ESPRIT - Technologies for Business Processes
GISIP Project no. 20.915

GISIP Evaluation and Dissemination

29 February 1996

Status: Final Report
Deliverable: [WP4: Evaluation and Dissemination]
Responsible Partner: University of Southampton
Due Date: 1st year / 6th month
Submission Date: 29 February 1996
Author: Keith Phalp and Peter Henderson

Contents

1. Introduction

This document forms the GISIP One deliverable 'Evaluation and Dissemination'. The purpose of the document is evaluate GISIP Phase One, and to describe the dissemination mechanism utilised.

The following section (Section Two), evaluates the GISIP methods and approach. This evaluation is in two parts. Firstly a summary of ongoing evaluation findings is presented. This is followed by an evaluation based on progress at the end of six months of the GISIP project (the end of Phase One). Section Three contains an evaluation of the results from GISIP Phase One. Finally, Section Four reports on the dissemination strategies and methods utilised within the GISIP project.

2. Evaluation of Approach and Methodology

In discussing the approach and methodology used by the GISIP partners, the report considers a number of levels of detail of method. In other words, there are methods within methods. For example, within the methods employed by consultants there are modelling methods (using established notations) and within these modelling methods there are methods used to structure the modelling, and so on.

Hence, this report starts by revisiting the need for methods. Similarly the sections evaluating methods, within this report, describe some exemplar levels of detail within the overall GISIP GUIDE method. This is necessary, because GISIP has employed new methods not only at the meta-level, in the design of GUIDE, but also at lower levels, in the use of new notations, and combinations of notations, to produce models of business processes.

2.1 Need for Methods

The application and integration of information technology, calls for a clear understanding of the way processes currently work, and the impact of the proposed technology. Changes in process, and the way in which organisation work, are inevitable, and must therefore be well understood. Process modelling, and process analysis encompasses a range of tools and techniques for assessing the way business processes operate, and the likely effects of change. However, these technologies themselves must not be applied in an ad-hoc way, and consultants and users alike need clear guidance about what should be modelled, how it should be modelled, and so on. Hence, methods are vital to the success of projects which attempt to introduce new technology.

The combined experience of the consultancy organisations provides much past experience of process modelling, business process reengineering, and associated methods and tools. Furthermore, this experience has been distilled into methods, which have been combined to form the GISIP GUIDE.

2.2 Feedback from Ongoing Evaluation

The following section summarises some of the evaluation issues and comments which have been raised during Phase One of the GISIP project.

2.2.1 Complementary Skills of Partners

One of the key successes in Phase One has been the combination of the complementary skills of the partners involved. This is particularly so at the consultancy level. This can be seen at a high level in the production of the GISIP Guide method. This method utilises the experiences of the consultants and their existing methods, to produce a method using their best practices, tailored to Geographical Information Systems.

However, at a less formal level there has also been much co-operation and discussion of appropriate strategies methods and tools. There has also been much cross-fertilisation of ideas, skills and expertise. Furthermore, this combination of skills has not just occurred within geographical boundaries. For example, there has been review and input of models produced within Denmark by Southampton University. This involved the production of models by consultants familiar with the business domain, which were then checked for consistency by those with greater tools expertise. This kind of co-operation has been a strength of the GISIP Phase One project.

It is also worth noting that this kind of international co-operation, has also been greatly enabled by the use of technology, for example, e-mail has been used not only for written communications, but also for the exchange of more formal models. (This use of technology will also be addressed in the section on dissemination).

2.2.2 GUIDE for Process Reengineering

The GISIP Guide method is a six stage approach. These stages or phases are:

1)   Strategic Positioning
2)   Initial Analysis
3)   Modelling
4)   Redesign
5)   Impact Analysis
6)   Implementation

This phased approach, has been well received within the user organisations, with both consultants and users reporting that the early phases (Phases One and Two) were very useful in gaining a consensus about how to proceed, and in gaining vital process buy-in among those who were to be involved in the subsequent modelling and redesign.

The initial analysis, modelling and redesign phases used a number of modelling approaches. For example, at Cannock, ProcessWise WorkBench was used to produce network diagrams showing who (what roles) communicate with whom. In addition, POSD was used to model and present the Cannock Gateway procedures. I

In Denmark JBP's Information Architect was used for initial process analysis and subsequent process used the standard ProcessWise WorkBench paradigm. Portions of

selected models were also modelled using POSD, and using RolEnact and the MBaSS slide show.

This use of notations can be considered as a different level of method. Hence, not only should the impact of the higher level modelling strategy (GISIP GUIDE), be considered, but also the appropriateness or success of the lower level use of modelling notation, to produce the models used within GISIP GUIDE.

2.2.3 Combination of Methods

It is clear, however, that this catholic use of a number of lower level notations, is somewhat unusual. It would appear that the consulting organisations chose to use methods which were deemed to be appropriate to the task or to the process under scrutiny, rather than to stick rigidly with a single notation. Reasons for this may be to do with the scale of the process under scrutiny, the experiences of end-users and consultants, and the nature of the problems to be solved. However, the use of this kind of objective goal based approach to selection of notation is admirable. Furthermore, the approach appears to have been well received by the end users, and to have produced models which they (the end users) felt to be representative of their own processes.

The combination of these low level methods into a single coherent strategy has not appeared to present a problem, since GISIP GUIDE outlines a number of distinct modelling activities within each phase.

However, a proof of concept (end to end) modelling method has been outlined. This method moulds the main modelling notations used into a coherent chain of models moving from process elicitation, through process description, and process experimentation (with executable models), to presentation of both static and executable models to users. This method will be described in later sections (2.3.4.2 and 2.3.4.2).

2.2.4 Previous experience and applicability

The differing experiences of the consulting organisations appears to have been a key factor in the success of the GISIP project. For example, not only have the domain specific skills of consultants been vital to the success and credibility of the consultancy, but also the experience of using tools and notations across a number of domains, has enabled their successful transfer to the local government domain. For example, the previous use of POSD in describing and structuring large business processes and the previous use of ProcessWise WorkBench across a number of domains, has enabled the choice of tool and notation to be appropriate to modelling tasks.

A good example of this discerning use of notation is that POSD provides a mechanism to describe the complexity of the Gateway procedures in a very understandable form. However, equally the PWB models of both Cannock, and SJC and Roskilde are appropriate to the level of detail of the modelling of processes undertaken.

2.3 Evaluation after Six Months

2.3.1 Combination of Partners

The early optimism about the collaborative skills of partners seems to have been justified. For example, the technical and tools expertise of some partners has been of benefit to others. One international example, of this collaboration has been the role of Southampton University in providing technical expertise in reviewing models of Danish Local Government. In addition, workshops have provided an excellent forum for the presentation of different low-level modelling approaches.

The demonstration of the potential for the combination of POSD with PWB has only been possible because all consulting organisations made their models available to other parties. This allowed for models to be produced by different partners, in different notations, representing the same process. These models were then compared and contrasted in a constructive collaborative manner.

Similarly, the consulting organisations have been able to pool their expertise in order to move towards improved process scenarios which are applicable to all end user organisations. The generic case handling model (described further below) provides an excellent example of this kind of cross consultancy collaboration.

2.3.2 Using GUIDE Methods

The production and subsequent application of the GISIP GUIDE method appears to be a particular success. Again it is interesting to note that the flexibility of the method has allowed consultants to emphasise areas which they felt most appropriate to end users.

The success of these undertakings can be seen by the positive results outlined in each of the reengineering reports.

2.3.3 Complementary Views of Local Government Processes

It appears to have been an efficient use of resource to allow for processes to be analysed at different levels of abstraction. This provides two kinds of views of local government processes, which one may categorise as Strategic and Operational.

For example, one might consider that the project detail of ProcessWise Standard Diagrams (see models of Roskilde or SJC) is operational detail. The examination of this operational detail leads to process advances, such as the move towards the generic case handling model. In contrast the POSD models of Gateway are a way of presenting a complex strategic process. However, within this strategic framework one discovers (as with the subsequent modelling of Cannock) operational procedures and processes - which are again candidates for process improvement. (Again at this operational level one can discern the kind of case handling procedures which may be described by a model like the generic case handling model).

This examination of strategic and operational views is beneficial for two main reasons. Firstly it presents a more rigorous test of the GUIDE approach, and the

associated modelling methods. Secondly it provides a richer picture of European Local Government processes.

2.3.4 Tools and Notations Overview

A brief description of each notation now follows. This is intended only to give a flavour of the notations, in order to understand this evaluation and dissemination document.

Information Architect, or "Strategist and Architect" is a modelling strategy based on IBM's Systems Planning Methods and James Martin's Information Engineering Methods. The method has been revised and used extensively by JBP. This approach is really more of a method than a notation, and has been incorporated into GISIP GUIDE. The main modelling product is a matrix of tasks along two orthogonal axes of Processes and Subject databases. This matrix is optimised (forming a diagonal string in the matrix reduces duplication, and separates and assigns processes to subjects through the tasks), as a stage in the planning of the information systems aspect of process design.

POSD is a notation with single primitive (a behaviour) which can be decomposed into processes, objects, roles, and so on. Where behaviours touch this implies that they have some shared behaviour, typically an interaction, and this must be maintained consistently throughout the POSD model hierarchy. (For a description of POSD see (Henderson and Pratten 95)). The major advantage of POSD, is that it allows a model to be decomposed not only in terms of processes or activities, but also in terms of interaction. This alleviates the 'wire syndrome' so commonly found in process based notations, which often causes overly complex higher level diagrams.

ProcessWise WorkBench - PWB (ICL, 95) is a process modelling tool which may be used in order to produce a number of types of graphical process model. The standard version of this tool allows one to produce standard (data flow like) models quickly, and to run some basic model checking for consistency and completeness. The standard models consist of three main primitive types. These are processes, business objects, and roles. Within GISIP, simple analysis with the tool has been undertaken mainly to check for completeness of models, for example to check that all inputs and outputs of sub-processes balance with their parent process. However, more complex analyses have been carried out for the generic case handling model. (Section Three includes a description of the generic case handling model).

The Professional version of the WorkBench tool allows for greater flexibility in the choice of modelling paradigm. For example, one use of this tool has been to produce models based upon a production rules (state-based condition-action) paradigm which is akin to a simplified Role Activity Diagram. This particular meta-model of the professional tool also enables one to automatically generate RolEnact code (see below) from these models. (Note that this meta-model and conversion was developed by a member of the ProcessWise Group at ICL).

RolEnact is a particular instance of a modelling language called Enact. Enact is used (within this context) as a process modelling engine, with which to run modelling paradigms. RolEnact code has rigorous semantics - being based upon a state model of

processes and can thus be executed. These executable models run under Windows, launching roles as independent Windows programs which communicate through the Enact DLL. This allows for rigorous experimentation with the process. Process scenarios may be produced and automated so that users may then experiment with running process models. This simulation may be used either as a first stage in moving towards process support, as a simple process mock up, or simply as a more rigorous presentation mechanism for proposed process changes.

2.3.4.1 Structure for Combination of Notations

The GISIP Guide method allows for the use of a number of modelling notations across its six phases. This multi-view approach appears to have provided consultants and users with the ability to choose notations appropriate to their modelling objectives.

Within the first six months of GISIP, these models have been largely distinct, however. For example, though different modelling notations have provided different views of the processes under scrutiny, there has been no large-scale mapping from one view to another. A good example of this is that the network models of Cannock, and the POSD models of Gateway show operational and strategic concerns. Though these models provide useful alternative viewpoints, it is not clear how they map to each other, in other words how one maps aspects of strategy or procedure on to existing actual processes.

However, though such formal combination of modelling views has not taken place an example modelling method has been developed in order to show how the notations used by the GISIP project may be combined. This allows users to choose models appropriate for different purposes, whilst still retaining the ability to map these separate models into a coherent structure.

2.3.4.2 Combination of Methods and Notations

The aim of the example (proof of concept) work was to have not only understandable notations for process elicitation and validation, but also to have executable process models which are suitable for presentation to users. That is:

- To initially describe processes using a notation which users understand.
- To be able to experiment with processes using an executable notation.
- To be able to present static understandable models of the process solution to users.
- To use a structuring notation (Process Oriented Systems Design (POSD) - (Henderson and Pratten 95)) which simplifies the presentation of complex models into a more understandable hierarchical model.
- To be able to present executable models of processes to users, which they can understand, and with which they can experiment with the logic of the process.
- To be able to map between models.
- To be able to go through this process quickly enough to be able to provide feedback to users when they need it.
- To have a method which links these models into a unifying structure.

This appears to have been a successful trial. Full details can be found via the GISIP home page, however, a summary of the work is also described here, in order to show the potential for further investigation in phase two of the GISIP project.
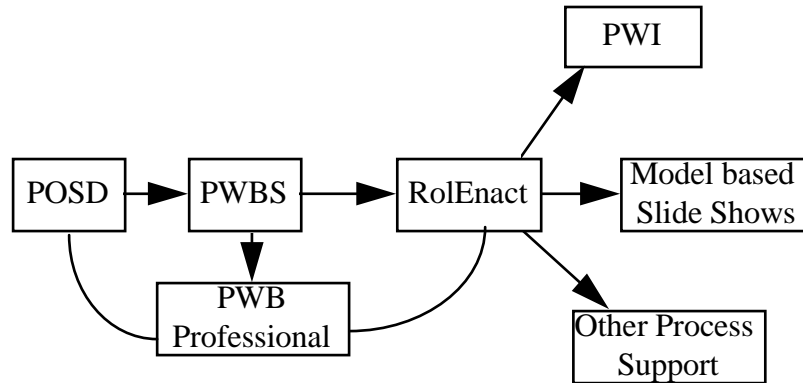
Modelling Phases and their Relationships

2.3.4.2.1 POSD - PWB

Two scenarios were produced to show how POSD may be mapped to standard ProcessWise WorkBench (PWB) models, and vice-versa. In the first case a POSD model was produced after the production of PWB models, in order to structure them more neatly and concisely. In the second case models produced in POSD were represented in PWB in order to check the POSD models for consistency and completeness.

This first use of POSD was meant to be mainly illustrative, and was presented back to the Danish partners, in order to show how POSD could be used to structure the diagrams which had been produced in the standard WorkBench notation (PWBS). In presenting these models back, not only to the consultants who had produced the PWBS diagrams, but also to representatives of the municipality, it was felt that the POSD depiction did accurately reflect the process under scrutiny in a particularly simple and understandable way.

It is also worth noting that the production of POSD diagrams led to the discovery of some inconsistencies in the PWBS diagrams upon which they were to be based. (That is, that in ensuring that touching behaviours have interaction or shared behaviour some gaps became apparent).

The second scenario was worked in the reverse way, in that a portion of an original huge POSD model was expressed in PWB. The reason for doing this was to have a further check of the completeness and consistency of the model by running some analyses. In examining these two contrasting models the key point to note is that the POSD representation of this very complex business process allows the interaction to be decomposed and shown at lower - appropriate - levels of detail. Hence, the POSD diagram is easily understood and digested, even by non-technical users. This problem

of wire syndrome is apparent even by looking only at a portion of the (simplified) top level of the PWB diagram. Despite the fact that there are only three processes shown on this diagram, the picture is very busy. In the POSD diagram, this interaction can be decomposed, and shown where appropriate, since all the modeller needs to do is to place the two behaviours adjacent and touching to represent that they have some shared behaviour (often lower level interactions).

In conclusion it appears that it is possible for these two user-facing modelling notations to be combined. For example, one may use data-flow like techniques (augmented with supporting roles) to describe process detail, and use POSD (briefly outlined above) to structure processes into a more understandable and hierarchic model.

2.3.4.2.2 PWB Enact

In moving from process elicitation to process simulation the following modelling phases are undertaken:

- Create PWB Model - Identify Roles
- Create Condition Action Model
- Create RolEnact
- Experiment with Process Logic in RolEnact
- Create Visual interpretation of process
- Present / Repeat

The final product of this modelling is a Model Based Slide Show (MBaSS) model, which has also been referred to as a multi-media slide show demonstration. The screenshots below, show part of a modelled process scenario , which was taken from some of the South Jutland processes, and based upon WorkBench diagrams provided by Danish consultants.
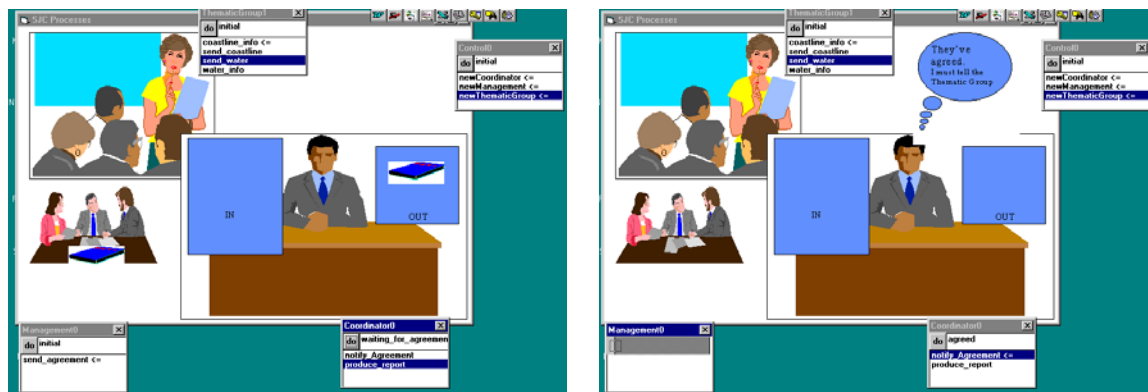
One the screen can be seen three groups (or roles). The roles are controlled by clicking on windows objects - in this version seen as rectangular boxes, with allowable actions listed. As these roles interact (which is controlled by the user experimenting with the process model) the objects on screen move from role to role to represent changes in the overall process. (For example, the report on the Coordinator's desk disappears only once the management group have agreed it).

One of the benefits of running a scenario on a computer is that it can illustrate that bottlenecks occur when certain choices are made. Or perhaps (less seriously) where the process does not quite behave as has been intended. Without running through such process simulations it is quite possible to make similar errors in process redesigns. When such errors are compounded by supporting process support tools (enabling Information Technology) only allowing process users to take part in certain activities, the consequences can be significant. Hence, the need for presenting executable process scenarios to users, in ways in which they themselves can experiment with models and understand more fully the consequences of possible process redesign

In summary, this method provides a way to produce a graphical understandable (slide-show like) model, which is controlled by a rigorous underlying process model. Rather than develop new paradigms throughout, this method has chosen to use some notations which are commonly used for process elicitation and which users can easily understand. Hence, it is not necessary to change the initial user-facing process modelling notations, with which users, and consultants alike, have confidence and experience. The value of the work is in mapping these kinds of notations to more rigorous representations of process (developed within the GISIP consortium) which allow the creation of executable models. This provides a coherent route from user-facing models through to process simulations. The development of (MBaSS) models which provide accessible process simulations to non-technical users extends the mapping to provide an executable user-facing modelling solution. This solution would be applied within GISIP Phase Two.
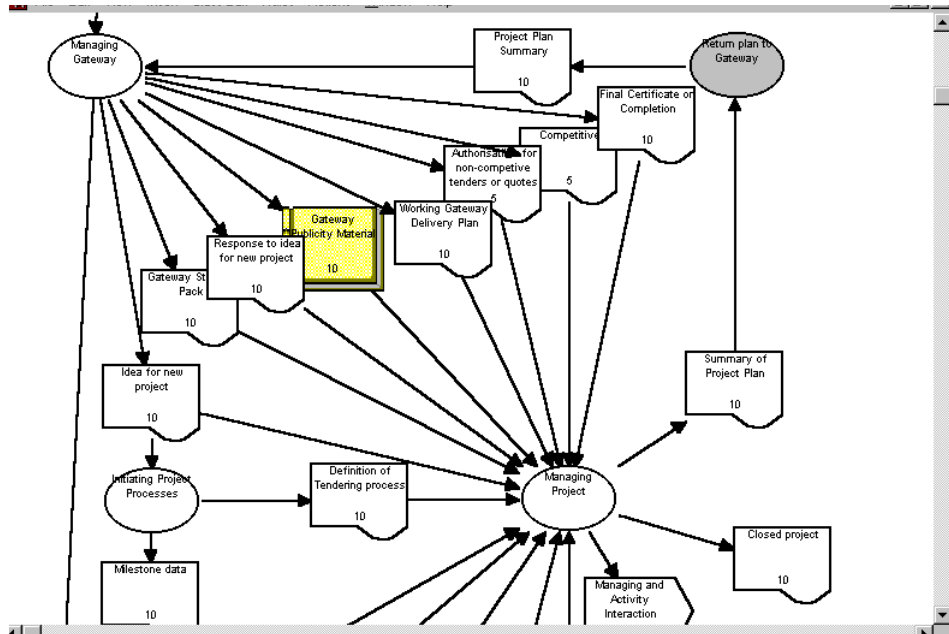
2.3.5 Appropriateness of Methods and GUIDE

It is encouraging that the use of methods within GISIP , and most notably notations appear to have been tailored to modelling needs. However, a possible area for further investigation is the combination of these apparently disparate models to provide a formally coherent view.

However, the above (Combination) example shows that it is possible to map from one kind of notation to another. Within this method the production of executable slide shows is an area of work which shows great promise and potential, and which further phases of GISIP would pursue.
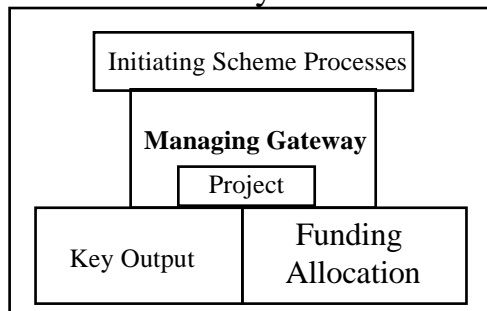
In addition, it is clear that the use of POSD has been less than originally expected. One reason for this limited use may be that the kind of process problems tackled were not of sufficient complexity to warrant the need for such a mechanism as POSD. For example, may of the standard WorkBench models were of discrete process portions, within local government, and thus the notations used to model them proved to have sufficient structuring mechanisms. The exception to this was in the Gateway procedures, where it was important to link together lower level detail into a coherent whole. This presents a very large and complex single model, and the need for POSD is much easier to see in this case. (It is clear that POSD provides an excellent structuring mechanism; as can be seen by comparing the POSD representation of Gateway with its equivalent PWB).

A portion of the top level of the PWB Gateway model

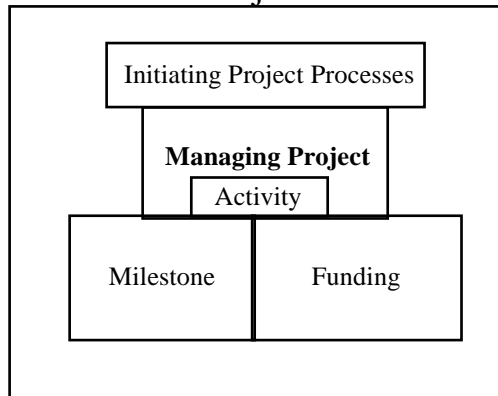The equivalent top level (in full) in POSD

Gateway Scheme

Initiating Scheme Processes

Managing Gateway

Project

Key Output

Funding Allocation

Project

Initiating Project Processes

Managing Project

Activity

Milestone

Funding

Though the potential of the POSD notation has been further demonstrated (by showing how it can be structured around standard WorkBench diagrams) it has not been applied across the whole project. This may well be a further example, of consultants choosing notations which are most appropriate for the needs of the modelling task (as suggested above), rather than simply sticking to a particular method.

2.3.6 Summary

The greatest success of the GISIP project seems to be in producing real reengineering solutions for IT enabled change. These are solutions which the end-users have already endorsed, and are putting into practice. In this, the project seems to have exceeded expectations.

That there are also clear process commonalties across local government organisations (e.g. case handling) is also of great benefit. However, in order to further examine the success or otherwise of the project it is worth revisiting the original objectives.

2.4 Revisiting Objectives

2.4.1 Original Objectives

Original Objectives may be summarised as follows:

- Investigate opportunities for reengineering enabled by GIS.
- Investigate business processes supported by GIS.
- Apply Business Process Modelling techniques to the end users.
- Produce a method which utilises GUIDE, other methods expertise, and tools and notations such as PWB and POSD.
- Determine Reengineering.
- Assess technology for GIS and Process Support.

2.4.2 What has been Achieved

The GISIP project recognised the opportunity which Geographical Information Systems (GIS) offer their users for re-engineering their business processes. In Local Government, many business processes are centred on the use of geographical data. At all levels, Local Government is installing GIS, and is thus in need of assistance with re-engineering their business processes to take advantage of this new business technology.

GISIP established a consortium of three Local Government organisations and five consulting groups bringing together expertise in GIS and business processes. The task was to analyse selected business processes of the three end-users and identify core processes where re-engineering to take advantage of GIS could yield substantial cost savings or service improvements.

The consultants, between them, supplied a number of complementary process re-engineering methodologies and tools. The end-users supplied a variety of process support tasks which range over the whole spectrum of Local Government from municipality (Roskilde), through district (Cannock) to region (South Jutland).

The consultants have combined their methodologies and by applying them to the range of re-engineering tasks supplied by the end-users have identified business process implementation tasks within the end-users where real benefit will accrue to the citizens of the respective entities, when the re-engineered processes are implemented.

The consultants supplied various tools and methodologies, including:

- ProcessWise Guide and ProcessWise WorkBench for business process analysis and modelling.
- An IT Architecture analysis, structuring and specification methodology.
- GIS expertise and methods for analysing human resource management.
- POSD notation and the Enact animation technologies.
- The capability to do technology assessment for GIS and business process support.

Aspects of all of these components were combined in the GISIP methodology, presented in the GISIP guide and applied to the end-users business processes.

The GISIP methodology was applied to various case-handling business processes in the Municipality of Roskilde, especially those of the type where planning permission is required. Such processes rely heavily on information held on maps and on planning legislation, much of which is of a geographic nature. Core processes were identified and proposals made to re-engineer these processes to take advantage of arrival of GIS technology.

The same techniques were applied to core business processes identified by South Jutland. In the same way, business processes were analysed within Cannock. In all cases, core processes were identified and re-engineering proposals made.

Meanwhile other consultants and end-users, assessed the current state of technology required to meet the end-user's business requirements.

2.4.3 Assessment

If one revisits the original objectives again, it is clear that these have been achieved. Having identified areas and opportunities which are appropriate to technology enabled (GIS enabled) processes, these processes have been investigated using state-of the art process modelling techniques. This investigation across all three authorities has utilised the GISIP GUIDE methods. The methods have utilised tools, such as POSD, PWB, and others, which were deemed to be most appropriate to the modelling task in hand. The modelling has enabled reengineering solutions to be found within all three end user organisations. Furthermore, a generic reengineering solution has been found, which is only possible because of the enabling technology of GIS. This generic case modelling solution is described within reengineering reports, and will be

briefly outlined within the evaluation of GISIP results below. The assessment of both exiting GIS and process support technology has been carried out, and produced in a separate report.

3. Evaluation of GISIP Results

3.1 Proposed Solution as assessed by users

User organisations believe that the GISIP exercise has identified reengineering solutions which will improve the efficiency of their processes, and which will pay for themselves over a few years. A generic modelling solution has been identified which will be instantiated for case handling within local government. This generic case handling model will be further examined below. The following section (3.2) describes the generic case handling model and considers the quantitative effects of this proposed solution. However, the main benefits of the solution, from the user point of view, are in providing a better service to their clients or customers. These are what have been termed soft benefits, and are these benefits are outlined in section 3.3.


3.2 The generic case handling model

The business process modelling carried out by the Danish consultants (Skankort - JBP) as part of the GISIP project has identified areas in the case-handling procedures of local authorities, where some improvements may be made. A new case -handling process has been proposed by the Danish consultants, and agreed across all participating partners. This process is possible because the use of GIS means that it is possible for upstream process contacts to have information earlier, and that information can be more easily accessed by single individuals. In the extreme this means that some cases may be handled by a single multi-disciplinary case manager, whereas previously they would have involved a number of specialists groups.

This model has been represented in ProcessWise WorkBench, in order to carry out some cost benefit and scenario analysis.

The PWB models below show the costing of data which will be used to argue the efficacy of implementing the new redesigned generic case handling process. The first model shows a PWB equivalent of the generic case handling process with numbers taken from the study of current government processes. This model has been split into two hierarchical layers.

Parts of Top
Wed Feb 7 14:50:34 1996
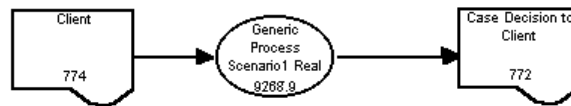
The upper layer shows a single process bubble for the case handling process with a figure representing the total time that the process uses. The lower layer shows the process in greater detail. Each lower level process (represented by an ellipse) has a worktime and a volume. Each business object (represented by roughly rectangular document shape) has a volume. The worktime is the time to process a single volume (a case). Hence, the product of worktime and volume will give an overall processing time used by that process. The business object volumes can be seen entering and leaving processes, and being distributed in different ratios. The sum of all of these overall processing time figures, gives a total processing time for the case handling process (as shown in the high level process bubble).
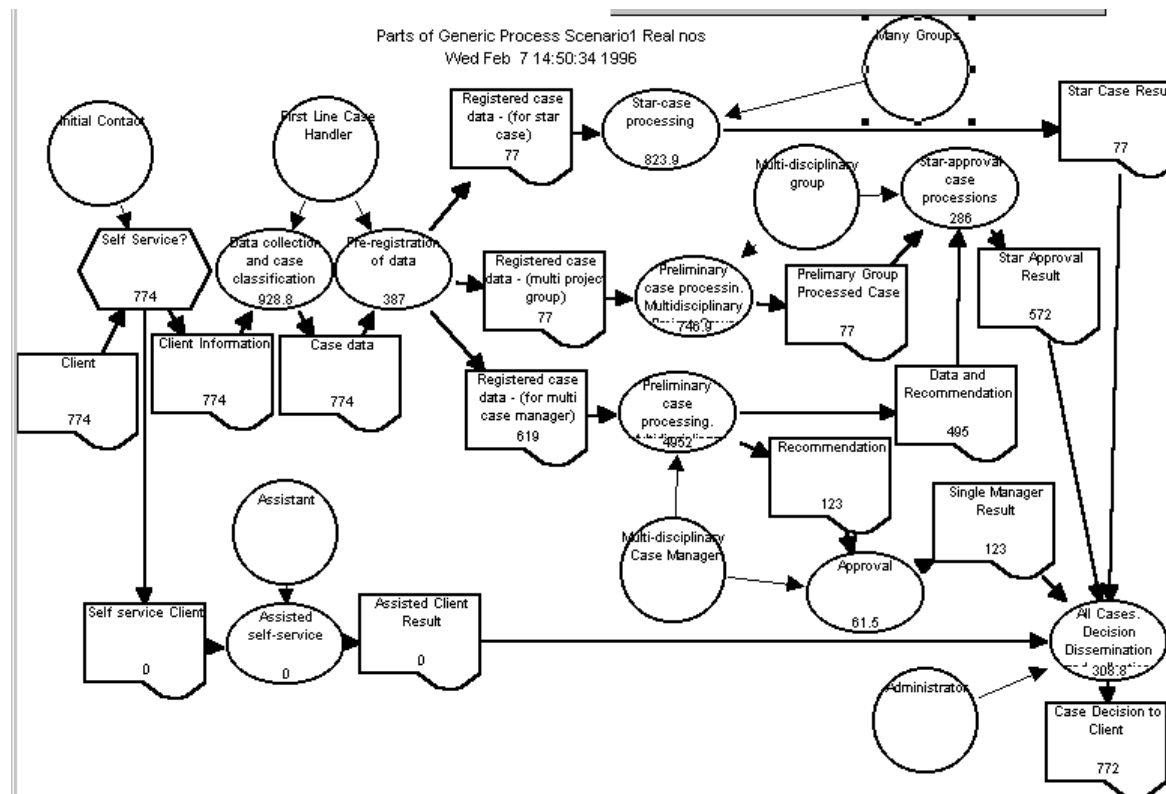
The amount of clients or customers going down a particular process stream is represented by the ratios of business objects. It is these ratios which may change, and which account for the different scenarios which are presented. For example, the

scenarios give a feeling for the impact of greater numbers of clients using a single multi-disciplinary case handler as opposed the traditional multi-group (star case) processing or vice-versa. In essence the scenarios change the percentages going in one of three streams, and the name of each top level process includes this ratio. Rather than present the detail of each scenario one may just show the top levels to users, with the total figure, and explain how the ratios relate to the volume streams. For example one might present the following scenarios as:

Scenario 1:   Real numbers: volumes split in ratio 10:10:80 (also shown above).
Scenario 2:   volumes split in ratio 60:20:20
Scenario 3:   volumes split in ratio 80:10:10
Scenario 4:   volumes split in ratio 2:8:90
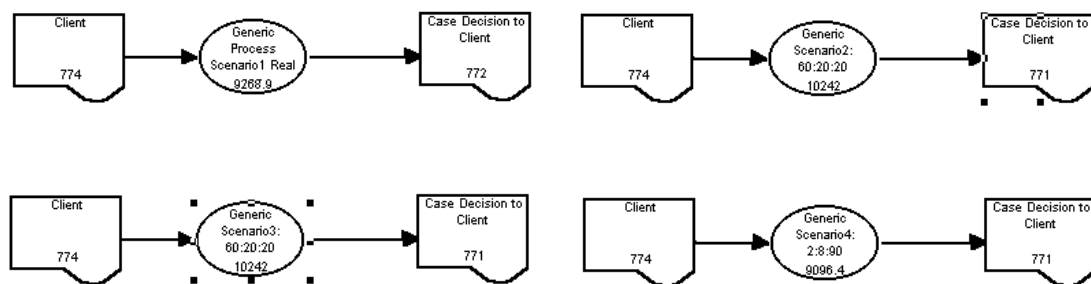
Hence, not only have modelling methods been used which allow for the elicitation of process, experimentation with process redesign, and presentation to users of process scenarios, but also to gauge the quantitative impact of process change. Furthermore, by integrating the business process metrics with the process model, it is far easier for users to understand where, and why to collect these measures, and to feed the results back for future process change.
.

3.3 Soft Benefits

The scenario outlined above shows how the business processes within local government organisations may be changed, so that cases (e.g. for planning applications) are handled differently. Although it is expected that there will be hard cost benefits, and thus some saving in time, and money, it is the soft benefits which most interest the end user organisations. For example, the use of a GIS, and the use of multi-disciplinary case managers (changes to process) open up many opportunities for providing improved service to the public (the clients). These benefits include:

Having a single interface with the local government.

Currently, one might have to visit a number of departments depending even within the context of a single planning application. This is confusing. Furthermore, when one contacts a local government office, for example by phone, one expects that the case details will be handled and passed across seamlessly. In other words, the public expect that department already should have knowledge about their case. Currently this might not be so. Even if the case is, in reality, handled by a number of people, if they

all have access to the same case data this creates the illusion of dealing with a single entity; someone who knows the information.

Speeding up a large number of applications / One Stop Shopping.

The total effort taken for an application may not be the most important factor to the person waiting for the approval. For many simple case, changes to the process may mean that they can be told of their approval far more quickly. An extreme case may be where for a simple application they may visit a single case manager, and be able to wait for approval to be granted there and then.

3.4 Plan for evaluation of GISIP One in GISIP Two.

To evaluate the GISIP Phase One project, we need to evaluate not only the methods used by the project, but also the results of the project.

The use of the GUIDE method, and associated tools and techniques constitutes the introduction of a new technology, and thus, GISIP methods must be evaluated in this respect. A framework for the formal evaluation of tools methods and technology, to assess their industrial effectiveness, has been produced by the DESMET (Determining an Evaluation Methodology for Software MEthods and Tools) project. This was a collaborative project run between NCC (National Computing Centre Ltd), the University of North London, GEC-Marconi and BNR Europe Ltd from 1990 to 1994. DESMET was defined in response to the DTI IED Advanced Technology Programme call for proposals in 1988, and was partially funded by the UK DTI and SERC.

DESMET presents a guide to using formalised versions of a number of traditional methods. For example DESMET provides case study design and analysis modules, experimental design modules, and so on. Guidance is given on setting up evaluation, conduct of evaluation, and appropriate analysis methods and techniques.

The University of Southampton's principal link with DESMET is through Dr. Rachel Harrison, who provided consultancy for the DESMET project. The DESMET approach has also been used in practice; to structure the evaluation of software process modelling methods; by Dr. Keith Phalp. Studies were carried out on a number of industrial projects, and were used to compare and evaluate the effectiveness of a baseline modelling approach, and two subsequent process modelling approaches, over a period of approximately two years. Hence, there is considerable expertise of methods evaluation within the University.

However, the choice of an evaluation method still needs to made. For GISIP Two there is far greater scope for control of experimental factors within the evaluation. However, for GISIP phase One structured evaluation is taking place post-project, and thus it is not possible to control for such factors. Hence, the evaluation will take the form of a case study (or series of case studies). An additional advantage of using a case study approach is that it allows us to draw upon a number of both qualitative and quantitative techniques within the case study framework. For example, it is possible to include survey data, quantitative models, and qualitative analysis within the same case study. Indeed, it is one of the characteristic strengths of the case study method that it draws upon multiple sources of evidence. (see Yin, R.K. 'Case Study Research': Second edition, Sage Publications 1994, recognised by many as the definitive text).

The results of the project can be gauged by both qualitative and quantitative measures of the effects of the new processes. For example, satisfaction with the new process, compared to the old, can be backed up by data on the cost benefits of change. This may involve a number of techniques, from observation, interviews and questionnaires through to the collection of process metrics. Indeed, such information will also be

used within the case study approach, to help to gauge the effectiveness of the methods.

4. Dissemination

4.1 Methods of Dissemination

All the end user process analyses described (in 'What Has Been Achieved') were disseminated among the project members, in workshops and by e-mail.

The cumulative effect has been the development of a generic case-handling business process model on which all of the re-engineering proposals are based. This generic model is supported by a metrication concept which will ensure that the implementation projects, once begun, can evaluate progress and clearly determine where benefit has accrued to the end-users and their citizens.

Methods for management of human resources within the end-users during transition to, and whilst running, the re-engineered processes have been defined. A multimedia scenario-presentation tool, for presenting the process proposals to end-users and citizens, has been developed by the consortium.

Dissemination within the consortium has been greatly enhanced by the availability of internet. We have made our results available to other TBP projects on the World Wide Web in a form which is acceptable to the confidentiality requirements of each partner.

In the implementation phase, each of the Local Government organisations will continue to be assisted by the appropriate consultants and the pooling of knowledge will continue in the form which has been so successful in the definition phase. The combined GISIP methodology will be applied by all consultants and its components made available to others on appropriate commercial terms. Generic results, such as the case-handling model and the multimedia scenario concept will be disseminated freely.

4.1.1 Reports

Draft reports have been produced throughout the project, and all partners have been involved in commenting and reviewing these drafts. This has followed the procedure as laid down by the GISIP Quality manual.

4.1.2 Workshops

Workshops have taken place throughout the project. These have ranged from formal workshop meetings, to less formal meeting between partners to discuss models and methods. A start-up method workshop meeting at South Jutland took place in September 95, and was followed by a reengineering package workshop in October 95, in the UK (at ICL). A mid-term meeting was held at Rosklide in December 95, and a concluding Worksop at Cannock at the beginning of February 96.

However, informal meetings have also taken place to discuss specifics of models. For example, a January meeting took place in Copenhagen between JBP, Skankort and the University of Southampton to discuss models of South Jutland and Roskilde. It is

worth noting that much of the work prior to this meting was possible only through the prior electronic communication of models, using e-mail.

4.1.3 Electronic Media

The use of electronic media has been crucial in the dissemination of information across partners, and has greatly enhanced the co-operation within the consortium.

4.1.4 E-mail

E-mail is frequently used to pass messages and drafts of the text of reports. An added use of email within this project has been to pass across case tool based model of processes. For example, compacted ProcessWise models of Roskilde and South Jutland processes have been sent to UK partners by email. These models have been extracted and then run upon the WorkBench at UK sites. This has enabled UK partners to run analyses on such models, which among other things allows for the checking of completeness and consistency of the models.

4.1.5 World Wide Web

The importance of the World Wide Web as a dissemination mechanism cannot be overlooked. The web provides a simple mechanism for dissemination of information not just throughout Europe, but throughout the rest of the world as well. Increasingly it is expected that information from Government and from corporations is available upon the web.

A GISIP home page has been constructed which has links to those deliverables from the project which partners have agreed may be public domain. This means that information is not only disseminated to other consultants, suppliers and end users, but to anyone with internet access. For example, it may be that a member of the public may learn of improvement to his or her government by browsing the GISIP web page. Similarly other authorities may use this source of information as a first point in improving their processes. The methods described, which have been produced by GISIP will also be available for use by other consultants or end users.

Indeed, the web will in some cases contain information which is duplicated elsewhere, for example reports and papers, since in many cases it is the simplest and easiest way for people to get that information.

4.2 GISIP GUIDE

The GISIP Guide provides a coherent method for the modelling, analysis and redesign of business processes supporting the introduction of Information Technology. The Guide has been developed from a number of inputs, including: ICL's ProcessWise Guide, JBP's method for IT-Planning and BPR methods, Skankort's input on human resource management, and ICL's and the University of Southampton's process modelling methods, tools and techniques.

The dissemination of the GISIP GUIDE method is viewed as an important part of the GISIP project. Hence, the methods contained in the GISIP GUIDE will be disseminated among other end-users and other consultants. The methods used for such dissemination have been outlined below. However, GISIP GUIDE forms such an integral part of the project that it is worth describing here some of the methods and perceived wisdom that it contains. To recap, GISIP GUIDE consists of six phases:

1)   Strategic Positioning

      This phase is used to identify the core business, and define objectives, themes and targets of the programme. A strategic framework is established for the subsequent reengineering work.

      Techniques used within workshops include:
      SWOT (Strengths Weaknesses Opportunities and Threats Analysis) - a method used to establish why processes need to be redesigned (Dyson, Robert G. 'Strategic Planning: Models and Analytical Techniques, Wiley),
      QUARTER ('The Changing Role of the Information Systems Executive: Sloan Management Review, 1982) used to help define mission statements, business objectives, and critical success factors,
      Inductive Thinking and Brainstorming (Hammer, Michael and Champy, James 'Reengineering the Corporation: A Manifesto for Business Revolution, Nicholas Brearley Publishing by arrangement with Harper Collins, 1993).

2)   Initial Analysis

      This phase is used to establish a model which identifies all key players and interested partners. Candidate processes for reengineering are established.

      Techniques used include mapping of critical processes, value chain analysis and 'opportunity and problem analysis' - based on the earlier SWOT analysis.

 3)   Modelling

      This phase represents the critical business processes, and models these processes (using WorkBench models), in their current state. It also establishes metrics to be applied the current and redesigned process.

      An overall (abstract) model is then produced, based upon descriptions of the process, functions, data and organisation of the current business processes. This necessitates the production of data models (Entity Relationship Diagrams), functional models, and matrices for association analysis (see JBP's IT Planning method, GISIP GUIDE Annex 3, and the brief description of this method given in section 2.3.4).

      The existing resources, skills and competencies are mapped, so that development potential and readiness may be assessed, and the existing systems are documented for use in the creation of an IT-Plan.

4)   Redesign

The process is assessed against a number of criteria including: business plans, core competencies, customer needs, and competitor processes. This is fed into a redesign, in which each activity is justified in terms of the criteria.

Incremental redesign opportunities are assessed considering how to increase the value of processes, without incurring additional costs. Process integration and interaction, and resource reallocation are also considered. Techniques used include value chain analysis, linkage analysis and resource analysis.

This phase makes use of a number of models. WorkBench is used to produce what if analyses, and remodelled process diagrams.

Redesign is considered from three further viewpoints, corporate or informational, human resource, and technology. JBP's Information Planning methods are used to redesign corporate and information structures to enable process change. Mappings of human resources to new process designs are undertaken to assess development needs. Component models, Distribution models and Configuration models are produced to describe the new technology strategy for the new IT architecture, and to integrate existing and new processes with a new data model into a coherent architecture. This results in a new logical information structure, and IT architecture which will support, and be supported by, the redesigned processes.

5)   Impact Analysis

This phase identifies the impact of potential redesigns. This considers the culture, people, skills and capabilities of the organisation as well as more quantitative elements such as calculation of return on investment. (Note that quantitative process models which include process measures on the depictions of process have been produced for this purpose as part of GISIP phase one).

An implementation plan is produced, as are documents examining the risks and uncertainties. A model of the process is produced, which may be used in process education. Prototypes of process support may also produced using tools such as ProcessWise Integrator, or Enact.

An evaluation report, and suggested implementation plan, are produced to enable to management team of the client organisation to decide whether to proceed with process redesign.

6)   Implementation

The chosen process redesign option is implemented.

Individual elements of the GISIP GUIDE (as described above) may be disseminated. However, it is likely that a GISIP GUIDE handbook, will be the principle method of dissemination. This may well be a commercial venture. It is interesting to note the

success, both in a commercial sense, and in the successful dissemination of measurement methods of the Application of Metrics in Industry (ami) initiative. This initiative uses a metrics handbook (initially distributed by the Centre for Systems and Software Engineering, Southbank University, in March, 1992) as its core component. The ami handbook puts key academic methods work, such as GQM (Basili, V. and Rombach, H.D 'Tailoring the Software Process to Project Goals and Environments', Proceedings of the Ninth International Conference on Software Engineering, Monterey, IEEE Computer Society Press, 1987), and experience of practise, into a more business oriented format. A GISIP handbook could take the same approach, presenting the exiting GISIP GUIDE, and further lessons learned in a way which would be understandable to end-users.

4.3 Further Dissemination

Other dissemination may be seen at a number of levels within the different categories of participant organisations.

4.3.1 Users

4.3.1.1 Internal

Information about improvement to process, and about the other benefits of GIS will be communicated to colleagues across departments within the user organisations, This kind of dissemination is particularly important in getting people to accept new technology. Throughout application domains many will believe that their organisation has particular difficulties or characteristics which mean that though GIS is useful to others it may not be appropriate to them. Success stories from within their own organisations will be far more convincing.

4.3.1.2 External

The GISIP end users may also act as points of information (or indeed as some consultancy role) to other authorities. Indeed, the Cannock Gateway project has been recognised within the UK as a model by which others may wish to proceed with regeneration.

4.3.2 Consultants and Suppliers

Consultants like end users will communicate the GISIP experiences and successes across their organisations, and thus increase the expertise of their organisations as a whole. The GISIP GUIDE will be a valuable method for reuse on other consultancy projects. This will increase effectiveness and competitiveness of consultants.

Experiences and methods may also be communicated to other consultancy organisations, for example, to colleagues in other countries, either informally or more formally through joint projects, or by acting as consultants to consultants.

Other Methods of Dissemination will include some of the following:

- The production of academic papers detailing the use of process modelling methods and notations. For example, a paper produced which details the end to end modelling method which moves from PWB models to the MBaSS Slide Show model (also referred to as the multi-media scenario tool) is being currently assessed so that it may be released into the public domain.

- A methods handbook. Based on GISIP Guide. (See section 4.2).

- A GIS best practice handbook

- The dissemination of a demonstration of a scenario demonstration of the MBaSS Slide Show model. This will be available on electronic media, so that it can be made available within the public domain.

- A special interest group. Again the web would be a useful starting point, and discussions would be ideally by electronic media.

- Links to TBP. For example GISIP web pages have pointers to and from TBP