View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by AIS Electronic Library (AISeL)

Association for Information Systems
AIS Electronic Library (AISeL)

AMCIS 2000 Proceedings

Americas Conference on Information Systems (AMCIS)

2000

Process Improvement Supported by the Selection of Case Tools: A Case Study

T. Rojas
Simon Bolivar University, trojas@usb.ve

M. Perez
Simon Bolivar University, movalles@usb.ve

Follow this and additional works at: http://aisel.aisnet.org/amcis2000

Recommended Citation
Rojas, T. and Perez, M., "Process Improvement Supported by the Selection of Case Tools: A Case Study" (2000). *AMCIS 2000 Proceedings*. 282.
http://aisel.aisnet.org/amcis2000/282

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 2000 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Process Improvement Supported by The Selection of Case Tools: A Case Study

Rojas T., LISI, Simón Bolívar University, Caracas, Venezuela, trojas@usb.ve
Pérez M ., LISI, Simón Bolívar University, Caracas, Venezuela , movalles@usb.ve

Abstract

The identification and selection of Information Systems projects is an important activity in most organizations [Hoffer et al., 1999], together with the search for the tool that is best adapted to these requirements, based on the system development process efficiency and the expected effectiveness of its results [Rojas & Pérez, 1995]. Organizations also use Information Systems as a weapon against the competition, insofar as the timely implementation of an Information System could represent a strategy providing competitive advantages to said organizations [Laudon & Laudon, 1996]. Porter [Porter, 1985] stresses that there are specific activities in the company where *competitive strategies* could be best applied and where it is almost sure that Information Systems will have a strategic impact [Díaz et a., 1998].

According to Pressman [Pressman, 1998], in the context of software development much work has been carried out in an attempt to fulfill automation petitions for different types of software development contexts. Thus, for a long time no thought was given to the possibility of attending themselves, for instance creating supports that would automate software development work.

For the purposes of enhancing productivity and software quality, it can therefore be concluded that it is increasingly necessary for analysts and developers to count on automated tools to carry out their job.

This paper shows the results obtained of contrasting the analysis carried out for the selection of Case Tools.

Theoretical Framework

The impact of a CASE tool is not only due to the inherent properties in the tool, but also to the characteristics of the project. Two project traits: its size and the activities to be developed, are particularly important inasmuch as they provide the guidelines for the functions required from the tool and the frequency of use [Bruckhaus et. al, 1996]. Selection of a tool must be preceded by selection of the methodology. For Topper [Topper et al., 1994] this fact reduces the risks in selecting an inadequate tool, thus reducing associated costs when a tool is selected based on a methodology that is already understood and assimilated by the organization.

For the specific use of a tool to be effective, first there must be an understanding as to how a tool shall affect the critical variables in the project [Bruckhaus et al., 1996]. A formal evaluation process reduces the possibility of purchasing inappropriate or unnecessary products. Thus, evaluation methods measuring key factors in the product to be purchased are required [O´Brien, 1999]. The selection process proposed by Topper and colleagues [Topper et al., 1994] consists of 4 steps: (1) a comprehensive review of the tools available; (2) testing of a small group selected from the previous step, through a pilot project or more detailed evaluation; (3) presentation of a score for the tools and selection of those with the highest scores; and (4) development of a tool and cost/benefit analysis for said development. Possibly, this proposal by Topper and colleagues would lead to the most adequate selection according to the organization´s needs, although the strategic opportunity for implementing a system would be threatened and the resources invested in the selection process would be elevated.

Given the diversity of factors affecting the adoption of a CASE tool, their complexity by way of the amount of components offered, the strategic importance for organizations of a timely, correct selection of tools, it is of utmost importance to support said selection process.

The Methodology Used

A set of thirteen criteria was taken into account in the selection of the CASE tools to be evaluated for this research project. In this manner, the selection of each CASE tool is the result of applying one of these criteria or a combination of these. The criteria were presented generically.

1. Participation in the Venezuelan Marketplace
2. Prior Experience

Professional: the tool was used on one or various projects carried out by individuals in the research group; or

Academic: the tool was used previously for teaching purposes.

3. Positive Recommendations or Publications by experts
4. Authors´ References
5. Type of Methodology Supported
6. CASE type
7. Cost

8. Ease of Pre-evaluation
9. The Prestige of the Provider
10. Ease in Contacting the Provider
11. The Phases Supported by the Methodology
12. Platform
13. Code Generated

The group of CASE tools included in the research comprised 16, as follows: System Architect 4.0, Power Designer 6.0, Visio Enterprise 5.0, Visible Analyst 6.3.2, ERWin 3.0, Rose 98 Enterprise 98, VisualAge for Java Enterprise 2.0, Power Builder 5.0, Designer 2000 2.1, Seagate Info 7 Crystal Report, Unified Process 5.0, Action Request System 3.2, MetaEdit Personal 1.2, Developer 2000 2.1, Procedure Design and BPWin 1.8.0.

Once these CASE tools were acquired the next step consisted of the development and application of a decision model, which resulted in a set of numeric results that served as the basis for the analysis and classification of the 16 tools.

Model Application

Each CASE tool evaluated was submitted to these six steps, leading to the selection of the tools that more closely fit the case study.

Table 1 Model Application

Phase	Activity
Step 1.	Calculation of the Values for the Indicators of each CASE tool
Step 2.	TYPE OF INDICATOR DOMAIN IT POSSESSES Type 1 A continuous value from 0 to 1 (grade) Type 1 A continuous positive value representing periodicity Type 3 Any positive N value Type 4 A value representing a flag (0 = no, 1 = yes) Type 5 Possible values: 0, 0.25, 0.5, 1 Type 6 A continuous positive value representing a rate
Step 3	Equivalence or Transformation of each Type (in Excel 1997® format)
Step 4	Analysis of Compliance of Rates
Step 5	Analysis of the Rate Coverage Level (whether the rate was totally or partially covered
Step 6	Sum Total of the Results per CASE Tool
Step 7	Results Phase

After having gone through all the previous steps corresponding to the Decision Model Application for each CASE tool purchased, a final classification was given to these as per the final scores obtained. This classification is detailed in Table 2.

Table 2: Classification of CASE tools as per Compliance with Rates Source: [Rojas & Pérez, 1999]

Compliance With Rates	Classification	Score
Complies with 12 rates	Optimal	120
Complies with 10 or 11 rates	Suboptimal	110-100
Complies with 8 and 9 rates	Analyzable	90-80
Complies with less than 8 rates	Not very recommendable	<80

Results

The results obtained from the application of the previously described model and the analysis performed on the basis of a set of indicators are presented next. Emphasis on details of said results was placed on those involving aspects critical to the decision-maker, such as type 6 or rate type indicators.

Within the evaluation process for CASE tools it is extremely important to focus the decision on certain indicators considered to be critical for the decision-maker: aspects which personalize the decision and are present in the organizational context for which the CASE tool is being selected. These indicators, considered to be critical, are known in the decision model as type 6 or rate type indicators. Their (operational as well as conceptual) definition reflects to what extent the evaluated tool satisfies those critical requirements.

In the description of the model one step was clearly identified that classifies the CASE tools evaluated as in compliance with these critical indicators. This step is known as the **Analysis of the Rate Coverage Level**. For the purposes of the decision model being dealt with, once the equivalence of all the indicators was performed, the classification as shown in Table 3 was carried out.

Table 3: Final Results of the Evaluation of CASE Tools LISI-USB Model for the selection of the tool
Source: [Rojas & Pérez, 1999]

Herramientas Evaluadas	Cumplimiento de tasas	Nivel de cobertura de las tasas	Totalización por herramienta	Apreciación
System Architect 4.0	120	570	405	Optima
Power Designer 6.0	110	500	373	Suboptima
Visio Enterprise 5.0	110	450	272	Suboptima
Visible Analyst 6.3.2	100	460	349	Suboptima
ERWin 3.0	100	420	340	Suboptima
Rose 98 Enterprise 98	100	410	343	Suboptima
VisualAge for Java Enterprise 2.0	100	400	310	Suboptima
Power Builder 5.0	90	380	323	Analizable
Designer 2000 2.1	90	360	371	Analizable
Seagate Info 7. Crystal Report	80	390	340	Analizable
Unified Process 5.0	70	350	226	Poco recomendable
TO12-Action Request System 3.2	70	330	325	Poco recomendable
Meta Edit Personal 1.2	70	310	229	Poco recomendable
Developer 2000 2.1	60	270	322	Poco recomendable
Procedure Design	60	270	282	Poco recomendable
BPWin 1.8.0	50	230	267	Poco recomendable

The criterion taken then was that a CASE tool with 3 or 4 rates with values equal to zero warranted special analysis, so as to verify if the decision-maker was willing to negotiate these unsatisfied critical indicators.

Obviously, one tool totally satisfying the critical indicators would be optimal for that case.

Although it was important to know which CASE tools fell into the previously mentioned classification, it was also necessary to identify to what extent they satisfied the rates mentioned. For this purpose, the score allotted was multiplied by the value that each indicator had obtained after equivalence. This calculation corresponds to column two of the matrix shown in Table 3.

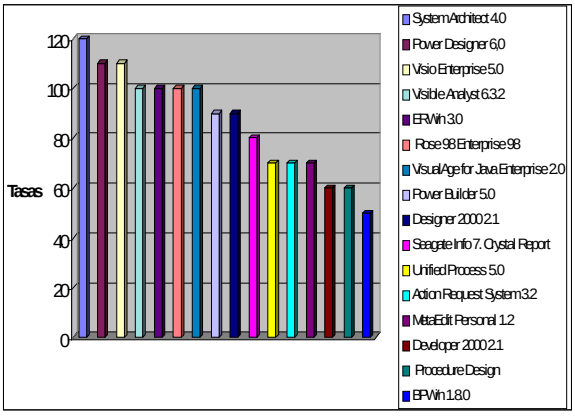
Once this weighing was carried out, the classifying tools and all their indicators were evaluated. As they were all represented in a scale of 1 to 5, they were all added up. The third column of the matrix shown in Table 3 is obtained by putting together both processes.

It is possible to undertake an analysis corresponding to each of the columns in that table: Compliance with Rates, Rate Coverage Level Analysis and Sum Total of the results per Tool. Notice that these analyses are important inasmuch as they are closely related with compliance to the decision-maker´s requirements.

1. Compliance with Rates (Type 6 Indicators)

The result of this processing can be classified as satisfactory inasmuch as, of the 16 CASE tools evaluated, 10 (62%) comply with over 65% of the rate type indicators (see Figure 3). For the case study, the tool to recommend would be would also be highly recommendable. The last five mentioned have a rate coverage surpassing 400 points.

Figure 3. Analysis of Compliance with Rates
Source: [Rojas & Pérez, 1999]



2. Analysis of the rate coverage level

Because it is not sufficient to know that the tool complies with all or almost all the rates (type 6 indicators), but rather aids in deciding with a lesser degree of uncertainty and helps to identify the percentage to which these rates are covered.

Figure 4. Analysis of the Rate Coverage Level
Source: [Rojas & Pérez, 1999]

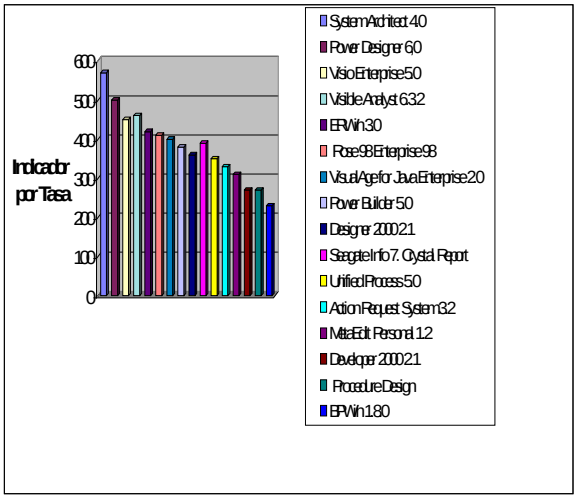


Figure 4 reflects, for example, that within the tools classified as Suboptimal, there is a significant difference of almost 15% weight among those occupying the first place in coverage, Visible Analyst and the one in the last place in this category. This explains why Visible Analyst not only covers 65% of the rates but also does it with a larger percentage of coverage.

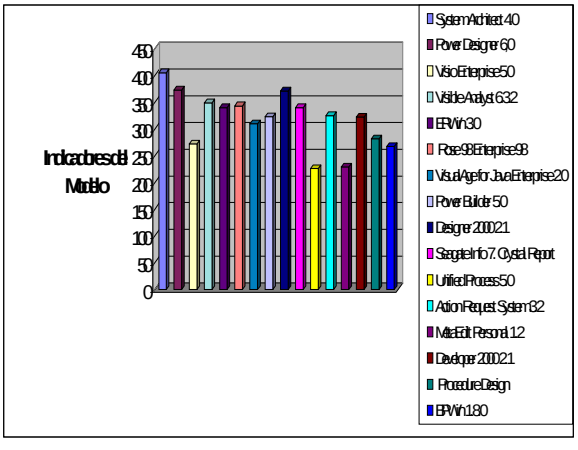
For the case of tools located in the 1st and 2 places (System Architect and Power Designer 6.0), the conclusion is that, apart from covering a higher percentage of the rate, they also provide superior coverage, which ratifies their classification as highly recommendable.

3. Sum Total of results per Tool

Finally, all groups (optimal, suboptimal, analyzable and not recommendable) were evaluated considering all the indicators proposed in the decision model.

This processing reflects an interesting situation (See Figure 5). The Designer 2000 tool that had been classified as analyzable, now takes third place in that category, indicating that, although it does not totally satisfy critical requirements (rates), considering the rest of the indicators, it is categorized as highly recommendable. This third processing thus provides more information to reconsider certain tools that had been classified as suboptimal or analyzable during the decision-making process.

Figure 5. Sum Total of the results per tool
Source: [Rojas & Pérez, 1999]



The results of this processing ratify System Architect 4.0 and Power Designer 6.0 as the most adequate tools for this case study.

Conclusions

1.- Venezuelan organizations can count on a decision model that would provide support in the process of acquiring such an expensive and complex product as is the case for CASE tools

2.- Researchers in this area will have a conceptual reference framework on the CASE approach

3.- Setting the bases for rapprochement among national and international academia, developing organizations and tool providers.

References

[Bruckhaus et. al, 1996], Bruckhaus, T.; Madhavji, N.; Janssen, I.; Henshaw, J. 1996."The impact of tool on software productivity." *IEEE Software, Sep; 29-38.*

[Díaz et al., 1998], Diaz, M.; Perez, M.; Rojas, T. 1998. "A Proposal Of Indicators For The Evaluation Of CASE Tools". *Proceedings of 4th International Conference On Information Systems Analysis and Synthesis. ISAS´98., Orlando USA. Julio; 310-317*

[Hoffer et al., 1999], Hoffer, J; George, J. Y Valacich, J.1996. "Modern Systems Analysis and Design" *Benjamin/Cummings Publishing Company, inc.*

[Laudon & Laudon, 1996], Laudon C.; Laudon K. 1996. "Administración de los Sistemas de Información Organización y Tecnología." *Tercera edición. Prentice Hall.*

[O´Brien, 1999], O'Brien, J. 1997. "Introduction to Information Systems". 9th Edition, Erwin

[Pressman, 1998], Pressman, R. 1998. "Ingeniería de Software: Un enfoque Practico". *McGraw Hill.*

[Porter, 1985] Porter, M. 1985. "Estrategias Competitivas" *CECSA.*

[Rojas & Pérez, 1995], Rojas,T.; Perez, M. 1995. "Improvement in the development of information systems by increasing its process effectiveness" *Information System Analysis and Synthesis, Focus Sympusium on Proccedings ot 5th international Symposium on Systems Research Informatic &Cybernetics,* Baden-Baden, Alemania, Aug; 36-41.

[Rojas & Pérez, 1999], Rojas T.; Pérez M. 1999. *Informe Técnico Final, Subvención 9600180.* CONICIT, Julio.

[Topper et al., 1994], Topper, A.; Ouellette, D.; Jorgensen, P. 1994. "Structure Methods Mergin Models, Techniques an CASE" *Mc Graw Hill.*