

# THESIS INFORMATION

Title: **A framework for redesigning the business processes of enterprises based on data mining and goal-oriented modeling**

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## 1. ABSTRACT

Along with the rapid growth of digital transformation, business process redesign is essential for maintaining the competitiveness of an enterprise. Business process redesign addresses changes, re-structuring and re-aligning alike. Redesigning itself has drawn traction in both academia and business. There is a variety of research works dealing with different approaches on business process redesign. According to their features, they are classified into the following groups: analytical methods -- creative methods, inward-looking methods -- outward-looking methods, transactional methods -- transformational methods. However, the automation of the above methods has not received much attention. That is shown through a limited number of tools supporting business process redesign. In particular, there are very few tools that really capture knowledge about the redesign directions, in fact, most of the tools called redesign tools only support modeling or evaluating business processes. In this thesis, the author proposes a new approach to business process redesign. The author's approach focuses on

applying data mining and goal modeling to business process redesign in order for increasing the efficiency of business processes. In addition, this approach lays the algorithmic foundation for business process redesign to enhance the level of automation in the redesign progress. The proposed redesign algorithms suggest design-time changes to be made to its business processes, primarily by eliminating redundant tasks and re-ordering inefficiently-located tasks. Furthermore, the author analyses the performance of candidate as-is/to-be business processes with regard to a set of indicators, including: time, cost, quality, flexibility, transparency, and exception handling. Based on this evaluation, the managers can choose an appropriate alternative. The author reports her work on business process redesign developed for a retailer of low-cost domestic flights in Vietnam.

## 2. MAIN CONTRIBUTIONS

- **Propose a formal framework** for redesigning the business processes of enterprises based on data mining and goal-oriented modeling.
- **Devise two algorithms** for redesigning the business processes of enterprises automatically. They point out how to remove redundant tasks and resequence inefficiently-located tasks of an enterprise's business process.
- **Propose a set of evaluation criteria** for process performance measurement. It includes time, cost, quality, flexibility, transparency and exception handling.
- **Applying the framework** for business process redesign to a retailer of low-cost domestic flights in Vietnam.

### 3. DISCUSSION & FUTURE RESEARCH

Despite the fact that our research has some academic and practical contributions but it still has some shortcomings -- leaving room for improvement. Our approach has some shortcomings -- leaving room for improvement, which are openly discussed below. Moreover, as digital transformation would draw traction in business engineering in general (and in business process discipline in particular), the concept of process improvement might be revisited when more emerging technologies become readily available.

- *Only AND connectives considered.* Currently, for simplification purposes, we support only AND connectives in the logical decomposition of goal-oriented requirements while several types of connectives are actually on the table. We intend to tackle this in future work, as a way to explore more alternatives.
- *Gateways and tacit knowledge still untouched.* Our redesign algorithms may move some process tasks without mentioning the consequence of changing dependencies between the tasks that were actually moved. This limitation is due to the fact that we formalize our processes in terms of scenario labels following fixed gateways. We intend to enhance the expressiveness of our ACP models and revise our redesign algorithms in order to cover the dependencies between tasks. Additionally, in our algorithms, all tasks are assumed to be fully transparent (i.e., no tacit knowledge or hidden attributes allowed) despite the fact that tacit knowledge might exist in real-life processes.
- *Human intervention and the completeness of measurement indicators.* Despite being positioned as a semi-automatic re-engineering framework, a good part of it is made of human intervention, for instance, modeling the as-is processes, developing goal models, assessing data mining models, and

specifying business rules. This heavy bootstrapping leads to too much background knowledge and domain expertise being required when we deploy the said framework. Although our supported indicators form a good basis for measuring the process performance comprehensively, we offer no evidence of the completeness of the set of indicators being used. This could lead in the future to new indicators being supported and evaluated also in relation to companies' needs.

- *Numerous factors influencing the adoption of our framework.* There are still some concerns lingering on the trustworthiness of data mining models being applied, the available budget for re-engineering (e.g. for some companies this can represent prohibitive costs of change implementation and having employees trained), the conceptual quality of goal models being specified, and the reliance of necessary expertise in constructing workable process models. All of these factors may inhibit the adoption of our framework. The factors on model quality and required expertise to build them are overarching with all model based approaches, and we still use them for their added benefits in terms of exploration of alternatives, and facilitation of communication with stakeholders (i.e. decision makers in our case). We see room for improvement with respect to making re-engineering more affordable for companies, by guiding them into finding a trade-off between the gained value and the cost they have to invest to re-engineer their processes, which might consider a subset of the proposed changes.

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