

Chapter XII

Business Process Simulation: An Alternative Modelling Technique for the Information System Development Process

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ABSTRACT

This paper discusses the idea that even though information systems development (ISD) approaches have long advocated the use of integrated organisational views, the modelling techniques used have not been adapted accordingly and remain focused on the automated information system (IS) solution. Existing research provides evidence that business process simulation (BPS) can be used at different points in the ISD process to provide better integrated organisational views that aid the design of appropriate IS solutions. Despite this fact, research in this area is not extensive; suggesting that the potential of using BPS for the ISD process is not yet well understood. The paper uses the findings from three different case studies to illustrate the ways BPS has been used at different points in the ISD process. It compares the results against IS modelling techniques, highlighting the advantages and disadvantages that BPS has over the latter. The research necessary to develop appropriate BPS tools and give guidance on their use in the ISD process is discussed.

INTRODUCTION

This article looks at Information Systems Development (ISD) and examines the potential role of simulation techniques within the Information System (IS) developer's toolkit. Since the inception of business data processing in the 1950s, ISD has remained a complex and unreliable process with the research repeatedly reporting high levels of failed projects (Standish Group, 1999).

Early approaches to discipline ISD focused on treating it as a production process and gave rise to the linear, or waterfall, Systems Development Life Cycle (SDLC). This was perceived to have three advantages: (1) it follows a series of specific and sequential phases from the beginning of the project until its end; (2) it advocates the use of techniques and tools to formulate step by step the detailed design and to implement the IS; and (3) it introduces the use of project management tools to control the overall process.

Despite the initial success of the linear SDLC, it did not deliver a dramatic reduction in the project failure rate, and a number of limitations was identified. For example, it is argued that instead of meeting organizational objectives, the traditional or linear SDLC aims to design an IS to help to solve low-level operational tasks (Avison & Fitzgerald, 2003). In addition, it is claimed that the traditional SDLC focuses on automating processes rather than proposing innovative integrated solutions (Rhodes, 1998). It is important to recognize that in parallel with the adoption of more rigorous ISD techniques, there also has been a progressive demand for IS to deal with more complex and wide-ranging business processes.

In trying to address some of these limitations, IS practitioners have proposed a wide range of alternative ISD approaches by emphasizing different aspects of the development process. For instance, some methodologies claim that organizational objectives can be met better by stressing the analysis of the organizational processes. Examples

of these are structured analysis and design of IS (STRADIS), SSADM (OGC, 2000), and Yourdon Systems Method (YSM). Others, such as information engineering (IE), claim that organizational goals can be addressed better by placing more emphasis on the analysis of the data. Finally, there are approaches like Merise that consider both processes and data with equal importance (Vessey & Glass, 1998). Most of these approaches stress a scientific or functionalist approach by breaking up a complex system into its constituent parts. However, there are other approaches, like soft systems methodology (SSM) (Checkland & Scholes, 1999), that suggest that the properties of the whole system cannot be explained in terms of the properties of its constituent parts but can be understood better when looked at from a holistic perspective. A key issue is the dichotomy between methodologies, like SSM, that see the human actors and decision makers as part of the system and those that focus on the automated all programmed elements as the system. The former wider view introduces complex sociotechnological issues that are avoided in the latter narrower perspective.

Even though ISD approaches long have advocated the use of integrated organizational views, appropriate modeling techniques have not been adopted, and practice remains focused on the automated IS solution. For example, well-defined IS modeling techniques are available in order to understand the overall function of the system in question, to understand IS data structures, or to model the processes involved in the IS software (see Table 1). There is, however, very little indication of modeling techniques for examining organizational views that explicitly integrate automated software and human activities (Giaglis, Hlupic, Vreede, & Verbraeck, 2005).

In order to address this problem, it is proposed that Business Process Simulation (BPS) can be used at different points in the ISD process in order to better integrate the organizational views and

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