

EVALUATING OR SELECTING A SUITABLE INFORMATION SYSTEM DEVELOPMENT METHODOLOGY: A CASE STUDY

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ABSTRACT

Information system development methodologies have been applied by numerous organisations since the mid-1980s in an attempt to improve the efficiency and effectiveness of designing and developing new information systems. Despite advances in methodologies, tools and techniques, productivity is still low. High quality products are seldom produced and at high cost. The advantages and disadvantages of using a methodological approach is discussed. The author identifies the key drivers for applying an information system development methodology successfully and provides a method for selecting or evaluating a methodology tailored to an organisation's unique set of organisational, cultural and environmental variables. The framework has been applied to Waymark Infotech, a South African information technology organisation.

OPSOMMING

Ontwikkelingsmetodologieë vir inligtingstelsels word sedert die middel van die 1980's deur vele organisasies aangewend in hul poging om die effektiwiteit en doeltreffendheid van die ontwikkelingsproses van inligtingstelsels te verbeter. Ten spyte daarvan dat vooruitgang en ontwikkeling plaasgevind het ten opsigte van metodologieë, hulpmiddels en tegnieke, is produktiwiteit steeds laag. Duur en lae-gehalte inligtingstelselprodukte word gelewer. Die voor- en nadele van 'n metodologiese benadering word beredeneer. Die outeur identifiseer die kernaspekte nodig vir die suksesvolle aanwending van 'n ontwikkelingsmetodologie vir inligtingstelsels. 'n Metode word aangebied aan die hand waarvan 'n bepaalde metodologie gekies of ontwikkel kan word. Die metode neem verskeie veranderlikes (organisatories, kultureel en omgewingsverwant) in ag.

1. INTRODUCTION

Information System Development Methodologies are used by organisations to structure the Information System Development Process. Each methodology contains its own philosophy and a collection of phases, sub-phases, processes, phase-inputs, phase-outputs (deliverables), procedures, techniques, tools and documentation aids. Some methodologies additionally include Project Management components (Project Management phases, processes, tools and techniques).

Various arguments exist for and against the implementation of Information System Development Methodologies. These arguments have been analysed and synthesised into a Methodology Evaluation Method, which could be applied by Software Development Organisations in evaluating or selecting a methodology that would fit their organisation's composition.

2. MOTIVATION FOR NOT APPLYING A METHODOLOGY

Capers Jones [9] examined the impact of standards and formal development methods in more than 100 large enterprises in the United States and Europe. He found that people had ambiguous opinions regarding the success of applying methodologies.

Fitzgerald [6] performed research on the use of methodologies, the circumstances in which they are used and the contribution of the methodology to the development process. His study indicated that 60% of the respondents were not using methodologies, while only 6% of the respondents reported on following a methodology meticulously. 79% of those respondents that did not follow a methodology indicated that they did not intend to adopt one.

Many organisations **favour** an a methodological approach. They reason that one could hardly apply the same methodology to different projects, since projects have more differences than similarities (De Marco [4]). Descriptive methodologies reduce rather than increase productivity (De Marco and Lister [5]). This is due to loads of paperwork, scarcity of methods, absence of responsibility and a loss of motivation. Boehm [1] performed a study indicating that a methodology is far less important than the ability of developers and the complexity of the project.

The main arguments against the application of Information System Development Methodologies are as follows.

System Design improvement claims have not been proven

According to Middleton [11], a large number of books have been written on various methodologies (for the training market). These books tend to focus on presenting the methodology rather than evaluating or criticising it.

Fitzgerald [6] also states that generalisations are made without the necessary empirical foundation.

Many of the modern methodologies **claim** to address certain gaps in traditional Information

Systems Methodologies. Some empirical studies have indicated that these **claims could not be proved**. Purvis *et al* [12] performed empirical studies to compare the effect of the Joint Applications Design (JAD) Methodology with the traditional Information Systems (IS) Design Methodology. The interactions between users and designers, consensus management and user acceptance of design specifications were compared. His research indicates that “**designers** perceived JAD as being superior to the traditional IS design method with respect to the quality of user-designer interactions, effectiveness of consensus management, and user acceptance of design specifications” (Purvis *et al* [12]). The **users** only perceived better user-designer interactions. The users **did not perceive** a significant difference in consensus management or user acceptance of design specifications in comparing the different methodologies.

Methodologies are based on certain rigid assumptions and generalisations. Exceptions are not catered for.

As an example, SSADM (Structured Systems Analysis and Design Method) states that “It is assumed that business planning, IS strategy and tactical planning will have been carried out before an SSADM project is initiated. Whether formally or informally, the types of analysis implied by these tasks must be undertaken before an SSADM project can be initiated” (CCTA, [2]). The problem with this assumption is that strategy **may change** during the development of a new system.

The requirements phase of SSADM also includes the proviso: “...ensure that all requirements, particularly non-functional requirements, have been identified, are described correctly, and are fully detailed.”(CCTA, [2]). Attaining such a full set of requirements is almost impossible as users invariably know what they want, they do not always know the possibilities of the technology, their perceptions change and changes in the external environment cannot be fully anticipated.

The rational and sequential processes of the methodology seldom fit all organisations.

Methodologies unlikely counters staff turnover

Some of the very structured methodologies will not counter the effects of staff turnover or inexperienced staff. The methodology based on the traditional mind-set, where knowledge is seen as “well-defined, unambiguous and articulate” can not produce greater staff productivity where a reality mind-set of “ill-defined, inferred, dispersed and entrenched” dominates (Sauer *et al* [11]).

Methodologies concentrate on technicalities

Most methodologies treat the System Development process as a rational, sequential process without incorporating the social aspects. Individual creativity and learning-over-time are often not recognised.

Most methodologies are unsuitable for rapid development

Fitzgerald [6] indicated that the organisational environment has changed to such an extent that

many of the methodologies are no longer useful. Methodologies rather add to the lethargy of the development process. Today's systems need to be delivered more rapidly. His study indicates that methodologies are used if five or more developers are employed and when the project duration exceeds nine months.

3. MOTIVATION FOR APPLYING A METHODOLOGY

The main arguments supporting the application of Information System Development Methodologies are as follow:

Providing a standard

One of the main advantages of using a methodological approach is the standardisation of design, development and implementation procedures.

According to Kruchten [10] many organisations do realise the benefits of using a methodology as a standard. Some develop their own methodologies, which often (according to him) "gather dust in nice binders on a developer's shelf – rarely updated, rapidly becoming obsolete, and almost never followed". Some of the new commercial-off-the-shelf methodologies in contrast (e.g. Rational Unified Process) are developed online using Web technology. Regular upgrades are released in a modular form – it could easily be tailored and configured to suit the specific needs of a development organisation.

Many methodologies also promote the use of standard sets and formats of documentation as well as coding standards. This ensures interchangeability among developers.

Ensuring quality

A methodology provides a framework of processes (often including measurements and criteria for their execution). Most methodologies specify the quality required for outputs or deliverables (e.g. test plans, use-case realisations and design models).

The methodology may also be used by the organisation to acquire ISO-certification.

Controlling change

Most methodologies specify a set of systematic activities for keeping track of system changes and system defects (as identified during the requirements, design and implementation phases). Changes are then synchronised with the available budget and delivery milestones.

Ensuring re-usability

Certain methodologies (e.g. the Rational Unified Process) are designed to support component-based development. Due to the implementation of the concepts of modularity and encapsulation, these components may be re-used in different Information Systems, reducing the overall development time of new systems.

Other Advantages

Fitzgerald [8] also mentions the following advantages:

- Due to the complexity of Systems Development, methodologies divide the process into a set of logical steps, which facilitate project management and control of the development process. These management and control elements reduce risk and uncertainty.
- A persistent framework is provided for the application of techniques and resources during the development process.
- Specialisation and division of labour is provided for, which makes determination of remuneration rates straightforward.
- The same framework may also be used for acquiring and storing knowledge and experience.

4. THE CONTRADICTION

From the previous sections it is clear that literature supports motivations **for** as well as **against** the application of Information System Development Methodologies. This contradiction will be explained in the following section.

According to Hares [8], the delivery of low-quality deliverables should not be attributed to the application of a methodology but rather the **incorrect** application of the methodology.

According to Rai [13] poor performance and failures can be attributed to a number of factors - the management approach applied to system development projects being the major cause of failure. He also states that methodology frameworks are only useful if they are applied to create process models that “enforce discipline within tasks, establish standardised interfaces between tasks and improve the predictability associated with resource requirements”.

Rai [13] performed research to increase the understanding of the interrelationship between development process modelling, task uncertainty and quality-oriented development outcomes.

The research results proved the following hypotheses to be true:

- The degree to which a process model has been established for a development project is positively related to process quality and product quality.
- The degree of task uncertainty in a development project is directly related to a decrease in the development process quality and product quality.
- The interaction between process modelling and task uncertainty influences the development process quality and product quality.

Rai’s hypotheses support the motivation for a methodological approach in developing Information Systems. The author proposes that the required process quality and product quality will only be realised if **appropriate processes** are identified for a **specific organisation**.

5. SELECTING THE CORRECT MIX OF PROCESSES

According to De Villiers [3] an organisation needs to consider a whole number of issues before choosing or introducing a methodology or a set of processes and tools into an organisation.

The author studied the various issues defined by De Villiers [3] and Fitzgerald *et al* [7]. The author then identified six main categories for grouping issues or parameters that may influence the success of an Information System Development Methodology. These are:

- Organisation (including Project Organisation and the Information System Client)
- Culture
- Environment
- Problem (including Client Requirements)
- Project Management and
- Methodology

Figure 1 indicates the different categorised parameters – each category having a different block-shape.

In selecting, amending or developing a methodology for a specific Organisation or Project, the selected **Methodology parameters** need to reflect reality in addressing **Organisational - , Cultural - , Environmental - and Problem** –parameters as well as the **Project Management** parameters.

Some Organisational parameters may drive the selection of a specific Methodology. For example, organisations that define unclear or unrealistic strategies should apply Information Systems Development methodologies that suit these strategic ambiguities. These organisations would require a methodology (such as Rapid Application Development Methodology OR the Incremental Development Methodology) that continually validates system requirements, software deliverables and embedded strategies. Other organisations may need to strategically release a product with reduced functionality to counter a move by a competitor. In cases such as these, organisations would require an iterative development approach. As an iterative approach tends to become uncontrolled, a methodology could aid in providing guidelines regarding iteration planning (e.g. numbering, allocating duration and objectives as well as tasks and responsibilities to each iteration).

In the following sections of this article, Fitzgerald's framework [7] for comparing methodologies has been expanded to illustrate the different methodology parameters, which will be applied in evaluating the feasibility of a specific methodology for a specific organisation.

Figure 1 illustrates the main components of a methodology. Each component contains a set of related parameters.

- **Application Area Domain:** This component represents parameters, which restricts the application area for which the methodology may be suitable.
- **Project Management:** This includes project-related parameters.
- **Modelling Types:** The nature of various methodology models.
- **IS Development Methodology Scope:** The structural elements of the methodology – phases, sub-phases, processes, inputs and outputs (deliverables). Other scoping parameters are also included: the interaction and iteration of phases, sub-phases and processes; integration with other systems; inter-phase communication and identification and management of design- or development changes.

- **Procedures:** Step-by-step processes for executing higher-level processes.
- **Techniques and Tools:** The parameters included here, portray the type of tools and techniques, their interaction and the capability of the methodology to expand the current set of tools and techniques.
- **Documentation Templates and Aids:** The set of electronic documentation templates that may be used to standardise Information System Development-related documentation.
- **Practice:** This component includes parameters, which describe the number and type of users who currently apply the methodology (in practice) as well as the type of participants responsible for implementing the methodology.
- **Product:** This component contains the parameters, which describe the methodology software package that may be available as well as the training, support and training documentation accompanying the software package.

Figure 1 indicates a set of 'Other Parameters'. Although these methodology-independent parameters do not form part of the methodology itself, the success of an Information Systems Development Project also relies on these parameters. Since the methodology-dependent parameters are related to the structure and content of the methodology itself, only these parameters will be applied in the Methodology Evaluation Method that follows.

6. THE METHODOLOGY EVALUATION METHOD

The value proposition of the Methodology Evaluation Method is to provide a quantitative method to:

- Evaluate several Information System Development Methodologies to select the most suitable methodology for a specific organisation or project.
- Evaluate the suitability of a current Information System Development Methodology (applied by a specific organisation) to highlight low-scoring methodology elements for possible methodology enhancement or amendment.

Defining the Method

The evaluation and selection of a methodology is to a large degree a subjective process. The evaluation method may be simplified by using the Parameter Framework elements of Figure 1 as measures in designing a Methodology Evaluation Table (Table 1).

The Methodology Evaluation Method consists of three processes:

1. Defining the purpose of the evaluation.
2. Completing a Methodology Evaluation Table.
3. Interpreting the results.

1. Defining the purpose of the evaluation

The purpose of the evaluation could be to:

- Evaluate several Information System Development Methodologies and select the most suitable methodology for the specific organisation.

- Evaluate the current Information System Development Methodology elements for possible methodology enhancement or amendment.

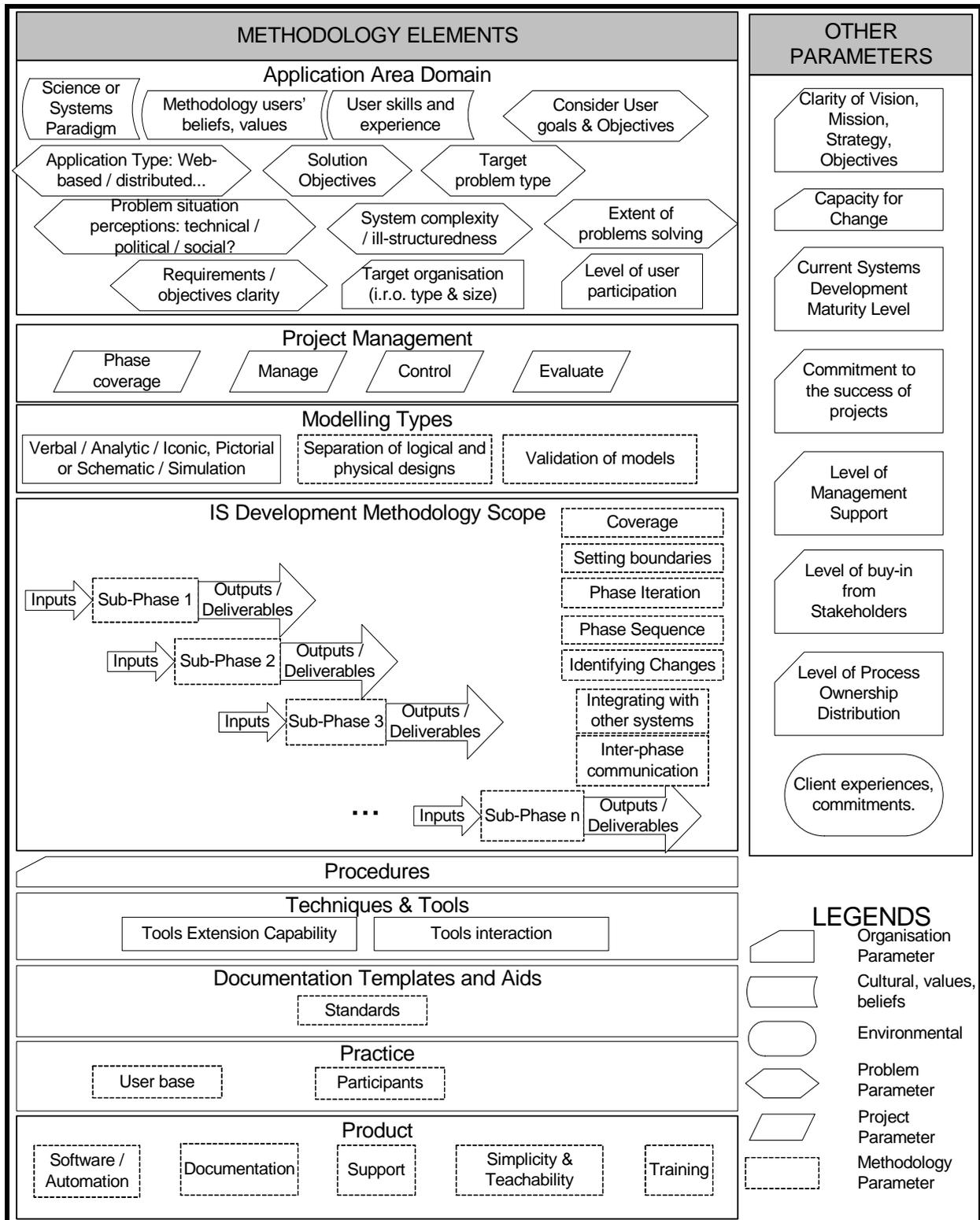


Figure 1: Parameter framework for selecting a suitable methodology

2. Completing a Methodology Evaluation Table

This process includes the following steps:

- Measures are listed in the first column (corresponding with parameters in Figure 1);
- Evaluation Criteria are described in the second column;
- Methodology Inclination (third column) describes the tendency of the Methodology regarding the specific parameter;
- Organisation Inclination (fourth column) describes the tendency or requirements of the organisation regarding the specific parameter;
- % Fit (fifth column) indicates the extent to which the Methodology proposition fits the Organisation's requirements;
- Weight (sixth column) indicates the relative importance allocated per measure – the Likert Scale is used ('1' indicates low importance, while '5' indicates high importance).
- The Results of the Methodology Evaluation Table is summarised by calculating an average **score** on { '%Fit' values multiplied with the corresponding 'Weight' values }.

Note that columns four to six require subjective inputs from organisational or project representatives. The weight-allocations (sixth column) may vary for different organisations according to the organisation's requirements and philosophic propensity.

3. Interpreting the results

If the organisation evaluates several methodologies for the purpose of selecting the most suitable methodology for the organisation of a project, the methodology that obtained the highest score will be selected.

If the organisation evaluates its current methodology for the purpose of identifying low-scoring elements, the results may indicate priorities for methodology enhancement or amendment. The results may also indicate a low overall score, which may justify adoption of a different methodology.

7. APPLYING THE EVALUATION METHOD TO WAYMARK

WAYMARK Infotech specialises in Software- Development and -Implementation. The organisation currently applies different methodologies in developing or implementing software products. WAYMARK has standardised on Oracle CDM (Custom Development Method) for Custom-Built Applications and various Off-The-Shelf Applications. Oracle AIM (Application Implementation Methodology) is used for implementing Off-The-Shelf **Oracle** Applications.

The Methodology Evaluation Method has been applied to assess the suitability of the current Custom Development Methodology as a standard methodology in developing new Software Applications OR implementing various Off-The-Shelf Applications (excluding Oracle Applications). Key personnel assisted in evaluating each measure and a total score of 80% was obtained. The elements that were valued by the organisation (having weights of "4" or "5"), but obtained a weighted score (% Fit x Weight) of 2 or less may be targeted for improvement or enhancement. The following table provides a list of these low-scoring parameters.

Methodology Element	% Fit	Weight	Weighted Score
Application type (Web-based etc)	50%	4	2
Identification of changes	50%	4	2

Table 1: Low-scoring methodology elements

WAYMARK is often forced to comply with a completely different methodology (e.g. SUMMIT or Pi-Tech) as prescribed by their clients. The Methodology Evaluation Method may be applied in evaluating each methodology within the organisational and project context.

Measure	Evaluation Criteria	Methodology Inclination (CDM)	Organisation Inclination (WAYMARK)	%Fit	Weight
Application Area Domain					
Science of Systems Paradigm.	Science paradigm of reductionism, repeatability and repudiation OR Systems paradigm, characterised by a holistic and subjectivistic approach. Views of the Methodology Users vs views of the Methodology.	Science.	Science.	90%	4
Methodology users' beliefs, values.	To what extent may the methodology processes be changed to accommodate the different beliefs and values?	Rather rigid in the sense that the set of prescribed procedures cannot easily be changed. Management does not really require additional flexibility.	Would require more flexibility.	90%	4
User skills and experience.	User skills and experience vs those those required by the methodology.	Analytical skills required. Basic knowledge of modeling techniques required (Process Flow Diagrams, ERD's.)	Exact figure not available. Guestimate.	60%	4
Target Organisation (type & size).	Targeted for a specific type or size or environment of the organisation.	Targeted for organisations developing new applications.	New application is developed. Current 'off-the-shelf' applications are configured.	50%	3
Level of User Participation.	High or low user-interaction.	High user-action required as stated: '...a necessary prerequisite is that there is sufficient user involvement, and that this involvement is from the most appropriate and effective users.'	WAYMARK encourages active user participation.	90%	5
Objectives: Extent of problems solving.	Interest in computerising OR interest in achieving solutions / improvements.	The toolset incorporated in the methodology is used for computerising.	Most solutions should lead to computerisation.	100%	3
Consider User Goals & Objectives.	Extent to which potential users' goals and objectives are noted and taken account of.	Sufficient user involvement' is a prerequisite. Techniques enable the user to point out errors, mistakes and	Many software applications are tailored from existing 'off-the-	85%	4

Measure	Evaluation Criteria	Methodology Inclination (CDM)	Organisation Inclination (WAYMARK)	%Fit	Weight
		shortcomings. It seems as if their goals and objectives are important. Requirements are also continually validated.	shelf applications. These applications are highly customisable to the users' needs.		
Application Type (Web-based etc).	Applicability to the specific type of applications developed (Web-based, real-time etc).	The philosophy of the Methodology states: '...is in particular written for developing custom applications within an Oracle environment using the Oracle database and tools extensively.' No Project Management / Quality Assurance tools are provided or proposed.	Tools would be required for various different configurations. Oracle is used to a large extent. Project Management Tools and Quality Assurance tools (as part of the Methodology) are urgent requirements.	50%	4
Solution Objectives.	Solve individual problems OR analyse the whole organisation.	Individual problems are solved. No tools are incorporated for analysing the company as a whole.	Company would like to focus on individual problems rather than analysing organisations.	100%	3
Target Problem Type.	Well-structured, well defined problem OR unstructured problem.	The methodology caters for well-structured problems. This is indicated by the analytical tool sets, which are incorporated.	Problems are fairly well understood and well defined.	65%	3
System complexity / ill-structuredness.	Complexity of the system measured against the skill and experience of required analysts.	The methodology caters for complex systems.	Most of the applications that need to be developed are complex.	90%	3
Problem situation perceptions: technical / political / social?	Predominant perceptions of the problem situation: technical / political / social.	Technical.	50% Technical, 30% Political, 20% Social.	50%	3
Requirements / objectives clarity.	Problem with clear requirements OR problem with unclear requirements.	Problem should not necessarily have clear requirements. The prototyping / iterative approach facilitates changes in requirements.	Requirements are usually clear. Requirements are well-structured by the client as part of a 'Request for tender' document	100%	

Measure	Evaluation Criteria	Methodology Inclination (CDM)	Organisation Inclination (WAYMARK)	%Fit	Weight
Project Management					
Plan.	Extent to which the methodology support the project management aspects of an Information Systems Project its timescales, resource requirements and constraints. This includes the extent to which the methodology evaluates the methodology itself in relation to the application(s) that have been developed in using the methodology.	The methodology employs its own Project Management Methods, which extensively covers each Project Management aspect.	Organisation Inclination not applicable.	100%	5
Manage.					
Control.					
Evaluate.					
Modeling Types					
Verbal / Analytic / Iconic / Pictorial / Schematic / Simulation.	Methodology type vs methodology users' preference.	Primarily Analytic and Schematic.	Primarily Analytic and Schematic.	100%	3
Separation of logical and physical designs.	Methodology catering for both logical and physical designs?	The methodology incorporates both logical (business layer) as well as physical (e.g. database scripts) models.	Organisation Inclination not applicable.	100%	3
Validation of models.	Automation of model validation (checking for incompleteness, inconsistencies and correctness).	Oracle tool sets have built-in model-validation.	Organisation Inclination not applicable.	100%	3
IS Development Methodology Scope					
Phases and coverage.	Scope of stages (10) covered: Strategy, Feasibility, Analysis, Logical Design, Physical Design, Programming, Testing, Implementation, Evaluation, and Maintenance.	The methodology covers 8 out of 10 stages: Analysis, Logical Design, Physical Design, Programming, Testing, Implementation, Evaluation and Maintenance. Strategy and Feasibility not included – quoting from the CDM Methodology: “It assumes that the business already has an information system strategy and that these elements will fit within that strategy”.	Although this item will only score 80%, management believes that the scope is sufficient.	100%	4
Definition of Inputs, Activities, Outputs (Deliverables).	Scope of defining Inputs, Activities, Processes, Workflows and Deliverables per Phase or Activity with allocated responsibilities.	Detailed Inputs, Activities, Processes, Deliverables, Process Flow Diagrams (indicating Activity Dependencies), templates for indicating responsibilities per Activity & Deliverables.	Organisation Inclination not applicable.	95%	3

Measure	Evaluation Criteria	Methodology Inclination (CDM)	Organisation Inclination (WAYMARK)	%Fit	Weight
Setting boundaries.	Extent to which the methodology allow for defining the areas of the organisation that will be covered by the system.	13 different inputs are required in order to define the boundaries of the system. (Scoping Project Management Plan; Business and System Objectives; Context Process Model; Top-Level MoSCoW List; Partitioned High-Level Business Processes and Functions; Existing Reference Material; Existing System Interfaces; Existing Capacity Plan; System Architecture Definition; Data Conversion Requirements; Documentation Requirements; Testing Requirements; Integrated Project Team.	Organisation Inclination not applicable.	95%	3
Sequence and Iteration.	Design of the methodology to cater for iteration and sequencing of phases and processes.	Detailed Process Flow Diagrams indicating the sequence of different Activities as well as the iteration of certain Activities. The methodology is an iterative Rapid Application Development methodology - phases do iterate.	Organisation Inclination not applicable.	100%	3
Identification of Changes.	Degree to which the methodology accommodates design changes throughout the life cycle.	Tool set used do accommodate forward and backward integration. Changes to design elements are also tracked - date, user. Links between elements are also tracked. Note the prerequisite: One should only use Oracle products. The company usually only apply the design elements (specifically Database Design). The company often uses different development tools - changes to software could thus not be automatically traced back to original designs. The methodology is thus not flexible enough to accommodate different development tools.	Organisation Inclination not applicable.	50%	4

Measure	Evaluation Criteria	Methodology Inclination (CDM)	Organisation Inclination (WAYMARK)	%Fit	Weight
Integration with other systems.	Degree to which the methodology provide for integration with other technical or non-technical systems.	Integration with other systems should be built in. The methodology addresses the process of defining integration requirements as well as Data Conversion Processes.	Organisation Inclination not applicable.	70%	3
Inter-phase communication.	The degree to which the full extent of work is communicated from one phase to the next.	The methodology indicates the prerequisites (deliverables from a previous phase) for commencing a next phase. No automation of communicating completed deliverables to specific individuals or triggers for creating follow-up tasks.	Organisation Inclination not applicable.	90%	3
Procedures	Extent of defining procedures in performing tasks. Flexibility in changing the procedures to fit the organisation-specific procedures.	Procedure for each task is described in detail. Methodology users cannot change the electronic methodology easily.	Organisation Inclination not applicable.	60%	2
	Extent to which the methodology may facilitate the generation of System Operating Procedures.	The Oracle tool 'Tutor' may be used for this purpose. This is though not part of the methodology yet.	Organisation Inclination not applicable.	65%	5
Techniques & Tools					
Tools Extension Capability.	Extent to which methodology is extensible to accommodate new techniques and tools to be incorporated, while still maintaining the overall consistency and framework.	The methodology proposes outputs / deliverables produced by using specific tools and techniques. The methodology is not editable to allow use of other tools and techniques.	Organisation Inclination not applicable.	20%	2
	Extent to which the proposed software tools are integrated with the methodology.	Proposed software products are well-integrated with the methodology.	Organisation Inclination not applicable.	80%	3
Tools Interaction.	Forward and backward integration capabilities to reflect changes.	Good forward and backward integration as long as the user applies the required Oracle Design and Development tools.	Organisation Inclination not applicable.	40%	3
Documentation Templates and Aids					
Standards.	Extent of Documentation Templates provided as a standard. Extent to which changes to Templates are incorporated as part of the existing methodology.	Complete set of templates for almost every deliverable. Note that templates are primarily 'MS Word' documents - documents could thus easily be changed	Organisation Inclination not applicable.	80%	3

Measure	Evaluation Criteria	Methodology Inclination (CDM)	Organisation Inclination (WAYMARK)	%Fit	Weight
		and the new version may also be saved as part of the electronic copy. Disadvantage: no mechanism for performing configuration control on the documentation.			
Practice					
User-base.	User-base of the Methodology - have other organisations applied this methodology successfully? Does the profiles of these companies resemble the profile of this company?	The company 'Oracle' and its partners are using the methodology for building Oracle Applications.	This company has a similar profile: selling existing software; building new applications, providing support on applications sold. The company does NOT only use Oracle architecture in building new applications. Other 'off-the-shelf' products are also sold.	60%	3
Participants.	Who are involved: system users and/or professional analysts?	Primarily professional analysts. Users are involved in providing requirements and system validation and testing against these requirements.	The consultancy company sells expertise to clients - professional analysts should thus be employed rather than system users.	100%	3
Product					
Software / automation.	Extent of automation vs required automation.	Electronic methodology with templates available. The electronic copy is though only a set of Standards into Inputs, Activities, Processes, Deliverables, Process Flow Diagrams and Document templates. The methodology software does not automate the system design and development effort.	The company is not in search of a fully-automated methodology. The methodology should though be flexible enough in order to change and enhance the methodology itself.	50%	3

Measure	Evaluation Criteria	Methodology Inclination (CDM)	Organisation Inclination (WAYMARK)	%Fit	Weight
Documentation.	Training documentation supplied.	Detailed electronic '.Pdf'-manuals are included.	Organisation Inclination not applicable.	100%	3
Support.	Type of support: telephonic / consultancy / online.	Once-off purchase of electronic methodology material.	Due to ease of use, no additional support is required.	NA	NA
Simplicity / teachability.	Ease of use and teachability.	Easy to use - interactive pages.	Organisation Inclination not applicable.	90%	3
Training.	Training required prior to using the methodology.	Prior training not really required.	Organisation Inclination not applicable.	90%	3
Total Score		80%			

Table 2: Methodology Evaluation Table applied to WAYMARK

8. CONCLUSIONS

Methodologies may have a positive effect on the overall effectiveness of a Systems Development Project if a suitable methodology is selected. The author proposes a Methodology Evaluation Method that may be used to facilitate the methodology evaluation process in evaluating or selecting a suitable Information System Development Methodology for a specific organisation. The evaluation process may also highlight certain aspects within the currently applied methodology that may require improvement or enhancement.

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10. REFERENCES

- [1] **Boehm B.** 1981. *Software Engineering Economics*. Prentice-Hall, Englewood Cliffs, NJ.
- [2] **CCTA.** 1990. *SSADM Version 4 Reference Manuals, Vols. 1-4, F-OVE-6 and F-RD-7*. NCC Blackwell, Oxford.
- [3] **De Villiers DJ.** 2002. Introducing the RUP into an Organisation. *The Rational Edge e-zine for the Rational Community*, Jan 2002, pp 1-16.
- [4] **DeMarco, T.** 1982. *Controlling Software Projects: Management Measurement and Estimation*. Prentice-Hall, Englewood Cliffs, NJ.
- [5] **DeMarco T, Lister T.** 1987. *Peopleware: Productive Projects and Teams*. Dorset House, New York, Prentice-Hall, Englewood Cliffs, NJ.

- [6] **Fitzgerald B.** 1998. An empirical investigation into the adoption of systems development methodologies. *Information & Management*, 34 p317-328.
- [7] **Fitzgerald G & Avison D.** 2003. *Information Systems Development: Methodologies, Techniques and Tools*, 3rd Edition, McGraw-Hill.
- [8] **Hares J.S.** 1990. *SSADM for the Advanced Practitioner*. Wiley, Chichester.
- [9] **Jones T.C.** 1986. *Programming Productively*. McGraw-Hill, New York.
- [10] **Kruchten P.** 2001. What is the Rational Unified Process? *The Rational Edge e-zine for the Rational Community*, Jan 2001, pp 1-11.
- [11] **Middleton P, McCollum B.** 2001. Management of process improvement by prescription. *The Journal of Systems and Software*, 57 pp 9-19.
- [12] **Purvis R, Sambamurthy V.** 1997. An examination of designer and user perceptions of JAD and the traditional IS design methodology. *Information & Management*, 32 pp 123-135.
- [13] **Rai A, Hindi A.** 2000. The effects of development process modelling and task uncertainty on development quality performance. *Information & Management* 27 p335-346.

