

What do we know about business process management training? Current status of related research and a way forward

Dharshani Thennakoon

*School of Management, Queensland University of Technology, Brisbane, Australia and
Department of Human Resources Management,
University of Colombo, Colombo, Sri Lanka*

Wasana Bandara

*School of Information Systems, Queensland University of Technology,
Brisbane, Australia*

Erica French

*School of Management, Queensland University of Technology,
Brisbane, Australia, and*

Paul Mathiesen

*School of Information Systems, Queensland University of Technology,
Brisbane, Australia*

Abstract

Purpose – There is wide acknowledgment that training people from all levels of an organization in process management activities and “process thinking” is a major contributor to the success or failure, and sustainability of business process management (BPM). BPM training is provided in almost all BPM initiatives and involves the investment of valuable financial, human, information and other resources. However, little research has focused on this area. As a result, there is a lack of guidance for organizations in conducting value adding BPM training. The purpose of this paper is to consolidate the current published knowledge on BPM training in the form of a descriptive literature review to paint a picture of the existing work, identify gaps and propose a program of work for the future.

Design/methodology/approach – A structured descriptive literature review was conducted to understand the current status of literature on training in the domain of BPM. Of an initial search of 90 publications, 64 publications, published between 1994 and 2015, were filtered and reviewed based on their relevance to answer the research question: What has BPM literature mentioned of training people for BPM? This study proposes a research agenda based on this. A grounded theory coding approach was employed, where NVivo 10 was used as a tool to support the analysis.

Findings – A total of 234 codes (representing emerging themes) were inductively identified from the data. These codes were further analyzed, resulting in eight core themes pertaining to training in the BPM context.

Research limitations/implications – The paper presents a vivid descriptive overview of the current status of research in BPM training identifying gaps in the literature and presents a research agenda which supports a call for action.

Originality/value – The paper is the first known of its kind to compile the status of literature focused on BPM training and recommend a research agenda based on such.

Keywords Training, Business process management, Structured literature review, NVivo analysis

Paper type Literature review



1. Introduction and background

Business process management (hereafter referred to as BPM) as a discipline has reached a certain level of maturity (Houy *et al.*, 2010) and has been widely applied, practiced and studied. BPM is accepted as a separate discipline with a multi-disciplinary flavor (Recker, 2014) with constant

attention from industry and academia (Dumas *et al.*, 2013; vom Brocke *et al.*, 2011). The definitions for BPM given by different scholars are many and varied (Houy *et al.*, 2010). BPM is often seen as “an integrated system for managing business performance by managing end-to-end business processes” (Hammer, 2010, pp. 4-5). It is defined by Hill, Sinur, Flint and Melenovsky (2006) as “a management discipline that requires organizations to shift to ‘process-centric’ thinking, and to reduce their reliance on traditional territorial and functional structures, so that business processes are treated as assets to be valued, designed and exploited in their own right.”

Although BPM has matured as a discipline, there are still various important open problems (van der Aalst, 2012). Though BPM-oriented methodologies have developed greatly in recent years, the number of implementation failures has been substantial, with a failure rate of greater than 50 percent (60-80 percent, according to Lockamy and Smith, 1997; and 50-70 percent, according to Cameron and Braiden, 2004, as cited in Melo *et al.*, 2010). Commitment and support from the organization’s upper management levels, careful attention to human factors and a gradual and systematic approach to implementation are needed (Al-Mashari and Zairi, 1999). Contemporary BPM research is no longer only about methods, procedures or tools for managing or modeling processes, but also about assessing and developing BPM capability in organizations. Hence, current research increasingly focuses on the advancement of BPM capability in organizations, i.e. the skills to employ BPM methods and tools for business process change (Niehaves *et al.*, 2014).

Different frameworks on BPM have captured the importance of people, process owners as an enabler of BPM (Hammer, 2010), and people as a core element of BPM (Rosemann and vom Brocke, 2015), has been emphasized. These seminal prior research studies in BPM make it clear that people in organizations play a major role in BPM initiatives. The “people” specific capability areas of process skills and expertise, process management knowledge, process education and learning, process collaboration and process management leaders have been identified by Rosemann and vom Brocke (2015), when describing the “people” element of BPM. It is very clear that people should be trained and developed to acquire the skills and expertise needed for BPM to be successful (Caldeira and Dhillon, 2010; Lehnert *et al.*, 2014; Ravichandran and Rai, 2000). However, the specific “process awareness” competencies that people in different roles should be trained and developed for, and the manner in which it should be done, are still very much under-researched, and left as a puzzle (Lehnert *et al.*, 2014; Olding, 2007). Lack of BPM training is a prevailing barrier for success in BPM initiatives (Santana *et al.*, 2011). BPM education and training are somewhat informal as of yet, often obtained through many channels, many of which are more grass-roots in nature (McCoy, 2008). These discussions emphasize the need to develop a more formal body of knowledge around BPM training, and for this, it is necessary to get an in-depth overview of what has been done in the domain to date.

This study presents a descriptive literature review (see King and He (2005) for further details of this category of reviews) that aims to illustrate where research to date on BPM-related training is at. Based on which, it aims to derive an evidence-based research agenda for this important, yet under-researched, area. The next section will discuss the approach taken in conducting the structured literature review. Section 3 will discuss the research outcomes, profiling of the publications used for the analysis and presenting the key themes derived from analyzing the literature. Section 4 is on the future paths of research and comments on the gaps in knowledge, and suggests possible areas of research that are identified as being under-researched or might benefit from further investigation. We conclude this paper with a discussion that highlights the findings and reflects on the limitations of the study.

2. Research approach

This paper summarizes what has been done in the domain of BPM on training and reflects about the path that training on BPM may take in the future. Essentially, it presents a

descriptive literature review, commencing with some basic quantification of a body of research with the aim of revealing interpretable patterns in the literature on BPM training (King and He, 2005), and provides a multi-staged content analysis that identifies and synthesizes the themes covered in BPM training literature currently available. A multi-phased literature review approach as suggested by Bandara *et al.* (2015) was adapted to support this review; these phases are further described below.

2.1 Identification of publications

Since the area of concern (training in BPM) is of a multi-disciplinary nature, specific outlets and databases from multiple related domains were selected for the search to ensure thorough coverage of the topic (see Table AIII for the list of included domains, search tools/databases used and specific sources covered).

“Training” on “employee competencies” in the BPM context were the core concepts of this literature search. These terms and their synonyms were carefully identified (as recommended by Bandara *et al.* (2015) – see Table AI) in a collaborative process with support and confirmation by a second author, research team peers and a reference librarian. Search strings (see summary in Table AII) were derived in several iterations using different combinations of text and applied within the online search tools and databases. The researchers funneled through the search results from broad to specialized literature outlets, starting with a preliminary Google Scholar search and then a search in main BPM-specific sources (BPM journal and BPM conference[1]). This was then further expanded to the other domains of interest of information systems and general management (see Table AIII).

Though emphasis was placed on ensuring the quality of the publications to be included in the review by specifying the outlets in which to look for literature (see Table AIII), this criterion had to be relaxed (Wolfswinkel *et al.*, 2013) because of the very limited number of papers that were published which had relevance to the domain of interest (BPM training); and the information rich, recent publications (reports and book sections) that were found through the initial Google search which were able to provide valuable insights into the review. The authors had to choose between the competing needs for more information for the review and the quality of the material (usually measured by peer reviews and citation analysis), where they opted for the first and thereby considered all types of sources, with no time period constraints. This resulted in 139 publications. The titles and abstracts of all publications were read to confirm the relevance of the paper for inclusion (based on the inclusion criteria given below):

- the content of the publications should be related to training of employees (note: tertiary education related publications were not within scope); and
- the context of the publications should incorporate BPM or specific process improvement initiatives and may include close proxies to BPM initiatives such as total quality management, Six Sigma and the like.

This relevance check resulted in a total of 90 publications which were read in full to further establish relevance. The relevance of these publications was contested by a second coder/author of this paper. A total of 27 publications were removed from the initial 90 publications which left the review with 63 publications considered as most relevant to be included for the review. This pool of publications covered the area of interest to different levels and not all of them were predominantly about BPM training. Some spoke of BPM training in a very limited manner. The primary focus of BPM training was seen in only four publications (see Figure 1 and related discussions below for degree of discussion on BPM training in the pool of publications). Backward and forward searching[2] was conducted on these publications with a primary focus on BPM training (which was only 4

within the 63 publications). The forward search was conducted using Google Scholar. Though the backward search did not directly link to any other relevant publications, the forward search revealed one journal article which was included in the review, making the total number of publications included in the review to be 64, understood as a reasonable volume of publications (Bandara *et al.* (2015) recommend an amount of at least 50 relevant publications in a review paper). Figure 1 presents a visual overview of the publication selection and screening across the different stages.

2.2 Preparing for coding and analysis

Prior to the analysis of the 64 publications, they were read in full and then were exported to NVivo (the qualitative data analysis tool used to analyze the publications) from ENDNOTE (the reference management tool used) and were prepared for coding. A grounded theory[3] approach[4], using *in vivo* coding, was used to code the relevant material in the publications, allowing themes to emerge during the analytical process (Bandara *et al.*, 2015). This is recommended for a thorough and theoretically relevant analysis of a topic (Wolfswinkel *et al.*, 2013). The dearth of research carried out in the topic area and the need to extract what the literature genuinely has presented to date justified this choice of approach.

In vivo coding is the coding technique of “assigning a label to a section of data, such as an interview transcript, using a word or short phrase taken from that section of the data” (King, 2008). It allows for the coded concepts to “stay as close as possible” to the original data (what the original authors of the papers had said) (King, 2008, p. 3), with codes formed from the actual language found in the qualitative data record. *In vivo* coding is considered appropriate for virtually all qualitative studies (Saldana, 2009). *In vivo* coding is recognized as an appropriate coding method within a grounded theory approach for initial coding (Saldana, 2009). High-level coding guidelines were derived before the actual coding started to set the ground rules of coding (Bandara *et al.*, 2015) and included aspects such as those listed below:

- coding was done using the most relevant text fragments;
- code labels were formed of the text from *in vivo* coding itself;
- the same content was coded under several categories/nodes[5]; and
- the thoughts that emerge during the process were captured manually in the form of notes (which will be stored as annotations[6] and memos[7] within NVivo).

A detailed coding rule book[8] emerged during the iterative coding process; it was impractical to have a coding rule book prior to coding as the codes were emergent rather than defined in advance.

While reading the publications’ text, whenever a phrase/word that was deemed appropriate to become a node was recognized, it was *in vivo* coded. Any other relevant text/excerpts that further reading surfaced which had similar meaning or association with any already existing node were placed in such codes/nodes. This resulted in 234 initial *in vivo* codes. Content in these codes were re-read twice for better understanding and



Figure 1.
Overview of the paper
extraction process

accuracy for assigning such text into the particular code. These 234 codes were then iteratively deduced to many different clusters, through inter-coder corroborations with a second coder, where eight broader themes were identified in a meaningful way. Content in the individual codes and content within the emerging themes (cluster of codes) were re-evaluated for accuracy. Reasonableness for being clustered in such a manner was first verified by the primary author, which was later verified by the second coder to ensure inter-coder reliability. Though NVivo helped immensely in the transparency, completeness, presentation and reliability (Bandara *et al.*, 2015) of this review, the synthesis and interpretation had to be done with care and involved a lot of iterative and time-consuming manual interpretive analysis, discussed in more detail in Section 3.2, as the core themes and related content are presented.

3. Research outcomes

This section presents the results of the structured literature review. It first presents a descriptive overview of the current status of literature, and then provides a rich narrative of the content discussed within the publications in relation to training in a BPM context.

3.1 An overview of the current status of BPM-related training literature

The 64 articles included in the analysis are profiled in this section, across a range of dimensions deemed relevant to relate the status of existing literature on BPM-related capabilities and training and development.

3.1.1 Degree of discussion on BPM training. Though 64 publications were included in the analysis, the degree to which the discussion focused on BPM training was different across the publications, as captured in Figure 2. Only four publications had a primary focus on BPM training. Most (49) only had a few mere statements of the importance of training in BPM, while in others (11), BPM training was mentioned throughout the publication, but not as the primary focus (for example in the paper of Santana *et al.* (2011), where lack of training is seen as a barrier to BPM governance). A list of the publications that were reviewed is included in the reference list with notations[9] depicting the different degrees of discussion that was observed, as described here.

3.1.2 Distribution of articles by year. The first article recognized as important to be included into this review was by Edwards and Peppard (1994). This paper discusses the issues of business process redesign and tries to distinguish business process redesign from business process reengineering. Its discussion on training was about the focus of human resource management (HRM) as an approach to business process redesign in the provision of training and enabling change within organizations. The number of extracted articles published since has increased over the following years but in a very volatile fashion.

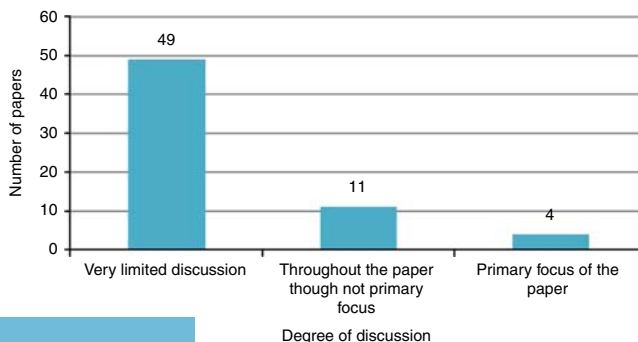


Figure 2.
Degree of discussion
on BPM training in
the publications

The years in which the most number of publications relevant to BPM training has been identified are 2010, 2012 and 2014. Figure 3 shows the distribution of articles per year and the degree of discussion of BPM training within them.

3.1.3 *Distribution of literature by outlet and outlet type.* An analysis of the publication outlets in which the 64 articles were distributed in clearly illustrates that these outlets are of varied nature. They have been published in 37 different outlets in different numbers (see Table AIV) across the years. A total of 36 journal articles, 11 workshop or conference proceedings, 3 book chapters and 14 industrial reports comprised the different outlets (see Figure 4 for a graphical representation).

The most popular outlet for this topic area was the *Business Process Management Journal* (with 16, 25 percent of the publications) followed by the Gartner industrial reports (with 11, ~17 percent of the publications). The outlets also represented different disciplines such as information systems, BPM, quality management, business and engineering. The ranking of the journals (based on Excellence in Research for Australia – ERA[10]) are also shown in Column 3 of Table AIV. Most of the publications have not been published in highly ranked outlets. Only 5 out of the 36 journal articles had been published in A* or A journals (based on ERA rankings), and only 4 out of the 11 publications from conferences were presented at A-ranked outlets. Of the publications that specifically focused on BPM training (see indicated with “***” in the reference list), only one (Wollersheim *et al.*, 2015)

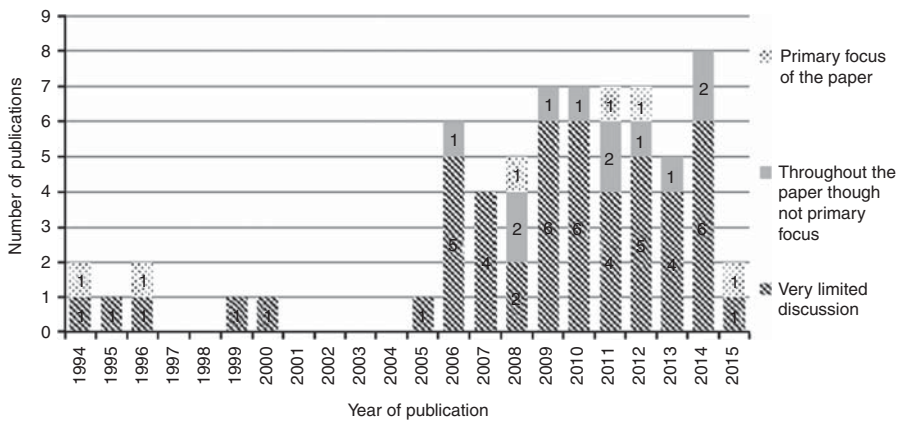


Figure 3.
Distribution of literature by year and degree of discussion

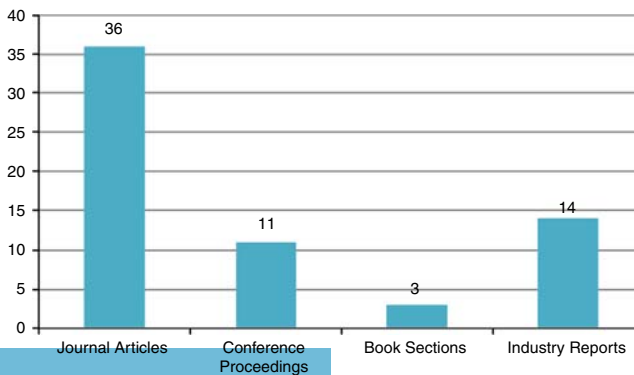


Figure 4.
Distribution of literature by outlet type

was in a journal that had some ranking. Given that the rankings of the outlets resembles rigor and relevance (high impact), one can interpret from this the lack of, and the need for, more impactful research (which provides rigor and relevance) in this area.

This profiling of article outlets also indicates which disciplines and outlets thus far have been most receptive to research on training in BPM and provides an understanding of potential outlets to examine for related research. When considering the four publications which had a primary focus on BPM training, they were published in the *Journal of Workplace Learning* (two articles), the *Journal of Management Learning* (one article) and a Gartner industry report (one industry report). This provides important insights to journal editors in the area of BPM, training and management indicating the need for their support and tolerance for emerging topics of a cross-disciplinary nature, like that of BPM training.

3.1.4 Overview of the reference theories, models and frameworks used. A stock-take of the reference theories used within the literature was helpful in understanding the degree of theoretical relevance and contribution made on the topic area to date. Sutton and Staw (1995) observe that there is more consensus on what a theory is not as opposed to what a theory actually is. References, data, variables, diagrams and hypotheses are considered as not theory by Sutton and Staw (1995), and this interpretation was taken as a basis in analyzing the reference theories used within the literature. Not all publications in the analysis had a theoretical inclination; while some publications used theories as a lens to look at the problems, others used theory to justify certain arguments that they put forward. Furthermore, as expected, industry reports (14 within the pool of publications) did not use a reference theory at all.

In addition to theories, a range of models and frameworks were also used as a point of reference (see Weber (2012) for a discussion on the difference between a theory and a model). However, as our domain of interest is BPM training, we deem it applicable to focus only on the four publications of which the primary focus was BPM training. Of the four publications, only two had reference to theory and a framework, and that too was not as a theoretical basis for the study (see details in Table I).

This further emphasizes the need to incorporate related theoretical underpinnings in future work to ensure theoretical contributions from research on BPM training.

3.1.5 Overview of the methodologies used. This section looks at the methodological inclinations of the publications. Only the journal articles and the papers presented at conferences (47 of the 64 publications, as presented in Section 3.1.3 and in Figure 4) were analyzed for this as it was difficult (and mostly irrelevant) to identify a methodological stance adopted within the book chapters and the industrial reports. As illustrated in Figure 5, quantitative, qualitative and mixed methodologies were employed with purely conceptual papers also observed. Qualitative research was the most prevalent methodology (35 of the pool of 47 papers) employed.

When considering the four publications with a primary focus on BPM training, one paper used a qualitative methodology (Börner *et al.*, 2012), one adopted a qualitative methodology (Wollersheim *et al.*, 2015), one a mixed methodology (Lu and Betts, 2011) and the methodology of the other which took the form of an industrial report was not apparent.

Paper	How the theory/framework was employed
Börner <i>et al.</i> (2012)	The use of cognitive load theory (Sweller, 1988) to emphasize the issues related to overloading objectives for role plays as a means for staff training Kirkpatrick's model in developing the survey for evaluating training programs
Wollersheim <i>et al.</i> (2015)	The use of cognitive load theory (Sweller <i>et al.</i> , 2011) to assume that the beneficial effect of implementing more than one learning intervention is subject to a saturation effect

Table I.
Theoretical reference in the publications which had a primary focus on BPM training

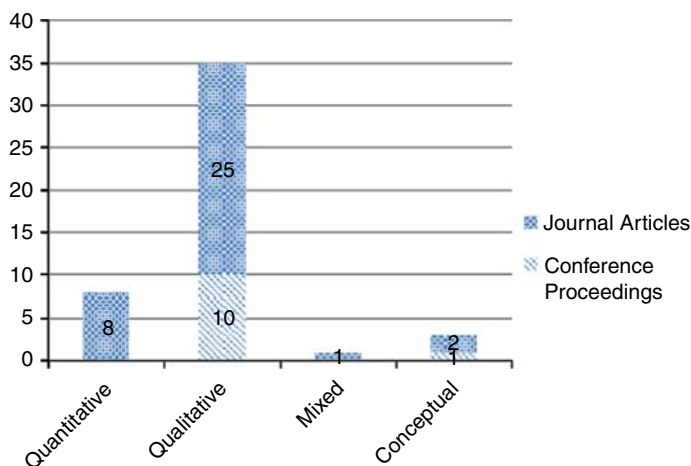


Figure 5.
The methodologies
adopted in the
literature

3.2 A summary overview of the main themes covered in the current literature

This section details the outcomes of the inductive coding that was done to synthesize the literature (as briefly introduced earlier). A grounded theory approach to coding was used where the data were initially coded using *in vivo* coding, resulting in 234 codes representing granular level themes emerging from the data. These preliminary codes were revisited with a series of iterations, deriving at the eight broader themes. Wolfswinkel *et al.* (2013) assert that when reading excerpts of literature a number of times, the “concepts” start to appear in one’s mind and ideally this set of concepts is mutually exclusive and/or well defined from earlier literature or can be well defined through the current work. Such was the case in the codification that took place in this review. Ample time was spent on carefully reading the publications, and excerpts that were captured in NVivo were linked and analyzed in a very transparent and collaborative manner until there was clear understanding that theoretical saturation[11] (Wolfswinkel *et al.*, 2013) has been achieved. Eight main themes were identified by analyzing the *in vivo* codes further, which are presented with some descriptions in Table II. The research gaps are identified for each of the themes and presented in the subsequent sections that follow. This was informed by the methodology advocated by Müller-Bloch and Kranz (2015).

3.2.1 Importance of training. Training of the workforce plays a critical role in the pursuit of BPM (Doebeli *et al.*, 2011; Rosemann and De Bruin, 2005; Searle and Robertson, 2012) and process improvement (Ataseven *et al.*, 2014; Berente *et al.*, 2009), and is considered a main

Theme	Description
Importance of training	All illustrations that specify why training is needed for BPM/BPI initiatives
Types of training	The different aspects that training is targeted at
Formats of training	The nature in which the training is carried out/delivered
Training roles	The individuals/stakeholders in a BPM/BPI training initiative conducting the training
Recipients of training	The individuals for whom training is directed at/the trainees
Phases of training	The training needs analysis, design, development, implementation and evaluation of BPM training
Effectiveness of training	The reaction, learning, behavior and results expected for BPM/BPI training initiatives
Issues in training	The problems associated with BPM/BPI training

Table II.
Theme/category
descriptions

service to be provided by a BPM center of excellence (Jesus *et al.*, 2009). BPM training is also considered as an essential business process related organizational practice (Sidorova and Isik, 2010). The importance of taking a formal approach to training and career development is pointed out for BPM success (Hill, Raskino and Melenovsky, 2006) and for the introduction of new BPM capabilities (Niehaves *et al.*, 2014, Looy and Backer, 2013). However, the process needed to ensure such formality or the means of how such formality can be used for the development or the formation of careers in BPM has not been discussed in depth. Training availability is identified as an organizational learning capability by Lee *et al.* (2007) and Škerlavaj *et al.* (2007), and also seen as an important means of communicating to gain business buy-in for BPM (Searle, 2014) and creating BPM awareness (Searle and Olding, 2011). Caldeira and Dhillon (2010) see an instituted training program as a competence itself and assist in the enhancement of competencies (Kujansivu and Lönnqvist, 2008). Additional insights on how BPM training can be leveraged as a competitive advantage over competitors, and benchmarking of BPM training, are areas that could shed more light to the varied uses of BPM training. Some authors have regarded training as having an important link to HRM aspects such as knowledge creation (Birasnav and Rangnekar, 2010), diminishing resistance to change (Smith *et al.*, 2013), increasing the levels of people's readiness for business process reengineering (Habib, 2013), in enhancing peoples' attitude to change (Margherita and Petti, 2010) and in embedding BPM cultural values into an organization (Schmiedel *et al.*, 2013). It is also regarded as a success factor for change projects (Baumöl, 2015), business process outsourcing (Mahmoodzadeh *et al.*, 2009) and process-based management (Balzarova *et al.*, 2004, as cited in Willaert *et al.*, 2007). Training has also been identified to be helpful for employees to implement future process-level projects more easily (Lehnert *et al.*, 2014). The importance of training as a means of encouraging the adoption and diffusion of ICT-enabled process improvements in government agencies is emphasized by Bandara *et al.* (2012). The best way to implement BPM training, who within the organization should take responsibility for it and the rationale for such are areas that warrant further clarification.

However, contrary to the above, Lu and Betts (2011) report that the idea that extensive training in tools and techniques of process improvement would deliver high standard process effectiveness and efficiency and yield high return on investment has been exposed to be false. Based on the above, a few open questions that need investigation are detailed below:

- What exactly do employees need to be trained on for BPM success?
- Who should be trained and at what specific instances should they be trained?
- How best can BPM training be formalized?
- How can BPM training be used for the formation or development of careers in BPM?
- How can BPM training be leveraged as an organizational competence?
- Who should be responsible for BPM training and how best can it be determined?

3.2.2 Types of training. Several types of training had been mentioned, though not discussed extensively by the different authors. Such training types identified are training in tools and techniques of process improvement (McCoy, 2008; Lu and Betts, 2011; McCoy *et al.*, 2010), training on IT applications (Kassahun and Molla, 2013), training for continuous improvement (Lu and Betts, 2011), cultural training (Habib, 2013; Abdolvand *et al.*, 2008), process redesign patterns (Lehnert *et al.*, 2014), Six Sigma training (Lehnert *et al.*, 2014; McCoy, 2008; Roberts, 2013), problem-solving techniques (Tonnessen, 2000) and more generic, broadly scoped training (McCoy *et al.*, 2010). Based on the above types of training

that the literature has mentioned of, some areas which would benefit from further in-depth exploration are:

- (1) What are the specific types of training that are necessary at each of the life cycle phases of BPM?
 - How would training types differ across different organizational contexts?
 - How would training types differ across different BPM initiatives?
- (2) What are the different types of BPM training that should be given to different levels of employees (or for different BPM roles)?

3.2.3 Formats of training. The reviewed publications discuss different formats of training for BPM initiatives, where several formats have been recommended by different authors, elaborating on how they will be useful for BPM to succeed. Such formats are on-the-job training (Olding, 2007), professional trainings with the use of experienced professionals (Börner *et al.*, 2012), professional training and feedback provided by leaders (Eicker *et al.*, 2008), formal training classes (Robertson and Light, 2014), standard training exercises (Schattenkirk, 2012), and the use of multi-disciplinary practitioners to train in the variety of activities relevant to BPM (Harmon and Wolf, 2010, as cited in Mathiesen *et al.*, 2011). Just-in-time training and practical experiential training made available through the support of a cohort of internal experts is discussed by Schattenkirk (2012). Seethamraju and Marjanovic (2009) identify the value of continued training for BPM success and sustainability. Melenovsky (2006b) introduces two approaches which were taken by the organization under study, as top-down training approaches where senior managers are trained first, and bottom-up training approaches for orientation on BPM adoption.

Despite the identification of the formats for BPM training, there still is ambiguity over a number of things which warrants further investigation, some outlined below:

- How should on-the-job trainings for BPM be conducted, and who should facilitate this?
- What criteria should be adopted in selecting vendors for BPM trainings?
- What standard trainings would benefit BPM initiatives?
- What BPM training formats seem to be the most popular among organizations? How may this differ based on their diverse organizational and BPM initiative contexts?
- What is the degree of reception and acceptance of each training format by the trainees?

Training for BPM has been discussed not only at the professional level (for workplaces), but also at the level of higher education [12] and even at the national levels (Bandara *et al.*, 2012). The importance of other formats of BPM education with the use of other collaborative tools, web-based training and social media has been emphasized by Moormann and Bandara (2012). Learning through self-education with direction from a mentor is also encouraged by Schattenkirk (2012). However, there still needs to be in-depth discussion and exploration on the perceptions of BPM education among those who have received such education (e.g. regarding the practicality, relevance for workplace transfer, etc.):

- To what extent has BPM education helped in the career formation patterns of BPM professionals who have undergone BPM training?
- How does institutional or national level up-skilling on BPM occur and what impact they have brought about?

3.2.4 Training roles. Several important roles could be identified in training for BPM. Among them are process owners (Hammer and Stanton, 1999 as, cited in Palmberg, 2010); business analysts (Sonteya *et al.*, 2012); VET teachers, trainers and tutors (Rozman *et al.*, 2011); business process trainers (Müller *et al.*, 2014); other professional trainers (Börner *et al.*, 2012); professional training providers (Moormann and Bandara, 2012); professional training institutions (Bandara *et al.*, 2012); change management coordinators who institute change early in the BPM initiative as a trainer and educator through the development of BPM courseware that provides interactive workshops with an objective of achieving early adoption (Melenovsky, 2006a); and process management trainers (Bandara *et al.*, 2012). Bandara *et al.* (2012) envision that selected individuals of middle and top executive levels of government agencies (i.e. ministries) can be trained on BPM to take the roles of championing ICT-enabled process reform efforts at ministerial levels for whole of government reforms. Similarly, they also note that selected higher education and professional training institutions can up-skill higher education institutes' faculty members to become BPM trainers in the future. Korhonen (2007) elaborates on the importance of the BPM center of excellence in the provision of training and consulting within an organization. Further research on this area, as outlined below, could enlighten our understanding on the different roles within BPM training:

- How best can organizational roles be positioned to benefit from BPM training?
- How can person-organization fit be assessed for BPM training to be successful?
- What characteristics should BPM trainers possess?
- What other support roles should exist to support BPM training?

3.2.5 Recipients of training. Employee training is advocated by many (e.g. Harkness *et al.*, 1996; Indulska *et al.*, 2006; Lee *et al.*, 2007; Lehnert *et al.*, 2014; Lu and Betts, 2011; Žabjek *et al.*, 2009; Bandara *et al.*, 2009, 2012). Schattenkirk (2012) is of the view that leadership training will pave way for strategic alignment along a cultural shift plan that is required for initiatives such as BPM. Emphasis has been placed on appointing as well as training process owners prior to the implementation of newly developed business process models (Kohlbacher, 2010).

Literature discusses the value in training organizational employees across different hierarchical levels, such as front-line workers (Hammer and Stanton, 1999, as cited in Trkman, 2010); end users (Ariyachandra and Frolick, 2008; Bandara *et al.*, 2005; Karim *et al.*, 2007, as cited in Trkman, 2010); operational staff (Bandara *et al.*, 2012) executives; managerial population (Lu and Betts, 2011); department heads (Niehaves, 2010); design team and subject matter expert levels (Olding, 2007); process managers (Lehnert *et al.*, 2014); and project leaders (Olding, 2007). With foresight, Moormann and Bandara (2012) say that BPM education is crucial for the existing and future workforce to integrate ICT-enabled process management. Despite the above claims, it is unclear as to who should be trained and in what, to support successful BPM implementations (i.e. whether organization-wide training is needed or whether training is best done for selected individuals)?:

- Who should be trained in the specific areas of BPM – on what topics and to what degree they should be trained in?
- What prior knowledge, skills and attitudes should the trainees possess for the trainings to be successful?
- What degree of business-related knowledge should the trainees on BPM possess and how best can it be assessed?
- What cross-over impact can be expected among employees who have and have not undergone BPM training?

3.2.6 Training process. Although there are many systems and models of training, almost all are based on the generic training framework of analysis, design, develop, implement and evaluate (Allen, 2006). The Black Belt Body of Knowledge and Lean Six Sigma Certification and the ISPI Human Performance Technology Body of Knowledge contain knowledge on training analysis/design (Margherita, 2014) which are two stages of the training framework. Bandara *et al.* (2011) elaborate on how different bodies of knowledge have contributed to the different stages of the training process. Stary (2014) also discusses on knowledge cycles and the importance of training in BPM. However, there seems to be a gap on, and:

- How training needs analysis should be conducted for BPM training?
- What activities should be undertaken to better understand BPM training needs?

Previous research has placed importance on identifying training needs within organizations in order to understand specialized skills needed for BPM and the time requirements it will need (Olding, 2007). Prior studies also highlight the need for more research to be conducted on the circumstantial factors and how they might facilitate the successful delivery of training programs (Dodgson, 2001, as cited in Lu and Betts, 2011).

Martinsons (1996) observes differences in the training strategies adopted in the USA and Japan (as cited in Niehaves *et al.*, 2012), which they think may explain differences in BPM outcomes between the USA and Japan. It would also be of value and interest to study on:

- What are the cultural implications for training?
- What implications does diversity of employees (i.e. males and female recipient, age, tenure at organization, recipients at different hierarchical levels, etc.) have on BPM training?

Post-training action is discussed in the work of Lu and Betts (2011), where guidance for trainees was given to put the learning into action. The need for senior leaders to play a pivotal role in BPM training decision making is emphasized by Lu and Betts (2011). They also identify three preconditions to exist for any large-scale BPM training program to commence: clear, unambiguous support from top executive management; a managerial workforce who are knowledgeable (in terms of technical knowledge to help support the newly trained staff) and passionate about the purpose behind the training; and sufficient resources being provided to allow the training to be put into action.

3.2.7 Effectiveness of training. Of the 64 publications, only 5 publications (out of which 2 were publications where the primary focus was on BPM training) referred to the effectiveness of training initiatives. Identification of training goals, and the achievement and evaluation of such, was mostly covered in these specific articles. The reference to a training goal (Capuano *et al.*, 2008); training outcomes (Lu and Betts, 2011); and training contribution (Luiz Afonso *et al.*, 2013) was identified as well as evaluation of workplace training programs (Börner *et al.*, 2012); training measures (Eicker *et al.*, 2008); training effects (Börner *et al.*, 2012); evidences of the training effort (Börner *et al.*, 2012); and follow-up training programs (Börner *et al.*, 2012).

Capuano *et al.* (2008), introduces a method of embedded learning in BPM, where the purpose is to define, develop and experiment models, methodologies and technologies aimed at tightly integrating individual learning with organizational business processes. Different means of evaluating training are also discussed in the publications such as through investigation of relationships between the training on the tools and techniques that managers need to use for improving the process they manage and the actual improvement in terms of errors and waste reduction (Lu and Betts, 2011); additional feedback from

trainees as evidence for the training effect (Börner *et al.*, 2012); use of surveys based on Kirkpatrick's model[13] (Börner *et al.*, 2012); and training measures across particular levels of competence acquired (Eicker *et al.*, 2008). Evaluations in terms of factors such as whether those involved in the training programs knew of the company's strategic objectives, the emphasis placed on the importance of everyone knowing the process, the participation of the employees and the directive, how the company detects opportunities for improvement, the autonomy granted to employees for continuous improvement activities and the awareness and training that employees have gone through (Luiz Afonso *et al.*, 2013) were also mentioned. The need for follow-up training programs to achieve a sustainable change in the behavior of participants was emphasized by Börner *et al.* (2012).

Given the limited scope within which the effectiveness of training for BPM has been discussed in the literature, the authors propose a research agenda for this topic as below:

- What are the reasons for evaluating BPM training in different empirical contexts and how has/can such be conducted?
- What are the types of evaluation designs, evaluation processes, evaluations (formative and summative) used in evaluating BPM training?
- What are the BPM outcomes (cognitive, skill-based, affective, reaction) that are used in the evaluation of the BPM training programs?
- What is a BPM training program's payoff for the organizations which denotes the results from the training (including return on investment and cost benefit analyses)?
- What are the different evaluation practices adopted by different organizations?
- What specific post-evaluation activities are done with regard to BPM training?

3.2.8 Issues in training. Lack of training is observed as an operational level as well as a strategic level issue faced by organizations with regard to BPM (Sadiq *et al.*, 2007), which leads to incorrect usage of BPM solutions resulting in deterring making the best use of the solutions purchased or deployed for BPM. António Rito and Rosemann (2012) and Habib (2013) also share the view that lack of training is an issue in BPM initiatives. Centralizing of BPM training is viewed as creating a structural impediment to the training dexterity and responsiveness that managers at diverse operational levels often so desperately need (Lu and Betts, 2011), which is somewhat aligned to the thinking that learning issues are not best dealt by the human resource department as it is in the case in many organizations, and that they rather should be embedded into the business needs.

Hanson *et al.* (2003) observe the tendency to forget what was learnt at the training due to increased time lapse between training and practice (as cited in Cheng *et al.*, 2006) and recommend additional training as a solution. The lack of follow-ups on training and the fewer opportunities that were limited to a selected sample (Caldeira and Dhillon, 2010), inadequate training support from supervisors (Nijman *et al.*, 2006, as cited in Lu and Betts, 2011) and large internal training institutions not being responsive to what the business really needs (Lu and Betts, 2011) are identified as issues in BPM training.

Lu and Betts (2011) attribute insufficient transfer of learning from training to the workplace as the key cause of dissatisfaction regarding the effectiveness of BPM training within many organizations. The manner in which employees should be supported for such transfer and any disparities between the training environment and the transfer environment has received little, if any, attention. McCoy (2008) says that the upfront training effort on the tools and techniques of BPM does not bring about BPM understanding and perspective and thereby did not translate into tangible BPM

conceptual skills and did not give the trainees a rich understanding of the purpose of the training. The fact that specialized programs for BPM are missing and BPM trainings are only performed on an ad hoc basis is also pointed out as an issue by Niehaves *et al.* (2014). Commenting on the context of Sri Lanka, Bandara *et al.* (2012) describe the issue of “knowledge drain” in the BPM context, as a major problem with developing BPM capabilities, as many of the best trained and educated personnel leave, creating a continuous gap of trained personnel. Employee retraining is considered a major problem encountered in the process management implementation by Elzinga *et al.* (1995).

Based on the above issues identified, the BPM discipline would benefit from investigations into:

- What contextual factors need to be taken into consideration in making BPM training related decisions?
- How best can employees be assisted for the transfer of learning to “actual practice”?
- What role does organizational politics play around BPM training?
- How can knowledge drain caused by employee turnover be addressed?
- How can BPM training be designed to minimize the gap between learning and practice?
- What mechanisms can be adopted for continuous and sustainable BPM training practice?
- Who should best own and manage the BPM-related training portfolio and activities?

4. Discussions

The literature profiling and analysis presented in this paper is the first known of its kind undertaken in the area of BPM training. Given that there were only four publications with a primary focus on training within BPM (see Figure 2), it can be concluded that there is a dearth of literature in this topic area. The fact that training had been mentioned as a critical success factor for BPM success (Trkman, 2010), and BPM training is discussed and emphasized on quite a few publications over the years (since 1994, as depicted in Figure 3), and the fact that the number of such mentions has increased over the years, provides good evidence to support that research in this area is of importance.

Based on the profiling of existing literature (see Section 3.1), and the discussion around the themes that were identified in the content of literature (Section 3.2), the authors identify the research gaps and propose how progression of knowledge around BPM training can be made from there (see the suggested research questions presented with the discussions within Section 3.2).

Emphasis should also be made to take into account the multi-disciplinary nature of BPM and hence training associated with it when conducting research. The need to ensure the conduct of impactful research which can be published in outlets of high quality should also be stressed. To achieve this, it is important to place emphasis on firmly grounding the studies in relevant theories and ensuring appropriate balance of methodological rigor and practical relevance to contribute to theory, the body of knowledge on BPM training and also the practice of BPM.

5. Theoretical and practical implications

This paper presents a comprehensive understanding about the nature of research conducted on BPM training to date. It is a rigorous literature review that has relevance to both academia and practitioners (an argument made following Rosemann and Vessey, 2008). It can inform current practice and guide future research on BPM training.

A literature review is an important initial step in every research. This literature review is a useful foundation for all future researchers interested in the phenomena of BPM training.

It has consolidated and synthesized existing work to date on BPM training, and presented an evidence-based research agenda. The paper profiling presented in Section 3.1, and the resulting themes and related discussions from the analysis (Section 3.2), paints a vivid picture on what work has been done, by whom, where and in what context. The gaps identified and the series of research questions proposed can guide, motivate and justify future research in the field of BPM training. The results of such undertaken research will enable the practice to make more informed decisions on BPM training.

This paper also acts as a one-stop resource for practitioners interested on BPM training. Through an easy-to-read (“accessible,” following Rosemann and Vessey (2008)) synthesis, the paper vividly describes the current status of existing knowledge about BPM training. Information such as the different types and formats of training (Sections 3.2.2 and 3.2.3) and the training process (Section 3.2.6) can assist practitioners in the sourcing, designing and delivery of BPM training. The details about training roles (Section 3.2.4) and training recipients (Section 3.2.5) can inform practitioners on the relevant governance surrounding BPM training. The summary of reported issues on BPM training (Section 3.2.8) builds awareness of potential issues/risks, which can enable the better design of required mitigations. Discussions on the importance of training (Section 3.2.1) can support practitioners with making the business cases for resourcing BPM training efforts. Similarly, the discussions on training effectiveness (Section 3.2.7) present preliminary insights to practitioners on how to reflect on the return of their BPM training efforts.

6. Limitations

Though a systematic attempt was taken to ensure that all relevant literature was captured for this review, we cannot guarantee that we found every article. A literature review is indeed never complete, new articles will always appear (Wolfswinkel *et al.*, 2013), but caution was taken to ensure that a rich coverage of literature was utilized for this review. There could also be errors in the coding process, but steps were taken to increase accuracy through inter-coder reliability via coding reviews and corroboration sessions. Similarly, we do not underestimate the fact that there could have been unavoidable biases that may have occurred in one or more steps of the review process, but caution was taken to always be self-reflective and transparent of the decisions made within the coding process so that the negative implications of such biases are minimized. Also, while BPM training in organizational settings were considered, BPM education at tertiary institutions was excluded in this paper, but there might be some cross-fertilizable insights that could be gained by studying both together rather than in isolation.

7. Conclusion

This literature review on BPM training, contributes to both the BPM and organizational training domains. It presents an overall portfolio of the existing work on BPM training, a thematic overview on key concepts covered and also identified gaps evidenced from what is (and is not) currently covered within the literature. It demonstrates that there is a dearth of empirical evidence with theoretical underpinnings on BPM training, with many gaps. The gaps identified at the end of each thematic discussion (see Section 3.2) forms pointers to future research, in support of furthering the knowledge of effective BPM training.

Note should be taken that training itself is not a panacea for all BPM challenges, but this paper provides several useful contributions by establishing BPM training as an area that warrants further research. It also presents an evidence-based research agenda to better understand this phenomenon. Despite the extensive existing body of literature pertaining to BPM, it remains a field of research that continuously evolves. This research suggests avenues for future research in the important area of BPM training which to date has received scarce attention from BPM researchers.

Notes

1. The BPM journal (see www.emeraldgroupublishing.com/products/journals/journals.htm?id=bpmj for further details), and the BPM conference (see <https://bpm2017.cs.upc.edu/> as an example) are the main two outlets targeted at the BPM community.
2. In backward searching, the citations within the relevant papers identified in the initial sample are carefully reviewed to learn about older papers that may be relevant. Forward searching is the search for articles citing the article extracted (Bandara et al, 2015).
3. In using grounded theory for literature review purposes, the data take the form of published papers rather than the documentary evidence coming from the customary open-ended interviews (Wolfswinkel et al, 2013).
4. Matavire and Brown (2013) differentiate between “grounded theory” and “a grounded theory approach.” Grounded theory as the outcome of the study and a grounded theory approach, as the process of the coding.
5. A node holds all the data coded under a certain category (Bandara, 2006).
6. An annotation in NVivo has some similarity with a footnote in word. The difference however is that NVivo’s annotations behave more like a link from a certain text area (or image) to a separate text box (Edhlund, 2008).
7. A memo is a shorter note or instruction with a similar use to that of a post-it note (Edhlund, 2008).
8. A copy of the detailed coding rule book can be provided upon request.
9. *The paper had specifically mentioned BPM training, but with very limited discussion on BPM training; **BPM training was discussed throughout the paper in an ad hoc manner, across several key statements and/or paragraphs; ***BPM training was primary focus of the paper.
10. See www.arc.gov.au/excellence-research-australia for further details of this ranking scheme.
11. Theoretical saturation is achieved when while developing the categories, no new concepts, properties or interesting links arise (Corbin and Strauss, 2014).
12. As stated earlier, BPM training and education in higher education institutions is not the focus of this review, rather the BPM training in organizations.
13. Kirkpatrick’s Model is a widely used and popular training evaluation criterion which proposes four levels of training evaluation criteria: reactions, learning, behavior and results (Alliger and Janak, 1989).

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- *Very limited discussion; **throughout the paper though not the primary focus; ***primary focus of the paper.
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Appendix. Additional details about the literature search

Key concept	Synonym
Business process management	Business process improvement, business process reengineering, process management, process improvement, process reengineering
Training ^a	Training needs analysis, training design, training development, training implementation, training evaluation
Employee competencies ^b	Employee capabilities, employee knowledge, employee skills, employee attitudes, people competencies, people capabilities, people knowledge, people skills, people attitudes, competencies, capabilities, knowledge, skills, attitudes

Notes: ^aThe scope of the paper was on BPM training within organizations and not on BPM education at higher education/tertiary education levels; ^bemployee competencies include knowledge, skills and attitudes

Table AI.
Key concepts and their synonyms included in the search strings

Aspect	Description
Key terms	Business process management, training, employee competencies
Boolean logic/wild cards applied	"OR," "AND" as necessary wild cards and truncations as deemed appropriate
Where search was conducted	Initially Title, Keywords, Abstracts and later to full paper due to the limited number of papers
Period	All time periods

Table AII.
Final search strategy

Search phase/stage	Search tools/outlets/databases identified as relevant (see Appendix 1 for rationale of selection)
<i>Phase I: initial paper extraction stage</i>	
Stage 1 – internet search tools	Google scholar
Stage 2 – specific BPM journals	<i>Business Process Management Journal</i>
Stage 3 – specific BPM conferences	Business Process Management Conference
Stage 4 – other journals from related domains	Information systems: senior scholar's basket of 8 journal databases (<i>European journal of Information Systems, Information Systems Journal, Information Systems Research, Journal of AIS, Journal of Information Technology, Journal of MIS, Journal of Strategic Information Systems, MIS Quarterly</i>) Top management journals ^a General management (<i>Academy of Management Journal, Academy of Management Review, Administrative Science Quarterly, Journal of Management</i>) Operations and technology management (<i>Journal of Operations Management</i>) Organization studies (<i>Organization Science</i>) Social sciences (<i>American Journal of Sociology, American Sociological Review, Annual Review of Sociology</i>) Human resource management (<i>Human Resource Management (USA)</i>) Strategy (<i>Strategic Management Journal</i>)
<i>Phase II: main paper extraction stage</i>	
Databases from the general management domain	Emerald, Gartner.com, Jstor, ProQuest, Sage, Science Direct, EBSCOhost
Databases from the information technology domain	Gartner.com, Emerald, Inspec, Science Direct, AISeL
Note: ^a 4* journals in the ABS Academic journals guide (2015)	

Table AIII.
Outlets used for the
extraction of literature

Outlet type	Outlet	Outlet ranking ^a	Number		
Journals (36)	<i>International Journal of Production Economics</i>	A	1		
	<i>Pesquisa Operacional</i>	Not available (N/A)	1		
	<i>Knowledge and Process Management</i>	C	1		
	<i>Enterprise Information Systems</i>	C	1		
	<i>Journal of Information Technology</i>	A*	1		
	<i>International Journal of Productivity and Performance Management</i>	C	1		
	<i>International Journal of Business and Management</i>	C	1		
	<i>Total Quality Management</i>	B	1		
	<i>International Journal of Information Management</i>	C	1		
	<i>Enterprise, Business-Process and Information Systems Modeling</i>	N/A	1		
	<i>The TQM Journal</i>	C	1		
	<i>Management Learning</i>	B	1		
	<i>Long Range Planning</i>	A	1		
	<i>Journal of Information Technology Education</i>	C	1		
	<i>Journal of Manufacturing Technology Management</i>	C	1		
	<i>International Review of Management and Business</i>	N/A	1		
	<i>Business Information Systems</i>	N/A	1		
	<i>Journal of Workplace Learning</i>	N/A	1		
	<i>Journal of Knowledge Management</i>	B	2		
	<i>IEEE Transactions on Engineering Management</i>	A	3		
	<i>MIS Quarterly</i>	A*	2		
	<i>Business Process Management Journal</i>	B	16		
	Conference proceedings/ workshops (11)	European Conference on Information Systems	A	1	
		International Workshop on BPM Governance	N/A	1	
		Business Process Management Workshops	N/A	1	
		Business Process Management Conference	N/A	2	
		Business Process Management Workshops	N/A	1	
		International Conference on Information Systems	A	1	
		Pacific Asia Conference on Information Systems	A	1	
		Proceedings of the Management, Knowledge and Learning International Conference	N/A	1	
		Proceedings of SIG GlobDev Annual Workshop	N/A	1	
		Australasian Conference for Information Systems 2006	A	1	
		Proceedings of the Mediterranean Conference on Information Systems	N/A	1	
		Book chapters (3)	<i>Handbook on Business Process Management 2</i>	N/A	1
			<i>Business Process Management (Book)</i>	N/A	2
	Reports (14)	BP Trends	N/A	3	
Gartner Research		N/A	11		

Table AIV.
Distribution of
literature across
different outlets

Notes: ^aBased on ERA's rankings of conferences and journals. ERA is a quality evaluation framework on research produced in Australian universities against national and international benchmarks. See www.arc.gov.au/excellence-research-australia (accessed December 8, 2015) for further details

Corresponding author

Dharshani Thennakoon can be contacted at: d.thennakoon@hdr.qut.edu.au; dharsani.thennakoon@hrm.cmb.ac.lk

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