Reference Curriculum for Executive Education in Business Process Management: Results of the Erasmus+ Project "BPM Online"

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Introduction

The project developed a reference curriculum for executive education on Business Process Management (BPM) for Europe. Such a curriculum was strongly needed, because there is a huge demand for competences in BPM, which is about the value creating application of information and communication technology (ICT) in business and society to support excellence and innovation.

BPM_Online is the first project to design a reference curriculum for executive education in the field of BPM that makes use of blended learning opportunities and involves leading research BPM institutes across Europe. The project BPM_Online intended to enable executive education jointly carried out by BPM research centres across Europe, and it is designed in a flexible way so as to be able to integrate new topics and partners in the future.

The project produced six intellectual outputs that will be ready to use for educational institutions throughout Europe, including a BPM Curriculum Framework and five BPM modules. These outputs go far beyond the existing educational offerings because they integrate world-leading up-to-date research results and they are tailor made for the needs of EU professionals using innovative virtual and blended learning scenarios.

Partners

Wirtschaftsuniversität Wien

Wirtschaftsuniversität Wien (Vienna University of Economics and Business) was founded on October 1 st, 1898 as the Imperial Export Academy. With about 27 000 (23% are international students from 106 nations) students, WU today is EU's largest educational institution for business and economics, business law, and social sciences.

In 2007, the WU became the first Austrian University to receive the international EQUIS accreditation. EQUIS (European Quality Improvement System) is an internationally recognised accreditation system offered by the European Foundation of Management (EFMD).

In 2011 WU's degree program in International Business Administration came in at a very good 18th place up six ranks from 2010. This ranking not only keeps WU in the same league as renowned schools like the London School of Economics and Political Science or Stockholm School of Economics, but also distinguishes WU as the only ranked Austrian business university.

The Institute for Information Business (IB) is part of the Department of Information Systems and Operations. With 7 tenure tracked professors and 61 academic staff members the Department of Information Systems and Operations at WU Vienna bundles competences in a diverse spectrum of IS research including information business, business process management and production management.

Project contributors:

- Dr. Monika Malinova
- Prof. Dr. Jan Mendling

Westfälische Wilhelms-Universität Münster

Founded in 1780, the Westfälische Wilhelms-Universität Münster (WWU) is a university with tradition. 250 courses of study, 15 faculties, 37 000 students, 5 500 graduates every year, a staff of 5 000 including 565 professors – as well as 400 partnership agreements with universities and other academic institutions all over the world. As one of WWU's faculties, the Münster School of Business and Economics (MSBE) is one of the largest and most prestigious business schools in Germany. The high prestige of the school is evidenced by the top ratings that are consistently achieved in all university rankings.

The Department of Information Systems (IS) as part of the MSBE is considered to be one of the largest and most respectable IS departments in Germany, currently employing 6 full professors, 2 junior professors, 16 post-doctoral researchers, 58 research assistants, and around 100 student assistants. The goal of the Department is to offer thorough internationally applicable education at the intersection between Economics and Computer Science. Every year up to 100 students finish their studies to work in different sectors as consultants, software project managers, information managers, information system and organization designers etc.

Furthermore, the Department developed a Master of Science in Information Systems study programme (MScIS), completely taught in English, as one of the first IS departments in Germany. The MScIS programme is a combination of disciplines such as Computer Science, Statistics, and Business

Administration, providing a unique environment for studies and research. Additionally, the Department offers German undergraduate studies (Bachelor of Science in Wirtschaftsinformatik, as well as an executive German Master in Information Management.

The research aspect of the programme is further strengthened by the international orientation of the European Research Center for Information Systems (ERCIS), bringing together researchers from universities across Europe.

Contributors:

- Prof. Dr. Dr. h.c. Dr. h.c Jörg Becker
- Nadine Ogonek
- Dr. Armin Stein

Copenhagen Business School

Copenhagen Business School (CBS) was established in 1917. Today, with 20 000 students and 1 500 employees, CBS is one of the largest business schools in Europe and one of the eight Danish universities. Since 2000, CBS has been accredited by EQUIS, by the Association of MBAs (AMBA) and by the Association to Advance Collegiate Schools of Business (AACSB) and has thus acquired 'The Triple Crown', an acknowledgement only shared by around 50 business schools worldwide.

In the ranking of the world's 1,000 best business schools by Eduniversal, which is part of the French consultancy SMBG, CBS is at position 3 after Harvard Business School and London Business School. Also other renowned rankings classify CBS as one of the most prestigious business schools worldwide.

With the distinctiveness of its diversity, CBS aims to offer strong research and education programmes in classical management disciplines (including finance and economics, accounting and operations management, marketing, strategic management and organisation) and in disciplines that place business in a wider social, political and cultural context. CBS has a particular responsibility to bring knowledge and new ideas to companies and business organisations, to the next generation of business leaders, and to society as a whole.

The Department of IT Management (ITM) conducts research within the following areas relating to IT and Information Systems: Design, Implementation, Use and Exploitation, and Information Management. The department's research concentrates around research themes that are topical, popular, inter-disciplinary, and dynamic in nature. Currently ITM focuses on IT strategy, social media, participation, open big data, the cashless society, and the internet of things. The department of information technology management is one of the largest of its kind in Europe, with 40+ full time researchers, in the area of Information System research. The Department also includes a variety of other disciplines, such as e-government, Human-Computer Interaction, computer science, and design science.

Contributors

- Ass. Prof. Dr. Matthias Trier

Vrije Universiteit Amsterdam

Vrije Universiteit Amsterdam is a publicly funded, broad, research-intensive university attended by a wide variety of students of diverse backgrounds In 2012, VU had about 24 500 registered students, most of whom were full-time students. Measured in FTE, the university had 2 250 faculty members and researchers, who were supported by 1 500 administrative, clerical and technical employees.

The university's annual endowment for 2013 is around €450 million. About three quarters of this endowment is government funding, the remainder is made up of tuition fees, research grants, and private funding. The Business Informatics chair is part of the Faculty of Sciences, one of the 11 faculties of the university. Vrije Universiteit Amsterdam is ranked 64th globally in the CWTS Leiden Ranking 2014.

Contributors

- Dr. Henrik Leopold
- Prof. Dr. Hajo Reijers

Universität Liechtenstein

The University of Liechtenstein is an internationally recognised university, top-rated owing to its close connection between study and practice. The university is a foundation under public law, which allows it to fulfil its performance mandate autonomously and flexibly.

The university's education and transfer offerings are geared to societal needs and business demands. Their key contents (i.e., Architecture and Planning, Business Economics) are disseminated in graduate and undergraduate study programmes as well as in continuing education, research and development, and technology and knowledge transfer.

Approximately 1 200 students are registered in the Bachelor's, Master's and doctoral degree programmes, in the Executive Master's and post-graduate programmes, as well as university courses of study either full-time or in a continuing education capacity. These educational offerings are interdisciplinary and aligned with international decision-making and responsibility expertise.

The Institute of Information Systems at the University of Liechtenstein is one of the leading research institutes on Business Process Management (BPM). It further has a proven track record of successful projects of innovating and integrating learning processes through digital technologies. Research and teaching at the Institute of Information Systems focus on information technology's role in organizational design. The institute collaborates with local and international industry and research partners to design methods and strategies that support the management of business processes.

Contributors

- Prof. Dr. Jan vom Brocke
- Dr. Theresa Schmiedel
- Dr. Nadine Székely

BPM Curriculum

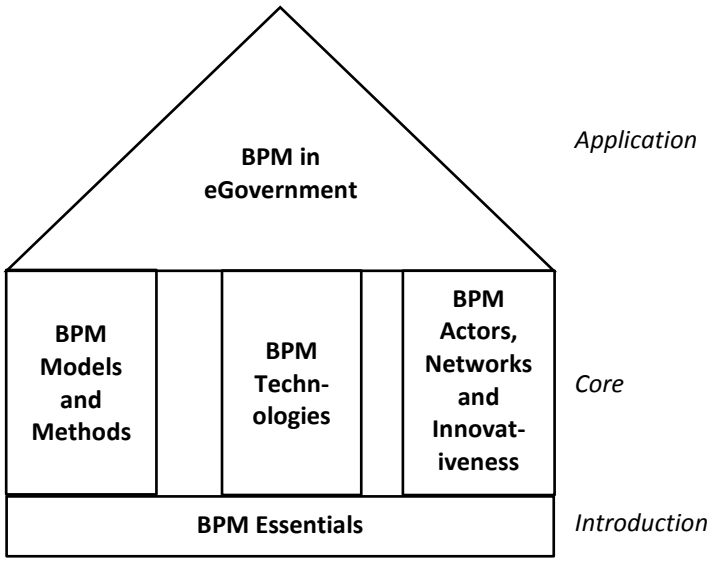
The curriculum presented in this documents has been developed for executive education on BPM. The target group of the curriculum are line and middle management specialists who wish to increase their BPM skills. The study program is designed for managers on group level that are confronted with challenges of business process management and the needs to increase efficiency, foster innovations, and take over responsibility in transformational BPM initiatives.

To account for the flexibility requirements of today's business world, the curriculum makes use of blended learning techniques. For the implementation of the curriculum, we recommend to establish an on-site kick-off event that allows participants to get in touch with each other and establish personal relationships. Similarly, we recommend to organize a closing conference, at which the participants have the chance to present the key learnings for their own specific organizational context and establish further personal ties to BPM professionals. Throughout the coursework, we recommend that lecturers foster class interaction.

The content of the curriculum provides a holistic overview on BPM and consolidates the current knowledge on this topic. Being developed jointly by five leading institutions in BPM research, the curriculum reflects different ways of how BPM can be approached.

The curriculum consists of five modules and can be extended in future through further modules. Each module covers a workload of 10 ECTS. The flexibility of the modular concept allows for the curriculum to be adjusted to national qualification frameworks depending on local requirements.

The five modules of the curriculum are split into three parts: an introductory part, a core part and an application part. In the introductory part, the module ***BPM Essentials*** provides an introduction to BPM by presenting core elements necessary to understand the idea of BPM. The core part consists of the module ***BPM Models and Methods***, the module ***BPM Technologies***, and the module ***BPM Actors, Networks, and Innovativeness***. In ***BPM Models and Methods***, participants learn methods how to analyze, document, and re-design processes. ***BPM Technologies*** provides an overview on technologies relevant for BPM. ***BPM Actors, Networks, and Innovativeness*** addresses the needs of a fast-changing digital word in terms of increased flexibility, open collaboration, and innovativeness. The application part consists of the module ***BPM in eGovernment***, which provides a detailed view on one specific application of BPM, namely eGovernment.



Regarding further modules that may be added to the curriculum in future, we have the following recommendations based on feedback we received from BPM experts worldwide. An extension of the curricululm may cover additional optional introductory modules that provide background for professionals from different disciplines. It may also cover additional core modules, for example, on inter-organizational perspectives of BPM. In addition, the application part may also include a case module on the overall application of the course contents on the organizations at which the participants work. Such a case module could also help examining how far participants are able to successfully align the course contents.

In the following, each of these modules is described in terms of learning objectives, required prior knowledge, blend of virtual/non-virtual techniques and proposed grading. Further, for each module, ten sessions are described by learning outcomes, table of content, major references, examples of education material, and pedagogical recommendations.

Module 1: “BPM Essentials”

The module ‘BPM Essentials’ provides an introduction to Business Process Management (BPM), presenting the core elements necessary to understand the concept of BPM. It starts with an overview on the six pillars of BPM: strategic alignment, governance, methods, IT, people, and culture. Participants thus get a holistic view on BPM which goes beyond the traditional focus on IT and methods. In addition, participants are introduced to principles of good BPM, which give guidance on how to implement BPM. A particular focus on the role of context in BPM implementation provides insights on how a suitable BPM approach can be derived. Thus, participants become prepared to choose the right way to implement BPM in their organization. The module is completed by a focus on value-oriented BPM, shaping an understanding that BPM needs to create value and contribute to the organizational purpose.
In each session, the participants will be provided with theoretical knowledge and examples of real-life cases. Further, participants will be invited to discuss their own experiences in the field of BPM concerning the presented topics.

Learning objectives

- Know the foundations of process management (e.g. business process re-engineering, total quality management)
- Apply the core elements of process management (strategic alignment, governance, methods, technologies, people, culture)
- Apply the key principles of good process management
- Outline the role of context-awareness and value-orientation in BPM
- Integrate the acquired knowledge to understand the benefits and competitive advantages of a holistic process management approach

Required prior knowledge

- None

Blend of virtual / non-virtual techniques

- Fixed virtual meeting dates with sessions that allow for interaction
- Virtual sessions are recorded and provided in case participants missed the meeting

Grading

- Exam: 40 %
- Participation (incl. peer feedback): 20 %
- Group work (incl. case on context-aware and value-oriented BPM): 40%

Session 1: Introduction

In the introductory session, participants learn about the importance of BPM and how BPM can help them to innovate and transform their organization. Thus, this session provides the ground for the following sessions.

Learning outcomes

- Share the fascination for BPM
- Demonstrate the innovative and transformative power of BPM
- Outline the relevance of BPM for digital transformation
- Provide a conceptualization of BPM
- Introduce the six core elements of BPM

Table of contents

- Concepts and nature of business processes
- BPM as a driver of innovation and transformation
- BPM as a management paradigm
- BPM as a holistic management approach
- The six core elements of BPM

Major references

- Hammer, M. (2015), What is Business Process Management, in: Handbook on Business Process Management: Introduction, Methods and Information Systems, Berlin 2015, pp. 3-16.
- Harmon, P. (2015), The Scope and Evolution of Business Process Management, in: Handbook on Business Process Management: Introduction, Methods and Information Systems, Berlin 2015, pp. 37-80.
- Rosemann, M., & vom Brocke, J. (2015), The Six Core Elements of Business Process Management, in: Handbook on Business Process Management: Introduction, Methods and Information Systems, Berlin 2015, pp. 105-122.
- vom Brocke, J., & Rosemann, M. (2014), Business Process Management (2014), in: Wiley Encyclopedia of Management, 3rd Edition, Volume: Management Information Systems, 2014.

Pedagogical recommendations

- Mix of lecture inputs, discussions, and small exercises

Session 2: Strategic Alignment

The session emphasizes the importance of aligning the BPM strategy and the organizational strategy. Participants will learn how BPM can be a competitive differentiator.

Learning outcomes

- Explain the importance of strategic alignment for BPM
- Reflect on value concepts related to BPM
- Calculate the return of process transformation
- Define performance measures for processes
- Outline strategies how to gain support for process transformation

Table of contents

- The concept of strategic alignment and related terminology
- The role of strategic alignment in BPM
- Criteria necessary for the evaluation of process performance
- Return on process transformation
- Strategies for process transformation

Major references

- Luftman, J. (2015), Strategic Alignment Maturity, in: Handbook on Business Process Management: Strategic Alignment, Governance, People and Culture, Berlin 2015, pp. 5-43.
- Burlton, R. T. (2015), Delivering Business Strategy Through Process Management, in: Handbook on Business Process Management: Strategic Alignment, Governance, People and Culture, Berlin 2015, pp. 45-78.
- vom Brocke, J., & Sonnenberg, C. (2015), Value-Orientation in Business Process Management, in: Handbook on Business Process Management: Strategic Alignment, Governance, People and Culture, Berlin 2015, pp. 101-132.
- Leyer, M., Heckl, D., & Moormann, J. (2015), Process Performance Measurement, in: Handbook on Business Process Management: Strategic Alignment, Governance, People and Culture, Berlin 2015, pp. 227-241.

Pedagogical recommendations

- Mix of lecture inputs, discussions, and small exercises

Session 3: Governance

In this session, participants will learn how to build up an efficient BPM governance structure. The focus of the session particularly lies on organizational roles relevant for BPM.

Learning outcomes

- Explain the importance of process governance
- Explain different coordination mechanisms in organizations
- Define different roles in process management
- Outline the functions of a process management centre of excellence
- Evaluate a real-life situation according to its governance considerations

Table of contents

- The role of governance in BPM
- Coordination mechanisms
- Roles in process management
- BPM Centre of Excellence
- The presence of governance in organizations

Major references

- Markus, L. M., & Jacobson, D. D. (2015), The Governance of Business Processes, in: Handbook on Business Process Management: Strategic Alignment, Governance, People and Culture, Berlin 2015, pp. 311-332.
- Spanyi, A. (2015), The Governance of Business Process Management, in: Handbook on Business Process Management: Strategic Alignment, Governance, People and Culture, Berlin 2015, pp. 333-349.
- Rosemann, M. (2015), The Service Portfolio of a BPM Center of Excellence, in: Handbook on Business Process Management: Strategic Alignment, Governance, People and Culture, Berlin 2015, pp. 381-398.
- Novotny, S., & Rohmann, N. (2015), Towards a Global Process Management System. The Thyssen-Krupp Presta Case, in: Handbook on Business Process Management: Strategic Alignment, Governance, People and Culture, Berlin 2015, pp. 471-483.

Pedagogical recommendations

- Mix of lecture inputs, discussions, and small exercises

Session 4: Methods & IT

The session provides an overview on modelling methods and information technologies relevant for BPM, which will be further deepened in the modules 2 and 3. Participants will get a first idea which tools they can use to model and manage processes.

Learning outcomes

- Explain the role of modelling methods and Information Technologies in BPM
- Outline alternative modelling techniques
- Explain Six Sigma and other techniques how to discover process improvement
- Give an overview of relevant types of IT for BPM
- Outline the potential of certain technologies for BPM

Table of contents

- Role of modelling methods and IT in BPM
- Alternative modelling techniques (e.g., process frameworks)
- Business Process Modelling Notation (BPMN)
- Six Sigma
- Essential technologies
- The value delivered by IT through process redesign and process innovation in organizations

Major references

- Aagesen, G., & Krogstie, J. (2015), BPMN 2.0 for Modeling Business Processes, in: Handbook on Business Process Management: Introduction, Methods and Information Systems, Berlin 2015, pp. 219-250.
- Conger, S. (2015), Six Sigma and Business Process Management, in: Handbook on Business Process Management: Introduction, Methods and Information Systems, Berlin 2015, pp. 127-146.
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- Kemsley, S. (2015), Business Process Management and the Social Enterprise, in: Handbook on Business Process Management: Introduction, Methods and Information Systems, Berlin 2015, pp. 463-474.
- Ouyang, C., Adams, M., Wynn M. T., & ter Hofstede, A. H. M. (2015), Workflow Management, in: Handbook on Business Process Management: Introduction, Methods and Information Systems, Berlin 2015, pp. 475-506.
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Pedagogical recommendations

- Mix of lecture inputs, discussions, and small exercises

Session 5: People

The session focuses on competences and skill development in BPM. Participants learn what the skill set of a BPM professional comprises of and how their organizations can develop these skills.

Learning outcomes

- Explain the role of skill development in BPM
- Explain relevant competencies in BPM
- Describe the skill set of a BPM professional
- Distinguish key job profiles in BPM
- Plan skill development strategies for BPM

Table of contents

- The concept of skills and related terminology
- The role of people and skill development in BPM
- Competence categories relevant to BPM
- Ideal types of BPM professionals
- Strategies for BPM skill development

Major references

- Antonucci, Y. L. (2015), Business Process Management Curriculum, in: Handbook on Business Process Management: Strategic Alignment, Governance, People and Culture, Berlin 2015, pp. 547-572.
- Bergener, K., vom Brocke, J., Hofmann, S., Stein, A., & vom Brocke, C. (2012), On the importance of agile communication skills in BPM education: Design principles for international seminars. Knowledge Management - E-Learning: An International Journal, 4(4), 415-434.
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- Kokkonen, A., & Bandara, W. (2015), Expertise in Business Process Management, in: Handbook on Business Process Management: Strategic Alignment, Governance, People and Culture, Berlin 2015, pp. 517-546.
- Müller, O., Schmiedel, T., Gorbacheve, E., & vom Brocke, J. (2014), Toward a Typology of Business Process Management Professionals: Identifying Patterns of Competence through Latent Semantic Analysis. *Enterprise Information Systems*, 10 (1), 50-80.

Pedagogical recommendations

- Mix of lecture inputs, discussions, and small exercises

Session 6: Culture

This session focuses on culture as a critical factor for BPM success. Participants learn to evaluate how far their organizational culture supports BPM and how to further develop the organizational culture to facilitate their BPM initiatives.

Learning outcomes

- Explain the concept of culture and organizational culture
- Explain the relation between culture and BPM
- Describe the phenomenon of BPM culture
- Evaluate BPM culture in an organizational context
- Outline how to develop organizational culture to support BPM

Table of contents

- The concept of culture
- The concept of organizational culture
- The relation between culture and BPM
- The concept of BPM culture
- The presence of BPM culture in organizations

Major references

- vom Brocke, J., & Sinnl, T. (2011). Culture in business process management. A literature review. *Business Process Management Journal (BPMJ), 17*(2), 357-377.
- Schmiedel, T., vom Brocke, J., & Recker, J. (2013). Which cultural values matter to business process management? Results from a global Delphi study. *Business Process Management Journal (BPMJ), 19*(2), 292-317.
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- vom Brocke, J., Petry, M., Schmiedel, T., & Sonnenberg, C. (2015), How Organizational Culture Facilitates a Global BPM Project: The Case of Hilti, in: Handbook on Business Process Management: Strategic Alignment, Governance, People and Culture, Berlin 2015, pp. 693-713.

Examples for educational material

- Culture Assessment (www.cultural-fitness.org)

Pedagogical recommendations

- Mix of lecture inputs, discussions, and small exercises
- Culture Assessment (cultural-fitness.org) can be completed by participants on an individual basis. Results can be compared and discussed.

Session 7: Principles of Good BPM

This session provides an overview on the ten principles of goof BPM. Participants learn how to successfully master the challenges of an BPM implementation with the help of these principles.

Learning outcomes

- Understand the need for principles of good BPM
- Describe the ten principles of good BPM
- Understand how these principles help to master contemporary and future challenges
- Outline how these principles guide BPM implementation

Table of contents

- Current failures in BPM
- The ten principles of good BPM
- Guiding questions for good BPM practices
- Application of the ten principles in organizations

Major references

- vom Brocke, J., Schmiedel, T., Recker, J., Trkman, P., Mertens, W., & Viaene, S. (2014). Ten Principles of Good Business Process Management. *Business Process Management Journal (BPMJ), 20*(4), 530-548.
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- Hammer, M. (2010). What is business process management?, in: vom Brocke, J. and Rosemann, M. (Eds.), *Handbook on business process management: Introduction, methods and information systems*, Springer, Berlin / Heidelberg, pp. 3–16.

Pedagogical recommendations

- Mix of lecture inputs, discussions, and small exercises

Session 8: Context-aware BPM

This session raises awareness that BPM needs to fit the given context and that one-size-fits-all approaches to BPM bear high danger of failure. Participants learn how to apply the BPM Context Framework to consider contextual factors in BPM practice.

Learning outcomes

- Understand the need for considering the context of BPM projects
- Describe contextual factors of BPM projects
- Describe the BPM Context Framework
- Explain the benefits of a context-aware BPM
- Apply the BPM Context Framework

Table of contents

- The role of contextual factors in BPM projects
- Characteristics of the context of BPM projects
- BPM Context Framework
- The nature of processes
- Knowledge-intensive vs. automated processes

Major references

- Zelt, S., Schmiedel, T. & vom Brocke, J. (forthcoming). Understanding the Nature of Processes: An Information-Processing Perspective. *Business Process Management Journal.*
- vom Brocke, J., Zelt, S., & Schmiedel, T. (2016). On the Role of Context in Business Process Management. *International Journal of Information Management, 36*(3), 486-495.
- vom Brocke, J., Zelt, S., & Schmiedel, T. (2015). Considering Context in Business Process Management: The BPM Context Framework. *BPTrends, Class Notes November 2015*, 1-12.

Examples for educational material

- BPM Context Framework (www.bpm-context.org)

Pedagogical recommendations

- Mix of lecture inputs, discussions, and small exercises

Session 9: Value-oriented BPM

This session raises awareness for value-orientation in business process management. Participants learn how to approach BPM, so it actually contributes to the organizational purpose and value creation.

Learning outcomes

- Describe the need for value-orientation in BPM
- Understand the concepts of value and value-oriented BPM
- Understand how business processes create economic value
- Evaluate the value contribution of processes

Table of content

- The concepts of value and value-orientation
- Value Considerations in BPM
- Return on Process Transformation
- Exemplary cases of value-oriented BPM

Major references

- vom Brocke, J., & Sonnenberg, C. (2015). Value-orientation in Business Process Management Management. In J. vom Brocke & M. Rosemann (Eds.), *Handbook on Business Process Management: Strategic Alignment, Governance, People and Culture (International Handbooks on Information Systems)* (2 ed., Vol. 2, pp. 101-132). Berlin et al.: Springer.
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- vom Brocke, J., & Grob, H. L. (2008). Profitability of Business Processes. In J. Becker, M. Rosemann & M. Kugeler (Eds.), *Process Management. A Guide for the Design of Business Processes* (pp. 491-520). Berlin et al.
- vom Brocke, J., Schmiedel, T., Recker, J., Trkman, P., Mertens, W., & Viaene, S. (2014). Ten Principles of Good Business Process Management. *Business Process Management Journal (BPMJ), 20*(4), 530-548.

Pedagogical recommendations

- Mix of lecture inputs, discussions, and small exercises

Session 10: Conclusion

This session concludes the module with a synthesis and application of the acquired knowledge. Participants learn how to use the concepts and models of this module in BPM practice.

Learning outcomes

- Outline the key learnings of this module
- Explain the importance of integrating the six pillars and principles of good BPM
- Apply the knowledge acquired in this module to different case situations

Table of contents

- Synthesis of module content
- Importance of integrating six pillars and principles of good BPM
- The case of Hilti: Insights from BPM in practice

Major references

- vom Brocke, J., Petry, M., Schmiedel, T., & Sonnenberg, C. (2015), How Organizational Culture Facilitates a Global BPM Project: The Case of Hilti, in: Handbook on Business Process Management: Strategic Alignment, Governance, People and Culture, Berlin 2015, pp. 693-713.
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- Peterken, H., & Bandara, W. (2015), Business Process Management in International Humanitarian Aid, in: Handbook on Business Process Management: Strategic Alignment, Governance, People and Culture, Berlin 2015, pp. 761-786.
- de Bruin, T., & Doebeli, G. (2015), Business Process Management at an Australian Transport Provider, in: Handbook on Business Process Management: Strategic Alignment, Governance, People and Culture, Berlin 2015, pp. 741-759.
- Fettke, P., Zwicker, J., & Loos, P. (2015), Business Process Maturity in Public Administrations, in: Handbook on Business Process Management: Strategic Alignment, Governance, People and Culture, Berlin 2015, pp. 485-512.

Pedagogical recommendations

- Synthesis of module content, case study work to apply module content and share experience regarding BPM in practice

Module 2: “BPM Models and Methods”

The module BPM Models and Methods provides detailed knowledge on methods how to analyze, document and re-design processes. It will provide an introduction on the challenges of modeling in large-scale enterprise context, such as multiple perspectives people are faced with when it comes to modeling. The module will discuss different model types and present a plethora of different modeling methods and techniques suitable for different modeling purposes.

Learning objectives

- Know the different methods on how to identify, discover, analyze and re-design business processes in organizations.
- Understand the different modeling challenges that occur in organizations
- Apply the appropriate method suitable for different modeling purposes
- Understand the quality requirements necessary for creating business process models
- Get familiarized with methods on how to govern and maintain process model collections derived as result of process modeling

Required prior knowledge

- BPM Essentials

Blend of virtual / non-virtual techniques

- Virtual sessions – recorded lectures provided to participants for all of the sessions
- Non-virtual sessions which enable discussions about the group work

Grading

- Final exam - 40% (theoretical part)
- Group work - 60% (practical part: real-world application of the knowledge gained from this module; includes process identification, process map design, process discovery (focus on one process), process analysis, process redesign and process model evaluation)

Session 1: Introduction to Methods and Models

The first session sets the foundation for this module, where the different topics covered during this module will be introduced. This session also discusses three model types and their role in organizations.

Learning outcomes

- Learn about the different topics covered during the course
- Get familiar with the three types of models related to business processes
- Learn about the purpose of different models

Table of contents

- Introduction to the topics covered during the course
- Introduction to model types:
    - Process maps
    - Process models
    - Petri nets

Major references

- Dumas, M., La Rosa, M., Mendling, J., & Reijers, H. A. (2013). *Fundamentals of business process management*. Heidelberg: Springer.
- Weske, M. (2010). *Business process management: concepts, languages, architectures*. Springer Publishing Company, Incorporated.
- Reisig, W. (2012). Understanding Petri Nets-Modeling Techniques. *Analysis Methods, Case Studies. Springer*.
- Rosemann, M., & vom Brocke, J. (2015). The six core elements of business process management. In *Handbook on business process management 1* (pp. 105-122). Springer Berlin Heidelberg.
- Hammer, M. (1990). Reengineering work: don't automate, obliterate. *Harvard business review*, *68*(4), 104-112.

Examples for educational material

http://fundamentals-of-bpm.org/

Pedagogical recommendations

- Lecture
- Discussions
- Exercises

Session 2: Modeling languages and methods

The second session provides in-depth insights into the different business process modeling languages used today. The session then introduces the BPM lifecycle and focuses on the first four phases of the lifecycle. The first four phases of the BPM lifecycle deal with how processes are identified, discovered, analyzed and redesigned in organizations.

Learning outcomes

- Learn about how modeling languages evolved and are still evolving to serve users in the most effective way
- Gain awareness of the different process modeling languages that exist and are used today
- Get familiarized with the BPM lifecycle as a method for managing business processes

Table of contents

- Evolution of business process modeling languages
    - UML, EPC, BPMN, PICTURE, Archimate
- Introduction to the BPM lifecycle
    - Process identification
    - Process discovery
    - Process analysis
    - Process redesign

Major references

- Dumas, M., La Rosa, M., Mendling, J., & Reijers, H. A. (2013). *Fundamentals of business process management*. Heidelberg: Springer.
- vom Brocke, J., & Rosemann, M. (2014). Handbook on business process management 1: Introduction, methods, and information systems.
- Kettinger, W. J., Teng, J. T., & Guha, S. (1997). Business process change: a study of methodologies, techniques, and tools. *MIS quarterly*, 55-80.
- Becker, J., Algermissen, L., & Talk T. (2012). Modernizing Processes in Public Administrations.
- White, S. A. (2004). Introduction to BPMN. *IBM Cooperation*, *2*(0), 0.
- Wohed, P., van der Aalst, W. M., Dumas, M., ter Hofstede, A. H., & Russell, N. (2006). On the suitability of BPMN for business process modelling. *Business Process Management*, *4102*, 161-176.
- Zur Muehlen, M., & Recker, J. (2013). How much language is enough? Theoretical and practical use of the business process modeling notation. In *Seminal Contributions to Information Systems Engineering* (pp. 429-443). Springer Berlin Heidelberg.

Pedagogical recommendations

- Lecture
- Discussions
- Exercises

Session 3: Model aspects and modeling guidelines

The third session focuses on the different aspects of models. In particular, this session will provide insights into the parts that constitute a model, such as its syntax and semantics (intra-model aspects) and the aspects important to consider when creating a model, such as domain, roles and tasks (extra-model aspects). The session also introduces guidelines for modeling business processes.

Learning outcomes

- Learn about the intra- and extra-model aspects
- Gain awareness of the importance of complying to guidelines when modeling business processes
- Learn how to use and follow modeling guidelines for the successful operationalization of the BPM lifecycle phases

Table of contents

- Model aspects
    - Intra-model aspects: abstract syntax, semantics, concrete syntax
    - Extra-model aspects: domain, roles, tasks
- Introduction to business process modeling guidelines
    - 7PMGs

Major references

- Dumas, M., La Rosa, M., Mendling, J., & Reijers, H. A. (2013). *Fundamentals of business process management*. Heidelberg: Springer.
- Mendling, J., Reijers, H. A., & van der Aalst, W. M. (2010). Seven process modeling guidelines (7PMG). *Information and Software Technology,* 52(2), 127-136.
- Becker, J., Rosemann, M., & Von Uthmann, C. (2000). Guidelines of business process modeling. *Business Process Management*. Springer Berlin Heidelberg, 30-49.
- Rosemann, M., & vom Brocke, J. (2015). The six core elements of business process management. In *Handbook on business process management 1* (pp. 105-122). Springer Berlin Heidelberg.

Pedagogical recommendations

- Lecture
- Discussions
- Exercises

Session 4: Process Identification I

The fourth session focuses on the identification of business processes that will undergo the phases of the BPM lifecycle. In this session criteria of how to identify processes in organizations are discussed. The session also introduces the concepts of process architecture and process maps, along with their role in organizations.

Learning outcomes

- Systematically define the set of business processes of a company
- Establish clear criteria for prioritizing business processes of a company
- Learn about process architecture, process maps and their role in business process management

Table of contents

- Focus on key processes
  - The designation phase
  - The evaluation phase
- Introduction to process architecture
- Introduction to process maps

Major references

- Dumas, M., La Rosa, M., Mendling, J., & Reijers, H. A. (2013). *Fundamentals of business process management*. Heidelberg: Springer.
- Malinova, M. (2016). *A Language for Designing Process Maps*. WU Vienna University of Economics and Business.
- Ould, M. A. (2005). *Business Process Management: a rigorous approach*. BCS, The Chartered Institute.
- Dijkman, R., Vanderfeesten, I., & Reijers, H. A. (2016). Business process architectures: overview, comparison and framework. *Enterprise Information Systems*, *10*(2), 129-158.
- Weske, M. (2012). Business process management architectures. In *Business Process Management* (pp. 333-371). Springer Berlin Heidelberg.

Examples for educational material

http://fundamentals-of-bpm.org/

Pedagogical recommendations

- Lecture
- Discussions
- Exercises

Session 5: Process Identification II – Designing a process map using PLMN (Process Landscape Model & Notation)

The fifth session introduces a notation for modeling process maps (PLMN) and provides insights into the relations between a process map and a process model. This session discusses the different concepts organizations should consider for the creation of process maps.

Learning outcomes

- Identify concepts necessary for creating process maps
- Get familiarized with the Process Landscape Model & Notation (PLMN)
- Learn how to use PLMN to create process maps

Table of contents

- Introduction to the Process Landscape Model & Notation (PLMN)
    - Abstract syntax
    - Semantics
    - Concrete syntax
- Use of PLMN for designing process maps

Major references

- Dumas, M., La Rosa, M., Mendling, J., & Reijers, H. A. (2013). *Fundamentals of business process management*. Heidelberg: Springer.
- Malinova, M. (2016). *A Language for Designing Process Maps*. WU Vienna University of Economics and Business.
- Ould, M. A. (2005). *Business Process Management: a rigorous approach*. BCS, The Chartered Institute.
- Dijkman, R., Vanderfeesten, I., & Reijers, H. A. (2016). Business process architectures: overview, comparison and framework. *Enterprise Information Systems*, *10*(2), 129-158.

Pedagogical recommendations

- Lecture
- Discussions
- Exercises

Session 6: Essential process modeling with BPMN

The sixth session introduces the Business Process Model & Notation (BPMN), which is the standard process modeling language used today. This session focuses on the behavior of the different BPMN gateways.

Learning outcomes

- Get familiarized with the capabilities of BPMN for process modeling
- Learn about the behavior of the different BPMN gateways

Table of contents

- First steps with BPMN
- Branching and merging
    - Exclusive decisions
    - Parallel execution
    - Inclusive decisions
    - Rework and repetition
    - Handling events

Major references

- Dumas, M., La Rosa, M., Mendling, J., & Reijers, H. A. (2013). *Fundamentals of business process management*. Heidelberg: Springer.
- White, S. A. (2008). *BPMN modeling and reference guide: understanding and using BPMN*. Future Strategies Inc.
- White, S. A. (2004). Introduction to BPMN. *IBM Cooperation*, *2*(0), 0.

Examples for educational material

http://fundamentals-of-bpm.org/

http://www.workflowpatterns.com/patterns/

Pedagogical recommendations

- Lecture
- Discussions
- Exercises

Session 7: Advanced process modeling with BPMN (Signavio)

The seventh session covers practical process modeling using the Business Process Model & Notation (BPMN), which is the standard process modeling language used today. This session focuses on using BPMN to model business processes.

Learning outcomes

- Get familiarized with the elements of BPMN, their meaning and usage
- Represent business processes in forms of business process models using the process modeling language BPMN

Table of contents

- Branching and merging
- Information artifacts
- Resources
- Process decomposition
- Process reuse
- Handling events
- Handling exceptions
- Process choreographies

Major references

- Dumas, M., La Rosa, M., Mendling, J., & Reijers, H. A. (2013). *Fundamentals of business process management*. Heidelberg: Springer.
- White, S. A. (2008). *BPMN modeling and reference guide: understanding and using BPMN*. Future Strategies Inc.
- White, S. A. (2004). Introduction to BPMN. *IBM Cooperation*, *2*(0), 0.
- van Der Aalst, W. M., Ter Hofstede, A. H., Kiepuszewski, B., & Barros, A. P. (2003). Workflow patterns. *Distributed and parallel databases*, *14*(1), 5-51.

Examples for educational material

http://fundamentals-of-bpm.org/

http://www.workflowpatterns.com/patterns/

Pedagogical recommendations

- Lecture
- Discussions
- Exercises

Session 8: Process Discovery

The eighth session deals with the various process discovery techniques. Process discovery techniques are followed to discover the As-Is state of business processes. This session presents also the challenges associated with process discovery.

Learning outcomes

- Gain awareness of the different challenges concerned with process discovery
- Understand the techniques used to discover the as-is state of the processes shown on the process map
- Learn about the steps of process discovery

Table of contents

- The setting of process discovery
- Process discovery methods

Major references

- Dumas, M., La Rosa, M., Mendling, J., & Reijers, H. A. (2013). *Fundamentals of business process management*. Heidelberg: Springer.
- Sharp, A., & McDermott, P. (2009). *Workflow modeling: tools for process improvement and applications development*. Artech House.
- Verner, L.(2004). The challenge of process discovery. *BPTrends*.
- Frederiks, P. J., & Van der Weide, T. P. (2006). Information modeling: The process and the required competencies of its participants. *Data & Knowledge Engineering*, 58(1), 4-20.

Examples for educational material

http://fundamentals-of-bpm.org/

Pedagogical recommendations

- Lecture
- Discussions
- Exercises

Session 9: Process Analysis

The ninth session introduces two types of process analysis techniques, namely qualitative and quantitative process analysis. This session gives in-depth insights into the identification of issues associated with business processes and assessment of the impact these issues have on the organization.

Learning outcomes

- Gain awareness of the basic principles and techniques for qualitative and quantitative process analysis
- Analyze the impact of issues with processes and accordingly prioritize redesign efforts
- Calculate performance measures of a process

Table of contents

- Qualitative process analysis
  - Value-added analysis
  - Root cause analysis
  - Issue documentation and impact assessment
- Quantitative process analysis
  - Performance measures
  - Flow analysis
  - Queues
  - Process simulation

Major references

- Dumas, M., La Rosa, M., Mendling, J., & Reijers, H. A. (2013). *Fundamentals of business process management*. Heidelberg: Springer.
- Conger, S. (2015). Six sigma and business process management, in: *Handbook on Business Process Management 1*. Springer Berlin Heidelberg, 127-146.
- Johannsen, F., Leist, S., & Zellner, G. (2010). Implementing six sigma for improving business processes at an automotive bank, in: *Handbook on Business Process Management 1*. Springer Berlin Heidelberg, 361-382.
- Laguna, M., & Marklund, J. (2013). *Business process modeling, simulation and design*. CRC Press.
- van der Aalst, W. M., Rosemann, M., & Dumas, M. (2007) Deadline-based escalation in process-aware information systems. *Decision Support Systems*, 43(2), 492-511.

Examples for educational material

http://fundamentals-of-bpm.org/

Pedagogical recommendations

- Lecture
- Discussions
- Exercises

Session 10: Process Redesign

The tenth session introduces process improvement and process innovation. The session focuses on improving the issues that have been identified during process analysis. In particular, this session introduces the various heuristics used for redesigning business processes.

Learning outcomes

- Rethink and reorganize business processes with the specific purpose of making them perform better
- Get familiarized with the Heuristic Process Redesign method that builds upon an extensive set of redesign options
- Get familiarized with the Product-based Design method which derives a process design based on the composition of a product

Table of contents

- Process improvement vs. Process Innovation
- The essence of process redesign
- Heuristic process redesign
    - Customer heuristics
    - Business process operation heuristics
    - Business process behavior heuristics
    - Organization heuristics
    - Information heuristics
    - Technology heuristics
    - External environment heuristics

Major references

- Dumas, M., La Rosa, M., Mendling, J., & Reijers, H. A. (2013). *Fundamentals of business process management*. Heidelberg: Springer.
- Hammer, M. (1900). *Beyond reengineering: How the process-centered organization is changing our work and our lives*.
- Hammer, M. (2010). What is business process management?, in: *Handbook on Business Process Management 1*. Springer Berlin Heidelberg, 3-16.
- Reijers, H. A., & Mansar, S. M. (2005). Best practices in business process redesign: an overview and qualitative evaluation of successful redesign heuristics. *Omega*, 33(4), 283-306.

Examples for educational material

http://fundamentals-of-bpm.org/

Pedagogical recommendations

- Lecture
- Discussions
- Exercises

Session 11: Process Model Evaluation

The eleventh session introduces criteria for evaluating the quality of the process models that have been created using BPMN. In particular, this session focuses on the evaluation of the semantic, syntactic and pragmatic quality of process models. In addition, this session provides insights into the governance and maintenance of process model repositories.

Learning outcomes

- Gain awareness and learn how to use criteria for assessing the quality of process models
- Learn how to govern and maintain a process model repository

Table of contents

- Process model quality assurance
    - Syntactic quality
    - Semantic quality
    - Pragmatic quality
- Process model repositories
    - Governance and maintenance of process model repository

Major references

- Dumas, M., La Rosa, M., Mendling, J., & Reijers, H. A. (2013). *Fundamentals of business process management*. Heidelberg: Springer.
- Krogstie, J., Lindland, O. I., & Sindre, G. (1995) Defining quality aspects for conceptual models. *Information System Concepts*. Springer US, 216-231.
- Dijkman, R. M., La Rosa, M., & Reijers, H. A. (2012). Managing large collections of business process models-current techniques and challenges. *Computers in Industry* 63(2), 91-97.
- Dijkman, R. M., Dumas, M., & Ouyang, C. (2008). Semantics and analysis of business process models in BPMN. *Information and Software technology*, *50*(12), 1281-1294.
- Dijkman, R., Dumas, M., Van Dongen, B., Käärik, R., & Mendling, J. (2011). Similarity of business process models: Metrics and evaluation. *Information Systems*, *36*(2), 498-516.

Pedagogical recommendations

- Lecture
- Discussions
- Exercises

Module 3: “BPM Technologies”

The module *BPM Technologies* discusses how technology can support the analysis and improvement of business processes. It will introduce the key concepts related to process mining as well as advanced analysis techniques for process model collections. The module addresses the increasing need for automated analysis given the large amount of process-related data that is available in organizations. The goal of the module is enabling participants to apply technology to automatically identify process improvement opportunities from both event data and process model collections.

Learning objectives

- Understand the concepts and the business value of workflow technology and management
- Understand the foundations and business value of process mining
- Be able to apply process mining tools in a business setting
- Develop awareness of key technologies for process improvement (such as robotic process automation, process collection analysis, process monitoring, text analysis) and their business potential

Required prior knowledge

- BPM Essentials

Blend of virtual / non-virtual techniques

- Virtual and non-virtual sessions that allow for interaction
- Non-virtual practice sessions (to help participants work with the tools)
- All sessions can be recorded and provided to the participants

Grading

- Written Exam - 40% (Questions about theory.)
- Assignment - 60% (Requires the participants to solve practical tasks related to topics of the lecture using respective tools. Grading will be conducted based on the results provided in the assignment report.)

Session 1: Fundamentals of Workflow Management

Workflow Management systems provide the infrastructure for defining, executing, and monitoring business processes. The success of such systems, however, heavily relies on the quality of the workflows put into them. Therefore, this session gives in introduction into the fundamentals of workflow management. In particular, we discuss the main workflow concepts as well as the principles of resource management. Finally, we elaborate on the possibilities for analyzing and improving workflows.

Learning outcomes

- Understand the main Workflow concepts (case, task, process, routing, enactment)
- Understand the role and basic principles of resource management
- Understand the main principles for analyzing and improving workflows

Table of content

- Workflow concepts (case, task, process, routing, enactment)
- Resource management and allocation principles
- Techniques for workflow analysis
- Principles for workflow improvement

Major references

- van der Aalst, W. M. P, van Hee, K. M. (2002). Workflow Management: Models, Methods, and Systems. MIT Press.
- Weske, M. (2012). Business process management architectures. In Business Process Management (pp. 333-371). Springer Berlin Heidelberg.
- van der Aalst, W. M. P., Ter Hofstede, A. H., Kiepuszewski, B., Barros, A. P. (2003). Workflow patterns. Distributed and parallel databases, 14(1), 5-51.
- Russell, N., van der Aalst, W. M. P., Ter Hofstede, A. H., Edmond, D. (2005). Workflow resource patterns: Identification, representation and tool support. In International Conference on Advanced Information Systems Engineering (pp. 216-232). Springer Berlin Heidelberg.

Pedagogical recommendations

- Combination of lectures and cases to avoid too strong theoretical angle

Session 2: Workflow Management Systems

The fundamentals of workflow management discussed in Session 1 are the key to achieving improvements with respect to efficiency and effectiveness of the organization and its work performance. The obvious next step is to realize the defined workflows using workflow technology. This, however, needs to be done with care. Among others, workflow systems must clearly reflect the structure of the defined workflows. At the same time, they must be structured in such a way that they can respond to future changes. In this session, we therefore discuss the role of workflow technology for successful workflow management. We first elaborate on the role of workflow management systems and discuss the architecture of Workflow Management Systems according to the workflow reference model. Then, we discuss the technical infrastructure of Workflow Management systems and give an overview of state-of-the-art products.

Learning outcomes

- Understand role of Workflow Management Systems
- Understand required technical infrastructure
- Be aware of available solution on the market

Table of content

- Role of Workflow Management Systems
- The workflow reference model
- Technical infrastructure of Workflow Management Systems
- Overview of state-of-the-art products

Major references

- Van der Aalst, W. M., & van Hee, K. M. (2002). Workflow Management: Models, Methods, and Systems. MIT Press.
- Weske, M. (2012). Business process management architectures. In Business Process Management (pp. 333-371). Springer Berlin Heidelberg.
- van Der Aalst, W. M. P., Ter Hofstede, A. H., Kiepuszewski, B., Barros, A. P. (2003). Workflow patterns. Distributed and parallel databases, 14(1), 5-51.
- Reichert, M., Rinderle, S., & Dadam, P. (2003). Adept workflow management system. Business Process Management, 1020-1020.

Pedagogical recommendations

- Combination of lectures and cases to avoid too strong theoretical angle
- Live demo

Session 3: Process Performance Measurement

Many organizations wish to measure the performance of their business processes. At the same time, they struggle to define suitable Process Performance Indicators and are not aware of the technological possibilities. In this session, we cover both of these topics. We first discuss how to define suitable Process Performance Indicators. Then we give an overview of the options how to implement and measure these indicators.

Learning outcomes

- Understand how to define suitable Process Performance Indicators
- Be aware of technical options to implement and measure Process Performance Indicators
- Be aware of available tools for monitoring and control and understand their application scenarios for different businesses

Table of content

- Defining Process Performance Indicators
- Implementing Process Performance Indicators
- Tools for Process Performance Monitoring
- Process Performance Management and Process Change

Major references

- Johnston, G. (2013). Designing KPIs to Drive Process Improvement
- del-RíO-Ortega, A., Resinas, M., Cabanillas, C., Ruiz-Cortés, A. (2013). On the definition and design-time analysis of process performance indicators. Information Systems, 38(4), 470-490.
- del-Río-Ortega, A., Cabanillas, C., Resinas, M., Ruiz-Cortés, A. (2013). PPINOT tool suite: a performance management solution for process-oriented organisations. In International Conference on Service-Oriented Computing (pp. 675-678). Springer, Berlin, Heidelberg.
- Leyer, M., Heckl, D., Moormann, J. (2015). Process performance measurement. In Handbook on Business Process Management 2 (pp. 227-241). Springer Berlin Heidelberg.

Pedagogical recommendations

- Combination of lecture and short case

Session 4: Process Performance Prediction

While measuring performance is an important capability, it only relates to the past execution of business processes. In this session, we present mechanisms and technology for predicting the future performance of business processes. We look into the possibilities provided by both classical statistical software as well as process mining tools and illustrate how they can help to predict future process performance and avoid operational problems.

Learning outcomes

- Be aware of different mechanisms for predicting process performance
- Be aware of technical possibilities to implement and conduct performance prediction
- Understand the role of different tools (e.g.: statistical and process mining tools) for performance prediction

Table of content

- What is Process Performance Prediction?
- Strategies for Process Performance Prediction
- Tools for Process Performance Prediction
- Process Performance Prediction and Process Improvement

Major references

- Kang, B., Kim, D., Kang, S. H. (2012). Periodic performance prediction for real-time business process monitoring. Industrial Management & Data Systems, 112(1), 4-23.
- Sánchez-González, L., García, F., Mendling, J., Ruiz, F., Piattini, M. (2010). Prediction of business process model quality based on structural metrics. Conceptual Modeling–ER 2010, 458-463.
- van der Aalst, W. M., P, van Hee, K. M., van Werf, J. M., Verdonk, M. (2010). Auditing 2.0: Using process mining to support tomorrow's auditor. Computer, 43(3).
- Van der Aalst, W. M., Schonenberg, M. H., & Song, M. (2011). Time prediction based on process mining. Information systems, 36(2), 450-475.

Pedagogical recommendations

- Combination of lecture and demo

Session 5: Process Mining I (Discovery)

Contemporary information systems, such as Workflow Management Systems, Enterprise Resource Planning Systems, and Supply Chain Management Systems, record events related to the execution of business processes in so-called event logs. Process mining takes these logs to discover the actual processes that are enacted within an organization. With these capabilities, process mining represents a powerful technology for businesses. In this session, we therefore introduce the foundations of process mining. We start by discussing the Petri net formalism, which forms the basis of most process mining techniques. We then use the Alpha algorithm to illustrate how business processes can be discovered from event logs. Finally, we discuss how the quality of process mining results can be assessed.

Learning outcomes

- Understand the Petri net formalism
- Understand and be able to apply the Alpha algorithm
- Understand the quality dimensions of process discovery algorithms

Table of content

- The Petri net formalism
- Process discovery with the Alpha algorithm
- Process discovery quality dimensions

Major references

- Reisig, W. (2012). Understanding Petri Nets-Modeling Techniques. Analysis Methods, Case Studies. Springer.
- van der Aalst, W. M. P. (2016). Process Mining: Data Science in Action. Springer.
- van der Aalst, W. M. P., Reijers, H. A., Weijters, A. J., van Dongen, B. F., De Medeiros, A. A., Song, M., Verbeek, H. M. W. (2007). Business process mining: An industrial application. Information Systems, 32(5), 713-732.
- Buijs, J. C., Van Dongen, B. F., van der Aalst, W. M. P. (2012). On the Role of Fitness, Precision, Generalization and Simplicity in Process Discovery. In OTM Conferences (1) (Vol. 7565, pp. 305-322).

Pedagogical recommendations

- Combination of lectures and exercises
- Exercises are key element to develop an in-depth understanding of the concepts

Session 6: Process Mining II (Conformance Checking)

In this session, we elaborate on the second important use case of process mining: conformance checking. We discuss the challenges assoiated with conformance checking and introduce the relevant key concepts. A particular focus of that lecture will be on alignment-based conformance checking and how it can be used for root-cause analysis.

Learning outcomes

- Understand how process mining allows to quantify conformance
- Know the principles behind footprint-based conformance checking, replay-based conformance checking, and alignment-based conformance checking
- Understand the advantages and disadvantages of the three conformance checking techniques
- Understand how alignment-based conformance checking allows for root-cause identification

Table of content

- What is conformance checking?
- Introduction to key conformance-checking techniques
- Advantages and disadvantages of the introduced conformance-checking techniques
- Root-cause analysis with alignment-based conformance checking

Major references

- Reisig, W. (2012). Understanding Petri Nets-Modeling Techniques. Analysis Methods, Case Studies. Springer.
- van der Aalst, W. M. P. (2016). Process Mining: Data Science in Action. Springer.
- Rozinat, A., Van der Aalst, W. M. P. (2008). Conformance checking of processes based on monitoring real behavior. Information Systems, 33(1), 64-95.
- Garcia-Banuelos, L., van Beest, N., Dumas, M., La Rosa, M., Mertens, W. (2017). Complete and interpretable conformance checking of business processes. IEEE Transactions on Software Engineering.

Pedagogical recommendations

- Combination of lectures and exercises
- Exercises are key element to develop an in-depth understanding of the concepts

Session 7: Process Mining Case Study

In this session, the participants will solve a process mining case. They will be provided with a realistic data set (i.e. it includes quality issues, noise, etc.) that needs to be analyzed. The participants will use a process mining tool to investigate and answer a number of business questions. The goal of the session is to make the participants understand how process mining tools can be used to answer specific business questions and how to conduct root cause analysis.

Learning outcomes

- Understand how to perform process discovery and conformance checking using a tool from industry
- Understand how to conduct a root cause analysis
- Understand the main follow-up analysis possibilities

Table of content

- Introduction into process mining tool (e.g. DISCO) and demo session
- Presentation of the case to be solved
- Strategy to match use case and algorithm
- Case Study (to be done by the participants using the tool)
- Discussion about lessons learned

Major references

- van der Aalst, W. M. P. (2016). Process Mining: Data Science in Action. Springer.
- van der Aalst, W. M. P., Reijers, H. A., Weijters, A. J., van Dongen, B. F., De Medeiros, A. A., Song, M., Verbeek, H. M. W. (2007). Business process mining: An industrial application. Information Systems, 32(5), 713-732.
- Tutorial Videos (e.g. “Getting started with process mining” : https://www.youtube.com/watch?v=KCpY90T3rQk)
- Rozinat, A., & Gunther, W. (2014). The Added Value of Process Mining. BPM trends.

Pedagogical recommendations

- Intended as an interactive session in which the participants apply process mining themselves
- Case solving will trigger important discussions about how to select the most promising algorithm in a business setting
- Onsite session is essential since participants may encounter a variety of technical problems and challenges

Session 8: Robotic Process Automation

Robotic process automation (RPA) relates to the application of technology, so called “software robots”, to automatically use and operate software applications, manipulate data, and communicate with other systems or users. A key feature of many RPA tools is that they do not require programming skills, i.e. any user can be trained to independently automate processes using RPA. The goal of this lecture is to give an introduction into RPA, the concepts behind it, and the potential of RPA for improving processes using existing tools.

Learning outcomes

- Understand the difference between RPA and traditional automation
- Know and understand the key concepts related to RPA
- Have an overview of the capabilities of existing RPA tools
- Understand the potential of RPA for process improvement

Table of contents

- RPA versus traditional automation
- Key concepts related to RPA
- Software for RPA
- Potential and future of RPA

Major references

- Mary C. Lacity en Leslie P. Willcocks (2017): Robotic Process Automation and Risk Mitigation: The Definitive Guide.
- Fung, H. P. (2014). Criteria, use cases and effects of information technology process automation (ITPA).
- Barnett, G. (2015). Robotic process automation: adding to the process transformation toolkit.

Pedagogical recommendations

- Combination of lecture and tool demo

Session 9: Effective Use of Process Model Collections

Many organizations engaging in process modeling face an increasing number of process models. At some stage, organizations struggle with maintaining and effectively using these large process model collections. In this session, we address the topic of process model collection by covering two main aspects. First, we discuss the issues and benefits that come with process model collections and present principles for proper organization. Second, we elaborate on the analysis potential of process model collections and give an overview how existing technology can be uses to get more value out of process model collections.

Learning outcomes

- Be aware of issues / benefits arising with growing process model collections
- Understand principles of proper process model organization
- Be aware of analysis potential of process model collections
- Be able to effectively apply analysis techniques for process model collections

Table of content

- Process model collections and their challenges
- Organizing process model collections
- Analysis potential of process model collections
- Link between use cases and technical opportunities

Major references

- Apromore (http://apromore.org/)
- Jin, T., Wang, J., La Rosa, M., Ter Hofstede, A., Wen, L. (2013). Efficient querying of large process model repositories. Computers in Industry, 64(1), 41-49.
- Leopold, H., Pittke, F., & Mendling, J. (2015). Automatic service derivation from business process model repositories via semantic technology. Journal of Systems and Software, 108, 134-147.
- La Rosa, M., Dumas, M., Ekanayake, C. C., García-Bañuelos, L., Recker, J., & ter Hofstede, A. H. (2015). Detecting approximate clones in business process model repositories. Information Systems, 49, 102-125.
- Klinkmüller, C., Weber, I., Mendling, J., Leopold, H., & Ludwig, A. (2013). Increasing recall of process model matching by improved activity label matching. In Business Process Management (pp. 211-218). Springer, Berlin, Heidelberg.

Pedagogical recommendations

- Combination of lecture and practice session
- Interactive format has the potential to positively contribute to the session: participants may have made their own experiences with process model collections

Session 10: Process Improvement through Text Mining

Text mining relates to technology that has been created to automatically analyze and understand natural language text. Due to the increasing number of natural language documents describing the content and the outcome of work procedures, natural language texts represent a valuable source for process improvement. In this session, we therefore give an introduction to text mining and discuss the possibilities of leveraging text mining for process improvement.

Learning outcomes

- Have an overview of the different facets of text mining
- Understand technical requirements of text mining
- Be aware of application possibilities of text mining for process improvement

Table of content

- What is Text Mining?
- Facets of Text Mining (from simple occurrence statistics to sentiment analysis)
- What do we need to conduct text mining?
- How to use text mining for improving business processes?

Major references

- Struhl, S. (2015). Practical Text Analytics: Interpreting Text and Unstructured Data for Business Intelligence. Kogan Page Publishers.
- Leopold, H. (2013). Natural language in business process models. Springer.
- Leopold, H., Eid-Sabbagh, R. H., Mendling, J., Azevedo, L. G., Baião, F. A. (2013). Detection of naming convention violations in process models for different languages. Decision Support Systems, 56, 310-325.
- van der Aa, H., Leopold, H., Reijers, H. A. (2015). Detecting inconsistencies between process models and textual descriptions. In International Conference on Business Process Management (pp. 90-105). Springer, Cham.

Pedagogical recommendations

- Combination of lecture and demo

Module 4: "BPM in eGovernment"

The application module synthesizes the basics that were presented in the previous modules 1-3 by putting them into a specific context. There is a multitude of different contexts BPM can be implemented in, like retail or supply chain management. For this curriculum, eGovernment was chosen, because the implementation of BPM in this domain is still rather new, despite its huge potential in terms of efficiency gains.
The participants will learn to understand the bigger picture, in which the BPM core concepts can be introduced. During their self-learning sessions, the students will deal with cases from practice and will have to identify and discuss challenges and solutions.

Learning objectives

- Get familiar with the roots and history of eGovernment
- Understand the different market environments of public and private bodies
- Develop an understanding of the intersections of eGovernment and Business Process Management (BPM)
- Understand intersections of general domains and BPM
- Understand approaches for process-oriented improvement of administrations
- Understand different eGovernment approaches and levels of maturity (international perspective)
- Understand the required skills for eGovernment professionals
- Gain an overview of implemented Information Systems in eGovernment

Required prior knowledge

- BPM Essentials
    - General understanding of process orientation
    - General understanding of process modelling

Blend of virtual / non-virtual techniques

- Fixed virtual meeting dates with sessions that allow for interaction
  OR
- Local, blocked sessions with discussions and group work
- Virtual sessions are recorded and provided in case participants missed the meeting
- Independent modeling tasks with personal feedback and suggestions for improvement

Grading

- Exam: 40 %
- Participation (incl. peer feedback, public administration modelling): 20 %
- Group work (incl. case): 40%

Session 1: An introduction to eGovernment

In the introductory session, participants learn about the application domain of public administrations, i.e. eGovernment, itself. They will get to know the key concepts and principles of eGovernment, where it comes from and why it is indispensable for the public sector today. Thus, this session provides the ground for the following sessions.

Learning outcomes:

- Getting an idea of historical development of eGovernment | understanding the past to be able to describe and discuss about it/remembering historical facts
- Learning about key concepts and principles of eGovernment | remembering and understanding the contents of eGovernment
- Getting to know different definitions -> learning about different foci in different countries | Remembering the core contents of eGov definitions/remembering and understanding the different foci in Europe + drawing connections and differentiating between different concepts

Table of contents:

- History
  - When did it come up and how did it evolve and why?
  - Different initiatives
- eGovernment today
  - Contents
  - Status quo in Europe (how is it organized: rules and regulations, definition by EC and others)

Major references:

- Aldrich, D.; Bertot, J. C., McClure, C. R. (2002). E-Government: initiatives, developments, and issues. *Government Information Quarterly*, 19(4) , 349-355.
- Jaeger, P. T. (2003). The endless wire: E-government as global phenomenon. *Government Information Quarterly*, 20(4), 323-331.
- Jaeger, P. T., & Thompson, K. M. (2003). E-government around the world: Lessons, challenges, and future directions. *Government Information Quarterly*, 20(4), 389-394.
- European Commission (2016): EU eGovernment Action Plan 2016-2020: Accelerating the digital transformation of government.
- European Commission (2015): Future-proofing eGovernment for a Digital Single Market.
- European Commission (2010) EU eGovernment Action Plan 2011 – 2015: Harnessing ICT to promote smart, sustainable & innovative Government.
- European Commission (2009): Ministerial Declaration on eGovernment.

Pedagogical recommendations:

Lecture with activating elements/questions about:

- Own experience with eGovernment
- Existing knowledge about eGovernment/ideas on what eGovernment is about

Session 2: An International Perspective on eGov

In this session, the participants will learn about the different strategies and transaction levels of eGovernment in different countries with the help of selected concepts and sample application. This session is meant to help the participants understand what challenges the implementation of eGovernment is facing.

Learning outcomes:

- Explain and discuss different transaction levels of e-Government
- Explain and discuss (dis-)advantages of the different sample applications
- Identify potential future opportunities and threats

Table of contents:

- Different strategies in different Countries
- Transaction levels of e-Government
- Selected concepts and sample applications
    - Open Government: Transparency efforts in Brazil
    - Mobile Government: Mobile Tax declaration (Sweden)
    - E-Participation: Online petitions (Germany)
    - Service integration: Estonian identity card
- Search and present examples from your home country
- The future: Leveraging to one joint Europe?

Major references:

- http://www.unpan.org/Library/MajorPublications/UNEGovernmentSurvey/PublicEGovernanceSurveyintheNews/tabid/651/mctl/ArticleView/ModuleId/1555/articleId/22305/Government-to-Egovernment-to-Esociety.aspx
- Lee, S. M., Tan, X., & Trimi, S. (2005). Current practices of leading e-Government countries. *Communications of the ACM*, 48(10), 99-104
- UN (2016): United Nations E-Government Survey: E-Government in Support of Sustainable Development.
- McDermott, P. (2010). Building open government. *Government Information Quarterly*. 27(4), 401-413.
- Schuppan, T. (2009). E-Government in developing countries: Experiences from sub-Saharan Arica. *Government Information Quarterly*. 26(1), 118-127.
- Lin, F., Fofanah, S. S., & Liang, D. (2011). Assessing citizen adoption of e-Government initiatives in Gambia: A validation of the technology acceptance model in information systems success. *Government Information Quarterly*. 28(2), 271-279.
- OECD (2011): Mobile Technologies for responsive governments and connected societies. OECD Publishing.
- Hung, S. Y., Chang, C. M., Kuo, S. R. (2013). User acceptance of mobile e-government services: An empirical study. *Government Information Quarterly*, 30(1), 33-44.
- Macintosh, A. (2004). Characterizing E-Participation in Policy-Making. Proceedings of the 37th Hawaii International Conference on System Sciences, IEEE, 1-10.
- Lindner, R., & Riehm, U. (2011). Broadening Participation Through E-Petitions? An Empirical Study of Petitions to the German Parliament. *Policy and Internet*, 3(1), 1-23.

Examples for educational material:

- http://www.opengovpartnership.org/country/brazil/action-plan
- https://e-estonia.com/component/electronic-id-card/
- https://www.skatteverket.se/download/18.15532c7b1442f256bae55d8/1394096959275/326B10.pdf
- https://democracyoneday.com/2013/03/07/e-petitions-in-germany/
- Lindner, R., & Riehm, U. (2011). Broadening Participation Through E-Petitions? An Empirical Study of Petitions to the German Parliament. *Policy and Internet*, 3(1), 1-23.

Pedagogical recommendations:

Lecture with activating elements:
Discussions about different international status and comparison with home countries

Session 3: BPM for eGovernment

In this session, participants learn about the importance of BPM for the application domain eGovernment and how BPM can help to innovate and transform public bodies. Thus, this session lays the ground for having BPM in eGovernment.

Learning outcomes:

- Identify and discuss benefits and obstacles that Public Administrations might face when introducing BPM
- Explain how the BPM MM relates to Public Administrations
- Explain the importance of process-oriented Public Administrations
- Describe and discuss the presented approach to introducing process-orientation to Public Administrations

Table of contents:

- Do Public Administrations require BPM? (BPM MM, discussion)
- Examples that make a difference (on a local, municipal level, taken from Gil-Garcia, J. R. (2013))
- Approach(es) to introduce and improve process orientation in Public Administrations
- The Case of a German Consulting Project (connect to PICTURE)
- Outlook: Modeling the Public Administration process landscape

Major references:

- Becker, J., Algermissen, L., & Falk, T. (2012). Modernizing Processes in Public Administrations.
- vom Brocke, J., Rosemann, M. (2015). Handbook on Business Process Management.

Examples for educational material:

- Araujo, R., Cappelli, C., Engiel, P. (2015). Raising Citizen-Government Communication with Business Process Models, in: Handbook of Research on Democratic and Strategies and Citizen-Centered E-Government Services, 92-106.
- Gil-Garcia, J. R. (2013). E-Government Success around the World: Cases, Empirical Studies, and Practical Recommendations

Pedagogical recommendations:

- Group discussion on
    - Own experience with eGovernment
    - Existing knowledge about eGovernment/ideas on what eGovernment is about

Session 4: Process Modelling in Public Administrations I – Theory

This session introduces the idea behind semantic modelling for public administrations by presenting the peculiarities of the public sector. It also offers a first introduction into an eGovernment-specific semantic modelling method: PICTURE.

Table of contents:

- Motivation for semantic modelling (30 Minuten)
  - Review: “Ordinary” process modelling (EPC, BPMN) (10 Minuten)
  - Example: Supply Chain Management (SCOR) (20 Minuten)
- Semantics in eGovernment processes (25 Minuten)
  - Peculiarities of the Public Sector
  - Building Blocks of E-Government processes
  - Benefits
- Introduction to the PICTURE method (35 Minuten)
  - Case study example
  - PICTURE Improve
  - Modelling examples

Learning outcomes:

- Identify and discuss differences in modelling methods and their suitability for different purposes
- Discuss reasons why modelling for public administrations can/must be different than for businesses and identify its advantages/disadvantages

Major references:

- Becker, J., Algermissen, L., & Talk T. (2012). Modernizing Processes in Public Administrations.

Pedagogical recommendations:

- Group discussions

Session 5: Process Modelling in Public Administrations II – Practical Application

This is a practical session where participants have the chance to model public processes with the help of the PICTURE tool. They will receive a practical public case to understand public processes, detect weaknesses and improve them.

Learning outcomes:

- Apply the PICTURE method by using the PICTURE toolset
- Abstract from a real-world scenario to a conceptual model
- Identify process weaknesses
- Improve administrative processes
- Explain and discuss differences of “regular” vs “semantic” business process modelling

Table of contents:

- Introduction to the PICTURE tool
- Case work
    - Understanding the As-Is
    - As-Is modelling
    - Weakness detection
    - To-Be modelling
- Presentation and discussion of solutions

Major references:

- Becker, J., Algermissen, L., & Talk T. (2012). Modernizing Processes in Public Administrations.

Pedagogical recommendations:

- Group modelling
- Group discussion
- Group presentation

Session 6: IS and IT-systems in eGovernment

In this session, the participants will receive a general introduction into information systems (IS) and information technology (IT), their use and role in an organizational context in order to show the specific requirements for IS and IT systems in the public sector, due to their specific processes and data.

Learning outcomes:

- Understand the difference between IS and IT and their role in an organizational context
- Identify and explainthe differences IS and IT are facing in the public sector
- Discuss the differences between requirements for IT/IS in private and public organisations
- Understand the peculiarities of different public sector types and learn about best practices

Table of contents:

- Introduction to IS
  - Socio-technical system
  - Three eggs model
- Corporate IS and IT systems
  - "Merten's pyramid"
- IS and IT systems for public administrations
  - Special requirements
    - Processes
    - Data
  - Basic components
- Study examples
  - Germany (challenges of federalism → chaos)
  - Europe's best practice (Estonia/Sweden)

Major references:

- Turban, E. (eds.), 2006: Information Technology for Management: Transforming Organizations in the Digital Economy. Wiley and Sons.
- Danziger & Andersen (2002): The impacts of information technology on public administration: An analysis of empirical research from the "Golden Age" of transformation

Examples for educational material:

https://solutionexplorer.sap.com/solexp/ui/vlm/i_pub_sect/vlm/i_pub_sect-ind-i_pub_sect

Pedagogical recommendations:

Lecture with activating elements/questions

Session 7: eGovernment Workforce

Session 7 provides an overview of the different actors playing a role in the public sector environment. It is essential to understand how the roles and positions of public servants have changed over time and why this might also lead to challenges public administrations are facing today.

Learning outcomes:

- Explain the difference between the three workforce concepts
- Explain the development of public servant's tasks and responsibilities throughout history
- Explain the challenges public administrations are facing today

Table of contents:

- Yesterday's and today's public servant
- Work force in public administrations
    - Positions
    - Roles
    - Competences
- Selected roles and respective competences in German public administrations
    - Example A
    - Example B
    - Example C
- Tomorrow's publics servant

Major references:

- Almarabeh & AbuAli (2010): A General Framework for E-Government: Definition, Maturity Challenges, Opportunities, and Success
- Lewis & Cho (2010): The Aging of the State Government Workforce: Trends and Implications
- Green (2000): Beware and Prepare: The Government Workforce of the Future
- Melchor (2013): The Government Workforce of the Future: Innovation in strategic workforce planning in OECD countries

Pedagogical recommendations:

Lecture with activating elements/questions about:

- Discussion: What is your understanding of "roles, positions, competences"?
- Discussion: What are your experiences or thoughts about roles in today's PA?
- Discussion: What are your expectations about "relevance of competences"?
- Group work: Here is a certain role.
    - Which position should hold this role?
    - Which competences and tasks do you expect to be assigned to it?

Session 8: eGovernment Adoption

This session will showcase one of the major challenges of eGovernment, i.e. its (stagnant) adoption around the world. The participants will learn about the existing enablers and hindrances of eGovernment adoption. This session will benefit from the different (cultural) backgrounds and experience of the participants.

Learning outcomes:

- Explain the concept of "adoption" in the context of eGov
- Search, digest, and describe factors influencing eGov adoption
- Describe the state-of-the-art understanding of eGov adoption in different global regions
- Describe the different importance of each factor in the different global regions

Table of contents:

- Information System adoption – an introduction
- Adoption in the context of eGovernment – enablers and hindrances
- Identification of factors influencing eGovernment adoption – Group work
    - Participant's experiences
    - List of factors in different regions (internet search)
    - Different importance of the factors in each region
    - Mapping of regional Case Studies to findings
- A scientific perspective on eGovernment adoption
- Discussion:
    - research vs practice
    - business vs public administration

Major references:

- Chen et al. (2006): E-Government Strategies in Developed and Developing Countries: An Implementation Framework and Case Study
- Abdullah, A. S., Rogerson, S., Fairweather, N. B., & Prior, M. (2006). The motivation for change towards e-Government adoption: Cases from Saudi Arabia. *E-government Workshop*, 6(1), 1-21.
- Bwalya, K. J. (2009). Factors affecting adoption of e-Government in Zambia. *The Electronic Journal of Information Systems in Developing Countries*, 38.
- Gonzalez, R., Gasco, J. & Llopis, J. (2007). E-government success: some principles from a Spanish case study. *Industrial Management & Data Systems*, 107(6), 845-861.
- Chatfield, A. T. (2009). Public service reform through e-Government: a case study of e-Tax in Japan. *Asymptotic and Computational Methods in Spatial Statistics*, 209.

Examples for educational material:

- Internet (search for factors in different countries)
- Cases:

- Abdullah, A. S., Rogerson, S., Fairweather, N. B., & Prior, M. (2006). The motivation for change towards e-Government adoption: Cases from Saudi Arabia. *E-government Workshop*, 6(1), 1-21.
- Bwalya, K. J. (2009). Factors affecting adoption of e-Government in Zambia. *The Electronic Journal of Information Systems in Developing Countries*, 38.
- Gonzalez, R., Gasco, J. & Llopis, J. (2007). E-government success: some principles from a Spanish case study. *Industrial Management & Data Systems*, 107(6), 845-861.
- Chatfield, A. T. (2009). Public service reform through e-Government: a case study of e-Tax in Japan. *Asymptotic and Computational Methods in Spatial Statistics*, 209.

Pedagogical recommendations:

- Lecture with activating elements/questions
- Group work with discussion about factors influencing eGov adoption in different regions of the world

Session 9: Increasing eGovernment Adoption

This session is a follow-up to the previous session. After having identified the existing enablers and hindrances of eGovernment adoption, the participants will now work out and learn about ways to increase eGovernment adoption. In this session, again the personal experience from the participants will serve as a valuable input generator.

Learning outcomes:

- Name and explain means to increase eGovernment adoption
- Explain the different efforts required in different contexts to implement means to increase eGov adoption
- Name the stakeholders involved in implementing means
- Explain and discuss differences and similarities of corporate IS adoption vs eGov adoption

Table of contents:

- Factors influencing eGov adoption revisited
- Means to increase eGov adoption
    - Development of a factor/category matrix (Class Discussion)
    - Derivation of means per selected f/c cell (Group Discussion)
    - Participant's experiences
    - Discussion about international perspective / different implementation efforts
    - Stakeholder involvement → who needs to do what
- A scientific perspective on approaches
- Discussion:
    - research vs practice
    - business vs public administration

Major references:

- Chen et al. (2006): E-Government Strategies in Developed and Developing Countries: An Implementation Framework and Case Study
- Abdullah, A. S., Rogerson, S., Fairweather, N. B., & Prior, M. (2006). The motivation for change towards e-Government adoption: Cases from Saudi Arabia. *E-government Workshop*, 6(1), 1-21.
- Bwalya, K. J. (2009). Factors affecting adoption of e-Government in Zambia. *The Electronic Journal of Information Systems in Developing Countries*, 38.
- Gonzalez, R., Gasco, J. & Llopis, J. (2007). E-government success: some principles from a Spanish case study. *Industrial Management & Data Systems*, 107(6), 845-861.
- Chatfield, A. T. (2009). Public service reform through e-Government: a case study of e-Tax in Japan. *Asymptotic and Computational Methods in Spatial Statistics*, 209.

Examples for educational material:

- Material generated in session 8

Pedagogical recommendations:

- Lecture with activating elements/questions
- Group work with discussion about means to increase the adoption of eGov

Session 10: Wrap up and Outlook

The closing session of this module will provide the participants with a wrap up of all covered topics and give an outlook towards the future of eGovernment. Participants are encouraged to discuss about future developments in this application domain as well as the possible impact(s) on BPM.

Learning outcomes:

- Explain the concept of eGovernment and how it developed
- Discuss different country-specific perspectives on eGovernment
- Explain the use of BPM in eGovernment, name an example of a domain-specific modelling type
- Name IS and IT-systems especially designed for eGovernment and explain their use
- Explain the different skills and roles required in public administrations and discuss the use of education
- Explain the region-specific adoption of eGovernment and discuss means to overcome them
- Discuss the future of eGov as a sustainable concept

Table of contents:

- History, Development and Status quo
- An international perspective on e-Government
- BPM for eGovernment
- Domain specific modelling: PICTURE as an example
- IS and IT systems
- Workforce: Skills, requirements, education
- eGov adoption: barriers and means to overcome them
- Outlook
    - eGov as a sustainable concept?
    - Preconditions and hindrances for a successful eGov
    - Alternatives to eGov?
    - Impact(s) on BPM?

Major references:

- Yildiz (2007): E-government research: Reviewing the literature, limitations, and ways forward, *Government Information Quarterly* 24 (3), pp. 646-665
- Barrett et al. (2015): Service innovation in the digital age: key contributions and future directions, *MIS Quarterly* 19 (1), pp. 135-154
- Dwivedi et al. (2015): Research on information systems failures and successes: Status update and future directions, *Information Systems Frontiers* 17(1), pp.143–157
- Weerakkody et al. (2015): E-government implementation: A bird's eye view of issues relating to costs, opportunities, benefits and risks, *Information Systems Frontiers* 17(4), pp. 889–915

Examples for educational material:

- Material generated in previous sessions

Pedagogical recommendations:

- Lecture with activating elements/questions
- Group work with discussion about the future of eGov

Module 5: BPM Actors, Networks and Innovativeness

The module 'BPM Actors and Networks and Innovativeness' (BPM ANI) accounts for a new context of BPM research covering the important field of increased flexibility, open collaboration and innovativeness in a fast-changing digital world.
BPM has evolved around an ERP-system paradigm that has been striving for efficiency gains through integration and automation. In this course, we will now discuss how the available tools and approaches can help to address the contemporary organizational and societal challenges.
To approach this objective systematically, we consider Gartner's pace layer architecture concept, which next to a focus on efficient systems with predictable and repeating use of core data ('records') also directs the attention to the requirement to have systems of differentiation and systems to foster innovation. We explore the possibilities of BPM in addressing the more challenging and dynamic parts in organizational contexts that are driven by disruptive surprises, expertise and creative innovation. Our key focus will be on (a) better understanding actors creatively and flexibly collaborating in complex institutional environments, and on (b) techniques such as network analysis to include a larger number of actual connections between actors and information in processes.
The overall course goal is to advance to an approach in which BPM can be appropriated and applied more reflected, integrative, flexible and innovative.

Learning objectives

- Identify and discuss challenges and opportunities of BPM in organizational case settings that are very challenging to design or manage via conventional models
- Identify and discuss options and boundaries of applying BPM to different layers of the Gartner pace-layer architecture.
- Explain options to extend BPM to organizational case settings, marked by expertise and networked collaboration and reflect on the boundaries of such extensions
- Explain options to extend BPM to organizational case settings marked by flexibility and differentiation (pace-layer differentiation) and reflect on the boundaries of such extensions
- Identify and discuss challenges and opportunities of BPM in creative processes
- Explain the link between BPM and the analysis of organizational networks and describe related methods

Required prior knowledge

- BPM Essentials
- BPM Methods and Models

Blend of virtual / non-virtual techniques

- Virtual sessions – recorded lectures provided to participants
- Virtual collaboration work on case settings and subsequent virtual feedback by peers and the course leaders
- Non-virtual sessions which enable discussions about the concepts and the group work

Grading

- Participation in ongoing smaller quizzes and constructive peer feedback reviews of peer submissions (20%)
- Virtual Case Presentation(s) using electronic material (20%)
- Group work and group report on discussing and applying the knowledge gained from this module to a case setting (60%)

Session 1: BPM in the Challenging Organizational Contexts

In the first introductory session, participants learn about three different layers in an organization and the increasing challenges to benefit from classic BPM in domains of differentiation and innovation. First approaches are outlined and the course structure is introduced as a grounding for the following sessions.

Learning outcomes

- Explain the role of organizational agility and networked experts in the company in relation to BPM
- Describe the organization as a pace-layer architecture, consisting of systems of records, systems of differentiation and systems of ideas and find practical examples for these layers
- Analyze BPM in use, as from the different perspectives of employees in the three pace-layers
- Critically debate post-modernist perspectives in organizations in turbulent environments with a focus on the role of data, information and process modelling
- Give an overview of the main foundations and organizational challenges in the two pace-layers systems of differentiation and systems of innovations

Table of contents

- Introducing User Perspectives on BPM
- The concept of pace-layer architecture
- The concepts of differentiation and innovation
- Challenging organizational domains for BPM

Major references

- Schmiedel, T., & vom Brocke, J. (2015). Business process management: Potentials and challenges of driving innovation. *BPM-Driving Innovation in a Digital World*. Springer International Publishing, 3-15.
- Rigby, D. K., Sutherland, J., & Takeuchi, H. (2016). Embracing AGILE. How to master the process that's transforming management. *Harvard Business Review*, *94*(5).
- Rayner, N. (2012). Applying Pace Layering to ERP Strategy. URL: https://www.pega.com/sites/default/files/docs/resources/Applying-Pace-Layering-to-ERP-Strategy.pdf.
- McBride, N., Lander, R., & McRobb, S. (1997). Postmodernist business information management. In *7th Annual BIT Conference, MMUniversity*.

Examples of educational material

- Case Study with online introduction video
- Facilitated Online Group work session with peer feedback
- Shared Canvas for gathering main take-aways

Pedagogical recommendations

- Lecture
- Concept and Case Discussions
- Case Exercises

Session 2: BPM in the Context of Innovation and Differentiation

In this session, participants learn about various novel concepts that are discussed at the strategic management level of the organization and how they create challenges but also opportunities for BPM. Example concepts involve 'Agility' and 'Ambidexterity'. Based on a thorough discussion of these concepts we aim to develop how BPM can embrace these developments and how organizations can be made ready for dynamic environments that are marked by high needs for flexibility and expertise.

Learning outcomes

- Gain awareness of the concepts such as agile organization, ambidexterity and dynamic capabilities to understand the complementary non-repetitive organizational domains and their relations to BPM
- Discuss possible bottom-up opportunities in BPM environments
- Understand the role of long-term dynamics around a business process change
- Reflect on possible links between exploitation and exploration in an example of a business process case setting

Table of contents

- Conceptual foundations of current organizational challenges
- The concept of dynamic capabilities in organizational change
- The concept of ambidexterity for organizational success

Major references

- Andriopoulos, C., & Lewis, M. W. (2009). Exploitation-exploration tensions and organizational ambidexterity: Managing paradoxes of innovation. *Organization Science*, 20(4), 696-717.
- Sherehiy, B., Karwowski, W., & Layer, J. K. (2007). A review of enterprise agility: Concepts, frameworks, and attributes. *International Journal of industrial ergonomics*, *37*(5), 445-460.
- Birkinshaw, J., Zimmermann, A., & Raisch, S. (2016). How Do Firms Adapt to Discontinuous Change?. *California Management Review*, *58*(4), 36-58.
- Van Looy, A. (2015). On the importance of non-technical process capabilities to support digital innovations. In *BPM-Driving Innovation in a Digital World*. Springer International Publishing, 259-274.

Examples of educational material

- Case Study with online introduction video
- Facilitated Online Group work session with peer feedback
- Shared Canvas for preparing decisions and gathering main take-aways

Pedagogical recommendations

- Lecture
- Concept and Case Discussions
- Case Exercise

Session 3: The challenge of Flexibility

In this session, participants learn about the important organizational challenge to offer high levels of flexibility and agility in various domains of an organization. We discuss example process where flexibility was maintained and approaches such as case handling and exception handling in the context of BPM.

Learning outcomes

- Describe the concepts of enterprise agility/flexibility and point out the main challenges for managers and BPM
- Describe extensions of BPM to handle exceptions in flexible processes
- Relate BPM to the approach of Case Handling

Table of contents

- Enterprise Agility
- Challenges for BPM and Modelling
- Exception Handling
- Case Handling

Major references

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- Reijers, H. A., Rigter, J. H. M., & van der Aalst, W. M. (2003). The case handling case. *International Journal of Cooperative Information Systems*, *12*(3), 365-391.
- Sta venko, Y., Kazantsev, N., & Gromoff, A. (2013). Business process model reasoning: from workflow to case management. *Procedia Technology*, *9*, 806-811.
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Examples of educational material

- Case Study with online introduction video
- Facilitated Online Group work session with peer feedback
- Shared Canvas for gathering main take-aways

Pedagogical recommendations

- Lecture
- Concept and Case Discussions
- Case Exercises

Session 4: The challenge of innovativeness – BPM's classic approach

As a precursor to our in-depth analysis of how to support innovativeness with BPM, this session reviews the classic approaches to innovate business processes, not without also critically discussing possible pitfalls. The session is aimed as a starting point for the investigation of the role of the employees as creatives and experts.

Learning outcomes

- Describe approaches for BPM driven organizational improvements
- Differentiate between approaches for incremental or disruptive changes
- Identify ways to find a balancing approach between incrementing and disrupting

Table of contents

- BPM driven organizational change approaches
- Step-Models for BPM driven organizational change
- Cases of Process innovation
- Address critique of BPM driven changes

Major references

- Zairi, M. (1997). Business process management: a boundaryless approach to modern competitiveness. *Business Process Management Journal*, *3*(1), 64-80.
- Ohlsson, J., Händel, P., Han, S., & Welch, R. (2015). Process innovation with disruptive technology in auto insurance: Lessons learned from a smartphone-based insurance telematics initiative. In *BPM-Driving Innovation in a Digital World* (pp. 85-101). Springer International Publishing. (A Case to trace process innovation)
- Golden-Biddle, K. (2013). How to change an organization without blowing it up. *MIT Sloan Management Review*, *54*(2), 35.

Examples of educational material

- Case Study with online introduction video
- Facilitated Online Group work session with peer feedback
- Shared Canvas for gathering main take-aways

Pedagogical recommendations

- Lecture
- Concept and Case Discussions
- Case Exercises

Session 5: Focusing the Actors I – BPM Use Practices and User Needs

In this session, we aim at a better understanding of the actual process worker, who more and more develops to become a core contributor to the innovativeness and differentiation of an organization. We review studies that analyzed how the employees accept the new processes and what the important drivers are to ensure employees adoption. This insight is needed to prepare for the next sessions that target at amplifying the role of employees to bring the knowledgeable people back into BPM.

Learning outcomes

- Understand the employee's broader contextual frame of information practices around business processes
- Reflect on drivers of successful BPM adoption by employees
- Analyze how to develop the employees alongside the new processes
- Understand the role of user participation in BPM initiatives

Table of contents

- BPM implication for workforce
- BPM adoption drivers
- BPM user participation
- Employee development alongside BPM

Major references

- Igira, F. T. (2008). The situatedness of work practices and organizational culture: implications for information systems innovation uptake. *Journal of Information Technology*, 23(2), 79–88.
- Kettenbohrer, J., Beimborn, D., & Eckhardt, A. (2015). Analyzing the Impact of Job Characteristics on Employees' Acceptance of Process Standardization. ECIS.
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Session 6: Focusing the Actors II – Tapping into Expertise

In this session, we focus on knowledge-intensive work processes and how BPM needs to be extended or applied in special ways in order to reveal and support these processes best. We shed light on the special process challenges and introduce approaches to model knowledge intensive processes, using case examples.

Learning outcomes

- Identify knowledge-intensive business processes in an organization based on typical properties
- Understand special requirements of knowledge-intensive business processes in an organization, such as the role of undocumented personal experience
- Understand limitations of general process modelling approaches
- Discuss and evaluate extensions of process modelling approaches to improve process support for knowledge-intensive business processes in an organization
- Analyze cases of knowledge-intensive work in an organization and derive suitable management support that is based on process models
- Extend knowledge work support beyond process models with related techniques

Table of contents

- The concept of tacit knowledge and personal expertise at work
- The concept of knowledge-intensive business processes in an organization
- The approaches to identify and analyze knowledge-intensive business processes in an organization

Major references

- McDermott, R. (1999). Why information technology inspired but cannot deliver knowledge management. *California management review*, 41(4), 103-117.
- Davenport, T. H., Jarvenpaa, S. L., & Beers, M. C. (1996). Improving Knowledge Work Processes. *Sloan Management Review*, 34(4), 53-65.
- Kwan, M. L. M., & Balasubramanian, P. (2003). Process-oriented knowledge management: a case study. *Journal of the Operational Research Society*, *54*(2), 204-211.
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- Ardichvili, A., Page, V., & Wentling, T. (2003). Motivation and barriers to participation in virtual knowledge-sharing communities of practice. *Journal of knowledge management*, *7*(1), 64-77.
- Motahari-Nezhad, H. R., & Swenson, K. D. (2013). Adaptive case management: Overview and research challenges. In *2013 IEEE 15th Conference on Business Informatics IEEE*, 264-269.

Examples of educational material

- Case Study with online introduction video
- Facilitated Online Group work session with peer feedback
- Shared Canvas for gathering main take-aways

Pedagogical recommendations

- Lecture
- Concept and Case Discussions
- Case Exercises

Session 7: Focusing the Actors III – Tapping into Creativity

We continue with looking at the special requirements of creative processes and creatives at their work place. Using case examples, the concept of 'pockets of creativity' is introduced to outline what can be done to support such domains on the task and the process level.

Learning outcomes

- Explain the influence of creativity at the work place for BPM
- List the main contextual drivers for creativity at the work place
- Describe the special requirements of creativity-based work processes
- Explain methods to foster the creation of innovation

Table of contents

- Creativity Drivers
- Creativity-based Business Processes
- BPM challenges for creative processes

Major references

- Amabile, T. (2012). *Componential theory of creativity*. Boston, MA: Harvard Business School.
- Ota, M., Hazama, Y., & Samson, D. (2013). Japanese innovation processes. *International Journal of Operations & Production Management*, *33*(3), 275-295.
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- Brown, J. S., & Duguid, P. (2001). Creativity versus structure: a useful tension. *MIT Sloan Management Review*, *42*(4), 93-94.
- Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of management journal*, *39*(5), 1154-1184.
- Perry-Smith, J. E., & Shalley, C. E. (2003). The social side of creativity: A static and dynamic social network perspective. *Academy of management review*, *28*(1), 89-106.

Examples of educational material

- Case Study with online introduction video
- Facilitated Online Group work session with peer feedback
- Shared Canvas for gathering main take-aways

Pedagogical recommendations

- Lecture
- Concept and Case Discussions
- Case Exercise

Session 8: A Network View on Processes I – Macro View: Actors, Values and Ecologies

In the previous sessions, we noted the increased requirements of employees. One aspect is the more complex informal interaction of the process workers, but also among the processes. One approach to address this situation is to explore the application of network analysis in the attempt to integrate it with BPM efforts. This session will introduce the benefits of looking at larger value and process networks.

Learning outcomes

- Discuss the role of the network perspective in understanding the big picture of a process landscape, and in extending business process modelling

Table of contents

- Socio-material network view in the BPM context
- Actor-network Perspective on BPM
- Value network analysis
- Organizational ecologies as contextual networks of BPM

Major references

- de Albuquerque, J. P., & Christ, M. (2014). Business processes as sociomaterial networks: exploring the multiple dimensions of flexibility in process modeling. In *2014 47th Hawaii International Conference on System Sciences*. IEEE, 1485-1394.
- Araujo, M., & Porto de Albuquerque, J. (2014). An Actor-Network Perspective on Business Process Management: A Case Study of a Brazilian Chemical Company.
- Sarker, S., Sarker, S., & Sidorova, A. (2006). Understanding business process change failure: An actor-network perspective. *Journal of management information systems*, 23(1), 51-86.
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- Karlsson, C. (2003). The development of industrial networks: challenges to operations management in an extraprise. *International Journal of Operations & Production Management*, *23*(1), 44-61.

Examples of educational material

- Case Study with online introduction video
- Facilitated Online Group work session with peer feedback
- Shared Canvas for gathering main take-aways

Pedagogical recommendations

- Lecture
- Concept and Case Discussions
- Case Exercises

Session 9: A Network View on Processes II – Micro-Level: Network Analysis

In this session, we continue with the focus on networks by introducing ways to analyze network configurations with a method called social network analysis. Further attention is given to existing approaches to data-based modelling of network interaction in the BPM context.

Learning outcomes

- Evaluate the links between formal business processes in the networked organization
- Discuss and apply the method of social network analysis (SNA) to assess informal collaboration networks
- Discuss and apply the method of dynamic and event-driven network analysis to understand evolving networks, e.g. of people and tasks, and their relations to processes

Table of contents

- The concept of informal and networked organization
- The relationships between networks and business processes in an organization
- The method of social network analysis
- Dynamic network evolution
- Social media and BPM in Use

Major references

- Eric, S. K., & Mylopoulos, J. (1994). From ER to "AR"—Modelling strategic actor relationships for business process reengineering. In *International Conference on Conceptual Modeling*. Springer Berlin Heidelberg, 548-565.
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- Bruno, G., Dengler, F., Jennings, B., Khalaf, R., Nurcan, S., Prilla, M., ... & Silva, R. (2011). Key challenges for enabling agile BPM with social software. *Journal of Software Maintenance and Evolution: Research and Practice*, *23*(4), 297-326.

Examples of educational material

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- Facilitated Online Group work session with peer feedback
- Shared Canvas for gathering main take-aways

Pedagogical recommendations

- Lecture
- Concept and Case Discussions
- Case Exercises

Session 10: Wrap Up and Outlook

The final session summarizes, how we can bring the various sessions together to form a coherent approach to BPM for improving flexibility and innovativeness. Participants will introduce their course-related investigations and projects. We will conclude with highlighting important new concepts that are likely to shape the future of BPM ANI.

Learning outcomes

- Discuss key challenges for agile organizations and the BPM perspective in the next years
- Reflect on the increasing role of speed and transparency of the business processes
- Suggest options for turning supply chain process data into added value for customers
- Discuss and suggest approaches to align BPM with new requirements

Table of contents

- New challenges for BPM
- Transparency
- Co-creation
- Pull-orientation
- Social business

Major references

- Hirschhorn, L., & Gilmore, T. (1992). The new boundaries of the boundaryless company. *Harvard business review*, *70*(3), 104-115.
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- Marshall, D., McCarthy, L., McGrath, P., & Harrigan, F. (2016). What's Your Strategy for Supply Chain Disclosure?. *MIT Sloan Management Review*, *57*(2), 37.
- Kiron, D., Palmer, D., Phillips, A. N., & Kruschwitz, N. (2012). What managers really think about social business. *MIT Sloan Management Review*, *53*(4), 51.

Examples of educational material

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- Shared Canvas for gathering main take-aways

Pedagogical recommendations

- Lecture
- Concept and Case Discussions
- Case Exercises

Application of the Curriculum

Beyond the scope of the Erasmus+ project (development of a reference curriculum for BPM executive education), the project partners already established a first instantiation of the curriculum, called “Executive Certificate in Business Process Management” (www.bpm-executive.com).

The program will start in February 2018.