DEPARTMENT OF COMPUTER SCIENCE

**Exploiting BP&ISR In The Sri Lankan Context: An Action Research
Project**

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Abstract

The action research project described in this report is an example of the exploitation of business process and information systems reengineering (BP&ISR) in Sri Lanka, and covers the reengineering of two processes at OrgPML, a typical public limited company in Sri Lanka. The project was sponsored and authorised by OrgPML's managing director and the BP&ISR team was made up from four OrgPML employees and one BP&ISR facilitator (myself). The following paragraphs describe how the reengineering work was done, starting from project initiation to process implementation. A structured framework (Weerakkody 1996b) was used as a guideline for the BP&ISR work. The report outlines how a combination of radical and incremental approaches were attempted for BP&ISR and the level of success and failure of each of these approaches. It also describes the computerisation of a manual system and outlines the pros and cons of comparing this to process improvement and IS reengineering. Finally the report concludes by evaluating the prospects for BP&ISR within OrgPML and in the general Sri Lankan context.

Introduction

In today's competitive market many organisations are under ever increasing pressure to improve performance and reduce the cost of running their businesses. It is now widely recognised that an understanding of core business process flows is essential if increased productivity and genuine cost savings are to be achieved (Hammer & Champy 1993, Johansson et al., 1993, IBM 1995, Hewitt Associates 1997). In this environment many organisations need to reengineer their business processes and information systems repeatedly to meet the changing nature of modern business (Hammer & Champy 1993, Harrington 1991, Davenport 1993). Business process reengineering (BPR) and its benefits are now recognised in developing countries in the South Asian region (Weerakkody 1996a). In Sri Lanka, which is considered as one of the faster developing countries in South Asia, a number of large multinational companies and some state owned organisations have already embarked on different quality improvement programs, such as, total quality management (TQM), ISO 9000, 'restructuring' and 'reorganisation'.

Most quality and business improvement initiatives, including BPR changes the way we view IS/IT substantially (Morton 1994). As in industrialised countries, many large and medium sized organisations in Sri Lanka rely on IS/IT to run their day to day business activities and to some extent achieve their goals and objectives. The reliability, efficiency, productivity and cost effectiveness of these business processes depends largely on the information systems. Thus, any BPR initiative will usually involve reengineering the information systems that support the core business processes (Weerakkody et al., 1996). In this context, it is appropriate that the term BPR is altered to accommodate the IS/IT element and hereafter referred to as BP&ISR (business process & information systems reengineering) in this report.

The project described in this report took place in a leading manufacturing, distribution and export based company (OrgPML) in Sri Lanka (refer appendix 1). The Colombo stock exchange in Sri Lanka ranks OrgPML's holding/parent company among the three most profitable and successful organisations in the country. After the recent success of being awarded ISO 9002 standards for its manufacturing based processes, OrgPML's strategic managers have shown a keen interest to improve some of the company's management and operational processes. In this context, BPR synchronised well with OrgPML's work environment and management objectives.

The main aim of the project described in this report was to exploit BP&ISR in the Sri Lankan context. A previous case study of the business and IS/IT environments in five leading organisations in Sri Lanka, included OrgPML, and identified a number of factors that may influence the implementation of BP&ISR in the Sri Lankan context (Weerakkody 1996a). After discussions with senior management in all five case study organisations, OrgPML was selected as a model environment in which to exploit BP&ISR. The exploitation of BP&ISR itself was done in the context of an action research project which was devided into two sub-projects and spread over a period of three months. The work covered two different business areas involving both process and IS reengineering and was carried out by a project team of two middle managers and two executives, with myself as the BP&ISR facilitator. Out of the two sub-projects, one involved both process and IS reengineering, while the other involved mostly IS reengineering work. A comprehensive framework of activities (Weerakkody 1996b) and a process mapping CASE tool were also used to assist the BP&ISR work.

The following pages describe the BP&ISR project from the time of initial contact with OrgPML sources to the completion of the project. It describes how the BP&ISR work was performed, the kind of obstacles faced by the BP&ISR team, and presents the author's analysis of numerous factors that influenced the BP&ISR work during the course of the project. The report begins by describing how the stage was set for the proposed BP&ISR work, followed by an account of how the actual project progressed. This includes a description of the project initiation, process identification, process analysis, process and systems reengineering and finally the implementation stage.

As is common in action research (Creswell 1994), this report is written in 'active past tense' and describes the events pertaining to the above project the way they happened. The report is written in 'active past tense' to give the reader a clear picture of the exploitation of BP&ISR in Sri Lanka as it happened in the 'real world'. The characters described in the report are real, while their names are fictional. The author's *analysis* and *comments* on the activities and events with the project appear in *italics*.

Set the Stage for the Proposed BP&ISR Project

The first contact with OrgPML was made in November 1995 during an initial investigation of the Business and IS/IT environment in selected organisations in Sri Lanka (Weerakkody 1995a). During this case study I had the opportunity to meet with the board of directors and discuss the possibility of conducting a BP&ISR project at OrgPML (its business and IS/IT background is described in appendix 1). Further communication between myself and OrgPML sources paved the way for the BP&ISR action research project described below.

Initial Contact

With regards to the proposed BP&ISR project, initial contact was made with OrgPML on the very next day of my arrival in Sri Lanka (8th November' 96). I spoke to Ron, the deputy general manager (research and development) and Ray, the divisional finance manager over the telephone. This conversation was very informal and little was said regarding the proposed BP&ISR project, except that I agreed to meet with Ron on 12/11/96 for an informal discussion. Although I would have liked to speak with Martin, the managing director, he was out of the country visiting one of the companies' overseas subsidiaries in Europe. However, I was informed that he will be back on the following Wednesday (13th November) and that I could meet him towards the end of that week. (*When evaluating the combined experiences of case study research and five years of IS/IT related employment in Sri Lanka, I was convinced that strategic management commitment is a necessity for a project of this nature.*) I was very keen to meet the highest possible authority in the organisation, in this case Martin, for three reasons. First, to inspire Martin regarding the proposed BP&ISR project and to boost his confidence in me. Second, to obtain his commitment for the proposed BP&ISR work and adequate authority for the team to perform the required changes in the context of the BP&ISR project. Third, to brief him about the proposed project and any related benefits to the organisation and to clarify the expectations on my part with regards to my PhD.

First Meeting With OrgPML Representatives

The first meeting was held with Ron, who was going to be the project co-ordinator. Ron and I had known each other for some time and therefore we decided to meet at his residence on 12/11/96 at around eight in the evening for an informal discussion about the proposed project

over drinks. On the evening of 11/11/96 I telephoned Ron to make sure that he hasn't forgotten our appointment. We both agreed that it would be a better atmosphere, minus the pressure and disturbance of the office environment. (*Being a friend, I was keen to meet Ron first to explain to him in detail the purpose of my visit to Sri Lanka.*)

At his home I explained to him what I expect to achieve from the proposed BP&ISR project in the context of my PhD. Then we discussed possible business areas that may need improvement and the pros and cons of reengineering these particular areas to both the organisation and myself. We agreed at this stage that neither party was under any pressure or obligation to deliver any particular results or outcome at the end of the project. I also took the opportunity to explain to Ron the BP&ISR 'framework' that I intended to use as a guideline for the reengineering work, and the 'BPWin' process mapping tool which will be used for process mapping and documentation purposes. At this stage Ron agreed that I should visit OrgPML on the afternoon of Friday the 15th and undertook to arrange meetings with Martin, the MD and Ray, the divisional finance manager. Our discussion ended around 10.00 p.m. with Ron inquiring about life at the University of Hertfordshire, since he too had spent three years as an undergraduate at the Hatfield Poly and had graduated with a degree in industrial engineering in the early 1980's.

First Visit to OrgPML

My first visit to OrgPML was on the afternoon of Friday 15/11/96. By now I had had nearly a week to prepare both mentally and practically, on how to tackle the planned BP&ISR work. I took this opportunity to revise my BP&ISR framework which I planned to use for the proposed (my first BP&ISR pilot) project. (*This being my first real practical experience of BP&ISR, it was important to me that it was a success. Although I was a bit worried at this point, I think my positive attitude helped to boost my confidence and I convinced myself that I could do it.*) As arranged, I arrived at OrgPML at around 1.30 p.m. on the 15/11 and was met by Ron and Ray, and later escorted to meet Martin for a brief discussion with him. This was my second visit to OrgPML within the space of a year (the first being in November 1995 to study OrgPML's business and IS/IT environments and explore the prospects for BP&ISR), and I was glad to see friendly smiles all-round.

The initial meeting with Martin lasted for around ten minutes and I briefed him on the proposed BP&ISR action research work, and of the benefits that it may bring to both the organisation and myself with regards to my PhD. Martin pledged his support and informed me that he will authorise Ray to allocate the time and resources required for the project. (*My impression after meeting Martin was that he was uninterested in knowing any details about the proposed project, but was only interested in seeing some improvements in the context of some of the inefficient business areas in his company.*) In contrast, my discussions with Ron and Ray that followed lasted for around two hours and our conversation varied from the economic scene in the country, to the business and IS/IT environment at OrgPML and the proposed BP&ISR project. Ray proposed a number of business areas that both he and Martin would like to see improved. These areas were, the business operations at OrgPML's warehouse, supplier payments process, the inventory control process, the sales process and the job control process. Ron volunteered to discuss these areas with Martin so that they could be prioritised. I agreed and reminded both Ron and Ray of the fact that we will only be able to cover a limited amount of work given the time constrains of my visit to Sri Lanka. Therefore, we all agreed that it is best to prioritise the target business areas, so that we could start

reengineering the most critical processes and move towards the less important ones depending on the availability of time.

Project Initiation

As described above, a series of meetings were held with different OrgPML sources in order to lay the foundation and prepare key OrgPML sources for the proposed BP&ISR project. The formal initiation of the BP&ISR work is described below.

First Formal Project Meeting

We held the first formal project meeting on Tuesday 19/11/96 at 1.30 p.m. I first met Ray who was to brief me on Martin's suggestions on prioritisation of the target business areas. However, Ray informed me that Martin had asked him to decide on the order of prioritisation. Since all target business areas (except for one which was partly controlled by the engineering function) were under the control of the finance function, Ray was responsible for majority of the procedures, information systems and the employees participating in them. Given this context, we agreed to first select a BP&ISR team and then decide on the reengineering sequence of the target processes. Therefore, both Ray and I agreed that he should be the process owner for all areas under his direct control that are selected for reengineering. (*Although Ray was briefed on important roles, activities and terminology that may be used in relation to the project, Ray, like others seemed to forget and never fully understood their significance.*) At this point we also discussed time frames and agreed on a tentative time table for the BP&ISR work, while I agreed to put it on paper in time for our first 'project team' meeting.

Referring to my BP&ISR framework, I explained to Ray the type of people, the skills and experience needed for the proposed work. We consulted Ron and then decided to form a BP&ISR team with the following professionals:

Project Sponsor	: Managing Director & CEO of OrgPML	- Martin
Project Co-ordinator	: Deputy General Manager (Research & Development)	- Ron
Project Team	: Divisional Finance Management & IS/IT Manager (Also the Process Owner for the 'Payments' process)	- Ray
	Finance Manager (Financial & Management A/c)	- Ann
	Accountant (Assistant Manager)	- Phil
	Systems Analyst / Programmer (Junior Executive)	- Riza
	BP&ISR Facilitator	- Myself
Process Owners	: Director Engineering (Process Owner for the 'Job Control' process)	- Jim
	Divisional Finance Manager (Process Owner for the 'Payments' process)	- Ray
Users	: 1 Junior Executive	- Pam
	1 Clerk (operational level)	- Colin

The next step was for Ray to introduce me to the above people. As the proposed project team members (Ann, Phil and Riza) were all employees under Ray's control, they all agreed willingly to participate in the proposed reengineering effort. [*This was a typical example of the hierarchical and authoritative management structure in practice (also refer appendix 1).*] I was also happy to learn that I had interviewed two of the intended team members during my first visit to OrgPML in November 1995, and were familiar with their backgrounds and skills. (*My immediate feeling was that these team members were glad to see me again. However, it appeared that some were more interested in general chit-chat, and less interested on the purpose of my visit and the proposed BP&ISR work.*)

The first formal meeting of the BP&ISR team was held on the same afternoon (19/11/96) and I took this opportunity to introduce myself and briefly explain about BPR in general and about the planned BP&ISR project. The team members were also briefed on the objectives and goals of the proposed BP&ISR work in the context of, both, myself and OrgPML. Both Ray and Ann suggested that the team meets every Tuesdays, Thursdays and Fridays from 1.30 p.m. onwards to carry out the BP&ISR work and the others agreed. We decided to meet in the afternoons as this gave the team members adequate time to attend to their normal day to day office duties.

Since all the team members were new to BP&ISR, I explained to them the sort of aims that I would like the project team to achieve. These included: improving the efficiency, effectiveness and reducing the cycle time and operational cost of identified processes; removing redundant, repeating and non-value adding activities of the identified target processes; improving the overall efficiency and effectiveness of the IS/IT systems supporting these processes; and introducing IS/IT to inefficient manual processes. The team members agreed and recommended that we needed the following resources to carry out the BP&ISR work effectively:

- A room to hold team meetings, workshops and to carry out process mapping exercises
- Additional programming staff when required to carry out software reengineering work
- Adequate hardware and software resources to carry out the BP&ISR work.
- Adequate commitment and time for the BP&ISR work by the project team members
- Two key process participants to user-test new and reengineered IS/IT systems from each target process area.

We held the first project team meeting in Ann's room which lasted for around two hours. The team decided to hereafter use one of the companies meeting rooms to carry out the project work since it was getting too crowded in Ann's room, and there was also the possibility of disturbing people seated in the vicinity.

Process Identification

At the time of starting the process identification exercise, a number of target business areas had already been recommended jointly by Martin, Ron and Ray. Therefore, the task of the BP&ISR team was to directly focus on these target business areas.

As arranged we (myself, Ray, Ann, Phil and Riza) met on 21/11/96 to discuss the overall target process areas and to identify and prioritise the exact process(es) to reengineer. This

team meeting was in many ways similar to a brainstorming session and was conducted in the context of a workshop environment. We started the process identification exercise by drawing a context diagram of the business activities presently performed by the finance function (Ray's function). A combination of methods, such as, the use of sticky labels on a magi-board and writing on the magi-board using coloured felt pens, were used to understand and map the current business activities. Phil volunteered to stand near the magi-board and do the drawing and writing etc.

We started discussing the proposed business areas (warehouse operations, payments, sales, inventory, job control), and naturally were unable to complete the exercise in the space of one workshop. Therefore, I suggested that we meet for a few hours on the following Saturday (23/11), and the rest of the team agreed. I also suggested that process prioritisation should be done on the basis of opportunity for reducing: cycle time; number of activities, steps and staff time taken to complete the process; the number of duplicate and non-value-adding activities present in the context of the process; and the cost associated with the process. Taking into account all the above, we met on Saturday and identified the 'payments' process as the most critical one needing improvements. Therefore, everybody agreed that the initial reengineering effort should be focused on this process.

During the workshop, in keeping with my BP&ISR framework I volunteered to prepare an outline project plan. However, the rest of the BP&ISR team did not see the need to adhere to a rigid project plan, but agreed that we should try and stick to the initial agreement of team meetings three times a week. They also agreed that we should have additional meetings depending on the BP&ISR workload. (*The impression I got at this stage was that the team members did not want to be bound by a firm project plan and that they wanted the BP&ISR work time table to be flexible. The team members as I understood later wanted to give more priority to their individual office and personal work, and therefore preferred a flexible project time table to accommodate this need.*)

Process Analysis 1 : The 'Payments' Process

This stage of the process reengineering cycle involved analysing the target process(es). In this context, the first meeting was held on 26/11 and the last on 10/12. We started the process analysis exercise minus one team member. Ann had to be excused as she was attending to some important departmental work. Therefore, it was left to myself, Ray, Phil and Riza to carry out the process analysis work. As usual Phil obliged with the sticky-labels and coloured pens and we started by drawing an outline context level diagram of the 'payments' process, which was soon followed by a detailed level 'As Is' scenario. While doing this, both Ray and Phil were quick to highlight the inefficient areas and non-value-adding activities. Riza was fairly quiet as he was relatively new to the organisation and was also the IS/IT representative in the BP&ISR team. [*As highlighted in earlier case study findings (Weerakkody 1996a), it was evident that the business knowledge of IS/IT people is limited.*] While Phil was drawing an outline diagram of the payments process on the magi-board, I was busy taking notes and at the same time participating in the debate regarding the process under review. (*Reflecting now, I feel that it would have been more productive if I had participated fully on the discussion and had left the note taking till the team discussion was complete.*)

Brainstorming

After Phil completed the layout of the 'As Is' scenario on magi-board, we critically examined it and identified a number of potential improvement options for each inefficient and non-value-adding activity. The team also discussed the pros and cons of each option. (*It is interesting to note that all team members came up with at least one suggestion for improvement, and the majority of reengineering suggestions also surfaced during this stage. An interesting fact was that except for one team member, the rest agreed that the payments process was inefficient and were willing to consider radical improvement options.*) The otherwise quiet Riza was quick to voice concern over the current legacy systems environment, highlighting the inefficient and ineffective systems supporting the payments process. Both Ray and Phil agreed and pointed out that two accounting systems running on different platforms were used for processing the 'payments' process information. Riza chipped in with an explanation of the technical backgrounds of the two systems, one based on a PC/UNIX-FilePro platform and the other on a IBM system 36 / RPG II platform. Ann agreed that nearly 80% of the payments process information was fed into the PC/UNIX system purely for the purpose of report generation of management and accounting information, while 50% of the same information was re-entered again into the S/36 together with the balance 20% for final accounts updating. (*I should say that I was taken aback to learn how even a leading organisation could engage in such inefficient activity without noticing it, or even if they did, not having changed it. It was immediately clear to me that this scenario was highly inefficient, it duplicated work, was running on incompatible hardware and software platforms, and there was also a lack of co-operation between the two parties handling the two systems.*)

Although a lot could have been done in the context of IS reengineering, due to the time constraints of the BP&ISR project we decided to re-use existing systems with minor adjustments, instead of concentrating too much on reengineering or introducing new IS/IT systems. However, in keeping with the reengineering principles and depending on the need, I proposed that we try and achieve radical improvements in one of three ways. First, by switching the legacy IS/IT system from one platform to another with minimum modifications; second, modifying the legacy systems to suit the new process environment; and third to introduce an entirely new system. Given the available time and IS/IT skills, we decided that this approach will help the team to optimise the efficiency and effectiveness of the existing legacy systems and help to exploit new opportunities and capabilities which have not been made use of in the past.

We had two brainstorming session before we could come up with feasible improvement suggestions for the payments process. At the stage when we were running out of ideas, I suggested that we interview a few process participants to obtain new ideas. However, Ray objected and the rest agreed that since the key stake-holders and process participants were already members of the BP&ISR team, further interviews with employees were not necessary. Ray, being the process owner and the manager in charge of the target (payments) process assured the total commitment and support of the process participants. (*I was a bit worried to proceed without consulting the users thinking that we may miss important suggestions and at the same time run the risk of user resistance.*) At the end of two brainstorming sessions lasting about 4 hours each, we ended up with two reengineering options, one a radical solution and the other an incremental improvement to the payments process.

Process Mapping

After the team effort, it was left to me to formally map the 'As Is' scenario. I undertook to develop the process maps with the aid of the *BPWin* tool (a Windows based process mapping case tool) on my laptop computer. (*I should confess that although it took me nearly a week to complete the process maps of the 'As Is' scenario, I enjoyed it, especially as I was still learning how to use the BPWin tool at this stage. I felt that learning to use the tool in itself was quite an accomplishment and therefore felt a sense of satisfaction*). Using the BPWin tool, I prepared maps of the target process highlighting the activities, supporting IS/IT systems, inputs, outputs and controls and an overview definition for each of the above (refer appendix 2a). The BPWin tool is capable of generating a number of reports. For instance, process and activity reports, input / output reports and activity based cost reports etc., can be generated according to user defined variables and in different formats. (*However, the process definitions and other forms of documentation were only of academic value to the team members. It appeared that the only concern of the process owner was to see the process improved and he was not interested in documentation. On the other hand, the rest of the team members cared even less and appeared to have an attitude of ' if my boss doesn't want it, why should I bother'.*)

After completing the process mapping work I telephoned Ray and arranged to meet on the afternoon of 05/12/96, about a hour earlier than our usual time. I indicated to him that I would like to first show him the BPWin version of the process maps before we discuss it as a team. Ray agreed and suggested that we discuss it over lunch. I met Ray as planned and excused myself for 15 minutes and paid a brief visit to Phil to take the printouts of the process maps by connecting my laptop to his printer. I had prepared process maps of the 'As Is' scenarios and the relevant documentation and requested Ray to briefly go through them for any obvious mistakes. (*I didn't want to make a fool of myself in front of the entire team by making any embarrassing mistakes. There was a high possibility that I could have made mistakes, or left out important inputs, outputs or controls, particularly when taking notes from the magi-board.*) When going through the process maps, as if to confirm my doubts Ray pointed out a number of mistakes regarding activity flows and missing outputs. Although our intention was to have a team meeting that afternoon, we had to postpone it till our next scheduled team session, which gave me time to correct the erroneous process maps.

As scheduled we met on the next day and I demonstrated the 'As Is' scenario using my laptop computer (i.e. by navigating through process models etc.) to the BP&ISR team. Ann requested that I take photocopies of the process maps and give them to team members so that they could go through the activities that concern them. At this point, since everybody was happy with the BPWin process printouts, referring to my BP&ISR framework I suggested that we start concentrating on the actual reengineering and process improvement work and scheduled a meeting for 10/12/96. (*During this exercise, I observed that most of the team members were highly impressed when I demonstrated the process maps using my laptop. However, it was also evident that some of the team members had little or no knowledge of process mapping, or what a process mapping tool such as BPWin is capable of doing*).

Process Reengineering : The 'Payments' Process

This was the most interesting stage in the BP&ISR project. I had to do nearly 80% of the reengineering work by myself and there was hardly any input from rest of the team. (*When*

looking back at the overall project, it was clear that Ron, Ray and the rest of the team members expected me to come up with the solutions for the target processes and be their Mr. 'Fix-it'.)

We started the process reengineering work on 10/12/96 by having a workshop type meeting to identify the payment process boundaries. Due to the functional nature of the organisation, we found that different business processes tend to be associated with particular departments and identifying process boundaries was easy. Unlike a process oriented organisation, the business processes tend to start and end within a department and does not extend beyond its boundaries, or get linked with other processes.

After discussing the 'As Is' scenario of the payments process, the team expected me to come up with the reengineered solution (i.e. a 'To Be' model). When carrying out the process reengineering work and mapping out the proposed solution using the BPWin tool, I made an effort to come up with two alternative models where possible (refer appendix 2b and 2c). One of a radical change option and another of a incremental change option. Ray, Phil and Riza all agreed that both radical and incremental change was possible in the context of the payments process. We selected the final blue print by having a workshop and discussing the benefits and disadvantages of the alternative options. While Ron, Ray and Ann preferred the incremental option out of the two which I proposed, Phil and Riza were for the radical option. *(It was evident that some team members were enthusiastic about radical change, particularly when it was perceived as more beneficial to the process under review. However, due to constraints in the legacy system and work environments, non co-operation of IS/IT people, and lack of skills and resources, implementing radical change was impossible. It was also evident that often the benefits of a radical change option was secondary to the risk factor connected with it. On the other hand, convincing the team members and obtaining their commitment for reengineering was easy, particularly when they all agreed that the current process was highly inefficient.)*

As often is the case with BP&ISR projects, the IS reengineering part was the most demanding of the entire reengineering cycle. When it came to reengineering the IS/IT part of the improved payments process, we were faced with a problem of getting the central (parent company's) IS/IT department, who were handling a number of systems for OrgPML, to reengineer a legacy system that was supporting the payments process. In this context, Ray, Phil, Riza and myself met representatives from the parent company's IS/IT department to discuss proposed changes to the legacy system concerned. The reaction we got from these IS/IT people was a negative one. However, they volunteered to look into the modifications that we proposed and requested a period of two weeks to do a study of the proposed changes. In the meantime Ray agreed to give them a reminder when the first week was up and also to encourage their IS/IT manager to authorise the necessary changes. Nevertheless, as I predicted, at the end of the second week we were informed that the requested changes can not be accommodated. *(Various excuses were given in this regard. I have nearly five years of hands on experience in a similar legacy system (i.e. both hardware and software) environment and the reasons given did not impress me at all.)*

Given the above context, we had no option but to abandon the payments process reengineering effort and direct our attention towards another process. At the same time Christmas was approaching and we decided to stop all project work and to start a new sub-

project after the festive season. I gladly agreed as I needed a break myself.. [*Although the payments process reengineering attempt was unsuccessful, I was not unhappy or frustrated, instead I was optimistic about our next attempt. Reflecting on the event I should state that I was fairly happy in the sense that we tried our best and failed due to inevitable circumstances, and was also convinced that we didn't overlook any important areas which would have improved the payments process. I accepted the fact that the reason was related to a legacy system problem which is a common issue in the context of many reengineering initiatives (Weerakkody 1996b).*]

Process Identification : The 'Job Control' Process

After nearly a weeks holiday for Christmas we met in the new year on 3/01/97 with a view to starting a new sub-project in the context of a new business area. Although we did not meet over the Christmas vacation, I contacted Ray, Phil and Riza several times over the phone to keep their enthusiasm on BP&ISR alive, particularly after the disappointment we suffered with the payments process. (*At this stage I was getting a bit concerned and was keen to start reengineering a new process as I was worried that the team would loose interest after a weeks layoff from team work.*) The team met as arranged on 03/01/97 and my immediate reaction was that both Phil and Ann had lost their initial enthusiasm and were not fully committed to the task at hand. Yet, Ray and Riza were devoted and we focused our attention on a new target business area from the list of critical ones already proposed by Ray and Martin. (*It is my intuition that the lack of interest on the part of Phil and Ann were due to the fact that they did not derive any direct benefit from the BP&ISR effort. There attitudes suggested that if they did not get a direct benefit by participating in the BP&ISR project, they are not obliged to contribute to the team effort. I would guess that if the proposed BP&ISR effort was a company wide one on which the future of the company and its employees depended, it may have been a different outcome.*)

Although faced with the above constraints, we managed to hold a process identification workshop on 07/01/97 and identified the 'job control' process as the next in line on the priority list of processes needing improvement. As I was the only outsider, Ray explained in brief the purpose of the job control process and its relevant activities and suggested that we consult a key process participant in order to get a better understanding of the target process. Riza was also relatively inexperienced in this area and had only a limited knowledge of the target (job control) process. Phil suggested that we consult Pam who was one of the most experienced employees in the context of the job control process. Ray also suggested that we consult Jim, who was the director in charge of the job control process before we commenced the BP&ISR work. The rest of the team agreed that we could not proceed without the permission and commitment from Jim. Since Jim was in charge of the overall target process, we appointed him as the process owner. At this point we adjourned the IS reengineering team session with Ray undertaking to arrange for us to meet with both Jim and Pam.

On the same afternoon I met Martin and Ron to explain the current position with regards to the BP&ISR work and the problems we encountered in the context of the payments process. I made it a point to make it clear to Martin that the reason for not completing the payments process reengineering effort was due to a legacy system problem which was beyond the control of the BP&ISR team. Although Martin was a bit disappointed, at the same time he was pleased to hear that we were starting BP&ISR work on the job control process, which he

thought was highly inefficient. (*I was surprised at Martin's attitude, as I guess I expected him to be more disappointed about the payments process. Instead, he was more interested and optimistic about reengineering the job control process. Reflecting on the event later, although Martin didn't indicate it, I came to the conclusion that a high level discussion had already taken place between Martin and OrgPML's parent company IS/IT sources, re - the payments process and the complications of reengineering the legacy system concerned.*) After meeting with Martin, I discussed the same issues with Ron and also indicated to him that two of the team members were not extending the level of commitment that I would like to see. However, both Ron and I agreed that if the situation deteriorates to proceed without the assistance of these two team members, since they were not considered as key people in the context of the job control process.

Process Analysis 2 : Preparing the 'Job Control Sheet'

As promised, on 10/01/97 Ray had arranged for me and Riza to meet Pam who explained to us in detail the job control process and the procedures involved when preparing the job control sheet. With Pam's assistance we drew an outline diagram of the current state of the job control process and started analysing it for the same type of criteria described in the payments process analysis stage. Although the target process was perceived as highly inefficient, Jim, Ron and Ray all indicated that we were unable to carry out any fundamental changes to the 'job control' process flow itself. [*As typical in a Sri Lankan business environment (Weerakkody 1995a), strategic management didn't want to take a risk with fundamental changes to the overall job control procedure. However, this did not mean that all managers disliked radical change. What I sensed was that some managers were keen to implement radical improvements as long as it did not interfere with the current procedures and practices in place, in the framework of the target process. In other words they preferred radical improvements without fundamental change. This as I understood is mainly due to the cultural environment, management attitude and the risk factor associated with change, in the Sri Lankan organisations.*] Given this context, since a major part of the job control process involved and was dependent on the manual preparation of a 'job control sheet', they agreed that computerising the job control sheet would be a major step forward.

[*From the reaction we got from Martin, Jim and Ron who were all strategic level people, it was clear that the decision to reengineer the job control process was very popular. However, I was a bit frustrated as we were not permitted to rethink or reengineer the process flow of the job control system and were only allowed to introduce IS/IT to a manual sub-process within the overall target process. This situation brought to mind Hammer & Champy's (1993) argument that says, automating an inefficient process helps us to do a bad job faster with even less effort than before. Therefore, I had to ask myself whether it was appropriate to compare the computerisation of the job control sheet with business process reengineering. Nevertheless, given the circumstances I had to convince myself that some breakthrough is better than nothing, and that at least we were proposing to speed up and reduce the cycle time of the overall job control process by introducing IS/IT to a part of it (i.e. to the sub process of preparing the job control sheet). In this context, Hammer & Champy's (1993) definition of BPR comes into the equation. It suggests fundamental re-thinking and radical redesign of business processes to achieve performance gains in the context of cost, quality, service and speed. However, I had to be satisfied with the fact that majority of present day process improvement initiatives referred to in the literature and by researchers, as BPR, hardly*

satisfy all the above criteria. In our case, although fundamental change was not an option, at least we proposed to improve the quality of the process (i.e. on-line access to management information and computer generated reports) and increased the information processing speed (i.e. automatically picking up information from data bases and performing calculations etc.) of a major sub process within the overall target process. Although I had no doubt in my mind that it is unfair to compare the 'computerisation of a process' with ' process reengineering', given the above benefits, I don't think it is wrong to compare it with 'process improvement'. I am also convinced that although it does not involve reengineering an existing IS/IT system, computerising a part of a process can be compared to the IS reengineering part of the BP&ISR project cycle.]

At the end of our first process analysis team workshop Ray suggested that I do the process reengineering phase with Riza since it involved IS/IT related work, and the rest of the team agreed. (*I was happy since Riza was a committed team member from the beginning and both being from IS/IT backgrounds, I was confident that we will be able to do an efficient job even without the rest of the team. One reason for this is that I can avoid postponing team meetings due to the difficulty of getting the entire team together at the same time in one place. In this context team work never gets done and at one stage I preferred to work alone.*) Therefore, effectively Riza and myself formed the IS reengineering team in the BP&ISR project. Our task was to analyse the 'As Is' scenario of preparing the job control sheet, re-designing and standardising parts of it and developing a computerised system to prepare the job control sheet. A major difference between the manual system and the computerised version is, the manual procedure is haphazard and involved process participants using different methods and standards when completing the job control sheet, while the new system had data entry standards and controls incorporated into it. Also, the computerised system involved automatic calculations, transferring of figures, validations, automatically picking up information from the data base, the generation of a variety of management information reports and a standard printout of the job control sheet .)

Process Mapping

Riza and I started the detailed process analysis work by going through the job control process, concentrating particularly on the preparation of the job control sheet. Pam joined us and gave vital suggestions on improvements and also tips on do's and do not's'. On a number of occasions we also consulted Colin, Ron and Ray in order to clarify certain issues. As we were faced with time constraints we didn't waste much time on drawing detailed 'As Is' process maps. As with the first target (payments) process, I undertook to develop process maps of both the 'As Is' and 'To Be' models using the BPWin tool (refer appendix 3a and 3b).
(*I was fairly frustrated at the fact that we had to leave most of the inefficient and haphazard activities as they were. The reason for this was to allow flexibility for the process participants. As pointed out earlier by Jim, Ron and Ray, Pam too confirmed the fact that the process flow was not to be touched.*)

Process Improvement : Preparing the 'Job Control Sheet'

After brainstorming the job control sheet preparation part of the overall job control process, I suggested to Riza that we do a proper system design before starting software development. We started the system design work on a 17/01/97 and completed it the following day which was a Saturday. We also agreed that in order to complete the IS reengineering work in time,

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hereafter (i.e. myself and Riza/the ISR team) to work on Saturdays if necessary. (*I was pleased with this suggestion as it provided an excellent environment particularly for software development. I.e. there were less people in the office on a Saturday and employees came to the office at their own will dressed in casuals and the entire environment is informal. It also meant that less people were using IS/IT which resulted in less disturbance for Riza.*)

System Design

Like many systems analyst / programmers in Sri Lanka Riza didn't have any experience of using systems analysis and design methodologies (Weerakkody 1996a). However, he had enough theoretical knowledge of using structured methods for system design. In this context, we used a mix between SSADM and IDEF0 to draw up rough sketches of the 'To Be' process and system models. Since Riza knew the data base and file structures well he decided which files we needed to access, while I guided him with the drawing of system and program flow charts, data flow diagrams, file formats, screen and report lay outs. Like before, on a number of different instances we consulted Pam, Colin, Ron and Ray to obtain their opinion on different issues depending on their areas of specialisation. By now we were also faced with time constraints with my departure date nearing. Therefore, both Ron and Ray agreed that Riza should complete the system documentation as soon as we complete the process improvement, system development and implementation work. Once the initial design work was done it was left to Riza to start developing the different programs (In total there were five programs, one large program and four small ones).

System Development

In the week that followed (including Saturdays 18/01/97 and 25/0197) Riza was busy programming. One major setback that we faced at this stage was that Riza himself was fairly new to both the organisation and the programming language used (FilePro), and had to learn new things during the process of program development. When designing the system, while allowing for flexibility, I made sure that maximum controls and standards are incorporated into the system, leaving minimum scope for errors. Incorporating some of these controls demanded good programming skills and many times along the way Riza got stuck with programming problems. There were also times when we had to leave a few loopholes due to constraints in both the programming language and programmer skills. In the process, I was compelled to get involved in the programming work and although I have never used FilePro before, by getting involved with Riza I began to understand it and also helped out Riza when he got stuck. (*Although my programming experience was in an entirely different environment, nearly five years of working as an analyst programmer and later as a systems analyst helped me to contribute effectively to the programming work.*)

System Testing and User Training

Once the programming was complete we tested the system under various conditions using different test data. A number of modifications were also done during the testing phase, particularly in the context of controls. An entire Saturday was spent testing and fine tuning the system and we also consulted Pam, Ron, Ray and Jim and obtained their opinion of the system. Jim and Ray suggested a number of changes to the screen layouts and report formats and Riza agreed to carry out these changes on the following week. At this stage Pam and Colin were both informed that their services were required regarding user testing of the computerised job control sheet. We conducted the user test on 27/01/97 and except for one minor change both Pam and Colin were satisfied with the proposed system.

With regards to user training, I suggested that we train and educate the users simultaneously during the user test sessions. Unfortunately, due to time constraints we were unable to train many users and had to be content with the training provided to Pam and Colin. However, Riza gladly undertook to train the remaining users while Ray agreed to supervise the training exercise. (*Although I would have liked to involve more users for the system design, testing and training stages, Jim, Ron and Ray all discouraged me fearing that different engineers will request for different facilities/characteristics to be incorporated into the system, making it difficult to implement controls and standards.*)

The Overall ISR Approach

Overall, we used a combination of structured BSAD and RAD a approach to develop the system. While the initial analysis and design was done using a structured approach, the latter part of system development was done using a RAD approach. We decided to adopt a RAD approach when we began to discover, particularly during the last stages of programming and later during the system testing stage that certain inputs, outputs and controls were missing in the system. Therefore, at this stage Riza and I decided to consult the rest of the BP&ISR team and key process participants in order to obtain their views on the system, and concentrated on simultaneously reengineering the system. The advantage of this approach was that, the key users played an important role in the system development process and therefore were already familiar with the system at the user training / testing stage. Throughout the course of the IS development process, we also kept the rest of the BP&ISR team who did not actively participate in the ISR work informed of the progress. (*In the context of this sub-project, very little of the BP&ISR framework was used. Two reasons contributed to this. One reason was, having completed one sub-project using the framework, I was fairly confident of myself at the time of starting the second sub-project. The other reason was the straight forward nature of the job control process which in my opinion did not demand the use of a framework.*)

Progress Meeting

Once the system development and testing was done I met Martin to inform him our achievements so far. On this occasion I had a long discussion with Martin and he indicated to me that he would like the supporting documentation used to prepare the job control sheet computerised as well. I agreed, but indicated to him that the time allocated for my 'BP&ISR action research project' was limited and that I am due to leave to the UK soon. However, I volunteered to speak with Ron, Ray and Riza with regards to this matter and proposed that we leave it in the hands of Riza to do the rest of the computerisation. Riza agreed especially as it was straight forward and needed only two more simple programs to facilitate the supporting documents. (*I was a bit worried when meeting Martin as I felt that I had failed in the context of BPR and related benefits where OrgPML was concerned, although succeeding in the context of my PhD research. To my pleasant surprise, Martin was only delighted at the fact that we managed to computerise the 'job control sheet', which he classified as highly inefficient and haphazard.*)

Process Deployment : Implementing the 'Job Control System'

The process deployment phase is often the second most difficult phase in the BP&ISR project life-cycle (the first being the reengineering phase). However, due to the straightforward nature of the target process (job control system) reengineering effort, it was identical to

implementing any new IS/IT system. Therefore, we decided that it was not necessary to draw up a formal process and IS/IT deployment plan, but discussed in the context of a team meeting how we would go about deploying the system.

The ISR team was responsible for identifying the hardware and networking environment required to support the proposed system. It was fortunate that Riza had a very good technical knowledge of IS/IT, as my knowledge of networks and cables are limited. After discussing with Jim, Ray suggested that we need a new printer installed in the engineering function which was situated in the ground flow of the company's two story building. Since the IS/IT function was placed in the first floor, Riza suggested that a cable had to be drawn connecting the printer in the ground floor to the main file server in the computer room. After carefully analysing the hardware environment, Riza also identified the need for an additional parallel card that needs to be installed in the file server in order to facilitate the new printer. Thereafter, in keeping with the normal practice, Ray and Riza undertook to outsource the preparation of the hardware platform (i.e. laying of cables, installing parallel cards and printers etc.), to OrgPML's usual technology service provider. (*I was frustrated as Ron and Riza took nearly three days to survey the market before they could identify the supplier with the most competitive prices and order the required hardware. Yet on the fourth day the supplier had still not delivered the parallel card. Given this context, it is clear that targets are hard to meet, particularly when a project is dependent on external service providers.*)

With regards to implementing the new system, Jim and Ray were confident and wanted a direct changeover from the old to new systems. At this stage it was time for my last team briefing before I parted company with OrgPML and returned to the UK. At the time I left the company on 03/02/97, the printer cable was being laid and Riza was awaiting the arrival of a new printer and parallel card, while Jim was waiting impatiently to start work on the new system. Ron and Ray undertook to complete the final system implementation in my absence, and Riza undertook to complete a few additional programs to computerise two other supporting documents used in the context of the job control sheet. (*It was clear that Riza was extremely pleased with the outcome of the second sub project, as I understand that this was his first major system development project since joining OrgPML. Therefore, it was a personal achievement on his part and I am confident that he will see it through to the end, which will also increase his worth in the face of management.*)

Conclusion

The main purpose of the project described above was to exploit the potential for business process and information systems reengineering in Sri Lanka. Arguable the best possible way of exploiting the potential of any technology, methodology or concept is by trying it out in practice. This was precisely what I did when exploiting BP&ISR in the context of the Sri Lankan business environment. The project concerned was carried out over a period of three months and involved process and IS reengineering work covering two different business areas. The BP&ISR work was done in the context of two sub-projects, one involving both process and IS reengineering, and the other involving mostly IS reengineering work. The organisation concerned (OrgPML) is a leading public limited company in Sri Lanka with characteristics common to most Sri Lankan organisations, and the BP&ISR team members were all individuals performing familiar corporate roles. Other than minor differences in the business

environment, the work and IS/IT environments too are familiar to most Sri Lankan organisations. Therefore, it is justifiable to use the results of this project as a common yardstick to evaluate the general prospects for business process and information systems reengineering in the of Sri Lankan context.

The BP&ISR work was performed in an action research environment with me acting as the BP&ISR facilitator cum project team leader. The outcome of the project can be evaluated from two perspectives. First, from the viewpoint of the organisation and second, from a research perspective of my PhD. When assessed from the organisational side, what was realised in the area of process reengineering/improvement was much less than what I would have liked to achieve. However, the project sponsor was quite satisfied with the overall outcome. On the other hand when evaluated from my PhD research perspective, the outcome can be given a success rating of 75% out of 100%, particularly since it helped to accomplish its objective of exploiting BP&ISR in the Sri Lankan context. Therefore, it is fair to state that the overall project was successful in the perspective of achieving its goals and objectives, although not so much from a view point of process reengineering.

The BP&ISR team had to overcome a number of obstacles and had to perform the work in the context of numerous constraints. The most serious obstacle was the disruption of team work due to the pressure and demand of individual work commitments of team members. This made it difficult for all the team members to meet at one particular time and also resulted in the postponement or cancellation of pre-arranged team meetings and workshops. The lack of interest among some team members was also a major psychological barrier, and the responsibility of overcoming this barrier fell on my shoulders. Although the team members were fairly enthusiastic about the BP&ISR work at the beginning, the level of interest declined with time. This appeared to happen gradually when the team members started to realise that the BP&ISR work did not provide any personal benefits for them. Another stumbling block was the lack of co-operation between the holding/parent company and subsidiaries and between different functions, particularly between the IS/IT function and other business functions. Finally, the lack of team working skills, process mapping, BSAD and general IS/IT skills was also a major hindrance to conducting a proper BP&ISR project. As a result, I had to bear the responsibility of performing some of the difficult phases in the reengineering cycle, such as, process mapping, reengineering and information systems design and development.

The practical BP&ISR environment can be summarised as follows: The work environment did not foster team work; target dates were hard to accomplish; the ISR part was difficult; inadequate IS/IT skills; poor knowledge of BPR; and management was not interested in any form of documentation of process definitions, process maps or IS/IT systems. Instead, process owners and strategic management were more interested in implementing the reengineered solution even before the target process map was prepared. In one instance, some activities in the target process was changed during the process analysis phase as a result of an idea that emerged in a brain storming session during a team workshop. This scenario proves that strategic management was more attracted towards improving their inefficient business procedures and less interested in how it was done. It was also evident that management had little or no knowledge regarding BP&ISR and were uninterested in learning about it or its related benefits. Also, the BP&ISR team members were not interested in acquiring any additional knowledge of BPR other than the minimum understanding required to perform the process improvement work in context of the project. Therefore, I had to co-ordinate,

encourage, lead and also perform most of the technical work in relation to process and IS reengineering. However, it should be noted that team work was useful and successful in the areas of process identification, analysis and deployment.

In conclusion, despite the fact that the project had its ups and downs, when the overall project is analysed it is clear that it has been successful in realising its objective of exploiting BP&ISR in the Sri Lankan context. Although the BP&ISR work concerned was conducted in only one organisation, similar outcomes can be expected in most Sri Lankan organisations, particularly due to similarities in the work and IS/IT environments, and employee skill and attitudes (also see Weerakkody 1996a). Given this context, it is reasonable to state that the above described project is an example and evidence of successful exploitation of BP&ISR in the Sri Lankan context and therefore, confirms that business process and information systems reengineering can be introduced to the Sri Lankan corporate environment.

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APPENDICES

APPENDIX 1

OrgPML : Business and IS/IT Environments

OrgPML is a manufacturing, export and distribution based company and is one of the leading organisations in its market. The Colombo stock exchange in Sri Lanka ranks OrgPML's parent / holding company among the three most profitable and successful organisations in the country. OrgPML is committed to total customer satisfaction and has a number of long term goals and a mission statement which includes, 'to strive for excellence as providers of high quality, reliable, value added products and services by mainly utilising local resources' (OrgPML annual report 1995/96). Some of the more significant long term goals are to: be amongst the top international companies in the field of making at the lowest cost and vending world-wide, the highest priced products derived from problem wastes; optimise use of resources by eliminating unproductive activities; and achieve front runner status in customer satisfaction, sales volume and profitability (OrgPML annual reports, 1995/96 & 1996/97). In addition to the long term goals, OrgPML has also set a number of medium term goals.

Company Structure

Has 8 subsidiaries (4 in Sri Lanka, 1 in England, 2 in Australia and 1 in Thailand) and 2 Associate companies (1 in Sri Lanka and 1 in the USA).

Number of Employees

At the end of 1996 OrgPML had 398 employees which is 61 less than the number they had in 1995.

Company Turnover	*1995/96*	*1994/95*
Turnover :	£ 11,126,412 (Rs. 945,745,000)	£ 6,294,141 (Rs. 535,002,000)
Profit (After Tax) :	£ 1,826,683 (Rs. 155,268,000)	£ 633,506 (Rs. 53,848,000)

Management Structure

As illustrated in page 20, OrgPML's organisation structure is a typical hierarchical model. However, in comparison to majority of other Sri Lankan organisations, OrgPML is less bureaucratic, and profit and customer satisfaction tend to override red tape (Weerakkody 1996a).

- **IS/IT Environment**

At the time of the initial case studies in November 1995 OrgPML's IS/IT environment supported the basic functions of accounting, engineering and the manufacturing processes. Most significantly the company's IS/IT infrastructure supported only around (50%) of the organisations day to day business activities, and had very little bearing on its goals and objectives (Weerakkody 1996a). Interviews with OrgPML sources revealed that nothing much has changed since. OrgPML uses a UNIX based operating system with file servers and workstations at key locations. The few IT related activities in place were mostly batch oriented with very few on-line applications being used. The IS development activities in the company do not involve systems analysis and design and evolve around software development and programming.

OrgPML Organisation / Management Structure

```
                    ┌─────────────────────────┐
                    │   Managing  Director    │
                    │     Project Sponsor     │
                    └─────────────────────────┘
                                 │
        ┌────────────────────────┼────────────────────────┐
┌──────────────────┐  ┌─────────────────────────┐  ┌──────────────────┐
│ Director         │  │  Director (Engineering) │  │ Director         │
│ (Technical)      │  │     Process Owner       │  │ (Factories)      │
└──────────────────┘  └─────────────────────────┘  └──────────────────┘
                                 │
                    ┌─────────────────────────┐
                    │           DGM           │
                    │ Human Resource Development │
                    │        Commercial        │
                    │  Research & Development   │
                    │    Project Co-ordinator   │
                    └─────────────────────────┘
                                 │
                    ┌─────────────────────────┐
                    │   Divisional Managers   │
                    │       Commercial        │
                    │       Production        │
                    │     Finance & IS/IT     │
                    │      Process Owner      │
                    └─────────────────────────┘
                                 │
                    ┌─────────────────────────┐
                    │  Departmental Managers  │
                    │   Engineering Projects  │
                    │  Engineering Maintenance │
                    │       Production        │
                    │ Engineering Procurement │
                    │ Packaging and Transit Store │
                    │     Quality Control     │
                    │ Management & Financial A/c │
                    └─────────────────────────┘
```

Assistant Manager (Accounts)

Systems Analyst/Programmer   Junior Executive *(User)*

Operational Level Employee
(User)

NOTE : The BP&ISR team members are indicated in **Bold** - *Italics*

APPENDIX 2 (a) : 'As Is' Model

USED AT:	AUTHOR: Vishanth Weerakkody	DATE: 18 Nov. 1996	WORKING	READER	DATE	CONTEXT:
	PROJECT: BPR : PAYMENTS Process	REV: 7 Mar. 1997	DRAFT			
			RECOMMENDED			
	NOTES: 1 2 3 4 5 6 7 8 9 10		PUBLICATION			

Inputs (left side):
- Purchase Order
- Invoice
- GRN
- Inventory
- Authorisation

Controls (top):
- Payment Authorisation Limit
- Unix System Controls
- S/36 System Controls

Outputs (right side):
- Vouchers
- Cash
- Cheques
- Periodical Listings
- Reconciliation Report
- Cash Book
- Updated Accounts
- Update Assets Expenditure

Central box:
MANAGE PAYMENTS

A0

Mechanisms (bottom):
- Paymt. System (Unix)
- Paymt. System (S/36)
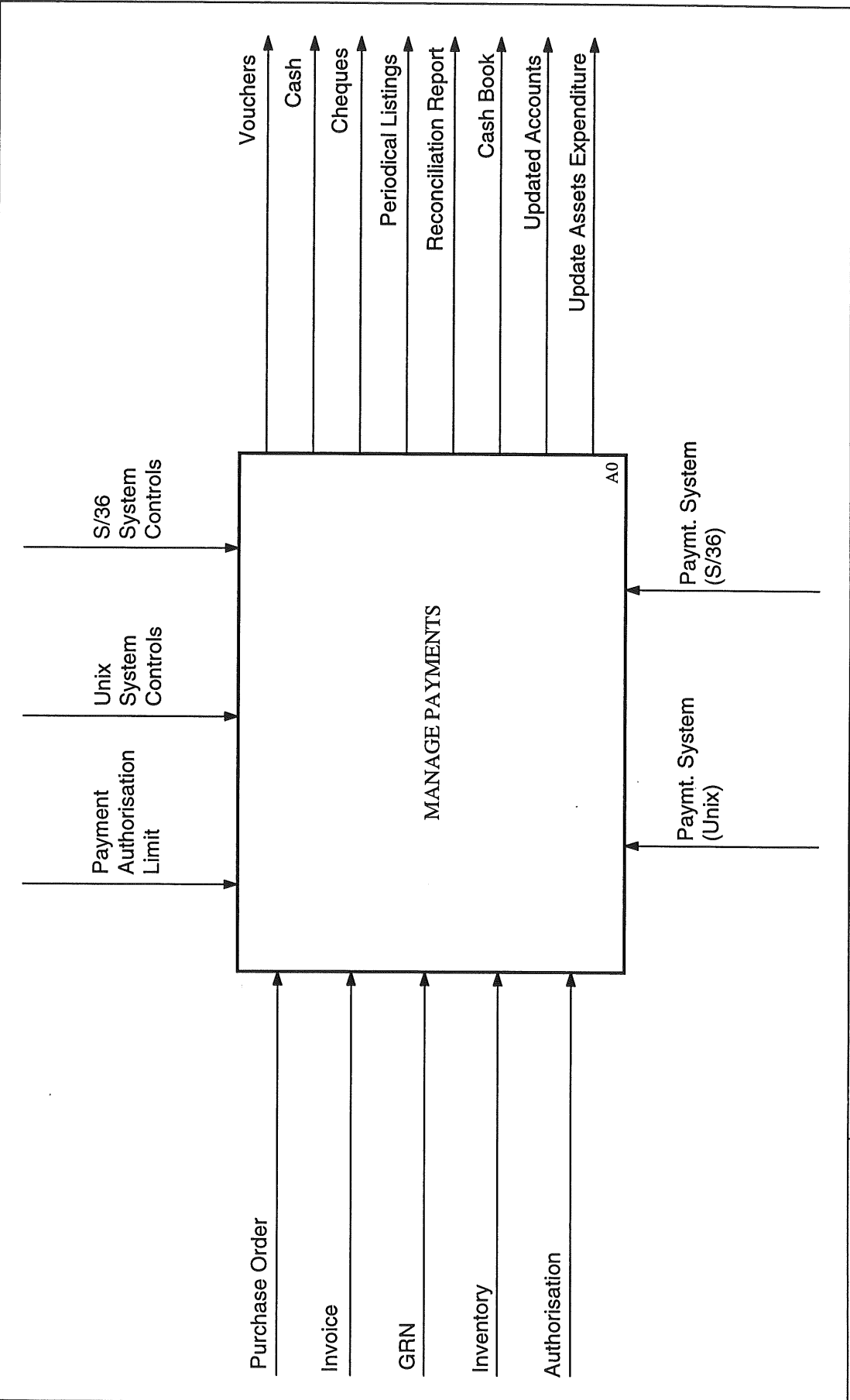
| NODE: A-0 | TITLE: MANAGE PAYMENTS | NUMBER: |

1

USED AT:	AUTHOR: Vishanth Weerakkody	DATE: 6 Dec. 1996	READER	DATE	CONTEXT:
	PROJECT: BPR : PAYMENTS Process	REV: 6 Mar. 1997			
		WORKING			TOP
	NOTES: 1 2 3 4 5 6 7 8 9 10	DRAFT			
		RECOMMENDED			
		PUBLICATION			A-0

C2 — Unix System Controls
C1 — Payment Authorisation Limit
C3 — S/36 System Controls

Purchase Order — I1
Invoice — I2
GRN — I3
Inventory — I4

C L E R K

PREPARE CPV / PCV — A1

Authorisation — I5
SNR MGR

Vouchers

AUTHORISE PAYMENT — A2

Vouchers

A/C ALLOCATE — A3
ACCNT (MNL)

Vouchers

CASHIERING — A4
CASHIER (MNL & IS/IT)

Vouchers

Reconciliation Report

LEDGER POSTING — A5
LEDG. CLERK (IS/IT)

Periodical Listings — O4

Cash — O2
Cheques — O3

Vouchers — O1
— O5
Cash Book — O6
— O7
— O8

Update Assets
Expenditure

Updated Accounts — M2
Paymt. System (S/36)

Paymt. System (Unix) — M1

NODE: A0   TITLE: MANAGE PAYMENTS   NUMBER:

2

| AUTHOR: Vishanth Weerakkody | DATE: 7 Dec. 1996 | READER | DATE | CONTEXT: |
| PROJECT: BPR : PAYMENTS Process | REV: 6 Mar. 1997 | | | |

NOTES: 1 2 3 4 5 6 7 8 9 10

WORKING	
DRAFT	
RECOMMENDED	
PUBLICATION	A0

C1

S/36 System
Controls

I1 Purchase Order
(MNL)

CHECK DOC'S
A1.1

OK

I2 Invoice
I3 GRN
I4 Inventory

DATA ENTRY
(1)
A1.2

User
Interaction

PRINTING
A1.3

Vouchers

Periodical
Listings → O1

ATTACHING
SUPPORT
DOCUMENTS
A1.4

Vouchers

CIRCULATION
& FOLLOW UP
A1.5

Vouchers → O2

(IS/IT)

(IS/IT)

(MNL)

Paymt.
System (S/36)
M1

(MNL)

NODE: A1 | TITLE: PREPARE CPV / PCV | NUMBER:

3

NOTES: 1 2 3 4 5 6 7 8 9 10

WORKING □
DRAFT □
RECOMMENDED ■
PUBLICATION □

A0

C1

Payment
Authorisation
Limit

ACCNT,

EXEC or Vouchers
I1

CLERK

(MNL)

SEND / TAKE
FOR
AUTHORISATION

A2.1

Manager
Satisfied

AUTHORISE
& DISPATCH
DOCUMENTS

A2.2

Vouchers

SIGN VOUCHER

A2.3

Vouchers O1

SNR MGR Authorisation
I2

(MNL)

| NODE: A2 | TITLE: AUTHORISE PAYMENT | NUMBER: |

4

AUTHOR: Vishanth Weerakkody	DATE: 9 Dec. 1996	WORKING	READER	DATE	CONTEXT:
PROJECT: BPR : PAYMENTS Process	REV: 6 Mar. 1997	DRAFT			
		RECOMMENDED			
NOTES: 1 2 3 4 5 6 7 8 9 10		PUBLICATION			A0

CASHIER

C1

S/36 System
Controls

Cash O1

Cheques O2

Vouchers O3

(MNL)

I1 Vouchers

**CHECK
AUTHORISATION
& PAY**

A3.1

Vouchers

(MNL)

**SERIAL
NUMBERING**

A3.2

Vouchers

**FLAG SYSTEM
RECORD**

A3.3

(IS/IT)

Paymt. System
(S/36)

M1
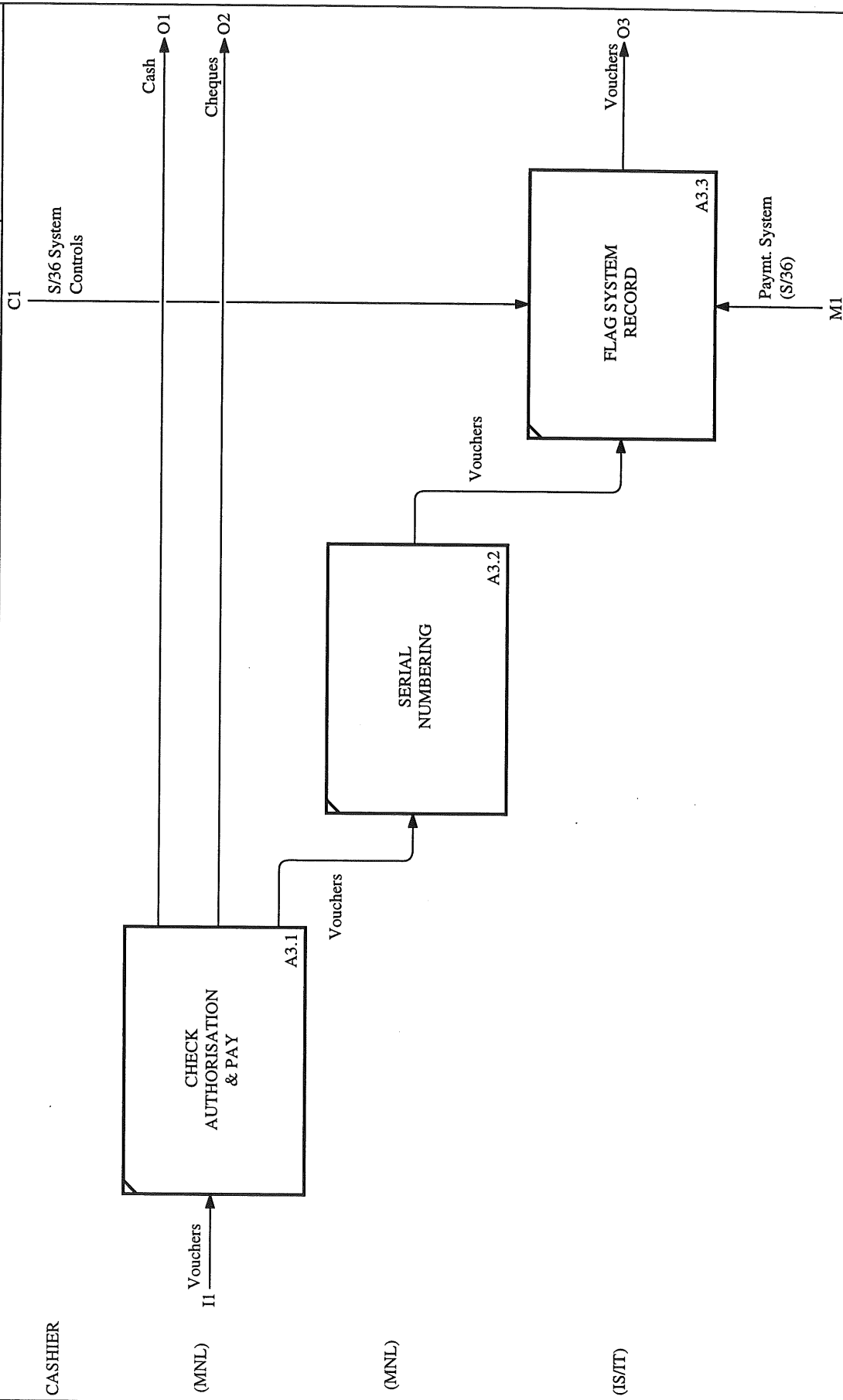
| NODE: A3 | TITLE: CASHIERING | NUMBER: |

DEPARTMENT OF COMPUTER SCIENCE

Exploiting BP&ISR In The Sri Lankan Context: An Action
Research Project

Vishanth Weerakkody

Technical Report No. 300

June 1997

LEDG. CLERK

C1

S/36
System
Controls

(IS/IT)

I1 Vouchers

ACCESS ACCOUNT

A4.1

User Interaction

Vouchers

POST TO LEDGER

A4.2

Reconciliation Report — O2

Cash Book — O3

Updated Accounts — O4

Update Assets Expenditure — O5

FILE DOC'S

A4.3

Vouchers — O1

(IS/IT)

(MNL)

Paymt.
System
(S/36)

M1

NODE: A4   TITLE: LEDGER POSTING   NUMBER:

7

APPENDIX 2 (c) : 'To Be' Model 2

USED AT: | AUTHOR: Vishanth Weerakkody | DATE: 18 Nov. 1996 | READER | DATE | CONTEXT:

PROJECT: BPR : PAYMENTS Process | REV: 7 Mar. 1997 | | | TOP

NOTES: 1 2 3 4 5 6 7 8 9 10 | WORKING | | |

DRAFT

RECOMMENDED

PUBLICATION

Payment Authorisation Limit

Unix System Controls

S/36 System Controls

Purchase Order

Invoice

GRN

Inventory

Authorisation

Paymt. System (Unix)

Paymt. System (S/36)

MANAGE PAYMENTS

A0

Vouchers

Cash

Cheques

Periodical Listings

Reconciliation Report

Cash Book

Updated Accounts

Update Assets Expenditure

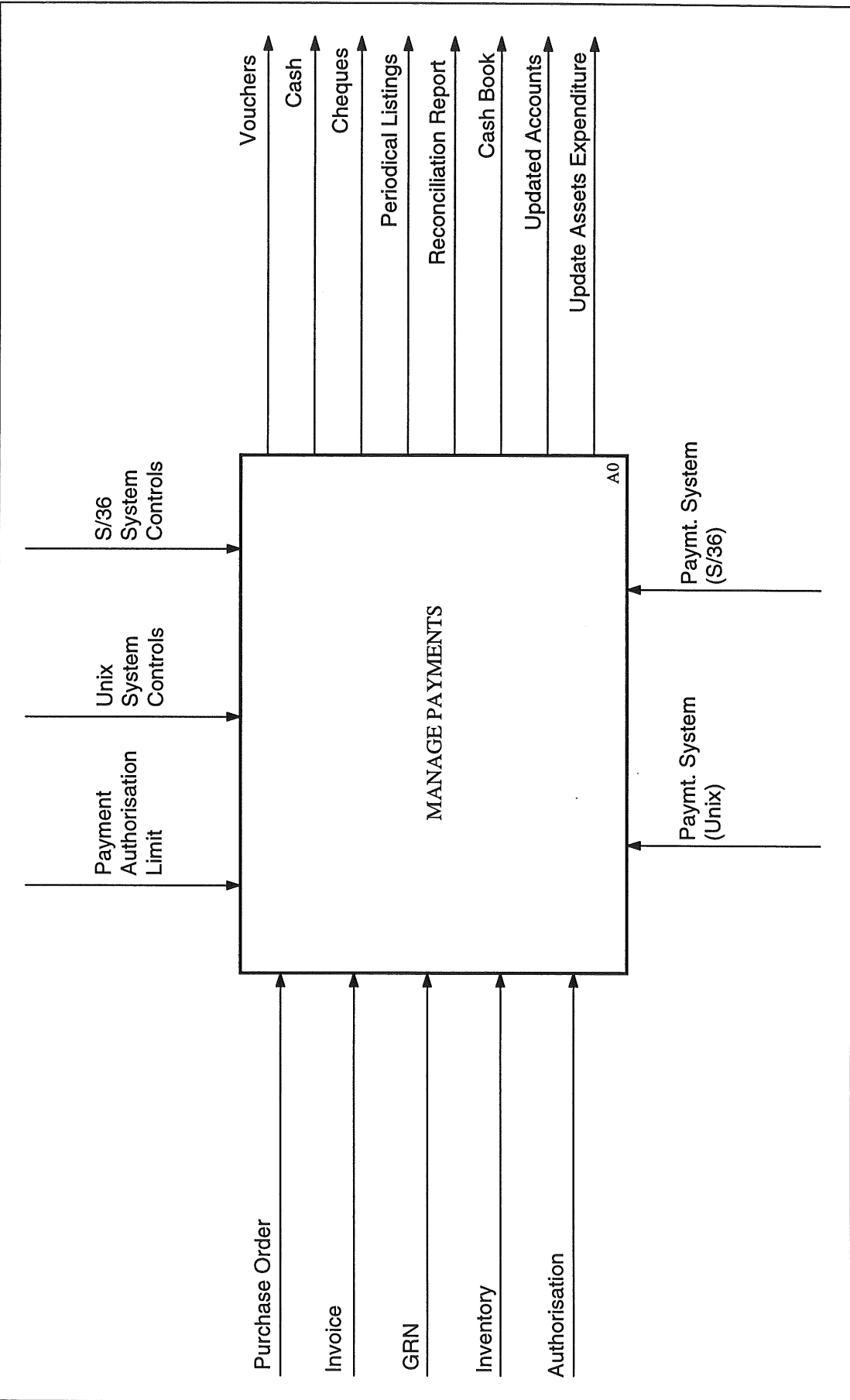NODE: A-0 | TITLE: MANAGE PAYMENTS | NUMBER:

| AUTHOR: Vishanth Weerakkody | DATE: 6 Dec. 1996 | READER | DATE | CONTEXT: |
| PROJECT: BPR : PAYMENTS Process | REV: 6 Mar. 1997 | | | |

NOTES: 1 2 3 4 5 6 7 8 9 10

WORKING	
DRAFT	
RECOMMENDED	
PUBLICATION	

TOP

A-0

C2 Unix System Controls

C1 Payment Authorisation Limit

C3 S/36 System Controls

O4 Periodical Listings

PREPARE CPV / PCV A1

AUTHORISE PAYMENT A2

CASHIERING A3

LEDGER POSTING A4

Vouchers

Vouchers

Vouchers

Vouchers

Cash O2

Cheques O3

Reconciliation Report

Vouchers O1 O5

Cash Book O6

O7

O8

Updated Accounts

Update Assets

Expenditure

Voucher File (Unix)

Paymt. System (Unix) M1

Paymt. System (S/36) M2

C
L
E
R
K
(MNL & IS/IT)

Purchase Order I1
Invoice I2
GRN I3
Inventory I4

SNR MGR (MNL)

Authorisation I5

CASHIER (MNL & IS/IT)

LEDG. CLERK (IS/IT)

| NODE: A0 | TITLE: MANAGE PAYMENTS | NUMBER: |

2

| AUTHOR: | Vishanth Weerakkody | DATE: | 7 Dec. 1996 | READER | DATE | CONTEXT: |
| PROJECT: BPR : PAYMENTS Process | | REV: | 6 Mar. 1997 | | | |

NOTES: 1 2 3 4 5 6 7 8 9 10

WORKING
DRAFT
RECOMMENDED
PUBLICATION

A0

Purchase
Order
I1

Invoice
I2

GRN
I3

Inventory
I4

CLERK
(MNL & IS/IT)

C1

Unix
System
Controls

CHECK DOC'S

A1.1

OK

DATA ENTRY
(1)

A1.2

User
Interaction

POSTING

A1.3

User
Interaction

PRINTING

A1.4

Periodical Listings

Voucher File (Unix)

O1

O3

Vouchers

ATTACHING
SUPPORT
DOCUMENTS

A1.5

Vouchers

CIRCULATION
& FOLLOW UP

A1.6

Vouchers

O2

Paymt.
System
(Unix)

M1

NODE: A1

TITLE: PREPARE CPV / PCV

NUMBER:

3

C1

Payment
Authorisation
Limit

H/O
or   Vouchers
FAC   I1 ——→

ACCNT / CLERK

SEND / TAKE
FOR
AUTHORISATION

A2.1

Manager
Satisfied

AUTHORISE
& DISPATCH
DOCUMENTS

A2.2

H/O
or   Authorisation
FAC   I2 ——→

SNR MGR

Vouchers

SIGN VOUCHER

A2.3

Vouchers ——→ O1

| NODE: | A2 | TITLE: | AUTHORISE PAYMENT | NUMBER: | |
| | | | | | 4 |

CASHIER

C1

Unix System
Controls

Cash O1

Cheques O2

Vouchers O3

(MNL)

I1 Vouchers

MAKE PAYMENT

A3.1

Vouchers

(MNL)

SERIAL
NUMBERING

A3.2

Vouchers

FLAG SYSTEM
RECORD

A3.3

Paymt. System
(Unix)

M1

NODE:	TITLE:	NUMBER:
A3	CASHIERING	

6

USED AT:	AUTHOR: Vishanth Weerakkody	DATE: 9 Dec. 1996	READER	DATE	CONTEXT:
	PROJECT: BPR : PAYMENTS Process	REV: 22 May 1997			
	NOTES: 1 2 3 4 5 6 7 8 9 10		WORKING		
			DRAFT		
			RECOMMENDED		
			PUBLICATION		A0

LEDG. CLERK

C1 Unix System Controls

C2 S/36 System Controls

(IS/IT) I2

Voucher File (Unix)

CREATE VOUCHER FILE FOR S/36
A4.1

Voucher File (S/36)

POST TO LEDGER
A4.2

Reconciliation Report O2
Cash Book O3
Updated Accounts O4
Update Assets Expenditure O5

FILE DOC'S
A4.3

Vouchers O1

(IS/IT) M1 Paymt. System (Unix)

(IS/IT) M2 Paymt. System (S/36)

(MNL) I1 Vouchers

| NODE: | TITLE: | LEDGER POSTING | NUMBER: |
| A4 | | | |

APPENDIX 3 (a) : 'As Is' Model

Project
Varience

Budget
Limit

**PREPARE
JOB CONTROL SHEET
(JCS)**

A0

Word Processing
System

Fresh Job Control Sheet

Used Job Control Sheet

Altered / Completed
Job Control Sheet

Discarded Job
Control Sheet

Overall Project Estimate

Job Estimate

Activity Details

Actual Job Cost

Job Transfers

Contingency Transfers

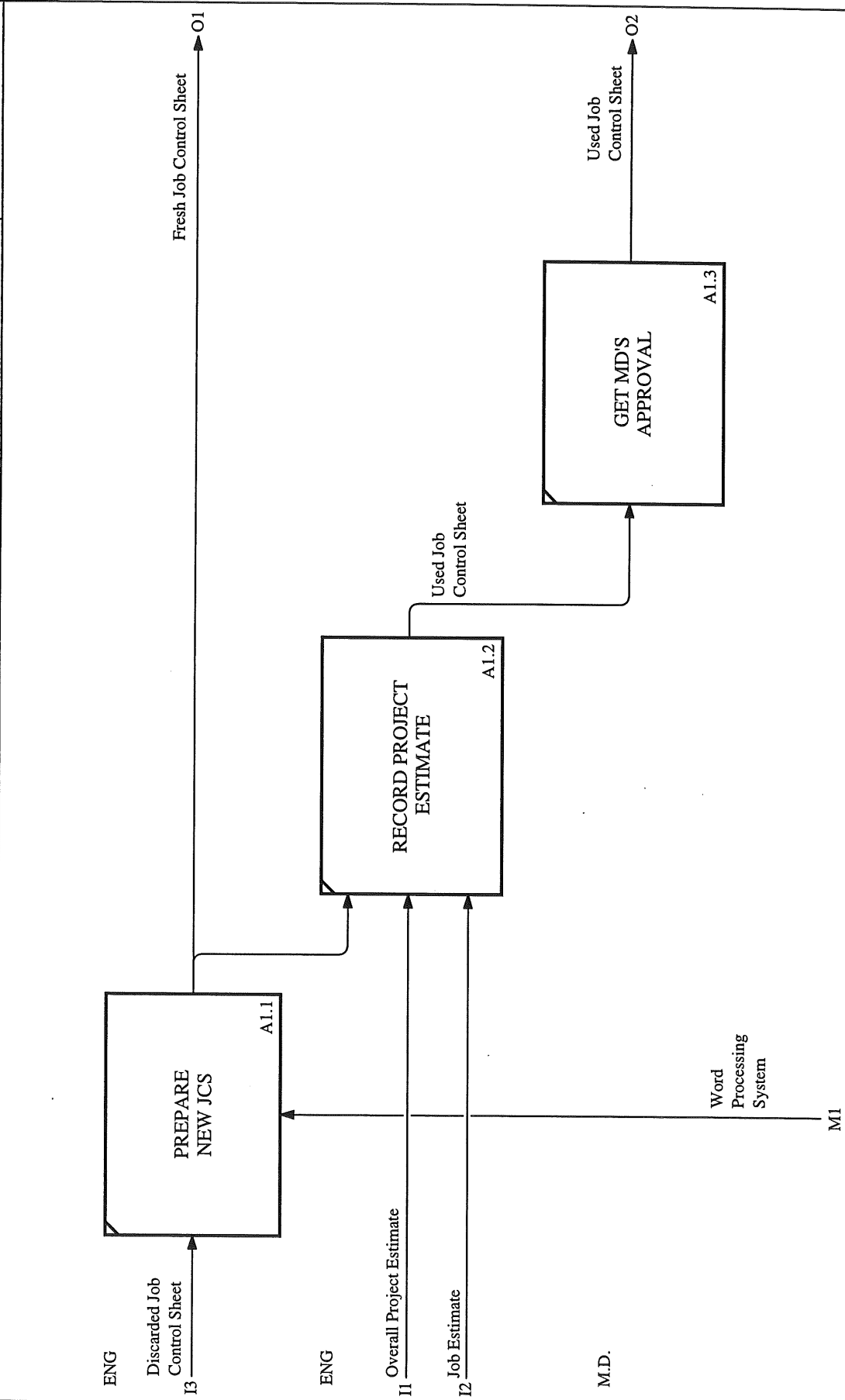| NODE: A-0 | TITLE: PREPARE JOB CONTROL SHEET (JCS) | NUMBER: |

1

USED AT:	AUTHOR: V J P Weerakkody	DATE: 18 Feb. 1997	READER	DATE	CONTEXT:
	PROJECT: BPR : Job Control Process	REV: 6 Mar. 1997			
					TOP
	NOTES: 1 2 3 4 5 6 7 8 9 10		WORKING		
			DRAFT		
			RECOMMENDED		
			PUBLICATION		A-0

ENG

Overall Project Estimate

I1

Job Estimate

I2

Activity Details

I3

Actual Job Cost

I4

Job Transfers

I5

Contingency Transfers

I6

C1 Budget Limit

C2 Project Varience

OPEN JCS

A1

OPEN JOB / SUB-PROJECT

A2

RECORD JOB DETAILS

A3

ALTER JCS

A4

Used Job Control Sheet

Used Job Control Sheet

Used Job Control Sheet

Used Job Control Sheet

Fresh Job Control Sheet

O1

Altered / Completed Job Control Sheet

O3

Discarded Job Control Sheet

O4

Word Processing System

M1

| NODE: | TITLE: | NUMBER: |
| A0 | PREPARE JOB CONTROL SHEET (JCS) | |

ENG

Discarded Job
Control Sheet

I3

PREPARE
NEW JCS

A1.1

ENG

Overall Project Estimate

I1

Job Estimate

I2

M.D.

Word
Processing
System

M1

RECORD PROJECT
ESTIMATE

A1.2

Used Job
Control Sheet

GET MD'S
APPROVAL

A1.3

Fresh Job Control Sheet

O1

Used Job
Control Sheet

O2

| NODE: | A1 | TITLE: | OPEN JCS | NUMBER: |

RECORD JOB ESTIMATE
A2.1

GET ACCOUNTANTS' APPROVAL
A2.2

GET DIRECTORS' AUTHORISATION
A2.3

I1 Used Job Control Sheet

I2 Job Estimate

ENG

Used Job Control Sheet

ACCNT

Used Job Control Sheet

Used Job Control Sheet

Used Job Control Sheet

DIR

Used Job Control Sheet

O1

| NODE: A2 | TITLE: OPEN JOB / SUB-PROJECT | NUMBER: |

USED AT:	AUTHOR: V J P Weerakkody	DATE: 18 Feb. 1997	WORKING	READER	DATE	CONTEXT:
	PROJECT: BPR : Job Control Process	REV: 6 Mar. 1997	DRAFT			
			RECOMMENDED			
	NOTES: 1 2 3 4 5 6 7 8 9 10		PUBLICATION			A0

ENG

I1 Used Job Control Sheet

I2 Activity Details

RECORD ACTIVITY
DETAILS

A3.1

Used Job
Control
Sheet

RECORD ACTUAL
COST

A3.2

Used Job Control Sheet

O1

I3 Actual Job Cost

All Activities in this
diagram are performed
by an Engineer.

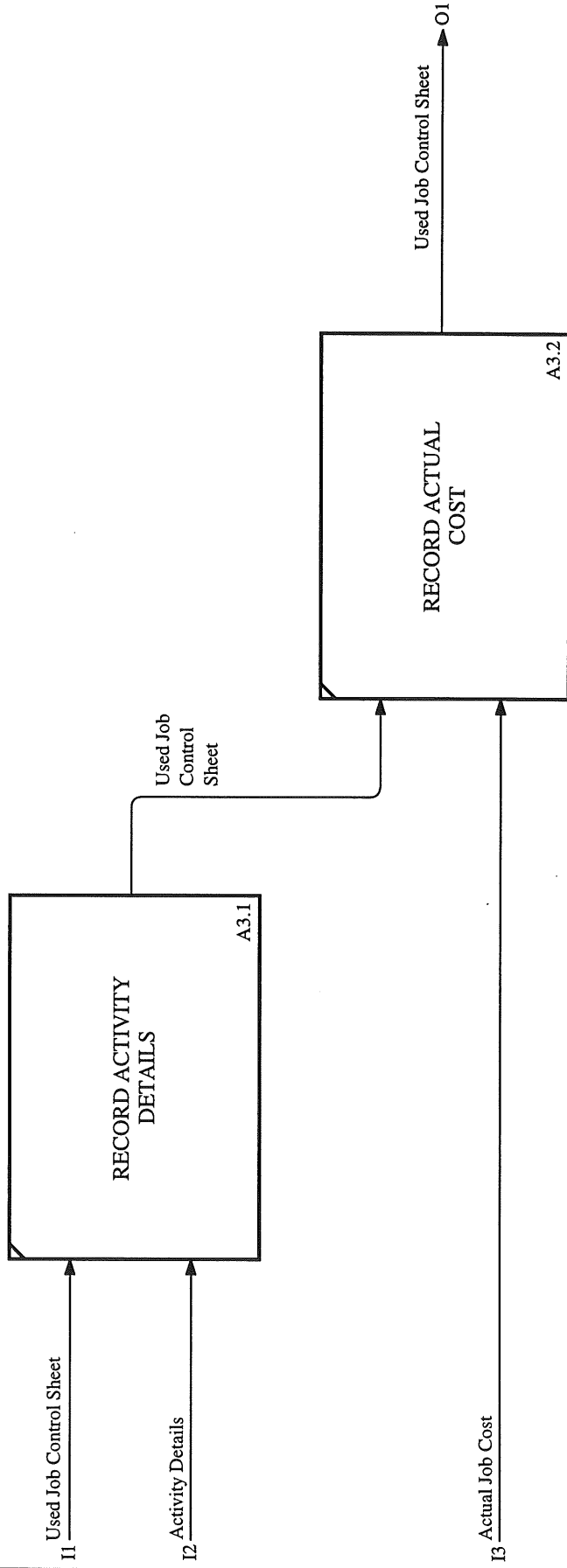| NODE: A3	TITLE: RECORD JOB DETAILS	NUMBER:

USED AT:	AUTHOR: V J P Weerakkody	DATE: 18 Feb. 1997	READER	DATE	CONTEXT:
	PROJECT: BPR : Job Control Process	REV: 6 Mar. 1997			
			WORKING		
	NOTES: 1 2 3 4 5 6 7 8 9 10		DRAFT		
			RECOMMENDED		A0
			PUBLICATION		

ENG

C1 Budget Limit

C2 Project Varience

I1 Used Job Control Sheet

CHECK FOR JOB BALANCE A4.1

YES → Used Job Control Sheet

NO

I2 Job Transfers

TRANSFER FROM JOB A4.2

Used Job Control Sheet

CHECK CONTINGENCY BALANCE A4.3

YES → Used Job Control Sheet

NO

TRANSFER FROM CONTINGENCY A4.4

Used Job Control Sheet

I3 Contingency Transfers

Used Job Control Sheet

DISCARD JCS A4.5

O1 Altered / Completed Job Control Sheet

O2 Discarded Job Control Sheet

All Activities in this diagram are performed by an Engineer

| NODE: A4 | TITLE: ALTER JCS | NUMBER: |

APPENDIX 3 (b) : 'To Be' Model

Overall Project Estimate

Job Estimate

Activity Details

Actual Job Cost

Job Transfers

Contingency Transfers

Budget Limit

Project Varience

Job Control Sheet (JCS)

PREPARE
JOB CONTROL SHEET
(JCS)

A0

Job Control
System
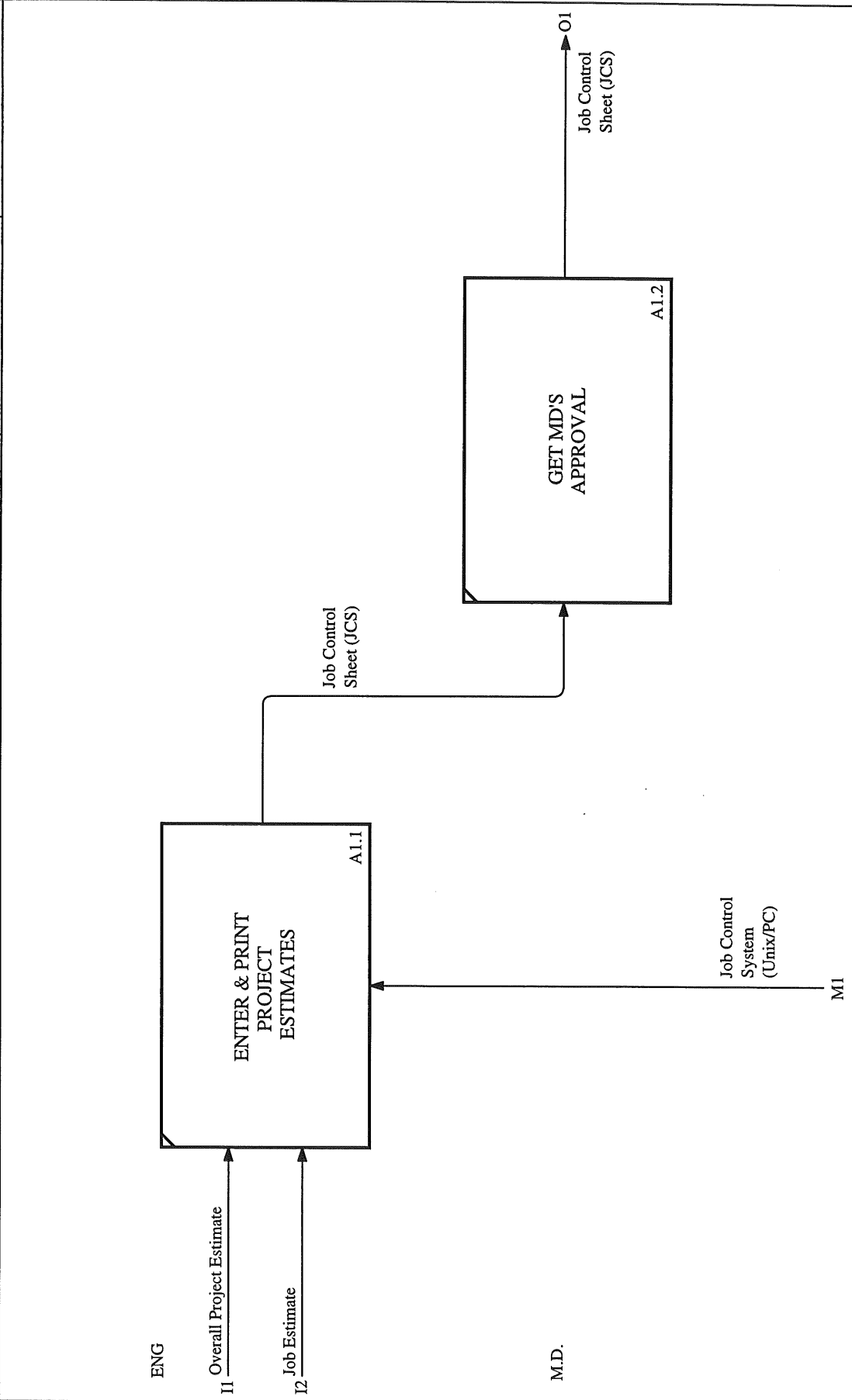(Unix/PC)

USED AT:	AUTHOR: V J P Weerakkody	DATE: 21 Feb. 1997	READER	DATE	CONTEXT:
	PROJECT: BPR : Job Control Process	REV: 6 Mar. 1997			
			WORKING		
	NOTES: 1 2 3 4 5 6 7 8 9 10		DRAFT		TOP
			RECOMMENDED		
			PUBLICATION		A-0

ENG

O1 — Job Control Sheet (JCS)

C1 — Budget Limit

C2 — Project Varience

I1 — Overall Project Estimate

I2 — Job Estimate

User Interaction

A1 OPEN JCS

A2 ENTER / UPDATE JOB DETAILS

I3 — Activity Details

I4 — Actual Job Cost

I5 — Job Transfers

I6 — Contingency Transfers

M1 — Job Control System (Unix/PC)

All Activities in this diagram are performed by an Engineer.

| NODE: A0 | TITLE: PREPARE JOB CONTROL SHEET (JCS) | NUMBER: |

ENG

I1 Overall Project Estimate

I2 Job Estimate

ENTER & PRINT PROJECT ESTIMATES

A1.1

Job Control Sheet (JCS)

GET MD'S APPROVAL

A1.2

O1

Job Control Sheet (JCS)

M.D.

Job Control System (Unix/PC)

M1

NODE: A1	TITLE: OPEN JCS	NUMBER:

USED AT: | AUTHOR: V J P Weerakkody | DATE: 21 Feb. 1997 | READER | DATE | CONTEXT:
PROJECT: BPR : Job Control Process | REV: 6 Mar. 1997
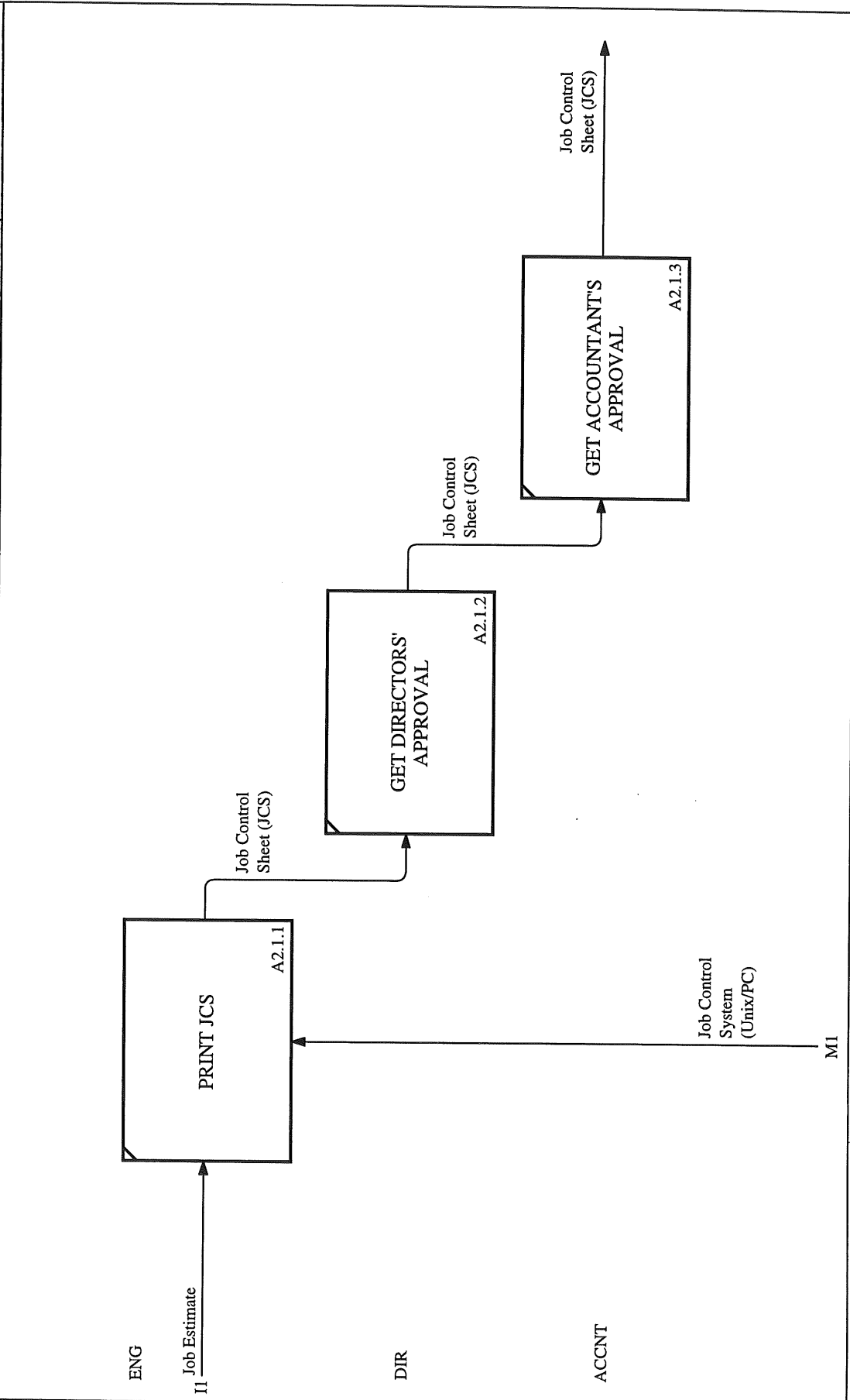NOTES: 1 2 3 4 5 6 7 8 9 10

| WORKING | DRAFT |
| RECOMMENDED |
| PUBLICATION |

A0

ENG

C1 Budget Limit

C2 Project Varience

I2 Job Estimate

ENTER JOB ESTIMATES — A2.1

User Interaction

I3 Activity Details

I4 Actual Job Cost

ENTER JOB DETAILS — A2.2

User Interaction

I5 Job Transfers

I6 Contingency Transfers

Job Control System (Unix/PC)

M1

ALTER JCS — A2.3

Job Control Sheet (JCS) O1

All Activities in this diagram are performed by an Engineer.

NODE: A2 | TITLE: ENTER / UPDATE JOB DETAILS | NUMBER:

AUTHOR: V J P Weerakkody	DATE: 21 Feb. 1997	READER	DATE	CONTEXT:
PROJECT: BPR : Job Control Process	REV: 22 Feb. 1997			

WORKING

DRAFT

RECOMMENDED

PUBLICATION

A2

NOTES: 1 2 3 4 5 6 7 8 9 10

ENG

I1 Job Estimate

PRINT JCS

A2.1.1

Job Control
Sheet (JCS)

**GET DIRECTORS'
APPROVAL**

A2.1.2

Job Control
Sheet (JCS)

**GET ACCOUNTANT'S
APPROVAL**

A2.1.3

Job Control
Sheet (JCS)

DIR

ACCNT

Job Control
System
(Unix/PC)

M1

NODE: A2.1	TITLE: ENTER JOB ESTIMATES	NUMBER:

ENG

ENTER ACTIVITY
DETAILS

A2.2.1

ENTER ACTUAL
COST

A2.2.2

User
Interaction

Job Control
System
(Unix/PC)

M1

I2 ── Activity Details

I3 ── Actual Job Cost

*All Activities in this
diagram are performed
by an Engineer.*

| NODE: A2.2 | TITLE: ENTER JOB DETAILS | NUMBER: |

CHECK JOB BALANCES A2.3.1

TRANSFER FROM JOB A2.3.2

CHECK FOR CONTINGENCY BALANCE A2.3.3

TRANSFER FROM CONTINGENCY A2.3.4

GET APPROVAL (DIRECTOR) A2.3.5

GET APPROVAL (ACCOUNTANT) A2.3.6

RE-ESTIMATE JCS A2.3.7

Cost Varience

ENG

I2 Job Transfers

ENG

ENG

I3 Contingency Transfers

ENG

DIR

DIR

ENG

Yes

No

Job Control Sheet (JCS)

Yes

No

Job Control Sheet (JCS)

Job Control Sheet (JCS)

Job Control Sheet (JCS)

Budget Limit

Project Varience

C1

C2

Job Control Sheet (JCS) O1

Job Control System (Unix/PC)

M1

NODE:	TITLE:	NUMBER:
A2.3	ALTER JCS	