

## Business Process Management Systems Selection Guidelines: Theory and Practice

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## INTRODUCTION

- ▶ Nowadays many business process management systems (BPMSs) are available on the market.
- ▶ The authors distinguish several categories.
  - ▶ For the purpose of this paper the term BPMS is used to describe BPM software, suite, system and tool.
- ▶ BPMSs are software platforms that support the definition, execution, and tracking of business processes.
- ▶ Selecting the BPMS is not an easy task.
  - ▶ BPMS have different capabilities and each organization has specific requirements against the BPMS.
- ▶ This paper presents a set of criteria and proposes guidelines for BPMS selection.

## THEORETICAL BACKGROUND

- ▶ Large companies are making major investments in BPM initiatives.
  - ▶ Worldwide spending on BPMS is set to grow 4.4 percent to reach \$2.7 billion in 2015 (Gartner, 2015).
- ▶ The knowledge about BPMSs is still premature.
- ▶ Organizations should consider different CSFs while implementing BPMS.
- ▶ Authors identified several examples of the mismatches between what the business process require and what BPMS has provided:
  - ▶ some BPM tools are too complicated and lack support; the communication gap between business and IT exists; individual work patterns cannot be easily modeled or captured by BPMS.

## LITERATURE RESEARCH AND ANALYSIS (1)

- ▶ In February 2016 Scopus and Web of Science (WoS) databases are checked according to the methodology criteria, as follows:
  - ▶ peer-reviewed articles in journal and conference publications
  - ▶ keywords 'business process management system' OR 'business process management software' OR 'business process management suite' OR 'business process management tool'
  - ▶ in the abstract and in the keywords of the articles
- ▶ Results: 102 hits (76 in Scopus and 26 in WoS), among which 97 different articles.
- ▶ 4 types of research domains are used to categorize the articles.
- ▶ For each article the domain of research was registered.
- ▶ 3 articles were eliminated („not relevant” for this research).
  - ▶ Article was considered relevant, if it specifically covers one of four BPMS domains.

## LITERATURE RESEARCH AND ANALYSIS (2)

- ▶ **BPMS essentials” domain covers the issues that influence the success of BPMS implementation.**
  - ▶ BPMS capabilities ((BPMS elements and functionalities, or BPMS architecture)
  - ▶ BPMS evaluation and/or selection methods and guidelines
  - ▶ BPMS implementation CSFs
- ▶ Number of different hits: 19

Domain	No. of hits:			No. of different hits
	Scopus	Wos		
BPMS essentials	1.1. BPMS capabilities	6	3	8
	1.2. BPMS evaluation and/or selection methods and guidelines	8	0	8
	1.3. BPMS implementation CSFs	3	0	3
Number of articles in domain 1				19
Methods, techniques and languages for BPMS development	21	7		26
BPMS integration frameworks and IT for extension of BPMSs	22	9		30
BPMS case studies	14	5		19
Number of relevant articles	74	25		94
Number of eliminated articles	2	1		3
<b>Total</b>	<b>76</b>	<b>26</b>		<b>97</b>

## BPMS ESSENTIALS: ANALYSIS AND SYSTEMATIZATION (1)

### BPMS capabilities

- ▶ According to Margherita (2014) a BPMS consists of 4 subsystems:
  - ▶ process strategy, process model, process execution and process performance.
- ▶ Shaw et al. (2007) theoretically explained and empirically illustrated BPMS architecture's core technologies that span numerous disciplines:
  - ▶ The 1<sup>st</sup> pillar is the subject that is modeled;
    - ▶ it consists of formal model constructs; formal modeling notation; ontology-based modelling grammar; and model abstraction capability.
  - ▶ The 2<sup>nd</sup> pillar is the relating IT:
    - ▶ software application; technical infrastructure; software language; software notation and software grammar; and software formalism.
- ▶ At the top of both pillars are "enactable models".

## BPMS ESSENTIALS: ANALYSIS AND SYSTEMATIZATION (2)

- ▶ **BPMS evaluation and/or selection methods and guidelines**
  - ▶ the authors propose different evaluation methods, frameworks and taxonomies;
    - ▶ evaluation and selection of BPMSs is complicated, cost and time consuming process, the success of the selection depends on the specific needs of each organization.
- ▶ **BPMS implementation CSFs**
  - ▶ the most often mentioned are situational factors, such as:
    - ▶ a cultural background, BPM maturity level and process orientation of a company; "a one-size fits all" approach cannot ensure the success.

## BPMS ESSENTIALS: ANALYSIS AND SYSTEMATIZATION (3)

- ▶ A feedback from business practice should be considered (Boots, 2012).
- ▶ The basic components of the „traditional“ BPMS are:
  - ▶ process modeler; data modelling environment; visual forms editor; process engine; and rules engine.
- ▶ Only an enactable business process model gives a BPMS the ability to automatically manage business processes.
- ▶ The set of additional features must be taken into account while evaluating BPMSs.
  - ▶ iBPMS: advanced analytics, real-time decision management; human collaboration support and integration with social media; cloud and mobile access to processes

## BPMS SELECTION GUIDELINES: PROPOSAL AND EVALUATION

- ▶ Guidelines for BPMS selection:
  - ▶ the findings about BPMS capabilities + feedback from business practice
- ▶ A process of selection consists of three steps:
  - (1) BPMS market analysis and evaluation of BPMS vendors;
  - (2) BPMS capabilities evaluation; and
  - (3) identification and evaluation of BPMS implementation CSFs considering the needs of a given organization (*out of the scope of this research*).

## BPMS market analysis and evaluation of BPMS vendors

- ▶ The Gartner report (2012) is used to identify the candidates from 3 categories:
  - ▶ Leaders, Visionars and Niche players.
- ▶ The criteria for selecting BPMS vendors:
  - ▶ maturity, geographic presence, revenue, applicability in different business branches.

TABLE III EVALUATED BPMSs

Vendor	Product evaluated	Gartner category [3]
IBM	IBM Business Process Manager	Leader
Software AG	webMethods BPM	Visionar
K2	K2 blackpearl	Niche player

## BPMS capabilities evaluation (1)

- ▶ Technical characteristics of examined BPMSs are compared (Table IV). All selected vendors are able to:
  - ▶ produce software applications suitable for desktop, laptop, smartphone and tablet devices;
  - ▶ support cloud development and installation practices; and
  - ▶ to some extent facilitate the development of software applications in terms of low-code.

TABLE IV BASIC TECHNICAL CHARACTERISTICS

Product	Modeling notation	Platform/OS	Out-of-the-box supported RDMS
IBM Business Process Manager	BPMN	Windows, Linux	DB2, SQL Server, Oracle JDBC + ODBC-
K2 blackpearl	Share Point workflow	Windows	SQL Server, Oracle
webMethods	EPC, BPMN	Windows (and Linux, Mac unofficially)	Oracle

### BPMS capabilities evaluation (2)

- ▶ At the second step, an initial (a narrower) set of criteria for the evaluation of BPMS capabilities is established:
  - ▶ Process modelling and design
  - ▶ Business rules
  - ▶ User interface and user experience
  - ▶ Mobile and tablet
  - ▶ Cloud capabilities
  - ▶ Low-code development
  - ▶ Reporting and analytics
  - ▶ Ease of implementation

### BPMS capabilities evaluation (3)

- ▶ The details of BPMSs capabilities are gathered through a combination of lab evaluations, demos, product documentation and reports of eminent market research and advisory firms.
  - ▶ The ratings are expressed through three descriptive categories: Low, Medium and High.
- ▶ Low rating does not appear in any category.
  - ▶ Software AG and IBM: High scores in "process modelling and design", „business rules" expressiveness and „reporting and analytics";
  - ▶ K2: „ease of implementation"

### CONCLUSION

- ▶ A complex set of criteria must be taken into account while evaluating BPMSs.
- ▶ The proposed set of selection criteria is intentionally quite narrow and general, so it can be applied to different organizations from different industries.
- ▶ Specific selection criteria must be added in order to assure the applicability of guidelines in specific cases.
- ▶ The guidelines should be improved through further research.
  - ▶ A set of criteria must be recognized and agreed upon by the business users, managers and BPM vendors;
  - ▶ An extensive quantitative validation is needed that should be done on a broad scale.