

## General Summary

These sets of summaries provided a broad overview of AI within the monitoring process, and in Business Process Management (BPM) in general.

### AI and Business

AI supports business activities in several ways. First, it allows businesses to adopt automation solutions, reducing costs and time-consuming tasks. Also, AI can complete multiple tasks, and enhance several processes. However, it can only act as an intermediary, and human supervision and intervention might be necessary. Another challenge related to AI job replacement. As AI can support a broad range of activities, some roles must be redefined.

### The importance of automation

One of AI's advantages is that it can automate numerous tasks and processes. In digitization, automation is a driving force fostering innovation. Through automation, AI increases available manpower, and can even provide insights that humans are not able to provide. According to the different articles, AI and automation have to be further investigated to explore and unleash their full potential in Business Process Management (BPM).

### AI models approaches, models, and techniques

Artificial Intelligence encompasses a broad range of approaches, models, and techniques. Some of them contribute to enhancing BPM and more specifically business process monitoring. Among them, Machine Learning (ML) enables models to learn from data. Within ML, there is a subset called Deep Learning (DL). DL is particularly used in predictive process behavior. DL encompasses techniques such as Long Short-Term Memory (LSTM), a recurrent neural network, and Gated Graph Neural Networks (GGNN), a neural network. They are all inspired by the human brain.

### The importance of data in the monitoring process

The power of these AI models mainly comes from the data they process. Although data is valuable for organizations, it is also essential in BPM. Data helps with process monitoring and optimization. In predictive monitoring, the DL model uses data to make predictions and detect issues early on. The DL model outperforms the traditional ML model when it comes to predictive monitoring as it provides more precise and accurate predictions. However, ML can combine with innovative technologies to get real-time data and enhance monitoring. That was the case in automotive manufacturing, where IoT-based sensors, big data processing, and hybrid prediction models enable real-time monitoring activities.

### The diverse approaches to the monitoring process

There are different approaches to monitoring. Each of them aims for more accuracy and better performance. The predictive monitoring approach is outcome-oriented. It uses DL to predict events and anticipate future process behavior. Prescriptive process monitoring, on the other hand, aims to identify when it is the right time to take action to prevent a deviation and which strategy should be implemented.

### Challenges of using AI in the monitoring process

One of the main challenges of monitoring processes powered by AI is interpretability. Predictive Business Monitoring must feature explanation capabilities to certify the accuracy of the predictions. Not only do humans need to understand the predictions, but they also need to understand the underlying process, how the system works, and provide predictions. To do so, the LSTM technique leverages sequential data, while GGNN is better suited for graph-structured data.

The same interpretability issue goes for Business Process Management. Semantic BPM (SBPM) integrates semantic technologies to provide insights into business process execution. The major advantage of SBPM is that it leverages ontologies, which ease data interpretability.

### **Safety and Regulations of AI in BPM**

Although AI enhances BPM and specifically the monitoring process, some questions arise regarding its endless capabilities. The concerns revolve around the lack of interpretability, audibility, data privacy, and safety of AI models. In some cases, AI can support individuals to ensure legal compliance, but in others, it can be used to track unlawful activities. That is the case in Russia, where Russian tax authorities leveraged AI to ensure compliance and prevent violations. Another risk is related to AI accuracy and learning bias. AI is trained with different streams of data. Hence, it must be high-quality data that fits the exact role it intends to.

To summarize, AI models and techniques are valuable tools to enhance Business Process Management and Monitoring. However, the limitless power of data and its lack of transparency and privacy raise some ethical and legal questions.