e-Process Selection using Decision Making Methods

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Keywords

E-Process, Selecting processes, e-Commerce, e-Commerce Information Systems, Case-Based Selection, Development Processes.

Summary

The key objective of this research is to develop a selection methodology that can be used to support and aid the selection of development processes for e-Commerce Information Systems (eCIS) effectively using various decision methods. The selection methodology supports developers in their choice of an e-Commerce Information System Development Process (e-Process) by providing them with a few different decision making methods for choosing between defined e-Processes using a set of quality aspects to compare and evaluate the different options. The methodology also provides historical data of previous selections that can be used to further support their specific choice.

The research was initiated by the fast growing Information Technology environment, where e-Commerce Information Systems is a relatively new development area and developers of these systems may be using new development methods and have difficulty deciding on the best suited process to use when developing new eCIS. These developers also need documentary support for their choices and this research helps them with these decision-making processes.

The e-Process Selection Methodology allows for the comparison of existing development processes as well as the comparison of processes as defined by the developers. Four different decision making methods, the Value-Benefit Method (Weighted Scoring), the Analytical Hierarchy Process, Case-Based Reasoning and a Social Choice method are used to solve the problem of selecting among e-Commerce Development Methodologies.

The Value-Benefit Method, when applied to the selection of an e-Process from a set of e-Processes, uses multiple quality aspects. Values are assigned to each aspect for each of the e-Processes by experts. The importance of each of the aspects, to the eCIS, is defined in terms of weights. The selected e-Process is the one with the highest score when the values and weights are multiplied and then summed.

The Analytic Hierarchy Process is used to quantify a selection of quality aspects and then these are used to evaluate alternative e-Processes and thus determining the best matching solution to the problem. This process provides for the ranking and determining of the relative worth of each of the quality aspects.

Case-Based Reasoning requires the capturing of the resulting knowledge of previous cases, in a knowledge base, in order to make a decision. The case database is built in such a way that the concrete factual knowledge of previous individual cases that were solved previously is stored and can be used in the decision process. Case-based reasoning is used to determine the best choices. This allows the user to either use the selection methodology or the case base database to resolve their problems or both.

Social Choice Methods are based on voting processes. Individuals vote for their preferences from a set of e-Processes. The results are aggregated to obtain a final result that indicates which e-Process is the preferred one.

The e-Process Selection Methodology is demonstrated and validated by the development of a prototype tool. This tool can be used to select the most suitable solution for a case at hand.

The thesis includes the factors that motivated the research and the process that was followed. The e-Process Selection Methodology is summarised as well as the strengths and weaknesses discussed. The contribution to knowledge is explained and future developments are proposed. To conclude, the lessons learnt and reinforced are considered.

Dedication:

I would like to dedicate this thesis to my father, Albertus (Arrie) Schutte, who passed away in October 2007.

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Frina Albertyn
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Publications and this thesis

Much of the information contained in this thesis has been published in journals, international conference proceedings, and national conference proceedings or as technical papers. The style in the chapters might in some cases be in the style of the particular publication. Consequently, there is some repetition, particular in the application sections and there are stylistic differences between the chapters.

Some of the published work included other authors. For each of the chapters my input was substantial. The initial design of the research, some of the fieldwork, the analysis and the writing of the publication has been mainly my work. For some of the publications I was, however, assisted by co-authors and would like to thank them for their contributions.

A list of publications by the author on e-Process Selection can be found in appendix A.