Towards a theoretical framework for collaborative electronic commerce projects involving small and medium-sized enterprises

Info.T.EC Solutions Pty Ltd, Sydney, Australia

&

Roger Clarke
Principal, Xamax Consultancy Pty Ltd, Canberra
Visiting Fellow, Department of Computer Science, Australian National University

Version of 11 April 1996

Published in Proc. 9th Int'l Conf. EDI-IOS, Bled, Slovenia, 10-12 June 1996

© Info.T.EC Solutions Pty Ltd and Xamax Consultancy Pty Ltd, 1996

This document is at http://www.anu.edu.au/people/Roger.Clarke/EC/CamCla960612.html

Abstract

Many important electronic commerce projects involve collaboration among organisations which involve significant numbers of small and medium-sized enterprises (SMEs). The existing literature is sparse in relation to the conduct and management of collaborative projects generally, but especially so in relation to SMEs.

This paper reports the findings of an exploratory study. This involved a comprehensive literature search, the examination of previously reported case studies, and the conduct of two new case studies, complemented by the authors' project management expertise in this area.

It is vital and urgent that the deficiencies of existing theory in relation to collaborative EC projects involving SMEs be addressed. On the basis of the literature and the available empirical evidence, guidelines are suggested which need to be appreciated by participants in such projects, and reflected in a specific body of theory.

Contents

1. Background
2. Motivation
3. Research Method and Structure of the Paper
4. Promising Reference Theories
5. Evidence from the Field
6. Inferences from the Empirical Studies
7. Conclusions
References

1. Background

Electronic commerce (EC) technologies are widely considered to have enormous potential to improve the effectiveness, efficiency and evolutionary capabilities of both individual organisations and whole industry sectors. In many cases, however, the rate at which adoption has proceeded has been disappointing, and the payback to participants much slower than originally anticipated (e.g. Clarke, Campbell, et al. 1992; Swatman & Swatman, 1992).

There are many circumstances in which EC technologies are implemented, and the reasons for the slower than hoped-for adoption rates may differ significantly among them. Different organisational arrangements and project methods may be appropriate to these varying circumstances. Some of the dimensions along which such differences may occur include:

- the nature of the participating organisations. Schemes which involve only large organisations may evidence different behaviour from those which involve only small and medium-sized enterprises (SMEs), a mixture of large organisations and SMEs, or a mixture of organisations, unincorporated enterprises and individual consumers (a class of system referred to in Clarke, 1992, as 'extra-organisational systems');
- the cardinality of the linkages. Significant differences may arise depending on whether the relationships are one-to-one (the narrow interpretation of the term 'inter'-organisational systems), one-to-many (e.g. so-called 'hub-and-spoke' and mediated multi-
The work underlying the paper comprised the following elements:

- the degree of competitive versus collaborative orientation. Those relationships which are established and maintained as a means of gaining advantages over other organisations may prove to be fundamentally different to those in which a group of organisations seek mutual benefits;
- the longevity of the associations among the participating organisations. The patterns which arise in respect of business partnerships and alliances, and other kinds of relatively closed user groups, may vary significantly from those which are found in the case of casual relationships among participants in such contexts as those addressed by Open-EDI; and
- the extent to which the project is revolutionary versus evolutionary in nature. Schemes which largely involve the automation or marginal rationalisation of existing structures and processes may involve different patterns from those embodying business system re-design and re-engineering.

The focus of this paper is on a very specific sub-set of EC schemes, viz. those:

- in which most participants are SMEs. (For the purposes of this research, the Australian Bureau of Statistics definition of an SME was used, whereby a 'small business' is one employing fewer than 20 full-time equivalent employees for non-manufacturing industries and fewer than 100 for manufacturing industries; and a medium-sized enterprise is one employing fewer than 500);
- which are relatively open, and which are typically facilitated by an industry association, and/or mediated by a network services provider;
- which are primarily collaborative. By 'collaborative' is meant projects spanning a group of independent organisations that have made a commitment (whether formally or informally) to work together to achieve mutually agreed outcomes;
- in which participants anticipate varying degrees of longevity in the associations from once-off, via occasional, to consistent and long-term; and
- in which a moderate degree of rationalisation or re-engineering is intrinsic.

2. Motivation

SMEs are widely recognised as being very important in many economies, because of their flexibility and their ability to quickly implement innovations. Moreover, in some countries, such as Australia, they are responsible for a large proportion of economic activity.

On the other hand, there are a number of factors which militate against early adoption of EC technologies by SMEs (see, for example, Clarke, Campbell, et al. 1992; Clarke 1994a, 1994b; Webster 1995; and Fisher, 1995). In particular:

- in comparison to large organisations, SMEs are generally less formal and 'scientific' in their organisational and managerial practices;
- many SMEs have less sophisticated IT capabilities and expertise than larger companies;
- SMEs tend to have a shorter-term focus, on medium-term survival rather than on long-term profit;
- SMEs commonly have fewer resources available, both financial and intellectual (and especially managerial), to invest in major initiatives; and are dubious about the benefits of committing those resources to the painstaking planning, data gathering, reporting and analysis that larger organisations would consider essential to such undertakings; and
- there is often a degree of cynicism among SME managers and owners as to who the beneficiaries of new technologies will be, and a tendency to await meaningful pressure from a major client as the necessary stimulus for implementation.

As a result, even where senior management commitment exists, the mobilisation of financial and intellectual resources that is essential to the success of innovative projects, is commonly lacking.

This work has been motivated by the need to establish new forms of systems analysis and design, and of project management, attuned to the specific needs of SMEs considering implementing EC technologies in open, collaborative contexts.

3. Research Method and Structure of the Paper

Considerable difficulties have been encountered in undertaking research in this area. The information systems literature relating to systems analysis and design and project management is almost exclusively oriented towards intra-organisational systems. Moreover, to the extent that supra-organisational systems have been focused upon, the discussion has almost exclusively related to large organisations in relatively closed settings, and with competitive overtones (e.g. Sharfman et al. 1991, Hagedoorn & Schakenraad, 1992; Hagedoorn, 1993; Kambil & Short 1994). As a result, guidance for the class of systems which is the focus of this paper is very poorly developed.

In addition to the paucity of theory, there is a shortage of prior empirical research in the area. The segment is perceived by the authors of this paper to be sufficiently important, sufficiently different, and sufficiently little-researched, that it demands attention, even though the treatment is, of necessity, preliminary and superficial.

The work underlying the paper comprised the following elements:

- a study of the existing information systems literature, and of material in reference disciplines, in search of a theoretical basis for the research;
- a search of the information systems and adjacent literatures for case studies that might provide insights into the problem-domain;
changes the way a community or industry carries out its activities (e.g. the implementation of EDI in the international transport

Collaborative technology projects may affect only the participants and their stakeholders (e.g. a closed alliance of business partners

4.2 The Theory of Strategic Bridging

"Bridging organisations span the social gaps among organisations and constituencies to enable co-ordinated action ... They are essential to the emergence of functional networks that span or link organisations into value-added chains ... both of which are hailed as alternatives to large hierarchies and as keys to social and technological innovation ... Bridging organisations must find mechanisms to integrate organisations that may be widely disparate ... and the more focused the objective of the specific operation the more difficult the bridging problem. Its members must understand the diverse perspectives they are trying to integrate. If factional contentions arise internally, it will weaken the bridging organisation's ability to succeed" (Westley and Vredenburg, 1991, p.67).

Collaborative technology projects may affect only the participants and their stakeholders (e.g. a closed alliance of business partners designing and implementing new technology) or they may be intended to involve the design and implementation of a technology which changes the way a community or industry carries out its activities (e.g. the implementation of EDI in the international transport
The use of bridging organisations is particularly vital in establishing and maintaining collaborative projects which impact an entire industry or community.

4.3 Game Theory

Collaborative projects can be defined as "voluntary inter-firm co-operative agreements, often characterised by inherent instability arising from uncertainty regarding a partner's future behaviour and the absence of a higher authority to ensure compliance" (Parkhe, 1993, p794).

Application of game theory led that author to the conclusion that formal means like the establishment of "structured mechanisms that provide real-time information and accurate feedback regarding each other's actions ..." were required to ensure inter-firm co-operation (p.795).

4.4 Web Theory

Web models "make explicit connections between a focal technology and the social, historical and political contexts in which it is developed and used" (Kling, 1987, pp.308). They postulate that:

- computer systems are "best conceptualised as an ensemble of equipment, applications and techniques with identifiable information processing capabilities ... and are also social objects which may be highly charged with meaning";
- the organisation of infrastructure, human judgements and essential resources required by systems makes them into "a form of social organisation" and therefore "not necessarily neutral";
- "computer-using organisations rarely have complete administrative or political control over all their infrastructure" and must compete for resources;
- "information processing leverage" depends on the effectiveness of the interaction with other computing resources and social or organisational arrangements; and
- "political interests, structural constraints and participants' definitions of their situations often influence organisational action" so that "an 'organisational process' model or 'negotiated order' model of social activities" can be "used to analyse social relations" (Kling, 1987, pp.308, 311-2).

4.5 Towards an Integrated Theory of Collaboration

Gray & Wood concluded that theories related to "access to resources, efficient use of resources and collective rules for governing resource use" may fit together to form the basis of a theory of collaboration. They argued that "Strategic management theory (how do partners regulate their behaviours so that collective gains are achieved?), ... micro-economic theory (how can collectivities overcome impediments to efficiencies in their transactions?), political theory (who has access to power and resources, and who does and does not benefit from the distribution of power and resources?), and resource dependency theory (what are the circumstances in which stakeholders will adopt collaborative alliances?) are the most relevant" (1991a, p.7; 1991b, p.156).

The next section presents empirical data about the domain, and the subsequent section seeks to draw on the theories in order to better understand the data and to extract some general principles as guidance for practitioners.

5. Evidence from the Field

There is a limited amount of carefully gathered and analysed evidence in the domain addressed by this paper. This section provides a summary of several cases previously reported in the literature, supplemented by material gathered as part of this study.

5.1 Previously Reported Case Studies

A limited number of case studies relevant to the domain were unearthed, although care is needed in applying some of their findings to SMEs. These included projects in financial services (Goldberg & Sifonis, 1994), in rail and customs (Ready, 1994), and in business broking (Rosenfeld, 1994); and clusters of secondary-source cases (Clarke & Staunton, 1989; Gray & Wood, 1991a, 1991b; Starr, 1991; and Sellers, 1994).

Clarke & Staunton (1989) concluded that "clan relationships of trust and honour" (p.170) appeared to be the most relevant mechanism for co-ordinating relationships. "Confidence and mutual trust that participants will abide by the intention of agreements is very important" (p.161). "A high level of uncertainty exists" (p.162), resulting in instability in achieving targets. Changes in organisational priorities and/or personnel may lead to the withdrawal of a participant from the project. Withdrawal or a change of priorities of a key partner can jeopardise a collaborative project. Appropriate timing of the project for participants is important to ensure continuing motivation and commitment. "The network mechanism used varies with culture" (p.172). The case studies showed that the form of "contract" used depends on the organisational culture of the participants (which may be a subset of the nationality of the owner of the enterprise), but it also depended on the nature of the commitment and the level of risk.
The outcomes of these interviews are reported in Cameron (1996), and key elements are incorporated into the following section.

Transaction volumes were increasing.

Trade and transport industry.

Is now managed by a community facilitative organisation, and participation in the implementation projects is open to all members of the

Arrangements by a second.

The transport project came to a halt after 18 months, due to the withdrawal of one key participant and a change of domestic transport

Software packages were developed separately by software houses that provide products and services to the book industry.

Both groups saw EDI as an opportunity and stimulus for redesigning business systems.

Representatives of their industry bodies and the results intended to be shared among booksellers and book wholesalers and publishers.

The objectives of both the transport and the book trade projects were:

- Improve business efficiency;
- Reduce costs and delays associated with the movement of goods;
- Reduce delays in sending and receiving data; and
- Reduce costs of preparing and processing operational and commercial documentation.

The transport project was collaborative among six trading partners involved in a maritime export chain, with the intention that each

Partner achieve competitive advantage over other companies in their particular industry segments. The book trade project, on the other

Hand, was collaborative across the entire industry segment, with participating organisations in the book trade project being appointed

Representatives of their industry bodies and the results intended to be shared among booksellers and book wholesalers and publishers.

Both groups saw EDI as an opportunity and stimulus for redesigning business systems. Participants in the book trade project were

Involved in the development of EDI messaging standards, whereas the message guidelines were already available to the transport

Project. The transport project participants were involved in the development of a PC-based software package, whereas the book trade

Software packages were developed separately by software houses that provide products and services to the book industry. Both projects

Included a Value Added Network provider (VAN) that assisted trading partners to implement EDI.

The transport project came to a halt after 18 months, due to the withdrawal of one key participant and a change of domestic transport

Arrangements by a second. The software had been developed, but not fully tested or trialled. The implementation of EDI in this industry

Is now managed by a community facilitative organisation, and participation in the implementation projects is open to all members of the

Trade and transport industry. The book trade project continues, and in late 1995, EDI messages were being used operationally and

Transaction volumes were increasing.

The outcomes of these interviews are reported in Cameron (1996), and key elements are incorporated into the following section.

5.2 The Australian Case Studies

Because of the paucity of published empirical evidence in the domain, and in order to ensure familiarity with the subject-matter through
direct fieldwork, two Australian projects involving SMEs were selected for study. In order to ensure a degree of variability in the
experiences from the case studies, it was considered desirable that the projects be from two distinct industries, involve two or more
different kinds of EC technology, involve system re-design and business re-engineering issues, and have differing outcomes. It was also
highly desirable that the respondents have been active participants in the projects, and have gained considerable experience in the
area.

Because of the maturity of electronic data interchange (EDI), and the relative newness of many other kinds of EC technology, it proved
necessary to examine two EDI projects. This is not unreasonable, however, because "EDI requires a boundary spanning effort"
(Emmelhainz, 1990, p.127), and involves "boundary busting" (Kinni, 1994, p.72). The other selection criteria were satisfied: one project
was in the transportation industry and the other in the book trade; both involved significant changes to existing practices; and the
transport industry project failed, whereas the book industry project is still in progress.

Existing theory, together with the findings from the empirical work, had given rise to a long list of quotations and assumptions about
collaborative EC projects involving SMEs. A comprehensive questionnaire was developed to provide structure to the interviews. It
comprised 81 open-ended and 55 multiple-choice questions. Responses to the open-ended questions were coded and compared with
the answers to multiple-choice questions.

For the book trade project, interviews and document collection activities were undertaken with four participants: one small and one
medium-sized retailer, one medium-sized wholesaler, and one software provider. In relation to the transport industry project, three
organisations were visited: a small freight forwarder, a medium-sized stevedore and the community facilitator.

The study was retrospective, with interviews conducted during the middle two quarters of 1995, and relating back to the periods 1991-95
in the case of the book industry project, and 1991-93 in the case of the transport project. The time-lapse problem, acute in the case of
the book industry case, was addressed by correlating minutes of meetings against interviewees' memories.

The objectives of both the transport and the book trade projects were:

- Improve business efficiency;
- Reduce costs and delays associated with the movement of goods;
- Reduce delays in sending and receiving data; and
- Reduce costs of preparing and processing operational and commercial documentation.

The transport project was collaborative among six trading partners involved in a maritime export chain, with the intention that each
partner achieve competitive advantage over other companies in their particular industry segments. The book trade project, on the other
hand, was collaborative across the entire industry segment, with participating organisations in the book trade project being appointed
representatives of their industry bodies and the results intended to be shared among booksellers and book wholesalers and publishers.

Both groups saw EDI as an opportunity and stimulus for redesigning business systems. Participants in the book trade project were
involved in the development of EDI messaging standards, whereas the message guidelines were already available to the transport
project. The transport project participants were involved in the development of a PC-based software package, whereas the book trade
software packages were developed separately by software houses that provide products and services to the book industry. Both projects
included a Value Added Network provider (VAN) that assisted trading partners to implement EDI.

The transport project came to a halt after 18 months, due to the withdrawal of one key participant and a change of domestic transport
arrangements by a second. The software had been developed, but not fully tested or trialled. The implementation of EDI in this industry
is now managed by a community facilitative organisation, and participation in the implementation projects is open to all members of the
trade and transport industry. The book trade project continues, and in late 1995, EDI messages were being used operationally and
transaction volumes were increasing.

The outcomes of these interviews are reported in Cameron (1996), and key elements are incorporated into the following section.
6. Inferences from the Empirical Studies

This section seeks to draw together the elements of theory and the evidence from various sources, in order to lead towards a framework for systems methods and project management suitable for collaborative EC schemes involving SMEs.

The information is expressed below as a tentative set of guidelines which can be used to assist in the establishment of these kinds of schemes.

Exhibit 1: Guidelines for Collaborative EC Projects Involving SMEs

- Mutuality
  - 'Win-Win' Profile
  - Participative Ethos
  - Risk Management
- Learning and Change Orientation
- Confidence
  - Visibility of Progress
  - Stability and Staying Power
  - Trust rather than Contracts
- Cohesion
  - Commonality of Culture
  - Investment in Communications
  - Co-ordinative Mechanisms

6.1 'Win-Win' Profile

Parkhe (1994) noted that the "the self-interest of each party can lead to actions that are individually rational yet produce a collaboratively sub-optimal outcome" (p.794). For a collaborative project to succeed, all partners must benefit from it, and perceive themselves as benefiting from it: unless significant and sustained market power is available and exercised, unbalanced alliances are highly likely to fail. Where the benefits are likely to fall unevenly, incentives are necessary, in order that participants will be enticed to sublimate their self-interest in that of the group.

To Australian respondents, an important pre-condition was a clear understanding by each enterprise of its own business needs and objectives, and of its environment, including a knowledge of client needs and awareness of competitors’ activities. This knowledge was needed so that the participants would be, and would remain, convinced that the benefits of collaboration outweighed the disadvantages and costs.

Starr (1991) argues, moreover, that flexibility in the arrangements is likely to be needed, to ensure that mutual interests continue to be satisfied, even in the face of changing conditions. Only in this way can each participant rely on each of the others to maintain their commitment.

6.2 Participative Ethos

Sellers (1994) found that wide consultation among participants and within partner organisations was essential for the success of projects. Starr (1991) emphasised the need for partners to share decision making; Roberts & Bradley (1991) referred to "shared purpose"; and Pasquero (1991) stressed "shared responsibility". Kambil & Short (1994) recommended mechanisms that provide 'real-time' information and feedback regarding each others actions, as a means of sustaining the feeling of mutuality.

Consistently with these arguments, Australian respondents indicated the importance of equal bargaining power, consultation and power sharing.

6.3 Risk Management

Starr (1991) suggested that capital and resource limitations necessitated limited project scope, in order to contain the level of risk. The need to keep technological and project risk within bounds, and to share it fairly among participants, was particularly apparent in the Australian book trade project.

6.4 Learning and Change Orientation

Starr (1991) reported that it is important that the strengths and weakness of each partner be understood. Preparedness to learn is a prerequisite, and actual learning, by all participants, must occur. Organisational and individual learning was an important component of the Australian case studies. Trial-and-error learning appears to be a necessary feature of most collaborative projects involving SMEs because many lack expertise in emergent technologies and their applications. Indeed, gaining knowledge and experience may be an important reason for their participation.
Clarke and Staunton (1989) found that whenever enterprises from different industries, and representatives with different skills and experience, are brought together to achieve a common objective, understanding and adaptation are dependent on willing and open transfer of information, of a technical, a business, an organisational and a competitive nature. Learning enhances flexibility and willingness to compromise to find a mutually beneficial solution. The Australian case studies also identified the need for the project management processes used to embody opportunities for mutual learning.

Starr (1991) found that each partner must be prepared to change long practised conventions if co-operation is to be successful. Successful negotiation to achieve the requirements of all project members was very important to Australian respondents.

6.5 Visibility of Progress

Direction and impetus need to be achieved and maintained. Both the Australian projects were hindered by the lack of concrete business achievement within "acceptable time frames".

Involvement of senior representatives in the establishment of a clear, shared and agreed understanding of the project, its objectives, definition and design is essential to provide the direction. Maintaining the impetus and direction requires chief executive support, personal agreements reached among participating organisations, and relationships among individuals involved in the project. Project planning and management are also required, in order to deliver progressive confirmation of progress towards the agreed goals.

The following factors, identified in reported case studies as characteristics of successful project management methods (Sellers, 1994; and Starr, 1991), were also considered by Australian respondents to be of significance:

- clearly defined project objectives;
- breakdown of the work into manageable tasks;
- an agreed project plan, incorporating realistic targets and clear deliverables;
- change paced to occur in small increments so it is easier to absorb and accept;
- project team autonomy to permit them to reach decisions quickly within their domains of expertise;
- utilisation of open systems and as much packaged or industry-standard technology as possible; and
- tracking of progress against the project plan.

6.6 Stability and Staying Power

The success of collaborative projects is highly dependent on stability within participating organisations, combined with continued commitment to the project. Changes in participants' corporate strategies and priorities, structures, financial well-being and computer systems impact on their capacity to perform their obligations.

Consistent with the predicted strengths and weaknesses of networks in comparison with hierarchies, Clarke & Staunton (1989) found that "a high level of uncertainty exists" in inter-firm networks (p.162) and this results in instability in achieving targets. According to Clarke & Staunton and Starr (1991), the appropriate timing of the project for participants is also important in ensuring continuing motivation and commitment.

In the Australian case studies, one member from each project dropped out due to being taken over by another corporation. This was a critical factor in the failure of the transport project.

6.7 Trust Rather Than Contracts

Goldberg & Sifonis (1994, p.170) reported "clan relationships of trust and honour" to be very important, and Clarke & Staunton (1989) wrote about "confidence and mutual trust that participants will abide by the intention of agreements" (p.161). Kling (1986) talked of a techno-social combination, and suggested the use of 'organisational process' or negotiated order' models.

The forms of agreement used appear to depend on the organisational culture of the participants (which may be a function of many factors, including the nationality of the owner of the enterprise), but also on the nature of the commitment, and the level of risk. Goldberg and Sifonis (1994) reported that representatives of an insurance and financial services organisation and a services provider "shook hands to seal the alliance" - a decision based on mutual trust, and support by one another's organisations' cultures. The chief executive fully supported the alliance and made it clear that management "would not put up with roadblocks to new developments", and that innovation would be rewarded (p.22).

In the Australian case studies:

- there was a reluctance by project participants to formalise arrangements by signing contracts relating to their involvement in the project. Instead, communication and trust among the organisations and individuals involved substituted for formal agreements (They did however, as a group and/or as individual organisations, enter into formal agreements with suppliers for the provision of goods and services);
- formal, bureaucratic structures and processes to co-ordinate activities among enterprises were not considered viable. Meetings of the project committees, supplemented by informal communication, were generally satisfactory unless a serious breakdown in relationship occurred. In this case, informal intervention, and mediation and negotiation processes, were required;
there was resistance to the use of hierarchical or bureaucratic means to impose rules, timetables and activities; and
the incorporation of penalties or formal disincentives for non-performance was avoided, and peer pressure preferred.

6.8 Commonality of Culture

Culture appears to play an important role in assisting communication and co-operation. When organisations, or the individuals representing them, have diverse, or worse still incompatible, cultures, misunderstandings occur more readily. This was evident in the Australian transport project.

6.9 Investment in Communications

"The information channel which develops ... will become significant" during a period of uncertainty or when issues require resolution (Clarke & Staunton, 1989, p.164).

Effective communication among participants and their organisations is essential; but time is required to establish rapport. When conflict or uncertainty occurs, the investment made in communication is repaid, or under-investment punished. The benefits of high-quality informal communications were clearly demonstrated in the Australian book trade project, when a decision was required relating to the role of the VAN, and increased financial risk for participants.

6.10 Co-ordinative Mechanisms

In addition to general communications in relation to a project, a co-ordinative framework is needed, in order to provide a basis for communications about project progress, and the expectations by participants of one another. Collaborative projects introduce new, diverse relationships that must be managed, and managed differently from a mere intra-organisational project.

Web Theory (Kling, 1987) provides a useful discussion frame for understanding group cohesion in collaborative projects, but falls short of providing the guidance needed in practice. Olle, Hagelstein, et al. (1988, p.2) identify the roles associated with project management. Sibley (1986) proposes that selection of an appropriate approach to project management needs to be driven by the particular technology involved, in combination with the nature of the project, and the culture and style of the participants.

Strategic Bridging Theory (Westley & Vredenburg, 1991) proved to be very relevant to the Australian case studies, because 'bridging organisations' (intermediaries, specifically an industry association and a community facilitative organisation) played central roles, providing a forum for consultation with all industry members and a focal point for advice and support, and acting as a conciliator or arbitrator when necessary.

The SMEs in the Australian projects did not favour complex, formal methods of project management. Simplicity and familiarity of the method to the participants was important. Collaborative activities were primarily co-ordinated by the use of minuted meetings and reports. Some organisations reported applying conventional project management methods in-house, as a complement to the overall project management mechanisms.

To apply to supra-organisational projects the same methods as are conventional with internal projects is unsatisfactory, and may even be inimical to success, because:

- different organisations adopt many different approaches to internal IT projects, and hence there is a great deal of scope for mismatch between the approaches of the various participants;
- among SMEs, internal project management is often informal and poorly documented, which further exacerbates the co-ordination challenges;
- organisations are very hesitant to accept formal reporting lines to an overall project manager external and super-ordinate to them; and
- no one person, or even organisation, has formal authority with which to enforce compliance with specifications or deadlines.

Appropriate project management structures and processes for collaborative EC projects involving SMEs may need to be modelled on the roles of facilitators and moderators in voluntary contexts, rather than on conventional project managers.

7. Conclusions

Theories relating to IT projects carried out within a single organisation, where formal power structures apply, are inadequate for projects comprising independent enterprises. Collaborative EC projects involving SMEs require a new theoretical framework, in which interpersonal and inter-organisational relationships, trust and communication replace formal power and authority structures.

A collaborative-project theoretical framework also needs to take into account the voluntary status of membership and the need to ensure each participating organisation and their representatives benefit from continued involvement and commitment. Group dynamics and cohesion must be maintained to ensure successful completion of the collaborative project for each and every participant.

Decisions, schedules and specifications cannot be imposed on participants in collaborative projects. Shared decision-making,
consultation and negotiation need to be incorporated into project management processes. The guidelines proposed in the preceding section provide pointers in the direction of the desired framework. One of the most critical elements appears to be measures to establish and maintain project group cohesiveness. An organisation will continue to contribute to a collaborative project when its leaders believe that the economic and business objectives of the enterprise will be achieved, and the representatives of the participating organisations believe that their personal and professional goals will be enhanced by their contributions to the project. Group cohesiveness therefore depends on each participating organisation and its representatives believing that they can influence the project activities and outcome and that they will benefit from involvement. Socio-political and micro-economic models of group and organisational behaviour are relevant to the cohesiveness of collaborative projects.

In addition, the project management approach must be appropriate to the technology, objectives, environment and characteristics of the particular project. Because the roles and activities are shared among independent organisations that are participating voluntarily in a collaborative activity from which they can withdraw with limited harm to themselves, the management processes used in collaborative projects must emphasise participation, consultation, negotiation, co-ordination and facilitation.

The authors are currently undertaking further work in this important area. The Australian international trade and transportation community comprises large numbers of SMEs, in a number of distinct industry segments and value-chains. The community's facilitative organisation, Tradegate Australia, which is based in Sydney, is conducting the Electra Program, comprising three projects designed to stimulate the use of EDI in the maritime export chain (EXTEDI - Cameron & Jeacle, 1995), the maritime import chain (EDIMI - Assenza & Walsh, 1995) and the air import/export industry (AIREDI - McKittrick, 1995). A related project, DOMEDI, addressing the domestic transport industry, is being undertaken by the industry association, Electronic Commerce Australia, based in Melbourne.

The principal author has managed the EXTEDI project since its inception in 1994. In addition to her own experiences, she is holding discussions with the project managers of the EDIMI, AIREDI and DOMEDI projects, and with selected participants in the projects, with a view to further refining the questionnaire, and undertaking additional case studies.

Other areas in which additional work is urgently needed include:

- **application of the survey instrument to additional collaborative EC projects involving SMEs** including project participants, services providers, and project managers and facilitators. It is particularly important that projects be targeted which involve technologies other than EDI. Inter-industry and inter-country comparisons may also prove informative;
- **development and testing of a theoretical framework** which has at least explanatory and preferably predictive power, rather than merely descriptive usefulness; and
- **development and dissemination of guidelines** for SMEs, for industry associations and services providers, and for policymakers.

It is particularly urgent that theoreticians provide assistance to practitioners in relation to the specific question of project structures and processes. Attention is needed to the characteristics of two quite different approaches:

- **independent project teams** within each participating organisation, combined with co-ordination mechanisms to bridge the gulf between them; and
- **a single joint team**, comprising both employees seconded from participating organisations, and outside expertise, together with mechanisms to ensure ongoing influence by the participating organisations over the team’s work.

**Acknowledgements**

The assistance of participants in the Australian case studies is gratefully acknowledged.

**References**


Explaining Institutional Work by State-Owned Enterprises: A Theoretical Framework. Supply Chain Management and Operations. Victor Arshavskiy Yaw Nyarko. Heitor Pellegrina. BEROC, Belarus New York University, United Arab Emirates New York University Abu Dhabi, United Arab Emirates. The work is based on the analysis of expert's interviews, reflecting the positive and negative experience of companies in introducing flexible management technologies. As study shows, traditional HRM techniques should be transformed into agile HRM. Keywords: agile frameworks, Agile manifesto, the New digital economy, human resource management, agile human resource management, teamwork. Entrepreneurship and Innovation.