Synthesis 1: **Business process modeling using petri nets**

- Introduction to Petri nets as a graphical modeling method for process representation.
- Historical exploration of business process modeling, focusing on its development and adoption.
- Examination of the challenges and opportunities in the dynamic business environment.
- Presentation of various methods and approaches to business process modeling.
- Importance of validity in ensuring process consistency and efficiency is mentioned.
- Future of BP and their link with software services is evoked.

Synthesis 2: **Semantically aided business process modeling**

- Importance of improving business process models with semantic annotations derived from ontologies.
- Use of Semantic Web techniques to formalize and verify constraints in business process diagrams (BPDs).
- Automated transformation of annotated BPDs into OWL ontologies.
- Specification and verification of structural constraints using Semantic Web technology.
- Integration of constraints into the Business Process Knowledge Base (BPKB).
- Introduction of an ontology-based framework for the verification of structural constraint sets.
- Significant benefits of the approach for specifying and verifying structural constraints.

Synthesis 3: **Achieving business process**

- Focus on semantic integration to ensure interoperability of information systems.
- Detailed explanation of meta-models and ontologies for true semantic interoperability.
- Combining meta-models and ontologies for a complete semantic description of model elements.
- Analysis of basic approaches to projecting model elements and developing ontologies.
- Overview of related work and a concept of semantic interoperability using metamodels and ontologies.
- Example of a company merger illustrating the challenges and opportunities of semantic interoperability.
- Exploration of advanced algorithms for improved semantic analysis of business process models.

Synthesis 4: **Business Analysis Method for Constructing**

- Developing AI technologies in companies.
- Importance of building suitable models for specific AI service system projects.
- Recognizing the added value of AI solutions in day-to-day operations.
- Proposed model for a flexible framework for AI systems projects.
- Highlighting of the design phase aligning business objectives with technological capabilities.
- Collaboration between business and IT departments for effective integration of AI technologies.
- Focus on key decisions made during the design phase of developing artificial intelligence systems

General Summary : These 4 articles take a detailed look at business process modeling and the integration of technology in modern companies. The first article deals with the use of

Petri nets as a graphical method for representing and analyzing the interactions between the various stages of a process. It also provides an historical context of the development of BPM. The second article focuses on the semantic enrichment of process models thanks to ontology-based annotations, highlighting the formalization and constraint checking. The third article focuses on achieving semantic interoperability by combining metamodels and ontologies, while focusing on the importance of this approach for a complete semantic description of model elements. Finally, the fourth article focuses on the implementation of artificial intelligence technologies in business, explaining the need to develop tailor-made models for each specific project, with particular focus on the design phase to align business objectives with technological capabilities. Together, these articles provide a clear understanding of the different dimensions of business process modeling, semantic enrichment, interoperability and the integration of artificial intelligence technologies, and illustrate their relationship in the modern & dynamic world of business management.