Understanding Strategic *ISD* Project in Practice – An *ANT* Account of Success and Failure

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Abstract. This paper presents an interpretive case study of a strategic information system development (ISD) project in an insurance Company whose outcomes were perceived as both a success and a failure. By following actors – both human and non-human – involved in the strategic ISD project and the processes of inscribing and aligning interests within their actor-networks, the paper aims to unpack and provide a rich description of the contradictory nature of the socio-technical in such a project and the making of its success and failure. Guided by Actor Network Theory (ANT) the description traces the emergence of heterogeneous actor-networks and reveals how and why some interests did translate while others didn't into the IS designs, thereby producing the perceptions of success or failure.

Keywords: Strategic ISD, IS success, IS failure, Actor Network Theory, ISD as heterogeneous actor-networks

1 Introduction

The value and importance of strategic information systems (IS) – defined as systems that alter a firm's processes, products and/or services and change the way a firm competes in its industry – has long been recognized by industry practitioners and academics alike [5]. Many studies focusing specifically on strategic IS success or failure recognized the importance of social factors [8], implying a greater need for richer approaches to and deeper understanding of strategic ISD processes. The prescriptive solutions offered by the predominantly functionalist, positivist perspectives fail to offer a deeper understanding of complexities and subtleties involved in the strategic ISD processes in practice, especially perceptions of their successes and failures [8], [15]. Furthermore, it has been emphasised that in order to achieve deeper understanding both the socio-political and the technical nature of strategic ISD need to be investigated in an integrative way [2], [17], [13], [15].

Although a significant body of IS literature investigates social and technical issues, the bulk of this literature simplifies the ISD project environment into two segregated domains – the social and the technical. Many argue that such views are too simplistic to account for the complex nature of both IS strategising and ISD, calling for a more holistic research approach that better accounts for the inner-workings and intricacies of these vital business processes [23], [21], [3], [6], [15], [12]. But to do that we need to address the very nature of the social and the technical as they merge in ISD projects, which has been the subject of ongoing struggles in the IS literature [23].

In this paper we investigate a strategic ISD project in an insurance Company with the aim to i) provide a rich description of the socio-technical nature of such a project, and based on this description ii) improve understanding of the socio-technical interplay between actors and explain how this interplay impacts the perceived success and failure of the project. To achieve these objectives we use Actor-Network Theory (ANT) as a theoretical lens to investigate and explain the nature of socio-technical work and the interplay between human and non-human 'actors' throughout the strategic ISD project (see e.g. [4], [9], [10]). Following a brief description of some key concepts of ANT, we present research design and the interpretivist case study of the strategic ISD. The empirical data (interviews, researcher's notes and documentation) were then analysed and interpreted through the lens of ANT thus enabling deep insights into the socio-technical nature of ISD and the resulting perceptions of both success and failure of the system.

2 Theoretical Background: Some Key Concepts of ANT

By rejecting the traditional sociological view of the 'social' as a particular domain of reality used to provide explanations of science, technology and society, ANT aims to explain the social by tracing 'associations' among heterogeneous actors as they interact and form more or less durable wholes – actor-networks [4], [9], [10]. Also called the 'sociology of association', ANT assumes no a priori distinction between human and nonhuman actors, and sees them as active makers of actor-networks. ANT offers a uniform framework that accounts for micro, meso and macro levels of analysis, without privileging any [14]. ANT has been used in IS research to "study the social relations and processes by which [an IS] is fabricated, [considering] the facts and artefacts which mediate and reinforce those relationships" ([3], p. 200). Its central concern is to understand and theorise the role of technology and technological objects in making the social [6], thus enabling deeper understanding of ISD success and failure in strategic projects [8]. Examples of ANT research include Mitev's analysis of the new ticket reservation system at the French Railways [14]; Aanestad's investigation of the impacts of telemedicine infrastructure in surgery [1]; and Walsham and Sahay's research into the adoption of GIS for district-level administration in India [24].

ANT is an emerging body of work and makes no a priori assumptions about the social world[1]. Some core ANT concepts, which remain constant throughout the body of literature, are summarised in Table 1. ANT is based on the core concepts of the actor. An actor is an entity – human, nonhuman or a combined hybrid object of the two – that can affect action in an actor-network. An actor-network is a heterogeneous network of aligned interests working toward the achievement of a common goal. The alignment of interests within an actor-network is formed through the enrolment of a body of allies (who become actors – both human and nonhuman) through a process of translating their interests to be congruent with those of the network [23]. This translation is achieved by inscribing actors' interests in the new system using 'scripts', which influence actors to assist an actor-network in the achievement of its goals. The act of inscribing actors with the necessary scripts is referred to as a program of action. Conversely, the act of challenging these programs of action is referred to as an anti-program of action [19]. These interests are inscribed into dele-

[1] ANT has been criticised on several grounds (especially the symmetrical treatment of human and nonhuman objects). These criticisms will not be addressed in this paper, however a full analysis can be obtained from [23].

gates, which are actors that stand in and speak on behalf of particular viewpoints that have previously been inscribed in them [24].

Table 1. Core concepts of ANT (adopted from [23], p. 468)

ANT concepts	Description
Actor or actant	Both human beings and nonhuman actors such as technological artifacts, documents, objects, etc.
Actor-Network	Heterogeneous network of aligned interests, including people, organisations and technology
Enrolment & Translation	Creating a body of allies, human and nonhuman, through a process of translating their interests to be aligned with the actor-network
Delegates & Inscription	Delegates are actors who 'stand in for' particular viewpoints which have been inscribed in them, e.g., software as a frozen organisational discourse
Irreversibility	The degree to which it is subsequently impossible to go back to a point where alternative possibilities exist
Black-Box	A frozen network element, often with properties of irreversibility
Immutable Mobile	Network element with strong properties of irreversibility and effects which transcend time and place, e.g., software standards

There are no prescriptive recommendations for the use of ANT as a research methodology. The following except from Walsham [23] is perhaps the best illustration and justification for the rationale behind ANT as a methodology:

> [ANT] is both a theory and a methodology combined…[as] it not only provides theoretical concepts as ways of viewing elements in the real world, it also suggests that it is exactly these elements which need to be traced in empirical work (p. 469).

Walsham and Sahay [24] noted that the aim of ANT is to examine the motivations and actions of actors in heterogeneous networks of aligned interests, by following these actors (and the work they do) through the actor-network. Underwood suggests that by following the actors of interest in a network and describing what we see as the key to revealing association s they make up the social, political, technical and contextual situations [20]. As a research methodology, we have chosen to enact the ANT methodology in this way, in order to trace actors through actor-networks, describing emergent situations using ANT terminology in order to understand, describe and ultimately reveal a rich description of a strategic ISD process and its outcomes.

3 Research Method

In enacting ANT methodology, we conducted an interpretive case study of a strategic ISD project – including a field study and a historical reconstruction of the project since its inceptions. Interpretive case study research was selected because it allows for tracing the associations and the construction of meaning through the direct engagement between the researcher and the actors – both human actors who experienced first-hand the situations being investigated and nonhuman actors involved in these situations. Secondly, achieving a rich understanding of the complex nature of a strategic ISD project necessitates that the study is conducted within its natural setting [22]. The case study was partially historically reconstructed as the key phase of the project studied was completed before the research started and some important actors left the Company.

The case selection required a strategic ISD project with an appropriate level of risk and complexity such that a degree of richness in data could be assured [16]. The selected Company that we call Olympia is the Australian arm of a large international insurance company. The project was unique in that it was an industry-first e-commerce system that transacted the Company's business insurance product direct to their brokers over the web. It was also interesting that the outcomes of the project were considered an outstanding success in the marketplace, however internally it was resented and considered a failure for not delivering required functionality and for being over-budget and over-time.

The case selected was auspicious in that one of the authors had previously worked at the Company over a six-month period as a member of the project team. The subsequent field study followed the actors: developers, managers, users as well as various technologies, plans, and documents. Empirical data gathered include i) transcripts of eleven interviews with two Architects, two Application Developers, Test Team Leader, Data Migration Developer, Senior Business Analyst, Business Expert– Underwriting, Business Project Manager, Senior Information Systems Executive, and Business Expert–Brokers; ii) project documentation (including historical documents); and iii) researcher's notes after the interviews and informal conversations with former colleagues.

The first stage of data analysis involved reading through printed copies of interview transcripts, notes and documents, highlighting interesting texts and tentatively classifying them under broad categories or 'codes' (open-coding). By following the actors – developers, analysts, managers, project plans, technology platform, strategic IS, etc., and by tracing their association and actor-networks' formation the analysis expanded, necessi-

tating redefinition and (re)grouping of codes and sub-codes. Through an iterative process codes/sub-codes and related quotes were then arranged, on a 3x4m paper on a wall (dubbed the ANT wall) in a large office indicating various associations and actor-networks. Such a comprehensive visual representation of the findings enabled further exploration of the interplay between different human and nonhuman actors and dynamics of their associations within a bigger picture.

We approached theoretical interpretation by first identifying and making sense of key events and points in time throughout the project that for whatever reason were considered important to the actors and project outcomes. Through an iterative process of describing and examining the emergence of these events using ANT semiotics we traced the socio-technical associations, alignment of interests, inscription and translation, operating throughout the strategic ISD project.

4 The Case Company and its Industry Context

Olympia is (a pseudonym for) the Australian arm of a large multinational financial services institution, dealing primarily in general business and life insurance. In 2001, Olympia's General Insurance (GI) Business Division undertook to become the first insurance provider in Australia of web-based e-business services to their Broker Community (clients), selling their business insurance products online. Prior to the development of this Information System, named 'Olympia-Online', Olympia was not taken seriously, or seen as a major competitor in the Australian general insurance market. All e-business in the Australian Insurance Industry was conducted via 'BrokerLine', an outdated mainframe-based electronic platform, run by Telcom, an Australian telecommunications company. More so than any of their competitors, this platform was vital to Olympia since all its business is mediated through Brokers, and Olympia has no direct contact with individual customers in the general insurance domain.

In 2001 Telcom announced to the Insurance Industry that they were ceasing operation of the current e-business platform (BrokerLine) and all companies were required to move their business operations to 'Horizon', a new web-based platform. This situation is presented by an actor-network in Fig. 1 that shows the Telcom Company exercising influence on Australian insurance companies to transfer their business from BrokerLine over to Horizon and in doing so attempting alignment with the Broker community. Unlike Olympia, most insurance companies transacted their business both directly with individual business and via the brokers (indicated by

their reciprocal alignment with both). This is why Olympia was particularly vulnerable to the change of the Telcom platform.

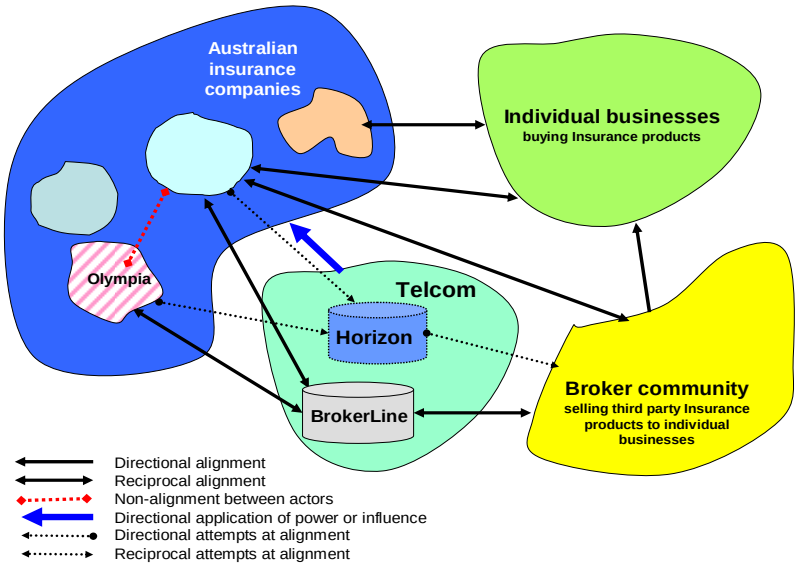

Fig. 1. An actor-network describing the situation in the Australian Insurance Industry early-mid 2001

Fearing the loss of all their business, and simultaneously recognising the opportunities a new web-based platform afforded, Olympia's GI Business Division and Strategy and Planning Division went about putting together a business case for the development of a new web-based e-business system, Olympia-Online. By inscribing Olympia's interest and its new strategy into the Business Plan for Olympia-Online development and by charging Information Services Department with the responsibility to develop a concrete solution (a new information system to interface with the Horizon's web-based platform) GI Business Division and Strategy and Planning Division succeeded to enrol Information Services Department into the new actor-network. This inscription seems to be strong enough to motivate Information Services Department to attempt alignment with Horizon. With a prospect of becoming the only channel through which Olympia would interact with the brokers in order to sell its insurance products, Olympia-Online development became a key strategic IS project in the Company.

5 The Story of Olympia-Online Development

Olympia-Online was a new type of information system in the Insurance Industry of a magnitude never experienced by Olympia before. Their Information Services Department did not have the necessary skills or resources to conduct the development in house. To combat this, Olympia attempted to enrol an actor with the capabilities to develop Olympia-Online and ensure Olympia's alignment with Horizon. Based on the scripts (imperatives) expressed in the business case documentation, two companies attempted to forge an alignment with Olympia (mediated through the Information Services Architect). Azteka was unsuccessful as they said they were not able to deliver the proposed system within Olympia's desired timeframe (by September 2001). Reflex Technologies was successful as it did promise delivery within the desired timeframe and also offered a fixed-price contract. Developers from Reflex Technologies however developed a prototype based on the Emperor technology – a proprietary rules engine of which they were the sole reseller in Australia – in a very short time period. The prototype played the key role in enrolling Reflex Technologies into the Olympia-Online development actor-network. As a non-human actor the prototype gave an impression that the Emperor was an appropriate technology upon which the new system could be built. The contract signed July 2001 marked the beginning of the Olympia-Online development project which lasted for 12 instead of planned 3 months. This was later on referred to as Phase 1. After a year in operation the development continued mid 2003 until April 2005 as Phase 2. We now describe the Olympia-Online development project as it evolved through the phases.

Phase 1 Olympia-Online design

Phase 1 development began with some initial requirements-gathering sessions, run by business analysts from Reflex Technologies:

> We ran some formal requirements gathering sessions, first of all more in terms of use case development, just running scenarios to try and understand functionally what the product was supposed to do. (Alan, a Business Analyst)

Once development was underway and Reflex Technologies' developers engaged fully with Olympia's Information Services staff several problems emerged. As the project evolved, Reflex Technologies' developers recognised the actual breadth and depth of the problem at hand. Olympia's internal Information Services staff gradually became aware that Emperor was not the right engine for Olympia-Online's purpose, and was as such

misaligned with Olympia-Online's initial objectives. In retrospect, the Senior Information Services Architect involved in commissioning Reflex Technologies noted that Reflex Technologies "didn't understand the problem at hand" and underestimated both its complexity, costs and the required development time. This was seen by the Information Services staff as the major reason for the seven months delay of the project.

The development of Olympia-Online emerged as a complex actor-network. It involved the integration between the existing Mainframe System, the new web-based application on Emperor, an interface with Horizon and PDF documentation development, which would be the customer's final output from the new system. The dynamics of this actor-network reflected the interactions among Reflex Technologies' developers completing the work that required Emperor, and Olympia Information Services staff responsible for all the integration between the Emperor component and the Mainframe resources. In addition, the interface development between the Olympia-Online and Horizon was being carried out by another third party, as was the development of PDF documentation.

That the work was eventually completed suggests that Olympia's interests were inscribed through a succession of translations into the Olympia-Online development actor-network. However the inscription was not strong enough to coordinate and channel the behaviour of actors so as to stabilize the actor-network. The Olympia-Online development actor-network involved eight actors, four of which were actor-networks themselves responsible for specific streams of development. Two other actors were overseeing this work – the Project Manager from Reflex Technologies and the Olympia Head Architect, who in their own words had "trouble ensuring the final system delivered the proposed system's original goals". Although they were officially in charge of Olympia-Online development their association with other actors was not strong enough to 'make others do things' ([9] p. 107) and deliver the desired functionality.

Furthermore, GI Business Division, as a powerful actor, put pressure on Information Services. As the original deadline for Phase 1 completion past GI Business Division was anxious to announce to the brokers that the new system is ready for use. They promised that full functionality will be available by mid 2002, which upset Information Services personnel:

> [GI Business Division] shouldn't have gone out and promised that because there's no way in hell we can do it. We just had hundreds of defects outstanding, large parts of functionality not working… At the end of the day they convinced us, everybody put in a huge amount of effort and we sort of got it working with one or two brokers, full functionality, ah, I think somewhere in July [2002]. (George, an Information Services Architect)

However, despite 7 months delay, GI Business Division considered the implementation of Phase 1 Olympia-Online a success. This is based on the positive feedback from the brokers. The success was primarily due to Olympia recognising the power and value in aligning the Company with Telcom and the new Horizon platform. This alignment, combined with Olympia-Online's novelty value, which in turn was associated with being first-to-market with a web-based business insurance product, ensured the new system's success from a market perspective.

During the implementation and operation of Olympia-Online system Information Services staff experienced its poor technical quality, slow performance, frequent crashes and numerous defects. Its design was not modular and hence the system lacked the ability to be scaled to Olympia's future needs. As a result Information Services staff had huge difficulties in maintaining Olympia-Online. They believed that Olympia-Online failures were caused primarily by the involvement of inappropriate actors – Reflex Technologies and Emperor. Emperor was originally designed for a different purpose and was not able to efficiently translate business rules into the rule engine.

However, Olympia's GI Business Division was unaware of the full extent of the system's technical instability, and thought the Olympia-Online system was an unqualified success. Based on this perceived success, GI Business Division, in discussions with Reflex Technologies, made the decision to purchase $1 million worth of Emperor software licensing such that the existing system could be rebuilt upon and more insurance products could be developed in the future. As Information Services did not enrol GI Business Division into the development actor-network, they were left out of this decision. GI Business Division, on the other hand, relied on their networks with brokers and Reflex Technologies. By purchasing the licence for Emperor they strengthened the actor-network with the Reflex Technologies and – perhaps inadvertently – translated their interests into Olympia-Online development actor-network. That Information Services, the only department that had the technical understanding and expertise, were neither involved nor consulted in this decision, had further implications for Olympia-Online re-development.

When the original Olympia-Online system became so unstable that its use could no longer be sustained, GI Business Division ultimately decided to redevelop Olympia-Online. However, since GI Business Division had already spent $1 million on licensing, redevelopment was planned again based on Emperor despite Information Services objections. This was then called Olympia-Online 'Phase 2' beginning mid 2003 and finishing in April 2005 when the system went alive.

Phase 2 Olympia-Online design

GI Business Division emphasised that their major goal of Phase 2 was to bring Olympia-Online development and knowledge in house, since it was key to Olympia's overall strategy and they wanted to prevent tacit knowledge and expertise from escaping the confines of the Company. This, goal, however, was not achievable since Olympia was reliant on Reflex Technologies' expertise during system development and design, as they were the only knowledge providers for Emperor in the market. Essentially, Emperor had become a delegate for Reflex Technologies' interests, and through the purchase of the Emperor license, Olympia had effectively enrolled itself in Reflex Technologies' actor-network, translating and aligning its own interests with those of the third party provider, as opposed to the other way around.

Phase 2 started with establishment of two new roles: the Business Project Manager responsible for ensuring internal business functionality of Olympia-Online and the IS Project Manager responsible for project completion on time and within budget. The third important actor was the Broker Business Experts (from GI) who presented the Broker Community's views. The Broker Business Expert managed to wield considerable influence on Olympia-Online development by translating the project objectives to be aligned with his own. This influence ensured the Phase 2 system was not implemented until a sufficient level of Broker Community functionality and quality had been delivered. He also made sure that the new system would be superior to both the existing system and other web-based products that competitors had recently developed in an attempt to attain parity with Olympia-Online.

This Broker Business Expert's high level of involvement resulted in the inscription of the Broker Community's interests in the new system, a strong alignment between the system and the Broker Community, and Olympia-Online's continued market success. This success in the market, however, is once again contrasted with internal failures.

The Business Project Manager appeared to be rather aloof and didn't engage in system development. As a result business requirements, including internally needed administrative functionality such as management and operational reporting, were not included in the Phase 2 Olympia-Online design. This means that GI's objectives were not inscribed in the new system.

Furthermore, the IS Project Manager's focus on time-line and budget control led to Olympia-Online design that was non-scaleable. Such a design would not enable adding easily new insurance products in the future. From this perspective the GI Business Division's interests were not

aligned with or enrolled in the new Phase 2 development actor-network. This outcome is particularly disappointing for GI representatives, as they were promised the delivery of such functionality. A Senior Manager from within the GI Business Division expresses this frustration:

> [Phase 2] should have been *it*. So, well, you spend a considerable amount of money on Phase 1, you get to redo it in Phase 2 and it's disappointing when you hear you might have to do it again in Phase 3, to get what you actually thought you'd be getting in Phase 2.

This absence of core internal functionality has distanced the GI Business Division even further from the Olympia-Online development actor-network. Because they didn't see their interests inscribed they disaligned themselves from this actor-network. This might have long-term consequences for Olympia as further development of Olympia-Online was not planned while their competitors in the industry were building comparative systems.

6 Discussion and Conclusion

The ANT analysis of the strategic IS Olympia-Online development project reveals an open-ended structure of heterogeneous actor-networks which provide a rich description of its socio-technical nature. Such a description enables unpacking of the socio-technical interplay between the project actors, both human and non-human, which in turn explains how both success and failure of this strategic IS development were constructed. The key to success of Olympia-Online development was the ability of Information Services staff to align diverse interests of Olympia, the Broker Community and the new Telcom system Horizon and inscribe these interests into the Olympia-Online development actor-network. Especially by translating brokers' needs and interests into the design of Olympia-Online, or in other words, by inscribing these interests in 'durable materials' (Law, 1992), Olympia-Online implementation and subsequent use strengthened and stabilized this actor-network.

On the other hand, persistent technical problems faced during the development and the failure of Olympia-Online to deliver internal business functionality can be seen as resulting primarily from GI Business Division's simultaneous weak alignment with their own department of Information Services and strong alignment with Reflex Technology. Firstly, by enrolling Reflex Technology into the Phase 1 development actor-network GI Business Division enabled them to inscribe their interests through a succession of translations into Olympia-Online via their proprietary tech-

nology Emperor. Secondly, such inscription was highly strengthened by GI Business Division's decision to purchase the Emperor software licence. Alternatively, GI Business Division could have followed Information Services' recommendations not to continue further Olympia-Online development based on the Emperor engine. The concept of irreversibility of an aligned actor-network explains the impact of such a decision (Callon, 1991). As we have seen, purchasing of the Emperor software licence shaped and determined subsequent translations in the Olympia-Online development actor-network and caused significant technical problems and perceptions of the system technical failure with long-term implications. This decision produced irreversibility of this actor-network as it became "impossible to go back to a point where that translation was only one amongst others" (Hanseth and Monteiro, 1998, p. 100). The longer Olympia-Online development continued on Emperor technological platform the degree of irreversibility of its actor-network became higher. As a result technical problems persisted and complexity expanded taking more time and resources. While increasingly misaligned with Olympia-Online development actor-network GI Business Division perceived the project as failure from a project management perspective (over time and budget) and for not delivering the desired internal functionality.

By following the actors – human and nonhuman – and by tracing their associations as they created actor-networks of the strategic IS development project we described simultaneous making of its success and failure. Through a historical reconstruction of this project, we traced the emergence of heterogeneous actor-networks and revealed how and why some actors succeeded in translating their interests into the IS designs while others didn't. These processes of actor enrolments, translations and inscriptions of particular interests led to instability of some heterogeneous actor-networks and strengthening others, thereby producing the perceptions of failure and success.

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