

Fabian Gubler

# Refactoring of a Software System for Industry 4.0

## **Bachelor Thesis**

to achieve the university degree  
Bachelor of Arts in Business Administration

submitted to  
**University of St. Gallen**

Supervisor  
Prof. Dr. Ronny Seiger

Institute of Computer Science

May 2022

# Abstract

This is a placeholder for the abstract. It summarizes the whole thesis to give a very short overview. Usually, this the abstract is written when the whole thesis text is finished.

# Contents

|  |           |
|--|-----------|
| <b>Abstract</b>  | <b>ii</b> |
| <b>1 Introduction</b>                                    | <b>1</b>  |
| <b>2 Exploration of the Fourth Industrial Revolution</b> | <b>2</b>  |
| 2.1 Terminology and Context . . . . .                    | 2         |
| 2.2 Defining Smart Factories . . . . .                   | 2         |
| 2.3 Economic Relevance . . . . .                         | 2         |
| <b>3 Theoretical Framework for Code Refactoring</b>      | <b>3</b>  |
| 3.1 Background . . . . .                                 | 3         |
| 3.2 Formalisation of Design Patterns . . . . .           | 3         |
| 3.3 The Business Case for Refactoring . . . . .          | 3         |
| 3.4 Thesis Context . . . . .                             | 3         |
| <b>4 Methodological approach</b>                         | <b>4</b>  |
| 4.1 Motivation and Procedure . . . . .                   | 4         |
| 4.2 Means of data collection . . . . .                   | 4         |
| 4.3 Methods of analysis . . . . .                        | 4         |
| 4.4 Limitations and justification . . . . .              | 4         |
| <b>5 Main Findings</b>                                   | <b>5</b>  |
| <b>6 Discussion</b>                                      | <b>6</b>  |
| <b>7 Conclusion</b>                                      | <b>7</b>  |

## List of Figures

# 1 Introduction

## **2 Exploration of the Fourth Industrial Revolution**

### **2.1 Terminology and Context**

### **2.2 Defining Smart Factories**

### **2.3 Economic Relevance**

## **3 Theoretical Framework for Code Refactoring**

### **3.1 Background**

### **3.2 Formalisation of Design Patterns**

### **3.3 The Business Case for Refactoring**

### **3.4 Thesis Context**

## **4 Methodological approach**

### **4.1 Motivation and Procedure**

### **4.2 Means of data collection**

### **4.3 Methods of analysis**

### **4.4 Limitations and justification**



## 5 Main Findings

## 6 Discussion

## 7 Conclusion

## Declaration of Authorship

"I hereby declare

- that I have written this thesis without any help from others and without the use of documents and aids other than those stated above;
- that I have mentioned all the sources used and that I have cited them correctly according to established academic citation rules;
- that I have acquired any immaterial rights to materials I may have used such as images or graphs, or that I have produced such materials myself;
- that the topic or parts of it are not already the object of any work or examination of another course unless this has been explicitly agreed on with the faculty member in advance and is referred to in the thesis;
- that I will not pass on copies of this work to third parties or publish them without the University's written consent if a direct connection can be established with the University of St.Gallen or its faculty members;
- that I am aware that my work can be electronically checked for plagiarism and that I hereby grant the University of St.Gallen copyright in accordance with the Examination Regulations in so far as this is required for administrative action;
- that I am aware that the University will prosecute any infringement of this declaration of authorship and, in particular, the employment of a ghostwriter, and that any such infringement may result in disciplinary and criminal consequences which may result in my expulsion from the University or my being stripped of my degree."

---

Date

---

Signature

By submitting this academic term paper, I confirm through my conclusive action that I am submitting the Declaration of Authorship, that I have read and understood it, and that it is true.

# Appendix