Chapter 25
Maximizing the Value of Packaged Software Customization:
A Nonlinear Model and Simulation

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ABSTRACT

Organizations that purchase packaged application software – for example, an Enterprise Resource Planning system – must make choices about customization. Packaged software vendors and practitioners recommend that organizations customize software as little as possible, and instead adapt their processes to meet the "best practices" of the software. However, organizations continue to exceed their budgets on implementing and maintaining customized software. This suggests that either these organizations are making poor decisions, or that the conventional wisdom about customization is incorrect. In this paper the author models the primary factors in the customization decision, most notably the "fit" between desired processes and the procedures inherent in the packaged software. The author then consider costs related to development, maintenance, and technical corrections due to poor integration and performance; and benefits related to increased fit, technical corrections, and user acceptance. This paper extends prior work by (1) modelling nonlinear relationships between the amount of time spent on custom development and the resulting benefits, (2) modelling nonlinear relationships between development costs and maintenance costs, and (3) modelling corrective development as a function of development related to fit and user acceptance. The author uses simulation techniques to illustrate the conditions under which customization is likely to provide value to the organization, as well as conditions under which customization should be avoided.

INTRODUCTION

Enterprise Resource Planning (ERP) systems are the most complex category of Enterprise Information Systems. While ERP adoption has progressed into some service industries, the vast majority of the ERP user base continues to be large manufacturing firms (META Group, 2004). Firms make the decision to implement ERP systems for many reasons, sometimes technical (Y2K or the obsolescence of old systems, for example) but predominantly to meet operational business requirements. One reason that many firms choose to implement ERP is in order to achieve competitive advantage over other firms in the same industry (Jafarnejad, Ansari, Youshanlouei, & Mood, 2012). The notion is that by following the business processes prescribed by the functionality and structure of the ERP system, business units (BU's) within a firm will be more efficient because they will be able to share data seamlessly (Ravasan & Rouhani, 2014). ERP systems have been shown to give firms an advantage over their competitors on several performance dimensions such as profit margin, return on assets, and inventory turnover (Hitt, Wu & Zhou, 2002; Tang & Marthandan, 2011). However, many companies decide to implement an ERP system after some of their competitors have already implemented or started implementing the same ERP system. For example, Mercedes, Porsche and McLaren all use SAP, the ERP market leader (SAP, 2016).

One way in which companies seek to extract additional gains from an ERP systems and other packaged software is to modify it with custom development that meets business-specific needs. For example, a beverage manufacturer may have a complex pricing structure that is not handled within the standard pricing functionality of an ERP package. Given this situation, the manufacturer can either choose to simplify its pricing process or to modify the ERP package using custom development in order to handle its existing process. Most ERP vendors provide a mechanism for custom development but warn against it. One advertised benefit of ERP systems is the "best practices" that are embedded in the software; custom development may be incongruent with these practices, or may interfere with their use. Custom development may also affect the integration of data across different areas, another important benefit. In addition, all custom development must be maintained over time, and custom development that is done poorly may slow down system performance (Ng, 2013).

In spite of these potential issues, many firms in the beverage manufacturer's situation would choose to customize the package. A responsible implementation project manager would conduct cost-benefit analyses to decide which pieces of custom development to create. Unfortunately, not all of these analyses are complete or accurate. Benefits from customization may be overstated, and software development costs are notoriously underestimated (Harter, Krishnan, & Slaughter, 2000). As a result, firms may not derive the value from custom development that they expect; in fact, custom development may decrease the overall value of the system. However, ERP project managers that fully understand the costs and benefits of custom development should be able to make more knowledgeable decisions about it.

In this paper we present several models of custom development in the context of packaged application software. The models are most relevant to large-scale business software such as ERP systems, but can be generalizable to any business application software. We then use simulation techniques to model different conditions under which custom development may occur. This paper extends prior work (Balint, 2015) by modeling nonlinear relationships between custom development effort and returns to development, custom development and maintenance, and custom development and corrective development. As a result, we are able to describe and interpret the optimal conditions for the custom development related to packaged software. Implications and limitations of our model are also discussed.

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