Chapter I

An Object-Oriented Architecture Model for International Information Systems?

Hans Lehmann, Victoria University of Wellington, New Zealand

ABSTRACT

Analysing four case vignettes in a grounded theory approach, this exploratory paper investigates the architecture and design principles of international information systems. A two-dimensional topology for international information systems — suggested in previous research — was confirmed as a useful architecture paradigm. In its terms, international information systems are configured from two elements: 'Core' systems (common for the whole enterprise) on the one hand and 'Local' systems (different for each site) on the other. The interface between the two is a third component. One case vignette in particular highlights the logical and organisational difficulties in defining these systems elements. Object orientation as the fundamental design principle is investigated as an approach to provide a solution for this problem. Because it enables implementation differentiation and flexibility for future functional changes, it is conjectured that object technology is an optimal — technical — development strategy for international information systems. Directions for further research are outlined.

INTRODUCTION

The notion that globalisation is the only key to survival in a rapidly shrinking world has been a hackneyed cliché for many businesses since the early 1980s. Equally, the pivotal importance of information technology as a key business driver has not been seriously questioned in 30 years. Yet the obvious fusion of these two truisms, the application of information technology throughout global operations, is still widely ignored by academics (Gallupe & Tan, 1999) and largely misunderstood by practitioners. As a result, international information systems projects over the last 20 years have often been downright disastrous. Research into why these applications are difficult and how they could be mastered should be of high priority, but is not: the ABI/INFORM database lists 32,919 papers with "information systems" as a keyword between 1985 and 2000. For the same time period, keywords to do with international information systems occur in 234 papers, i.e., in two-thirds of one percent.

Furthermore, the sparse research efforts by the academic community have been sporadic and dispersed over many, disjointed and often irrelevant topics (Palvia, 1998; Gallupe & Tan, 1999). This has left the field devoid of a firm theoretical base and framework from which to advise practitioners and to direct further applied research.

This exploratory paper validates a generic architecture common to international systems.   Selecting and building an appropriate IT architecture is considered an important building block for the successful development of any complex system (Earl, 1989). Because such an *a priori* architecture simplifies the design process, it has the potential to make the development of international information systems faster and less risky.

A two-dimensional topology of systems' elements has been postulated some time ago. Using three case vignettes from the author's own experience in conjunction with a more recent, large case validates this two-dimensional architecture model. It also points to the difficulties with the definition of each of the topology dimensions as a major factor in the failure of IIS projects. The difficulties stem mainly from the fact that it is organisationally difficult — and politically sensitive — to achieve agreement for what systems and processes should be under central control and what may remain within local autonomy.   Object orientation, with its emphasis on accommodating disparities in common entities, seems a suitable vehicle to deal with the 'local' variations to 'central' systems elements required by the architecture model.

Validation of the architecture model establishes a useful framework for further research into the nature of IIS. Combining the two-dimensional topology with the notion of object-oriented analysis, design and development of IIS provides a method for building IIS which is clearer, would avoid failure through destructive politics and thereby removes a large portion of the risk associated with these systems. It furthermore establishes the flexibility required for the ever-changing information systems and technology environment within multinational enterprises.

The paper is organised as follows: After a review of the (sparse) literature, previous research into the architecture of IIS is summarised. Next, the methodological backdrop to the approach used in the study — qualitative research, using Grounded Theory principles, especially the use of ideational concepts for sketching out a theory and its validation by re-casting these concepts — is introduced. The case vignettes are then described and their IIS structure expressed in terms of the postulated architecture model. Finally, the use if the architecture model as a framework for analysing, designing and

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