⁵ Black-boxing is defined by Tierney & Williams as a process producing a preassembled technical tool or product which can be used reliably without the user needing to understand and intervene in their internal technical intricacies (Tierney & Williams, 1990:1).

¹⁶ The package paradox refers to the difficulties to balancing the independent development of a software package as a commodity on one hand, and the opposite trend towards extensive customization that user organizations are aiming for.

'sticky' and the way this causes problems in innovation related problem-solving activities. This also has implications in the process of commoditization of technologies and organizations because of the difficulties to capture certain pieces of information and knowledge, extract them from a certain locus or site and use it to develop a commercial product.

Other ongoing research relevant to the commoditization and commercialization of knowledge focuses on social choice during the phase of procurement. More particularly, it explores social choice between suppliers and users in the procurement of software packages drawing on the notion of performativity¹⁷ placing social choice in the midst of economic and cultural sociology theorisations (Pollock & Williams, forthcoming). It is argued that actors attempt to drag the choice from the informal domain which cultural sociologists would focus on, onto a more formal, accountable plane through the mobilization and performance of a number of 'comparative measures' and criteria (ibid.). They conclude that it is not the properties of the technology that determine choice, but the way these properties were given form through the various comparative measures put in place. This means that decision making and social choice on technology design and procurement appear to be significant social actions that contribute to its shaping.

2.6 SUMMARY

Societal and historical changes on one hand and theoretical and analytical developments in social studies of technology and organization on the other are in a mutual influence relationship. The way historical moments and societal changes affect the way analysts pose questions and analytically conceive their subject matter is captured by the Weberian discussion on values and value neutrality in social research, while the way science influences society was captured, more recently, with

¹⁷ The term suggests that certain phenomena are, to a substantial degree, brought into existence and sustained through the actual doing of them (MacKenzie, 2005: 9). In this sense, Callon suggests that if people are to trade and purchase goods in a 'market' (as opposed to any of the other ways the exchange of goods might occur) then the market has to be continually performed (in Pollock & Williams, forthcoming).

the notion of performativity (MacKenzie, 2005). Recent developments in the social and economic relations bringing together, integrating and shaping the T-O relationship - such as the commoditization of knowledge supply, the emergence of diverse knowledge skills that create a diverse division of labour, the emergence of new technology markets and contexts of use, the proliferation of and increasing contention over the knowledge economy and the changing importance of certain economic activities over others - provide the “material” and empirical basis on which interdisciplinary STS research could be based on and explore the T-O relationship. Further theoretical, analytical and epistemological developments that capture and address current socio-economic developments will provide a basis for a conceptual integration under which a certain history of existing research and literature could become useful to present and future students of STS and more particularly to the T-O relationship. There is a need, therefore, for a new integrated and updated sociology of T&O as a resource of solid academic identity and of reflexive planning by practitioners and policy makers. In other words, academic research in the field of T&O should catch up with empirical socio-economic developments in order to become useful. Academic researchers and analysts who struggle to construct an identity that makes sense given the social and economic reality they study and they are part of will profit from it. Furthermore, practitioners and policy makers seeking for applicable and relevant scientific knowledge in order to be able to insightfully plan and regulate will also be advantaged.

CHAPTER 3

RESEARCH DESIGN, ANALYTICAL CONCEPTS AND METHODOLOGICAL APPROACH

3.1 INTRODUCTION

A need for integration of the concepts and issues raised by the diverse literature reviewed in chapter two has been identified. This can happen through further theoretical and analytical developments able to capture and address the shaping of T&O in a consistent manner that reflects the multidimensionality and complexity of the socio-economic relations shaping T&O on a global and local scale.

Designing and organising a research project on such grounds was a difficult task, given the diversity of alternative analytical and theoretical approaches. For this reason, the encounter with the empirical research field proved to be helpful in formulating a research design. If the research field and its particular social and historical circumstances are the factors that direct research investigations, according to the Weberian teachings on values in social research, then maybe I should look at the particular research field more closely in search for a way to design a research that explores the shaping of T&O. The design and conduct of this particular research reflects a quite interesting personal journey of the analyst before the analytical and methodological developments that I suggest were crystallised into a more concrete proposition for an alternative research approach. Nonetheless, the suggested approach should be able to incorporate analytical dichotomies, such as, action-structure, micro-macro and global-local in explaining the shaping of T&O.

The chapter is structured according to the research design steps described by Miles & Huberman (1994:16-39). Firstly, I present the analytical concepts and tools developed and used in this study. Secondly, I formulate and present my research questions according to the conceptual framework. The third step is to define the case. That is to say, to define what I will be studying, in other words, the unit or units of

analysis (Miles & Huberman, 1994:25). Since the conceptual and analytical work is related with the redirection of analytical units, this issue will be discussed in the conceptual framework section. Here, however, more specific information on the case studies will be provided. The fourth step involves sampling, while the fifth and final step has to do with instrumentation, that is, to decide *how* to get the information needed. For instance, if one seeks to find out how suspects are arrested and booked, one may decide to interview people associated with this activity, collect arrest-relevant documents, etc. (ibid:35). The sections on case-studies, sampling and instrumentation are discussed together and then a discussion on the techniques of data collection and analysis follows. It is my hope that the alternative theoretical-analytical and methodological approach suggested and developed here will resolve the problems identified with existing literature on the relationship between T&O. In other words, this research is about developing an analytical grid that will help develop a methodology, a way of approaching the topic of the relationship between T&O.

3.2 REDIRECTING ANALYTICAL FOCUS: TOOLS AND CONCEPTS

3.2.1 On Action, Structure, Actors and Social Choice

Traditionally, sociology and social sciences in general are considered with the notion of action and the circumstances surrounding it. Along this, the SST perspective is considering with capturing the social choices (intended or not) that contribute to the shaping of technologies. However, social action and social structure are situated into various contexts and analytical purposes that may have various complicated meanings in different cases. The same is true for accounts on social choices and actions within STS and SST approaches. There is not a consistent meaning of the concepts of actions, structures and choices and there should not be one given the diverse, contingent circumstances and empirical contexts within which

such concepts are explored. The linkage of the concepts of action, structure and social choice with their particular context, is the key to providing a complete and consistent theorisation of social action and social structure, where consistency does not refer to homogeneity of meaning, rather to the illustration of such concepts as open to various interpretations and analytical uses. Analysts, then, “consistently” need to be aware that the particular context and analytical purposes of a study attach meaning to concepts such as action, structure or choice.

In this particular research, although there was an initial interest in action-structure debates, the concept of social choice occurred later on when exploring the field and gradually becoming familiar with studies on the SST. Social action, therefore, came to mean social choice while social structure refers to the conditions that generate, motivate, promote and finalise such a choice. In the context of this study, then, action can be spotted in decision-making processes where actors are planning and making certain choices instead of others in the context of managing T-O change and innovation. Such choices might include selection of technologies, that is, what to buy, what to invest on, what kind of expertise and other resources are needed, where to get them from and how to organise them. On the supply side, such choices might include how to design, what products to promote, what kinds of technological solutions to develop, who to collaborate with, how to maintain and expand their networks, towards which direction. Regulators need to decide how to regulate the environment of design, procurement and adoption of technologies, and so on. Social action is, therefore, seen as the possibilities open to a certain actor for making social choices in the context of strategic decision making and management, while social structure is seen as the factors that might constraint, limit or direct and condition these possibilities.

In the literature review it is shown that there is no agreement on the notion of action and social choice as well as on who the actor is and where and how action and choice emerges (for example differences between managerial, political process approaches, theories of the firm). Such controversies are challenging when designing research. It is argued here that particular attention should be placed on the choice of the focus of analysis. An analytical focus that will make more visible who the actor is and where and how action as social choice emerges is needed. It will also

contribute to the conceptual integration of the approaches reviewed in the previous chapter. For this purpose, a focus on “instances of T-O change” within the wider socio-economic environment they emerge from is suggested, while at the moment the concept of actor, the nature of choices and the way they emerge will be explored and defined by the field.

3.2.2 Instances of Techno-Organisational Change

The redirection of the analytical focus towards “instances of T-O change” and the way they are linked with their wider socio-economic environment within a global knowledge economy will provide a framework for analysis able to capture and make more visible the relations involved in the shaping of T&O by addressing social action, structure and choice. Instances of T-O change can be defined as the social situations where the biographies of technological artefacts meet with the histories of organisations and firms. The significance of these situations as important moments able to affect the future of the technologies or organisations is something to be decided and evaluated by the actors involved, according to their separate strategic plans. The importance of such instances for both technologies and organizations has been emphasized through various terms and research. Hyysalo (2004) for instance examines what he calls “visible handshakes” in the shaping of healthcare technologies and Vergragt (1988) calls them “critical events” which are crucial moments in innovation process where directions are decided, negotiated or consolidated and might affect future possibilities. Additionally, such instances have been studied as boundary objects (see for example Jensen, 2005), political spaces of inclusion-exclusion (Clausen & Koch, 1999, Clausen & Yoshinaka, 2004).

Such social situations have been conceptualized and studied in different ways and in different contexts where various aspects have been examined and attention has been given to alternative foci, according to the commitments of different intellectual backgrounds employed. In the context of this study a focus on T-O change instances is suggested because it is during the *instantiation*, *design* and *implementation* of such instances that a space and a social situation is created for the actors involved in it to

make sense of that situation which will lead to decision making and social choices in regard to the direction of the shaping of T&O. In this way, social choices, that is, the interplay between social action and structure linked with a particular context of T-O change become visible. Additionally, T-O change instances do not emerge out of nowhere; rather, from the formulation of socio-economic relations amongst various actors. It is important, for this reason, to identify and explain how such instances are linked with the wider environment of a global knowledge economy and how it might be configured differently in different local contexts and circumstances. The notion of a global knowledge economy is an ambiguous term. It has many facets, it has been conceived in many ways, many consider it as an undisputed fact while others question its existence and whether it constitutes a recent phenomenon or not. I will not get into the debate of defining the global knowledge economy. Given its ambiguity and lack of consensus in its use, however, I will use it for its analytical merit (see Vissers, 2003). This is to refer to the global, abstract social and economic environment of the relations of supply and use of technologies, knowledge and expertise, and other elements that comprise technological solutions looking their way out to instances of T-O change.

The phases of initiation, design and implementation of T-O change instances can provide a basis for a systematic exploration of different sets of social choices that actors involved in such an instance need to make (what to buy, how to design and so on). The centre of analysis of this study, then, is not a particular technology or a particular organization, rather *the social situation which is created when certain dynamics bring together certain technologies with certain organizational settings within the global knowledge economy and how this situation can be perceived and managed by different actors involved in it*. An exploration of how such instances emerge and how they are linked with the wider environment of the knowledge economy will be attempted. In other words, the shaping of the relationship between T&O will be accounted for more completely by a focus on the techno-organizational rather than on just the technological or just the organizational. That is to say, in this thesis there will be an attempt to pursue and develop the “techno-organizational” concept as a theoretical-analytical category that could provide a wider focus for studies on T&O. The techno-organizational change concept has been used elsewhere

to stress the mutuality of technological and organizational change processes (McLaughlin et al, 1999:7). It is argued here that technological and organizational change is not about two separate but mutually shaped processes, rather it should be seen as one process with different aspects. Additionally, the redirection of the analytical focus on instances of T-O change will help define the case studies and the unit of analysis. By producing case studies on a set of instances of T-O change rather than on firms will help locate social choice and social action as it emerges within these instances. Finally, instances of T-O change will give rise to the actors involved in them, their nature and the way they act and produce social choices.

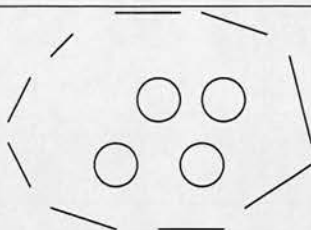


Figure 3.1: Particular instances of T-O change within abstract knowledge economy

The figure above represents instances of T-O change as social situations that emerge within a wider yet indeterminate socio-economic environment that could be captured by the concept of global knowledge economy. As this figure is not very sophisticated in illustrating how instances of T-O change are linked with the global knowledge economy, later on in the analysis chapter a more elaborate figure which is informed by the findings of this research is presented.

3.2.3 Actor's or Analyst's View?

The redirection of the analytical focus towards the instantiation, design and implementation of T-O change instances as it happens within the socio-economic relations of the knowledge economy requires methodological adjustments that will bring about the processes through which social choices are happening regarding the shaping of T&O. This is due to the heterogeneity and diversity amongst the actors that could be involved in a T-O change instance. The concepts of network innovation, distributed organizing and distributed innovation mentioned in the

previous chapter suggest that T-O change is taking place with the involvement of heterogeneous elements (resources, expertise, artifacts, etc.) carried into the T-O change instance by various actors (firms) through the development of networks. Since the necessary elements and resources for a T-O change instance to take place require the involvement of various heterogeneous and diverse actors with different roles, different strategic orientations and a different set of choices to make during the instantiation, design and implementation of a T-O change instance, the perspective of the analyst needs to be paralleled with the perspective of the actor. Although a focus on instances is suggested, methodologically a “follow-the-actor within a multi-actor socio-economic environment” approach should be adopted. The concept of “actor”, as mentioned earlier, at this stage of research is not entirely shaped. Therefore, an initial exploration of the empirical field will be necessary in order for actors as entities to emerge and take form. It is suggested, however, that the place to look for actors is the T-O change instance where social choices as actions emerge. Therefore, the process of paralleling the analytical view with the actors’ views is one unfolding in parallel with the emergence of actors as significant entities that produce social choices and shape the T-O relationship within social situations of T-O change instances. The exploration, then, of how different actors understand and become conscious of themselves and their environment, while they are emerging within T-O change instances, will reveal how social choice is differently framed in different contexts by attaching meaning to the particular social situation and in turn the challenges and factors that generate social choice. This will help theorize social action and structure as they are linked with the special context within which they emerge. In this way more voice will be given to the actors, that is to the empirical and pragmatic entities, to define the challenges and the significant aspects of T-O change regarding the choices that each actor needs to pursue in order to manage T-O change. In turn this will help the analyst produce theories and analytical frameworks to explore and explain these processes.

3.2.4 The Agora Metaphor

The concept of “Agora of Techno-Organisational Change” (ATOC) is introduced in the context of T-O change in order to capture the analytical space between instances of T-O change and wider socio-economic relations within the global knowledge economy, as conceived by different, diverse and heterogeneous actors. Let us see in more detail what is an Agora, why and how it is used, and which are its analytical powers.

Although in the modern Greek language the term Agora translates as “market” or “marketplace”, the ancient Athenian Agora was not just a marketplace equivalent to a modern shopping centre, it was also a place/space of gathering for Athenian citizens to discuss, exchange political views, socialize etc¹⁸. For centuries the Athenian Agora served as a busy marketplace where merchants and artisans had congregated to offer their goods to all who gathered and it also provided a platform for the Athenian political and intellectual life. It was the physical place where every Athenian citizen gathered to conduct their business, participate in their city’s governance, decide judicial matters, express their opinion for all who cared to listen, and elect their city officials (Thompson, 1985). The concept of Agora then, in the context of ancient Athens, refers to a physical space which served as a platform for the formulation of social, economic, political, commercial relationships and the exchange of material products, ideas, values and knowledge amongst Athenian citizens.

The Agora metaphor has been used in STS by Nowotny et al, (2001) in order to capture and explain the complex social and political processes involved in the production and use of scientific knowledge. This thesis, although it is not related to the work of Nowotny et al in terms of the research topic, could profit from the use of the Agora metaphor which can embrace and capture the formulation, maintenance or transformation of complex relationships between actors and the material and non-material, basis of these relationships, i.e. the type and nature of the resources circulated. Also, the discussion about commoditisation and marketization of expertise and innovation (see previous chapter) points to the direction of the

¹⁸ The word Agora comes from the Greek word *ageiro* (αγειρω), meaning “gather” or “assemble”.

emergence of a market, not just in the strict economic view, but rather as a format where social relations are developed and unfolded, technological products are bought and sold but also non-material aspects influence the way this market operates. This makes the Agora metaphor appropriate to be used as an analytical concept to capture socio-economic relations surrounding instances of T-O change where various diverse and heterogeneous actors are involved.

In the context of study of T&O in an era of globalisation, the Agora concept would not be restricted in a reference to a physical finite space; rather its more cognitive and non-physical boundaries should be explored and analytically exploited. For example, how come different actors from different parts of the world, involved in different kinds of activities, belonging in different industries, can be seen as being part of the same ATOC even though they might have not any relationship whatsoever with each other? Relevant to this is Giddens' (1989) discussion on space, time and place (in Heiskanen, 2003:10). Giddens argues on the distancing of space, time and place as an increasing phenomenon in modernity as opposed to pre-modern societies. Therefore, "when" does not coincide with "where" and "space" does not necessarily mean "place" (in Heiskanen, 2003:10-11). The notion of time still exists and plays an important role in social relations but it does not refer to a particular geographical place. Within a set of organised relations time could count differently for different parts within the space or have different significance. The meaning, therefore, of such notions like space, time, place is transformed as societies change. The combination of these concepts with each other is relevant to how one perceives them and it is very much dependent on the different situations that they are used. ATOC, then, refers to a space in a wider sense of the term within which local instances of T-O change are shown as emerging from and linked with socio-economic relations amongst actors within a globalized knowledge economy¹⁹.

For the purposes of this study the analytical capabilities of the ATOC concept will provide a template within which actors' social choices will be followed and explained, according to the methodological propositions suggested above. The space between local instances of T-O change and socio-economic relations within a global

¹⁹ For more on the notion of space, i.e. production of space, real vs. imagined space, material vs. non-material space, etc. see Heiskanen (2003) and Kaniadakis (2004).

knowledge economy will be identified as a significant terrain for the shaping of T&O within which the interplay between social action and structure will be theorised by looking at social choices made during those T-O change instances. In other words, the ATOC concept helps make visible an alternative analytical space but also an unexplored space for action within which social choices could become more prevalent. This will lead to a more comprehensive theorisation of social action and structure in the context of T-O change, thus, responding to the problems of existing literature identified in the previous chapter. Additionally, a contribution will be made to the establishment of a new terrain for practitioners' action and intervention, a new focus for the task of managing the challenges of T-O change, by enabling actors to conceive themselves as part of their external environment of a global knowledge economy.

It is important to state that the conceptual tools and analytical and methodological suggestions presented here emerged and developed during the processes of data collection and analysis along with the exploration of relevant existing literature, in other words, throughout the research journey of this study. While I was struggling to cope with the challenges of the above processes I gradually formulated my methodological strategy, my alternative analytical focus as well as the concepts that would capture the processes I wanted to explore. The ATOC concept for instance emerged during my attempt to integrate findings from my two case studies under a single explanatory scheme. Or the suggestion to parallel the analyst's view with the actor's view emerged from my realisation during fieldwork that the different people I interviewed were describing the same situation from a distinctively different point of view, depending on the firm they represented, their expertise and their position within organisational hierarchies. The choice to present them here in this chapter was made due to the need to construct a narrative and a thesis structure.

Nevertheless, the choices for the formulation of this particular research design were developed from a combination between the inconsistencies and shortcomings stemming from the diversity of analytical foci in the existing literature and the gradual appreciation of the empirical context while the research process was unfolding. Given the gradual appreciation of the empirical context where the concepts of "distributed organising" and "networked innovation" were illustrated as

indicators of innovation taking place between rather than within certain actors, a redirection of the analytical focus towards instances of T-O change and their links with their wider socio-economic environment would analytically open up such a space. Within this newly identified “terrain” the production and promotion of social choices as they emerge together with certain actors could be captured and explained better as generated within such multi-actor, multi-level and distributed social situations. This would avoid inconsistencies stemming from an *a priori* focus on certain technological or organisational outcomes that single design and implementation studies could produce and capture social choices “in-the-making”. Additionally, the selection of the particular case studies, which include actors that are not directly involved with each other in a commercial or contractual relationship, although it happened based on the contingencies of organising and gaining access to the field, it proved to be particularly beneficial. This situation offered insights for the conceptualisation and development of the ATOC as a space for innovation. For example, the fact that actors from the two case studies did not have any present relationship with each other does not mean that they do not have any relation at all. They are part of the same socio-economic environment captured by the ATOC concept and they exist as possibilities for each of the actors in terms of the options and choices that link development, supply and use of T&O. This also made possible the identification of the non-choice, as it will be shown in chapter seven, as a possibility for action, which refers to the possibilities for choice that were not selected.

After the fulfilment of the goals of this thesis, I hope that the concepts developed here will be established and accepted as both useful analytical tools which mark and represent new areas/fields for scientific enquiry but also as useful concepts within which practitioners will be able to use in understanding their environment and themselves as part of it while developing strategy and managing T-O change. Along such lines, I will now discuss the ATOC as an alternative spatial concept contrasting it with various similar ones.

3.2.5 ATOC: An Alternative Spatial Concept

With the gradual appreciation of the distributed and networked character of innovation, spatial concepts that capture and embrace spaces within which social and economic relations and processes of innovation are formulated in multiple levels of understanding, are extremely important. Such concepts open up alternative empirical research fields, or rather, alternative ways of approaching and accessing the empirical reality, and help analysts to clarify and make sense of complex situations. The ATOC, as an analytical concept could be contrasted with any such spatial concept. Reference is made here to a few of such concepts.

“Innovation space” (Tidd et al, 2005:10-13), is a concept which attempts to map various different types of innovation (product, process, position, paradigm) and the variety in the degree of novelty they might project (radical – incremental). Although the “innovation space” concept implies the existence and importance of multiple levels of innovation, through the different degrees of novelty and scale of changes, and although it allows for the presence of innovation strategy and management, it fails to illustrate how multiple actors might co-exist in such a space, how they produce social choices and how these are shaped and negotiated through political and power relations. In other words, this is a managerial model providing a generic map of different types of innovation, however, it does not necessarily refer to a system or a nexus of social and economic relations amongst various diverse actors, in the way the ATOC concept does.

Another similar spatial concept is that of “development arenas” (Jorgensen & Sorensen, 1999). Building on ANT, the “development arenas” concept illustrates the interaction of “actor-worlds” around the development of certain technologies. Although “development arenas” is a useful spatial concept that captures important socio-economic dynamics in the development of technologies, it could be argued that it provides a rather restricted view of T-O change. The reasons for that are associated with an artefact-centrism this concept is based on where actor-worlds interact around the development of particular technologies. The ATOC concept provides a wider frame as it includes global abstract relations and integrates them with local particular social situations. In that sense, there might be various development arenas within the

ATOC and contribute more or less significantly in various techno-organisational configurations. For instance, as we will see in chapters five and six, the development arena of banking integrated software packages could be identified as part of ATOC as it appears in the two case studies.

Finally, concepts such as “technological frames” (Bijker, 1995) and “practice-bound imaginaries” (PBI) (Hyysalo, 2006) could be contrasted with ATOC. These concepts could be seen as spatial concepts in the sense that they constitute sources that provide references and metaphors for design and/or implementation of technologies in various contexts. They, therefore, refer to design and implementation spaces. More particularly, “technological frames” is a concept that provides shared assumptions, knowledge and expectations through which relevant groups give meaning to an existing or emerging socio-technical configuration (McLoughlin, 1999:160). The concept of ATOC as an analytical space, however, includes wider processes and social relations beyond such configurations and moves away from strictly organisational understandings of the T-O relationship. Additionally, the exploration of ATOC both as an analytical space but also as a space for action/practice allows for a more material presence of socio-economic relations, rather than just the metaphorical presence suggested by the notion of frames. The material reality is more present in the concept of PBIs, as metaphors and representations are rooted in social practices, however, social choices in-the-making cannot be accounted for with this concept, only *a posteriori*.

The ATOC concept is an alternative spatial concept seeking to integrate multiple levels of analysis in exploring and understanding innovation as it takes place in the space between local T-O change instances and the global knowledge economy. In doing so, the production, promotion and negotiation of social choices in the socio-economic space amongst multiple and diverse actors is highlighted as essential in the exploration of such a concept. The following research questions aim at the exploration and understanding of the socio-economic space the ATOC concept represents.

3.3 RESEARCH QUESTIONS

According to Punch (1998), research questions, in general, do five main things:

- They organise the project, and give direction and coherence.
- They delimit the project, showing its boundaries.
- They keep the researcher focused during the project.
- They provide a framework for writing up the project.
- They point to the data that will be needed (Punch, 1998:38).

The formulation of the research questions for this study, however, reflect an unfolding research process, a journey that reveals a gradual change, or rather the gradual formulation of my research agenda. The illustration of this evolution in the formulation of research questions will add more value to this research as it supports the argument of linking or aligning theoretical and analytical developments with empirical socio-economic changes that shape T&O, in other words, that analytical and theoretical development has or should have a basis in reality.

My initial attempt towards pursuing a conceptual integration of STS studies for the exploration of T&O was to produce a more theoretical approach based on action-structure and micro-macro debates. By involving such analytical distinctions/debates I wanted to improve the theoretical treatment of T&O. Drawing on Mouzelis' suggestion that action should not be associated only with micro and structure only with macro levels (Mouzelis, 1995:155), I had conceived an analytical basis in order to explore how the action-structure and micro-macro concepts could be combined in the study of T&O towards a multi-level understanding. The empirical basis for this theoretical endeavour would be cross-sector, cross-national, two-by-two case studies of firms in Greece and the UK. However, this was at a stage that I had no fieldwork experience and my reading of STS literature was very limited. Nonetheless, an initial set of general and theoretical research questions developed and they were focusing more on exploring action-structure and micro-macro in the context of T&O.

More particularly I was directed towards exploring what constitutes action and what constitutes structure within a multi-level reality, that is, to see how action

and structure expressed at various analytical levels (micro, meso, macro).

Subsequently, I wanted to explore how the links between such levels could be captured through conceptualising and putting in motion the action-structure interplay as it could appear in various levels and how this interplay was revealing a dynamism between different levels of analysis (i.e. tensions between global-local) and contributing to the shaping of T&O. Initially, then, I had identified a need for further theoretical and analytical developments in the study of T&O by embracing the analytical distinctions of action-structure and micro-macro (with global-local being a certain version of it) but having no clear idea of what could be counted as action or structure; the initial research questions were directed towards defining these concepts.

Entering the fieldwork and further engaging with relevant literature, however, helped me formulate more particular research questions along with developing original analytical concepts and tools that could capture the reality that I was experiencing. During my interviews the commoditisation of knowledge and technology supply became apparent where supplier-user relationships were playing an important role in how technologies were coming in contact with various organisational contexts. In such commoditisation processes I could see that technologies were integrated with organisational elements and constituted configurations that could be developed, sold and bought within networks of supply and use of technological solutions for organisational/business problems (see analysis and concluding chapters).

In such a context the concept of action was associated with social choice during decision-making and management of T-O change, while the concept of structure was associated with the factors conditioning the emergence of such choices. Additionally, the concept of the actor was starting gradually to become clearer in the context of the research. As research was unfolding business firms started crystallizing as important actors. User and supplier firms that go through decision-making processes for the production/deliverance of social choices were emerging and in turn directing my focus of analysis towards social choices produced by such actors. If action and social choice, however, become completely identified with the actor-firm, the importance of inter-organisational networks will be downplayed and

inter-firm relationships will analytically disappear, since social choice will be seen as emerging from individual actors without any influence. Fincham et al (1994), for example, have shown the importance of networks of expertise in innovation where it is prevalent that when a firm makes a choice to buy or invest on a technology this is actually an investment on networks of expertise. A firm-based theory of technical and organisational change, then, has to be carefully conducted because although firms might appear as the legal entities that produce social choices, the emergence of these choices does not lie within the firm's organisational structures, but rather on networks of inter-organisational relations. On the other hand, social choices as conceived by political process approaches - as emerging through conflicts and negotiations at the organisational level -- cannot be neglected as well. This thesis will attempt to integrate such approaches systematically and show how action can be theorised and conceptualised in such a context.

In summary, the evolution of the formulation of research questions for this thesis started with a realisation for further theoretical development that would offer the grounds to provide an integrated theorisation of T&O based on analytical distinctions of action-structure and micro macro. This led to a set of general and theoretical research questions. As the fieldwork research was unfolding social choices emerged as actions and business firms were crystallizing as significant actors within a wider socio-economic environment within which instances of T-O change were initiated, designed and implemented. This led to the development of the concept of ATOC to capture the socioeconomic relationships and map out an environment of supply and use of technologies and knowledge, which generates social choice during T-O change. The ATOC concept, it might be argued, is an analytical response to the pragmatic and empirical integration between technologies and organisations into configurations that constitute solutions to business problems. In other words, my exposure to the field and my encounter with the emergence of the commoditisation of technology and knowledge supply and use led me to the development of the ATOC concept but then further questions emerged on how the social and economic relations captured by ATOC work. A second set of more particular research questions on what ATOC is, how it operates and what is the role of actors within it, was developed. This second set of research questions was also

directed to the improvement of the theoretical and analytical treatment of T&O but through showing how ATOC works and how actors-firms appear as the producers of social choices as actions within it.

Given the above evolution in the development of the research questions of this study the final questions will be presented here. The first set of questions refers to T&O in more general terms while the second is more particular and refers to the ATOC.

General Research Questions:

1. How can the relationship between T&O be understood in the context of this study?
2. How can the concepts of action-structure and micro-macro (global-local being a certain version of it) help improve the theoretical and analytical treatment of the T-O relationship?

Particular Research Questions:

1. Within the space between local T-O change instances and the global knowledge economy, which are the social and economic relations the ATOC concept is referring to and which are the dynamics shaping them and the way ATOC operates?
2. How is the ATOC environment challenging during instances of T-O change and how do actors strategically manage them?
3. How can the ATOC be understood in terms of actors' strategies and social choices on the management of T-O change?

While the first set of research questions refers to a more general theorisation of T&O by using fundamental theoretical/analytical distinctions/debates in social sciences, the more particular research questions refer to ATOC and how it operates. The first question, for instance, aims at defining what ATOC as a phenomenon that is empirically studied is, what is its nature and what are its driving forces. The second question aims to show how such an environment may be challenging for the actors involved in it, in other words how and under what grounds this environment can

generate action during T-O change. Finally, the third question aims to show how social choices during the management of T-O change constitute actions that shape the relationship between T&O within ATOC. The last two questions will also give insights on the relationship between actors as they emerge from fieldwork and the environment within which they operate.

As it is shown here, research questions, especially in qualitative research, may be *unfolding* rather than *pre-specified* (Punch, 1998:23). The evolution in the development of the research questions illustrates important aspects of the co-development between theory and empirical practice and the importance of the field itself and the subjects studied in the contribution to the analysis and to theory building. Exploring the above research questions will be a first step in finding out how this study can fulfil its purpose, that is, to provide a basis for an integration of STS literature that could be used for the study of the T-O relationship in an interdisciplinary manner that bridges the gap between theoretical-analytical, pragmatic and empirical developments.

3.4 CASE STUDIES, SAMPLING AND INSTRUMENTATION

A case study takes as its subject one or more selected examples of a social entity - such as communities, social groups, organisations, events, etc. - which are studied using a variety of data collection methods (Hakim, 2000:59). Punch (1998) argues that a case could also be a process (Punch, 1998:152). In this study, as stated previously, the object of study consists of instances of T-O change within the wider social and economic environment within which they emerge. As mentioned earlier, actors appear in this unit as firms that are called to be engaged in the production of social choices within such instances. Actors are represented in a T-O change instance by physical persons involved in it or by means of structures such as legal framework, directives, standards. These physical persons as well as relevant documents would be the sources of information. This is not to say that the firms themselves are

unimportant as entities to be at the centre of analysis. On the contrary, the firms involved in this study are very important sources of social action. This action, however, emerges and becomes visible within instances of T-O change, which are the multi-actor social situations within which social choice is produced.

The process of selecting units of analysis is called sampling (Miles & Huberman, 1994:27). Sampling here is purposive rather than random which means that there are certain criteria under which I chose the social situations that serve as instances of T-O change comprising the unit of analysis. This could be done in many ways. For instance, one could first select a team of firms and from then go on to identify moments in their history or relevant activities they are involved in that could count as instances of T-O change. Another way would be to directly identify significant T-O change instances (i.e. restructuring programs) and from there on to map out the various different firms/actors involved in it. In this study both of the above happened because of the specific route of my research journey. Let me explain:

The scope of the study and the development of the sampling strategy evolved in the same manner that my research questions did. As stated earlier, initially the aim was to conduct two cross-national and cross-sector two-by-two case studies around banking firms and IT firms. The exploratory nature of the study led to the gradual formulation of the scope of the study and the types of case studies that it will include. A redirection of the analytical focus from case-firms to instances of T-O change as more appropriate in an attempt to reveal social choices helped expanding the scope of the study towards a more extended theoretical exploration of the cases. This expansion became possible due to a deeper appreciation of the empirical field and the nature of socio-economic relations of supply and use of T-O solutions. This expansion of the scope, therefore, was not theoretical but pragmatic since it was allowed by the nature of the social and economic relations amongst actors in the empirical field. This made possible the involvement of a wider range of players (suppliers, consultants, users, etc.) and the exploration of the relationships among them, rather than focusing only on case-firms, which would offer a restricted account of the shaping of T&O. To put it simply, I expanded the scope of the study because I realised I could do so.

A focus on instances of T-O change served as a methodological device to guide my snowballing technique and the scope of my first case study. More particularly, I identified a T-O change instance in a Greek Bank (GB) as a starting point, and I snowballed my way out. I, therefore, interviewed people from various expert firms and organisational structures of the bank that were directly involved in it. Firstly, I met an external consultant that was involved in the change program. He then introduced me to people from the bank and other consultants and suppliers. The scope of this case study, then, was determined by the scope of the particular T-O change instance. While collecting data for this case, it started becoming apparent that suppliers and experts involved in the instance were quite important for its direction and control. This directed me to look for actors in the supply side for another case study. It also became apparent that different people interviewed were expressing different views and were interpreting in different ways the same social situation they were involved in. This led me to the development of the idea to use the differing views of the different actors as analytical lenses, thus, paralleling my analytical view with the actor's view. This methodological decision led to the sampling of the second case study, where I did not start from an instance and work my way out; rather, I started from a particular actor, a System Integration Firm (SIF) from the supply side and looked at their involvement in the initiation, design and implementation of series of T-O change instances. The actors selected do not constitute the case studies. They rather provided two different angles, two different nexi through which a set of multiple T-O change instances was examined. One was the instance in the GB and the others were instances that the SIF is involved in. This way, both the supply and use sides involved in the shaping of T&O were examined also allowing for fruitful comparisons between the GB change program and SIF's projects, in terms of how they were managed. It is important to state that GB and SIF are not currently involved with each other in any kind of relationship. This is because of the form of my access to the field but also it will be challenging to show why and how two firms that are not in any form of relationship might be seen as part of the same socio-economic environment.

Although the particular national and industrial context of this study will be discussed in more detail in the next chapter, a few words are necessary at this stage

as a justification of the choices to study the specific cases. Relevant literature in Greece on the relationship between T&O is minimal. Most of the studies that have been conducted regarding technological and organisational issues in Greece have not been produced within the prism of a specific discipline or an area of studies. This is not to say that T&O in Greece is studied according to interdisciplinary principles. This would presuppose some sort of cohesion in the methods used or in the kind of bibliography that various authors draw upon. Rather the study of T&O in Greece is a collection of dispersed accounts not linked with each other, written mostly by engineers, architects and regional scientists (see Sefertzi, 1998). Due to the condition above, it is quite difficult to locate and identify relevant literature with some form of consistency in order to review it and reach valid conclusions. This shows that the national environment of Greece is an understudied field with many inconsistencies and incoherencies. It, therefore, provides an excellent virgin area for studies on T&O to be empirically, but also theoretically and analytically, studied. The banking industry in Greece is an appropriate sector to look at for the purposes of this study. Banks, due to strong competition and due to newly introduced programs of techno-organisational restructuring, are almost constantly in the process of reshaping their technologies and accordingly their work content. Additionally, the banking industry in Greece is ideal for studies of new technology applications because it constitutes a pioneering industry, in that aspect, in the service sector as a whole (Stratigaki, 1996:43). The IT sector, respectively, is the fastest growing sector in Greece and exhibits a substantial degree of indigenous technological development. It, therefore, provides cases of advanced players in the field.

Regarding the issue of generalisability that case studies suffer from (Punch, 1998:153-156), it is argued that generalisability, in the sense of identifying commonalities in a wide population the way a survey does, is not one of the goals of this study. As Yin (1994) argues, empirical studies do not only provide generalisations to a population but also to theory. Since this study is aiming at advancing theoretical-analytically the shaping of the relationship between T&O, rather than just to produce empirical findings *per se*, generalisations will be attempted in relation to how the relationship between T&O can be theorised. Additionally, while attempting to link individual local instances of T-O change with

the wider socio-economic environment within which they appear, it will be shown how local individual cases can be seen as a part of a wider general socio-economic environment. It is suggested, therefore, that linking individual cases with wider relationships and environments extending outside these cases, provides a new, alternative meaning to the principle of generalisability in social research.

The fifth basic step of a research design, as described by Miles & Huberman (1994) is instrumentation, which provides a plan on how to get the necessary information from the field (ibid:35). First of all, access to the field is needed. Contacts with people from firms, other academics in Greece that might have relevant access was a strategy that was followed. In both cases (a consultant for the GB case and an academic for the SIF case), I established contact with one person and then I worked my way through getting in touch with the rest of my informants. In terms of the types of informants and the questions that needed to be asked in order for the necessary information to be extracted I asked people from various hierarchical levels within the firms involved in the examined T-O change instances. Access was, thus, gained to various kinds of decisions and choices that needed to be made during the initiation, design and implementation of those instances. In order to formulate an idea of what the instances examined are about as well as the nature and the role of the actors involved, relevant questions regarding general processes, activities, firm histories, profiles, were asked. This is discussed in more detail in the following section on data collection and analysis.

3.5 TECHNIQUES OF DATA COLLECTION AND ANALYSIS

The main techniques of data collection used for this research are semi-structured interviews and documentary analysis. It is often appropriate and necessary to combine different methods of data collection and analysis, as limitations in one method can be compensated for by the strengths of a complementary one (Marshall

& Rossman, 1995:99). The information collected by interviews was, therefore, supplemented by documentary analysis.

3.5.1 Interviews

Interviews are defined as "encounters between a researcher and a respondent in which the latter is asked a series of questions relevant to the subject of the research. The respondent's answers constitute the raw data analysed at a later point in time by the researcher" (Ackroyd & Hughes, 1983:66). Since the goal is mainly to explore the respondents' experiences, views, opinions and ideas in relation to the shaping of T&O, semi-structured interviews were used. As Arksey and Knight (1999) argue, semi-structured interviews are qualitative data gathering techniques that are designed to obtain information about people's views, opinions, ideas and experiences (Arksey & Knight, 1999:96). In semi-structured interviews, there is a thematic guide that serves as a framework for the main body of an interview, and it is based on the key questions that the study is addressing (Arksey & Knight, 1999:97). This includes probes and invitations to respondents to expand on issues raised by seeking further elaboration, clarification, the use of specific examples and so on (Fielding, 1988:212; Arksey & Knight, 1999:97). While designing interviews, I start by devising a wide range of questions, eliminating any that are unlikely to contribute towards answering the research questions, piloting to see how well the remaining questions work and revising accordingly (ibid.). Since the access to the field is quite limited, a proper pilot study seemed unrealistic. Alternatively, I incorporated piloting with the actual interviews by attempting to improve my questions and my interview approach interview after interview. It is difficult to interpret the data from the first interview with a discourse used for the last one. The experience I gained while interviewing, however, helped me do so. In cases where uncertainty of meaning was very prevalent I had to contact the informant again via email or telephone and ask for complementary specifications. This happened on two occasions.

3.5.2 Informants

Various groups of informants were identified beforehand during the research design process. I had a rough idea that I would speak to bank managers, bank workers, technology suppliers and consultants for the GB case and also managers and technical staff from the SIF case. Going into the field and gradually becoming aware of the social organisation of the activities and the situations I was exploring (i.e. organisational structure of the bank and various levels of hierarchy and different kinds of expertise), the groups of informants became clearer. In the GB case my informants consisted of: *top managers* of the bank, *branch managers* and *branch employees*. I also spoke to people from the various specialist firms and technology suppliers involved in the GB project. The structure of the project and the various tasks that had to be done required different kinds of expertise and resources and that made necessary the involvement of different kinds of actors. Apart from the bank people, therefore, I spoke to *managers* and *technical specialists* from the various external firms involved in the project. Regarding the SIF case, the identification of possible informants took place with the involvement of my academic contact. He pointed out people that I could speak to from various departments, organisational units, hierarchical levels and types of specialty within SIF. Then, he phoned them one by one and we arranged appointments for meetings. For the SIF case, then, my informants consisted of *top managers* and *general directors* of SIF, *middle managers* of different divisions and organisational units, *technical specialists* and programmers. I also had weekly meetings with my academic contact discussing my progress with interviewing. These discussions helped me to put in perspective the information I was collecting from interviews. Additionally, although I accessed information on various customers and suppliers of SIF, I did not think it was necessary to contact them for interviews since they are different actors and given the suggested methodological approach, things would become confusing when following different actors simultaneously.

GB CASE	SIF CASE	BOTH CASES
2 top bank managers	3 top managers of SIF	
4 branch managers	2 pre-sales managers	
6 branch employees	1 R&D manager	
2 organisational processes firm(OPF)	3 Information Services Division managers	
1 consortium leader firm manager	2 sales managers	
1 software package representative	2 IT programmers and technical specialists	
1 risk management firm manager	1 top manager of a financial technologies firm	
1 sub-contractor firm to OPF, manager	1 academic consultant to SIF	
1 general project manager		
TOTAL: 20	TOTAL: 15	TOTAL: 35

Figure 3.2: Number of interviews for the two case studies

A pre-specified number of necessary interviews is not important at the research design phase. It is important to conduct the right amount of interviews that could provide the range of perspectives needed for a study, including the confirmation of this information. I had planned an estimated amount of interviews, approximately fifteen to twenty for each case study. I eventually conducted twenty interviews for the GB case and fifteen for the SIF case. More particularly, as figure 3.2 shows, for the GB case I spoke to seven external experts representing various specialist firms (suppliers and consultants) within the GB restructuring project. All of them had various positions within the project's organisational structure (i.e. project managers for the various subprojects and one of them was the project manager of the whole restructuring project). Two people from the top management of the bank were also interviewed as well as four branch managers in branches around Athens and Crete. Finally, I interviewed seven branch employees from various branches. For the SIF case, I interviewed people from all hierarchical levels and organisational units of the firm. They had either engineering or business backgrounds, or both. I also interviewed the director of a financial technologies firm closely associated with SIF and I had several meetings with my academic contact. During planning and conducting interviews I tried to have a wide representation of various types of informants in order to get a more complete picture of what I was looking for. The

themes discussed with my interviewees were not only related with their particular role or tasks that they were involved in, in relation to specific instances of T-O change, but also with their views, perceptions and ideas of the wider environment within which they operate. I was asking, for instance, top managers to describe and offer their opinion on the general business environment both in Greece and internationally. Since most of them were highly educated people, with post-graduate training and PhDs, and with many years of experience in the area, they were quite opinionated and reflexive regarding their activities and the conditions of their environment. This served as a mechanism to sketch the multiple levels that could be conceived as important in the shaping of T&O, as they are conceived by the views of different actors.

Most of the interviews were tape-recorded, then transcribed and qualitatively analysed. In the SIF case some of my informants refused the recording of our conversation but they were very happy to go into details about anything I wanted to know. In these cases I kept notes and whenever something important was mentioned I asked them to give me time to write it down. Quotes used in the case studies chapters from such interviews were documented in this way. This issue was not a barrier for my research. My informants were more comfortable to express their views and talk about topics that they would normally not talk about to an outsider like myself, given a general suspicion about people in the world of business. It would also be unethical to insist in using the tape recorder as I could lose any trust that they might have invested in me. Finally, all informants were before hand ensured of the confidentiality under which the data was collected and they were assured that there would be no disclosure of any relevant information to anyone else besides myself. For this reason, interviewees and names of firms were anonymised, although the positions of my interviewees within organisational hierarchies and the types of firms they represent are factual.

3.5.3 Analysing Interviews

In relation to the analysis of the data, at an early stage of the collection I was looking for significant themes, issues, parameters and patterns that might seem important based on the interview themes that I had prepared. These themes and patterns would help me later on in structuring my thesis while writing it up (Arksey & Knight, 1999:161 provide good guidelines on how to analyse qualitative interviews). More specifically, during and after the collection of the interview material I proceeded to the *indexing of data*, that is to say, chunks of speech were coded and cut out of the transcript and pasted with similar items under a category or topic heading (Arksey & Knight, 1999:163). The next step was to *retrieve* the data, which means to search for all the information about a particular topic or theme that has been indexed under the same code (ibid:167). The last step was to *interpret the data* to generate meaning from them according to the goals of my project (ibid:169). Miles and Huberman (1994) list a few tactics for generating meaning among which are: note patterns and themes; look for concepts that describe related observations; try counting to see whether something is as common (or as rare) as it seems; compare and contrast to see whether categories are distinctive, and whether they need to be split, etc. (Miles & Huberman, 1994:245-261). In this way while data collection was still in process, the process of data analysis had already started. Of course, the themes and issues identified were changing during the life-cycle of the research process, new themes were emerging and old ones were transformed or merging with others. Eventually, a way that the interview data could be utilised for the purposes of this thesis was finalised based on their incorporation into the analytical concepts suggested previously (i.e. techno-organisational change and ATOC).

3.5.4 Access to Informants and Practical Considerations

Previous studies on firms in Greece stated that firms, especially large ones, are usually very open to researchers because they have very well developed public relations departments, due to the open marketing that they follow. In the beginning

of my fieldwork, however, I encountered rejection and unwillingness from various firms that I approached. This happened in a number of cases when I was contacting the PR departments of these firms. As I was routinely denied access to the field, I decided to contact individual persons working in these firms, or that had some sort of relations with these firms, based on my social and informal networking while staying in Athens. In this way, I managed to get an interview with a person from a consultancy that was involved in the GB project and from then on, through snowballing, I managed to get access to the field despite the initial rejection from the central PR departments of the firms that I contacted. Learning my lesson from the GB case, I did the same for the SIF case and through my academic contacts in Athens, I gained access to the field²⁰.

Another problem that I had to overcome when conducting fieldwork was the difficulties in communication due to the difference in discourses used by my informants and myself. This was the basic issue that I was dealing with when updating my interview questions and my interview themes. I was trying to phrase my questions as openly as possible in order to avoid misunderstandings and to make sure that both my interviewees and I could understand each other. Eventually, I familiarised myself with technical and professional jargon and interview after interview was getting easier in that sense. Patience and constant updating of the questions and the interview themes used in my discussions with my informants, therefore, solved this problem.

Finally, a problem that emerged with interviewing was that in some cases my potential interviewees were suspicious of the role I was playing, especially when I was asking to interview people in the low echelons of organisational hierarchy. This problem appeared mainly in the GB case. Since the restructuring project was still in progress, questions raised suspicion on behalf of the branch employees and branch managers. Some of them thought that I was sent there by the central management to control them and evaluate their performance. In most cases where I was interviewing branch staff I spent the first minutes of the interview explaining who I was and why I want to interview them. This put their minds at ease, though not completely. I was

²⁰ See previous section, on instrumentation.

also conscious of the way I look and the way I was dressed. I did not want to look too informal when speaking with managers, but not too formal either in an intimidating and authoritative way.

3.5.5 Documentary Analysis

Documents can tell us a great deal about the way in which events were constructed at the time, the reasons employed, as well as providing materials upon which to base further research investigations (May, 1993:133). Also, documents do not simply reflect, but also construct social reality and versions of events. That means that they may be located within a wider social and political context (ibid:138). In this case, there are different types of documents that may be used. The allocation and use of relevant documents will depend on the aims of the research, the researcher's perspectives, but also at the time and resources available and the problems encountered in the collection of data (ibid:140). At this point, I refer to the types of documents that might be interesting for this research, the sources that I might get them from and also availability issues.

First of all, the necessity of using document analysis for this research will be illustrated. I chose to use documents primarily for the following reasons: Firstly, through document analysis I aim to achieve a credible characterisation of the contextual elements at the various levels of analysis (T-O change instance, firm profile, wider environment, regulatory frame). The second reason is to supplement and verify data collected through interviews. Thirdly, through the use of documents a more accurate historical account of the examined cases becomes possible. Finally, various other actors are involved in the shaping of T&O but do not physically participate in instances, thus becoming visible (i.e. regulatory bodies, the state, standardisation committees, etc.). I will, therefore, use documents that refer to the firm, such as company accounts and annual reports; relevant EU and Greek legislation that might apply to the examined cases and have a significant effect on the characterisation of the socio-economic environment; during fieldwork, power point

presentations and proposals from suppliers and consultants became available which provided an understanding of T-O change instance as a process with different phases.

In terms of analysing document data, according to May (1993), qualitative content analysis starts with the idea of process, or social context, and views the author as a self-conscious actor addressing an audience under particular circumstances where the task of the analyst becomes a "reading" of the text in terms of its symbols (May, 1993:146-147). This case also is about conscious writers addressing to particular audiences. Examples of the opposite would be, for instance, diaries, novels, personal letters, etc. Additionally, this relates to the aim of the study and the research questions. In the qualitative content analysis, therefore, I will pick out what is relevant for analysis and piece it together to create tendencies, sequences, patterns and orders (ibid:147). During this process, then, theory is generated, modified and tested from the particulars of the document to a general understanding of its context and ways of representing the social world (ibid.). In other words, the documents that I collect and analyse are seen as representations of a reflection of reality, but I will also consider them as representative of the practical requirements for which they were constructed (ibid:137).

GB CASE	SIF CASE
GB annual report 2000	Annual reports 2003, 2004
Software package leaflet	Data on SIF from previous research by my academic contact
Bank of Greece regulatory acts	Examples of proposals
1 existing research paper	Drawings by my interviewees
3 power point presentations by internal and external specialists	SIF website
GB website	

Figure 3.3: Documents available in relation to the two case studies

Regarding data availability, most of the types of documents mentioned above were easily accessible, even through the Internet. Firms, for instance, very often put their annual reports in their web sites. Also, regulatory acts are not hard to access through Internet websites and the university's libraries. The most difficult documents to get hold of were the power point presentations and other solution proposals, which

were accessed through contacts with individuals in addition to the interview I had with them. These were difficult to access because a certain level of trust was needed in order for people to be convinced to make available such documents to me without fearing that I would betray the rules of confidentiality implied by the levels of trust built between my interviewees and myself.

3.6 SUMMARY

In this chapter I explain how the research design for this study was developed. I discuss how the motivation to conduct this study, but also the practicalities of conducting fieldwork, have influenced the formulation of this study. More particularly, I discuss the development of alternative analytical concepts. I say how my research questions were formulated while research was unfolding, followed by the case studies and their scope, and the processes of sampling and instrumentation. Finally, I present issues on the processes of data collection and analysis.

In the following chapters, before proceeding to the presentation of the case studies and the analysis of the empirical data, there is a chapter providing information on the context within which the case studies are happening. This context refers to the particular industries (banking, IT), globally, nationally and organisationally and how various dynamics and societal and economic transformations have lead to the present condition.

CHAPTER 4

GLOBAL AND GREEK BANKING AND THE SUPPLY OF TECHNO – ORGANISATIONAL CHANGE

4.1 INTRODUCTION

This chapter serves as a link between the research design chapter and the presentation of the two case studies. Specifically, it sets my research questions within a more particular context, thus providing an empirical basis for the development of theoretical and analytical work. Furthermore, it also provides a social, economic and historical framework within which the particular empirical case studies will be explored in the following chapters. In short, it is the last phase of the research design and at the same time the first step into the presentation of the empirical material. While exhaustive details concerning the particular developments and specific characteristics of the banking or the IT industries lie beyond the scope of this study (I do not intend to tell the deregulation story one more time), it is necessary to discuss some historical and general characteristics: The importance, for instance, of T-O changes in banking as well as the development of a global supply of T-O solutions for banking (and not only). And also, particular characteristics of the Greek banking and how the global development of T-O supply have touched upon the Greek banking industry.

This chapter, finally, illustrates the integration and the commoditisation of technology and organisation as it historically evolves and takes on a global scale in relation to various industrial fields of the economy and to banking in particular and explores both the development of a global supply of T-O solutions and their association with banking at an international and national level.

4.2 RECENT DEVELOPMENTS IN THE GLOBAL AND GREEK BANKING

Recent changes in the regulatory environment of the financial services along with rapid technological advancements (Harrison, 2000; Claessens, 2002) - both of which are part of a globalisation process, within or towards a more knowledge and IT intensive international economy (Fincham et al, 1994) - have changed the nature of the industry and also the competition within it (Harrison, 2000). The harmonisation and balancing of the link between trade liberalisation and domestic deregulation hold great importance in ensuring effective international competition in the financial services industry (Claessens, 2000). Successive deregulation has broken down the traditional lines of demarcation that once served to limit competition and as a result, non-financial institutions are also able to enter the competitive arena (Harrison, 2000). Banks, consequently no longer provide unique services within the financial services industry, but resemble all the other firms and organisations which are part of a competitive environment (Claessens, 2000). It seems, then, that although banking still plays an essential role in the modern economy, banks are not (Furash, 1993:20) as a distinctive type of institutions defining a whole industry. Such changes are altering the nature of banking fundamentally in many industrialised parts of the world (Nelson, 1999:265) bringing banks into a difficult position, which has been characterised as “the most serious bank crisis since the Great Depression” (Furash, 1993). Due to this difficult situation banks, both corporate and retail, lose most profitable customers to their competitors while retaining their most costly clientele (Nelson, 1999:265).

The segmentation of the market for financial services, which was introduced through deregulation and trade liberalisation, has increased competition, which banks must now face. Banks, as a result, lost the traditional role within both the market and economy. There were variations in different national banking systems in the way this crisis emerged and also in the way it was perceived and treated, due to differences social, economic, political and historical differentiations. Nonetheless, the increasing globalisation of financial markets and of the economy in general highlights the similarities of different national banking systems rather than their differences,

especially regarding issues on T&O, a highly globalised domain. In the following I will track how these developments in global banking affected the Greek banking system. Though it might have distinctive particularities and unique characteristics, the Greek banking industry is nonetheless part of a global economy.

Until the mid eighties, the Greek banking system operated in an environment characterised by selective controls and regulations, which gradually led to inefficiency and to serious distortions in the functioning of the country's financial system (Christopoulos et al, 2002; Hondroyiannis et al, 1999). The need for a modern, flexible and market-oriented financial system, which would participate in the Single European Market and the EMU initiated efforts towards deregulation. Thus, in 1992 Greece was decisively affected by the harmonisation of national regulations within the EU with the enactment of the Second Banking Directive (SBD), which concerned the establishment, operation and supervising of credit institutions. The Greek Parliament passed the SBD in August of the same year (ibid; ibid;). The SBD also states that the Bank of Greece is the competent supervisory authority and specifies the context of the Bank of Greece's co-operation with the respective supervisory authorities in the EU (ECB: Blue Book, 2001). Among other things, the SBD affected one of the major structural features of the Greek banking system, that is, its institutional specialisation, which was required by law rather than dictated by market forces (Christopoulos et al, 2002:815-817; Hondroyiannis et al, 1999:378-379). In Greece there are seven such specialised credit institutions (two investment banks, three housing banks, a saving bank, a specific purpose bank and four credit co-operatives) which were, now under SBD allowed to offer new services, such as leasing, factoring, forfeiting, and venture capital, while firms were permitted to borrow in foreign exchange; additionally, banks were allowed to use financial derivatives, such as futures, options, and swaps for hedging against potential risks from both foreign borrowing and foreign exchange liberalisation (Hondroyiannis et al, 1999:380). All foreign exchange controls concerning current transactions were lifted in 1992, while capital movements were completely liberalised in May 1994 along with other various measures that were taken towards the modernisation of the capital market (Hondroyiannis et al, 1999:380).

At present, a decade past, Greece has moved from one of the most restrictive financial environments in the Western world to a largely deregulated market (Eichengreen & Gibson, 2001). More specifically, features of the Greek financial-credit system, which includes the smallest number of credit institutions in the EU, has been the decisive presence of the state, the dominant role of a few large banks (see Hondroyiannis et al, 1999:381) and the limited share of foreign banks along with the relative high weight of banking in the Greek financial system (Christopoulos et al, 2002:817). Within the rapid changing banking environment, domestic and EU, the Greek government decided to reduce the state's intervention by moving to a gradual, controlled privatisation of previously state-owned banks. Thus, banks such as Attica, Cretabank, Macedonia-Thrace, of Central Greece along with the third largest bank, Ionian Bank, were privatised, even though state intervention still remains relatively high (Christopoulos et al, 2002:817). Also, various mergers and acquisitions took place which further changed the structure of the Greek banking system (Christopoulos et al, 2002:817). Taken together, these changes lead to the conclusion that the liberalisation measures introduced in recent years have both improved the degree of competitiveness of the Greek banking system and decreased its oligopolistic character (Hondroyiannis et al, 1999:380).

In addition to the government bodies and the Bank of Greece that promote legislation and are responsible for the supervision of the banking institutions in Greece, there are also other private and public sector bodies that partly shape the Greek banking sector. One such organisation is the Hellenic Bank Association (HBA), which is a non-profit organization representing Greek and foreign banks operating in Greece. It was founded in 1928 and today has 29 members, of which 24 are regular and 5 associated (HBA website). HBA recognises as its mission the promotion of the collective modernization of its member banks and develop the banking sector in general, thereby contributing to the advancement of the Greek economy. As a representative body, the HBA contributes in a consultative capacity to regulatory issues by participating in the formulation of legislative proposals or in technical committees on the international, European and national levels (HBA website). They therefore help creating regulations and legislations by using their organs and consultative committees; co-operate with the Bank of Greece and other

government and non-government bodies; and they finally provide training for bank employees with the Hellenic Banking Institute which was established in 1986²¹. Additionally, the HBA has been monitoring related developments and offering significant feedback to its members (ECB: Blue Book, 2001). These activities also include: conducting research with regard to the development of new payment systems and the improvement of existing inter-bank payment systems in order to identify the related operational requirements and finally supporting its members in matters related to technology by the standardisation of services and procedures (ECB: Blue Book, 2001).

Although they claim to be engaged in some social activities, HBA is not a union representing the bank employees. In fact it is the Greek Federation of Bank Employees Unions (OTOE), a bank employees union, which is responsible for the employees' rights. OTOE was established in the 1950s and it is mobilised towards work, trade-union, and insurance issues and they constitute an important voice in the Greek banking sector (see OTOE website). In 1991 there was established the Institute of Work of the OTOE (INE/OTOE), which is constitutes a branch expression of the institute of work of the General Confederation of Greek Workers (GSEE), which is itself, in turn, responsible for issues of trade union information, educational training, carrying out of studies on the banking industry (OTOE website).

The international trends in banking have penetrated the Greek banking sector and had their effects on its transformation. New legislations coming either from the EU directives or from domestic government measures have set the basis for the transformation of the Greek banking. The role of other private and public sector bodies that operate within the sector environment is also significant in the shaping of the recent developments. As a result of these measures we have increased

²¹ The Hellenic Banking Institute is not an independent legal entity; it operates as part of the Hellenic Bank Association. Its predominant academic organ is the Board of Education. Board members are university professors, bank representatives, an OTOE (bank employees' trade union) representative and HBI executives - its Director being among them. The Chairman of the Board of Education is the Secretary General of the Hellenic Bank Association. A five-member Executive Committee coordinates the various activities of the Institute (HBA web site).

competition within the sector, which come not only from foreign banks of other member states that do business in Greece (such as Barclays, ABN-AMRO Bank, Credit Commercial de France, Midland Bank plc, etc.), but also from within the markets where with the growth of securities exchanges and derivative financial instruments, corporate and other clients will be able to choose among various sources of finance (Eichengreen & Gibson, 2001). Individuals once forced to place their savings in deposit accounts will be able to choose among money market mutual funds and other financial instruments (Eichengreen & Gibson, 2001).

In summary, global trends in international banking has affected the Greek banking industry despite this industry's unique environment with distinctive characteristics. Greek banks, then, are facing similar challenges as international banks, where increasing competition has brought them face to face with a serious crisis to which they had to respond. In the following section the techno-organisational developments in the global and Greek banking industries will be discussed where the emergence of a global supply of T-O solutions promises to help banks survive the crisis.

4.3 MARKETING STRATEGIES AND TECHNO-ORGANISATIONAL DEVELOPMENTS

The response of the banking industry to this crisis was directed towards reorganisation efforts and enhancement of marketing strategies supported by advanced information systems (IS) in an effort for banks to attract and retain profitable customers. Banking organisational processes and information systems started, therefore, being problematised and framed as the area of intervention where banks should focus in order to respond to the upcoming crisis. Recent research has shown that from 1970 onwards there is little evidence that banks employed IS capable of supporting the needs of their marketing strategies (Nelson, 1999:265). Also, banking IS of the pre-deregulation era, practically always home-grown, are seen as remaining huge and cumbersome, requiring extensive maintenance and

limiting the flexibility of banks to create strong links with existing customers and also to attract new ones with increased marketing efforts (Mentzas, 1997:179). These kinds of issues and concerns have called for a practical need for a reengineering of both the banking business and organisational processes along with the associated information systems (Watkins, 1994; Maull & Childe, 1994).

The development or redirection of strategic and marketing philosophies in banking was an aspect of these transformations providing new visions that guide and direct transformations (see Fincham et al, 1994:54-56 on the importance of business strategy and marketing culture for technological change). The directions at which these T-O transformations aimed vary according to the national and organisational environment, capabilities and strategic visions. There are identifiable trends, however, that pave the way. For example, there is a trend for a shift in banking business models from product or account-oriented systems to more customer-oriented ones (Mentzas, 1997:179), which has led to the systematisation and rationalisation of the marketing of banking products and services while providing a source of visions which might guide T-O change in banking worldwide.

4.3.1 Global Techno-Organisational Trends and International Banking

The realisation of such strategic and marketing visions at an organisational level of the user could traditionally be seen as generated within individual organisational settings (i.e. developed and implemented in-house). The processes of globalisation and the expansion of a knowledge economy, however, have led to the emergence of a global supply of technological and organisational knowledge as a commercialised response to the crisis in banking at an industrial and economy level. Certainly, the emergence of global technological supply is not only particular to the banking industry. Global technological supply has penetrated, or has been accessed by, various industrial fields of the economy. In banking, however, it was associated with the certain developments in this particular industry, as discussed earlier. The commercialisation and commoditisation of the response to the crisis in banking and

its move outside organisational boundaries and within ATOC global networks has led to the professionalisation and commoditisation of T-O change efforts and the further legitimization of technological and organisational transformations as an appropriate strategic response to any emerging crises in various industries and in banking in particular. The promises of the emerging global techno-organisational possibilities for business success on the one hand, and the opening and exposure of user organisations to those promises on the other has created a global supply-use chain, a cycle of development, distribution and use of such T-O solutions supported by visions for a better future.

Within this cycle various elements that constitute ways through which strategic and marketing visions can be achieved are circulated and have created trends in T-O transformation worldwide. One such trend in T&O in general, not particular to banking only, is Business Process Reengineering (BPR). It is described as a means of facilitating significant, even fundamental, change in the way an organisation operates (see Hammer & Champy, 1993; Davenport, 1993a; also in Currie & Willcocks, 1996). The holistic approach to strategy, structure, process, people and technology is a central element to BPR practice (Currie & Willcocks, 1996:214), despite the variations in the interpretation and implementation of BPR both within and across national borders and the mismatch between its rhetoric and what is actually implemented (*ibid.*; PRECEPT report, 2003).

A large study involving many European countries and carried out by a consortium of many academic institutions reveals the ambiguity behind the BPR concept. This study stresses, what it terms, the “interpretative flexibility” involved in the BPR concept, which means that BPR is, what it terms, a “contestable concept” that allows for various competing interpretations and conceptions (PRECEPT report, 2003). Consultancies and others were able, as a result of this flexible interpretation of the BPR notion to create a variety of methods, as products for company renewals, while still meeting the obligatory point of passage constituted in the need to “do BPR” (*ibid.*). This reveals a strong rhetoric around BPR and a weakness in crystallising a unique methodology (*ibid.*). In other words, there is not one way of doing BPR, or alternatively, the BPR concept has come to express any attempts for company reorganisation worldwide the past decade or so, whether these attempts

refer to incremental or to more radical and holistic changes (see Currie & Willcocks, 1996; Davenport, 1993b on incremental vs. radical transformation).

It is important to see the role of IT in relation to BPR and how these might be viewed as complementary to one. One might well ask whether IT should be entwined with BPR or not. If it should, then, what should be the role of IT towards organisational change? Should firms aim at radical or incremental change? Should firms invest on tailored or bespoke IT systems or rather adopt packaged software? (see Graham & Williams, PRECEPT report, 2003). IT, by becoming a factor included in strategy placed IT specialists in the centre of attention, that is, they became quite important players in the whole change process.

There is mixed evidence whether T-O change or innovation in banks is IT-driven. On one hand, there is research that supports the importance of IT adoption in innovation. Davis (1989) for instance argues that perceived benefits on an innovation promote the adoption of that particular technology. Also, Fuglseth & Gronhaug (1997) argue on the possibilities of IT to enhance consistency between strategy and operation, improve the quality of empowered employees' decisions, and, finally, facilitate organisational learning. Lastly, Gupta et al. (2001) conclude both that operations must be recognised as a strategic function in banking institutions and that investment in new technologies should be strategically directed to strengthen various operations such as quality, process, capacity and facility. On the other hand, evidence from twenty banking institutions in Britain on the benefits of Expert Systems (ES) in banking, suggests both that ES benefits are perceived in process-related organisational aspects of IT management and that perceived ES impact is not found associated with ES adoption in banking organisations (Shao, 1998). In this case therefore, innovation is not seen as IT-driven but as driven by the business needs of the organisation (*ibid.*).

In any case, banking organisations become exposed to a variety of different possibilities for T-O change in terms of the variety of technologies that could adopt, packaged or tailored solutions, the variety of organisational principles and visions of business models that could pursue and finally, the way they perceive the benefits from such actions and realise their goals, i.e. either radically, or incrementally, in-house or outsourcing. All the above possibilities constitute a source that generates

decisions to be made for the techno-organisational present and future of a business firm. As shown in the previous chapter such decisions will become more visible as challenges and how they are managed. This will be achieved by placing the focus on instances of T-O change within a global knowledge economy, a space including the cycle of development, distribution and use of T-O change solutions.

4.3.2 Systems Integration: Integrating T&O and Linking Supply and Use

These decisions on T-O change are associated with the increasing importance of the activity of Systems Integration (SI). As Hobday et al. (2005) argue, SI capabilities are inextricably linked to decisions on whether to make in-house, outsource, or collaborate in production and competition (Hobday et al, 2005:1111). SI has gradually entered the domain of business and T-O change, evolving from an engineering practice to a strategic business activity, moving beyond its original technical and operational tasks to encompass a strategic business dimension, becoming, therefore, a core capability of many high-tech corporations (ibid:1110). Hobday et al (2005) provide both a broad and narrow definition of SI:

“In its broader sense, systems integration can be defined as the capabilities which enable firms, government agencies, regulators, and a range of other actors to define and combine together all the necessary inputs for a system and agree on a path of future systems development. In the narrower sense of firm capability, systems integration is concerned with the way in which firms and other agents bring together high technology components, subsystems, software, skills, knowledge, engineers, managers, and technicians to produce a product in competition with other suppliers. The more complex, high technology and high cost the product, the more significant systems integration becomes to the productive activity of the firm” (Hobday et al, 2005:1110).

SI as a business activity could be seen as emerging from the need to combine a variety of heterogeneous elements which might be found in different places within the global knowledge economy due to the market segmentation of T-O change solutions. The tensions between the global supply of technologies and business models, on one hand, and the local circumstances emerging from a T-O change

instance on the other, makes SI a significant activity for the production of complete and effective T-O solutions for any possible emerging user organisation.

We have seen in this section that there is a significant commercialised and professionalized response to the crisis that business organisations have gone through during the 1980s and 1990s with the establishment of a global emergence of T-O solutions for this crisis. The focus has centred mainly on interventions associated with the technological and organisational capabilities and models of the user firms. The activity of SI has increased in importance, in bridging the global supply of solutions with local circumstances and needs of the users. Also, it is an activity that integrates technological and organisational elements and configures them into a commoditized solution. Let us now see how the Greek banking industry is part of these developments.

4.3.3 Techno-Organisational Trends and the Greek Banking

Kyrtsis (2005) examines the different phases of computerisation of Greek banking in the period 1975-2000. He argues that the international trends affected Greek banking in similar ways to the rest of the world although specific national, industrial and organisational characteristics of Greek banking also played an important role in the history of computerisation of Greek banks. Although in the 1980s and early 1990s several Greek banks kept pace with international developments, in the late 1990s they lost ground due to difficulties in adopting a quality management culture which affected the rates of success in adopting relevant Management Information and Customer Relationship Management systems (CRMs) (Kyrtsis, 2005). Rationalisation and consolidation and not technological expansion appear to be the main strategic and managerial tasks. The introduction of new technologies, therefore, does not seem to be the main issue, but the integration of existing technologies with incremental needs to add new elements (*ibid.*). Handling organisational aspects, and, consequently, also the human resources aspects, becomes increasingly equally or even more important than decisions on the acquisition and use of new hardware and software components (*ibid.*). As the

movement of fundamental computerisation seems to end at the end of the 1990s, the main problem now is organisational restructuring and the taming of operating cost and operational risks (ibid.). This would suggest that IT-driven T-O change in Greek banking has given way to organisational restructuring as defining the relationship between T&O.

The global supply of T-O solutions has, nonetheless, entered the Greek industrial environment. This is reflected both by the entrance of a network of various expert firms that specialise in organisational restructuring in Greek industry and in banking in particular. The need for restructuring of the Greek banking system at an industrial and organisational level brings more actors into the process of shaping of the banking industry. Technology suppliers and consultants and systems integrators are professional expert firms that have been expanding and dominating the T-O supply. Such firms also form associations in order to create more institutionalised channels for the diffusion and promotion of their products. One such association is the Association of Greek ICT Firms (SEPE). SEPE is a non-profit organisation, it was founded on March 1995 in Athens, consists of more than 450 firms, mostly software developers, hardware builders, software and hardware distributors, telecommunications firms and consultancy firms (SEPE web site). SEPE is a member of the European ICT Association (EICTA), WITSA and ITU. At a national level, SEPE is cooperating with the Greek state, political parties, representative professional, economic and social organizations, the academia and research centers and Media, while its general aim is to secure and promote the common interests of its members and the IT sector in general (SEPE web site). SEPE is also cooperating with the Hellenic Association of Management Consulting Firms (SESMA). Within the frame of this cooperation the two associations have had meetings discussing the prospects of future common action (SEPE web site). SESMA is a non-profit organization, founded in 1992 from the 23 largest consultancy firms in Greece. Today the association has 58 members among whom there are Greek firms and also international firms that operate in Greece (SESMA web site). SESMA is also member of the international organizations: European Federation of Management Consulting (FEACO) and International Council of Management Consulting Institutes (ICMCI), while nationally, it is a member of the Federation of Greek Industries

(FGI), and its general goal is the development of management consulting services provision in the public and private sector of the Greek economy (SEPE web site). SESMA's activities are separated into four streams: The first has to do with the market, the second with the public relations and the communication among its members, the third with training, conferences, etc. and the fourth with "other activities" (SEPE web site). These professional and expert actors involved in T-O change activities from the supply side, constitute business firms with individual strategic objectives and visions, although most of them are under more or less control by international supplier firms which they might represent. The SIF case study will provide useful insights on the role of such firms in the shaping of T&O.

4.4 SUMMARY

This chapter provides a basis for the exploration of the empirical context within which the case studies unfold. The history of international banking overlaps with the history of technological and organisational development. The deregulation forces in the banking industry have increased the competition in financial services. While banking institutions were brought in front of a crisis, techno-organisational transformation, has been offering a commercialised response to that crisis in the form of a global supply or possibilities for T-O change. ICTs are integrated with business models, organisational elements, marketing principles and are configured into products and services that suppliers can sell and users can buy. Whether banks worldwide are forced by competition or convinced by business consultants or genuinely seek a way to join this global Agora of T-O Change is an issue for the strategic management of T-O change which would provide an answer if we look at the case studies examined in this thesis. The following two chapters, then, will be devoted to the two empirical case studies. In the first case, a restructuring program in a Greek Bank (GB) will be examined, showing how the specific local actor from a peripheral country constitutes part of the international developments in the banking industry and also of those in the development of T-O solutions. The second case

study will be on the involvement of a Systems Integration Firm (SIF) in the initiation, design and implementation of T-O change solutions within T-O change instances, exploring how the actions and social choices of this particular actor within ATOC are made and how they influence the way ATOC operates while linking global supply of T-O elements with the local T-O change instances in which they are involved. Finally, the strategies and social choices of suppliers, users and other actors involved in T-O change instances will also be explored.

CHAPTER 5

A LARGE TECHNO-ORGANISATIONAL CHANGE INSTANCE: SHAPING THE VIEWPOINT OF A GREEK BANK

5.1 INTRODUCTION

The first empirical case study discusses large restructuring program in a Greek Bank (GB). This change effort is one of the biggest and most extensive changes in GB history. The aim of the effort is a transition from a product-centered to a customer-oriented business model. The change involves a series of sub-projects covering the areas of strategy, human resources, organizational processes, IT systems, risk management and Loan Portfolio Management (LPM). It started in 1997 and at the time of data collection (2003) the program was in the rollout phase where changes were implemented in GB's large branch network throughout Greece.

Following the analytical and methodological suggestions presented in chapter three, the analytical focus here is the particular instance of T-O change in GB; that is, the restructuring program and the way it was initiated, designed and implemented within the socio-economic relations and networks of ATOC. In paralleling the analytical view with the actors' views, emphasis is placed on illustrating the point of view of GB as an important actor emerging from this instance, the way it was shaped and the social choices of GB in light of this change. A brief historical account and T-O evolution of GB is, thus, provided. The points of view of other external actors are also illustrated although within the restricted limits of the organizational structure of the particular instance. Following the historical account on GB, the phases of initiation, design and implementation of the restructuring effort are presented. The social choices contributing to the shaping of this instance are revealed. These cover choices made in relation to the initiation, design and implementation of the particular change effort.

5.2 HISTORY AND TECHNO-ORGANISATIONAL EVOLUTION OF THE GREEK BANK

As mentioned in chapter three, there is a distinction between the actor and the space where action emerges through the production of social choice. The paralleling the analyst's view with the actor's view helps understand how social choices are produced. There is a need, however, for a historical profile of the main actor involved in this case study. This will provide the context for the emergence of the particular T-O change instance in GB. Although T-O change instances are at the centre of analysis, their links with other events and socio-economic relations in time and space will help to avoid a snapshot account of an actor or a social situation²².

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- 1929: GB was founded in 1929 as a non-profit organisation, provider of credit to the agricultural sector aiming at implementing programmes for financing both the activities of the primary sector of the economy and the processing and marketing of agricultural products, and enhancing rural development.
 - 1950: In the 1950s, GB expands its activities in the agricultural sector by founding a number of companies which produce farming products and exploit resources all over the country.
 - 1980: GB expands its activities in the non-agricultural sector, by developing both a broad branch network all over Greece and a variety of new financial products and services. To the same direction, the bank enters the insurance industry.
 - 1991: GB becomes S.A., broadens the spectrum of banking and financial services and acquires participating interests in specialised financial companies, thereby expanding the GB group of companies.
 - 2000: GB increases its capital in order to join the Athens Stock Exchange, where its shares have been listed since January 2001 and the Greek state is its major stakeholder.
-

Figure 5.1: The History of GB

Source: GB Web site

The above figure shows some major moments in the corporate history of GB since its foundation. Today, GB is amongst the one hundred and fifty top European Banks (The Banker, September 2003) and the fifth largest bank in Greece (total assets, 31/12/2002)²³. GB was not always a bank in the traditional sense of the term.

²² Due to lack of research involving the specific firm, data for this section come from the bank's own web site, annual reports of the bank, reports of the regulatory bodies in Greece (Bank of Greece, relevant ministries), reports of various associations (HBA, INE/OTOE). The main bulk of data, then, comes from interviews as well and from experiences while doing fieldwork.

²³ For some key numbers see Appendix.

It started out as a credit institution for the agricultural sector in the late 1920s. In the 1950s it expanded its activities within the agricultural sector and in the 1980s it started showing tendencies for expansion outside the agricultural sector. Although agriculture still remained their main focus, given their specialisation determined by law, they also showed the first tendencies to enter commercial markets. From institutional and T-O perspective this meant that they had to be transformed into a “real” commercial bank. From the beginning of the 1980s and for 15 years thereon a series of T-O changes took place in order to transform the credit body into a commercial bank expanding into retail. It was a challenge for GB to be able to compete with newer more innovative and flexible commercial banks within the Greek environment. Changes were slow and incremental reflecting movements of adjustment to the banking developments and to the unfolding and expanding strategic directions of the bank. Organisationally, new offices were created, others were eliminated, a large branch network was developed throughout Greece, new financial products and services were launched and two insurance companies were also founded.

A wider opening to the commercial retail markets occurred in 1991 when the guidelines of the Second Banking Directive (Second Council Directive 89/646/EEC of 15 December 1989) were applied in Greek banking. The institutional specialisation characterising the Greek banking system, which restricted specialised credit institutions to operate outside their special area of activity was abolished (Christopoulos et al, 2002:815-817; Hondroyiannis et al, 1999:378-379). The way for GB to enter commercial banking was not straightforward. This change meant that specialization in a particular area must be determined by market conditions rather than by legislative constraints. Although GB was legally permitted to enter commercial banking, commercial banks were also permitted to enter the sphere of the agricultural credit market. GB could not neglect the long established relationships with the agricultural populations and focus only on the newly explored commercial markets. The change in the institutional environment of the GB from monopolising the agricultural credit market and no competition to a double-sided competitive challenge both in the agricultural and commercial markets posed corporate survival challenges. In 1991, then, the GB became a S.A. while they also founded a group of

companies that offered financial products and services, i.e. mutual funds, life insurance, credit cards, leasing, IT, supplementary pension schemes consulting.

Up to that point in GB's history a series of incremental T-O changes took place leading to the shaping of a business model characterised as *product-centred*. A top manager of the bank referred to this long term historical T-O and institutional transformation of the bank as follows:

Organizational changes happened, new offices were created, others were stopped, mergers and so on. A structure was created similar to the structure that a modern bank should have within an intensive competitive environment. It was a structure which could be called product-centered. (TP1, top manager, interview 30/05/2003)

The organisational model of the bank, then, was based around the products and services they were offering to their customers. Technologically, GB was running a few applications most of which were built in-house, however, computerisation was still quite restricted and segmented. In 1997, a realisation that this model was no longer effective led to a decision towards a large scale restructuring.

This historical note on GB shows how the co-evolution between the GB and its environment play a role in the strategic initiation of T-O change instances towards incremental or more radical transformation attempts. The incremental transformation of GB from a specialised credit institution for the funding of the farmers into a commercial bank created many inconsistencies in the T-O and cultural evolution of this institution. Although the bank decided on product-centred organisational model after 1991, which pointed to a certain vision and a certain direction, this model was problematised in 1997 and a transformation was designed and implemented. In the following sections, the particular T-O change instance from product- to customer-centrality is presented.

5.3 A T-O CHANGE INSTANCE IN THE GREEK BANK

5.3.1 Initiation: Framing the Problem – Building the Vision

Given GB's situation, its top management started considering a large T-O change effort that would transform the corporate identity of the bank and would help the re-direction of business and marketing strategies. For this purpose, an evaluation committee was formed consisting of top managers of the bank and other external specialists. This committee framed the problem with the existing model of the bank, built a vision for its future business and marketing direction, composed a call for proposals, which was published in the press, to invite specialist firms and afterwards they evaluated all the proposals to make the final choice of one. A top manager of the bank summarises the initiation of the GB T-O change instance while explaining his own role in it:

I'm one of the two to three people that foresaw and shaped the changes of the bank; we made suggestions to the general director, we argued on the reasons why the bank should change, we designed the changes with the consultants that we hired and today we are bringing them to realization [...] We identified the need, we convinced the central management and the ministry that we have to move on, we mapped out the needs, what needs to be done, we shaped, in a way, the project, and then we informed the interested parts about it and they started to come and do presentations to us about what they can offer us. (TP1, top manager, interview 30/05/2003)

There are two sources of information on the problematisation of the existing model and the vision for a customer-centred one. The first source is a systematic documentation of the problematisation process found in power point presentations from top managers participating in the evaluation committee, while the second source is a more free expression of the problematisation process by my interviewees. I shall attempt to present both.

For a systematic problematisation of the existing model *organisational* and *operational* aspects of the GB were examined in relation to each other. They are presented in the figure below.

ORGANISATIONAL ASPECTS	OPERATIONAL ASPECTS
Distribution of responsibilities	<i>STRATEGIC</i>
Communication lines	Strategic planning
Models and processes	Risk Management
Decision making	Internal and external communication
Exploitation of financial resources	<i>PRODUCTIVE</i>
Managerial control	Deposits
Coordination	Loans
Support relations amongst org. units	Intermediation
Skills and qualifications	Operations
Training	Fund management, etc.
Personnel motivation	<i>CONTROL AND SUPPORT</i>
Technological automation	Audit
Quick and valid information sharing	Financial control
Etc.	Marketing support
	Human Resources Management
	Information Technology
	Etc.

Figure 5.2: Organisational and Operational Aspects of the existing model of GB
Source: Based on a Power point presentation by PM, overall project management, 22/10/1999.

The results from a cross-examination of the organisational and operational aspects formed an understanding of the existing condition of GB. This served as a basis for problematisation and for direction of the search for relevant solutions. In organisational terms the product-centred model presented problems which were framed and codified as *organisational, HR & cultural problems* and *technological*. They were seen as affecting the operational aspect in terms of *strategy, HR, IS* and *processes*. These operational problems, in turn, were projected in a quantitatively measurable form as having effects on the processual efficiency of GB, i.e. commercial inefficiency (ability to develop new products and adapt to market conditions) financial inefficiency (ability to manage risk, ability for profitable development), internal and organisational operation inefficiency (ability to manage resources, apply standards, make decisions, cross departmental communication, efficient control and coordination) and inefficiency of development of infrastructure for continuous improvement (HR management and development, development of IT infrastructure) (source: power point presentation by PM, overall project management, 22/10/1999). Intervention on these aspects was seen as essential

towards the realisation of a new vision in terms of strategic focus, customer central orientation and cost.

Regarding future directions, a few criteria were used for the evaluation of alternative, possible models. I shall call those “rhetorical techno-organisational models”, in the sense that they embody various T-O trends that influence the direction of a T-O change instance and might be seen as crystallising various globally available possibilities for T-O change. These models are rhetorical in the sense that they exist in terms of the actor’s awareness of them but it is not certain whether or not they will be selected. The four groups of criteria used for the evaluation of the rhetorical T-O models are shown below:

<p>a) General organisational principles</p> <ul style="list-style-type: none"> * Managerial efficiency * Organisational efficiency * Communication efficiency * Decision making efficiency 	<p>b) Specific organisational criteria</p> <ul style="list-style-type: none"> * Strategy support * Adjustment to external environment requirements * Development of core competencies * Paralleling to stakeholders requirements * Operational model support * Consistency with historical evolution of GB
<p>c) Materialisation of organisational choice</p> <ul style="list-style-type: none"> * Entrepreneurial culture/climate * Position of employees union * Position of top hierarchical people * Position of top management * Levels of employees skills * Financial cost 	<p>d) International banking experience</p> <ul style="list-style-type: none"> * Success factors * Problematic factors

Figure 5.3: Criteria for the evaluation of rhetorical T-O models

Source: Based on a Power point presentation by PM, overall project management, 22/10/1999

As shown in figure 5.3, a mix of general and specific to GB principles are expressed, while the best choice of a model would be the one able to achieve some compatibility between the general and specific aspects. This systematic problematisation of the existing condition with the use of statistical categories and

criteria pointed to the direction of a transition from the product-centred existing model to a customer-centred new one. The vision, therefore, to be achieved was the creation of a new competitive commercial bank by means of a T-O change that allows the transformation of the business model from product- to customer-centrality.

Apart from the methodological and systematic problematisation of GB's current model the interviewees also referred to various technological, organisational and cultural problems emerging from the current condition. They supported their arguments with various examples. Interviewees offer a more general justification of the change and its direction by engaging in a 'dominant change discourse' circulated throughout firms and organisational hierarchies. One common major problem they referred to was the multiple recording of the customers. Customer identification for the old product centered system in GB was not a working reality. In cases where a customer was buying two different products from GB, s/he would be recorded twice as two different customers. This aspect was emphasized by interviewees, especially top managers of GB and external consultants, when they were asked to describe GB's condition prior to reorganization. For example, an external project manager for the whole restructuring effort, said:

The previous system did not put you in the logic of identification. So, you would go there saying 'my name is Kaniadakis' you would go somewhere else saying that you've changed your ID card because you lost the old one. The system did not predict the fact that they had to erase you in order for you to be unified and link you to all the new accounts. Therefore, you were recorded twice. Multiply this by four hundred and seventy branches, times thousands of customers [...] it makes it a huge problem and it's tragic for us. We've been trying to solve it for two and a half years but we haven't succeeded yet. (PM, overall project manager, interview 19/05/2003)

This leads to the discussion about the IS of the bank. Prior to reorganization GB did not have very sophisticated IS. It was described as an antiquated system, built in-house²⁴, supporting only deposit products. Loans were processed in paper, there were not many computer terminals in the branch network and finally, up to 1997 the

²⁴ The fact that the IS was developed in-house meant for the external expert informants that it was not or it could not be as sophisticated as an integrated software package.

bank did not have ATMs. The same informant describes the condition in regard to the IS of GB:

We are talking about a bank that had an antiquated system, developed in-house, the loans were not getting in the system, only the pure deposit products were, which means that in fact there was nothing! You had a loan and you wanted to ask for your account balance and they couldn't tell you. They had to fill an application, in paper, to the central office and then to send you back your card after a week and a half, if you knew the director (with humor). [...] When the card would reach your branch, the clerk, if he remembered it and he liked you personally, he would give you a call to let you know. To put it simply, when I started with the bank in 1997 it was unbelievable. We're talking about an antiquated system, of the most antiquated systems, in every sense, in Greece. (PM, overall project manager, interview 19/05/2003)

A consultant from a subcontracting supplier firm also explains:

The bank didn't have the infrastructure to provide modern banking products, to design a banking product and offer it. They also didn't have the informational infrastructure, and the process and the marketing channel to do that. (SCF, manager subcontracting supplier firm, interview 05/02/2003)

Regarding the organisational processes and structure of the GB, interviewees describe the previous condition as *chaotic*. Although organisational processes and description of roles existed typically they were not working as they should. Informants expressed their frustration regarding the organisational and processual condition of the bank up to 1997. An interviewee from the project management firm said:

[...] there were not processes, organizational structure at a central level and at a branch level. They existed but it was chaos, nothing was working. The situation was so 'hunched'!... (PM, overall project manager, interview 19/05/2003)

Prior to the 1997 reorganization, the marketing strategy and focus of the bank was mostly directed towards service provision neglecting development work. No new products were developed, marketing was underdeveloped and there was no effort to enter and maintain a good position in the market. Additionally, the bank was not fully exploiting the large branch network throughout Greece (OPF1, senior manager, interview 19/02/2003 and OPF2, director, interview 21/02/2003). This strategic lack of focus was associated mainly with the organizational culture of GB.

Most interviewees mentioned two aspects of organizational culture contributing to the problematisation of the existing condition and the justification of T-O change choices towards customer-orientation. These are the “public servant mentality” and the “corner-store mentality”. These aspects were affecting the performance and competitiveness of the bank but also caused problems during implementation due to difficulties in changing them. The public servant mentality refers to the ‘comfortable inertia’ emerging from the security of being employed in the public sector, given the permanent status of such position. In turn, this caused lack of motivation and no obligation to work extra. The public servant mentality was prevalent in GB and its negative effects were revealed when bank employees showed resistance to the reorganization project. The corner-store mentality refers to the marketing strategy of GB and its inability to develop new products and approach the market more dynamically. More particularly, informants, both external consultants and also branch managers who were supportive to this change, described GB’s branches as corner stores where customers walk in to buy banking products the same way they go to the corner store to buy a pack of cigarettes. After finishing acting as a specialized institution, GB had made no efforts to develop a rational marketing approach. Additionally, GB’s existing customer base was comprised mostly by farmers with low-income levels, with specific characteristics and mentality. Throughout its many years of servicing farmers, GB had adjusted to their special customer characteristics, demands and behaviour.

During the late 1990s, however, they decided they had to abolish this mentality and develop a sophisticated marketing strategy, as it was not enhancing the visions of customer centrality. A top manager of GB compares the old model with the new one with reference to the importance of organizational culture and mentality:

The old one was [...] a product centered bank, it was serving customer of low income levels, with specific mentality (the customers), the lowest level in Greece, and today they are asked to serve other cases too. Entrepreneurs. All these years, by serving specific customers, the bank had been adjusted to the demands of the customers, the behavior of the customers [...] now, there's need for a new attitude, new character, new mentality. The bank had never gone outside for the development of its market. Today, they are asked to go outside, for the first time. This is a big step. It needs different kind of people. (TP1, top manager, interview 30/05/2003)

The framing of the problem in the GB led to the formulation of a vision for a new bank with a new identity. The links between the problematisation of the condition, the development of a new vision and the way in which to bring it to fruition were shaped by various factors that were considered. These factors were systematically examined and broken down into indicators, while they were also discursively circulated throughout the T-O change instance. Based on the problematisation of the existing T-O condition a vision was built to guide the T-O change effort. This vision was not finalized in the initiation phase, only in general terms. In terms of design, it was still developing up to the point where the new strategy of the bank was formulated. An informant from the IT firm explains:

When we were starting the project, our task was to modernize the bank. We knew the steps to do that, we didn't know the aim 100%, we just had the tools to do it, and I'm saying that we didn't know the aim because we didn't know what the strategy was. After the strategy of the bank was formulated we all had a vision which was the accomplishment of the strategy of the bank (ITF1, project manager, interview 29/03/2003)

A more general vision, however, was to create a new modern competitive commercial bank with a new identity and aligned with the T-O principles of customer centrality. A top manager makes the following claim on the new vision:

To transform the state bank with a restricted market into a bank of multiple activities, competitive, [...] that was the vision. To transform the bank from a purely agricultural bank into a bank of multiple activities focused on the customers. (TP1, top manager, interview 30/05/2003)

The realization of the newly formulated vision was linked with *technological*, *organizational* and *cultural* transformations aimed to solve problems of performance, competitiveness and control of the processes and the resources. As it will be shown in chapter seven, the initiation of the particular T-O change instance in GB can illustrate business choices of the GB to open up its organizational boundaries, expose itself to the ATOC environment in search of T-O change elements and rhetorical T-O models. In doing so, a variety of other diverse actors, such as suppliers and specialists are allowed into the instance and contribute to the particular processes of

problematisation and vision-building, thus, acquiring their share of control of the instance.

5.3.2 Design: Actors and Resources Included in the Project

The specific change program, in line with the framing of the problem, encompasses four major aspects of change which crystallized into various sub-projects: *Strategy*, *Organizational Processes*, *Human Resources* and *Information Systems*. There is also a fifth sub-project named *direct interventions*, which includes changes that could not fit in any of the other four categories, mainly a Risk Management project and a Loan Portfolio Management (LPM) project. A wide range of expert groups, both internal and external to the bank, was involved in this project. The estimated cost of the whole effort was around € 14,500,000, with a three-year timetable and a workforce of approximately a hundred and fifty people (source: power point presentation by TP2, BPR project manager, 22/10/1999). The whole change effort was BPR driven. Although the strategy project provided the basis for the rest of the sub-projects to acquire more specific vision in terms of “what needs to be done”, the organizational processes sub-project (BPR) was placed at the centre in terms of “how it should be done”.

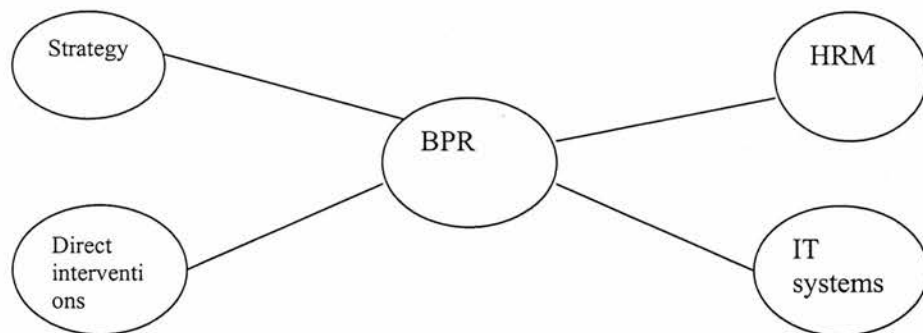


Figure 5.4: Total restructuring program

Source: Based on a power point presentation by PM, 22/10/1999

In perceiving this restructuring effort as an instance of T-O change, it is important to identify the resources and actors that were mobilised, their origins, the

choices these actors are called to make, the way they enter the project, the way they are organised and the way goals are achieved. The process of designing T-O change instances shows how ATOC is mobilised for a particular T-O change instance to be constituted and carried out.

Two types of actors are emerging from this instance. GB is one and various external actors comprising a consortium of specialist firms are the others. Although the concept of actor was eventually associated with firms there are different groups of people even within the same actor that were directly involved in the T-O change. The directly involved persons represent different actors-firms. Knowledge and resource management during the instance calls for such an organisational arrangement. It will be examined, therefore, what kinds of organisational actors were physically involved in the instance, what was the process of entering the instance and what kinds of resources they carried into it.

Four groups of people were identified. These are: *GB's top management*; *branch managers*; *branch employees*; and the *consortium of expert firms*, involved as external players. The consortium of experts consisted of various firms that formed a partnership in order to carry out the various sub-projects, meaning that a wide variety of external, specialist knowledge was needed. The channels and ways through which internal and external actors entered the project space are the following:

Bank staff (internal players) enters the program space instantly, since the whole reorganisation effort is organised around the specific bank. There is still, however, an identifiable entering process related to the decision by the top management to proceed to reorganisation both of the central management offices and of the branch network. This entering process is related to different timing during the life cycle of the project. For example, branch staff did not enter the project space all at once; rather, they were entering gradually in four-month intervals as the project was unfolding (described by informant OPF1). The positive or negative attitude of the various branch employees towards the reorganisation effort was also a criterion for the time of entering the project space. For instance, some branches were more positive than others and they volunteered to enter the reorganisation space, while others expressed a more negative attitude and resistance. Eventually, they were

forced to do so. Initial attitude towards entrance to the instance was crucial for the relevant success or failure of the project in regard to each particular branch, as verified by informant OPF1 (senior manager, interview 19/02/2003). The role of the branch managers was also crucial as s/he influenced the creation of that positive or negative attitude, a view expressed by branch managers but also verified by OPF1 (ibid.).

Regarding the *expert actors*²⁵, they entered the project space after a selection process through a competition of consortia of expert firms. The evaluation committee composed a competition announcement, a call for proposals outlining the various subprojects and the required actions for the project and was published in the press. Various consortia were formed by specialist firms, which developed respective proposals in order to compete for the GB reorganisation project. Afterwards, there was a selection process, where the committee had to choose one proposal for the specific project. There were four consortia participating in the competition. Consulting, suppliers and IT firms had formed these consortia to cover the requirements of various sub-projects. Specific subcontractors were hired with specialized knowledge to cover various aspects. In all these consortia, the main contractor, the consortium leader was always the IT supplier, which shows the importance that was attached to the technology as a leader of T-O change. Finally, a specific consortium was picked, which was led by a Greek IT firm, the biggest in the country. The rest of the partners were foreign firms of international reputation and operation which maintain offices in Greece²⁶. There was a group of firms for each of the sub-projects. Organizational processes firms, a strategy firm, a HR firm, firms for the direct interventions sub-project and various other firms that were supporting the main consortium by providing various tools and specialized knowledge and finally another firm in charge of the project management of the whole restructuring effort. Internationally recognized firms comprised the rejected consortia as well. One

²⁵ The process of formulation of consortia, their evaluation and selection by the evaluation committee as well as the criteria for that selection were described by various informants, mainly people participating in that committee but also confirmed by other informants that could provide a descriptive account of the design of the project. It is not necessary to provide any exact interview quotes since there are no any major differences in different descriptions of this process.

²⁶ The names of the firms comprising the consortium will not be mentioned for obvious reasons.

consortium, however, was led by a foreign bank that had built their own in-house solution. The criteria for selecting the specific consortium are described by PM:

From the four competing consortia we chose the IT firm one for two main reasons: They had a lot better know-how on Greece and the rest of the firms that made proposals were emerging serious problems which we saw during on-site visits that we made. That is, in Spain where we went, the consortium of Accounting Firm could not convince us that they were doing good job here (in Greece), they had a project with another bank which was a complete failure, anyway, we didn't reject them for that reason, the consortium of the bank with the in-house solution had not a very good representation in Greece, the system proposed by another consortium had not installed it nowhere else apart from one bank in Greece, which was still in the process of development, while the one we chose, at least had the two banks in Greece plus two or three banks abroad, so we were convinced that in terms of technology, at least, we could get a good project. Additionally, the rest of sub contractors in the consortium were in a very good level in relation to competition, thus, we selected these ones. (PM, overall project management, interview 19/05/2003)

These criteria and the formulation and constitution of the consortia reveal two important points: First, the evaluation and selection committee was looking after solutions offered by firms that combined experience and success history both at a national and international levels; and second, the solution needed for the GB case was thought of being provided mainly by the suggested for adoption IS –a packaged IS for banking – while the other sub-projects were thought of as complementary and of secondary importance. This was because these sub-projects were aiming to transform the user environment in a way that the IS would work, although the whole project was BPR driven. The choice of “what to buy”, therefore, was determined by the criterion of which IT system is the most reliable technologically as well as of who supplies it. The choice of “how to implement” it and make it work was affected by the BPR methodology. Furthermore, discussions with people not involved in this reorganization effort pointed to the direction of the politically significant position of the selected consortium leader (the IT firm) in the Greek IT-related market. Informants from the second case study referred to this specific firm as having very good relationships with the Greek government and that they almost monopolized projects in the public sector. With the Greek state being the major stakeholder in the bank, the selected consortium was presented by these informants as having an advantage regardless of the quality or suitability of the offered solution.

A combination of internal resources available to GB with the selection of missing resources from the external environment comprised the elements necessary for the shaping instance to take place. External resources, then, represent the lacking elements for the reorganization effort to be carried out in-house. The degree of exposure of the GB to the ATOC is analogous to the scale of the change effort and the resources already available to them. What kind of resources are we talking about, then, besides the physical presence of the external and internal representatives of various actors? Where did they come from and how did they become a part of this T-O change instance? The examination of the groups of people directly involved and the elements they carry besides their physical presence will shed some light²⁷.

5.3.2.a Bank Top Management

Bank Top Management consists of well-educated people. Most of them have postgraduate education or PhDs, either from Greece or from abroad. They either have technological or business background, or both. They also have a very good knowledge and perception of the international trends in banking. They carry knowledge about various technologies and business ideas that are used in international banking. Additionally, they are carriers of the EU legislation environment. GB's top managers have a very good knowledge of the sector and the Greek market. They are aware of the T&O developments of other banks in Greece, they are highly networked (formal and informal networks), and they have access to the T&O solutions selection environments. The various legislations here become more specific with directives from the Bank of Greece (BoG), the main regulatory body in Greek banking. Top management receives various circular letters which they diffuse throughout the branch network and the central offices. Some of them as part of their networks have strong political connections and good relationships with the

²⁷ In terms of adequate documentation, these collective profiles of the groups of informants directly involved in the T-O change instance were constructed by information they were providing during interviews when they were asked to say a few things about themselves, what they do, their background and their personal professional history. Also, interview data on the role of different people in the project were used for this profile (i.e. the significance of branch managers to the implementation of the changes). Although there were variations and the sample was not so big, I attempted here to give a reliable summary, an average of what these different types of informants were bringing into the T-O change instance.

government. These connections were useful for a smooth and quick development of the reorganisation project. Their physical and organisational presence is also important. By belonging to the top layers of the hierarchy of the organisation, they have a high decision-making power and they are the ones that have the final say regarding the direction of the change project. They have good knowledge of the condition of the bank and a sense of how this condition came to existence, through personal experience. Finally, they have access to the branch network.

5.3.2.b Branch Managers

Branch managers have restricted access to the external environment of the bank, although they have a very good knowledge on the Greek banking industry. In general, they are well-educated people, but not necessarily. What is considered more important is their working experience. Most of them have worked for the bank for many years starting from the lower echelons of the hierarchy eventually becoming branch directors. They are quite important players in the reorganisation effort because they constitute the bridge between the top management and the branch employees. They are people with many years of experience, they have excellent knowledge of their branch and its resources (human and non-human) and for this reason they have authority to implement the new organisational structure of the branch. Over the years, they developed a large informal network with their colleagues from other branches which allows them to know the problems that emerge elsewhere with the rollout. Finally, they are the ones who contribute to the positive or negative attitude of the whole branch towards the reorganisation effort. It is not surprising that the branches where the branch manager was more positive towards change showed better transition results than other branches where the director was not so positive. Branch managers are, indeed, the “kings” of their branch, they seem to know their territory better than anyone else, they know all the branch employees personally and they enjoy high levels of trust by them. A manager of a branch in which the change was relatively successful explains how his positive attitude influenced change results:

I had a positive attitude towards rollout since the beginning and I supported it and my advice to other colleagues is always the same: to do whatever they can for this system to succeed. Because we don't have an alternative. There is no alternative option to adopt if we abandon rollout. We have this. And for this to happen much time and work was spent and the best people of the bank. This is it and we have to support it. I sometimes go to the training centre and I speak to people, directors' teams, about the way we got in, the way we achieved the results. It is not propaganda, it's a reality which we believe in, we've experienced it and we are now transferring it. (BM2, branch manager, interview 03/04/2003)

5.3.2.c Branch Employees

Branch employees have also a restricted access and perception of the international and national scene. They have a restricted knowledge of the Greek industry. They are both people that have worked many years in GB and people that have recently been hired. A large percentage of them are university graduates. They are organised into a GB's Employees Association, a union concerned with financial issues, access of the employees to the hierarchical mechanisms, insurance issues etc. Branch employees, especially the older ones, have also formed informal networks with their colleagues in other branches and have knowledge of the various problems that were emerging or were about to emerge. Apart from their skills, qualifications and experience, they carried into the project the everyday practical problems occurring in each branch. They had an opinion on the design of the processes, although their opinion was not always heard. Regarding the reorganisation effort, branch employees were treated mostly as a resource and not as actual players with power to influence. Their influence on decision-making was restricted to feedback extracted by the consultants. Every single one of them had to go through training for their new role. They expressed various concerns most of which were associated with the everyday life in the branch. Finally, the branch employees are the ones who most frankly portray the organisational culture of the bank. They are the ones who seemed to be more affected by this change as their job descriptions changed radically.

5.3.2.d Consortium of Experts

Most of these firms were international firms operating offices in Greece as well as in many other countries. This gave them access to expertise from many countries and contexts having formed large databases of previous accumulated know-how and experience. People in these firms are highly educated experts with Master's, MBAs and PhD degrees and with many years of experience in the field. In terms of their expertise, they are quite diverse, with business experts and technologists (engineers) in a variety of specialisations. These firms are part of the international market and also part of the national more particular market. They know the trends in new technology and business ideas development, they have a good sense of the international competition and they manage and promote their expertise and the products and services they sell in order for them to be absorbed by the local markets. They have a good knowledge on banking processes, they are informed about the trends and regulations in the banking sector, and their products and services are influenced by the international standards, like ISO. They also form partnerships on an ad hoc or more regular basis with other expert firms like in the GB case. Upon their selection for participation in the project, they gain access to the particular settings of the user organisation and as part of their job they record and evaluate the local circumstances in order to apply the international knowledge they carry. In other words, the expert firms provide a good bridge and a good channel for material and non-material elements to be used for the reorganisation effort. Relatively speaking, they demonstrated the power and authority that their knowledge and experience gave them as experts to influence the direction of the change and contribute to the formulation of the visions in regard to the future of the user organisation.

After the decision for the initiation of this shaping instance there was a concentration of the necessary resources (knowledge, ideas, material technologies, visions, business models etc.) by means of the players carrying them.

GREEK BANK	EXTERNAL ACTORS
Top managers	IT firm (consortium leader)
Branch managers	Strategy firm
Branch employees	Organisational Processes firm (initially two firms that later merged into one)
	Human Resources firm
	Direct Interventions firm
	Other subcontractors
	Project Management Firm

Figure 5.5: Players directly involved in the instance

The above figure shows the different actors involved in the reorganisation effort as well as the different groups of people from different hierarchical levels and roles physically involved in the project and forming an organisational structure of the reorganisation effort. From the GB then, top managers were involved, branch managers and branch employees, while from the external actors technical and business specialists that were designing and implementing the project were involved.

Following the initial choices to proceed to radical restructuring, further choices were needed in relation to the design of the change effort. Such choices referred to the mobilisation and combination of internal and external resources, ATOC elements and rhetorical T-O models with the vision for the future GB model. Given the configurational character of the instance and the multiple actors involved the criteria for such choices to be made were pursued by the use of political power and influence of the various actors, however, the process of designing an instance involves choices that bring the abstract, indeterminate ATOC environment closer to the particular circumstances of the local instance settings by combining internal and external resources and circumstances. In other words, as it will be shown in chapter seven, through such choices the ATOC environment becomes more particular to the specific T-O change instance in GB.

5.3.3 Implementing T-O change: The various Sub-Projects

As shown in figure 5.4, the whole change effort was divided into five sub-projects: The Strategy project done by a Strategy firm (SF), the Human Resources project by a HR firm (HRF), the Organisational Processes project by two firms that later on merged into one (OPF), the IS project by the consortium leader (ITF) and the

project of Direct Interventions (LPM, Risk Management) by another firm (DIF). The project management of the whole effort was done by another international expert firm (PMF). Some of the expert firms formed further partnerships with other subcontractors; thus, the network of actors was expanding. For instance, the OPF subcontracted a firm, which was providing a software program used for the recording of organisational processes. The same subcontractor also provided training to the people from the OPF on the use of that software (consulting on-the-tool). Some of the firms involved had little or no contact with the GB. For instance, people from DIF met with people from GB very few times, since their customer was the consortium leader. Similarly, the firm providing the process recording software had little contact with GB since their customer was OPF. In such complex and diverse conditions set by these special social arrangements it is not hard to sense the wide difference in perspectives and the nature of different socio-economic relations of the actors.

Within such complexity and heterogeneity there was an increasing need for total supervision of the whole change effort, which should be independent from the rest of everyday activities of the banking organization. For this reason, a separate independent office was established, the so-called *reorganization division* which was housed in the bank's central offices building. Reorganization division consisted of people from the bank along with people from the expert firms, working under the same roof. This resulted in a smoother and more efficient development of the project which was characterized by the participants in the project as "a very smart move" on behalf of the bank's central management. Reorganization division provided the spatial and cognitive boundaries within which the players were negotiated and decided on the direction of the change. This structure was also crucial in providing common grounds for better communication between the experts. In other words, the implementation arena of this particular T-O change instance acquires a material hypostasis through the creation of this separate division. Let us discuss now the various sub-projects.

5.3.3.a Strategy (strategic development of markets)

The logic behind the division of the instance into various subprojects and the recruiting of the experts gave priority to the strategy project, which had to be chronologically completed first in order for the rest of the subprojects to unfold on the basis of a new strategy. In the strategy project the newly formed business objectives as well as the various critical factors for business success were set. The new strategy of the bank posed an opening on the market to new segments. This suggested expansion to include new customers, new competitors and the development of new distribution channels. These changes led to new challenges for the organisation undergoing them, which would be met by T-O transformation. The promise of this transformation was that it would lead to the ultimate satisfaction of customer needs, and the introduction of the principle of “triple A banking” (Anytime, Anyhow, Anywhere) (TP2, BPR project manager, power point presentation, 22/10/1999). This would bring the desired goal of customer centrality by changing the identity and the marketing focus. What was the meaning of T-O transformation in terms of the design of the change? As mentioned earlier, it meant four things, which are portrayed in the division among the various subprojects: redesigning organisational processes, redesigning organisational structures, redesigning the roles of the employees and redesigning the information systems. The new strategic business goals were, therefore, directly linked to further changes that took place. BPR was, then, promoted as the best way to achieve customer centrality. The strategy sub-project, however, was the one that would provide a basis for the rest of the projects to unfold. In other words, the strategy sub-project referred to the sophistication and shift of the bank’s business and marketing strategy towards expansion into new markets enhanced by a new, customer-oriented approach. The strategy project was necessary for the new change vision to be crystallised and systematically framed.

5.3.3.b Organisational Processes

According to power point presentations on the BPR project (by TP2 and PM, 22/10/1999), the consecutive steps that needed to be taken were: recording of the existing organisational and operational structure; redesigning the processes into a

new operational model; formulation of a new organisational structure based on a centre-periphery arrangement; description of new employees roles; composition of training manuals; operational rules for each unit; development of process-oriented IS. Basically, the above steps portray the BPR project where they had to record and redesign the organisational and operational processes of GB, both at the level of central management offices and the branch network. When I asked my interviewees why they chose to do BPR and what it meant to them, the majority said that they had no other choice and that these kinds of changes are only done with BPR.

Additionally, they see BPR as a methodology to reengineer organisational and processual changes. Why was BPR so necessary? The large scale of organisational transformation seemed to provide a justification and legitimization for the use of BPR. A top manager, responsible for the BPR project explains:

Changes were big and we had to go with a BPR methodology, a redesigning of the processes, roles, systems, etc. With small changes this could not happen and that's why we chose a BPR methodology regarding processes, systems, HR, informatics, everything. (TP2, BPR project manager, interview 10/02/2003)

When the same informant was asked what were the alternatives they had apart from following a BPR methodology, he said:

When you have very big changes to do, you do a redesigning of the process at a business reengineering level, if you want to claim that you are doing something in a correct way, otherwise, everything is in the air. (TP2, BPR project manager, interview 10/02/2003)

The strategic re-orientation was of a significant scale which meant that the organizational and processual changes needed to be done with BPR, which was believed to provide sophisticated methods for this effort. The use of BPR was justified by the new strategic focus of the bank. Apart from being a methodological tool, the BPR discourse served as a justification mechanism in regard to the direction of the changes. The consultants who possessed knowledge of the BPR methodology used it when facing resistance regarding organisational changes. One of our informants when referring to the phase of acceptance and approval of the designed changes by the central management and the rest of the people working in the bank explicitly illustrates this conflict of opinions:

You design a new organizational structure, and this structure, before it gets approved by the bank, you have to inform all branch directors, the totality of the employees, the central management [...] these stages are very painful and everyone says their own thing, they give their own opinions on everything. Everyone thinks is an organizer (being sarcastic). (TP2, BPR project manager, interview 10/02/2003)

Central Management Offices

Firstly, there was a reorganisation of the central offices. According to interviewees working on this project (OPF1, OPF2, TP2), the criteria for the formulation of the new organisational structure of the central management offices were related to the customer units the bank has or wants to have, the kinds of products and services they offer, the kind of IS available to support such changes, the competitive advantages of the bank at the centre and the periphery, and so on. Regarding the latter, GB has a big advantage in the periphery due to the large branch network and traditional know-how on agricultural issues.

The product-centred system of GB, at the level of central offices, was organised based on the various products of GB. Thus, they had offices for deposits, dispensations, loans, crediting, which were portrayed at the branch level as well. The new organisation of the central offices in accordance with the new strategic orientation of the bank required the creation of new offices and the transformation of old ones. According to power point presentations on this project, confirmed by interview data, some of the central management offices that were transformed were: state and public organisation division, individuals and farmers division, enterprises division, corporate clients division, network support division. They also had separate offices dealing with organisational issues of the bank such as HR division, IT applications division, group strategic division, risk management division, internal audit division. This was considered as a more sophisticated organisational structure at the level of central management offices.

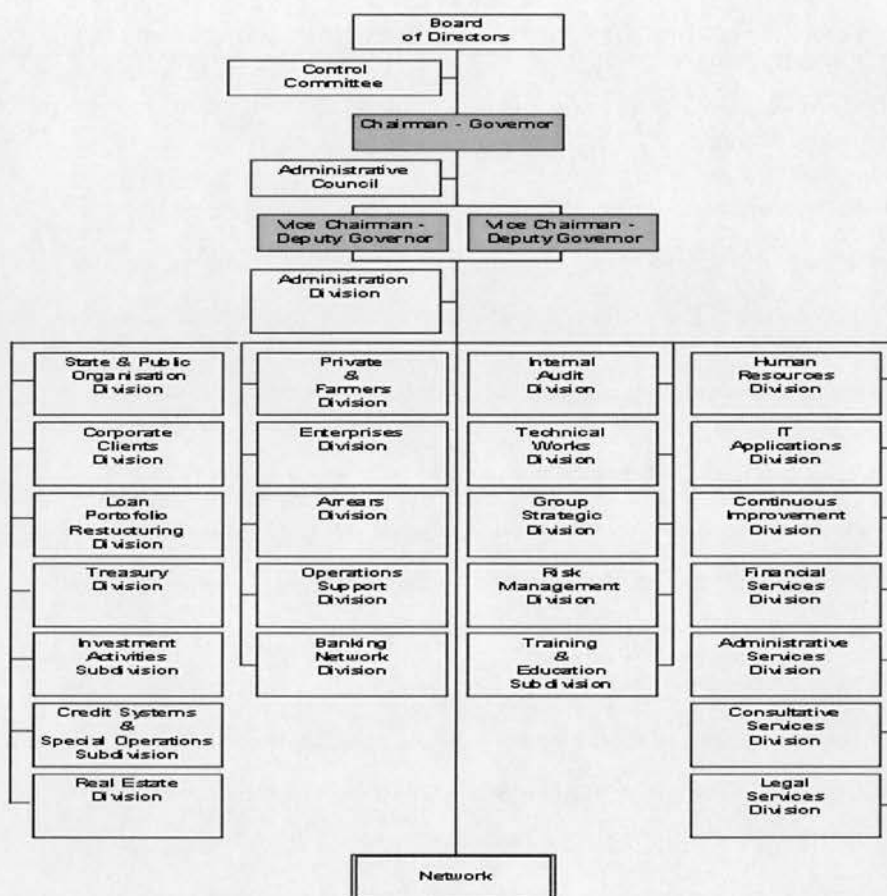


Figure 5.6: Organizational chart of the GB central offices
Source: GB website

Branches Rollout

The local particular settings of the GB and the resources available affected the decisions on the direction of the new organisational and operational structure of the bank. More particularly, the GB had a large branch network expanded throughout Greece. This was a crucial factor in determining customer focused marketing strategies and the opening of distribution channels. The availability of such a large network could not be neglected and thus the decision to proceed to reorganisation of the branches as well. As OPF1 explains:

Everyone wants profit and efficiency but it's how you realize that. GB and Citibank have different perceptions of what an individual customer is. They define them differently. Bank of Cyprus for instance, without having such a wide network they might want to follow such an approach via phone banking, e-banking etc. GB has the branch network, so I'll make sure that my structure and my approach of the customer to happen through the branch. Other banks that have no network but they

have good technological infrastructure might choose to approach customer-centrality with different ways. Or in some areas where I have network, I approach via my branch while in other areas I don't have presence and I'll approach via other methods. (OPF1, senior manager, interview 19/02/2003)

The OPF, responsible for the reorganisation of the central management offices, also took over the reorganisation of the branch network. This helped to get a sense of continuity between the different tasks. The branch transformations were, thus, seen as a consecutive step to that of the central offices transformation (OPF1, senior manager, interview 19/02/2003). First, there was the design of the new way that the branches would look like and then the rollout process started.

At the branch level, changes involved organisational, technological, cultural and also architectural changes. As mentioned earlier, a group of branches would enter rollout every four months. According to OPF1's description of the rollout process, the consultant from the OPF would first go into the branch and develop an initial organisational structure plan, based on various criteria, mentioned above; then, they would try to embody the old organisational structure into the new one by replacing existing personnel into their new roles and also allocate the newly-hired staff. Some general guiding principles for this include: the condition and volume of a branch, the condition of the local market and the profile of their customers²⁸, and the opinion of the branch manager who knew the personnel very well. Regarding the positioning of individual employees into their new roles, some special criteria include: seniority, history of the employee within the GB, performance, requirements of the new position for qualitative and quantitative efficiency and employee's skills (professional and social). A two-month period of training followed. After training, they went to the branch and started working. The consultant from the OPF remained at the branch until the four-month period was over and provided on-the-spot support. During the on-the-spot support the consultant helped the personnel to apply their new

²⁸ For a branch at the centre of Athens it would be highly unlikely to have individual farmers as customers, but it is most likely to have private enterprises. The Athens branch, therefore, should focus more on attracting and servicing "urban" customers by developing the appropriate banking products, i.e. business loans for companies. Another example is from a branch outside Athens. The area the branch was situated in was under development due to the 2004 Olympic Games and literally looked like a construction site. The director of this branch stressed that in light of this entrepreneurial mobility and rapid development in the area they had to "*have their eyes open*" in order to attract new business customers and take advantage of the situation.

responsibilities and the new way of operation of the branch. Every new role presupposed specific tasks and everybody was tested on them. This means that changes were also happening in the initial design of the chart if an employee could not reciprocate to the requirements of the new role²⁹. As a consultant puts it “if we see that one does not fit with the new role that is been given to him in the new chart, there is a chart modification” (OPF1, senior manager, interview 19/02/2003). Apart from the typical qualities and experience of each staff member, their personality and social skills was also taken into account when their replacement was discussed. For example, they would not place a grumpy and impolite person in a position requiring direct servicing of customers or approaching prospective customers on a face-to-face basis. These modifications were happening after the training and during the on-the-spot-support period. The final chart of the branch was delivered by the end of the four-month period and the consultant was leaving the branch going to the next one.

The process of constructing a new organisational chart by including new roles with lots of replacements involved was not an easy task since there was the issue of interfering with the hierarchy of GB. A consultant from OPF explains:

We're looking at how things were before change [...] each branch has specific personnel, with specific experience, specific hierarchy. This is very important because although the bank has entered the stock market, it maintains some structures of public law, which means you cannot mess with the hierarchy easily, [...] so, we take the existing personnel, and based on their experience and their position in the hierarchy, we embody them into the new organizational structure, according to the demands that every new role has. And based on that role, they come and get trained. (OPF2, director, interview 21/02/2003)

Designers' attempts not to affect the hierarchy were reflected on the final result of the change and the careful treatment of the old hierarchical structures. For this reason, the criterion of seniority was taken into account in the formulation of the new organisational charts. This shows how local particular circumstances have influenced choices articulated by external ATOC specialists.

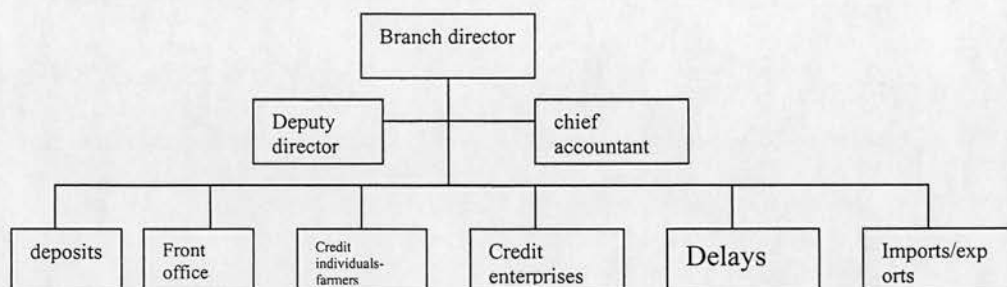
²⁹ For instance, one person was transferred from deposit products to salary products. There was basic training for the new role, to learn the new job, but the employee could not pull it off, so they replaced him and the chart changed again.

In terms of its organizational units, the new customer centered branch is separated in two big areas: the area of *Servicing* and the area of *Development of Works*. The latter has two sub-divisions, the *Individuals-Farmers* and the *Enterprises*. The area of Development is the one that pulls the branch outwards, approaching and creating contacts with prospective or existing customers. The area of Servicing is a purely procedural part and supportive to the development area. The concern of interfering with the hierarchy of GB had as a result a balance in the relevant importance of these two areas, although they are very different and require different kinds of skills from the personnel. OPF1 explains:

It's important to bring the customer in, but it's also important to service him in a right way in order to remain a customer and give the opportunity to the development area to do better sales. (OPF1, senior manager, interview 19/02/2003)

There was a deliberate attempt, therefore, to achieve hierarchical balance between the two areas, which was a sensitive issue for the designers, and a goal in itself.

Current branch organisational structure



New Branch Organisational Structure – adjustment according to branch size

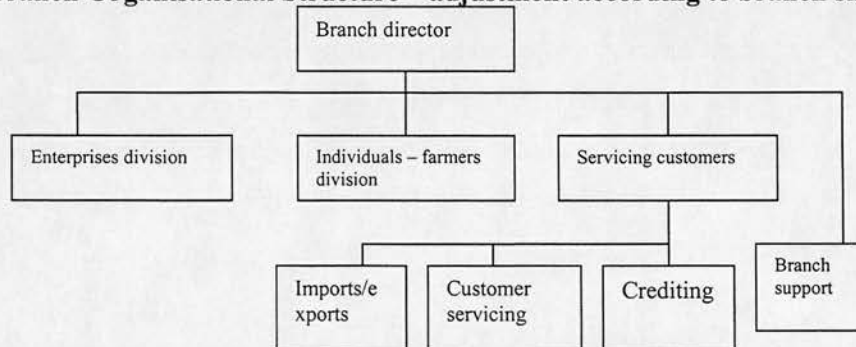


Figure 5.7: Transformation of branch organisational structure

Source: Based on a power point presentation sent via email on 11/03/2005 by OPF1, senior manager.

The whole task of branch reorganisation required great coordination of various things. It did not get completed with the contribution of only one team but of many which represented the various offices such as technical support, customer offices, suppliers of the bank, personnel office. There was also a demand for coordination and speed. These are challenges that the working teams had to face in light of the pressure for deliverables and deadlines.

With a great diversity among branches throughout Greece it is normal to have variations in the results of the restructuring efforts. There was a mechanism which evaluated the efforts in quantitative terms and showed which branches had positive results, and which failed to adapt. The measuring of the degree of success of the change is closely related to the indicators of the financial performance of the banking organisation and also to the indicators used to initially frame the problem. How much sales went up; how many new customers there were; increases in productivity and performance. In some branches the results were impressive. For instance, numbers such as a 500% raise in loans sales were reported, while in other branches, where the change was not as smooth, results were not so impressive. Generally speaking, the reorganisation was considered as successful by most interviewees although there was a view arguing the opposite. Interviewees from the project management team compared results from the reorganisation of the central offices with that of the branches. As one of them said:

While at the level of central offices there has been done very good job, there is a 5-year transmission plan with charts etc., in the specific rollout we're stuck badly! [...] However, the fact that you walk into a branch now and you see that people are trying to sell is encouraging. (PM, overall project management, interview 19/05/2003)

The above interviewee had a few objections regarding the reorganisation of the branches. The above quote, however, reveals that some work was done on the organisational culture as well, at the branch level. The corner-store and the public-servant mentalities started being gradually replaced with a new culture which required more motivated sellers in the branch, at least at the branches with good results.

5.3.3.c Human Resources

The human resources (HR) sub-project was seen as a necessary inclusion in the whole reorganisation attempt. The technological, organisational and cultural changes that were initiated in the GB required HR interventions as well. The organisational transformations, especially at the level of branch network, brought about severe changes in the roles, the positions and the requirements of these positions. In terms of organisational structure, then, employees that were previously working in the various offices distinguished on a product basis had to be fitted into one of the two major operational areas of the branch. Either at the development area or at the customer service area. In terms of organisational culture, these employees had to abolish the corner-store and public-servant mentalities, become more motivated and focused more on product development and sales. Technologically, they had to familiarise themselves with the new IS installed and make the most out of it. In other words, the T-O changes aiming to the transition from a product-oriented to a customer-centred model required a new type of employee in terms of skills, qualifications, personality and attitude. This was, mainly, the aim of the HR sub-project: to design and implement the mechanisms through which this new type of employee could be shaped and maintained.

The restructuring of organisational processes, as shown previously, determined the new roles, their position within the organisational structure and the demands in various areas of qualifications. In turn, the HR sub-project determined the career path for each new role, empowerment mechanism, motivation, the payments, personnel capabilities, training. (Email communication HRF, manager from HRF, 11/03/2005).

The new type of employee had to be motivated and to be offered an attractive career path, in order to be effective. Each new role and position in the hierarchy of the GB had to be clearly determined in terms of the prospects of climbing the hierarchy and building a personal career in accordance with the performance and the demonstrated enthusiasm of the employee occupying such a position. In other words, if an employee performs s/he has more chances to get promoted sooner and receive various bonuses than other employees who do not perform. The performance measurement was computerised and provided data to the management regarding the

performance of each employee all positions. In the previous model, performance was measured on a personal, subjective basis as a branch employee explains:

There was a system which was very subjective. That is, the director would make a quality report at the end of the year, it was supposed to be objective [...] the customers were satisfied, if they were saying good things about you, he (the manager) would take a brief look at the volume of tasks to see if you're doing well, all your attitude was good, all these were put in a piece of paper produced by the branch director and another superior. They were, let's say, the two judges. But it was completely subjective. (BE1, branch employee, interview 30/05/2003)

The empowerment and motivational mechanisms that the HR sub-project introduced were bonus and reward-based. Furthermore, the salaries for each position in the new organisational structure were determined by the HR sub-project.

Career paths, empowerment mechanisms and payment methods were not yet fully determined at the time of data collection. More than a year had passed since the branches rollout started and the payment methods were not finalised, and although the positions and roles had changed a long ago, they were still getting the same salary as before. Interviews from branch employees show that at that point this was one of their main problems and concerns. (BE1 interview 30/05/2003; BE2 interview 27/02/2003; BE3 interview 15/04/2003; BE4 interview 03/04/2003; BE5 interview 03/04/2003, BE6 interview 15/04/2003).

The creation of a new type of employee required investment in training. All employees (around 4,000) had to go through training that explained their new roles, diffused the new mentality and familiarised personnel with new technological applications. GB maintains for more than eighteen years a training centre with thirty permanent personnel and around one hundred and fifty external partners involved in training and teaching activities. The training centre does not only train the GB personnel but also offers courses and transfers know-how to agricultural industries, cooperative associations, enterprises, banking executives and scientists, in subjects such as management, marketing, finance, technology adoption and implementation, skills development and in other agricultural issues (GB website).

Under the product-centred model employees were specialised in only one product, whereas with this change instance they had to specialise in all products, in

addition to developing their selling skills and becoming adjusted to the new job requirements. In relation to this issue one a branch employee says:

They (consultants) are not so interested in the execution of things but rather they are interested in how are we able to sell, to have other kinds of skills. It's more important to have the talent of a salesman than that of a technocrat. On the other hand, though, there is the view that if you want to be a good salesman you have to have a very good knowledge of the subjects, others say that if you have the charisma of the salesman you don't need anything else. (BE1, branch employee, interview 30/05/2003)

Other employees were emphasising the increased intensity of their new roles and the pressure they feel from the new performance measurement techniques:

The system asks from the same personnel to do multiple things than those they used to do. To intensify their attempts. And these attempts are recorded. With this new system they can see the amount of work you do. How many customers did we serve? How many collections we made? It is a real count. This happens through the computer. This is another dimension; we're getting into other issues. The human issues and how the bank worker should be. I'm not saying that things should be relaxed, but the system is becoming more "cold-blooded". It measures you. (BE2, branch employee, interview 27/02/2003)

Furthermore, in regard to the intensification of tasks and the organisational culture:

In the reorganization case, where you demolish something and build something new, there is a lot of work. While you're servicing the customer you also have to talk to the other colleague on how you should change subject and distribute the roles. Therefore, there are parallel jobs happening in many spots. The philosophy used to be "corner store". The customers would walk in and get a loan, for example. But now [...] it's a system which is very demanding. More work to do. (BE1, branch employee, interview 30/05/2003)

The HR sub-project aimed to the creation, maintenance and sustainable improvement of the human resources available to the GB. In doing so various mechanisms were introduced in order to adjust the HR to fit with the recent T-O changes. The specific HR sub-project, however, in comparison to more general T-O changes was described as a short-term solution in light of this transition while a long-term development strategy and its integration with wider HRM policies is still lacking (Petridou & Glaveli, 2003).

5.3.3.d Direct Interventions

The direct interventions sub-project referred to two projects that did not fit with the rest of the changes but had to be done for a number of reasons. These were a *Risk Management* project and a *Loan Portfolio Management (LPM)* project, carried out by the DIF, which was subcontracted by the consortium leader.

The direct interventions sub-project mainly relates to issues of control of the internal processes and the management of risk factors. The inclusion of these projects was not a GB choice; they were rather forced by the Bank of Greece (BoG) with certain laws. In relation to the LPM project, for example, the relevant normative act from the BoG has the code name 2438/6.8.98. It forces financial institutions to establish internal rules of controlling their processes by setting up an organizational structure that supports the effective operation of what was termed as Internal Control System (ICS). ICS is a set of control mechanisms and processes covering all activities of credit institutions (Bank of Greece Governor's Act No. 2438/6.8.98). The regulatory principles and the standards set by the BoG were embodied in the LPM application. The same act forces banks to establish a Risk Management Unit. As the act commands, credit institutions should conduct systematic risk monitoring and management and protection of the institutions assets from loss. Credit institutions should have adequate mechanisms and organizational structures enabling the timely detection, analysis, control and management of risks entailed in banking activities, which should be supported by information and communication systems that ensure the flow of timely and reliable information necessary for decision making and control (Bank of Greece Governor's Act No. 2438/6.8.98).

The direct interventions sub-projects involve IT applications the implementation of which also requires organisational changes. Regarding the LPM project, for example, in order for the experts to design the relevant application they had to define the organisational environment this applications could operate in. The BPR job which would determine the organisational environment, however, was not yet completed. The firm responsible for the LPM project could not wait for the BPR project to finish in order to do the LPM on top of the new organisational structure. Instead they proceeded by suggesting and implementing a few organisational changes. The BPR experts that came afterwards to do the BPR project had to take

these changes into consideration. These changes involved the closing down of some offices and the renaming of some others. This was not a simple thing to do because of the close dependence of the GB on the Greek state which had not been fully abolished yet. An interviewee from the DIF explains:

[...] in order for the organizational structure to change and add a new management office, there's need for the issue to be discussed in the parliament and to be published in the Government Gazette. Unbelievable! (DIF, general manager, interview 04/03/2003)

Keeping the above in mind, they renamed some offices with the involvement of some agriculturalists with knowledge of economics.

After the changes in the organisational environment, they moved on to the processual part of the project where they defined some basic principles. This related both to the old and new portfolios, things that were seen separately, up to a point. The definitions of these processual principles were embodied to some suggestions they made on how some things could be transferred from one portfolio to another. Upon the acceptance of these suggestions, they wrote detailed user and procedure manuals on the newly automated process. They included information on how a transaction is done, how it was done before, and so on.

Another step that would normally have to be done was the recording of system specifications. The packaged IS GB had bought, provided the operational environment for the LPM project; therefore, there was nothing to pre-record. They pre-recorded, however, what they call *Notes Origination*, that is, the whole process from the moment when a loan application of the customer is received, its processing and its approval or disapproval. Additionally, the LPM project involved an application in relation to the different approach of the consumer and entrepreneurial loans. This was not a very sophisticated model, as it was one of the existing best practices, a statistical model similar to Microsoft Office EXCEL. The DIF suggested to GB to run it and see how it works. The DIF created two sets of specs and elements, which made it relatively automatic. With this program you could predict statistically the possibilities of a loan not to get paid. Finally, there was an educational program, with topics suggested by the DIF, in order for the personnel to get trained on them.

After the designing phase the GB put the above in action. Firstly, they turned the user manuals into a circular letter and they distributed it throughout the network. Nevertheless, there were further modifications of the system. The bank piloted the system in some branches in its initial form, they gave it to some programmers internally, they turned it into web-based application, they did the rollout and eventually it operated everywhere. The user of the information handled by this system is the Risk Management Unit. These systems were offering a possibility for collection and processing of information centrally.

The Risk Management subproject started and ended in parallel with the LPM one. It was exactly identical in structure. DIF designed the organizational structure of the new unit. GB did not have a previous Risk Management Unit, therefore, everything needed to be done from scratch. An informant from DIF illustrates:

In the LPM project we did re-engineering, in the second one we did engineering, it was from scratch. (DIF, general manager, interview 04/03/2003)

This involved the writing of large volumes of definitions, methods, processes, topics and recruitment. The research for the writing of these volumes was extensive and it covered most of the relevant international bibliography, resources from the Bankers' Association in the UK and so on. This piece of international knowledge was translated but the whole process involved a selection of how this universal knowledge could be used for the specific bank. As the same informant puts it:

[...] we discussed it in a logic of awareness about what these things (international resources) are, which are the best ways for the specific bank to use them, we did not suggest them the most sophisticated ways that exist, we told them that in their condition they should start from some simpler things and then move on to something more complicated (DIF, general manager, interview 04/03/2003)

Apart from the above there was also training and recruitment of personnel to work in the newly formed Risk Management Unit. They brought in people from the branch network, familiar with the topic, they trained them and they tested them; some of them were hired. Lastly, there were the specifications of the IS, which were done in the same way like the LPM project. The LPM and the Risk Management projects lasted about 6 months.

For the completion of these projects by DIF, there was some know-how transfer which was done internally. One of their partners-firms from Sweden offered know-how on similar issues from the Swedish experience during 1980s and 1990s.

The particular condition of GB was crucial for the completion of these projects. Some of the factors were related to the kind of products the GB offers, its large size, its particular organizational structure, the fact that they did not have a previous version of a Risk Management Unit, their decision to change the core IS, and finally, in this case, political issues. In relation to the latter, GB's central management faced difficulties where they had to cause a little damage to the "social face" of the bank. For instance, the changes within the frame of risk calculation and sophistication of the loans involved political cost. As our interviewee illustrates:

The bank needed to make some decisions that might seem cruel, or to know that the press will protest or the farmers will go on protesting against the bad GB that wants to take our cows because they gave us a loan ten years ago and we didn't pay, but some things could be done if there was the option of transcending some political cost that exists regarding some decisions. (DIF, general manager, interview 04/03/2003)

The top management of GB were careful at taking this political cost and proceeded rather conservatively in relation to the changes relating to loans and the terms under which they credit them or not.

Regarding the success or failure levels of these subprojects, they are considered quite successful, in general. There were some issues in the beginning regarding the expectations of GB and what DIF has to offer but this was diagnosed early on. As a general manager from DIF puts it:

If you leave the gap between customer expectations - consultant's design till the end, you're screwed. You have to work on that distance from a very early time and try to bridge it and make one common image regarding what needs to be produced. Luckily, we saw this early enough and we fixed it [...] the customer rarely knows what they want. And it makes sense. The customer wants to get as many things as possible. It's our job to explain to them that in relation to the time and the price/cost, this is what you can get! There is always something better; there is always something more. (DIF, general manager, interview 04/03/2003)

Additionally, this shows the relative character of what is considered success or failure. An interviewee from PMF explains:

If previously you had one loan and now you have five loans, that's 500% increase in sales. But still the bank next door sells more loans than you. (PM, overall project management, interview 19/05/2003)

5.3.3.e Information Systems

The IT sub-project is a very important part of the change because, in a sense, it represents the informatisation of the organisational processes of GB. As mentioned earlier, although the execution/implementation approach was BPR driven, the choice of the selection of the consortium was highly influenced by the reliability and technical soundness of the IS, as well as the reputation and position of its supplier. Additionally, there was an introduction of new processes. The transformation to a customer-centred system required an IS that fitted into the new organisational philosophy.

The bank's previous system was built in-house with in-house developed applications. The new IS consists of an integrated banking package (I shall call it PACKAGE from now on). It is a product developed by the ITF, and it is marketed as a professional solution that fits universal banks. Among its main objectives and fundamental concepts are: the promotion of customer orientation and relationship banking, enhancement of competitiveness in changing market environments, improvement of efficiency and quality of service to the customer, improvement of security and authorisation mechanisms and fully support various organisational structures (see PACKAGE leaflet). This product was designed using state-of-the-art software methodologies and tools (CA SMART certification), with security specifications according to international quality standards (ISO 9001) and its modular design allows for expansion and adaptations according to changing user needs (see PACKAGE leaflet). More particularly and in regard to its design, PACKAGE consists of a core system and of additional systems. The core system consists of some core banking operations such as: *customer management, deposits, general ledger, funds transfer, product management, loans and foreign exchange*. This core system constitutes a basis on which a variety of additional systems may be incorporated according to the specific needs and priorities of the user banking organisation. Such additional systems are: *MIS, Auditing, Collaterals, Budgeting,*

Profitability, Risk Management, Liquidity Management, ATMs/POSs Management, Phone/Remote Banking, Letters of Credit, Letters of Guarantee.

The modules of the software package might be adjusted to the user organisations according to its particular organisational settings and its strategic orientation. In other words, there is a process of customisation where the software package is adjusted to the requirements of the bank. Criteria for customisation are related to the kinds of products the bank offers or wants to be offering, the kinds of customers, the operational mode of the bank. In the GB case, this process was quite difficult and time consuming because of its particular circumstances. As an interviewee from PMF explains:

[...] it was extremely difficult; it was a very difficult bank, because we have loans which are regulated. For instance there is a farming loan for cotton in Northern Greece and there is a natural disaster. What kinds of people get involved after that? There is deregulation of the loan, there is our insurance company, what kind of insurance will they give them, the ministry of agriculture that gives you guidelines that we fund and support those people and a loan that you start in a way A might end up to a way B. Thus, it needed a special customization even in the very simple things. In other words, it has to do with the definition of 'what is a product'! (PM, overall project management, interview 19/05/2003)

The above products along with accounts, transactions, dispensations, deposits, investments and other processes had to be adjusted to the particularities of the customer segments. This transition took place with the involvement of the directors and sub-directors of the various divisions of GB who were assisting external experts with the customer segmentations.

Another criterion was the difference between the level of central offices and branch network. This difference was important in terms of spatially balancing the IS and the organisational processes of the bank, which also reveals how the BPR project and the IT overlap. Which processes are taking place at the branch and which go to the central offices? PM illustrates:

What leaves the network and what goes to the centre? I.e. if I have my loans, loans means paperwork, some customer applies for one, the responsible for loans takes it [...] where does it go after? Do they stay at the branch level? At a peripheral level? At a central offices level? Or do they even go to the dispensations committee which is

in the central administration? This role allocation was done by the BPR. (PM, overall project management, interview 19/05/2003)

In terms of its technical architecture, PACKAGE is designed to operate in multiple operational environments. It is compatible with multiple servers, multiple databases, programming languages, and interfaces. The process of designing, developing and marketing such a package involves extensive and long term research internationally. In order for the various modules of the PACKAGE to be selected and included in its packaging, there was research on new banking products, new trends, new management visions and ideas, new processes, new regulations and so on. For example, in the next version of PACKAGE the designers of the product would have to include the new accounting models and the standards of Basil directive (ITF2, manager, 13/12/2004).

PACKAGE was implemented gradually in the GB, a few modules at a time. In the annual report of the bank there is a section referring to the progress of the project as a whole with reference to the various sub projects. In the year 2000 for instance, it is reported that:

- The first group of PACKAGE applications (Support Systems, Customers, Products, Cashier's Offices, Security, Loans and Collateral) were completed and delivered by the bank, while these applications would be put in operation by the first half of 2001.
- The central accounting system was at the testing stage, while implementation had begun regarding the systems for Letters of Guarantee, Deposits, Movement of Capital & Purchase/Sale of Foreign Exchange, Securities and Safe Deposit Boxes.
- The task relating to the Technological Infrastructure of the units making up GB's Network had been completed. Thus the bank had 480 points of sale (Branches, Customer Service Counters, Cooperatives) with the latest technology equipment comprising 3,500 terminals, 1,600 printers and 420 laser network printers.

(Annual Report, 2000: Section on Structural and Technological Modernisation)

The IT sub-project was time consuming and took up more time than other sub-projects. The greatest bulk of work for this project was the transfer of the bank's

database into the system. This data referred to the customers of the bank but also the internal information, such as directives. In terms of alignment between the IT system and the organisational transformations PM holds an absolute opinion:

Is it possible for those two ever to be aligned? In a market that is modified every week? Therefore, if you ask me if they are aligned, no they are not! And they won't be for the next ten years at least. Does the human and organizational factor follow the IT and visa versa? If you ask me at a theoretical level in paper we've reached a 60%-70% alignment. We have the would-be IT system, and the would-be organizational and job description level. We see that in reality there is a difference. The organizational re-designing moves with very much faster speed than the re-designing of IT. That is the rollout has been done in about two hundred and fifty branches. Regarding IT, there are about fifteen branches so far. (PM, overall project management, interview 19/05/2003)

The reason for this difference in speed is quite interesting and PM offers a quite reflective explanation:

There is a history which you have to transfer gradually to a new condition. Customer identification: No one here deals with it. They don't know what it is about. How can you manage to put all your customers on-line from your old system? [...] When you have loans and loan history and you want to put it in the new system. You know what this means? I don't know if you can capture the volume [...] imagine all these loans with history that does not exist in the old system...to try putting them into the new one! When you press the button to turn on the loans program, you have instantly 125,000 loans. Loans, collaterals, contracts, estimations, re-estimations [...] we are trying gradually to build our base. (PM, overall project management, interview 19/05/2003)

The long un-computerised history of GB creates a tremendous amount of work to be done in building the IS and a database that would work in line with the organisational processes. The processes, therefore, might be redesigned according to the new system but there might not be any information to process. At the time of data collection this was still a problem that GB and external specialists were struggling to solve.

The presence of different actors, as well as the audibility of various organisational voices, such as the branch employees, makes the implementation phase highly political and quite heterogeneous and complex. Also, this phase should not be seen as separate from the initiation and design phases. For instance, many of the issues that were brought up in the initiation and design phases were transferred

and dealt with during implementation, such as the issue of changing organisational culture. Nevertheless, the implementation of the GB T-O change instance involves further choices that will ultimately configure ATOC into the particular situation of the GB.

5.4 EMERGING ISSUES ON THE GREEK BANK INSTANCE

The difficulty of communication among the various direct players, the conflicts and power relations amongst them were significant challenges for the successful completion of the GB T-O change instance. The involvement of a variety of expert groups in the project along with the participation of the bank players created a heterogeneous environment in terms of the knowledge deployed, the various actors' perceived interests, and perspectives and so on. This heterogeneity needed to be bridged in order for the involved players to communicate with each other in a meaningful way. The relationships formed were between the experts and the bank top management, experts and branch players and also communication between top management and branches through the links provided by the bank's organizational structure.

At the level of the relationships among experts there was a difficulty in communication among them. This was a result of the differences between the various sub-projects and also a result of the fact that these heterogeneous players were not "speaking the same language" and had different viewpoints. Experience from participation in similar projects helped overcoming communication problems as OPF2 says:

We had to attain common language and common view. The engineers have different perceptions than the business consultants. The experience helped us. (OPF2, director, interview 21/02/2003)

Other interviewees who said that it was organizational politics and conflicts of interests that caused problems and not just different backgrounds questioned the 'lack of communication' argument:

In was not lack of communication. It was disagreement on the project and also conflicting interests. For example, the firm responsible for the IS did not want to have clearly recorded processes because clear processes meant clear technical specifications, and thus, more work. The firm that brought the strategy part from abroad didn't want to put much effort in order to customize it in the bank. They were saying 'this is what you have to do'. But the GB does not even look like the National Bank of Greece. It's a special case. (SCF, manager subcontracting supplier firm, interview 05/02/2003)

Interviewees also emphasized conflicts emerging out of the different times in which the deliverables were presented. For instance, some of the experts were finishing their task on time and they were complaining because other expert firms were causing delays:

[...] we had the typical problems of 'who causes delays to whom' amongst the consultants mostly, absenteeism, because the project was very demanding and because the projects were connected. (ITF1, project manager, interview 29/03/2003)

Conflicts among consultants were mostly expressed during meetings for closure of the deliverables:

[...] in order for the deliverable to become accepted, there were internal meetings taking place, there was a presentation from the consultant, there was discussion and defense, and after a painful and 'full of blood' process we could reach to an agreement and the signatures were coming in. And every deliverable was, then, a reference point for the continuation of the project. Such problems were many (SCF, manager subcontracting supplier firm, interview 05/02/2003)

Nevertheless, all experts interviewed referred to the experience of this project as something quite useful for their development as individuals and as professionals. The extended project life cycle made the experts participate naturally in it, a routine, and eventually it became a point of reference for their personal careers. All conflicts were overcome and everyone seemed happy with the results. This T-O change instance also provided the opportunity for a merger between two of the firms involved. Initially these firms were hired separately but during the project's life cycle they merged into one.

In terms of the relationships between expert firms and GB top management, the situation is also interesting. The role of the experts was to make suggestions for

top management to decide which of the suggestions to follow. Decisions were made centrally within the reorganization division and then they were diffused and implemented throughout the central offices and the branch network. Interview data shows that there was some tension regarding the final decisions of the direction of the change also leading to conflicts and replacements of various people, showing that negotiations between the bank managers and the experts were not always smooth:

There was difficulty in harmonization between the consultants and the executives of the bank; thus, there were many conflicts and many exchanges of people. The best diplomats survived even though they might have been mild as personalities and could harmonize situations, in contrast with others who were more qualified but also more aggressive. (SCF, manager subcontracting supplier firm, interview 05/02/2003)

Additionally, the expert knowledge and international experience of the expert firms gave them the power to promote certain solutions, or point to certain directions instead of others. GB's top management negotiated the acceptance of experts' proposals on political grounds. Even though the negotiation process was painstaking, the proposed changes in this case were greatly supported by the general director of GB, in comparison to other cases where the central management might not be so supportive. This support was explained by one of our interviewees in terms of the political connections of the general director with the government:

[...] usually the general directors and the deputy directors, that is, the first and the second levels of management are appointed not by criteria of meritocracy but by political influences. Therefore, one political 'clan' appoints someone, another minister someone else; someone else might have been forgotten from a previous government, which might have been a different political party. These people then, have political back ups. In such a situation, black or white, what do you have to do? Fire one and hire the other, but because you can't do that [...] you're stuck with them [...] In the specific case, the administrator had powerful, the most powerful possible bonds with the whole specific political party. Therefore, he was 'the law'. There is no concept of dispute there. Whatever he was wishing [...] it was happening. That simple. It's a unique case; there are two or three people that can have such an access to the government. (SCF, manager subcontracting supplier firm, interview 05/02/2003)

Regarding the relationships between the experts and the branch employees, things vary throughout the large and diverse network of branches. In some branches changes were implemented more smoothly than in other branches. The change effort

encountered certain levels of resistance on behalf of the employees at the lower hierarchical echelons, mostly by older employees with many years of experience. It was harder for older employees to change their mentality. Younger employees were more positive as they perceived this change as an opportunity to climb the hierarchy quickly, based on the new system of performance assessment. This new system was causing uncertainties for older employees who were afraid of losing their jobs to younger and ambitious employees.

As mentioned earlier, the role of the branch managers was crucial in initiating, maintaining and diffusing a positive or a negative attitude towards change. For that reason, some branches were more “successful” than others. The relationship between experts and branch employees was also full of tensions, as the branch employees had not initially understood the role of the consultant. A consultant reports:

[...] some employees think that we went there to do their work. ‘You came right on time, come and take care of these papers’. Every person tries to get comfortable. (OPF2, director, interview 21/02/2003)

Additionally, the consultants were facing hostility and disbelief by branch employees as they felt that their experience of many years had deteriorated. Common comments circulated amongst branch employees in the beginning of the experts’ entrance were:

‘Since this person is coming and we pay him to be wise, he has to prove it every other second’ or ‘who are these people that came here and tell us what to do?’. (OPF2, director, interview 21/02/2003)

Nevertheless, the consultants were meeting the employees in whom employees were expressing their thoughts and opinions. Some of those opinions were implemented, mostly the ones concerning practical measures. The formal concerns of the branch employees regarding the rollout were expressed in the union newsletter. More or less, these referred to the system of matching of the roles from the old to the new system, hierarchy, intensification of work as a cause of de-humanization, dislocation of the working relations and increase of profits by further exploitation of branch employees. They also argued that “the working relations have

not been transformed, they were rather turned upside down into a fluid condition not of positions of work but rather of roles” (Employer’s Union Newsletter - see also Appendix). Changes at a more general level, however, were not a matter of negotiation between the consultants and the employees. Although there were attempts by employees to modify their roles, the consultants had to make clear that decisions were made, some things had to be implemented and there was no other choice:

Everyone things that they’ll modify their new role to fit their liking. There has to be a homogeneous way of operation. And it has to be the way that the central management decided. There is no negotiation. If they argue something, you counter-argue by saying: ‘what you said was taken into account and the bank decided this’. So there is nothing else to negotiate. (OPF2, director, interview 21/02/2003)

Finally, the employees more negative towards change were the older ones. It was difficult for them to change their mentality but it was also difficult to accept new ways of doing things. Younger employees were positive towards change and perceived it as an opportunity to fulfill their career ambitions.

The geographical location of a branch made a difference in terms of interpretation of the transition to customer centrality by the employees. In branches in rural Crete, for example, branch employees could not easily justify this transition. As one branch employee puts it:

Regarding the customer-centered system, I have doubts if this is the best system because we’re not a huge company with many floors. We have a restricted space [...] we didn’t need to be so much customer centered (BE1, branch employee, interview 30/05/2003)

Additionally, in small branches with no corporate customers, where the great bulk of customers are still farmers, the transition to the new model did not make much sense to some of the branch employees, mainly in peripheral areas.

Finally, one interesting issue that emerged from this case is the variety of perceptions, interpretations, and the meanings that direct players attached to the reorganization effort. The first question I asked all my interviewees was: what is this project about? Indeed I received, interestingly enough, different kinds of answers. The expert consultants were answering by describing the socio-technical constitution

and the gradual unfolding of the various tasks and phases project. For instance, one consultant gave the following answer:

The bank in 1998 decided to do reorganization in many parallel subjects, introduction of new information systems, new applications, change in the crediting systems, new systems of HR, and the issue of the change of the organizational structure and operation. Our firm works on the part of the operational and organizational reorganization. It had many stages of analysis, proposals, decision making, until the analytical skeleton of the designing was determined and then we moved gradually to the materialization phase, where we started applying the initial propositions. It started as a pilot project, in relation to the network, changes that have to be made in the network, in the central level, and then we moved on to the so-called rollout, that is, the total inclusion of all branches. We have various stages [...] gradual inclusion of branch teams. However, the designing existed, what was happening was adjustments based on the needs of the materialization, the current conditions, emerging issues [...] from then on, we follow strictly the direction of network change. In the beginning there is a scanning of the network with many sub-goals referring to the upgrading of the bank and the branches. That's where we're at right now (OPF2, director, interview 21/02/2003)

Another consultant replied:

It started in 1998; it was a three-year project. It had a few sub-projects. One was HR, the other was strategy, the administration systems and another that had to do with processes and the other was informatics. And there were consultants, if I remember well, one company did the HR, another did the software, a third one had the part of the recording and improvement of processes and another one had the project management. We were a supporting company to the firm that did the organisational processes (SCF, manager subcontracting supplier firm, interview 05/02/2003)

Banking players, such as branch managers and branch employees, were answering by focusing on the content of the changes and the new organizational environment in their branch. A branch director answered like this:

[...] it's called rollout and it's based on the redirection of the branches and of the bank where the branches are becoming sales centers. For example, loans are not decided in the branch but in some centers, which are the central offices. So the branches are freed in order to deal with sales firstly and not the approval of loans. If a customer walked in and wanted a loan, the branch wasted time with the approval of the loan. We didn't have time to be engaged with marketing and how to sell a product. Now, these kind of processes left the branches and went to a centre (BM1, branch manager, interview 11/02/2003)

Another branch manager:

The attempt is about the change of philosophy of work in the branches. Transform branches from points of product sales to points of customer servicing. So, the system is now becoming customer-centered. The customer in order to get served was coming into the bank and had to go to various departments and offices. Now the customer goes to a section that administers him from the beginning to the end. That is, the philosophy of customer servicing changes. The areas are the same, but the administering of customer servicing changes completely. Every colleague in the bank has a specific role and mission, they know them, and I think this is the great success of the system, which undoubtedly has great results (BM2, branch manager, interview 03/04/2003)

A deputy branch manager:

With the new system, branches have some areas with some people in charge of them, we are the area of development of the enterprises, there is also the area of development of individuals-farmers, and the area of customer servicing. Every employee, from the director to the last cashier, has his own position, and his role. We believe that with this system the bank will be able to improve its financial condition, its competitive position, it'll be more flexible in the banking sector, the decisions will be made faster, we'll be approaching the customers better, we have developed the ATMs and people won't wait in the queues (BM3, deputy branch manager, interview 27/02/2003)

Different interviewees when asked to define the reorganization project, focused on different aspects depending on their role and their position. Experts emphasize the methodological design of the project and how it unfolded in various phases, which reflects their role as experts. The bank players, however, tend to base their definition on the content of the change and how things became different than they used to be in relation to their responsibilities.

By referring to the relationships amongst different groups of visible actors involved in the GB instance and by looking at how different interviewees define the instance, a variety of voices comes to the fore each of which is based on and promotes a certain but different rationality. The variety of rationalities and viewpoints can be identified at the arguments of interviewees and the ways through which the politics and economics of negotiation of choices are revealed by the quotes provided above. In chapter seven, it is shown how the co-existence of such diverse rationalities can be theorized in the context of the T-O relationship.

5.5 CONCLUSIONS

This case study focused on a large restructuring program in GB as a particular instance of T-O change. It was approached through the point of view of GB, that is the user organisation, in order to explore and explain how certain decisions during the initiation, design and implementation of the instance were taken. It seems however that the size and scope of the particular instance was such, which required the involvement of large numbers of external specialists and suppliers that took over large amounts of control and responsibility of the change effort. Although the particular T-O change instance initially was methodologically approached with the intent to illustrate the point of view of the user organisation on ATOC and the particular instance, it turns out that this viewpoint was shaped by the involvement of the external specialists and suppliers that were designing the program in collaboration with internal expertise. Therefore the user organisation viewpoint exists and emerges from this instance to generate and direct social choices on the management of T-O change, however, it seems to have been a product of negotiation and influence by the extended external expertise involved.

The role that external suppliers and specialists play in the initiation, design and implementation of the T-O change instance in the GB directed my interest and my attention towards exploring in chapter six the involvement of a systems supplier in Greece in the initiation, design and implementation of large or smaller-scale T-O change instances.

CHAPTER 6

THE VIEWPOINT AND ROLE OF A SYSTEMS INTEGRATION FIRM ON THE SHAPING OF TECHNO-ORGANISATIONAL CHANGE INSTANCES

6.1 INTRODUCTION

T-O change instances still remain at the centre of analytical focus in the second case study. In this chapter, however, I will not examine only one T-O change instance, but the viewpoint of a particular actor, SIF, on ATOC and their role and involvement in the initiation, design and implementation of various T-O change instances. The case study focuses on how a firm conceives the ATOC environment and strategically plans and negotiates their role and involvement in the initiation, design and implementation of T-O change instances. This is to identify how this particular actor makes social choices during their participation in various instances, what kind of challenges emerge during this process and how SIF's management copes with them. For this reason, empirical data are more closely associated with the particular actor, its historical evolution, its organisational structure, its productive activities, the ATOC network they are part of and the mechanisms that produce social choices during T-O change instances throughout their customer base. It is necessary to collect information on the actor, its corporate identity, its strategic focus, its organisational structure and productive activities in order to be able to account for the emergence of social choice within ATOC networks and how do they influence the shaping of the relationship between T&O during instances of T-O change. Reference will be made to various T-O change instances, mainly in relation to banking and with a particular customer, The Bank, because SIF's main activity, as an ATOC professional, is to profit from the initiation, design and implementation of T-O change solutions throughout existing and prospective customers.

The chapter consists of a historical account on the development of SIF and its engagement with banking, a mapping of SIF's external environment and how it is mobilised towards the development of T-O change solutions for specific customers, the process of initiation, design and implementation of T-O change solutions and finally, the relationship between SIF and one of its largest customers, The Bank.

6.2 HISTORICAL DEVELOPMENT OF SIF

6.2.1 Foundation, Mergers and Name Changes

SIF is an IT firm active in the area of systems integration. It is a Greek S.A. specialising in the development and commerce of technological solutions, turn key solutions or specific parts. The history of SIF³⁰ has been unfolding in parallel with the history of the whole Greek IT sector; SIF, together with IBM Hellas, are the oldest and largest IT firms operating in Greece. SIF's history after its foundation is a product of a series of mergers both at international and national levels.

SIF's history starts in the 1960s with Mr CD, the owner of one of the largest offices in the world in city planning carrying out large residential development projects mostly in the third world. Mr CD needed statistics for the distribution of housing needs, or distribution of traffic flows in a city. Computers could be used to produce the statistics, but would prove expensive. Mr CD, therefore, thought that it might be better if he became a representative of a multinational IT firm and, thereby, profit from the provision of IT services in Greece. He, thus, created his own resource base which he could use for free or with transfer pricing for his office. He rejected IBM because of its inconvenient subsidizing policy. MSIF (before mergers) at that time was using advanced technology, although it was not as commercially successful as IBM. In 1964, then, Mr CD started a distribution partnership with MSIF and created a Greek IT firm (SIF Annual Report, 2003). SIF was, thus, founded and started the promotion and distribution of MSIF products in the Greek market. In 1970 SIF

³⁰ Parts of the history of the firm have been developed by narrations of my interviewees while others from SIF documents. Relevant quotes are provided when available and appropriate.

became a S.A. (FEK 1595/31.12.1970) under the same name (SIF Annual Report, 2003). In 1988 (FEK 3607/12.12.1988), after the international merging of MSIF with another multinational specializing in network technologies, the Greek IT firm bought the representation of that firm in Greece under a different name (SIF Annual Report, 2003).

International mergers did not necessarily mean that the Greek firm would follow at a national level. During the 1988 merger, for example, a question was raised whether the Greek IT firm would be able to buy the representation of the newly merged firm. This would be both of technological and marketing importance. An external academic consultant to SIF explains:

[...] in this case, the technology transfer was quite important but there is also the expansion of the markets. The new firm had a very large base on the markets, they had a very good personnel, know-how about important sectors, such as airlines, banks and the public sector, so beyond the technological reasons, there were reasons of access to the markets and the quality of the personnel which brought operational sufficiency [...] Technologically, what was important in this merger was the combination of technological mainframes of MSIF with network technologies. (EAC, academic, interview 7/10/2004)

The Greek IT firm, however, did not have the funds to assimilate the other firm and one of their customers, The Bank, got involved and solved the problem. Academic consultant explains that:

[.]the general director of The Bank, who understood the importance of these things and the merging of technologies, said that he would help with capital but he would participate himself taking advantage of this merger for his own bank. He got in with 30%. Since then, the bank has stock presence with a percentage between 15-33% in the SIF. (EAC, academic, interview 7/10/2004)

At the end of the 1990s, and now relatively autonomous, SIF decided to attract more capital and develop their activities. They, thus, attempted to enter the stock market to solve their funding problems. There was a question though of whether the firm could enter the stock market under the same name. A new name was eventually decided upon which would be reminiscent of the previous firm, with all the funding problems. This name change also helped them to become both more independent from their suppliers and start developing their own activities and

strategies. As they state in the 2003 annual report, “the change of name aims to clarify for the benefit of our public investors that our firm is completely independent from MSIF” (SIF Annual Report, 2003). In 1999, it was renamed as SIF and entered the stock market. The main shareholder of the Greek IT firm is Mr CD’s son, Mr D, who owns nearly 40% (SIF Annual Report, 2003).

1964: Foundation of SIF. Mr CD starts a distribution partnership with an international IT firm.

1970: SIF becomes a S.A.

1975: SIF sell their first MSIF mainframe in The Bank.

1988: International mother firm merges with another multinational network technologies firm and SIF follows the merging at a national level with the involvement of a large customer, The Bank. SIF next changes its name and starts exploiting network technologies for branch automation solutions.

1999: SIF changes name, re-considers its marketing strategies and enters stock market.

Figure 6.1: History of SIF

Source: Based on SIF annual report, 2003 and on interviewees narratives.

6.2.2 From Distributor to Systems Integrator

In 1960s SIF was doing various jobs of data processing, accounting offices, government projects. Whatever computing needs there were at that time in Greek society were shared between IBM Hellas and SIF. Gradually some banks started asking for IT services in order to digitize and process their archives; earlier, the circulation of information was done physically with cards and card punching. Programming issues also arose. Banks during that time used Fordham and other kinds of languages like Pascal to carry out their, mostly in-house, programming. SIF’s management realized that they had to take advantage of these emerging prospects. Their customers up to that point included: the Army, Organization of Telecommunications of Greece (OTE) and so on. In the beginning, therefore, their clientele consisted of state-owned organizations and also a few firms big enough to buy IT products and services.

In the banking sector, no MSIF mainframes had been installed. They were installed only in 1975 when The Bank's director, a trained engineer, who was the inspirer of this attempt and had the knowledge to communicate with technologists, wanted to acquire their own mainframe computer and develop their banking processes around it. This was a time in the banking sector during which the mainframe computers and the organization of banking operations around that computer by building in-house applications became fashionable, and as an organizational model was taken up from the airline industry. An academic consultant to SIF confirms:

The model of airline firms started 'touching' the banks, because this organization - where we have big network systems around a big mainframe - was something which was developed mainly by the airlines and then taken up by banks. This was an era where all these things had started to mature. The airlines had been quite developed; the banks had started using their organizational model. (EAC, academic, interview 7/10/2004)

The director of The Bank, decided on social and technological reasons, to buy a MSIF, not an IBM mainframe. The social reasons were in reference to The Bank's director's confidence in the local market and his ability to control the processes of the bank, whereas, the technological reasons involved the relevant supposed superiority in some aspects of MSIF computers over IBM. The policy and culture of the supplier and the way they manage their inter-organizational relationships was also a determining factor for this choice. The same interviewee explains:

The Bank thinks that IBM is too oppressing and manipulative and sometimes the control of the internal processes is lost by the way IBM penetrates into them. For example, IBM has a very hard customer corruption policy internationally. In order for them to keep a relationship they offer large premiums. For example, if a director or someone else wants to leave IBM, this means that they significantly reduce their income. These things were detected and understood very well by the general manager of The Bank and said no to IBM. (EAC, academic, interview 7/10/2004)

The Bank's manager also had friendly personal relationships with Mr. D, thus explaining how SIF enters the banking sector.

Due to the fact that most of the mainframe computers installed in Greece were IBM, entering the banking sector for SIF meant that they had to focus mostly

on branch automation where profit prospects were better, although they still maintain the second customer base in mainframe servers in Greece after IBM (SIF Annual Report, 2003). The 1988 merger enhanced the possibility of developing activities in branch automation by accessing network technologies. There was a technological problem of how to combine IBM mainframes with MSIF branch automation. A sales manager explains:

When SIF started dealing with banking IBM had covered most of the mainframes in the Greek market. So, SIF got directed towards the offer of branch automation. There is an issue of how to combine an IBM mainframe with MSIF branch automation. This can be combined with the APIs (Application Program Interfaces). (SBA, sales manager, interview 22/10/2004)

On the other hand, entering the banking sector influenced SIF's identity and its role in the economy. This expansion of activities meant that SIF people had to learn banking. Of course, in the 1970s, this was not such a big requirement due to the role of such firms in the economy. As the director of information services division of SIF explains:

The mentality of IT firms back then was that they were developers of hardware and software. Every business organization had their own informational environment, within which they were building their own technologies and software products. Our role back then was to get trained and learn the products of our supplier. We would teach The Bank techniques to exploit their IS but we wouldn't teach them how to write the accounting or payment applications. We didn't know how. They were doing it internally. This wasn't our role. Our duty was to teach them how to exploit the machines, make intelligent data bases, and so on. If they would put banking or other kinds of data in it, that was their problem [...] our role was more restricted in promoting our suppliers' products. The Bank, for instance, in 1979 asked us for two IS, capable enough in order to be able to support their operations in their branch network. They didn't ask us to build them two on-line systems. I would have said to them: You need two large IS, you need a network, you need applications, and so on, and I can help you build them. (DIS, IS director, interview 18/11/2004)

The management of IS in banking, at this early period of computerization, did not require extensive training on banking processes on behalf of IT suppliers. With a general banking training, they could solve any emerging problems. It was not necessary for SIF to be any more involved in their customers' business processes. The restricted role of IT firms in this early stage of their development was also due to

the partnership structures formed with vendor companies. Firms like SIF were more exclusively dependent on their mother firms, in this case MSIF. Gradually, things changed and SIF became more independent from MSIF and their role changed from a simple distributor of various products to a system integrator. The director of information services division explains:

[...] as technology was developing and what we call IT business was transformed, our firm made the analogous adjustments. First of all, our dependence from MSIF was reduced and they allow us to develop complete integrated solutions. The requirements of our customers have changed over the years. Today they ask for complete solutions. What does it mean? Software products [...] they say: I have this problem: I want to organize my sales unit and I know that IT can give me some solutions. Therefore, you have to develop applications, to set up a network, to get supplies, hardware and so on. (DIS, IS director, interview 18/11/2004)

An ex-managing director of the technical divisions and pre-sales of SIF refers to the relative independence from MSIF and SIF's ability to develop individual strategy:

Nowadays, things are more relaxed. For example, SIF doesn't want to be exclusive distributor of some of MSIF's products. Now products are more open and can be distributed through various channels. (XMD, ex-managing director, interview 15/12/2004)

As the development of IT and its penetration into businesses has changed requirements, it also changed the role and activities of various actors in the economy. The activity of system integration is becoming more important and SIF adjusted to this new requirement. On the increasing importance of system integration this former managing director reflects:

[...] system integration is becoming more important for the reason that the complexity is increasing. Even large customers find it hard to maintain the know-how levels that they need. Therefore, although the customer did the integration, now they realize that they can't do it, in other words, it's too expensive to do it themselves. To maintain human resources with high expertise in all these fields is too expensive and it cannot reciprocate to the standards of competition. Since this is expanding, business firms now do outsourcing of computerization, and that's what system integrators do. (XMD, ex-managing director, interview 15/12/2004)

Additionally, the integration activities and services of the firm seem to represent a continuously increasing percentage of the IT projects while hardware supply seems to have become of secondary importance (SIF Annual Report, 2003).

Although system integration is gaining increased importance, the transformation of the role of particular firms such as SIF also depends on the business models of their vendors and how they develop their distribution channels. An ex-managing director explains:

[...] the role of system integrators and if they gain importance or not is related to the business models of the vendor companies and how they develop distribution channels. Dell, for instance, sells directly to the customers. IBM has a few ways of selling. They have various channels but also sell directly. (XMD, ex-managing director, interview 15/12/2004)

In the gradual transformation of SIF from provider to system integrator the technological direct link between system software and user applications played a significant role. As one of our informants suggests:

[...] whoever installs a mainframe is the one that will take care of the system software also. System software is the one that creates platforms on which the end user applications are built. (EAC, academic, interview 7/10/2004)

It seemed, therefore, like a logical choice for SIF, as the business and technological environment was changing, to start develop their knowledge base and become more active in system integration and the writing of user applications for customers they already had supplied with MSIF products. For this reason SIF created long-term relationships with few large customers in the Greek market showing their desire to embed within the local market settings.

Organizationally, SIF is separated in various productive divisions: Marketing and pre-sales, information services, customer support, R&D, and financial and administrative services. All these divisions are providing services to the business units of the firm, namely, the public sector, private sector, telecoms and financial services sector (SIF Annual Report, 2003). Different people with different specializations are recruited for each of these business units. This organizational structure reflects a strategic attempt for a better knowledge management and

expansion of activities in the markets by perceiving the markets as groups of customers.

To summarize, I have discussed how SIF was created, how it expanded its activities in the banking sector and how its role in the economy changes as technological and business environments are transformed. This shows how SIF's viewpoint on ATOC and their relationship with it historically sets the basis for the promotion and negotiation of choices that influence the involvement of SIF in various particular T-O change instances, thus contributing to certain ATOC configurations. A closer look at SIF's external environment will shed light on how ATOC is conceived and acted upon by SIF.

6.3 LINKS WITH EXTERNAL ENVIRONMENT

A firm like SIF, whose main activity is system integration - that is, the selection, assemblage of various components and their configuration into complete solutions for particular customers - needs links, channels and networks through which to gain access to elements that could possibly be used for the development of a solution. The external environment of SIF and the ways it is managed contributes greatly to the way solutions are designed and implemented in SIF's customers. The links of SIF with its external environment are provided by contacts with various actors. Extended discussions and interviews with executives from SIF helped the mapping of their external environment. As shown in the figure below, this includes: suppliers, partners-competitors, customers, the Greek state, SEPE (Federation of Hellenic Information Technology and Communications Enterprises), EPY (Hellenic Society of Computer Scientists), various universities and research centers, standardization bodies (i.e. ISO), regulatory bodies for the business areas they cover i.e. Bank of Greece for their banking solutions. All these contacts form a semi-stable network of links with the external environment which is mobilized during SIF's activities. Let us examine these players more specifically and their relationships with SIF.

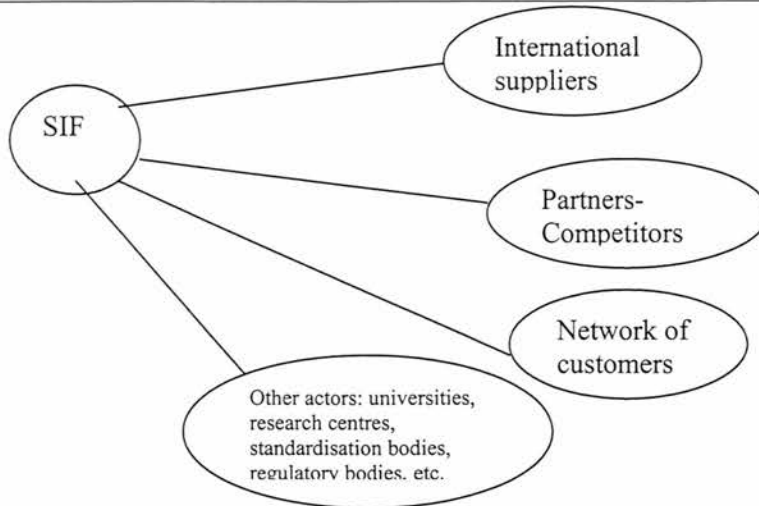


Figure 6.2: SIF's links with external environment

Source: Based on a drawing done by SBA, sales manager, during interview 22/10/2004

6.3.1 International Suppliers

SIF has become part of a network of international partners that supply technological products or complete solutions, depending on the partner. This network is comprised of international firms, like IBM, Oracle, Microsoft, HP, Nortel and of course MSIF. SIF has signed one-year distribution or commercial partnership agreements with such firms and most of them are automatically renewed (SIF Annual Report, 2004). In 2003 it was estimated that more than 80% of the products that SIF used for solutions came from suppliers with whom they had signed distribution agreements (SIF Annual Report, 2003) while this percentage dropped to 60% in 2004 (SIF Annual Report, 2004). SIF has established partnerships with a certain degree of permanence while it still remains open to new ad-hoc co-operations. SIF's main supplier is MSIF since 1964, while the rest of the suppliers are selected on the basis of compatibility of their products with those of MSIF (SIF Annual Report, 2003). Supplies from MSIF, however, even though they are increasing in the long run, in terms of absolute value they constitute a progressively smaller percentage of the total supplies of the firm (SIF Annual Report, 2004).

As mentioned earlier, the business models of vendor companies and the way they choose to develop distribution channels influence the role and identity of system integrators like SIF. SIF has a special relationship with MSIF. The ownership structures and dependence from the MSIF are crucial in determining the role of SIF as a system integrator. As an academic consultant to SIF explains:

At an international level, MSIF, in contrast to IBM, had the policy of breaking down their representation into relatively independent offices. Their representatives were not just branches of a multinational company. They were autonomous companies that were representing MSIF in the various local markets. They had, though, to maintain some standards, that is, they were something between representatives and franchising, in some sense. Thus, even today SIF, which is quite independent, is amenable to various forms of control by MSIF. Of course, this has led to a condition where firms like SIF start developing their own strategies. Whether they match with the interests of MSIF or not, is a matter that differs according to each case. For instance, in the cases that MSIF wants to maintain the absolute control of things, they do not give the representation rather they establish branches which take over service bureaus. For example in Cyprus they have service bureaus for some reason. (EAC, academic, interview 7/10/2004)

Furthermore, on the relationship and dependence of SIF from MSIF:

MSIF has the policy of leaving great autonomy to its local distributors who may then develop their own strategies regarding the development of products, solutions and services. For example, SIF might do remarketing on many of IBM's products in various projects... Of course, this was known by MSIF [...] there are some rules. MSIF has knowledge of things. Also, MSIF has placed a person within SIF to watch things and control things and discusses all the conditions with them. Also, there is a manager who is in charge of a large territory of Europe and who comes here often and discusses these things. I know this from when I was working for the e-learning project in The Bank where we used an IBM platform. First, we asked MSIF if they have the product or not. Then, we told them that we'd get it from IBM. They tried to stop us but we explained that if we don't do this we'd have more general problems with the whole project. So, they accepted this in sorrow. So, the logic is that there is discussion about these things, but they cannot stop some things from happening because there is no other way. Of course, if SIF does a remarketing of IBM mainframes instead of MSIFs, then there is a big problem. Of course, it doesn't make sense to do such a thing because much of the money comes from selling mainframes. If something like this would happen, then obviously the relationship between MSIF and SIF would be over. (EAC, academic, interview 7/10/2004)

SIF, although it started out as – and still is - a MSIF representative, over the years, developed partnerships with various other international supplying firms in

order to cover the needs of the increasingly demanding markets. Also, as the SIF's activities expand to various areas, new partnerships are formed with other suppliers independently from MSIF. For instance, they formed an agreement with Nortel for enterprise solutions and later the agreement was expanded in call centers, as part of SIF's activity in the area of telecoms and SIF was proclaimed as a "Gold Solutions Partner" with Nortel networks (SIF Annual Report, 2003). In doing so, the human resources of SIF had to go through special training and take exams in order to be certified by Nortel (SIF Annual Report, 2003). Apart from the relationship with MSIF, then, there are various other partnerships. A few more-or-less permanent partnerships for SIF include:

EMC: DISKS AND STORAGE SYSTEMS
IBM/HP: other hardware – PCs, microcomputers etc.
Oracle, Microsoft, etc.: for software
Nortel: telecom products
Etc.

Figure 6.3: Some of SIF's international suppliers and what they offer
Source: Drawn by SBA, sales manager, during interview 22/10/2004

Partnership with international suppliers does not only mean the transfer of hardware or software products, which might be accompanied with relevant services whenever required. A manager in the financial services unit in the information services division explains:

[...] we have a web of suppliers that offer us hardware, applications, or in some cases, complete solutions with services. Or they might offer us just consultancy services. For example, we might ask MSIF to send us a guru in topic X for a period of time and they send us some guy. (MFS, manager, interview 26/10/2004)

In regard to how this network of suppliers is shaped and maintained, the same manager refers to the motivation of creating a new partnership linking it with market competition:

This is a very wide network of partnerships which sometimes is determined by opportunistic or competitive issues. Some of them are more long term while others are ad hoc. (MFS, manager, interview 26/10/2004)

Additionally, the wide range in prices of technological components of solutions also seems to determine the formulation of new partnerships. As managers of SIF claim, if a customer wants a cheap solution, then they will try to achieve this low price by forming a partnership with a supplier who offers cheaper technologies. The role of SIF as a system integrator makes it necessary to maintain a network of partnerships and suppliers of products, which will comprise the solutions they develop. As an R&D manager in SIF explains:

More traditionally, we have partnerships with firms that offer some product. This has to do with the fact that I'm a system integrator and I choose components. (MRD, R&D manager, interview 16/11/2004)

6.3.2 Partners – Competitors

Apart from the international contacts, a system integrator forms partnerships with other system integrators, or consultants or subcontracting firms on a more ad-hoc basis at a national and international markets level. That is, they form horizontal partnerships with other IT firms or specialist firms within the same market settings. Depending on the case, these partnerships might take the form of “subcontracting” or “consortium”. SBA explains how these two work:

You hire subcontractors when your percentage of work within the project is large enough. When your responsibilities cover just a 10% of the whole project you do not hire subcontractors because you take the responsibility and the risk if something goes wrong. In consortia things are different. There is a legal framework covering the whole relationship. They make papers, they go to the lawyer, they go to the tax office, they get a tax register number, etc. It's the same as if they create a new company but only for a short period of time. When the project is over, the new company is dissolved. This legal contract is very carefully composed in order to be safe and fair for both sides. Everything is counted and estimated in every detail. (SBA, sales manager, interview 22/10/2004)

These collaborations happen because SIF might not have the necessary resources; that is, access to technologies and the expertise to provide a complete solution due to the scope of the project. They, therefore, turn to ATOC network and mobilize the resources that are distributed there by forming relationships with other actors and an

extended division of labour is created. A manager from the financial services business unit of SIF explains:

Collaborations happen when 'the pie' is very big and it cannot be handled by a single organization. For example, the Police-on-line project which costs 40 million Euros, in order to have been done by SIF, we would have to become 3 times our size for one year in order to gain the capacity to complete such a project. This cannot happen. But it happens indirectly through the formulation of synergies. So, 'the pie' is divided and each firm of the synergy does what they do best. This is how it works all over the world, not just in Greece. (MFS, manager, interview 26/10/2004)

In cases where the project is too large a problem arises between the various firms because the same firms appear to be both partners and competitors simultaneously.

As MFS explains:

These [partnerships] might be with firms that are your competitors within the same market. For example, SIF and another system integrator at the present moment are partners in two projects, they are competitors in five projects and there are five more prospective projects and we're trying to see whether we'll be partners or competitors. This happens in huge projects mainly in the public sector that need this kind of synergies. This schizophrenic effect is in the nature of the market. Not just in the market of technological solutions, but the whole market. (MFS, manager, interview 26/10/2004)

The legal framework behind this kind of relationships seems to provide a safety net and a justification of this paradox. When I asked this manager to explain why they do not have problems with the management of such relationships, he responded:

You go on to a consortium with some firms, you sign contracts etc. you have a legal coverage and it doesn't matter if you are competing with these firms in five other projects. (MFS, manager, interview 26/10/2004)

Further interviews with SIF's top management show that SIF is projecting an open profile in relation to its competitors and their technologies. They do not restrict themselves in staying "faithful" to using only the products of their partners. Various managers of the firm claim that they are open and able to combine various technologies and establish a variety of connections with other firms even if they are their competitors, in order to offer a good solution to their customers. The ultimate example of this contradictory company behaviour is that SIF has embodied in their organizational structure know-how related to IBM technological products. They have

a unit with technologists with training and experience in IBM products, although IBM is their main competitor in Greece.

6.3.3 Network of Customers

In parallel with the management of the international supply and partnership contacts, SIF also develops strategies and activities in regard to their network of customers. The historical development of SIF and its changing role in the economy is associated with their relationships with their customers. As mentioned earlier, SIF started out by offering IT products and services to state organizations and the army. As they entered other areas of activity, such as the financial services industry and as their role as system integrator became more active there was a tendency of SIF to get closer and become more attached to fewer but larger customers in the local market. This is attributed to historical circumstances but also to a conscious choice of SIF's management. The reasons they present at the 2004 annual report for their attachment to fewer but larger customers are the following:

- SIF is one of the few IT firms that had access to technological solutions that could serve the needs of large customers such as enterprise servers.
- The small number of large firms in Greece along with the delayed diffusion of computerization in Greece compared with the rest of Western Europe and North America.
- The value from H/W and S/W along with the accompanying services of system integration and support of solutions offers more profit prospects than of selling PCs on a mass scale.
- Long-term relationships with large customers offer profit, bigger than the one from the initial sale, coming from updates necessary due to technological development, the assignment of complementary projects, maintenance services of H/W and S/W.
- The incremental development of IS of business organizations with small and individual updates does not pose the need for mass

replacement which would make the customer consider an alternative system integrator. Also, the applications S/W increasingly acquires more value with constant updates instead of being devalued.

(SIF Annual Report, 2004)

Additionally, long term relationships between the supplier, the system integrator and the user organization are seen as necessary because of the technological relationship between system S/W and applications S/W:

- The operational environment of systems S/W is proprietary which means that the applications S/W would have to come from the same supplier (SIF Annual Report, 2004).

It is on the interface between system software and end user applications where SIF developed a long-term bond with their largest customer, The Bank. An ex-managing director of SIF also refers to the closeness to the customers and how they build long-term relationships with them:

[...] with customers where you do or have done a core part of their computerization, then you have a different kind of relationship, more close because you can also see the perception of things under different criteria. As time goes by we have new needs, new projects that develop and the relationship becomes closer. (XMD, ex-managing director, interview 15/12/2004)

Finally, if SIF would easily change their main suppliers to attract new customers, this would cause great risk in terms of their know-how base:

- On behalf of the customer, the change of supplier of IT services would result in the devaluation of a great investment in know-how. Also, they would need new time consuming training programs to regain this know-how (SIF Annual Report, 2004).

This, however, is happening on a smaller scale where new supplier partnerships are signed as SIF evolves and its customer network is modified.

Interviewees associate the transformation of the role and identity of SIF throughout the years with the relationship with their customers. Proximity and long term relationships with their customers is, therefore, seen as something necessary since it makes SIF better understand user requirements and thus offer better solutions. A director of the information services division explains:

This transformation [of the role of the firm] came mainly because we were always close to our customers and we would record the new needs and requirements as they were evolving. IT is not a goal in itself. We sell products and solutions in order for the customer to do their job. That's the mission statement of an IT firm. In order to make the right tools to do the job, I would have to learn how they work as well. This came from a close relationship and commitment with our customers and we've reached a point where our concerns would be shared with our customers. We would attempt new technological things. We might not have had the know how to do it but we knew how to get it with the consensus of our customers. We could have stayed restricted to our traditional roles of maintenance of IT products but eventually we would be extinct. We chose not to do this. All IT firms work like that. They don't wake up one morning saying, 'we'll build this super-duper gadget'. They get stimulated by the community of their customers. Then, some of these technologies get diffused to the rest of the market as products which might be sold to a third or fourth customer. (DIS, IS director, interview 18/11/2004)

Although some interviewees saw this proximity and dependence on few large customers as a successful or necessary strategic adjustment to the evolving market conditions, others saw it as a sign of 'underdeveloped marketing' on behalf of SIF. Although the attachment and dependence on few large customers might have given lots of profit to SIF, there is great risk involved in such relationships. An academic consultant to SIF explains:

There is the sense that there is no need for sophisticated marketing. Management rationality shows that there is a need for such a thing but there are so many things happening with big clients [...] there is a postponement [...] When the balance sheet shows good numbers, there is not the sense that they're in a hurry to fix a few things. But there is a danger to find themselves in a very difficult position. (EAC, academic, interview 7/10/2004)

Most interviewees, who spoke about having to reduce their degree of dependence from certain large customers, backed up this view. An attempt towards this direction was made in 1999 when SIF entered the stock market and reorganized their business units for better marketing and knowledge management. SIF is aware that their

dependence on few large customers might cause dangers, on the other hand, this was perceived as a necessary condition due to historical and socio-economic circumstances. The risk, however, from the dependence on their customers has made SIF develop strengths in other aspects, mainly during the initiation and procurement of T-O change instances, in order to feel more secure. An academic consultant explains:

[...] these fears that we talked about have created a very strong sales and pre-sales department where the approaching attempts to the market take place. For instance, one thing that SIF did not do in the past and does now is that they participate in public competitions. Those competitions don't have a very good financial profile, but it's a way for the firm to declare its presence. They give a small profit, but they create significant presents. (EAC, academic, interview 7/10/2004)

The relationship with their customer network has a similar nature with their network of suppliers and partnerships. That is, some of the customers are more permanent while others are more occasional. The business units of SIF are responsible for various groups of customers and they maintain relationships with them. From the financial services industry, therefore, they support mostly banks; in telecoms they have customers such as OTE, TIM, Vodafone, Forthnet, Vivodi, etc. From the public sector they have done projects in various ministries, elections 1981-2004, Hellenic Post. From the private sector they also have various customers (See SIF Annual Report, 2004).

6.3.4 Other Actors

Although suppliers, partners, competitors and customers are the most direct contacts of SIF as part of the ATOC network, there are other actors involved that might have a significant influence over the initiation, design and implementation of T-O change instances. Actors that affect the operation of SIF either directly or through their customers' environment include: the Greek state, EU regulations, SEPE (Federation of Hellenic Information Technology and Communications Enterprises), EPY (Hellenic Society of Computer Scientists), universities and research centres, generating regulations, standards, institutions and research. The Greek state, for instance, regulates the taxation of IT products as well as the taxation environment of

SIF's customer groups. It also administers various programs and initiatives in regard to the development of computerisation in Greece, like the Information Society initiative (<http://en.infosoc.gr/>) launched by the Greek ministry of the Economy and Finance. SIF is involved in this and they participate in various projects through requests for proposals.

In relation to customers' environment, EU and Bank of Greece (BoG) directives affect the shaping of T-O solutions. SIF is informed about these directives either through professional associations such as SEPE and EPY or directly from the BoG. These might include community banking legislations such as the Basel II directive for risk management. Additionally, as suggested by interviewees, professional associations (SEPE and EPY), apart from the promotion of professional interests, also provide a moral and ethical framework and operating standards for IT firms. Finally, SIF is involved in various partnerships where they participate in R&D programs with Universities and research centres.

The R&D department of SIF develops relationships with most of external actors, attempting to implement the results of these contacts into possible solutions for their customers. Regarding the role of the R&D department and its relation to the developments in banking regulations an R&D manager explains:

First of all, we read and find out what these regulations are. Directives from the BoG, etc. Research to find these info, study them and for each rule that's in the directive we try to find out how each one of them might affect the banking systems [...] For instance, rule number sixteen of the directive of the BoG "touches" fifteen application of The Bank. I go to the bank and say: in order for you to conform to rule sixteen you need to do these things. There is a study in the current systems to see what needs to be changed for the systems to be according to the directive. Then, the bank can do these changes themselves or the ISD could do them. The R&D part is this study I just described. This part is something new, the directive is new, and it didn't exist before. As an R&D department that's the service I offer, the study. In the first bank we'll participate with the implementers in the implementation of the changes but in the second bank, the implementers will go by themselves. (MRD, R&D manager, interview 16/11/2004)

Apart from the new regulations and standards that are embodied in new solutions, the R&D department is also involved in contacts with the external environment. The same interviewee explains:

As an R&D department, we get involved when something new is emerging. Even if that is a new customer where you need a different approach when you try to get the first job. All this is the pre-sales support. Therefore, we do presales support for new customers, new regulations, new business models, new technologies [...] Apart from new customers we also do new areas of activity. For instance, SIF had never done anything relevant to culture, like the museums project [...] the goal is for the R&D department to do the first moves and then the other units of the firm to take over. Most of the time though, the other departments are lazy and don't want to learn from us. (MRD, R&D manager, interview 16/11/2004)

The R&D department of SIF, therefore, has a role that can be separated in three axons, as MRD says:

Research and marketing support for solutions that haven't happened before; the first implementation of new solutions, or in new customers; and the pure R&D activities with more indirect results, what will happen in two-three years. (MRD, R&D manager, interview 16/11/2004)

After mapping the external environment of SIF and the nature of their relationships, it is time to explore how this ATOC network is mobilised during the initiation, design and implementation of T-O change instances. Challenges for SIF will be revealed during these processes, what kind of decisions and choices are made and in what way and how the internal organisational structures of SIF interact with the external environment.

6.4 INITIATING, DESIGNING AND IMPLEMENTING SOLUTIONS

According to Computer Desktop Encyclopedia, in regard to technology markets, solution, "is a new IT marketing buzzword of the 21st century. Nobody makes products or provides services anymore; everybody just offers solutions!" (www.answers.com). Interviewees supported this view. An IT solution for business organizations as described by a technical manager of SIF:

[...] consists of hardware, applications software and services. In such solutions all of its components might come from various suppliers. Usually, it is supplier/s plus SIF. (MFS, manager, interview 26/10/2004)

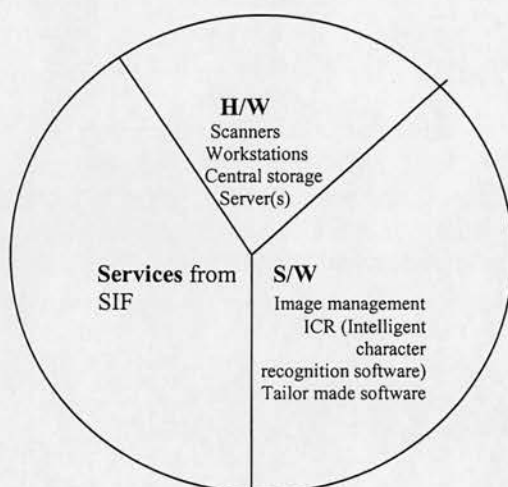


Figure 6.4: Cheque processing solution

Source: Drawn by MFS, manager, during interview on 26/10/2004

An IT solution, as shown in the above figure, is a configuration of various elements, products and services, that possibly have different origins within SIF's wide network of suppliers and partners. If SIF's network within ATOC was different, that is, if it consisted of different suppliers, the same solution would be different, in terms of its components and the expertise used. The figure above was drawn by MFS as an example of a cheque processing solution. The hardware of the solution might consist of scanners, workstations, central storage, server(s) - the systemic part - offered by several of SIF's suppliers. The software of the solution might consist of image management, intelligence recognition software, tailor made software - the operational applications part - also offered by various suppliers and the services of project management, implementation and maintenance support offered by SIF alone or with various subcontractors and partners. As confirmed by MFS, the services provided are related to the technological products comprising the solution. This means that the integrator needs knowledge of the products, hardware and software in order to know how to integrate them and how to repair them if they break down.

MFS describes the process of development of solutions which shows the role of a systems integrator as follows:

For an integrator it is impossible to know all the products in the market. So, we offer a packaged solution to the customer where its various components might come from various suppliers. We offer services too along with the services of the other supplier and this is how a solution is composed. In a solution, for instance, we got some training from an Israeli firm and an application specialist for a month. In other cases, we provide all the services [...] We have a web of suppliers that offer just hardware, applications or complete solutions with services, we might offer just consultancy solutions; for example, we might ask MSIF to send us a guru in X topic and they send us some guy. (MFS, manager, interview, 26/10/2004)

The assemblage and integration of various technological products and services, however, is not enough to constitute a solution. Firms like SIF are enterprises which aim to sell the solutions they develop and profit from this activity. For them, something qualifies as a solution – that is the product of their activities - when it is associated with a business or organizational problem of an existing or prospective customer. In discussing the new trends in business and technologies, a product manager from the pre-sales department argues:

[...] the business trends go first and the technological trends follow to support the business. Therefore, you see the business needs and you try to satisfy them. In the financial unit, for instance, the sales department of our firm of course have a business knowledge regarding the needs of a bank. They follow the trends. They know that banks have the tendency in 2008 to do this. What does it mean technologically? What kinds of solutions are there for this? We'll be prepared in 2008 to face this challenge, for example, Basel II. If a firm does not see the introduction of Basel II as a business opportunity, then this firm lost a chance. (PSD, pre-sales manager, interview 26/11/2004)

This shows how SIF's managers perceive the market and how they search for opportunities to develop and sell new solutions. A solution, therefore, consists of H/W, S/W and services but only in static terms. From the point of view of SIF this configuration is a commodity that has to be sold to a customer, and it is initiated, designed and implemented within the framework of SIF's commercial activities. To understand, therefore, technologies as solutions and SIF as a commercial supplier of such solutions is important to help us realize how the nature and viewpoints of actors

are linked with the development and promotion of choices on the initiation, design and implementation of T-O change instances.

6.4.1 Initiating and Composing Solutions: Developing Proposals

Looking at SIF's organizational structure and its productive departments the Information Services Division (ISD) is responsible for the development of solutions and the Customer Services Division (CSD) is responsible for the maintenance and the support of the various technological products included in a solution. In other words, the ISD develops the solutions and the CSD provides services to the ISD, not on the complete solution but on the products/elements comprising it. That is: CSD signs the maintenance contracts with the customers and if something goes wrong in the use of a solution, the customer is contacting the CSD for repairs and maintenance support. These, however, are the "after-sales" activities of SIF. The division of marketing and pre-sales is responsible for "finding a solution for covering customer's needs in the right price" (PSD, pre-sales manager, interview 26/11/2004); in other words, they are responsible, together with the R&D department, for developing proposals to respond to the markets needs. This is where a solution and a T-O change instance are initiated. They make the first moves and then the rest of the units take over.

For the initiation of a solution there must be a 'stimulus'. There must be a customer request for proposals (RFP), either instigated by the customer or by SIF's pre-sales department through induction of customer interest. A top manager from ISD confirms:

There are two ways: Either the customer comes to us asking for a solution or we go to one of our customers and offer a solution which we believe will be of their advantage. (YDIS, assistant director, interview 15/11/2004)

PSD is specifying that the first way occurs mostly in the public sector unit with request for proposals. The second is most common to the rest of the business units where SIF develops close relationships with their corporate customers and through

maintenance and consulting services promote solutions to them as a result of the deep contingent knowledge they acquire through constant and long term contact with user environments. In any case, there is a process of co-construction of the request by the pre-sales and sales departments and the customer. PSD describes how the request is constructed and how the proposal is developed:

The first thing is the request. The request from the customer does not come out of the blue. It might come like that but it's dangerous for us because we don't have a sense about what this project is all about. Someone else might have. In order for a request to have a value, it has to have been worked on before hand. This is the responsibility of the sales and the pre-sales department. This means that you need to have a contact with the customer, to know their needs, to talk with them both at a business and technical levels, and then you reach to a point where there is a fact which leads to a request. You have to convince the customer that they will have problems in the future in some aspects. Therefore, after meetings and presentations etc. a request is constructed: 'I have this business problem and I want to solve it'. This means that I need software to do certain things, I need support for this software, I need implementation services, I need technical support for the guarantee, etc. Therefore, we have to go to the customer with our proposal and offer something complete. This means that you give them, hardware, services, support, everything, for this solution to work. After the request, the sales person has the responsibility of the account, that is, to promote the proposal with the right prices etc and try to win it and we (pre-sales) have the responsibility to come up with a technical proposal which makes sense technically, to be attractive, and offer it to the customer. Also, someone has to have the bid management. Therefore, you determine a person who studies the proposal, takes the various components, binds them together, makes them attractive and present them to the customer. This person needs to have both business and technical knowledge. If the bid manager lacks some pieces of knowledge he contacts people from the firm and tries to find these pieces. That is, the product people of the firm: the man who deals with servers, the man who deals with networks etc. The key person here would be the man who has the sense of the architecture of the solution. After you develop the architecture of the solution then you talk with the various people that have the servers, the networks and so on and start structuring the solution. Therefore, we develop the proposal for an X solution and we will be partners with the X, Y, Z firms [...] the bet is to be able to illustrate the business need of an organization in technological terms. (PSD, pre-sales manager, interview 26/11/2004)

Since various parts of a solution, products or services, originate from various suppliers and partners or subcontractors of SIF, the process of selecting components for a solution coincides with the process of selecting partners and suppliers for a particular project. There seems to be a series of criteria that determine these processes, all of them having to do with the negotiation between SIF, the customer

and the partners. The following highlights negotiations between SIF, its external suppliers, partners and the customer. PSD explains the politics in selecting partners:

[...] there are political reasons that determine your partners. For instance, in a particular project I will have to be partners with IBM. Why? Because our bosses got together, they agreed and they said that we need to be partners for this project. From then on, the technical people responsible will develop a proposal and based on the policy of each firm they will say: no HP, yes IBM, or we'll put MSIF no matter what. And this way, all this mosaic is built. Responsibilities and tasks are allocated to various people, etc. (PSD, pre-sales manager, interview 26/11/2004)

The same interviewee highlights the political processes involved during this process contrasting the public with the private sector:

The government has consultants and more consultants for the consultants. I'm not saying that they give money under the table to promote certain firms, but there are personal relationships among people and, why not, some people that have access to the government and know these consultants might convince them to pressure for the promotion of certain solutions of certain firms. This makes sense. Any firm would do it. In the private sector this is easier where there are no rules. You just call someone ask him to meet and talk and then you come up with a request. There is a 'give and take' of the IT firms with the people that develop requests. There is a constant relationship. There are also academics involved in committees that form specifications. I'm not talking about a financial 'give and take', rather a technological one between the market and the people that develop specifications. You can't make specifications by sitting in your office and read the prospectus. You'll have to talk to some people around. That's what I mean that requests have to be worked on before hand. So, when the request will come, you won't be scratching your head. (PSD, pre-sales manager, interview 26/11/2004)

Another interviewee, top manager at the ISD stresses the power of the customer choice in structuring a solution and what happens when customers are not so persistent:

Mainly, it is what the customer wants. For instance, OTE wants Oracle. If you don't go to them with Oracle in your proposal you have no chance. On the other hand, The Bank, don't use Oracle except from some minor applications where it could not be done differently. When there is no such requirement from the customer, or the customer is flexible, we prefer to propose technologies that come from our partners and suppliers because we know these technologies very well, we've worked with them in the past for several times and we can offer a solution in a lower cost since there is no need for subcontracting know-how or extra training. (YDIS, assistant director, interview 15/11/2004)

Another interviewee, IT project manager in one of SIF's customers, The Bank, also echoes this view:

[...] you look at the various options which are becoming limited. For instance, the bank strategically decided that they would never use an RDBMS [Relational Data Base Management System] which is not Microsoft. This is a strategic decision. There are others in the market. Oracle might offer a better one, but for some reason The Bank strategically wants Microsoft. Therefore, for us this is a determining factor. We have no choice. Things like that narrow down our options in the selection of the components of a solution. (TMA, senior IT consultant, interview 10/11/2004)

The same interviewee talks about the technical and financial evaluation of the proposal:

[...] there is also a technical and financial evaluation. We can technically evaluate and say: This is technically the best, as it happened with check scanners. But the financial evaluation was not compatible. Therefore, we re-evaluated the condition, we moved on to something less technically good in order to meet the financial capabilities of the customer. Therefore, the choices for the solutions are examined both technically in the first phase and financially. This process might happen during the pre-sales phase where we do this kind of evaluation. You can't go to the customer with ten different options. You go with one or two. (TMA, senior IT consultant, interview 10/11/2004)

He also refers to the relationship and agreements with suppliers as a determining factor in composing a solution:

We have an opinion on the products and we give it to the customer. We also have strategic agreements with suppliers. So, all these things play a role in determining the components of a solution. For example, you cannot go into a competition with a product from a firm when that firm is also competing because they will be cheaper for sure. Therefore, you'll choose something else for your proposed solution. Or you can approach that firm and do a strategic agreement and say, 'I'll promote your product'. Things like that happen when composing a solution. (TMA, senior IT consultant, interview 10/11/2004)

Despite the mobilization of a large network of contacts while developing a proposed solution, however, interviewees accept that there is no such thing as 'an ideal solution' in the market for a particular problem. The reasons for that seem to be emerging from the diversity in the mobilization of this network. As TMA explains:

There was one case where we needed a component, we didn't have it and our competitor had it, who was competing with us for the same project. In that case we went on without that component and in such cases the result whether you get the job, depends on the total evaluation of the solution. The competitor might have an advantage in regard to the particular part, but you might have another advantage in regard to other things, like cost, or have another component that the competitor doesn't have. Another reason is that a component might be expensive and the customer doesn't want to pay for it. Therefore, he was willing to sacrifice the better quality for a less costly solution. Therefore, the ideal solution does not always happen for a number of reasons. (TMA, senior IT consultant, interview 10/11/2004)

While initiating and designing a solution, within SIF's organizational boundaries, the pre-sales department is in close cooperation with the ISD department. As PSD explains:

Pre-sales cooperates with ISD for the proposal of a solution and the result is incumbent because SIF is responsible to the customer in regard to the cost of the solution. The roles of pre-sales and ISD are not the same in every firm. In some firms, the pre-sales and ISD are different teams while in other firms the same team develops the proposal and implements the solution. (PSD, pre-sales manager, interview 26/11/2004)

A manager from the ISD also refers to the relation between the two different organizational units and how they cooperate:

We, as ISD, participate in pre-sales activities when we're needed to give advice on technical stuff [...] In the pre-sales phase they look what solutions or components of solutions we have access to through our partners or the ones that we've developed ourselves. Sometimes, however, the pre-sales people don't have the know-how to build the solutions and they ask us for advice. Pre-sales and marketing department know some things already or through the subcontractors they cooperate with. But for some technical things and specialized things they'll ask us for help for building the solution. Also, from us they'll take a timetable with the things that need to be done and when to be done. That is, time estimation and the necessary resources such as personnel for implementation, hardware and so on. (MISD, manager, interview 16/11/2004)

In other words, the role of the pre-sales and sales people is to formulate and negotiate the request with the customer and develop a detailed proposal which will include a technical architecture of what needs to be done, a timetable and an estimated cost. It is important to emphasize that during the building of the proposal there is an estimation of the cost and the time needed for implementation and not an exact

calculation. If the proposal gets accepted and the project is taken, then the development of the solution starts from the ISD and the various business units.

The phase of approaching customers and developing proposals for solutions represents the phase of initiation of an instance and some initial design of that instance which is embodied in the proposals. Based on their viewpoint and access to ATOC channels, SIF makes choices on the development and design of solutions to be sold as commercial products. In order for such solutions to be developed choices need to be made on which elements and which actors to include, which not to include, based on various criteria. Such criteria that give rise to choices, as it will be shown in chapter seven, emerge from technological and business negotiations amongst networks of actors (suppliers, users, consultants, competitors), governed by politics and market dynamics. Such choices are made in order for proposed solutions which represent particular ATOC configurations to find their way towards local particular T-O change instances. In the next section I discuss the process of making more particular design choices.

6.4.2 From Operational Requirements to System Specifications

During the pre-sales phase and the process of constructing a request, the customer, sometimes with the help of business consultants, develops operational requirements for the solution. These reflect what needs to be done in terms of business processes in the organization. MISD explains:

Usually the customer gives operational requirements specifications. When the customer gives the CFP they have to know what their operational requirements are, or this can happen by the consultants. This means that the customer must know very well what their processes are and to be very specific. If they are organized, they might give them in a written form. (MISD, manager, interview 16/11/2004)

During the development of the proposal, the operational requirements are stated but later on there is further analysis of these requirements and their “translation” into system and software requirements. MISD continues:

During the pre-sales phase the operational requirements are usually known at a high but general level and based on them they build the proposal. Later on, when the implementation begins, during the requirements specification phase, there is a detailed analysis of the operational specifications and their translation into system specifications. In some rare occasions the detailed operational requirements are known during the pre-sales phase. In this case, there is no need for the phase of requirements specification to take place and there is their immediate translation into system specifications during the pre-sales phase. Thus, we have an exact calculation of cost and implementation time. (MISD, manager, interview 16/11/2004)

Furthermore, the same interviewee reflects on the relationship between operational requirements and system software requirements:

Therefore, we have the operational specs, which refer to the processes, and on the other hand there are the system specs which refer to the system which is about to be built. From the operational requirement specification emerge the software requirement specifications. The customer might give you specs on the layout of the screen, of the prints, etc. as well. This is where the big deal is. You start from the entrepreneurial processual specs and these have to be translated into system specs. (MISD, manager, interview 16/11/2004)

The process of analytical recording of operational requirements and their translation into system requirements is a painstaking process and, therefore, a methodical structured way to record the operational specs is believed to be necessary and important in order for the translation to take place. MISD describes this process:

What we do is this: First of all, we divide the project in major operational areas. Usually, we put an analyst in each of the operational areas. This analyst understands what the customer is saying and records it. The different analysts know the system very well and they cooperate with each other. If an analyst changes something in his operational area they have to notify the analysts of other interconnected operational areas to do changes as well. Therefore, they produce a volume of operational specs which is reviewed by all analysts, they comment on it, etc. (MISD, manager, interview 16/11/2004)

Regarding the background and specialty profile of these analysts and how they use it, the same interviewee explains:

We have business analysts and technical analysts. There are people that are more business and less technical. There are people that understand both. The basic thing is that you need to have both. If there is a business person he has to talk with technical persons as well and to be able to communicate with them. Because what we do is to translate the business requirements into technical requirements. What do I

need to do on the system, what do I have to do in the code, to the data base, etc. Therefore, the analysts listen to the customer and they translate it into what needs to be done on the system. In some areas we had a technical analyst who also understands the business processes, but we also might have had our own business analyst who was cooperating with the technical. For example, there are areas which are very processual. The approval of the loans for instance, is a very processual operational area. Therefore, we'll put a business person there, not a technical. To understand well the processes is what it's important in this case... That's why it is important to determine the operational areas and place the right analysts in the right places. (MISD, manager, interview 16/11/2004)

The processes of developing a proposal and analytical requirements specification are not always separate from each other. The boundaries between them and the role of the specialists working in each one of them are blurred. The pre-sales people work together with ISD people in developing the proposal. During this phase, therefore, the ISD people and the analysts involved in the operational requirement specification and translation into system requirements are also involved in proposal development and have a say in the estimation and calculation of cost and of timetable since they know what needs to be done and what kind of resources will be used. Nevertheless, this is a process of more particular design choices which emerge from the management of knowledge and expertise within an instance.

6.4.3 System and Applications Implementation

After the operational requirements have been agreed upon between the customer and SIF, their translation into system requirements start, again in negotiation with the customer, and the system starts being built. This is the *system implementation* process and also an *application implementation* process starts. PSD explains:

Implementation services include: installation of infrastructure, that is, computer room, cables, networks, servers, PC, tuning of the operational systems, web servers, proxy servers, etc. This is the system implementation which is a huge job. There is also a development job that needs to start for the applications of the solution. Afterwards, we have the support services. These are the support that each firm provides to the customer. Something breaks down and we need to fix it, telephone support, advice, and so on. Therefore, the costs are: Initial implementation of infrastructure, the implementation of the application, whatever that means, and the annual maintenance costs. (PSD, pre-sales manager, interview 26/11/2004)

Another interviewee from after-sales explains the process as well:

We do implementation and support. One first phase is to build the facilities, the infrastructure. The computer room, phone lines, cables etc. We usually do these with subcontractors. Another phase is to install the H/W and the system software and after that I give it to the programmers. But the project is not completed yet. It might finish after a year because most of the time is spent for the development of applications. All this time we do support on the project, that is, our own people. After the delivery of the project and depending on what the contract says, we support the customer. Some teams support the system some other teams support the applications. (ASS, manager, interview 29/11/2004)

Usually, during implementation the implementers have a technical report with the things that need to be done. A project manager in The Bank confirms this:

After the process of designing a solution, there is the implementation. In implementation there is a technical report of the things to be implemented, what is about to be done, and then you start doing them. The deliverable of the implementation is the final application that you'll give the customer. (TMA, senior IT consultant, interview 10/11/2004)

The passage point from design to implementation, however, is not always clear and the translation of operational requirements into system requirements can be done simultaneously with system and application implementation. An ISD manager explains:

Then we start doing the specs of the system. Either we put them in paper or if we cannot do them in paper we do a prototype. We start doing something, we show it to the customer, and if they agree we carry on. (MISD, manager, interview 16/11/2004)

Additionally, the specifications might change halfway during implementation which causes delays and confusion. A project manager to The Bank explains:

One basic thing is that the requirements of the solution might change halfway. From the time you get the specs till the time you complete the solution several months might pass. So, the specs might change meanwhile. You might start with three options but after a couple of months these options might be four. So, you might have to go back in the design phase and redo the evaluation taking into account the additional factors. These changes might both refer to technological and business aspects. For example, the introduction of Euro. You might start a big project thinking that it would be finished by a certain time and all of a sudden things might change and we find out that we'll enter the EMU. Or the Olympic games for

instance. These factors might come from external factors that even our customer has no control of. The bank of Greece for instance might send out a new directive. Therefore, some external factors might change your initial specs and depending on the phase you're in you might have to go a bit back in the process. Or you might have technical stuff to deal with. For instance, a supplier might tell you that their product works in a certain way but you find out that it doesn't. For example, the supplier might tell you that their printer prints Greek characters but you find out that it doesn't. So, you'll have to go back and talk to the supplier and see where the problem is. (TMA, senior IT consultant, interview 10/11/2004)

Another reason related to requirements specification and causes problems during implementation is communication difficulties during negotiation of operational requirements. An applications programmer reports:

One major problem during all this process is that of communication and difficulty to negotiate the requirements of an application. Sometimes the customer doesn't know what exactly wants and we have to guess. Then, sometimes they say one thing but they mean something else. Or they forget to say some things and they finally say them after the deliverable. (APA, senior IT consultant, interview 12/11/2004)

Another manager from the Financial Services business unit of SIF also refers to these communication problems among the stakeholders of a project and links them to the lack of a clear way for notating the operational requirements.

Following the implementation of the solution there is a process of thorough testing of the solution. TMA explains the process:

The solution is getting tested technically first, to see if there are any technical problems and then the business people come in and test. In this case the people from the organization management will come and do the test. These are the people that gave the requirements in the first place. If we look at check processing as an example, the business people look at the whole process. They are not at all interested in the technical details behind the solution. They are interested for the job to be done as they want it. Therefore, they might force you to employ complicated techniques in order to make the work of the final user easier. This is the user acceptance test and refers ONLY to the final user. Meanwhile there are also other things that are checked. For example, can the network support this application? There are also risk tests: will the money disappear magically? (TMA, senior IT consultant, interview 10/11/2004)

After the deliverance of the solution and the completion of the project and according to the contracts signed SIF keeps a maintenance relationship with their customers

during which they might, as discussed earlier, approach the same customer to negotiate the construction of further requests for proposals.

6.4.4 Projects

The implementation of such solutions takes place in project-based efforts. It seems, however, that there is a great variety in the size of such projects. MFS gave a categorization of projects that they participate according to the size, the time and the resources needed for each project:

PROJECTS			
	Elapse time	man/months	persons
Small:	2 weeks	2-3 m/weeks	1-1.5 persons
Medium:	1-12 months	2-12 m/months	2-3 persons
Large:	1-2 years	20-120 m/months	10-15 persons

Figure 6.5: Various projects and times and resources needed for them

Source: Drawn by MFS, manager, during interview on 26/10/2004

The number of people mentioned above for each project category includes only the people from SIF. The project might include more people from SIF's partners or from the customer.

As MFS clarifies:

The SIF – customer ratio of involvement in a project may vary. It may be 10:1 or 1:1. For instance, in a project SIF might be asked to offer a person or two for a certain period of time; for instance, two programmers for six months. (MFS, manager, interview 26/10/2004)

Also, in terms of how the project is carried out based on various project management methodologies, MFS refers to difficulties in coordination of large projects:

There are working teams consisting of people from both supplier and customer. The project management and steering committee meet every fifteen days and discuss the issues that the various project managers raise. There is the general director of the supplier and two general directors from the customer. These meetings never happen as planned. For instance there were supposed to be monthly meetings in a project but the first became in January 2004, the second in July, the third is about to happen in November. This is due to the difficulty to gather such high executives in the same room a specific date. They are all busy. This happens in the large projects. (MFS, manager, interview 26/10/2004)

In the next section the relationship between SIF and one of their largest and oldest customer, The Bank, is presented. Empirical data show a special relationship that will bring about issues regarding the initiation, design and implementation of T-O change solutions and instances.

6.5 SIF AND THE BANK

In the section about SIF's network of customers I discussed its attachment to a small number of large customers for a number of reasons. Some views emphasized the necessity of being closely attached to customers for the development of good solutions, others spoke of SIF's underdeveloped marketing and its anxiety to reduce the degree of dependence from such customers and finally others have explained this attachment as an adjustment to the evolution of the market conditions. The major large customer that SIF associated its fate with is The Bank. A managing director of SIF, opposes the underdeveloped marketing view and supports the latter explanation in regard to the relationship between SIF and The Bank while he also explains the difficulties of constantly approaching new customers:

It wasn't a result of underdeveloped marketing, it was a result of the conditions in the market. That is, the monopoly of the public sector by Intracom, the political conditions and interests, etc. Most of the banks in Greece had IBM mainframes and in order for us to survive in the banking sector we had to find ways to expand our profits. In a sense then, at that time we devoted ourselves to The Bank which was giving us large projects and prospects for profit [...] Additionally, with new smaller customers we have to know them from scratch and we spend much time till we reach a point to become effective. This reduces our profit. Therefore, The Bank combines big customer with large and many projects plus lots of room for profit in combination with the know-how on the customer acquired over the years, where things have a continuity, there is lots of tacit knowledge and we don't waste any time. Therefore, this wasn't necessarily a bad move. The Bank is a good, innovative bank and the close relationship with them gave us the chance to create a strong financial base in order to be able to invest in other areas as well. (DIS, IS director, interview 18/11/2004)

As discussed in the section of the historical development of SIF, The Bank has played an important role to the entrance and development of SIF within the area of Banking and Financial Services industry. On the other hand, SIF has contributed

greatly in the development of The Bank's information systems. Interview data and written documents of major projects on The Bank reveal a history of the two firms as it evolved in various major periods lasting over thirty years. Let us see how their overlapping and co-influencing histories developed:

Phases	1975-1987	1988-1994	1995-1998	1999-today
E V E N T S & A S P E C T S	SIF provides MFS & Software related services To the bank	International & national mergers. Access to network technologies for branch automation	Installation of treasury systems & other projects, i.e. merging of The Bank with another bank	Relationship continues with new applications, new MF in 2000 which supports SAP applications
	Some organizational blending & development of IT specialists	New operational systems-External pressures to IT investments by suppliers.	80% of the IT Company's operations are related to the bank-Stronger bonding	Restructuring of the IT company, Entering the stock market
	Most end user applications built in-house	SIF more involved in applications Dev.-strong bonding		Decreasing % of operations from 80% to 60%
	Still weak bonding			Bonding still exists but more rationalised

Figure 6.6: History of the SIF-The Bank relationship

Source: Based upon a figure produced by EAC, academic.

The above table shows four major phases of evolution of the relationship between the two firms. In the first period (1975-1987) SIF installs two MF computers in the bank and relevant system software while most of the end user applications are developed in house. The first signs of bonding, however, especially after 1980 when according to some interviewees SIF started neglecting its marketing strategies, emerge. As an academic consultant assures:

From the beginning of 1980 and after, SIF started having an underdeveloped marketing and underdeveloped sales strategy. And this is because, by then, the 'incest' relationship with The Bank had started becoming quite clear. (EAC, academic, interview 7/10/2004)

Also, the two firms started both developing their specialist human resources and blend with personnel transfer from SIF to The Bank and the creation of hybrid structures. The same consultant explains:

This early there were a few people with relevant experience in Greece, most of which had acquired this experience in the Army by using the army's computer [...] and most of them were hired by The Bank while another physicist with graduate studies in England was hired by SIF. A while later with an agreement of the two firms, this man left SIF and went to The Bank. This is the man that later on would become the director of The Bank's IT department. (EAC, academic, interview 7/10/2004)

This personnel transfer was related to the relationship between SIF and MSIF as opposed to a hypothetical relationship with IBM. Additionally, this blending created bonding and attachment between the two firms. The same interviewee explains:

This could not have happened with IBM. You could not have a member of IBM transferred to a bank. This was proved to be in favour of SIF commercially because a part of the people that the bank had was coming from SIF and they thus created an incest relationship between them, even in eras where the percentage of activities was not very big [...] They realize that they feel more secure cooperating with people that they know [...] SIF has close relationships with another bank but not very intense because this bank is IBM oriented. (EAC, academic, interview 7/10/2004)

In terms of hybrid structures, in 1986 SIF and The Bank created a separate IT company (joint-venture). EAC explains:

XXXX, for example, is a firm that was created by SIF in cooperation with The Bank, and the general director of SIF was placed as a general director of XXXX. Nevertheless, they followed their own path, generally they are not competitors with SIF but they tried to get into some projects. (EAC, academic, interview 7/10/2004)

During this first period, then, the relationship between the two firms started with various activities. They started blending organisationally and some bonding was created but the bond was still weak and the strategies of the two firms were still diversified and unable to influence each other significantly. However, this would start changing during the second period of the relationship when the bank invested directly in SIF by getting involved in its merger with a network technologies firm. The Bank decided to get involved in order to profit from the technology transfer based on the view that there is a connection between mainframe, system software,

branch automation and applications³¹ which prevailed soon after The Bank was persuaded, with the involvement of international supplying companies, to adopt operating systems, which were products of the newly merged with SIF company³². SIF on the other hand, by including The Bank as shareholders was aiming at ensuring a degree of commitment on behalf of The Bank³³. During this period, SIF became more involved in writing user applications and changed all the applications to work onto the new operating systems; thus, the bond of the two firms grew stronger. Also, the new ownership structures between SIF and The Bank had conflicting effects on strategic planning. On one hand, SIF had a sense of security but, on the other hand, they felt the danger from their attachment to The Bank. The two following quotes by EAC illustrate the two different sides of this effect:

This big privileging customer had created such a great sense of security [...] they were saying: 'whatever happens, this bank needs us'. We are talking about some difficult times and years where the SIF's budget was saved literally because The Bank made big purchases. And generally, SIF is very much focused and directed on its relationship with The Bank and its internal culture is very much determined by this relationship. This means that in some cases, the relationship of SIF with the external environment might be 'arrogant' which means that if the relationship with other customers won't work, it's not a big deal since SIF can focus more on its relationship with The Bank. (EAC, academic, interview 7/10/2004)

He continues:

Of course, The Bank places under competition its offers for projects, that is, it is possible not to give projects to its closely associated firms, if there is a much better proposal by another firm in a very good price. Or, the financial and economic profile might show that although the technology is not the best, it will nevertheless bring profit. So, the fact that The Bank owns part of SIF doesn't mean that they will turn down a more profitable proposal by another firm. (EAC, academic, interview 7/10/2004)

During the third period, SIF persuades The Bank to combine MSIF technology with Microsoft technology in parallel with a large merging project between The Bank and

³¹ This was confirmed by a series of discussions with EAC, which were not recorded.

³² These new systems allowed for distributed, multitasking computing (interview with EAC 7/10/2004).

³³ This view was expressed by SBA, sales manager, during interview on 22/10/2004.

another bank. This reveals important issues on the role of SIF in the market and how it works as well as its relationship with the international mother firm. EAC explains:

MSIF has the policy of leaving great autonomy to its local distributors, and the distributors may develop their own strategies regarding the development of products, solutions and services. For example, a new mainframe which was installed in The Bank [...] there were many PCs needed and also a tool for network management. This was bought from IBM because it was the best in the market and The Bank wanted it. Also, many of the PCs that were connected with the network were bought from IBM. So, SIF did what is called 'remarketing'. Also, in the year of the merging when there were huge needs, the 20-25% of IBM Hellas' budget for that year was coming from this remarketing by SIF. Of course, this was known by MSIF which couldn't do anything and they were getting out of the PC market. (EAC, academic, interview 7/10/2004)

In addition to this, there was the installation of both treasury systems in the bank and various other projects of smaller scale. During this period, and especially after 1996, the percentage of SIF staff working in projects of The Bank started growing and the Bank related operations of SIF reached at some point about 80%³⁴. In this period then, the two organizations were at the closest they have been both organizationally and strategically since the volume of activities was the largest it had been.

After 1999, SIF underwent restructuring and rationalization of their marketing in order to decrease the degree of dependence from The Bank. A manager from the R&D department explains:

Five to six years back this relationship was very close. The Bank was the only customer of SIF. But this wasn't a good strategy because you had all your eggs within one basket. Therefore, the goal changed and we wanted to reduce the percentage of dependence from The Bank and increase the percentage with other customers. (MRD, R&D manager, interview 16/11/2004)

During this period SIF supplies a new peripheral mainframe which supports SAP applications. A manager from the ISD explains:

[...] The Bank started looking at the market to see if there is something good to improve the accounting system. They found SAP but it couldn't be loaded in the core

³⁴ This percentage comes from an interview with a manager from the Financial Services business unit. The interview was not recorded.

system. It wasn't compatible. SAP works only in Unix and Windows. Therefore, they got another peripheral system for the SAP. This was a process of detachment of accounting. (ASS, manager, interview 29/11/2004)

With the restructuring of SIF, they started developing other business units and created contacts with more customers and finally managed to decrease the percentage of dependence from The Bank from 80% to 60% (SBA, sales manager, interview 22/10/2004). There is still a strong bond but there is an effort on behalf of SIF to deal with this in a more rationalized way. EAC explains the restructuring attempts to rationalize SIF's marketing and resource management:

[...] there is a unit of 'private sector' within SIF which attempts to be completely detached and independent from The Bank and deal with manufacturing. There are some other departments that refer to other areas of the financial sector. Banking division has completely been separated by The Bank. That is, The Bank has become one separate division, and there are attempts so the people that work on the banking division not to deal with The Bank at all in order not to be influenced by it [...] this does not mean, however, that the firm works like that. The distinctions above work like this within the frame of sales force of the firm. And, accordingly, the sales force creates distinctions within the pre-sales department where all the projects are prepared. (EAC, academic, interview 7/10/2004)

The relationship between SIF and The Bank, therefore, remains strong, although more rationalized and strategies appear to tend towards diversification.

Organizationally, the two companies are still connected. MFS has provided a sketch to explain the organizational contact:

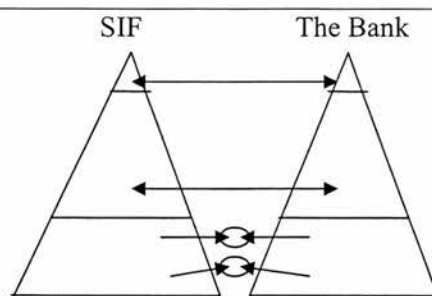


Figure 6.7: Contact between the bank and the IT firm at different hierarchical levels
Source: Drawn by MFS, manager, during interview 26/11/2004

At the top level, there is contact between the top management of SIF and The Bank.

At the level of middle management, there is day-to-day contact between various

managers and at the lower level³⁵, technical staff such as software engineers, programmers) both from SIF and The Bank work together in the same space. The little circles represent various different projects where people from both organizations work together. As MFS confirms, there are also SIF staff who have worked permanently in The Bank for more than ten years.

Finally, despite the gradation of the degree of attachment and the tensions between the two organizations over a thirty-year relationship, they still maintain good relationships. As DIS explains:

This relationship has to do with a long-term trust and commitment. We provide solutions and we are tested every day. If we stop offering good solutions the relationship will stop. Within this framework of trust we have an advantage since we know the customer. We don't have secrets with The Bank any more. That's why our people function also as consultants to the bank. If we were only looking at our own interests and wouldn't care for the interests of our customers we wouldn't have the relationship we now have. (DIS, IS director, interview 18/11/2004)

Additionally, regarding the emerging contingent knowledge and the nature of the relationship as it developed gradually, the same interviewee explains how it works:

Our knowledge of the customer gives us the opportunity to act proactively and instead of going there and ask them what they want us to build for them; I go and suggest things for them. I foresee that you'll need this. I've studied it and I think you'll need this solution for the future [...] In regard to the composition of a solution we provide alternative scenarios. We try to take advantage of all the value of the existing systems of the bank. Whenever we see that something still can be used effectively we won't advice them to throw it away and get something new. We might go onto a process of gradual replacement. In our relationship of many years that's what we do. And this is how we build the IS of The Bank. Gradually, if something that we offered was a complete failure we have the courage to say so and suggest them to replace it with something new. (DIS, IS director, interview 18/11/2004)

Finally, as EAC explains, the nature of this relationship has led to the development of more realistic solutions to the emerging problems:

[...] there is the issue of knowledge of the business operations of The Bank and of course the way that the IS is organized. When for instance you want to sell a solution

³⁵ The Bank pyramid is not the actual pyramid representing its organizational structure. This is how SIF people would perceive their customer organization in terms of working together in projects and maintaining a relationship. In other words, this doesn't mean that the IT people of The Bank are the lowest in the hierarchy of the organization.

to your customer you have to make him believe that what you're talking about is related with the realistic problem that your customer has. If you don't know details of the structure of his system, then possibly your proposal to be much less realistic, unless of course you demolish everything and offer something from scratch. This happens more often in Greece, demolish and replace with something else, while abroad this doesn't happen [...] and in that aspect, the SIF people have a great advantage over the IBM people. (EAC, academic, interview 7/10/2004)

The relationship between the SIF and The Bank and the way it has evolved over the four phases as presented here, illustrates how an actor like SIF makes strategic choices based on a very specific way of ATOC configuration and particularization towards instances initiated, designed and implemented with a specific user in mind. Based on various options, constraints and the strategic management of their viewpoints, SIF and The Bank try to balance the degree of particularity or abstractness of ATOC, by means of deciding whether they should stay in a close, almost exclusive relationship or should they be more open to the wider ATOC environment, as it will be shown in chapter seven when discussing the viewpoint as an approach to innovation management.

6.6 CONCLUSIONS

The historical evolution of SIF reveals useful information on how the supply part of the ATOC conceives and strategically plans their involvement in T-O change instances. Of course, not all systems suppliers have the same approach to ATOC. Nonetheless, the role of firms like SIF in linking the international technological supply with local contexts of use is quite interesting in shaping the way various technologies are coupled with a variety of organizational models and structures. The activity of systems integration with which actors like SIF are engaged, is handled by SIF in a way that makes them develop from a simple distributor of technological supply and a mediator in their early history, into an actor that has the relative power to influence the process of linking supply and use. They develop their own individual strategies, they have their own point of view of ATOC and they develop their activities by strategically planning or adjusting to future or emerging market and industry trends. SIF, as an ATOC professional have a specific role to fulfill in terms

of taking part to the mechanisms that contribute to ATOC effectuation, but they are doing so in a rather particular way while trying to maintain themselves and dominate certain markets which will increase their profits and their status as businesses. For this reason, the processes and the mechanisms through which they reach social choices and decisions, relating both to the shaping of various T-O change instances but also to the corporate future of SIF, are quite interesting.

The phases of initiation, design and implementation of T-O change instances and solutions do not have clearly distinct boundaries. This is because the solutions that are developed by SIF are designed and implemented on the spot when a T-O change instance is initiated. There is not a systematic packaging and reselling of these solutions and therefore there is not a clear boundary between designing and implementing a solution, which might occur for some of the technological components of a solution. This, however, is not the only reason. The concept of *innofusion* (Fleck, 1988) has captured the non-distinguishable nature of innovation into processes of innovation and diffusion, or design and implementation.

In the next chapter, I attempt to integrate and analyze findings from both case studies and make full use of the analytical tools suggested earlier and also see how this attempt will help our understanding of the relationship between T&O and the way it is shaped within the framework provided by the space between local instances of T-O change and the global emergence of the knowledge economy.

CHAPTER 7

ATOC AS AN ENVIRONMENT FOR ACTION: A VIEWPOINT APPROACH TO STRATEGIC MANAGEMENT OF TECHNO-ORGANISATIONAL CHANGE

7.1 INTRODUCTION

The purpose of this chapter is to employ the suggested analytical tools and concepts in an attempt to integrate and explain the collected empirical data from the case studies presented in the previous two chapters. The concept of T-O change instances can reveal processes and social choices in the initiation, design and implementation of T-O change and shift the focus away from restricted, one-dimensional aspects. Considering the actors' viewpoints as they emerge from the empirical cases helps to explain the social choices during the management of T-O change by offering justification for these choices. The ATOC concept, finally, offers an analytical space that embraces social and economic relations amongst heterogeneous and diverse actors within the global knowledge economy, which is best understood as a space between local T-O change instances and global trends and resources within the knowledge economy and how these are linked.

This chapter, firstly, revisits the empirical data and identifies possible problems in relation to processes of initiation, design and implementation of T-O change instances. Secondly, it reveals the challenges that emerge within ATOC during the management of T-O change and how actors cope with them. Finally, it offers an explanation on how the T-O relationship is shaped through social choices from diverse and heterogeneous actors within a global knowledge economy and through instances of T-O change.

7.2 INSTANCES OF T-O CHANGE: TECHNOLOGICAL SOLUTIONS FOR ORGANISATIONAL - BUSINESS PROBLEMS

In this section, the empirical case studies will provide a first layer of analysis where the processes of initiation, design and implementation of T-O change solutions and instances will be examined. Let us start with the GB case.

7.2.1 GB Case Study

The GB case provides an excellent opportunity to study the initiation, design and implementation of a T-O change instance. The particular history of GB, its position within the Greek market, its relationship with the state, the relatively recent involvement in broader ATOC networks as well as the large scope of the change effort offer a good opportunity to examine the above processes in as much detail as possible and reveal interesting issues regarding the shaping of the T-O relationship. Although GB emerges as a significant actor in this case study with a certain conception of the ATOC, that is called to make social choices in this T-O change instance, it seems that social choices were influenced in a high degree by the involvement of external specialists and suppliers.

7.2.1.a Initiation of the GB Instance

The importance of the pre-instance or pre-project phase in T-O change has been stressed, although not enough, in previous work (McLaughlin et al, 1999:57) in illustrating the on-going development of technologies while being selected and adapted to the specifics of an organisation (McLaughlin et al, 1999:57). This argument, however, is perceived in rather limited organisational terms of selection and adaptation. The ATOC theory allows for a wider view of this phase by seeing it as emerging from a wider socio-economic environment. Therefore, an emphasis on the initiation of a T-O change instance could show how broader socio-economic relations within ATOC, but also previous configurations of T&O (rhetorical T-O models) and their histories are enacted as negotiable elements during T-O change

instances. The broader socio-economic and industrial context within which the GB T-O change instance emerged, was discussed in chapter four. Forces of banking de-regulation, increasing competition and the parallel emergence and diffusion of relevant technological developments have created the basis for the instantiation of the 1997 instance in GB. Therefore, the local T-O change instance in this particular moment of GB history emerged through the interaction of local organisational and business settings projecting the difficult condition in which GB's top management found themselves to be. The decision for the instantiation of this particular T-O change instance, then, emerged from GB's management conception of themselves as a competitive firm within a wider changing socio-economic business and industrial environment. This move represents a social choice in T-O management which differentiates the GB management from a non-choice, which would be not to proceed to a radical restructuring effort. Alternative social choices could be to decide a smaller scale change, which would continue a segmented relationship with ATOC, staying away from integrated, change management visions and promises.

Prior to the 1997 T-O change instance GB had a restricted relationship with ATOC, having gone through segmented and inconsistent innovative moments in their history. On the other hand, subsequent developments were done at that time in relation to new technologies (i.e. CRM software packages, banking information systems), management techniques and business models that have been used in other banks and were leading the way in T-O change in banking. In terms of social choice, then, GB also had to consider the possibility of "non-choice" which would involve a decision not to proceed to a restructuring effort. Non-choice, therefore, takes the meaning of a "decision not to act".

In 1997, GB opened up its organisational boundaries and outsourced resources for a large scale restructuring which would affect the corporate identity of the organisation. This would mark the initiation of a particular T-O change instance where certain socio-economic relations and their conception by particular actors brought together an organisation with a certain, particular history and certain technologies and business models as they had been developing through processes of ATOC commercialisation and supply of solutions, and used and re-configured as they were travelling in various user contexts (see Pollock et al, 2003; Pollock et al, in

press). Top managers of the GB formed a committee with the gradual involvement of external consultants who first started negotiating this. The initiation of the T-O change instance and the choice to turn to ATOC seems to have been promoted by experts internal to the bank in collaboration with external technological and business expertise. The size of the project in this case, however, and the volume of complex expertise outsourced, shows that a large amount of responsibility and control of the particular change instance was placed in external experts. Given the inconsistent relationship GB had with broader ATOC up to 1997 a broader exploration of the ATOC was seen as necessary. Thus, relevant external expertise that would bridge the gap between GB and the broader ATOC was employed and acquired great value for the success of the T-O change effort. The particular instance in GB, therefore, was initiated as a business decision by the central management to agree on a mobilisation of specialist knowledge, technological and business, internal and external to the organisation, in order for this T-O change instance to become a successful strategic moment in the corporate history of the organisation. This move, in ATOC analytical terms, constitutes the initiation of a particular instance of T-O change in GB. After the central management was convinced, the committee composed and published a competition announcement, a call directed to the ATOC. At the initiation stage there was a general problematisation of the existing model and based on that, arguments were formulated supporting and justifying the move to T-O change. These arguments refer to the difficulties of GB to manage their customer databases, the antiquated or non-existent, sophisticated IS and relevant electronic applications, GB's weak marketing strategy and the inappropriate organisational culture of the bank and called for radical changes that would transform GB's corporate and organisational identity.

The initiation of this instance for the particular user organisation with a specific innovation history represents an opening of its organisational boundaries and a deeper involvement with ATOC. Also, this instance means that GB allowed in its T-O change effort various diverse players and elements from ATOC. On one hand, they gained access to previously lacking expertise and material resources necessary for the T-O change but, on the other hand, they seem to have lost some control of the T-O change effort regarding its direction and decisions on design and

implementation. The GB case is an example of how large amounts of responsibility and control are transferred to the external actors who are able to set the basis and examine the criteria for the promotion of choices. Social choices from GB are put in a negotiation space within the T-O change instance. The control of the complex – due to the variety of expertise, variety of conflicting interests, miscommunication - mechanisms that produce social choices able to influence the direction of T-O change was, in a sense, distributed among the diverse actors involved in the T-O change instance. Finally, the initiation of this instance represents one of multiple opportunities for ATOC to find its way towards a particular case of T-O change.

7.2.1.b Designing the GB Instance

The analytical framing of the problem in GB led to the formulation of a vision for a new bank with a new identity. The links between the problematisation of the condition, the development of a new vision and the way to materialize it were shaped by various factors that were considered, such as, the existing model of the bank, various quantitative indicators referring to competition, performance, control, external trends in banking and technologies crystallized in what we termed as rhetorical T-O models. The new vision was to create a new modern competitive commercial bank with a new identity aligned with the T-O principles of customer centrality, the realization of which was linked with technological, organizational and cultural transformations with an analogous project design where the T-O change instance was broken down into various relevant sub-projects. This method of management of expertise, although it provided a systematic way of executing the T-O change, did not have a ready solution to the issue of heterogeneity and the challenges posed by the distributed character of this innovative change.

The point to be made here is that the problematisation of the existing GB model and the building of a new vision are in essence processes of linking/aligning the particular circumstances of a business organization with wider trends and elements from ATOC, based on quantitative indicators of competition, performance and control. This way ATOC could perform its purpose as a market of commoditized T-O change. In regard to the direction of the vision, the different actors involved play

their role as sources of political power and influence in negotiation. In the initiation phase, the scope of change and the degree of openness to ATOC was decided and this was further shaped in more particular terms through design and implementation processes.

Given the amount of diverse resources distributed within heterogeneous ATOC networks, which were necessary for this instance, a need emerged for the creation of a team which would carry out the design of the change towards the realisation of the new vision. Specific decisions and choices were generated regarding the elements of ATOC that would be utilized for this particular instance, as opposed to other elements that would be rejected or not considered at all (non-choice). The specialist firms constituting the selected consortium represent the mobilization of ATOC resources, expertise, artifacts, tools, analogous to the design of the T-O change instance into various sub-projects. Most of the resources were carried into the T-O change instance through ATOC networks and partnerships, as embodied in specialized personnel representing various ATOC professional suppliers, given that different actors within ATOC have access to different and competing types of resources.

An important phase of the design of T-O change solutions for a particular T-O change instance is to select the components that would constitute the solution by selecting a particular consortium amongst the competing ones. Therefore, in terms of identifying social choices that influence the design of a T-O change instance and solution one needs to look at the criteria and choices of the actors used in the instance and also the resources and elements they carry into it. The design phase of the GB T-O change instance starts more or less simultaneously with the initiation phase. The initiation phase is, in a sense, an 'abstract design' which later on becomes more particular as the instance unfolds through the making of relevant social choices on the formulation of consortia, the selection of one of the alternative ones and the more systematic design of the T-O change by the various stakeholders. The abstract design then enters the instance and becomes more particular as it unfolds within the change project. This is discussed more later on when discussing ATOC particularization.

7.2.1.c Implementation of the GB Design

The various actors comprising the selected consortium have to implement the various subprojects and as the T-O change instance was designed, they would have to be done in a logical, chronological order. This would give the whole effort a sense of continuity and progress. The strategy project would have to be completed first and then the BPR project would start in order for the organizational processes to be determined for the rest of the projects to be informed by the new processes and then the rest of the subprojects. Of course, the design of the T-O change effort did not get implemented like that at all! Although the strategy project was finished first, the rest of the subprojects were happening at the same time and they overlapped many times raising issues of accurate implementation of the design and in consequence causing what has termed as 'innofusion' (Fleck, 1988), where one actor was invading the area of another because of delays in completion. This situation caused conflicts, delays and questions on the initial design of the T-O change effort.

The process of implementation of the various subprojects reveals interesting social and political interactions and negotiations amongst the project stakeholders. Findings suggest that this process was highly political and the decisions affecting it can be seen as made within tensions of politics, in an organizational and wider sense. This was both to the conflicting interests and varying political agendas of the stakeholders and to the still close dependence of GB from the Greek state. For instance, suggestions made by specialist actors for design modification became an issue discussed in the Greek parliament and published in the government Gazette. Another example comes from the close interrelation of the IS with the organizational processes of the bank. In banking, as both cases reveal, technological developments seem to follow organizational developments in T-O innovation, although T-O changes are seen as technologically driven (in the GB case, the consortium leader was the IT firm but the whole change was BPR driven). This is partly due to the promises of technologies in terms of promotion of innovation, on one hand, and partly due to the nature of such technologies as processual technologies of modular design where their design seems to be informed by developments in various business domains. However, ISs and organizational processes are closely related and shape each other. Decisions and social choices during implementation, where the sub-

projects overlap and physical actors involved in the project are in contact with each other, take place through political negotiation amongst these actors. For instance, there was the issue of the centralization of organizational processes previously held at a branch level. This was part of the BPR project. The final decision, however, on which processes belongs to the branch and which are centralized was negotiated between actors during implementation. In relation to this, studies in the UK have shown how branch managers resisted the centralization of loan approval (see BoS case in Fincham et al, 1994) in similar situations and thus politicize the process of organizational transformation.

This politicization of T-O change emerges from the relationship and interaction between rhetorical T-O models and the existing model (or universal knowledge vs. contingent knowledge). In the UK cases above and in the GB case we can identify instances where the previous models resist rhetorical models both in the phases of design and implementation. In the design phase of the new organizational structure for example, there was pressure from the bank management to the consultants not to interfere with the hierarchical structures of the organization. In the design phase, therefore, the existing structure was exercising strong control against radical transformations that would affect the long existing hierarchical structures of GB. Any resistance to organizational changes was perceived by the internal and external specialists as due to the ownership structures of the bank, where the Greek state was still maintaining an influential presence and this presence would make organizational changes a highly political and painstaking process. In this change instance then, the state had a strong *imminence grise* presence. In many occasions it was a point of reference during negotiating change, even though the new strategic direction of GB was based on its detachment from the Greek state. Additionally, GB's personnel posed resistance during implementation, especially in branches where more senior employees were not keen on changing working mentalities. On the other hand, younger employees saw that as an opportunity to climb up the hierarchy and build their personal careers. The internal organizational politics and their managerial treatment reveal the emergence of various organizational voices expressing interests and concerns regarding the direction of the change and their future status within the organization. These voices add to the politicization of T-O

change management as they were treated as disruptive during implementation, rather than been seen as a constructive mechanism to influence design. The solution to this emerging 'problem' was the transformation of the organizational culture and mentality by diffusing a common change discourse throughout the organization and convincing employees that this change was a win-win situation for everyone.

The process of implementation cannot fully be detached from the design phase, as the concept of *innofusion* (Fleck, 1988) would suggest. This is true in the GB change instance as well. The complex environment with the various diverse actors and various interconnected sub-projects, made it impossible to maintain a certain order in terms of discrete design and implementation phases. Initial design, therefore, could be seen as 'incomplete' in itself or "abstract", which is completed during implementation and use. Although typically distinct processes of design and implementation were anticipated, in practice they were not. This was projected in interviews as "implementation problems". In the GB case, although these problems were expected they were still referred to as problems that needed to be solved. This shows that external specialists believe to the "ideal" of distinct phases of design and implementation and treat their overlapping as implementation problems, the solution of which lies in the experts' many-year experience. It could also be argued that design is never complete rather it is happening constantly with incremental innovation and maintenance of the T-O model of an organization. I do not wish to go that far, although, arguments could be made on the blurred boundaries of these processes and on the analytical need to conceive them as a unity, inseparable from each other, as captured here by the concept of 'instances of T-O change'. Due to the fact that the boundaries between these processes, initiation, design, implementation are so blurred, their driving forces and the factors influencing the way they unfold are of similar nature. The issues that can be raised regarding T-O change are making reference to all three phases.

Finally, in regard to the GB case study, the involvement of various diverse actors with different roles, positions and power within ATOC, makes T-O change instances within ATOC social situations which appear to be very complex and heterogeneous. Heterogeneity and complexity could be argued in many terms. For instance, the different backgrounds, specializations, resources, that different actors

carry into the T-O change instance; the different discourses employed by these different actors during communication; the different interests and strategic orientation of different corporate but also organizational actors within the instance; and finally, the different views of the world - or rather of the instance within the ATOC - and themselves as part of this world by different actors, either action is defined as coming from an individual and acknowledged a posteriori, or the concept of action includes the decision-making process and the logic behind it. This heterogeneity and complexity within ATOC and the way it works towards instances of T-O change create challenges for the actors involved and difficulties in making social choices and decisions for the management of T-O change and corporate strategic planning. These challenges will be discussed more in the next section.

7.2.2 SIF Case Study

The highly politicized heterogeneous and diverse social situation of the T-O change instance in GB takes us to the SIF case study which reveals interesting information regarding the involvement of a systems supplier in the initiation, design and implementation of instances of T-O change. SIF is a firm that develops and promotes technological solutions for organizational and business problems in various areas of the economy. These solutions constitute configurations of modular design, based on the organizational processes of the user environment. They are constituted by software, hardware and services; they are commercial products, commodities that need to be assembled, packaged and promoted to the customer. The process of doing so needs to be seen analytically within the framework of a T-O change instance, which is also a "commercial situation". Not all T-O changes are of a large scope and so organized; however, even the smallest T-O transformation requires the mobilization of various resources, which if they cannot be found in-house, are looked for within the ATOC networks. Through the activation of social and economic relations within ATOC, T-O change solutions are re-contextualized (Schumm & Kocyba, 1997) and find their way out to different contexts of use through the instantiation of small or large scale instances of T-O change.

7.2.2.a Initiation of T-O Change Instances

A look at ATOC from SIF's point of view reveals the commercialized character of the initiation, design and implementation of T-O change solutions. The initiation process involves actions and decisions happening within a business discourse. Although SIF is a specialist firm with access to expert knowledge in various technologies and business processes through their international collaborations, the management of these resources involves business activities that would transform this expertise into packaged technological products. This will then be bought by their customers through the initiation, design and implementation of T-O change instances, while trying to establish and maintain its position as an "obligatory point of passage" (Law & Callon, 1992) for T-O solutions. In organizational terms, this shows that this actor, from the supply side of the ATOC is also a business organization; they develop strategies and they are part of ATOC's competitive environment. For example, the organizational unit of SIF responsible for the development of proposals is called "marketing and pre-sales", while the unit responsible for the implementation and maintenance of the solution is called "after-sales".

Data from the SIF case suggest that the initiation of a T-O change instance is a "business negotiation". The initiation of such instances is negotiated between SIF and its customers. The stimulus might come either from the customer or from SIF and it seems to be negotiated in business terms between the pre-sales people of SIF and top management from the customer. The first occasion is pretty straightforward, in terms of the initiation of a T-O change instance, while in the latter the supplier (i.e. SIF) approaches the customer and attempts to induce interest for their solutions with reference to new trends. During this business negotiation technological expertise is also required in order for the business agreement to have a realistic technological equivalency and for a more accurate estimation of the various costs involved. Therefore, within the business negotiation there is also "technological negotiation" involved.

The construction of a request and the development of a proposal are two different but closely related processes where an organizational/business problem is framed and then a proposed technological solution is developed to solve this

problem. The problem is negotiated between the customer and supplier with the involvement or consideration of other factors as well - such as, regulations, legislations, trends, other actors, and strategies - and as a result social choices emerge and shape the solution and the particular relationship between T&O. The proposal that is developed to solve the problem which has been formulated is an estimation of the cost, the timetable and the resources that would be needed for the development and implementation of a T-O change solution. In other words, it represents a business arrangement resulting from the negotiation of the relevant actors within a market framework of commerce of technological solutions, as it was shown in section 6.4.1.

The initiation of T-O change instances is a process that is amenable to management by different actors. SIF, as an ATOC professional specialist, wants to initiate as many instances as they can handle given the resources they have, or can gain access to. Therefore, they try to manage the initiation of such instances through marketing their solutions to their customers and the development of partnerships with international suppliers. The technological and business aspects of the initiation of a T-O change instance in terms of the resources mobilized and the nature of socio-economic relations (i.e. commercial, business, etc.) are analytically captured by the concept of "techno-organizational" within which the social-choices and actions of the different actors involved are highlighted within instances of T-O change.

7.2.2.b Designing a Solution

The process of designing a technological solution for an organizational problem, apart from being a process of configuring various elements (technological design), is also a business process or rather a suggested business plan for T-O change that the user organization (customer) is called to approve or reject. From the point of view of the system integrator a proposal for a solution is also a product that is promoted to the market. Therefore, the process of selecting and adopting technological solutions and the process of developing and promoting technological solutions involve negotiations that lead to decisions regarding investment in technologies within ATOC networks for the user and decisions for product development, marketing and networking, for the integrator. In the design of such

solutions then, why are certain decisions made instead of others? For instance, why does a specific solution consists of certain components instead of others given the infinite possibilities offered within ATOC? The decisions on the design of a T-O change solution are based on business negotiations amongst different suppliers and users and the development of networks. The configurational character of such solutions of modular design makes the design process to be a process of network management within ATOC's business environment, which might be different in different T-O change instance according to different local circumstances of the instance. This network management is often based on meta-knowledge regarding the actors operating in a field, generating reputation and other indicators where technological properties and capabilities are hard to assess directly. For instance, the relationship between SIF and The Bank was built on both technological but also on non-technological criteria which had to do with the supplier itself.

The decision on which elements to include in a particular solution for a particular T-O change instance is negotiated – both in business and technological terms – between the users and the various suppliers within ATOC who are competing for an entrance to the particular instance and proposing alternative ATOC configurations that will produce alternative solutions to possibly alternatively formulated business/organizational problems. Design of a solution, then, is an issue of technological design but also an issue of producing a commercially successful product or an investment plan for user organizations, by suggesting alternative configurations of ATOC's networks according to the position and access one supplier has to these networks. Based on the SIF case study it could be argued that the factors influencing the negotiations among involved actors leading to decision making on the design of a solution for particular T-O change instances could be categorized as follows: The design process of a solution of a particular T-O change instance is affected by *politics* of negotiation and communication amongst various actors; by *market dynamics* of competition and collaboration which shape the way the networks and market structures are formed and evolve; and, finally, by the relationship between *technological and business* aspects, both in terms of the knowledge and expertise required and also in terms of the different levels of negotiations. Important issues emerge on the *management of networks* of suppliers,

partners and customers, which are mobilized during the development of T-O, change solutions and as it will be shown later, cause new challenges for individual actors/firms.

7.2.2.c Implementing Solutions

The link between an organisational/business problem with a technological solution, that is, between a T-O change instance and ATOC, constitutes an initiation and design process, which might take place in many different manners as described above. However, there is also an implementation process that is a part of the whole ATOC journey. The implementation of solutions as seen in the SIF case reveals interesting issues regarding the management of expert knowledge, the interplay between technological and business aspects of T-O change, organisational politics, conflicts of interests and heterogeneity. It reinforces the findings of the GB case and also raises issues on the management of expertise, which emerged by examining T-O change from SIF's point of view.

An interesting process that emerged from the SIF case regarding the implementation of T-O change solutions is the recording of operational requirements of the solution and their translation into system requirements. The business/organisational problem needs to be identified and translated into technological terms. This way the process of finding technological solutions to organisational problems is realised. Although this process starts from the initiation phase at a more general level, it becomes finalised during implementation. The process of the analytical recording of the operational requirements is highly controversial and much conflict and miscommunication result from it.

Evidence from the SIF case reinforces the findings of the GB case regarding the heterogeneity, the difficulties in communication amongst the stakeholders and the politics emerging from the conflicting strategies and interests. Interviewees especially emphasised the difficulties to negotiate operational requirements with customers who "do not always know what they want". As a result, the operational requirements might change halfway during the implementation process. This might happen due to external factors that none of the stakeholders have control over, such as the introduction of Euro. Additionally, this case reveals blurred boundaries

between the design and implementation processes due to this difficulty to negotiate operational requirements. For instance, when a common language is difficult to achieve, the integrators develop something which has to be approved by the customer before they move on with the design and development processes as shown in section 6.4.3 where it shows that the translation from operational to system requirements can happen simultaneously with the systems and applications implementation, which also confirms the blurred boundaries between design and implementation. This painstaking process requires management of business and technical knowledge by the integrator. As shown in the SIF chapter interviewees stressed the importance of placing the right analysts with the appropriate expertise to the right place, to negotiate with the relevant people in regard to relevant aspects of the change. This knowledge management is necessary in order to reduce emerging problems from difficulties of communication amongst the stakeholders, conflicts of interests, delays. This shows how the technical and business knowledge mobilised for such T-O change instances is carried by persons directly involved in the project in the form of experience or formal training. This also makes the mobility of persons an important factor of management of expertise. The SIF case has examples of people transferred to the customer environments. Additionally, the management of specialist knowledge during implementation requires management of networks which are still present during this phase and continue to play an important role.

During implementation there is a need for mobilisation of technological and business knowledge, but SIF does not hold all the necessary specialist know-how internally; rather they might need to mobilise it externally, within ATOC. For example, they might ask from MSIF to send them a specialist in a particular product for a certain period of time. However, this would happen only if they could not find the particular expertise somewhere closer. The external specialist from above will cost far more money and thus will make the solution more expensive. Finally, there is a series of tests of the implemented solution in regard to both its technical and business aspects by the people that participated in the development of the technological and operational requirements.

To summarise, findings from the SIF case support those of the GB case regarding the design and implementation processes; however, the SIF case brought

about a new issue engulfing these difficulties from the point of view of the system integrator. This issue is the tensions between technological and business knowledge in relation to instances of T-O change and the need for an appropriate management of specialist knowledge in order to reduce the negative effects of those tensions. The discussion on the implementation challenges in the SIF case focused on the translation of operational requirements into system specifications. The variety of business and technological specialists, the changing internal organisational and external industry environments, the communication difficulties between supplier and user constitute a heterogeneous environment that has to be 'homogenised' during an instance of T-O change in order for this translation to take place. Intense processes of negotiation and generation of contingent knowledge on the user settings aim at the "smoothing" of this process. In T-O change instances where the supplier and the customer have long-term relationships and have established structures and modes of information and communication exchange, this process appears less problematic. Communication barriers are overcome and accumulated experience helps in the development of common discourses at the level of negotiating operational and system specifications. The SIF-The Bank relationship offers such an example. However, political processes where conflicting interests interact might cause problems similar to the GB case, such as, resistance and absenteeism. Nonetheless, for an actor like SIF the implementation challenges emerging from the social relations between supplier and user within the framework of a T-O change instance can be managed by a proper management of expert, technological and business knowledge.

7.2.3 Emerging Themes and Issues on ATOC

From the above discussion on the initiation, design and implementation of T-O change instances, various issues and themes emerge in relation to what ATOC really is and how it operates.

7.2.3.a Management of Networks and Distribution of Control

Actors are embedded in certain historically developed and evolved networks of social and economic relations involving partners, suppliers and customers. Some of these partnerships are more permanent while some others are formed on an *ad hoc* basis. This network of contacts constitutes series of channels for better access, distribution and mobilization of ATOC and its elements throughout various environments. Through such channels, actors gain access to various resources which open certain possibilities in terms of what a particular solution will be composed of and also access to certain promises, visions and rhetorical T-O models. When SIF, for instance, merged with a network technologies firm, a new channel was opened and new business and technological possibilities emerged in relation to the participation in instances of T-O change, by means of accessing certain technological components instead of others. On the other hand, these networks are more or less restricted within a globalised economy. SIF cannot have access to every technology or every piece of specialist knowledge in the world. Although these networks that firms like SIF are embedded into open channels to an abundance of possibilities and options of a global selection environment, they are also structures that pose restrictions to actors in the sense that they limit the initially or seemingly affluent possibilities. Additionally, the fact that T-O change is happening within such networks poses challenges for actors in terms of the control of the T-O change and management of these networks in relation to particular instances of T-O change. The existence of these networks reinforces a “distribution of control” of T-O change as it is crystallized in various instances. The distributed control of T-O change instances means that the actors involved do not have full control of decision-making mechanisms and mechanisms of production and promotion of social choices; rather, they are influenced by power emerging from certain configurations of ATOC networks during T-O change instances. There is then the issue of how much control is an actor willing to sacrifice or determined to acquire in relation to a T-O change instance. In the GB case, for instance, as shown earlier, following its decision to open up its strategic change program, much of the control and responsibility of the instance was shared amongst the external suppliers which were directing GB’s social choices.

7.2.3.b Politics of T-O change: Private Sector – Public Sector

Operating under such networks, the socio-economic relationships amongst the various diverse actors provide a ground for negotiation on solutions to be developed. These negotiations, which occur both in business and technological terms, are highly politicized and the actors involved are employing power and influence mechanisms in order to promote certain interests. Such politics might be projected in the form of conflicts at an organizational level; however, they are linked in wider socio-economic relations within ATOC networks and the way actors manage such networks.

There seems to be a difference between the instances of T-O change in the public and the private sectors. In the public sector, where the state is involved the political character of the negotiation shows how various actors are attached to the state or attempt to access mechanisms in order to influence state decisions in relation to the promotion of certain technologies or certain suppliers in the market. Some firms in Greece, for example, have an advantage when it comes to public sector projects because they are more attached to the government and their consultants. However, even in projects where the state is involved there are embedded actors with networks of power and influence. In the private sector, firms like SIF are more free to develop contacts and networks of influence in order, on the one hand, to get access to channels of involvement in the initiation and, on the other hand, to gain access to the necessary partners and suppliers who will provide the elements that constitute a solution. In short, things are not so different in the public sector projects where the free operation of the market is demonized and things become more sensitive. Occupational and industrial networks of power and influence in the control of T-O change have been stressed as important by relevant literature (see Fincham et al, 1994; Swann, 1997; Clark, 1997).

One might ask the question whether actions and social choices of actors are significantly bound to established networks or not. Whether, for example, networks can be radically reconfigured during a T-O change instance or whether the stability of relationships between actors is more important (Koch, 1997). The management of networks issue could be answered with the notions of ATOC embeddedness vs. embodiment, as it is discussed in the section 7.2.3.e.

7.2.3.c Commoditization and Marketisation of T-O Change

Due to the commoditization and commercialization of T-O change the above politicized business and technological negotiations are taking place within an environment governed by market dynamics. A technological solution for a business/business problem is also a commercial product or service, which is being invested on, designed, marketed, promoted, sold, and consumed. On one hand, the user firms constitute a market for such solutions/products and on the other hand supplier firms develop and offer such solutions to them. This, however, happens in a more dynamic way where suppliers and users are involved in the creation and expansion of markets according to their individual strategic orientation, as we have seen with SIF and how it developed historically into a more active actor within ATOC. As Callon argues, agents within markets pursue their own interests; they have diverse interests as buyers and sellers and transactions between them resolve such conflicts by defining a price (in Clark, 2000:103-104); that is, as we have seen, they go into a business arrangement reflected in the constitution of a proposal of a solution.

'Supply' and 'demand', 'competition' and 'collaboration' are concepts referring to the initiation, design and implementation of T-O change solutions and attempt to capture institutionalized, or less institutionalized interactions between groups of suppliers, distributors, integrators and users of T-O change solutions, as ATOC driving forces. Particularities and strategic choices of the user determined by cost estimation, on one hand, and the development and mobilization of supply networks, on the other, and the power of influence of various actors within these relationships are influencing the form of the final solution for a particular instance. Thus, there is a negotiation which balances these interacting forces and creates bridges between what the customer wants and what the supplier and the integrator promotes. ATOC then is a market of technological solutions for organizational/business problems and its market structures provide a basis for the development of socio-economic relations amongst actors and the development of networks and the mechanisms of production of social choice. As this study reveals, the marketisation and commoditization of T-O change is governed by formal market dynamics and processes but also through informal non-technical aspects. As Pollock

& Williams (forthcoming) suggest, social choices are determined not simply by the properties of technologies but rather through the way that these properties take form during the construction and negotiation of comparative measures in the midst of technical and cultural criteria.

7.2.3.d Technological and Business Aspects

Negotiations among actors are taking place in both business and technological terms. Agreements on collaborations and projects are discussed in business terms by employing relevant expertise and discourse. SIF for instance when they are thinking of starting a new partnership, think of the business prospects and how this new partnership will bring them more profit. User organizations like GB and The Bank are considering the positive or negative effects that T-O change will have on their firms as a whole in relation to the changing trends and business environments and also they negotiate the design of T-O change solutions in terms of the cost of that solution based on their financial capabilities. The negotiations between the various diverse actors would have to align somehow the business and technological aspects of a solution. This alignment is evaluated through relevant tests where both financial and technological aspects are examined but also during the design process where the integrator is technologically designing a solution based on the user's financial capabilities, organizational requirements and particularities. The interplay between technological and business aspects of T-O change solutions makes necessary the mobilization, employment and successful management of a variety of expertise, where technologists and business specialists are involved in the negotiations. The organizational structure of SIF provides evidence on how they manage this required expertise during the initiation, design and implementation of solutions. This way, the proposed solution becomes more accurate and the final solution more realistic and marketable.

7.2.3.e Ideal Solutions for Ideal Problems: Embeddedness – Embodiment and Management of T-O Change

The way particular T-O change solutions are initiated, designed and implemented based on political connections, market dynamics and networks that

various actors involved makes this process amenable to various contingencies. This shows that there are no ideal solutions. The final solution designed for a particular T-O change instance is never the 'ideal solution' because decisions and compromises need to be made due to the limited access to resources and limited financial capabilities, despite the global availability and mobility of actors and resources that give the sense of affluence of possibilities. For example, the users are negotiating the best solution they can get, given their capabilities and not the generally best solution for a particular problem. From the point of view of the integrator, they develop solutions for problems that help being framed, based on their own access to relevant resources and capabilities to mobilize them. Different integrators would develop different solutions. They would most likely be comprised of different components, different brands of servers, different applications, different databases and also might be supported by different kind of maintenance contracts. This is due to the different degrees of embeddedness of actors in various networks within ATOC and also the different degrees that various actors have embodied elements and resources of ATOC, but also due to differentiating strategic goals of various actors. The degree of embeddedness-embodiment in ATOC is transforming over the years when actors like SIF strategically position themselves within ATOC, by developing new partnerships, approaching new customers, gaining access to new resources and finding ways towards an expansion of the T-O change instances in which they can be involved. Their capabilities and their ability to control and influence the development of a solution increases because they become more flexible in their design. They might have many alternative options to choose from, and they might be able to mobilize a variety of alternative resources for the design of a solution. On the other hand, they might not be able to do all these things and this depends on the problem they are looking a solution for and whether or not they have significant involvement in and control over the process of problematisation.

Nonetheless, if a firm like SIF cannot handle all the necessary resources for a solution of a particular instance of T-O change, they can increase their size and capabilities temporarily by developing *ad-hoc* partnerships with other specialist firms with complementary to the particular solution resources. Such *ad-hoc* partnerships are formed on the basis of instances of T-O change where various

consortia of expert firms are formed and compete to entering the T-O change instance, like in the GB case. In the long run, therefore, the balance between embeddedness and embodiment in ATOC might be transformed based on strategic expansion or restriction of an actors' access to ATOC networks, but there is also a temporal and short term management of the size and access to ATOC of a particular actor like SIF, based on local market circumstances, opportunities and prospects for participation in various instances of T-O change. The section 6.4.1 on initiating and composing solutions and developing proposals provide strong empirical evidence on how actors like SIF manage networks and gain access to ATOC resources.

Market dynamics of competition, collaboration, demand and supply as well as political influences and conflicting interests play important role in determining which would be the final solution for a particular T-O change instance. These dynamics for an ATOC professional like SIF but also for a user like GB or The Bank, are translated into issues of management of expertise and management of networks of suppliers, partners and customers. Effective management of those aspects would mean more control and more influence within the cycle of production, distribution and use of T-O change solutions, that is, more control over ATOC. The management of the relationship between embeddedness (what I can have access to externally) and embodiment (in-house resources acquired over the years) of ATOC from an actor is a route to influence the development of solutions for particular T-O change instances. All these issues and dynamics that influence the design of T-O change solutions reveal increased complexity and heterogeneity amongst the various diverse actors involved, which might increase uncertainty in the production of social choices. Different political interests, different access to different resources, different industries, different instances of T-O change, different options, comprise an environment which creates complexity for actors from both the supply and use sides. This causes difficulties in assessing supplier offerings and whether they would fit particular user organizational settings.

There are five aspects regarding ATOC and the way it operates. First, ATOC is highly politicised at many levels; namely, at the level of the importance of the links with the government, at the level of organisational politics and at the level of promotion of innovation. Second, these political interactions happen within a market-

like environment and are governed by market dynamics. Forces of competition and collaboration, supply and demand, pursuit of profit, show the increasing commercialisation and commoditisation of T-O change. Third, the coupling of T&O and the process of developing technological solutions for organisational and business problems raises the issue of the interplay between the technological and the business aspects of T-O change, both in terms of diverse expertise and also in terms of different levels of negotiating and managing T-O change. Fourth, the link between problem and solution in terms of T-O change shows that there is not an ideal solution for a given problem; rather, the problem is framed according to the way the previous three aspects are handled by the various actors. That is, the framing of a problem and the development of a solution to that problem is a process that involves organisational politics, within a market-like environment where the technological and the business aspects are handled in various ways. Therefore, this process involves decision making which is influenced by all these factors and make the final design and development of a solution highly contingent upon various circumstances and how the power relations and influences are negotiated. The link between instances of T-O change and the ATOC is contingent upon the situated way actors manage T-O change. Finally, all the different and diverse actors involved in the process of initiating, designing and implementing T-O change solutions constitute a network which create a heterogeneous and complex environment. This refers both to conflicting business strategies and interests of different actors/firms and also to the diversity of the mobilised expertise and other resources (knowledge and artefacts) for the process of developing technological solutions for organisational/business problems. This heterogeneity and complexity creates challenges for actors in terms of developing business strategies, policies and strategic management of expertise. To summarise briefly, T-O strategy and policy can be understood as 'management of specialist knowledge and other material and non material resources', which means, in turn, 'management of networks', which itself reduces to 'management of heterogeneity and complexity'. In the following sections it will be shown that these challenges are dealt with through a process of self-realisation, a construction of a corporate identity.

7.3 CHALLENGES IN THE MANAGEMENT AND CONTROL OF T-O CHANGE

ATOC captures the space where development and supply, on one hand, and various contexts of use, on the other, create a ground for the development of a global, complex, multi-actor, knowledge based, market-like social network. The increased complexity and heterogeneity of ATOC poses challenges for user organisations in light of instances of T-O change. On one hand, they invest in technology and want to exploit a wide range of possibilities but, on the other hand, they also want to maintain a large share of control and an important role in the strategic management of T-O change, although this share was not an equal one in the GB case where external experts acquired more control as shown in chapter five. Practically, users by narrowing their search for solutions they reduce their search costs but on the other hand they may get locked-in to sub-optimal solutions. System integrators like SIF on the other hand also face challenges in terms of developing and promoting to the market commoditised technological configurations as solutions to a wide range of organisational/business problems. They too want to maintain high levels of control in order to be able to promote their solutions to their customers without problems. This was empirically illustrated in chapter six in the form of the dilemma in the relationship between the SIF and The Bank. In other words, the challenges, both for users and system integrators are raising within the framework of strategic planning and positioning within ATOC and the formulation of a corporate identity and a conscious role in ATOC processes as business organisations. Finally, ATOC also poses challenges for policy making, in terms of regulating this abstract complexity and heterogeneity.

In this section it will be shown how these challenges are formulated for various kinds of actors involved in ATOC, although the focus will center more on users and system integrators. The discussion about policy issues will have a more general character and will not only refer to regulatory bodies, such as the state or standardisation bodies, rather to regulation that is posed all kinds of actors by the management and control of T-O change. In doing so, reference will be made to the concept of organisation and its changing meaning based on evidence from these case

studies and the role of various kinds of organisations in T-O change. Secondly, strategy issues and the strategic challenges faced by both users and system integrators in regard to the management and control of T-O change as emerging from the changing concept of organisation and the meaning of T-O change will be discussed. Finally, issues about policy will be explored. This section is about the formulation of the environment and the challenges that form the basis for the emergence of social choices by the actors involved in T-O change instances.

7.3.1 The Changing Meaning of Organisation and T-O Change

As shown in chapter two there is a lot of discussion on the changing concept of organisation. A combination between changing business environments and trends and strategic planning and positioning of various individual actors, in relation to the emergence and expansion of ATOC and the way it operates, contributes to a transformation in the meaning of organisation in relation to firms-actors. In the GB case for instance an opening of organisational boundaries and the transfer of the issue of T-O change from inside the organisation outside to the ATOC can be identified. The outsourcing of technological and organisational/business expertise and resources is moving the management of T-O change outside the user organisation and places it within ATOC's complex and heterogeneous networks, as the GB case shows. Another user, The Bank, with a close long term relationship and attachment with a certain supplier of technological solutions (SIF) has been co-evolving organisationally with that supplier and in many cases it seems that the organisational boundaries between the user organisation and the ATOC are quite blurred, which gives a new, extended meaning to the concept of organisation. On the other hand, SIF also changes organisationally and its role as a system integrator within ATOC is also transformed, as shown in the section on the historical development of SIF, both due to the changing external circumstances and trends but also due to its strategic actions, attempts to control their role within the changing environment. For example, as SIF is developing and expanding organisationally it acquires a more active role with more access to control of ATOC and its networks.

Also, SIF, as a system integrator who develops T-O configurations which are used as solutions for their customers, is an organisational configuration itself as it embodies multilevel ATOC networks in its organisational structure. The various partnerships with various international suppliers and the network of permanent and *ad hoc* partnerships with other specialist firms and with various customers give a very wide and distributed definition of organisation as a network. It is also the nature of the activity and the role of SIF that allows for such distribution of organisational structure. SIF's co-evolution with The Bank shows how the distributed organisation may have a more permanent form based on inter-organisational relations, trust, and attachment.

Therefore, firms, both users and suppliers, are opening their organisational boundaries and become part of ATOC networks when it comes to T-O change. Davenport (2005), for instance, in relation to this trend discusses commoditisation of organisational processes where organisations can buy organisational processes. Orlikowski (2002) discusses 'distributed organizing' and Swan & Scarbrough (2005) discuss 'networked innovation' in order to capture issues and challenges in relation to the significance of the changing concept of organisation to innovation processes, that is, to T-O change. This changing meaning of the concept of organisation in relation to business firms shifts the focus in the capturing and explaining of social choice and action from within organisational boundaries of firms to external ATOC networks. The analytical focus on T-O change instances within ATOC helped capturing this transformation in the concept of organisation.

7.3.2 Strategy Issues

The changing concept of organisation and the meaning of T-O change have influenced strategic planning for both user organisations and system integrators raising issues of strategic management of T-O change. In light of the shift in the meaning of organisation towards its understanding as a more extended network, the management of the relationship between ATOC embeddedness vs. embodiment and *ad hoc* networking creates the basis for the generation of strategic social choices in relation to T-O change. The concept of embodiment of ATOC, in organisational

terms represents the internal capabilities and resources that an organisation maintains, while the concept of embeddedness to ATOC represent the resources and elements that an organisation has access to externally based on the maintenance of long term stable networks and partnerships. The balancing between embeddedness and embodiment, that is, what someone has internally and what someone can get access to externally, is complemented by *ad hoc* networking, negotiated and decided upon in light of the emergence of particular instances of T-O change. Of course, the balance between embeddedness and embodiment might change over time, as the two concepts have a dynamic relationship. For example, user organisations internalise external elements as it has happened in The Bank in the form of personnel transfer where staff from SIF has moved to The bank. Nonetheless, the relationship between embeddedness and embodiment through network development is amenable to strategic management by actors and create a basis for the generation of social choices. Such choices might involve: What to outsource and what to develop in-house? How to manage my resources and my internal expertise? How to balance and bridge internal and external resources?

Embedded and *ad hoc* networks not only constitute channels to accessing resources and possibilities but are also networks of power and influence at the level of negotiation and at the level of “doing business” within markets. That is, an actor strategically manages the distribution of power and influence amongst the diverse actors embedded within certain networks of collaboration and competition. In the GB case for example, the strong relationship of the central management with the government played a definitive role in the design and implementation of the T-O change instance. Similarly, SIF’s partnerships with popular international suppliers like Nortel or Microsoft or MSIF gives them a certain power to influence and shape the local markets. Therefore, management of networks, apart from managing specialist knowledge and resources and making certain choices instead of others, it is also management of power to influence which determines how actors position themselves strategically within ATOC as significant or less significant players. Within ATOC’s networks of power and influence there is a distribution of control during initiation, design and implementation of T-O change instances. T-O change instances as particular configurations of ATOC networks makes the decision making

and the control of the instance an issue that is settled through negotiations, power and influence relationships. A user organisation, the GB, for instance, cannot have 100% control over the T-O change instance. This is obvious from the first moment when external experts were involved in the problematisation of the existing model, where they directed T-O change towards certain routes. Also, the long term relationship of The Bank with SIF has placed certain levels of control of the T-O change into the hands of the SIF, which in turn handles that control through the management of their own contacts with suppliers and partners internationally. The distribution of control in T-O change instances generates strategic social choices that contribute to the management of T-O change. These might relate to the choice by user firms to outsource critical processes or not, something that might require the sacrifice of the control of the T-O change instance and its direction. Supplier firms on the other hand need to manage the distributed control by deciding what kind of partners and on what extent are they willing to share with them the control of an instance and what will their role be within it. The degree of attachment to relevant partners is also something that needs to be dealt with strategically, as the case of SIF and its relation to The Bank reveals, which has implications for the development of marketing strategies.

The way ATOC works presents a degree of heterogeneity and complexity. This is a challenge for both users and suppliers during their exposure to ATOC networks as a selection environment. When actors interact with ATOC face an abstract, indefinite selection environment which reflects ATOC's heterogeneity and complexity that generates social choices in terms of how to select resources, partners, suppliers and network configurations from the global knowledge economy to be used at a local T-O change instance. Social choices of selection during the initiation, design and implementation of a T-O change instance narrow down the abstract indeterminacy and reduce heterogeneity and complexity. The degree of embeddedness of actors into ATOC networks helps towards that process by creating restricted, or rather alternative routes for access to ATOC resources and networks of power and influence. For instance, the relationship of The Bank with SIF gave them access to certain resources within ATOC through the international suppliers of SIF. But by selecting to buy things from SIF and maintain that relationship for a long

time, they most likely restrict their access to the indefinite possibilities within ATOC. In other words, the embeddedness of business organisations into certain ATOC networks gives them a certain version of the indeterminacy and complexity and heterogeneity within ATOC, which, nevertheless, is a restricted version. On the other hand, the levels of ATOC embodiment within the organisational structures of an organisation might also create constraints. For instance, the organisational capabilities of a firm might not allow for access to certain technologies or knowledge, or there might be financial constraints which limit the options, or organisational structure constraints that would reject some otherwise possible options, as it happened with the GB case. It seems then that the level of ATOC embodiment within an organisation in terms of creating a set of T-O change capabilities might also limit the abstract, indeterminate possibilities mobilised within ATOC and reduce heterogeneity and complexity for a business organisation during decision making on technological options for business problems. Therefore, the management of ATOC heterogeneity and complexity in terms of selecting from the abstract, indeterminate ATOC possibilities generate social choices directed towards the management of ATOC networks and the relationship between embeddedness-embodiment.

7.3.3 Policy Issues

Although this study was not about policy and ATOC regulation, it is important that the issue is introduced here but further explored in future work. Just briefly then, it can be argued that regulating T-O change seems to be a very complex process. The concept of regulation must not be seen in its conventional meaning, that is, some regulatory bodies are imposing some rules according to which relevant processes operate. These bodies exist of course and can be seen in the face of the Greek state, the EU, standardisation bodies, regulatory mechanisms in relevant business areas (i.e. European Central Bank, Bank of Greece, etc.) which all have a say in affecting somehow the development, diffusion and use of T-O change solutions, either by creating new processes (i.e. Risk management) or by controlling old ones and imposing ways of their operation. However, the concept of regulation

could be conceived in a broader sense, where actors by strategically engaging in the management of T-O change either as users or as suppliers and system integrators, they contribute to the shaping of a regulatory environment for various activities within ATOC. Studies on the shaping of IT standards (NO-REST, 2004) clearly reveals how various actors shape the standards by which ITs are developed in relation to various industries and business areas (health, telecoms, etc.). Distributed access to ATOC mechanisms, resources and power by diverse and heterogeneous actors constitutes a regulatory environment which seems to be shaped by the very action of managing T-O change by these very actors, as they are engaged in processes of initiation, design and implementation of T-O change solutions. Conflicting interests, competition and collaboration and the diverse strategic goals of these various actors create an environment which seems to be regulated by this very diversity, complexity and heterogeneity. Thus, traditional regulatory bodies have only a partial role in this process. Future research on ATOC regulation would be very interesting.

As shown here, the changing concept of organisation and the changing nature and meaning of T-O change and what its management involves create strategic challenges for actors involved in the initiation, design and implementation of technological solutions for organisational/business problems. Business firms increasingly need to be engaged in network management in order to manage their access to resources, power, influence and access to distributed control of T-O change as effectuated and configured in various T-O change instances. This is due to the increasing trend for the management of T-O change to be transferred from inside the organisational boundaries into ATOC networks. The strategic management of T-O change under such circumstances of networked innovation is quite challenging, as actors need to deal with heterogeneity and complexity of ATOC networks and with strategically settling the relationship between abstract, indeterminate possibilities and constraints in terms of making social choices of selection. How is this happening? In the next section the notion of “viewpoint approach” to strategic management of T-O change emerges and explains how individual firms approach and manage the

challenges of T-O change, through the justification and legitimization of social choices.

7.4 VIEWPOINT APPROACH TO THE STRATEGIC MANAGEMENT OF T-O CHANGE: MANAGING POSSIBILITIES-CONSTRAINTS

With actor's view guiding the analyst's view in investigating T-O change instances and the gradual emergence of firms as actors, made the presence of a diversity of actors, as well as the different ways through which these actors are engaged with ATOC and its networks, more visible. Given the changing meaning of organisation and T-O change within a heterogeneous and complex ATOC environment - involving different actors with differing interests, positions, roles, goals, with different access to ATOC resources, power and influence -- the existence of different actor viewpoints is revealed. This explains how different social choices (or non-choices) are made during the management of T-O change. For example, SIF has a certain conception of the ATOC and their role in it as a system integrator, which has been historically constructed and re-evaluated during T-O change instances. The same is true in relation to The Bank, which has a certain, different viewpoint of ATOC and its role and nature of conduct with it. As the SIF-The Bank relationship empirically illustrates, different viewpoints coexist and interact with each other while making social choices for the initiation, design and implementation of T-O change instances. Also, the GB case offers examples of the emergence of different viewpoints when examining the relationships between different directly involved actors in the GB instance in section 5.4. These different viewpoints emerge due to the diversity and heterogeneity of actors within ATOC but also due to the configurational character of technological solutions, which allow fluidity, but also continuity, in technology supply chain as well as a certain division of labour illustrated during T-O change instances. In other words, the distributed and networked character of T-O change creates multiple different ATOC configurations during T-O change instances where the diverse viewpoints of different actors emerge

and possibly clash/interact during the shaping of those instances. Of course, it is not surprising that different actors have different viewpoints but what is revealed from this study is the way these viewpoints are utilised, shaped, mobilised during complex and heterogeneous social situations that generate social choices, such as T-O change instances. The revelation of the differing actors' viewpoints suggests the employment of a "viewpoint approach" to strategic management of T-O change. The viewpoint approach refers to how actors-firms conceive ATOC and their position and role within it, regarding the possibilities on one hand and the constraints on the other, in relation to decisions and social choices during managing T-O change. In other words, these differing viewpoints have to do with the self-realisation and self-consciousness of the corporate identity of an actor and they represent the dominant rationale under which complex actors like SIF and GB are able to produce social choices, or non-choices, if their viewpoint allows for non-action, necessary for strategic planning.

Analytically speaking, the strategic self realisation of the possibilities vs. constraints in the management of T-O change could be expressed in structural terms where the indefinite, abstract possibilities represent the options an actor has for action, that is, an ability to select, decide and act upon their decisions, while the constraints represent the restrictions that limit such possibilities. That is, by action one can understand the abstract, indeterminate possibilities for action while by structure, the constraints that would limit those possibilities, while the challenging part for management would be to create a balance between possibilities and constraints in order to reach legitimate, justifiable decisions for T-O change. One should not only acknowledge the "preventive" traits of structure but also its "determining" capacities; that is, to provide historically shaped established patterns for action (i.e. networks) which may limit one's possibilities but, on the other hand, they reduce complexity and provide routes to effective decision making and management of T-O change. In the long run these structures are not as stable as one might think since they are constantly shaped through their interplay with action. They become modified or completely changed, new elements are enacted, existing elements are shut down, and so on. It is argued that actors manage T-O change, that is, they make social choices through managerial decision making by employing a

viewpoint approach, which enables them to balance the relationship between possibilities and constraints and produce justifiable and legitimate choices. A few examples from the empirical cases help illustrate the above:

In order for GB management to act, that is, to make decisions and fulfil them, they had to choose amongst various options brought to them by their first significant encounter with ATOC. On one hand, upon deciding on proceeding to T-O change, potentially they had indeterminate possibilities regarding which technologies to adopt and the direction of T-O change; that is, they had indefinite alternative possibilities for action within ATOC, which constitute fuzzy interpretations of future directions. On the other hand, the existence or the enactment of certain structures makes things more particular. These structures are expressed through the specific ATOC networks GB got involved in where more specific options were produced based on constraints relating to GB's particular conditions (i.e. its financial capabilities, available resources, organisational constraints and resistance, network politics, direction of corporate strategy) thus making the abstract selection environment more particular in terms of forming a definite number of realistic options from which to choose. In short, the final decisions regarding the management of T-O change were made on the basis of balancing the relationship between abstract possibilities for action, on the one hand, and structural constraints that were enacted during this process, on the other.

Also SIF, in theory, has indeterminate options to establish partnerships with an infinite number of international suppliers and vendors, has an unlimited number of possible customers and ad hoc partners. These abstract possibilities are restricted by the enactment of certain structures that constrain but also reduce complexity and heterogeneity. Such structures might emerge due to the embeddedness of SIF into certain historically developed ATOC networks where the role of knowledge and trust reduce the cost and the risks in the production of social choices in T-O change instances. Additionally, the size of SIF and the definite number of resources and influence they can generate and mobilise at a certain time, also limits the seemingly infinite options for action. The viewpoint approach explains this process of self-realisation and consciousness of the relationship between possibilities and constraints regarding the social choices generated by the challenges of T-O change, in the eyes

of an individual actor's management, as it has been shown in chapter six when discussing the SIF-The Bank relationship.

The viewpoint approach of an individual business organisation, then, in relation to the management of T-O change, is the conscious realisation of the relationship between that individual organisation and the ATOC. In the involvement of a firm in instances of T-O change, either as a user or as a supplier, there are certain decisions to be made regarding the management of T-O change. In this case, the management base their decisions on their viewpoint of the ATOC and their position within it. Through the viewpoint, individual organisations conceive, on one hand, the abstract possibilities for action and the structural determinants and constraints, on the other. It helps firms become conscious of the restricted access to ATOC resources as opposed to the abstract indeterminacy of ATOC, which increases complexity, heterogeneity and uncertainty in strategic decision-making. Due to the position and role of an actor within ATOC, they have a restricted ATOC share and the viewpoint approach helps them realise that. Put differently, the "globality" and intensity of ATOC activities gives the impression of unlimited possibilities but the limited access to ATOC resources, power and influence enacts certain structures that cause constraints but also enable an organisation to become strategically conscious of its condition through the viewpoint approach and thus make social choices which are more realistic but also justifiable and legitimate during T-O change.

7.4.1 Sharpening Viewpoints and Building Visions of T-O Change

Although firms as actors within ATOC employ a viewpoint approach to strategic management of T-O change, evidence from this research shows that actors do not have full control over shaping their viewpoint; the same way they do not have full control of a T-O change instance. This research reveals that during instances of T-O change the viewpoint of the actors involved goes through a process of "sharpening". In other words, the position of that actor within ATOC is re-examined, re-evaluated and re-conceived before social choices are produced. This is usually

happening within a project-based effort like in the GB case. However, as both case studies reveal, the sharpening process is not an issue to be solved internally within the organisational boundaries of an individual organisation. An actor's viewpoint is rather exposed to ATOC networks and it is sharpened through negotiations between supply and use. This happens with the involvement of technological and business knowledge, through organisational politics, conflicting interests, and so on, during the process of initiation, design and implementation of T-O change instances.

The viewpoint sharpening during the process of initiation, design and implementation of a T-O change instance is a process of building a vision of T-O change and try to realise it. Based on the sharpening of an actor's viewpoint, that is, based on the conscious realisation of the abundant possibilities, on one hand, and the structural determinants, on the other, a certain vision for T-O change is constructed and realised through a project based effort. During this process of viewpoint sharpening, global, indefinite possibilities and trends are linked with particular, local circumstances and organisational problems of the organisation in question. Therefore, the initiation, design and implementation of a vision for T-O change in an individual organisation is, in essence, a "sharpening" of an actor's viewpoint, which narrows down the scope for social choice as shown in the figure below.

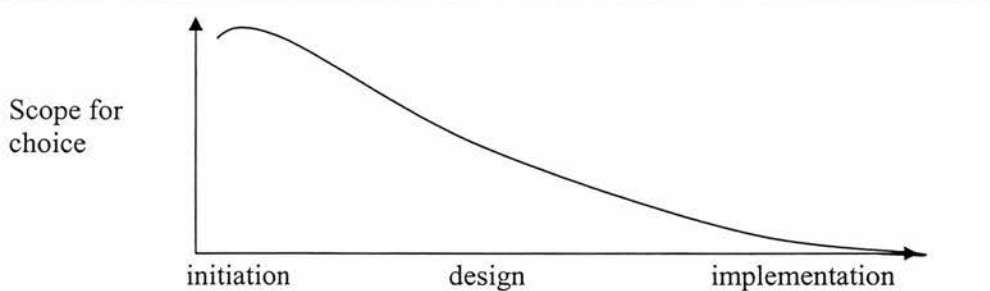


Figure 7.1: Viewpoint Sharpening and Scope for Social Choice

However, since this process is not happening internally to the organisation and since a variety of external actors is involved, the process of viewpoint sharpening is affected by the distribution of control in T-O change instances. Let us see a couple of examples from our case studies:

The sharpening of GB's viewpoint and the building of the vision for the particular T-O change instance was done with the involvement of various stakeholders in the reorganisation project. There was a process where the evaluation committee framed the organisational/business problem of GB and based on that they built a new vision on which they based the design of the T-O change instance. The final choices for the T-O changes to be made were made by the GB top management. However, these decisions were not made based only on the technical specifications and characteristics of the technological products involved but it was more guided by the social forces governing ATOC. This means that the management decisions that contributed in the design and implementation of the change vision in the GB case happened under the influence of the various external specialist actors involved in this project. The specialist knowledge that GB outsourced and its power to influence management decisions contributed highly to the final decisions made. The sharpening of GB's viewpoint and the building of a vision for this particular T-O change instance which in turn generated social choices, was done by the involvement of various external actors during a project based effort. This effort emerged out of the business and technological negotiations between supply and use, between business and technology specialists, based on the diverse corporate interests of these heterogeneous actors.

Firms like SIF also have significant involvement in viewpoint sharpening and vision-building. They provide limited and realistic options for T-O change to their customers, by developing proposals for solutions to particular organisational/business problems and promoting them. Not all system integrators have the same amount of involvement in viewpoint sharpening and vision building. The historical evolution of SIF into a more active player proves it. As business firms, they have their own viewpoint of ATOC, their own access to ATOC resources and elements and thus their own management which is strategically devoted to managing the relation of SIF with ATOC and its networks and maintaining or developing their position within it. Through sharpening the viewpoint of their customers SIF promotes and supports their own viewpoint, that is, their own perception of ATOC and their position within it and try to realise it by using it as a guide to the production of social choices during the initiation, design and implementation of T-O change

instances. They are trying to realise their strategic goals based on their own conscious realisation of the possibilities and constraints that they face within ATOC. The viewpoint sharpening is illustrated empirically in chapter five in the sections on the initiation, design and implementation of the particular T-O change instance where final choices were influenced by the involvement of external actors. It is also illustrated in chapter six in the section discussing how SIF develops proposals and initiates T-O change instances by trying to influence their customers and sharpen their viewpoints.

7.4.2 Emergence of Different Viewpoints and Legitimization of Social Choices

The variety of different corporate viewpoints in a T-O change instance empirically emerge when justification and legitimization is sought for the social choices (and non-choices) that are produced and promoted; that is, final social choices in relation to a T-O change instance are justified and legitimated through their association with a negotiated viewpoint based on the direction of the instance itself and the vision that it achieves, as it was sharpened during the initiation, design and implementation of that instance. Therefore, all heterogeneous and diverse actors are trying to project and promote a T-O change instance viewpoint, in a sense detached from any individual actor, as a common point of reference in order for the social choices made to be justified. The diffusion of a common change discourse is essential to the creation of an “instance viewpoint” shared by all heterogeneous actors involved. For instance, although different actors provided a different definition of the GB instance, they merely projected a justification for the choices associated with this instance based on a similar shared discourse mainly around the principle of customer-centrality.

Separate corporate viewpoints emerge representing the different actors-firms involved in a T-O change instance. Apart from justifying the final choices during an instance, there is also a need to justify choices that different actors promote during negotiations in the initiation, design and implementation phases of an instance. The process of developing and pursuing justifiable and legitimate social choices during

instances of T-O change means that these choices will have to be aligned with the overall business strategy of the firm producing them. SIF, for instance, might promote certain social choices within a T-O change instance through the promotion of certain technological components. This move will have to be seen as supporting SIF's overall business strategy. GB similarly, wants to make social choices during the restructuring effort that will benefit their strategy in the long term. This becomes apparent when looking at the distribution of control within the instance where separate corporate viewpoints become differentiated and distinguished. Every interviewee justifies their participation and the quality of their work according to the degree of alignment the choices they promote has with the separate overall corporate strategy of the firm they represent³⁶. They also refer to the success of the T-O change instance, the benefits for their personal career development and experience and through the differences in how different actors reflect on conflicts they have had with other stakeholders in the project. In the case of employee resistance to change in the GB case, there were attempts to align these diverse voices with a central GB viewpoint (or instance viewpoint) by means of changing the organisational culture at the branch level. Separate corporate viewpoints also become apparent when looking at processes of allocating responsibility among the stakeholders as they serve as mechanisms of allocation of responsibility. For instance, when problems were emerging during the project interviewees tended to differentiate themselves, as firms, from the other stakeholders and allocate responsibility under such basis. For example, as a quote in section 5.4 shows, there was differentiation amongst the external actors as specialist firms with conflicting interests within the instance.

³⁶ The people physically involved in a T-O change instance need to pursue social choices that will, on one hand, develop and realise a successful change vision but also promote the interests set by the overall business strategy of the firm they represent. The first refers to the viewpoint associated with the direction of a particular T-O change instance, which might be seen as benefiting the user firm or as a stand alone successful instance, while the second refers to the alignment between choices pursued within that instance and the overall strategic goals of the different individual firms involved in it.

7.5 AGORA OF T-O CHANGE: A JOURNEY FROM GLOBAL ABSTRACTION TO LOCAL PARTICULARITY...AND BACK

Empirical evidence from the case studies provides the necessary basis to construct a theorisation linking the global emergence and operation of ATOC conceived by the actors as situated in an international scale and the locally situated decisions and actions. It is argued here that the cycle of initiation, design and implementation of T-O change solutions is actually a cycle from the “abstract” to the “particular” and back. As shown above, certain local actors like GB have certain viewpoints of ATOC and their position within it, in relation to an instance of T-O change. Most of GB’s top management projected a certain view of the ATOC in light of their decision to proceed to reorganisation. In order to justify this decision they had to place the particular bank and its condition within a wider framework. For instance, interviewees’ narratives referred to the condition of the bank prior to reorganisation and how it has led to a dead-end situation. They referred to various problems that were emerging and were mostly related to technology, organization and culture. In turn, they referred to the situation of the Greek banking sector and compare GB with other more innovative banks but also with older ones that had already caught up with international trends. Finally, there were references to international trends in banking models and technology, i.e. customer centered models and information systems, based on business and technological principles of universal scope. All these references describe the ATOC environment and the position of GB within it, that is, GB’s sharpened viewpoint. However, in making certain decisions regarding the particular T-O change instance, the local actors had to cover a distance from the bank’s situation prior to reorganization to the global principles of customer centrality and other banking and technological trends. In other words, a process that would link the abstract, distant, global conceptions of trends and developments in banking and technologies with the more particular settings of the national environment of Greek banking and eventually with the organizational settings of GB, was initiated in light of the decision to proceed to an instance of T-O change towards reorganization of the bank’s business model. Therefore, the linkages between global

socio-economic relations of rhetorical T-O models supply would have to be linked with GB's T-O change instance, as the social situation within which social choices were generated, negotiated and decided. This alignment process was empirically illustrated in chapter five when discussing the processes of initiation, design and implementation of the GB T-O change instance. It can be described as a journey from the "abstract" global socio-economic environment of ATOC to the "particular" settings of a T-O change instance. This is a process of "ATOC particularization", as shown in figure 7.2 later on. While the process of making choices is unfolding during the initiation, design and implementation of a T-O change instance, ATOC is brought closer and it is configured into that particular instance. Most of the abstract indeterminate possibilities are excluded with the choice of one (or a combination of certain possibilities), heterogeneity and complexity are gradually reduced, networks are more clear and so on. The initial choice of the GB, for example, to proceed to a large scale restructuring effort and with no previous consistent relationship with ATOC, brought them in front of an abstract, indeterminate and uncertain environment. Gradually, as the particular instance was designed and implemented, subsequent choices have made that abstract environment more particular and have configured it into the specific instance. SIF also, as an ATOC professional, contributes to such ATOC particularizations by opening certain channels through which they offer alternative ATOC configurations into various local T-O change instances.

On the other hand, there is the opposite process from the particular T-O change instance to the abstract ATOC environment. It is argued that this reverse process of "ATOC abstraction" is taking place merely through the same channels as particularisation. The process of abstraction means that the elements that constituted the particular T-O model in a particular organisation *might possibly* take the road back to abstraction, become 'rhetorical T-O models' in relation to another instance in another organisation, again through strategic planning and choices by the actors articulating such elements. In the GB case, for instance, one of the competing consortia was from an Irish bank that had developed a model in-house and they wanted to sell it to the GB as well. Thus, the T-O model of this Irish bank constituted one option, a rhetorical model, for GB. It could have been selected, but it was not.

Similarly, GB could do the same thing in the future if they find a way to market their model and develop the relevant expertise to support it. This is a possibility and it depends on GB's strategic plans and capabilities³⁷.

Another way that the particular T-O change instance in GB might take the route to abstraction is through the experts involved. The accumulated experience the specialist firms acquire from the participation in various instances of T-O change in various organisational contexts and different customers might lead to the development of standardised packages by suppliers specialising in banking technologies. A pre-sales manager from SIF explains how packages are developed:

Packages are built based on the experiences of a firm which started some day making a package for customer satisfaction, for instance... Since the needs of a firm in terms of customer satisfaction are more or less common from one firm to another, the firm that developed this software thought: why don't I sell it next door as well? In order to do that and sell it next door and next to the next door, etc. there is a common core. This common core was kept and became a package. Therefore, a firm with many years of experience will develop such packages since they showed with their experience that the components of their package are the ones the market needs. One customer cannot give you the truth, but if you have done some things in ten customers, then you start realizing some common characteristics. Also, the forces and rules of a market pose various standards about how processes should be done, how transactions should be done, etc. Of course, package developers will have to take these standards into consideration. (PSD, pre-sales manager, interview 26/11/2004)

Accumulated experience from various instances of T-O change then becomes reconfigured into generic products that could be sold to various customers. Therefore, it becomes a rhetorical T-O model, a possibility for user organisations under a certain degree of abstraction. Of course, the process of abstraction, as shown in the above quote, is also led by market forces, and factors that regulate them. However, not all supplier firms develop standardised packages. The decision to do so is also depended on the market situation and the capabilities of the firm, that is, on the firm's corporate viewpoint and its strategic realisation. The same interviewee illustrates their viewpoint which explains why SIF has not developed such a package:

³⁷ The story of the Irish bank reveals the changing or multiple role of banking institutions. They are not only credit institutions but they are in a position to develop T-O solutions, IT, specialist business knowledge and market it internationally. They are simultaneously ATOC users and ATOC suppliers.

In order to do such a packaging you look at the cost. You need a series of resources that will be devoted to this package. They will maintain it, they will promote it in the market, you'll have sellers for it, that is, you have a circle. Therefore, you think after that: how many customers do I have from then on in order to maintain this product in the market. If there is one or two, then it's not worth it. Therefore, in our customers we do not resell our solutions from one bank to another, there is not a package, rather we use our experience in order to find a solution that will fit to their requirements. For example, we use a lot our experience in infrastructure: we can set up network, servers, we can do rollout, and so on. This might not be a package but it is a solution. (PSD, pre-sales manager, interview 26/11/2004)

Therefore, SIF do not configure their accumulated experience into a specific product to be sold in a wide market and thus contributing this way in ATOC abstraction, since they do not see any prospects for profit from that action. On the other hand, they are involved in abstraction processes by using their experience from various instances of T-O change in a more segmented way. Technological and contingent organisational knowledge from various customers have given them the ability to develop realistic proposals for their customers, towards further ATOC particularisations. This is another way of managing and commercially exploiting expertise and experience on T-O change.

As mentioned in chapter two there is some work that has been done in explaining such processes (see Pollock et al, 2003 on generification³⁸). Here, however, it is argued that such processes of generification, of developing more universal technologies are also processes of abstraction, from the particular to the abstract. They are also part of the cycle of initiation, design and implementation of T-O change solution within ATOC, when it comes to conceiving the links between global universal processes and trends with local organisational circumstances and instances of T-O change. It is also argued that the process of abstraction is taking place through similar channels with the process of particularisation, which are developed within networks and are managed and governed by market forces and dynamics and the development and interaction of business strategies³⁹.

³⁸ Generification is defined as "supplier strategies for taking a technology that has worked in one place and attempting to make it work elsewhere, and, in principle 'everywhere'" (Pollock et al, 2003:318).

³⁹ In this thesis I did not examine processes of abstraction in depth, rather I discussed it as a possibility within ATOC's complete cycle from the abstract to the particular and back, that is, from

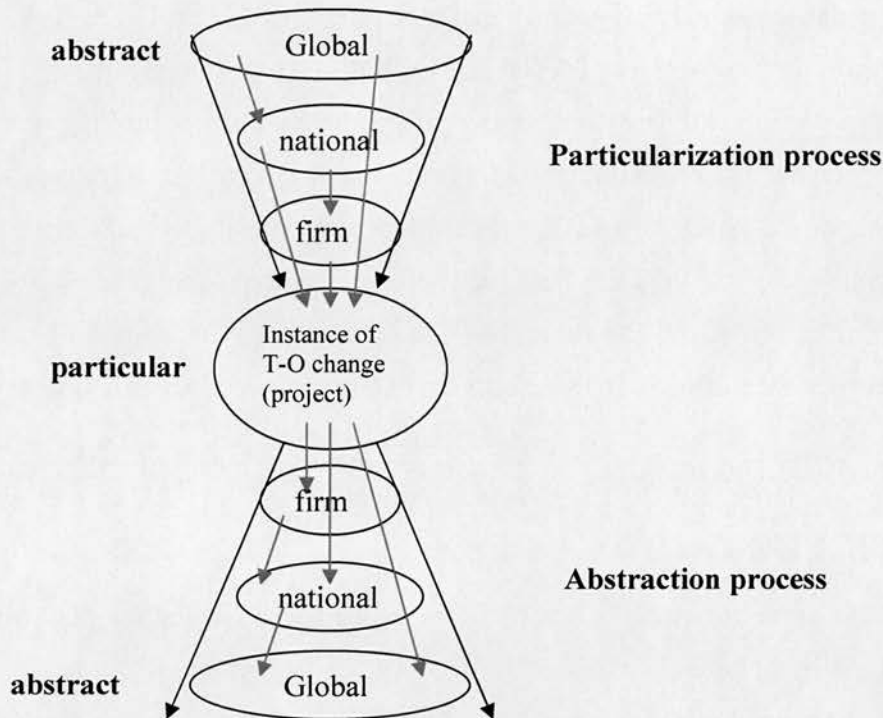


Figure 7.2: ATOC particularization and abstraction processes

The driving forces of the ATOC particularisation and abstraction processes are related to the characteristics and nature of ATOC as an environment of socio-economic relations amongst diverse and heterogeneous actors. ATOC is characterised by market characteristics of supply, demand, competition and collaboration. Therefore, the processes of particularisation and abstraction are happening within such a frame. Within these market settings the social choices of actors-firms and the way they manage T-O change is also a driving force of ATOC particularisation and abstraction. Since, however, there is so much heterogeneity and complexity within ATOC, there are also many different scenarios of particularisation and abstraction, based on the particular circumstances of different cases. Therefore, ATOC configuration into a particular T-O change instance may happen in many different ways although standardisation processes might create more fixed and

global trends in T-O models to particular instances of T-O change, and back. In absence of in-depth working examples from the case studies, it is hard to assess the utility of the abstraction process as an analytical concept. However, it is introduced here as another possibility to direct social choices for actors and it is supported by already existing research.

understandings of ATOC configurations where the channels and mechanisms of ATOC particularisation and abstraction appear more stabilised (i.e SIF-The Bank relationship). Both the processes of ATOC abstraction and particularisation contribute to the effectuation, realisation and expansion of a cycle of development, supply, adoption and use of ATOC configurations. In this cycle, the material and non-material, the technological and the organisational, the social and the technical, the contextualised and the generic, the distant and the proximate, merge and are shaped through actors' social choices and non-choices within social and economic relations between the global knowledge economy and local instances of T-O change.

7.6 CONCLUSIONS

In this chapter the empirical case studies were analysed by the use of newly formulated analytical tools. The concept of instances of T-O change which re-directed the analytical focus, the paralleling of the analyst's view with the actor's view and the concept of ATOC sketch the social choices and the processes that link local T-O change instances with the socio-economic environment of the global knowledge economy and supply of technological solutions for organisational/business problems. Within this framework the relationship between T&O can be understood as it is constructed through T-O change in business firms. With the concept of techno-organisational various aspects of T&O are captured and challenges for actors are revealed. The management of these challenges is explained by the concept of viewpoint approach to strategic management of T-O change which illustrates managerial decision making as action that produces social choices (and non-choices) within the social situation of a T-O change instance. The gradual emergence of actors-firms in the case studies illustrates that in order for complex actors to act within an ATOC multi-actor and multi-level environment, the production and promotion of legitimate, justifiable and accountable social choices is necessary and the viewpoint approach to strategic management of T-O change offers this possibility. For the production of such social choices actors are going through a

process of conceiving themselves as part of a wider socio-economic environment and through managing possibilities and constraints they develop strategic planning.

The globalisation of the knowledge economy and the identification of the global-local paradox raise issues regarding the practical and analytical linking of these different levels through multilevel and multidimensional theoretical-analytical understandings of the relationship between T&O. The global-local paradox constitutes both an analytical and practical issue. Essentially, it is an issue of conception of how actions, trends, social relations, the social in general, may be conceived with reference to many different levels that refer both to the width and the range the social might be seen as covering (macro, meso, micro) but also to the time span within which the social might be seen as unfolding (long term, short term). Therefore, the global might be referring to macro, long term societal trends and transformations as they can be analytically conceived to describe and explain society in general while the local might be referring to meso and micro, shorter term moments and social relations, such as, an instance of T-O change. The analytical link between these can be provided by an appropriate theorisation (i.e. ATOC theory). On the other hand, the global-local paradox also constitutes a practical issue, that is, an issue for the actors involved in social relations. It takes the form of challenges emerging from the need to link abstract indeterminate possibilities with local particular circumstances in the production of social choices or non-choices during the initiation, design and implementation of T-O change instances. An analytical, conceptual issue acquires a practical essence as shown in these case studies due to the fact that actors base their actions on the development, sharpening and employment of certain viewpoints, which are conceptual conscious realisations of the “world” and their position and role within that world, in other words, a corporate identity.

CHAPTER 8

THE AGORA OF TECHNO-ORGANISATIONAL CHANGE: TOWARDS A NEW SOCIOLOGY OF TECHNOLOGY AND ORGANISATION

8.1 INTRODUCTION

In this thesis, two detailed longitudinal case studies of T-O transformations in the Greek banking industry were examined. The first study was about a large scale, radical restructuring effort around the Greek Bank (GB), which was initiated, designed and implemented under the vision transforming the particular business firm from a product oriented business model to a customer-centred. The way this particular case was approached reflects the suggestion of an alternative research design and analytical perspective. This new approach places at the centre of attention instances of T-O change which it links with the wider socio-economic environment within which it emerges, stretching out to a global level of the knowledge economy. The second case study refers to the involvement of a systems integrator firm (SIF) in the initiation, design and implementation of T-O change instances to a wider customer base. In this study, although T-O change instances remain at the centre of attention, it is not only one separate instance that is examined, rather sets of instances. The important role and increased responsibility and control that external specialists and suppliers had in the GB case shifted the interest of the thesis from exploring individual instances to exploring the way actors like SIF conceive the ATOC environment and strategically plan and negotiate their role and involvement in the initiation, design and implementation of small or large scale T-O change instances. Approaching T-O change instances through the perspective of particular actors reveals important information on how these different actors conceive, interpret and manage such instances and the socio-economic relations they emerge from. The ATOC concept provides a useful tool in capturing the social and economic

environment that links local, particular T-O change instances with the global, indeterminate, abstract knowledge economy. The empirical case studies, then, were examined as part of such a socio-economic environment. This thesis aims at exploring, describing and explaining this environment while revealing how the various actors involved in it act upon and manage the challenges it creates for T-O change through the production and promotion of social choices. On the other hand, the introduction of the ATOC concept along with the analytical and methodological suggestions discussed in chapter three also open up a space for discussion on the theoretical, analytical and epistemological contributions of this thesis.

This chapter consists of two main parts. Its structure is based on chapter three and the formulation of two sets of research questions; a set of more general and theoretical and a set of more particular and empirical questions. The first part of the chapter discusses the ATOC as a space for practice, based on which the empirical cases acquire meaning, reflecting the more empirical questions on what ATOC is and how it operates. The empirical material of the two case studies offers some insight on how ATOC as a space for action could be defined, based on how different actors conceive and understand it. It is therefore seen as a space for T-O change, as a knowledge market, or market for T-O change resources, and as a political arena. The relationship between individual actors-firms and the ATOC as a practice environment is also discussed and certain challenges for the management of T-O change are flagged, as well as the way they are strategically approached by actors. In the second part of the chapter, the theoretical, analytical and epistemological contributions of the thesis and the ATOC theory are explored, reflecting the more general and theoretical set of research questions. The action-structure and the technology-organisation relationships are theorised, and the theoretical-analytical capabilities of the ATOC concept are explored, pointing to the direction of a new sociology of T&O. In this chapter then, the implications for practice but also for theory and analysis are discussed, based on empirical material-theory co-development.

8.2 PART ONE: EXPLORING THE AGORA OF T-O CHANGE

8.2.1 ATOC as a Space for T-O change

Concepts such as network innovation (Swan & Scarbrough, 2005), distributed organising (Orlikowski, 2002), innovation space (Tidd et al, 2005), and development arenas (Jorgensen & Sorensen, 1999), suggest that innovation is increasingly happening outside organisational boundaries of a firm and theorise spaces where certain socio-economic relations contribute to the shaping of certain technologies or organisations. For this reason in chapter three it is suggested that social choice in relation to the shaping of T&O should be sought not within the actor's organisational structures rather within the social situation within which the actor is involved and generates that social choice. Reflecting on such literature, this study suggests that T-O change as a social situation which generates social choice is increasingly moving outside particular organisational boundaries and is placed within more complex ATOC networks. Examples from the cases support this shift: GB, for instance, historically had a restricted and inconsistent exposure to ATOC networks and this large reorganisation project, which must be analysed as occurring within ATOC instead of within GB's organisational boundaries by using internal expertise and other resources. Also, SIF's relationships with their customers reveal the role of a system integrator firm in opening up such spaces, various different routes of ATOC particularisation and how the relationship with ATOC is managed and maintained. The increasing outsourcing of T-O change has put to the fore inter-organisational and inter-firm networks as increasingly significant in the shaping of T&O. In house development of T-O change also involves an ATOC, in a sense of involving inter-organisational networks (see Fincham et al, 1994 on in-house restructuring based on the mobilisation of professional networks), however, in this study ATOC emerges in a way where distinctions can be made from the past and evolutions to be spotted in ATOC's nature. This is due to its conception and definition through the viewpoints of the actors involved in it, and since viewpoints

are also evolving with time ATOC is also seen as evolving and can be constructed and interpreted differently in different cases depending on the actors' viewpoints. In the GB case, for example, T-O change can be spotted within ATOC networks as opposed to previous T-O change instances they have been through, most of which were in-house and with limited external networking involved. This suggests an expansion of ATOC, on one hand, and its fluidity, on the other, in terms of the diversity of technological solutions for solving similar problems and also the plurality in supply strategies.

ATOC, therefore, is a socio-economic space within which T-O change occurs. It involves choices, negotiations and interactions of diverse actors that shape the T-O relationship as they take place within the wider ATOC space. They are not restricted in spaces such as the organisational environment of the user, or arenas and networks defined by certain technological artefacts, industrial fields or organisational actors and relations. The ATOC as a space for T-O change shows how the abstract, indeterminate socio-economic environment of the global knowledge economy can be realised and systematically linked with particular local instances of T-O change.

8.2.2 ATOC as a Knowledge Market

ATOC as an emerging and expanding space where T-O change is taking place has various other characteristics and dynamics that shape the way it operates. Empirical findings of this study offer useful insights on what kind of environment ATOC is, what it includes and how it is challenging for the actors involved in it. In this section ATOC is revealed as a market, in terms of its structure and its driving dynamics but also in terms of its particular content.

First of all, ATOC is a market, or better a market space. The increasing demand for technologies and technological solutions by business organisations and the emergence of ATOC professionals and experts in the supply side create the dynamics of a market governed by supply and demand. It is also characterised by competition, collaboration and abides to the formulation of an arena where social, economic, but also cultural, political and moral relations are formed, based on the

circulation of knowledge, the construction of beliefs, reputations, and competing visions. The pervasiveness of technologies and business models and their ability to become configured, re-configured and applied in various industrial activities means that ATOC has the ability to penetrate through various sectors and industrial fields and become configured through various T-O change instances in various business environments as part of the processes of ATOC particularisation and abstraction. The markets for technological solutions for organisational/business problems although they might be stabilised and embedded in certain socio-economic and moral relations, also present a degree of fluidity in the way they are configured and penetrate various industrial fields. This becomes visible when looking at how SIF, as an ATOC professional from the supply side, enters different industrial activities. In other words, the market networks of supply, demand, competition and collaboration are not static and fixed, as the notion of embeddedness of the new economic sociology (Granovetter, 1985; Smelser & Swedberg, 1994) would suggest. The co-existence of embedded and ad hoc networks and relations refers to the relationship between embeddedness and embodiment of ATOC for the management of resources, power and influence.

Regarding the content of the ATOC as a market, in relation to T-O change, relevant discussion can be made in relation to commercialisation and commoditisation of T-O change. As shown in chapter two, literature on the commoditisation of technologies and organisational processes appears one-dimensional, focusing either on technologies or organisations. Findings from this study contribute in integrating different aspects of commoditisation of knowledge, artefacts and organisational processes into the concept of commoditisation of T-O change. More particularly, this study suggests that the relationship between T&O can be understood as a situated convergence between technologies (or technological systems) with particular organisational structures and Company Social Constitutions into a commercial commodity that can be developed, sold and bought. This convergence happens through instances of T-O change. Nonetheless, there are problems and limits in commoditising complex organisational technologies and change management techniques. This is because of difficulties in assessing technological capabilities, which make technologies fit into different organisational

settings. Those limits, however, do not stop the processes of commoditisation and commercialisation of T-O change; rather, they place them within the problematisation and negotiation environment of T-O change instances where social choices emerge and shape T&O. In other words, if commoditisation was a complete, unlimited and absolute process, T-O change instances would not be as challenging and problematic. ATOC as a market, then, is based on such processes of commoditisation and commercialisation of T-O change where artefacts, knowledge and expertise merge into commerciable products and services. This would make ATOC a knowledge market based on the idea that different types of knowledge is mobilised in order for T-O change instances to be carried out.

If the relationship between T&O is seen as projected through configurations of different forms of knowledge embodied in technological artefacts, organisational processes, people, this study would suggest that another distinction can be made between technological and organisational/business knowledge, apart from more traditional distinctions such as tacit-explicit, universal-contingent. The case studies show that there are processes of problematisation of organisation in business terms, translation of the problem into technological terms and development of technological solutions to solve these problems. The SIF case study where there is reference to the processes of development of proposals for solutions, the recording of the operational requirements and their translation into technological/system requirements, shows that technological and organisational/business expertise is mobilised and employed. During the various phases of initiation, design and implementation of T-O change, different types of experts, belonging to different organisational units of SIF are mobilised to negotiate the initiation, design and implementation of T-O change. Organisationally, this expertise is distributed throughout the human resources of SIF either as organisational/business expertise or as technological expertise, with some personnel demonstrating a hybrid expertise either due to many years of experience in the field, or due to relevant background and training.

ATOC as a knowledge market, therefore, reveals extended networks and structures of supply and demand, governed by relations of competition and collaboration. It also reveals that knowledge is mobilised and marketed within ATOC in many different forms, as codified in artefacts, embodied in persons and in

organisational structures. Finally, the distinction between technological and organisational/business expertise in T-O change instances reveals how various firms approach knowledge management issues in managing ATOC as a knowledge market.

8.2.3 ATOC as a Political Arena

The ATOC as a space for T-O change and a knowledge market also reveals an arena for the emergence of ATOC politics. Some sociology of markets has talked about market politics with emphasis on the relationship between markets and the state as a regulatory mechanism (Lindblom, 1977; see Lie, 1997 for a review). On the other hand, there is some literature in innovation studies that has emphasised the role of organisational politics of innovation deriving from the different conflicting particular interests of the actors involved as well as the status of different types of knowledge mobilised (Swan & Scarbrough, 2005; McLoughlin & Badham, 2005). Research findings of this study integrate these two literatures by showing that the political aspect of ATOC is far wider than the role of state intervention as a regulatory mechanism and it includes also organisational politics, informal networks, conflicts between corporate interests and conflicts between diverse types of specialist knowledge. Politics in T-O change, then, do not refer only to the intervention of the state and other regulatory bodies but also to social action of the actors involved as a political action in the sense that it supports certain interests of various actors. Additionally, a wider definition of politics should have limits without including everything, as the political process approach would imply (Dawson et al, 2000); rather, the political character of social and economic relations should be identified carefully on a case-by-case basis. In this study, the political characteristics of T-O change within ATOC are identified both in the intervention of the state as an actor rather than as an external regulatory body and also in the motives justifying the social choices of actors trying to defend their interests during T-O change instances.

By illustrating business firms as complex actors within ATOC and with the distribution of control that the empirical cases reveal, the notion of actor politics takes a special meaning. It moves away from a restricted conception of actor politics

as organizational politics and conflicts and makes visible the politics involved at the level of inter-firm relations. ATOC, as a multi-actor market environment with stable and fluid networks is a heterogeneous and complex environment due to the diversity of the resources mobilised and circulated in it and also due to the diversity of actors involved in it. The diversity of resources creates heterogeneity and complexity in terms of providing an indeterminate selection environment and the diversity of actors and their active involvement in social choices during initiation, design and implementation of T-O change creates tensions due to the distributed control, competition, diverse interests of actors, diverse strategic goals and channels for achieving them. This latter notion of ATOC politics questions traditional notions of market regulation as something deriving from more traditional sources like the state and sees regulation as a wider concept where the role of corporate decision making is quite as important, as Gordon would suggest (Gordon, 1996).

To summarise, the identification of the ATOC space as a political arena integrates notions of politics of innovation that identified at the level of market regulation and state intervention, organisational politics and conflicts, and politics at the level of inter-firm relations relating to the strategic management of the distributed control of T-O change.

8.2.4 ATOC and the Actor

The heterogeneity, complexity, diversity of actors and resources within ATOC and the way it can be configured across industries and sectors through processes of particularisation and abstraction makes it hard to account for objectively defined ATOC boundaries as a space linking T-O change instances with the global environment of the knowledge economy. The importance of individual organisations' corporate decision-making points towards an actor-based definition of ATOC's boundaries. They can be identified when looking at particular T-O change instances and mapping the way particular networks were configured during that instance. Also, the processes of particularisation and abstraction, that is, the particular way ATOC becomes effectuated in relation to that particular instance will be explained through the identification of the mechanisms and socio-economic

relations that generate and finalise the negotiated social choices by the actors involved in that instance. Nonetheless, ATOC can be defined through the paralleling of the analyst's view with the actor's view. Actors define ATOC based not only on their involvement in actual specific ATOC networks, but also on their conception of the networks and the environment that they are not necessarily part of, but are still aware of its existence. For instance, The Bank, is mostly part of the SIF and MSIF network of technology supply since they feel more secure by being part of this long term well established network. They are aware, however, of the alternatives that IBM Hellas might offer. ATOC for them is defined through their actual experience with their relationship with ATOC networks. It is also defined by the networks and elements of ATOC that they are not part of, either due to conscious decision-making (action) or due to inability to gain access to such networks (structural constraints). This definition of ATOC as a space involving elements that individual actors-firms have access to and networks they are part of but also elements and networks that actors are not a part of, reveals a more dynamic nature of the relationship between ATOC and individual actors. This is because it allows for change to happen and leaves room where social choice is important. In other words, ATOC is a market, a mechanism of linking supply with demand and the actor-based definition of its boundaries reveals how ATOC is amenable to change through corporate decision making by individual organisations where choices become more visible within the frame of abstract, indeterminable possibilities that ATOC has to offer, but also the constraints that might prevent actors or direct them away from accessing certain ATOC elements and resources.

The identification of ATOC as a knowledge market, a space of T-O change and a political arena ranging from local T-O change instances to the global knowledge economy with subjectively defined boundaries contributes to the understanding of an organisation's external environment. This environment is rather complex and challenging, involving multiple actors and levels of understanding where actors' differing perceptions of it is quite important in understanding how it works and how to strategically manage the challenges it poses. Social choice for the management of T-O change is what shapes and gives substance to the actors-firms. In this study actors-firms emerge because certain choices that need to be made need

justification and legitimization. The ATOC environment where these choices occur gives rise to the actor-firm and their viewpoint, which emerges in order to legitimise and justify them. In turn, these choices contribute to the ATOC particularisation and thus actors through social choice emerge and shape ATOC. Respectively, ATOC as a challenging environment shapes the nature of individual actors-firms, or better, their viewpoints of ATOC with the challenges it poses, which generate social choices. It could be argued, then, that there is a co-shaping between the ATOC and the actor at the level of capturing such a relationship analytically.

8.2.5 ATOC Challenges for T-O Change Management

The exploration of the ATOC as a space of action of various diverse actors cannot be complete before establishing its challenging nature for the actors involved and operating in it. The nature of ATOC as a space of T-O change, as a knowledge market and as a political arena, as well as the fact that it does not have objectively defined boundaries, creates certain challenges for the actors involved in it, as shown in section 7.3 of the previous chapter. Based on empirical data, the challenges emerging for actors could be classified in relation to the following:

- possibilities vs. constraints
- heterogeneity and complexity
- distribution of control
- embeddedness – embodiment
- networks for resources, power and influence

Figure 8.1: ATOC challenges

More particularly, issues emerging from the participation in the initiation, design and implementation of T-O change instances affect corporate management and strategy as follows:

- How do I identify and manage all the possibilities that ATOC might offer in relation to the constraints that emerge from my position and role within ATOC?

- How do I decide how to balance the relationship between embeddedness and embodiment of ATOC in terms of accessing and balancing external with internal resources?
- What is the importance of networks and how do I decide and manage which networks I am part of?
- How do I manage heterogeneity and reduce complexity and uncertainty when having to make decisions on T-O change?
- How am I able to make decisions at all within an environment of distributed control?

The way these challenges are structured and presented, reveals the paradoxical features of ATOC as a complex and heterogeneous socio-economic space within which different actors and viewpoints might be clashing or aligned, competing or collaborating. Something might be a possibility for one actor but a constraint for another. This also shows that there is not a single solution for such challenges. After establishing the importance of corporate management and decision making for the initiation, design and implementation of T-O change instances within ATOC, the above challenges show the focus of corporate management towards resolving emerging problems of T-O change.

These challenges might lead to the production of social choices or non-choices by the actors facing and strategically assessing them, meaning that actors, based on their viewpoints, decide a scope for action. They might decide to proceed to a radical large or small scale T-O change, but there is also the possibility of not doing anything at all. This possibility for non-choice or non-action emerges from this empirical research and it can be spotted mainly in the initiation phase of a T-O change instance but also during the design and implementation phases, when a decision is made to exclude certain possibilities altogether and not take action. This is an important achievement of this research as it suggests a wider conception of social choice by the exemplification of non-choice, which highlights the degree of rationality of actors during decision-making. The concept of action as social choice, as an analytical category must also include non-choice because it reveals how complex actors, such as firms, based on a certain dominant “socially constructed”

rationality decide and shape a certain *scope for action* in a given challenging social situation, even before they act. The concepts of choice and non-choice take meaning in the context that they emerge depending on what are the challenges which generate them, and how they were conceived in terms of possibilities and constraints. Non-choice might refer to possibilities that were not selected, or not considered for selection. It can be defined either in relation to lack of access to alternative possibilities due to ATOC embeddedness restrictions, or in relation to conscious neglect of certain possibilities for action, depending on actors' strategies and visions of the future.

The above could inform the management of technology and strategy literatures by offering a more realistic, more relativist and less mechanistic focus, by understanding management challenges as portrayed by the actors facing them. To summarise, the challenges of T-O change management are: access to relevant resources, power and influence within ATOC while making or not making and negotiating social choices through balancing possibilities and constraints during the initiation, design and implementation of technological solutions for organisational/business problems.

8.2.6 Facing ATOC Challenges: A Viewpoint Approach

The prospect of a T-O change instance creates a challenging social situation where actors are required to make decisions on certain choices as well as the promotion and negotiation of these decisions with other actors within ATOC. In doing so, they employ a viewpoint approach, that is, they start examining their strategic identity and their relationship with their environment. It is argued that viewpoints are developed by the immediate access to experiences but also by the imagination of non-experiences, that is, the ability of actors to imagine the environment they are not directly part of, through secondary information. Different actors have different viewpoints of ATOC because they are embedded in different, alternative networks within ATOC. They embody different kinds of ATOC elements, and they conceive in different ways the rest of the ATOC networks that they are not

part of. The differences in viewpoints of different actors are also due to their different roles, different or competing strategic interests and access to different resources. They emerge because of the distributed and networked character of T-O change within diverse and heterogeneous ATOC networks; they are illustrated when seen within a T-O change instance. The viewpoint of an actor is important for the management of T-O change because it helps them become conscious of their relationship with ATOC in order to conceive and manage the possibilities it offers them in relation to the emerging constraints, when they find themselves in a social situation that generates social choices or non-choices.

The viewpoint approach - the consciousness of an actor in reference to themselves and their environment - their capabilities and their possibilities for choice, narrows down the scope for action in T-O change instances. This happens, as shown in chapter seven, during the process of viewpoint sharpening where abstract, abundant ATOC possibilities become particular in order to fit local specific organisational settings.

As shown in chapter two, strategic management of technology literature has been struggling since the 1980s to find ways to incorporate technology strategy into the overall corporate strategy of a business organisation (Husain & Sushil, 1997). The viewpoint notion reveals how certain social choices directed to management of T-O change can be seen as part of the overall corporate and business strategy of the organisation. This is not to suggest that a centralised management exists within organisations and that all the individuals within organisation share similar views on what would be the right choices, that there are not organisational conflicts and so on. On the contrary, it is suggested that the conflicts and the negotiations are extended from within organisational boundaries into the ATOC space and the process of decision making is a rather complex process negotiated amongst the diverse actors involved directly in a T-O change instance. Individuals directly involved in T-O change instances, however, represent business firms which need to be benefited by the social choices of this particular instance. Alignment between the social choices promoted by an actor in a T-O change instance and its overall business strategy is, therefore, required. This alignment is desirable because this way the decisions made during the initiation, design and implementation of a T-O change instance and their

promotion, appear as fully justifiable, legitimate and accountable since they are aligned with the overall strategic goals of an organisation. In the GB case, for instance, the decision to adopt a certain software package was aligned with the decision for restructuring from product-centred business model to customer orientation. In summary, an actor's viewpoint serves as a basis of legitimizing and justifying social choices during T-O change instances in the process of aligning technology strategy with overall business strategy, even though actors do not have full control to sharpen their viewpoint. This means that the alignment of social choices made during T-O change with their overall business strategy, although desirable, does not guarantee success and efficiency. That is, although choices might be legitimate and justified, they are not necessarily optimal under given circumstances. Nonetheless, the concept of viewpoint embodies the dominant rationale expressed by complex actors, like business firms. It constitutes a resource for social choice, which is constructed through historical processes and it is re-examined through sharpening processes and, finally, it is realised in instances of T-O change through legitimizing and justifying the social choices it generates.

It could be argued here that the management of T-O change, that is, the management of the challenges during instances of T-O change, could be seen as synonymous with the management of viewpoints. The final decisions made for a T-O change instance emerge out of the interaction of various viewpoints as they are sharpened during the initiation, design and implementation of that instance. In the final stage of viewpoint sharpening the organisation, either user or system integrator, is in a position to consciously realise the meaning and the significance the final negotiated decisions have for their corporate and technology strategy.

The shift away from more managerial to more political and processual understandings of T-O change, discussed in chapter two, has illustrated the importance of organisational politics and processes; it also shifted the interest away from strategic centralised decision making within the firm towards a networked, multi-firm social situation. Social choices and action are theorised as part of organisational conflicts and politics, while more complex action is not captured under a single concept. Firms, then, lose their status as paramount actors capable of shaping T&O within a complex ATOC environment, while innovation is accounted

for through negotiations between actors positioned within different organisational hierarchies, promoting differentiated interests and agendas. The social situation of a T-O change instance is no doubt challenging for individuals within organisations in terms of their interests being jeopardised. However, ATOC theory and the viewpoint approach are re-establishing firms as important actors producing social choices although without losing awareness of the complexity of the actor. The viewpoint approach as a management tool pulls organisational politics and conflicts - that is, social choice in Political Process Approach terms - towards an alignment with the corporate viewpoint of the firm during the process of viewpoint sharpening. The viewpoint as a management approach, thus, promotes and pursues an ethical commitment to a dominant rationality overarching separate individual political interests. This way central management reclaims action and social choice during instances of T-O change as it can be accounted for within broader ATOC networks and not just within restricted organisational boundaries. The viewpoint approach to strategic management of T-O change shows how semiotic power and micro-political power are integrated into a disciplining power (see McLoughlin, 1999:159-164), a dominant rationale, which represents actors' viewpoints of ATOC, by placing a T-O change instance within a multi-actor, multi-level networked environment. By conceiving ATOC as a space of practice and action, the firm as an actor emerges and claims action and social choice during T-O change instances. Actors-firms are represented by their viewpoint, which absorbs internal organisational politics and conflicts and instead politicises inter-firm relationships within wider ATOC networks of technology supply and use.

In terms of social choice as strategic choice, the viewpoint concept shows that social choice is not only influenced by the external social and political environment as Child (1972) suggests, or just by internal conflicts and political negotiations of individual or group interests and agendas. The viewpoint pulls internal organisational politics towards the externally influenced viewpoint sharpening process and aligns them towards a commitment to a dominant rationality of T-O change. Viewpoint also provides legitimization and justification of social choice and non-choice, both in terms of strategic management of T-O change but also in terms of managing internal conflicts and processes during implementation.

The way management frames this alignment might point to the understanding of organisational politics either as disruptive and therefore eliminated by the viewpoint approach or as constructive and therefore included in the sharpening process towards a more robust decision-making process. The viewpoint approach as a management tool resolves issues mentioned above by helping central management to reclaim action within a complex social situation. As an analytical concept, the viewpoint helps to link socio-economic relations at a micro-level within organisational boundaries with socio-economic relations at the level of inter-organisational networks. It helps capturing the relationship between single separate individual rationalities with more complex wider collective rationalities.

Viewpoint approach	What it is	What does it do
	Dominant rationale of a complex actor	Narrows down choices
	Management mechanism to produce and promote choices	Rationalisation, justification and legitimization of choices
	Mechanism for actors to conceive themselves and their environment	Links technology strategy with overall business strategy
		Resolves conflicts and organisational politics

Figure 8.2: Viewpoint approach: what it is and what does it do.

In the first part of this chapter, the ATOC as an action and practice space was explored, based on the empirical findings of the case studies. Certain characteristics were identified in relation to its nature, the way it can be challenging for the actors involved in it during instances of T-O change as well as how such actors approach and resolve the ATOC challenges. In the second part of the thesis, the theoretical, analytical and epistemological implications of the ATOC theory are explored, in an attempt for theory development in parallel with the empirically based exploration of ATOC as a practice space.

8.3 PART TWO: TOWARDS A NEW SOCIOLOGY OF TECHNOLOGY AND ORGANISATION

The exploration of the ATOC concept through the examination of empirical cases in Greece has made it possible for such empirical material to contribute to further theoretical, analytical and epistemological advancements. More particularly, based on the empirical findings this thesis is able to present interesting developments in the theorisation of action and structure, of technology and organisation, of micro and macro and global local, fundamental distinctions in social sciences, which have also influenced the interdisciplinary study of the T-O relationship, as shown in chapter two. In the following sections it is discussed how the ATOC theory may contribute to the theorisation of such analytical distinctions and make analytical and epistemological statements which will point to the direction of a new sociology of T&O.

8.3.1 Theorising Action and Structure

The emergence of the business firm as a paramount actor in the shaping of T&O offers new dimensions in the explanation of the motive for action as social choice or non-choice made during T-O change instances. In existing STS literature scholars have talked about relevant actors, actions, relevant social groups that make social choices in the shaping of a technology or an organisation (i.e. Koch, 1994). However, such actions, such social choices influencing the shaping of T&O have not been conceived as actions or choices initiated on the basis of making business decisions. Such actors, when making certain decisions, which shape a technology or an organisation or both, have not necessarily an intention to do so, as their main activity might not be technology or organisation development. They are rather engaged in decisions and actions that influence the T&O relationship by means of improving their business opportunities. SIF, for instance, although it belongs to the supply side of technologies, would not have an interest in developing a high-tech technological application unless there were business prospects to profit from the marketing of this application. This does not mean that technologies and organisations

are shaped by unconscious side effects of business activities. Instead it is suggested that the nature and corporate identity of such actors as business organisations within a certain environment and certain strategic goals, determines the consciousness of their influence on the shaping of technologies and organisations. For instance, research on the development and evolution of ICT standards (NO-REST, 2004) shows that certain actors might exercise pressure for the establishment of certain standards according to their position and power to influence. This is done consciously but the motive to do so is not the shaping of a technology as a goal in itself; rather, the business benefit they might have from such a move. Social choices in the shaping of T&O, therefore, although they are generated in a socio-economic space outside the actor, should not be completely detached from the actors business identities because the legitimization of those choices will not be revealed and interests, political power and motives behind certain choices will remain hidden.

Additionally, the above does not mean that the shaping of technology is driven by conscious, strategically planned business motives only. The point to be made here is that although business organisations in various industries have been adequately studied as important actors, either as users or suppliers, who make social choices and can influence the shaping of a technology, these choices have not been explained or justified as driven by the nature of such actors as business organisations and their conscious realisation of this nature. In this study it is shown that the level of consciousness of actors' choices as business choices is very high. Actors might not have a full control of that consciousness but this consciousness is still shaped within a "business rhetoric". Social choices have been conceptualised as political, social, serving certain interests of actors. Paradoxically, they have not been conceived as "business choices". This is not to reduce the shaping of T&O to a business negotiation, rather decision-making and choice is conceived as part of the concept of action and also linked with the conscious realisation of the nature of the actors performing such an action.

The emergence of the business firm as an important actor reclaims social action as attributed to more complex entities, like business firms, which are operating in a multi-actor, multi-level challenging environment. This is contrary to a theorization of social action as driven by political interest and lost in the midst of

organizational politics and conflicts, as a political processes approach would suggest, or as motivated necessarily towards the shaping of a particular technology or organization, as certain constructivist approaches would argue. ATOC theory seeks the motive behind social action within the identity and nature of the actor as a complex entity, as a business firm and as expressed through choices and non-choices that actors make and promote during instances of T-O change. Nonetheless, as it was previously shown with the viewpoint approach, organizational action is also taken into account but ATOC theory theorizes it as integral with the emergence of business firm as central actors in T-O change within ATOC. Williams & Edge (1996) suggest that choices in the shaping of technology are essential but not necessarily conscious. They argue that they are inherent both in the design of individual artefacts and systems and in the direction or trajectory of innovation programs (1996:886). This is true and it becomes apparent when examining technologies retrospectively, after they have been shaped to a certain extent. In doing so, however, the link between social choices and the actors producing them is lost and not complete reference can be made to the rationale and legitimacy of the origins of certain social choices. ATOC theory and the emergence of the viewpoint approach effectively links the social choices with the actors producing them. These findings contribute to various kinds of literatures by integrating and making more visible issues and socio-economic relations in the management of T-O change.

The debate between research focusing on action and structural accounts in the study of technologies and organisations, although too complex to be resolved by this single study, nevertheless, useful comments can be provided on the relationship between action and structure. The management of T-O change could be seen as an action-structure interplay. This study suggests that action and structure, both as analytical concepts and their interplay as a social phenomenon, are not fixed categories, they are not “black-boxes”, to use a SST term. Their content and meaning is bound to the social situation that generates them; basically, through the interpretation of that situation and its environment, by the actors involved in it based on their viewpoints. As Clark (2000) argues, “structure, agency and reproduction must acknowledge that structures are historically and contextually specific. The reproduction of social structures involves situated practices which have to be

assembled” (Clark, 2000:82). In this study, the action-structure relationship is understood in terms of producing and promoting social choices during the initiation, design and implementation of T-O change instances within ATOC. Action can be understood as the development of social choices by individual firms and the power to impose them in order for them to influence the particular social situation towards a certain direction, as justified by their individual viewpoint. Structure is constituted by the elements enacted, to use Giddensian terms, during this social situation that constrain, restrict, limit, determine and enable certain choices to be made and promoted. Additionally, as the viewpoint approach would suggest, the concept of action includes observation of other actions, prediction, imagination, planning, evaluation, and also interpretation. Actors have the ability to observe social situations and attach meaning to them, that is, identifying various elements as actions or as structures. For instance, the fact that IBM Hellas has strategically acted, given the circumstances, in a way that they had covered most of the Greek market’s needs for mainframe computers in the banking industry appears as a structural constraint to the SIF’s management. This influenced the way they are producing and promoting social choices during the initiation, design and implementation of T-O change instances. An actor conceived another actor’s action as a structural determinant. The concepts of action and structure, therefore, are situated on and constructed by the social situation they refer to, the wider environment of social and economic relations within which that situation emerges, as well as the differing viewpoints of the actors involved in that situation. The action-structure interplay is, therefore, captured as embodied and expressed by an actor’s “rationality”. It constitutes the interpretation of a challenging social and material situation, based on the actors’ viewpoint of themselves as part of their environment.

The action-structure interplay within ATOC becomes open to various interpretations due to the variety of indeterminate possibilities that exist, on one hand, but also a variety of particular structural constraints, on the other, as different actors might perceive them. The viewpoint approach to strategic management of T-O change enables business organisations to settle the challenges and the uncertainties the above condition poses. The employment of a structural vocabulary illustrates what corporate and T-O managerial action involves and how decisions are

made based on the conception and interpretation of the possibilities for action and the structural constraints. Additionally, it makes areas of action and intervention within ATOC more visible and more open, as actors attempt to position themselves within ATOC, gain access to resources and power and influence. These areas of action and intervention within ATOC, a heterogeneous and complex environment of distributed control become more open and visible for actors by realising and focusing managerial action on the challenges that the management of T-O change poses.

The challenging ATOC environment generates social choice, that is, action which aims to resolve and manage the difficulties of T-O change. Different actors understand ATOC in different ways, they are configured in it through being part of different networks; however, all of them need to face the challenges emerging from being part of such a socio-economic reality. Managing possibilities-constraints, networks of power and influence and access to resources, reducing complexity, reaching optimal decisions, surviving competition and the distribution of control are all common challenges for both suppliers and users participating in instances of T-O change within ATOC. In understanding how actors manage these challenges, I tried to examine them through the eyes of different actors and found that the social choices made and promoted during T-O change instances are based on these actors' different viewpoints. These differing viewpoints serve as a basis to make legitimate and justifiable, yet not necessarily optimal, choices due to not having full control of their viewpoints and the process of its sharpening.

This discussion on action-structure promotes reflexive reading of existing literature in T&O as well as reflexive future research and analytical approaches that make use of these terms.

8.3.2 Theorising Technology and Organisation

The development of ATOC as an analytical concept alongside its increasing empirical salience as a socio-economic space for practice, offers an opportunity to rethink the concepts of T&O and the way they are coupled in the context of instances

of T-O change. In doing so, ATOC theory responds to shortcomings of existing models of conceiving T&O. Let us be more specific:

8.3.2.a Problematizing Organisation

Studies that focus on organisation are not consistent in terms of how they define the concept. Some see it as whole firms, others as work organisation, others as processes, others as resources. In the context of T-O change, this thesis suggests that the concept of organisation refers to:

- the negotiable elements of the user organisation i.e. processes, marketing, HR, and so on.
- rhetorical elements of models developed elsewhere and are considered for adoption (rhetorical T-O models or metaphors or visions).

The concept of organisation, therefore, becomes present in these two forms and refers mainly to the business/organisational aspects of T-O change. When these two understandings of the concept of organisation interact within a particular T-O change instance a certain organisational/business problem is framed seeking a solution. During the initiation, design and implementation of technological solutions for organisational/business problems, organisational elements are framed, negotiated in both technological and business terms and discourses, based on previous T-O configurations or more generic models which are parts of “rhetorical T-O models” circulated within ATOC. Next, a technological solution is developed to solve the particular problem. Such elements might include organisational culture, processes, resources, routines, capabilities, organisational structures and the extent to which they can be problematised, changed and reconfigured during instances of T-O change. The concept of organisation takes meaning during T-O change instances through the “problematiseable” elements and aspects that can be examined as part of a problem that needs to find a technological solution. These elements and aspects might refer to processes, structures and resources, but they are understood as parts of a problem as it is constructed and negotiated in business terms. Negotiation, of course, does not mean that organisations are totally plastic and malleable. For instance, in the case studies examined in this thesis, the organisational elements that could not be easily changed or problematised in a certain way, either they were

incorporated into the particular customised design or they were dealt with as emerging problems during implementation. Organisation, then, acquires new meaning through the process of initiating, designing and implementing technological solutions for organisational/business problems as a set of elements that could or could not be amenable to problematisation, negotiation and change. The nature of actors, their role within ATOC and the nature of the social situations in which they are involved, provide the basis for the definition of organisation under such terms.

8.3.2.b Technologies as Solutions

Technologies, similarly, have been conceived in many ways in relation to organisations. Deterministic views see technology as shaping organisation; some others see it as shaped by it, while still others in a mutual co-shaping relationship. Also, some would define it based on distinctions such as material-immaterial or technical-social. As part of the techno-organisational entity, technologies are seen as elements constituting solutions for organisational/business problems. Managers of user organisations might see technologies as investments, as facilitating business opportunities, enhancing productivity, helping management of processes and playing a rather instrumental role. Supplier organisations develop technologies as solutions, as products to be sold to their customers or as technical configurations, depending on the expertise employed). The interpretive flexibility in how technology can acquire meaning is, therefore, quite high. Nonetheless, the nature of ATOC as a socio-economic environment, the nature of actors within ATOC as business firms and the nature of T-O change instances as social situations of ATOC re-configurations where technological solutions for organisation/business problems are initiated, designed and implemented, is a determining factor in how technologies are defined.

The large ATOC networks of technology supply and use worldwide are developed in order to make sure that a market of supply and demand for technological solutions for organisational problems is established and working. The rise of the technology supply industry along with business consultants have become part of the ATOC mechanism that circulates technologies as parts of solutions for organisational/business problems within a variety of organisational fields worldwide.

In relation to a particular T-O change instance, these constitute parts of rhetorical T-O models which are up for selection. When selection and choice are required, technologies are parts of the elements configured into a product that constitutes a solution to the problematized organisational settings and acquire certain meaning in the context of particular instances of initiation, design and implementation of technological solutions for organisational/business problems, where such products are sold and bought. Technologies are parts of techno-organisational configurations (Fleck, 1993) in technical terms where software, hardware and services come together and constitute a technological commodity, but they also constitute solutions to certain organisational/business problems; that is, at the socio-economic context where they will be applied. For this reason, they can be negotiated and assessed both in technological and non-technological, business terms, based on the expertise available to the actors participating in a T-O change instance and on the different phases of the development of such a solution. Usually the business negotiation precedes the technological one. Technologies can, therefore, take on all of these forms depending on the relationship between ATOC and the actor as well as on the social situation that this relationship becomes prevalent.

The understanding of technologies as solutions to organisational/business problems and the realisation that there is not a single optimal solution to a given problem, rather the problem-solution duality co-develop in various contexts, opens up space for the involvement of interpretive flexibility and the interaction amongst various viewpoints during a challenging situation of T-O change.

8.3.2.c The Techno-Organisational Concept

In contrast with the literatures with a one-dimensional focus on technologies or organisations, this study illustrates these concepts as part of the techno-organisational as an analytical concept. Techno-organisational is an entity that is shaped through instances of T-O change. Organisations and technologies as negotiable elements during T-O change instances which might take the meaning of a “problem” and a “solution” are products of historical developments as well as socio-economic. T-O change instances could be seen as the moments when certain technological and organisational histories come together at a certain time and space

forming an ATOC configuration. The relationship between T&O is not just technologies and organisations coming together at a certain time and place, but also their organisational and technological histories, which have been developed within ATOC and are constituted by various networks of socio-economic relations between a variety of actors. This is why the T-O relationship could be theorised as an ATOC configuration, rather than the ambiguous term of socio-technical configuration, in the sense that it includes a wider socio-economic environment and relations.

The fact that ATOC might be configured in many different ways means that at a particular T-O change instance certain technologies come together with certain organisations instead of others. This presupposes choice. The histories of both technologies and organisations in a T-O change instance are very important in terms of the legacies that might determine certain future choices. For instance, a legacy banking system might shape future choices in relation to T-O change. During a T-O change instance these histories are translated into possibilities and constraints at the level of the T-O change instance; that is, become problematised and negotiable. At the time of a T-O change instance, these histories or, more accurately, the legacies of these histories are seen as possibilities or as constraints for the change effort. Organisational and technological histories, therefore, are re-enacted during T-O change instances and contribute to the creation of social choices. The concept of techno-organisational and the focus on instances of T-O change, therefore, does not aim at neglecting the importance of histories and biographies of technologies and organisations; rather, it reveals how these histories are conceived by different actors involved in a T-O change instance at a certain time and how they are incorporated in decision making processes in relation to social choices generated during the initiation, design and implementation of T-O change. Histories are important and this study shows how they are filtered, re-enacted and employed in real time through the actors involved, within a frame of exploring possibilities and constraints in the initiation, design and implementation of T-O change instances.

From the above, it can be argued that the analytical value of the techno-organisational concept integrates literatures and issues and resolves inconsistencies emerging from one-dimensional research focusing either on technologies or on organisations on the basis of accounting for the importance of technological and

organisational histories. The T-O change concept captures changes in technologies and organisations through the emergence and negotiation of social choices between diverse and heterogeneous actors within the framework of T-O change instances. Such social situations place certain technologies and certain organisational elements within the same template and explore how they are co-shaped by also taking into account the histories and biographies of the technological and organisational elements brought together at a certain time and space.

The ATOC concept which understands the coupling between T&O as part of the techno-organisational entity which is shaped during T-O change instances within ATOC as a practice space, offers a wider understanding of how socio-technical configurations emerge (ATOC configurations here), rather than alternative concepts, such as, technological frames (Bijker, 1995; McLoughlin, 1999). Frames provide the shared assumptions, knowledge and expectations through which relevant groups give meaning to an existing or emerging socio-technical configuration (McLoughlin, 1999: 160). However, the concept of ATOC as an analytical space includes wider processes and social relations beyond certain such configurations and moves away from a strictly organisational understanding of the T-O relationship.

8.3.3 ATOC: A Multilevel Analytical Space

The viewpoint-based definition and conception of ATOC offers the possibility of a multilevel theorisation of T-O change based on the idea that actors can conceive of themselves as part of their wider environment extending from a local level of a T-O change instance to a global level of the socio-economic relations of the knowledge economy. At the level of personal identity of individual actors it can be argued that individuals understand themselves by acknowledging multiple aspects of their identity, for example, as members of a family, as workers, as citizens of a nation, as citizens of the EU, as members of a “global village”, to use Marshall McLuhan’s concept (McLuhan, 1962). All these aspects may be parts of people’s identities although there is not immediate access or contact with all these levels and

forces that construct these identities. They might have immediate access to some of the social forces shaping their identity, but some other forces are more distant and completely imagined, in the sense that Benedict Anderson uses the term “imagined communities” to define the nation (Anderson, 1983) or in the sense that Castoriadis uses the term “imaginary institution of society” (1975) to show how the psyche creates stable figures for the self, ignoring the constant emergence of mental indeterminacy and alterity by creating external social institutions that give stable form to what he has termed as the *magma* of social significations. In STS there is already work of increasing significance on the notion of imaginaries as bound to professional practices (practice-bound imaginaries) and the way these practices shape prospective uses of technologies (Hyysalo, 2006; Gregory et al, 2003).

An analogous argument could be made about more complex actors, like firms. The constructed multifaceted and multilevel identity of actors-firms can be captured by the concept of viewpoint. Through their viewpoint, firms, independently of their size, are still able to conceive themselves as part of something wider, especially when they interact with elements of their environment that can be seen as having a wider, global scope. The globalisation of T-O change and the emergence of ATOC enact multiple levels in firm’s viewpoints and shape it. Viewpoints, however, are shaped not only through the things that actors experience and have direct contact with and access to, but also through things that are imagined. Existing STS literature, for instance, although they have paid attention to social choices in the design and implementation of technologies in organisations, do not examine the processes of emergence of those social choices, rather they reduce it to an empirical issue, examined *a posteriori* (i.e. Hyysalo, 2006). In other words, a viewpoint is shaped not only by the things you see, but also by the things you cannot see but you imagine them because “you know” they are there, either by engaging in risk taking activities or by employing secondary knowledge. By giving voice to the actors involved in T-O change instances, as they occur within a global knowledge economy, the conception of multiple levels into which the ATOC space is spread and also the interpretation and significance of this space to the actors conceiving it is possible, since the actors’ voice represents their viewpoint of the world. ATOC as a practice space, therefore, can be conceived as involving multiple levels which can be

analytically captured by ATOC as an analytical concept which places within the same analytical template the local and the global, the micro and the macro.

Through forces and processes of particularisation which narrow down indeterminate possibilities, reduce complexity and uncertainty and also forces and processes of abstraction that generify and feed back to the global knowledge economy insights from particular T-O change instances, ATOC realises and effectuates itself in a way that the global is linked with the local. Making this process of how ATOC works analytically visible is adequate for explaining and resolving the global-local paradox, at least as it appears in this study. The global-local paradox finds a practical resolution, in terms of employing a viewpoint approach to manage indeterminate possibilities offered within the global knowledge economy, that is, within ATOC as a space for practice. It also finds an analytical resolution, in terms of analytically being able to capture processes and mechanisms that link the global with the local regarding the relationship between T&O as it is happening through instances of T-O change.

The processes of abstraction and particularisation of ATOC could be contrasted with the processes of de-contextualisation and re-contextualisation in technological development. Schumm & Kocyba (1997)⁴⁰ focus on processes of technological development to analyse decisions made by the influential actors involved in these processes. They distinguish three steps of multiple transformation which are:

- Perception and articulation of the problem.
- Translation into guidelines for technological development (de-contextualisation).
- Technical engineering development work, translation back to the application context (re-contextualisation) (Schumm & Kocyba, 1997:54).

By “de-contextualisation” they understand the process by which social needs and interests are translated into demands for technical function; these demands are detached step-by-step from their social context and specified according to technological criteria (*ibid.*). This way they see technological discourse as apart from

⁴⁰ This is not mentioned in the literature review because it is contrasted to the particularization-abstraction model which emerged later on, after the analysis of the data.

the organisational context but they do not examine the recording of the operational requirements, as a process of problematisation, as a de-contextualisation. Based on the concept of techno-organisational, a counter-argument could be that both technology and organisations are negotiated, de-contextualised and re-contextualised during processes of initiation, design and implementation. However, the specialist technological or business knowledge involved in T-O change instances should not be seen as out of context. Analytically, the space that is conceived as a context is a particular T-O change instance within ATOC and not the specific organisational boundaries of the user organisation. The translation of operational requirements into technological specifications, therefore, is not a process of de-contextualisation, as it happens within the conceived context of ATOC, but rather one of the processes that contribute to ATOC particularisation. This is because this translation is taking place based on choices and reflections on the technological resources available to a particular instance through networks and contacts and, therefore, it is a process that particularises the indeterminate technological possibilities that ATOC might offer. The translators, thus, would not translate an operational requirement into a technological function that they cannot cover; they would not create a problem that they could not solve. There is not an ideal solution to a pre-fixed problem, rather the problematisation of organisational structures with the translation of the problem in technological terms and the development of a solution to that problem all happen in the same context which is captured by the concept of ATOC and the way it is particularised towards instances of T-O change. Also, the de-contextualisation and re-contextualisation processes could not explain technological development in the context of long-term relationships between suppliers and users, like SIF and The Bank. In such cases, for the most part, the process of de-contextualisation does not happen at all.

Accounts such as the de-contextualisation – re-contextualisation (Schumm & Kocyba, 1997) or localised and de-localised meanings of a technology (see McLaughlin, J. et al, 1999:7) although they give an account of the local context, neglect the “de-context”, or the “non-context” and the fact that it is conceivable by actors and can influence social choice or non-choice. Literature has been unable to describe and explain non-context and it is used only as a reference point in order to

define the context of a technology or a social situation. ATOC theory provides a consistent and systematic account on how the non-context could be defined as perceived by socio-economic actors, capturing it by processes of particularisation and abstraction during the initiation, design and implementation of local T-O change instances within ATOC and the global knowledge economy.

ATOC theory could also be contrasted to the neo-institutional paradigm (DiMaggio & Powell, 1983). Apart from the restricted focus on institutions, an emphasis on symbols and rites as important and beyond choices of rational actors and a fixation with literature studies (Clausen & Koch, 2002), it could also be argued that the concept of homogenisation and isomorphism cannot quite fit to a complete explanation of the shaping of the relationship between T&O. More particularly, and in contrast to the ATOC model, it is suggested that homogenisation and isomorphism occurs at a rhetorical and abstract level, in terms of the management of T-O change. Although tendencies for isomorphism might be identified at a rhetorical and abstract level, as they are pushed by the marketing of innovation processes (see generification literature), they could be associated with processes of ATOC abstraction. This means that although isomorphic tendencies may be identified in the structuration of organisational fields, as DiMaggio & Powell (1983:147) would suggest, this may be seen as a process of abstraction in relation to the distance between T-O change instances with the global knowledge economy.

The realisation that business organisations tend to resemble each other can be seen at a rhetorical level and does not simplify the challenges of T-O change emerging from a social situation characterised by diversity of actors' interests, CSCs, knowledge, resources and strategies. Highly institutionalised organisational fields and well established actors might have the ability to partially shape the criteria for T-O change by promoting and facilitating homogenisation at a rhetorical, abstract level. The great diversity of organisational and inter-organisational contexts and spaces, however, oppose to the practical realisation of this rhetorical trend. In this sense it could be argued that institutional and neo-institutional approaches tend to overemphasise the power of certain well established institutions on the shaping of T&O while neglecting emerging and contingent factors of the local (inter-) organisational circumstances. The concept of isomorphism, then, is quite simplistic

in comparison with the ATOC model which captures the complexities and contradictions of the socio-economic relations shaping T&O. For instance, neo-institutionalism might identify BPR as a significant institution that shapes T&O but it does not capture the different choices and possibilities that actors make while adopting and implementing BPR. A neo-institutional approach would not be able to successfully conceptualise, link and analytically use the global-local distinction; rather, it would bring about its paradoxical qualities, the ones ATOC theory aims to resolve. ATOC framework acknowledges the significance of a neo-institutional insight but it would place it on an analytically restricted space, at a rhetorical level between processes of particularisation and abstraction. Neo-institutional perspectives are meso-approaches with very specific focus and the neo-institutional lenses cannot see as close as an instance of T-O change or as far as a global system of socio-economic and market relations.

It seems that the ATOC metaphor and an analytical focus on instances of T-O change within the global knowledge economy provides a useful analytical template in order to capture, explore, describe and explain multilevel and multidimensional spaces within which socio-economic relations are shaping the relationship between T&O through managing T-O change and linking the global knowledge economy with particular local T-O change instances. Various concepts have been developed in order to capture the socio-economic relations amongst various actors who contribute to the development of technologies and organisations, even within a global environment where the global-local issue might appear as a paradox or as a problem to be analytically solved. The concept of “arenas of development” (Jorgensen & Sorensen, 1999) is also an attempt to capture a space where the development of technologies is taking place, but the focus on the technology leaves some actors, factors and processes invisible. Another concept that might be of relevance here is the “firm-in-sector” perspective by Whipp & Clark (1986), which provides an analytical template to capture organisations within their environment. This concept, however, is quite restricted in accounting for processes happening beyond organisational and sectoral boundaries.

The most obvious template to capture socio-economic relations and how they are formed within a global-local framework comes from an ANT perspective. In the

TSR.2 case, Law & Callon (1992) offer a template to capture the development of an actor-network in the building of an aircraft with reference to the global and the local. This template, however, is quite restricted since it does not capture a space or an environment within which the actor-network is developed. This is related to their also restricted conceptualisation of action. They look at action by “digesting” everything to the local actors but without placing them within a wider framework, which would illustrate how action is performed based on decision-making choices. They look at completed actions without examining the existence or not of various possibilities before the actions are performed. For example, they refer to the global and the local by using a network vocabulary. They speak of global network and local network and of ‘obligatory point passage’ linking them (ibid:48). Global and local, however, do not only refer to networks but also to environments and cognitive and conceivable spaces within which networks are developed. This have been achieved by including in the concept of action the ability of actors to conceive an environment of possibilities and constraints in light of making decisions to act. The global includes not only the networks of actors that could be linked with a particular instance (T-O change instance in this study, the aircraft in Law & Callon’s study) but also the rest of the possible or alternative networks that could have been mobilised but did not. At the local level also, processes of initiation of an instance where networks might or might not exist before the particular instance are captured and the way networks are configured with processes of particularisation in relation to that instance are revealed. To conclude, ANT approach could only account for a particular ‘slice’ within ATOC since they take already completed one-off cases and they deconstruct them, but they leave outside their analysis processes that illustrate more how choices are made, how decision making is happening based on the linkage between a local particular T-O change instance with a global indeterminate and abstract environment of the knowledge economy.

The way ATOC works from the abstract global knowledge economy to local particular instances of T-O change, as an analytical scheme resembles with conceptions of the realist approach where “concrete” *events* are seen as shaped by less concrete and more abstract *mechanisms* which are situated within abstract *structures* (see Clark, 2000:81-82). Also, in relation to the separation of three

separate domains, - the real, which contains natural and social objects and mechanisms (mechanisms are defined as tendencies to behave in particular ways) and there are real structures which endure independently of our experience and our knowledge (Sayer, 1992:33); the actual domain which is made up of events that can occur without being experienced; and the empirical domain which is made up of experiences (Clark, 2000:81) – are trying to explore the degree to which structures, although hidden, distant and independent of experience, constrain and shape everyday patterns of action and events (Clark, 2000: 82). In addition to these and in relation to studies in strategy, Clark argues that they overplay the capacities and freedom of movement available to most persons (or firms) while they underplay the shaping influence of pre-existing conditions and causal relations (Clark, 2000:82). The notion of imagination of the non-experience which sharpens the actors' viewpoints when are called to make social choices (or non-choices) as emerging from this study might give an answer to how hidden structures might create mechanisms that would shape actions and events.

8.4 SUMMARY AND CONCLUSIONS

The employment of the ATOC concept helped capture the space between instances of T-O change and the global knowledge economy and resolve some of the confusion created by inconsistent and disintegrated interdisciplinary research in the study of T&O. The global knowledge economy has gained increasing attention in the face of both the increasing importance of knowledge and information in societies and the increasing intensity of knowledge and information activities, due to the globalisation of economic activities and due to the increasing interconnectedness and networking of socio-economic relations (see Dankbaar, 2003). In relation to the shaping of T&O through instances of T-O change and the emergence of the challenges of T-O change management for the heterogeneous actors involved in it, the tensions and the forces driving it appear constructed in a certain way. When looking at instances of T-O change as part of a wider environment of socio-economic relations and how actors perceive and manage the challenges of those instances, the

global knowledge economy appears as constructed in a certain form and is realised through certain processes. In these processes, the social choices of actors and the way they emerge are captured and illustrated as significant in how the global knowledge economy is realised within the spectrum between wide abstract socio-economic relations and local emergences of instances of T-O change. The theory of ATOC captures this journey of the realisation of the global knowledge economy through the viewpoints of different and diverse actors. It illustrates it as a cycle from global, abstract, indeterminate, seemingly abundant possibilities, which need to be balanced and fit with the constraints that the local, particular, organisational, settings of the social situation of a T-O change instance pose, and back. The abstract global knowledge economy, then, finds its way to multiple, particular, local T-O change instances through social choices of the heterogeneous and diverse actors involved in them emerging from the interactions and negotiations of their diverse viewpoints during T-O change management.

The theoretical-analytical and epistemological developments brought in by this study with the concept of ATOC point towards a new sociology of T&O by focusing on actors and the processes that lead to the emergence of social action as social choices generated by social situations created by the configuration and re-configuration of socio-economic relations within ATOC. A focus on such social situations as emerging within a wider nexus of social and economic relations among diverse and heterogeneous actors; the illustration of actors' viewpoint as a useful means for a more realistic, multilevel and multidimensional understanding of the world; and the development of new concepts that can capture previously hidden relationships, helped provide an adequate resolution and analytical incorporation of long-standing dichotomies in social science, such as action-structure, micro-macro and global-local and technology-organisation. In a sense, ATOC theory does not focus on macro or micro-objects by falling into the pitfalls of reductionism or dualism (see Barnes, 2001) or on structure or agency. It rather exemplifies the way complex actors make social choices and non-choices by conceiving and interpreting the macro, the micro, actions and structures while understanding themselves as part of a wider environment during social situations significant enough to generate social choices. ATOC theory also shows how actors become conscious of their own actions

and how they contrast or differentiate them with actions of other actors within ATOC socio-economic relations.

More specifically, the general ATOC theory provides a useful analytical template which makes the socio-economic relations that shape the T&O relationship more visible. More particularly:

- It conceives and captures the relationship between the global and the local and how they interact in a more complete, visible way by taking into account the viewpoint approach of different actors involved in a T-O change instance.
- It constitutes a more flexible mechanism to define and capture spaces, inter-organisational relationships, networks of innovation etc. because it illustrates the differences in viewpoints and strategies, the distributed control, heterogeneity and diversity.
- Makes network development more visible and complete by showing how networks are developed in a certain way instead of another based on actors' strategies and their management of possibilities.
- Makes action more visible by associating it with the social choices and non-choices of actors when they are managing possibilities and constraints in T-O change instances and illustrates its importance for the shaping of T&O relationship.
- Trade-offs are more visible in the sense that it accounts for the justification of actors' choices.
- Provides a better account on organisations and their environment. The relationship between a business organisation and its environment is not just a geographical, cognitive, analytical, stable mapping, it is rather an issue for management (i.e. management of networks and contacts).
- Finally, it integrates snapshot studies with a wider socio-economic and historical environment by linking instances of T-O change with the global knowledge economy. This way it fulfils C. W. Mills' call (1959) for sociological imagination by linking the history of a particular instance (how it was created through particularisation) with the history of the wider knowledge economy, thus resolving the global-local paradox.

Within this context, the T-O relationship can be captured in a certain way and theorised. The shaping of the T-O relationship may be conceived as ATOC configurations and re-configurations through processes of ATOC particularisation and abstraction by the involvement of actors' social choices and strategic management of T-O change. The value of this study lies on the fact that it is based on the co-development of empirical study with theoretical, epistemological and analytical advancements. Building on the Social Shaping of Technology tradition this new sociology of T&O explores new ways of capturing socio-economic relations in the shaping of the relationship between T&O. In doing so, it integrates STS literatures that might seem inconsistent and disintegrated in the study of T&O under an interdisciplinary prism. This way it provides the basis for the development of a more solid academic identity. With this study I hope to stimulate the relevant academic community and interdisciplinary networks to take up some of the ideas developed here, explore them further and add more value to them by cross-fertilising them with new ones in order to bring more insights to the understanding of the relationship between T&O. In a sense, this study by making visible certain processes and socio-economic relations in the shaping of T&O opens up a door for the development of research agendas and programs with an interdisciplinary understanding leading to a new sociology of technology and organisations. Additionally, this study has value in offering practical insights to industry practitioners involved in T-O change management. Given the risks and the challenges of decision-making and scoping social choice during instances of T-O change, the viewpoint approach as a management tool could be a resource for reflexive access of actors to the possibilities and constraints they might face.

8.5 LIMITATIONS AND FUTURE WORK

In general, the present study with the development of ATOC theory in understanding the shaping of the relationship between T&O which points to the direction of a new sociology of T&O that captures and explains local social and economic phenomena as linked with wider socio-economic developments in time

and space, thus bringing the study of T&O closer to C.W.Mills' call for sociological imagination (Mills, 1959). Mills argues that "No social study that does not come back to the problems of biography, of history and of their intersections within a society has completed its intellectual journey" (Mills, 1959). The idea seems to be that in social studies, personal, individual, snapshot biographies should be linked, or seen as part of a more general history of society, in order for them to be intellectually complete. In staying faithful to this suggestion, the ATOC model suggests that in the study of T&O, more long term and larger scale studies of historical and longitudinal dimension should be done that include both broader socio-economic changes as well as directly involved actors and particular local circumstances. The links between these two levels, in a way that the biography of a T-O change instance could be linked with wider socio-economic developments in the history of economies, markets and industrial models should be explored.

The ATOC model challenges the mode of doing case studies traditionally by shifting the focus on instances of T-O change, by questioning the analyst's involvement and the time in which s/he enters the field. More particularly, a focus on social situations rather than on technologies or organizations offers a more accurate and reliable source of social choices and non-choices; the paralleling of the analytical view with the actors' views offers a less disruptive involvement of the analyst and an alternative understanding of the relevant values that govern the production of social choices, rather than externally imposing arbitrary value judgments on the subjects of the study; finally the time of entrance in the field in a way that phenomena are studied as they unfold reveals the rationality and legitimization mechanisms of social choices rather than examining the effect of those choices retrospectively, where the link between "social choice" and "actor" is lost. Additionally, this study questions the way that actors and issues acquire analytical and academic importance in case studies on T&O. The sampling techniques and the analytical viewpoint adopted for this study make the important actors and issues emerge without the influence of any personal biases of the analyst. A challenge underpinning these innovative steps towards a new sociology of T&O would be to manage to address them empirically and make good use of them in various contexts of research. In terms of future work, then, the ATOC model sets a basis for the development of further empirical studies

that make use and are benefited by the analytical and conceptual developments illustrated in this study.

Apart from the analytical, theoretical and empirical value of this study, there are a few constraints and limitations that need to be mentioned and certain research design choices to be reflected on. The limitations of this particular study as a research process are mostly due to restrictions of the research field, of time, space, and budget while the limitations of ATOC theory as a template for analysis and understanding of the relationship between T&O could be resolved by further work and engagement with the topic where various alternative possibilities will be examined and more ideas employed. Let us discuss, therefore, various limitations and how do they point to the direction of future research.

First of all, I had access to a limited number of corporate actors within ATOC who might appear during processes of initiation, design and implementation of T-O change instances. Such actors are: the state, regulatory bodies, professional associations, unions, wide range of specialists and suppliers. ATOC theory, however, provides an excellent framework for such actors to be conceptualised and examined. I chose a certain amount of case studies because I wanted to develop them up to a certain range and scope that would provide necessary empirical data to sketch the ATOC environment and certain social and economic relations within it. Later on, the scope was widened including more actors, however, a focus on T-O change instances made their inclusion possible. Viewpoints from the supply and use side of ATOC were chosen as basic actors. Other actors could have been chosen as well but their viewpoints would not be able to be fully developed and justified due to lack of time, space and money. One direction for future work would be to explore the role of different actors within ATOC and how they might contribute to the processes of particularisation and abstraction of ATOC by developing and performing their viewpoints.

Although the ATOC theory framework is able to accommodate small sized actors or actors that are not necessarily leading the international developments in technologies and business models, my case studies are about actors and instances significant enough to exemplify issues such as diversity, heterogeneity, complexity, multiplicity of actors involved in one instance. If case studies were about smaller

actors, SMEs for example, the issues raised might have been different and theory development would have been tailored more on smaller actors and their relationship with the global knowledge economy. The point is that the choice of cases might affect the way an ATOC framework could be used, however, this flexibility might contribute to further analytical exploration of such a framework by employing it in a variety of cases and contexts. Besides, this is the point of understanding the viewpoint approach; that is, to be able to recognise different issues and challenges that different actors might bring to the surface.

In this study, although the process of abstraction was identified there was not time and the space to examine it more thoroughly. At this point I referred to some existing literature such as generification, standardisation, institutionalism, only to point to the direction of future research able to capture more elaborately the process of abstraction, which would show how local, particular instances of T-O change might be part of processes of creating an abstract global knowledge economy. The same happens with issues of policy and regulation. Although there is a clear argument in relation to policymaking and regulating ATOC, I did not devote much space because I did not have adequate empirical data to support it. I, therefore, presented my argument as a hypothesis or as a research topic that needs to be further explored within an ATOC theory framework.

Apart from the above imperfections that could be explored more in the future, I would also like to explore the analytical value of the ATOC theory and the understanding and use of a viewpoint approach by looking further for metaphors and concepts that could improve the understanding of how ATOC works and the role of actors in it. For example, some concepts that we have already started looking at come from psychology, philosophy and psychoanalytically influenced sociological theories. More particularly, I would like to explore the notion of “imaginary” (i.e. Castoriadis, 1975, English translation see 1998;) as part of the viewpoint approach in relation to decision making. In Castoriadis’ terms, it could be explored how actors understand themselves as part of ATOC through processes where ATOC becomes socially instituted. Additionally, I would like to explore notions such as “perception” (see Descartes, for instance) or consciousness (corporate and organisational consciousness) and how it can be usefully employed towards an understanding of

viewpoints and the construction and understanding of rhetoric, visions, and ATOC promises. A relevant and interesting concept to explore in this context is that of “distributed cognition” (Hutchins, 1995). This refers to a branch of cognitive science that sees knowledge and cognition as not confined to the individual; rather, it is distributed by placing memories, facts, or knowledge on the objects, individuals, and tools in our environment. Although this concept accounts for various representations within an environment, it will be also interesting to explore the material basis surrounding the shaping and development of such representations.

The above concepts and their employment will also make the role of history more visible in the sense of how corporate actors develop their identity and consciousness historically (history of viewpoint). For instance, what is the role of organisational and corporate history of a firm in the viewpoint sharpening? Are histories always a good thing or is it better to be forgotten sometimes? How can organisations forget “unpleasant” parts of their histories during instances of T-O change? Is forgetting one’s history a process of social learning? Additionally, interesting issues that might be explored in the future are related to the embeddedness of actors in networks and how the degree of embeddedness might, or might not, create some sort of confidence in decision making and how this might cause rigidity towards change or not. For example, organisations with a high degree of embeddedness in long term established networks might have gone through learning processes which in turn might cause rigidity in exploring alternative possibilities within ATOC for example. I could, therefore, explore which are the factors that might make viewpoints more rigid or more flexible in decision-making and how histories of organisations, past experiences, learning processes and degree of embeddedness might contribute to that.

I would also like to expand my understanding of ATOC in various industries and also government organisations. In Greece at the moment, for example, there are changes happening for the modernisation and computerisation of government organisations. This means that the Greek state as an organisation has opened its boundaries and exposed itself to ATOC. It would be interesting to see how the ATOC theory could be useful to explain T-O change in the Greek government organisations and ministries, while the role of the citizens would be of great interest

here in the relationship between citizen-state. This shows another imperfection of this study that I did not take into consideration, the role of the customers of the user organisation and whether they had some sort of involvement in the T-O change instances that we looked at. This would be another dimension to be taken into account in the future. The above are just a few possibilities for further exploration of the analytical value of ATOC theory that the author is currently looking at.

Finally, I could have said the same story by keeping my narrative more closely to the industry specific characteristics of banking, for instance. The theoretical-analytical and epistemological value of this study excited me more and I made a conscious decision to invest more on it rather than focusing and illustrating industry-specific characteristics of banking and IT industries which would nevertheless contribute to the enrichment of empirical evidence from Greece. Future work closely related to various industries could develop when the ATOC theoretical-analytical and epistemological suggestions become more accepted by the academic community.

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APPENDIX

1. INTERVIEWS

This is a list of my informants for both case studies. For anonymity purposes, I give a code name to each of them, I provide their role or position and the date the interview was taken.

GB case

(TP1, top manager, interview 30/05/2003)
 (TP2, BPR project manager, interview 10/02/2003)
 (PM, overall project manager, interview 19/05/2003)
 (SCF, manager subcontracting supplier firm, interview 05/02/2003)
 (OPF1, senior manager, interview 19/02/2003)
 (OPF2, director, interview 21/02/2003)
 (ITF1, project manager, interview 29/03/2003)
 (ITF2, manager, interview 13/12/2004)
 (BM1, branch manager, interview 11/02/2003)
 (BM2, branch manager, interview 03/04/2003)
 (BM3, deputy branch manager, interview 27/02/2003)
 (DIF, general manager, interview 04/03/2003)
 (HRF, manager from HRF, 11/03/2005- email communication)
 (BE1, branch employee, interview 30/05/2003)
 (BE2, branch employee, interview 27/02/2003)
 (BE3, branch employee, interview 15/04/2003)
 (BE4, branch employee, interview 03/04/2003)
 (BE5, branch employee, interview 03/04/2003)
 (BE6, branch employee, interview 15/04/2003)
 (BE7, branch employee, interview 27/02/2003)

SIF case

(EAC, academic, interview 7/10/2004)
 (SBA, sales manager, interview 22/10/2004)
 (DIS, IS director, interview 18/11/2004)
 (XMD, ex-managing director, interview 15/12/2004)
 (MFS, manager, interview 26/10/2004)
 (MRD, R&D manager, interview 16/11/2004)
 (PSD, pre-sales manager, interview 26/11/2004)
 (PSD1, pre-sales assistant manager, interview 24/11/2004)
 (YDIS, assistant director, interview 15/11/2004)
 (TMA, senior IT consultant, interview 10/11/2004)
 (MISD, manager, interview 16/11/2004)
 (ASS, manager, interview 29/11/2004)
 (APA, senior IT consultant, interview 12/11/2004)
 (TIF, director, interview 09/12/2004)

2. FURTHER ANONYMIZATION

I present here all the fake names I had to invent in order to secure the anonymity of the persons, firms as well as brands of products I was dealing with during fieldwork (apart from my interviewees which were anonymized as shown above). Some other actors mentioned in the study are not anonymized due to the fact that most of them are international multinationals and by mentioning them does not reveal any information about my central actors' identities. Additionally, the information provided with reference the non-anonymized actors could not be considered as classified information since my informants were expressing personal opinions about these actors and not to any objectively defined information of any kind.

GB Case

Greek Bank (GB): Referring to the user organisation which underwent the large restructuring program that was studied in this thesis as an instance of T-O change.

Strategy Firm (SF): Referring to the external specialist firm involved in the consortium of firms that took up the GB change program and was in charge of the strategy project.

Human Resources Firm (HFM): Referring to the external specialist firm involved in the consortium of firms that took up the GB change program and was in charge of the Human Resources project.

Organisational Processes Firm (OPF): Referring to the external specialist firm – after a merger of two firms that were initially involved – part of the consortium of firms that took up the GB change program and was in charge of the Organisational Processes project.

IT firm (ITF): The Consortium Leader. Referring to the external specialist firm leading the consortium of firms that took up the GB change program. ITF provided the PACKAGE, the integrated banking software package.

Direct Interventions Firm (DIF): Referring to the external specialist firm involved in the consortium of firms that took up the GB change program and was in charge of the Risk Management and Loan Portfolio Management (LPM) projects.

Project Management Firm (PMF): Referring to the external specialist firm involved in the consortium of firms that took up the GB change program and was in charge of the overall project management of the whole effort.

PACKAGE: Referring to the Integrated banking software package provided by the ITF.

SIF Case

Systems Integration Firm (SIF): Refers to the systems supplier firm, the central actor involved in the second case study.

MSIF: Refers to the international IT company of which SIF is the main representative in Greece.

The Bank: Refers to the banking organisation which is SIF's largest customer. It holds a special place in the case study due to the long and interesting history of involvement with SIF.

Mr. CD: Refers to the owner of one of the largest offices in the world in city planning who first set the basis for SIF's foundation.

Mr. D: Mr. CD's son and the main shareholder of SIF, who owns about 40%.

3. GREEK BANK IN NUMBERS

Some key numbers (31/12/2003):

- Over 2.5 million active accounts
- More than 100 products and services
- Powerful group of 9 financial services companies
- 570 ATM's
- 451 branches in Greece
- 5 representative offices in Germany and a worldwide network of 40 correspondent banks
- 17,831 mil € total assets
- 14,220 mil € customer deposits

Source: GB website

4. SATIRIC COLUMN REGARDING INTENSIFICATION IN THE GB CASE:

How many credit cards did you sell today?

- -Eh...
- How many personal loans? How many stegastika?
- Hmmm....
- What? Just this little? That's bad! Very bad! You don't know how to talk to the customers. You're not taking initiatives. After work go and find some commercial stores and talk to them about "business 1". Tonight go to the night clubs and find customers. After the night clubs close, go and find night watchers, they don't get paid well and they need a personal loan. And in the morning at work when you don't have any customers, make phone calls and

offer a free weight loosing program for free.....ehmmm..sorry, I meant a Visa card...

- Why don't you bugger off!!!

(free translation from the Employees' Union Newsletter)

5. COLUMN REGARDING THE *PACKAGE*

PACKAGE or Prophets: Our colleagues are reporting enormous difficulties from the application of the program. The results: More working time, more nerves, more stress, more frustrated customers. And then it's the workers' fault that they don't catch up with the time schedule. It's the workers' fault that they don't achieve the goals. *PACKAGE* should be giving answers to the customers and their businesses. We are not prophets.

(free translation from the Employees' Union Newsletter)