

Toward Collaborative Impacts Among Process  
Instances in a Workflow Management System

By: Mr. Yazan Asaad

Supervised by: Prof. Pnina Soffer

PROJECT SUBMITTED IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS  
FOR THE MASTER'S DEGREE

Month January, Year 2024

Approved by: Prof. Pnina Soffer    Date: \_25/3/24\_



## ***1. Abstract***

In business process models, processes are represented as isolated instances (cases), each with its own expected behavior. It is possible, however, to execute multiple processes concurrently as long as they are managed by the Workflow Management System (WfMS).

Within WfMS, managing instances of business processes aims at gaining insight into their consistency while they are executed. In this way, the instance's management mechanism can be optimized. Also, to dynamically identify which parts of the process should be improved or may be impacted by unexpected behaviors in other parallel instances.

For this to be achieved, impacts among instances at run-time within WfMS should be identified. Unfortunately, existing approaches to the project of identifying and presenting impacts on parallel running instances at run-time are limited and haven't been investigated yet.

Given complex processes with many activities and complex case routings, impacts among running instances are hardly identified from divergent process models managed via WfMS. Many instances are running at once and sharing data and resources with each other, thus making it impossible to intuitively see the global picture of having an instance with effective management methods.

This work looks at an approach to having an effective management method of process instances in a WfMS. Based on an analysis of impacts at design-time, a method to identify impacted instances at run-time, regardless of model's complexity is presented.

The obtained impacted instances are then projected onto the process model such that an effective management method can be obtained. To evaluate the performance and demonstrate the applicability of the presented approach, the method has been implemented as an extension of the Camunda WfMS for different business process models and narrative interviews have been executed.

***Keywords:*** business process model, process instance, impacts among parallel instances, Workflow Management System (WfMS).