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IS Initiatives in the Vocational & Technical Education Sector of Developing Asian Countries: A Systems Approach to the Management of Project Intervention Processes

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ABSTRACT
This paper is set against a background of national IS initiatives implemented in the VTE (Vocational and Technical Education) sectors of developing Asian countries through donor agency funded projects, which can be seen as Project Intervention Processes (PIPs). This research is based on a 6 year research study of IS initiatives implemented in 9 VTE sector projects covering Laos, Sri Lanka and Vietnam undertaken through empirical investigations and a review of secondary data. The research reveals that the process of managing PIPs using traditional project management theory, which is based on hard approaches, is problematical in terms of generating desirable outcomes from the IS initiatives to address perceived VTE problems. Soft Systems Methodology (SSM) is based on a learning/enquiring cycle and is often used to manage problem situations that are poorly structured. The paper presents two key findings: namely the nature, scope and problems faced by PIP based IS initiatives; and a SSM approach to managing PIP based IS initiatives.

Keywords
Developing countries; IS initiatives; vocational and technical education; VTE; SSM; project management.

INTRODUCTION
The research questions of this study were twofold, in the context of VTE in developing countries: firstly, identifying management issues of IS based PIPs; and secondly making a contribution to the project management literature specifically donor agency funded projects. The research studied 9 projects, 3 each in Laos, Sri Lanka and Vietnam. Each project was initiated by a sponsor domain (donor agency) for a host domain (Government institutes) in order to address a perceived VTE sector problem and could be viewed as a Project Intervention Process (PIP). Each PIP had a number of IS initiatives targeting a multi-organisational VTE sector spanning national, regional and local stakeholders. The research revealed that the management of the Project Intervention Processes (PIPs) was problematical and had a major impact on the success of the IS initiatives implemented. This research contributes to the theory of project management by applying SSM as an approach to the management of donor based IS projects in developing countries.

The presentation and interpretation of this research is structured into four main parts. Firstly the current state of VTE in Asian developing countries is reviewed in terms of the literature and key problems highlighted. These provide the contextual setting for the implementation of IS initiatives through donor projects. The second part of the paper positions the research theoretically. In addition to the central concern of donor project management the research framework explicitly considers the use of SSM in managing project based IS initiatives as it provides a device to facilitate the management of complex project based IS initiatives. Part three details the research approach and the empirical design. Finally, part four presents the research outcomes and the interpretation of these together with some implications for ongoing research.

VTE IN DEVELOPING COUNTRIES
The VTE literature is extensive but much is centred on areas dealing with education theory, the economics of VTE and ICT adoption in the classroom. In terms of VTE in Asian Developing countries, traditional literature sources are limited and key sources are development agencies such as the Asian Development Bank (ADB), and World Bank (WB). The aim of the VTE
literature reviewed in this research and summarized in this section was to better understand the nature and scope of VTE in developing Asian countries at a broad level. This in turn was expected to help provide the context to the specific literature dealing with the management of projects in developing countries.

VTE Nature and Emerging Issues

In the context of Asian Developing economies, the Vocational and Technical Education (VTE) sector plays a pivotal role in meeting the human resource requirements of national economic development (ILO, 2002). The broad aim of VTE is to equip work-forces, in particular school leavers, for job opportunities across a range of labour markets brought about by industry needs (Middleton, et al, 1993). VTE comprises Vocational Training and Technical Education. Vocational Training broadly focuses on the preparation of ‘practical work skills’ to be used for the development of skilled and semi-skilled workers. On the other hand Technical Education focuses on ‘technical skills’ which are required by technicians. Numerous authors have developed taxonomies to provide a structure to VTE sectors (Pelgrum and Plomp, 1991; Ledgerwood and Kernaghan, 1998). However these tend to place a significant focus on activities at the classroom level. As the project based initiatives in this research were at a national level, a broader taxonomy was needed to provide relevant structure to VTE sectors. Following the review of VTE literature for the 3 countries studied in this research (Laos, Sri Lanka & Vietnam) the authors found that the VTE sectors can be conceptualised in terms of 3 core components:

1. VTE Policy Planning and Management

This component is responsible for developing sectoral strategies, allocation of resources, coordinating national programmes, monitoring major initiatives and assessing emerging sectoral requirements. This component is usually presided over by a central Government Ministry. It also involves a number of national authorities and regional departments for planning. In addition there are number of other government stakeholders involved in VTE planning such as: central Ministries handling national finance, planning, economic development; sectoral or ‘line’ Ministries responsible for areas like: construction, agriculture, youth, tourism, industries, transport; and regional or provincial authorities with autonomy over certain training functions;

2. VTE Programme Development & Standardisation

This component is responsible for monitoring, developing and upgrading the content of VTE programmes. This covers areas such as: VTE curriculum development, instructional processes, Teaching and Learning Resources (TLRs), VTE standards, accreditation mechanisms, development of short-term programmes, apprenticeships and teacher training. This component is typically presided over by a specific Authority or Department under the Ministry responsible for VTE. Other important linkages include the Ministry in charge of Education, and ‘line’ Ministries in charge of developing skills in specific industry sectors.

3. VTE Delivery

This is responsible for delivering VTE programmes to the target groups. This component is made up of a network of VTE colleges across each country. The colleges come under a number of authorities including: some divisions of the Ministry responsible for VTE, sectoral Ministries and regional authorities.

In the recent years many Asian developing countries have undergone a skills gap in their labour markets (ADB, 1999b). In many instances the need for skilled workers has not been met and industry has lagged behind as a consequence. There is tremendous pressure on the VTE sectors to increase the number of people who receive employable skills. ADB studies conducted in Laos (ADB, 1996), Sri Lanka (ADB, 1999a) and Vietnam (ADB, 1998) conclude that the VTE sectors have the following major perceived problems: (i) are supply driven and not market driven; (ii) are without Labour and Education Management Information Systems (LMIS and EMIS respectively); (iii) have little or no program or institutional accreditation, or skill standards and testing certification (SSTC) mechanism; (iv) are faced with poorly trained instructors and educational managers; and (v) have VTE infrastructure, learning materials and instructors’ guides which are out-dated, and not related to the needs of local and national employer expectations.

IS Initiatives in VTE

Faced with perceived problem situations outlined above, many Asian developing countries have embarked on national initiatives to modernise their VTE systems to meet industry needs. These initiatives have been designed and funded by donor agencies such as the ADB, European Commission (EC) and the World Bank and been implemented through projects. These projects have provided the main technical and financial impetus for modernising the VTE sectors in Asian developing countries including the introduction of IS. These projects are implemented by a multi-organisational ‘host’ domain involving
Education and Training Ministries, VTE agencies, Industrial sector Ministries, Provincial bodies, VTE Schools and private sector organisations. The projects range in timescale from between six months to six years and are major imperatives due to their financial scale, with projects sometimes over 100 million US dollars in size. IS initiatives have been important components of these projects. Typically these initiatives included Labour Market Information Systems (LMIS), Education Management Information Systems (EMIS), Financial Management Information Systems (FMIS) and Benefit Monitoring and Evaluation (BME) systems.

In terms of IS initiatives in the VTE there is a body of literature dealing with specific initiatives such as LMIS (dealt with by authors such as Sparreboom, 2001; ILO, 2002; Hopkins, 1999) and Learning Management Systems (dealt with by authors such as Commonwealth of Learning, 2002; World Resource Institute, 2002). However this literature focuses on the objectives and specifications of such IS initiatives as opposed to managing these IS initiatives within project based interventions which is the focus of this research paper. The lack of relevant literature has meant that there is only a small body of knowledge to inform the practice of initiating and implementing IS initiatives through projects in developing countries. The ADB which is the biggest donor agency in the VTE sectors of South and South East Asia has recognised the limited success of implementing IS initiatives through its projects (ADB, 1999b; ADB, 2005). This research paper contributes to the literature gap by investigating the design and implementation of IS initiatives implemented through projects in the VTE sectors of selected Asian Developing economies.

THEORETICAL FRAMEWORKS

Donor Project Management

The majority of innovations such as IS are implemented in developing Asian countries through Project based Intervention Processes (PIPs). Consequently the theory surrounding projects and project management is of significance to this research. Much project management theory is based on a ‘Hard systems’ orientation, where problems are well structured. The projects involving IS initiatives in the VTE sectors of Asian countries are predominantly ‘soft’ driven poorly structured problem situations with a messy social context. An appropriate definition of a ‘soft’ project as applied to the context of international donor projects is provided by Friend (1998, pp 2) who defines a project as:

“An engagement of limited duration, negotiated amongst people representing varied programme strands in agent [consultant], host and sponsor domains.”

According to Crawford and Bryce (2003) key distinguishing features between donor projects and construction/manufacturing projects which are the major focus in the project management body of knowledge (PMBOK) of the Project Management Institute include:

- Project goals deal with social transformation/human development as opposed to “hard” implementations. Even aid projects with hard components are often a means to achieve some form of developmental end. This makes aid project performance measurement notionally complex

- Donor projects are inherently political as they create social, economic and environmental impacts. Thus they have a wide range of stakeholders which required high levels of accountability which requires complex reporting

- The operating environment of aid projects is often contextualized by issues which make traditional project management tools and approaches less appropriate. These issues include wide geographic distances between project actors (recipient country, contractors and funding agency), cultural differences between project actors, competing agendas between project stakeholders, technologically challenged operating conditions and unpredictable socio-political environments.

There is increasing concern in the literature about the relevance of project management theory and how it relates to the practice of managing complex, social, projects (Morris, 1994; Koskela and Howell, 2002). This can be attributed to the fact that the intellectual foundations of project management are largely based on hard systems thinking and systems engineering (Morris, 2002). According to Winter and Checkland (2003) much of current project management theory (such as the PMI’s PMBOK) focuses on the ‘process’ dimension of project activity, which is carried out through a predefined sequence of stages typically defined by a project lifecycle. This in turn would involve application of hard project management techniques. This implies that project management would focus on managing ‘technical’ processes such as ‘engineering’, ‘development’, ‘construction’ etc. The use of hard systems approaches are even more pronounced in IS projects in both developed and developing countries, which heavily draw upon such approaches as: the waterfall method, PRINCE, SSADM, critical path analysis and work breakdown structures (Checkland and Holwell, 1998).
The relevance of traditional project management theory to managing donor projects is even more inadequate (Morris, 1994; Friend, 1998). Donor projects are characterised by a heavy bias towards ‘soft’ situations involving poorly defined problems (ADB, 1999b and 2005; World Bank, 1998). They are often even more complex than soft projects implemented in developed countries as they have added stakeholder pressures brought about by international donors and expectations from a multitude of local stakeholders.

SSM

Many authors feel that soft systems approaches are better suited for project management specially when dealing with social or people based project situations (Morris, 1994; Winter, et al, 2003; Checkland, et al, 2005). According to Winter and Checkland (2003) the ‘soft systems’ view of managing projects focuses on the social process of ‘managing’ in complex situations and trying to cope with an ever-changing flux of messy situations and complex issues. According to Winter and Checkland (2003) in these messy project situations, the aims and objectives are generally the main problem as opposed how to achieve them. Here SSM has gained credibility amongst project management theorists (Morris, 2002) due to its emphasis on ‘learning’ about the problem situation and accommodating stakeholder interests rather than trying to solve a particular problem.

Soft Systems Methodology (SSM) emerged in the 1970s from an action research programme of Lancaster University. SSM is particularly well suited to messy project situations with its emphasis on problem situations rather than well defined problems, different worldviews, models as devices for learning rather than prediction and consciously organised inquiry. SSM considers that the real world consists of complexity and confusion and hence the aim is to organize an exploration of it as a learning system. This distinction between hard and soft systems approaches to understanding the real world could be seen from Figure 1 (reproduced from Checkland 1990, A 11).

![Figure 1: Distinction between Hard and Soft Systems (Reproduced from Checkland, 1990: Figure A2)](image)

The scope of SSM has evolved to being an inquiring or learning cycle as summarized by Checkland (1990) in Figure 2. This learning cycle involves five principles (see Figure 2) which is based on a complex perceived problem situation or ‘content’.
Checkland further adds that the current version of SSM is a ‘four activities model’ where the activities are as described in Diagram 3.
Having reviewed a wide range of literature on SSM the enquiry/learning cycle behind SSM was applied to interpreting the research findings in terms of understanding the ‘problem situation’ surrounding PIP based IS initiatives, and the ‘five principles’ and ‘four activities’ for inquiring into such a situation. The specific SSM concepts and devices applied to the research and the manner in which they were applied are described further under the Research Approach.

RESEARCH APPROACH

Checkland’s FMA model of research (1985) was adapted and used as the research approach to inform and guide the authors’ interventions in order to learn about an area of concern (A), using a methodology (M) and Framework of ideas (F). This is shown in Figure 4. Each ‘intervention’ was essentially a case study of a project intervention process, with a view to understanding and making recommendations for improvement. In using the FMA model, it is essential, as Checkland and Holwell (1998) point out, to declare in advance of the action, the elements F, M and A. In this research, these elements were:

- the area of concern A which was ‘IS initiatives in the VTE sector of developing Asian countries’ with a particular focus on Project Intervention Processes as a vehicle for IS implementation
- the methodology M which was based on: the learning cycle of SSM as illustrated in Figure 2 and live and retrospective case studies of projects in Laos, Sri Lanka and Vietnam
- the framework of ideas F which was the application of concepts embodied in SSM to project management theory, especially the concept of structuring the enquiry process as a learning system, the use of purposeful activity models as devices to structure discussion on PIPs relevant to IS initiatives and about propose feasible ‘changes’ to overcome such issues.
Figure 4: Research Approach

The main issue in the design of the research was access to project actors and project literature due to the political sensitivity from donor agencies, host governments and consultants. Much of the access was facilitated through a research company involved in development work in Asia. Case studies were used as the main empirical tool and were designed based on the approach of Yin (2003). Nine case studies were identified based on access opportunities, 3 each in Vietnam, Laos and Sri Lanka. These focused on project intervention processes with IS initiatives. As part of a longitudinal process the cases involved a combination of retrospective and live studies of projects. Each country involved 1 retrospective study and 2 live studies of projects. The case studies were developed through a combination of semi-structured interviews with actors from the projects studied and through access to secondary data in the form of the extensive project documentation. The interviews were conducted with the key actors, in each project studied, from the sponsor domain, host domain and agent domain.

The approach to developing each case study consisted of two distinct processes. Firstly a narrative of the real world, based on the project documentation and interviews, was produced as part of the ‘finding out’ phase of SSM. Secondly SSM based analysis and interpretation was applied to the real world findings in order to generate debate by the author about the problematical situation surrounding each project intervention.

The real world narrative or finding out process consisted of 3 components. Firstly the historic background to each project was developed. Secondly a profile of the project intervention was developed in terms of the perceived problem situation, as defined by the donor agency, and the IS initiatives to address the problem situation. This was done in order to understand the nature of the overall PIP and its relevance to the specific VTE problems. Thirdly each of the IS initiatives in the PIP were
described terms of their key activities, donor ‘expectations’ from the activity, the actual ‘response’ to the activity by the VTE actors and the outcome. This was done to identify the donor expectations and the actual project results for each IS initiative.

Following the narrative, the nature of each project intervention process (PIP) under study was interpreted in terms of a role profile of those involved in the project by undertaking an SSM based Analysis One of each PIP by the author. This is a modified application of Analysis One, which is normally applied to the research intervention. Each project intervention was then analysed using Analysis Two of SSM to provide a social system analysis. This was followed by Analysis Three of SSM, to provide a political system analysis. Based on the findings from the above three SSM Analyses a Rich Picture of the problematical nature of each PIP was produced.

Each PIP was further analysed in terms of SSM by identifying a number of relevant purposeful holons and developing Root Definitions and Conceptual Models. The purpose of these SSM modelling activities was to stimulate and structure a comparison to explore management issues of IS initiatives in each PIP and how to address them. A number of relevant Root Definitions (RDs) were developed based on the world views of the key project actors. The structure of each Root Definition was tested using the CATWOE review of SSM (Checkland and Scholes, 1990). The most relevant RD was then selected by the author based on the verifications provided by key project actors from interviews and a Conceptual Model of this RD developed

By continuing the application of SSM, the Conceptual Model from each case were compared by the author with the respective rich pictures from each case in order to debate the management issues that can be learnt from each PIP and propose feasible changes. The outcomes from the debate from each case study were then integrated into a cross case synthesis. These issues were developed further in SSM terms in the form of suggested feasible changes which would improve the management of PIP based IS initiatives in the VTE sector. These are presented in the research findings.

RESEARCH FINDINGS

Two key themes have emerged from this qualitative research on project based IS initiatives in developing countries. Firstly is a SSM based conceptual interpretation of a project with IS initiatives. This provides insights into the nature, scope and problems faced by project based IS initiatives. The second theme deals with the process of managing PIPs having IS initiatives. The findings relating to these themes are described further below.

**Theme 1: Interpretation of Project with IS initiatives in VTE in SSM terms**

An important outcome of the case studies across the nine projects is the visualisation of the project initiation and implementation processes studied in terms of SSM. The VTE sectors corresponding to project situations were situations regarded by many VTE actors as problematical. The host domains and sponsor domains designed projects to bring about ‘improvement’. These parties who initiated projects also had consideration through ‘whose eyes the improvement is to be judged’. In these terms the project situations studied all met the conditions of an ‘intervention process’ specified under SSM. Therefore the projects that were studied were ‘project intervention processes’ (PIPs) to bring about ‘improvement’ to the corresponding VTE ‘problem content’. This interpretation of projects studied under the cases in SSM terms could be visualized in Figure 5.
It was found that the project intervention processes carried out by a host domain, sponsor domain and agent (consultant) domain are themselves problem situations in terms of SSM (Checkland, 1991). The interventions were situations in every day life which were regarded by those involved in the interventions themselves (from the host, sponsor and agent domains) as problematical and required improvement. Hence the project-based-cases that were studied in this research even though intervention processes introduced in order to improve some perceived VTE problems were themselves problematical, leading to a new problem ‘content’.

According to the nature of the actual intervention processes learnt from the cases the PIPs involved 4 major tasks: 1) identification of a project; 2) managing interventions of the project (including IS initiatives); 3) facilitating project activities by ‘administrative support’; and 4) complemented by ‘terminating action’ which culminates in the end of the project. In real world project contractual terms the task of initiating a project is outside the intervention process. However from the cases it was observed that the task of ‘initiating’ which defines the project interventions and role players is mostly problematical. Hence in trying to see ways and means of improving project interventions in general and IS initiatives in particular project initiation needs to be taken as part of the overall process. It was observed that managing initiatives involves: 1) action to be taken by the Agent Domain; 2) follow-up action and decisions to be taken by the host domain; and 3) ensuring expected outcomes are met. On the other hand administering support is based on: 1) action to support project interventions; and 2) action to meet procedural requirements of sponsor and host domains. Terminating action consists of: 1) action for sustainability & follow up; and 2) Action to wrap-up project activity and transactions. The projects as intervention processes with these major tasks could be visualised as in Figure 6.
Figure 6: Projects as Intervention Processes trying to Improve some Perceived VTE Problem Area

Theme 2: The process for Managing PIPs with IS initiatives

In trying to reflect on ways of improving project intervention processes with IS initiatives in the VTE sector SSM based thinking was used to understand the problem situation in terms of the generic rich-picture of the intervention process presented in Figure 6. For this purpose the insight gained from the application of SSM concepts in terms of Role Analysis (Analysis One), Social Analysis (Analysis Two) and Political Analysis (Analysis Three) of cases was also taken into account. For this purpose a number of Root Definitions were developed taking Project Intervention Processes from different perspectives and view points such as a system: 1) enabling to enhance relevance of VTE programme to skills needed; 2) instigating Government action to improve VTE efficiency and effectiveness; 3) providing relevant opportunities for a Government, a donor, consultants and other stakeholders. Finally a Root Definition capturing more than one such view was built as given below:

A Government host domain, sponsor domain and agent domain collaborative system to instigate Government action to improve efficiency, effectiveness and efficacy of the VTE sector by initiating and managing an intervention process with IS initiatives.

For the purpose of generating a debate which could improve the situation of PIPs a purposeful holon capturing the notion implied by SSM was used. This notional system captures some important essence for proper functioning of PIPs which is currently missing or implicit and responsible for its problematical nature. Here initiating and managing a PIP is seen essentially as a collaboration of Government host, sponsor and agent (consultant) domains. A Conceptual Model as shown in Figure 7 was developed for this debate.
Figure 7: Generalised Conceptual Model (CM) of Managing a PIP with IS Initiatives

This general conceptual model of PIPs with IS initiatives was compared with the actual situation that existed in the 9 PIPs studied in the cases. In the PIPs studied the initiating phase is highly dominated by the donor agency who designs the PIP in a prescriptive manner. ‘Managing’ a PIP is not taken adequately as a joint collaboration between the host and agent domains. The agent (consultant) undertakes their components according to their TORs (terms of reference) whilst expecting the Government host domain to contribute their part in terms of effecting change within the VTE sector. The sponsor reviews progress typically in a ‘detached’ style through quarterly or bi-annual missions. Currently collaboration and participation is missing at all levels. The absence of these key management activities in this vigorous form could be seen as the reason for the problematical nature of these PIPs with IS initiatives.
In trying to formulate some changes or improvements to the existing PIPs, the observations from the comparison were reviewed in the light of the findings gathered from the Social Analyses and Political Analyses corresponding to the cases. Having considered the social and political sensitivity some contributions could be made to improve PIPs in the VTE sector and these are discussed in this section. These changes could be used in the real world as they present an ‘accommodation’ between different interests of role players in PIPs.

A PIP should be defined as an effort involving collaboration by host, sponsor and the hired agent instigating host action to improve efficiency, effectiveness and efficacy of the VTE sector within the scope of the most suitable initiatives and resources available. Managing a PIP is thus the process of ‘ensuring such collaborative effort amongst these tripartite domains to improve the perceived problem situation of a VTE sector utilising the best suited initiatives within available resources’. This implies that the initiatives to be included in a PIP should be determined carefully having learnt the nature and scope of the problem situation with active participation and collaboration of all stakeholders.

CONCLUSION

Since PIPs are aiming to address some problem content of VTE sectors, the systems based study of PIPs not only facilitated understanding their problematical nature in terms of management but found PIPs as a worthwhile vehicle to comprehend the problems faced by IS initiatives applied to VTE sectors in developing countries.

The application of a universal hypothesis for administrative science has been endorsed by major development agencies such as the ADB, World Bank and IMF by applying traditional project management theory in the management of IS projects in developing countries. However, as Lubatkin, et al, demonstrate the application of this universal hypothesis can have very limited roles in the management activity of developing countries. The research undertaken demonstrated the complexity of VTE sectors in developing countries with their complex organisational context and ‘extra-soft’ problem content involving difficult to structure problem situations. The research revealed that it is an extremely difficult task to manage project or PIP based IS initiatives by applying the traditional hard approaches of project management used in developed countries. A softer approach to managing IS projects is proposed by the authors using the enquiring/learning cycle of SSM. A conceptual model of the process of managing PIPs was developed. The recommended activities in the model accommodate the different interests and requests from the different stakeholders involved in the PIPs.

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