Data Analytics, Control, and Risk Management Mini-track

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1. Introduction

Data analytics (DA) technology has emerged as a critical component in sustaining and transforming business processes, which enhances agility and control environment. DA allows a firm to develop real-time solutions for anomalies or unusual trends of the provided service or products, to reduce business risks, and to conduct advanced sentiment analyses and thereby enhance customer relationships. DA also enables a firm to examine the entire population of transactions in a timely fashion, effectively reducing sampling risks, identifying anomalies, and improving both the quality and the efficiency of transaction testing. DA technology can result in improved understanding of a firm’s operations and associated business risks, increased potential for detecting errors, and enhanced communications with those charged with governance of internal and external entities, which lead to improved overall firm performance. Thus, issues pertaining to the potential returns and risks associated with DA have become subjects of research.

In this mini-track, we seek research papers that explore the role that DA technology plays in identifying and analyzing a firm’s risks as well as improving the effectiveness of a firm’s control and risk management. Analyzing data in a timely manner enables firms to gain insights from their internal and external environments and to better sense changes in their markets; indeed, it serves as a basis for determining how risks, control effectiveness, and policy compliance should be managed. With data surrounding us, how firms can take advantage of the insights generated by DA to better understand risks and uncertainties that they are facing and more importantly, to improve their risk management and compliance are important questions.

2. Sessions

We thank the authors who have submitted papers to this mini-track. This year’s mini-track includes the following four research papers. All accepted papers discuss the opportunities of exploiting DA to improve business processes, detect anomalies, and enhance risk management. Combined, they demonstrate multiple new benefits of sophisticated DA on risk mitigation. Their findings have implications for managers and practitioners.

The first paper, titled, “Using Autoencoders for Data-Driven Analysis in Internal Auditing” by Jakob Nonnenmacher, Felix Kruse, Gerrit Schumann, and Jorge Marx Gómez discusses the use of unsupervised neural networks (NNs) in the form of Autoencoders (AEs) on real-world nonfinancial data to explore their potential for internal auditing. The qualitative evaluation of their findings highlight that AEs can support audit execution and audit planning to improve the quality of the internal audit engagement.

The second paper, titled, “Data-Centric Risk Management for Business Processes” by Markus Michael Mützel and Omid Tafreshi proposes two Key Performance Indicators (KPIs), namely Data-oriented Process Risk and Data Type Risk, to analyze this relationship and to prioritize actions to improve data quality. The authors suggest the importance of both KPIs in order to quantify the risk for (i) a single process belonging to a process hierarchy based on the quality of its data and (ii) all analyzed processes based on the quality of a specific data type.

The third paper, titled, “Requirements Identification for Real-Time Anomaly Detection in Industrie 4.0 Machine Groups: A Structured Literature Review” by Philip Stahmann and Bodo Rieger outlines the data, infrastructure, and analysis requirements for streaming analytics. The authors conduct a systematic literature review of 44 publications in the areas of streaming analytics, anomaly detection, and smart manufacturing and interview industry experts. Their study solidifies the understanding of the requirements for implementing real-time anomaly detection in the Industrie 4.0 era.
The fourth paper, titled, “A Case Study on the Application of Process Mining in Combination with Journal Entry Tests for Financial Auditing” by Sebastian Stephan, Johannes Lahann, and Peter Fettke demonstrates a possibility of combining traditional journal entry tests with process mining techniques to enhance audit effectiveness. They contribute to the literature and practice by showing an innovative approach of discovering anomalies.

We strongly believe that this mini-track has great potential to stimulate the creation of a robust, interdisciplinary analytics research community within HICSS.