Achieving Sustainable Development by Integrating It into the Business Process Management System

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Achieving sustainable development by integrating it into the business process management system

Tomislav Rozman[1], Anca Draghici[2], Andreas Riel[3]

[1]DOBA Faculty Maribor / BICERO Ltd., Slovenia
tomislav.rozman@bicero.com
[2]Politehnica University of Timisoara, Romania
anca.draghici@upt.ro
[3]Grenoble Alpes University/EMIRAcle AISBL, France
andreas.riel@emiracle.eu

Abstract.

The purpose of the article is to present an approach how to integrate sustainability related topics into an organization's management system. As a starting point and connecting tissue, we use a process-oriented approach (BPM) for managing companies and then apply sustainability dimensions (economic, ecologic, and social) to it. Using this approach we do not change existing or already established management systems of companies, but we adapt it by modifying company vision, strategy and most importantly, management and core processes.

Integrating sustainability related processes into organization management system prevents "fire-fighting" and ad-hoc activities, which are performed by companies to comply with the increasing number of sustainability related standards.

In addition, we present two managerial trainings (business process management and sustainability management), which when combined, will enable managers to adapt to today's highly competitive business environment.

The concept presented here is a novel approach under the ECQA (European Certification and Qualification Organization), which will allow on-demand clustering of managerial skills and trainings (BPM and sustainability management).

The results presented are particularly useful for process analysts, quality managers, sustainability managers, social responsibility managers and similar professional profiles in order to improve their companies' activities and processes with respect to the sustainable development values.

Keywords: leadership, business process management, sustainability, lifelong learning, certification, business analysts

1 Introduction

We all strive for sustainability, in every aspect of our lives. We want to sustain our lives, our families, our companies and the whole society.
We are very good at sustaining ourselves (as a person) and what directly affects us (our social, technical or eco-environment). This kind of sustainability related knowledge we have 'built-in' (some) and we learn it in our families through generations (as knowledge base experiences transmitted in order to survive and develop ourselves).
Despite this individual behavior, we are not so good (and we have proved this many times) at sustaining larger scale subjects, for example companies, countries, and natural resources. Therefore, learning from good practices of subjects (individuals and groups), who already have success in this area could be a solution for this kind of group behavior and knowledge acquirement (acquisition).
At the organizational level (seen as multilayer of functional groups or cross-functional groups), the problem of behavior and knowledge acquirement is more complex.
Process oriented organizations have traditionally focused on the following aspects: time, cost and the quality. The key performance indicators for the development expenses were time and costs, where other resources and impact on the environment and the society was usually neglected.
But what is sustainability in the business and development context? The authors of (Fistis, Rozman, Riel, & Messnarz, 2014) define it as "an integrated approach to ecological, social and economic impact issues (both internal and external), which leads to long term, sustainable survival of the organization and its environment, which also includes profit growth (but not at any cost)."
In addition to these three dimensions, and upon all of them management and leadership skills are a "must", if we want to achieve the behavior and knowledge in order to develop a sustainable business of a company. It became obvious that to build a sustainable society, we need sustainable companies. To make a company sustainable, we firstly need leaders and managers, well educated in all mentioned aspects.
Sustainability aware leaders define a sustainable vision, strategy and tactics that will determine sustainable activities and processes in a company's internal environment and these will generate sustainable products and services. Business and process analysts define processes for a company. Middle managers and process owners ensure that processes are performed. Processes are executed by employees. This is how it should be in ideal organization. But where do we start? How do we integrate sustainability aspects into company's management system?
In previous years, there was a focus on an incremental process change and improvement. While this approach results in optimized processes, it may not take into account social and environmental sustainable business processes.
To address these issues, companies need to adopt a radical approach (sometime) by introducing completely new processes into their practices simultaneously with the reshaping the existing ones with respect to the sustainable development values, norms and standards. Therefore, this article tries to answer the following research questions:

RQ 1: *Are business process management and sustainability management complementary and can they be integrated?*
RQ 2: *Which existing BPM related standards could be used to integrate sustainability into organization?*

2 Business process management and sustainability

Business Process Management (BPM) is a structured way of understanding, documenting, modeling, analyzing, simulating, executing, measuring and improving end-to-end business processes and resources. The aim of BPM is to improve business in all aspects (transparency, efficiency, resource usage).

While many organizations follow functional management (departments as islands), a process-oriented management promises to deliver value or better experience to customers. In real life, strict separation of functional and process oriented management is difficult to achieve, therefore a mix of those two is more realistic and common.

The usual approach to BPM follows the process presented in [Fig 1]. In reality, when a company and/or consultant starts with implementing BPM in an organization, some BPM principles are already in place. Many companies to which we provide our BPM consulting services have already some form of process descriptions in place. For example, the majority of them have already established an ISO 9001 compliant quality management system. On the other hand, the quality management system is rarely fully in use. Many times, we get the comment: "Yes, we do have our processes described, but we perform our work differently as described." This is a clear sign that the respective company's efforts to establish BPM were not successful and are thus not sustainable. Others are reluctant to model AS-IS processes (because they are broken) and want to model ideal (TO-BE) processes. The lesson learned from the real world consulting is, the process thinking implementation is not as straightforward as usually presented in the literature.

Some companies see BPM as a purely information technology related initiative, but it is actually not. It is true that BPM is an enabler for process automation, however information technology is not the core of the approach. The key message is 'Integrate work, not (only) applications'.

In this article, we distinguish between sustainable BPM and a sustainable organization, which is not the same. Sustainable BPM means that we take a process-oriented approach to an organization's primary way of management and we continuously refine, measure and optimize processes. Implementing sustainability aspects in BPM means that we reengineer existing processes or introduce new ones in our organizations, which cover all the sustainability dimensions (economic, social, environment).

2.1 Similar work from BPM and sustainability field

Sustainability and BPM topics started to appear in combination in the literature several years ago, for example with (Jeston & Nelis, 2008) or (zur Muehlen & Su, 2010), just to mention some of them.

A literature review of sustainability in BPM research has been published in 2012 (Stolze, Semmler, & Thomas, 2012) and there were findings "if the BPM research provides the right tools and methods to green the underlying business activities or if it is rather embracing sustainability only on a descriptive/argumentative level without true incorporation into its methodological foundations".

The CAiSE'11 Panel on Green and Sustainable Information Systems (Pernici, Aiello, Donnellan, Gelenbe, & Kretsis, 2012) has underlined aspects that are more specific and practically oriented. It has been recognized that BPM and the associated optimization actions that are developed in companies have not been specifically explained for some important sustainable aspects such as energy savings and business process environmental impact in general. "With the notion of *green BPM*, it has been argued that *green information technology* may be too limited to allow for a full exploration of the role of information systems". Therefore, studying the mechanisms of innovating and transforming business processes toward more environmentally sustainability work practices seems to be a promising field of information systems research (vom Brocke, Seidel, & Recker, 2012).

In order to understand the link between sustainability and BPM, six essential research directions for green BPM have been identified, which are related to six factors or core elements of BPM (vom Brocke et al., 2012). The associated questions for each factor try to explain the motivation, meaning and the importance of sustainability association with BPM:

1. *Strategic Alignment*: How can we operationalize sustainability? What are the relevant value dimensions? Should they be measured?
2. *Governance*: How can we organize sustainability? What roles are needed? What procedures can be applied in specific organizational contexts?
3. *Methods*: How can we identify the sustainability impact of processes? What extensions to modelling languages are needed?
4. *Information technology*: How can we find technology that supports process change? What is sustainability-enabling technology? What are best-practice use cases?
5. *People (Human resources)*: How can we educate people to adopt sustainability practices? What is the Curriculum of Sustainability Training?
6. *Organizational culture*: How can we identify, operationalize, and communicate values relevant to sustainable processes? How can we transform people's attitudes?

More recently, the Green BPM concept was defined (from an information system researcher's perspective) as "the sum of all information systems-supported management activities that help to monitor and reduce the environmental impact of business processes in their design, improvement, implementation, or operation stages, as well as lead to cultural change within the process life cycle" (Opitz, Krüp, & Kolbe, 2014).

As a general conclusion, of the more recent published works in the field, researchers provide good ideas about sustainability and business process management (most on green information systems and green BPM), but they provide only little or no guidance how to integrate sustainability in the concrete organization business processes.

2.2 Sustainable Business Process Management

According to (Tregear, 2009), sustainable BPM in an organization should have: process architecture, continuous measurement and a consistent framework.

Process architecture is a top-level view on an organization's key process areas [Fig. 3]. Continuous measurement is a system of key-performance indicators established and monitored. Consistent framework means all levels of the organization should be involved in BPM:

1. *Enterprise level*: top management and members of the process office manage enterprise processes. This means they identify, model, measure, govern and align high-level processes with corporate strategy.
2. *Process level*: analysts should understand, analyze, redesign, implement and roll out operational processes and deal with day-to-day management.
3. *Implementation level*: IT professionals transform process models and rules into applications; manage changes, while middle managers manage people and projects.

According to these perspectives on business process management, we are proposing a model to integrate sustainability aspects into organization using existing BPM related standards and frameworks.

3 Integrating sustainability into an organization

3.1 How to achieve sustainability of an enterprise?

If the enterprise wants to sustain its business, it should (Reeves, Zeng, & Venjara, 2015) : keep resetting the vision, experiment with business models, focus on seizing and shaping strategic opportunities, not on executing plans and get good at adapting the organization.

This is the so called "self-tuning" and the main pre-requirement for it is a system which allows fluidity and feedback. In addition, this means that the top management tasks like setting the vision, strategy and tactics is not a one-time job, but rather have to be continuously performed based on the client and market feedback. To put it simply: an enterprise without an established and integrated feedback loop is not sustainable from its existence point of view. To be more concrete, an organization should integrate a process called "Re-planning" in its process landscape [Fig. 3, KPA 1.2]. Leading companies (from business sustainability perspective) operating globally through the Internet as Google, Netflix, Amazon, Alibaba use this approach. But there's more to sustainability than leadership in income, pervasiveness and number of

users. People usually see only economic dimension of the sustainability, while having a blind spot on the environmental and social.
If the organization has a BPM system in place and working, a good starting point is to integrate sustainability into it related processes (following this order): 1. update the organization's vision, strategy, tactics (corporate level); 2. update its process architecture; 3. update management, core and supporting processes.
In the following chapters, some guidance how to implement sustainability aspects in those three levels is provided.

3.2 Implementing sustainability aspects: at a corporate level

For managing or better structuring organization vision, strategy and tactics, a BMM can be used ("Business Motivation Model, Version 1.3," 2015).
To integrate sustainability into organization, we have to start with top level concepts, which are according to BMM:

- Ends: What (as opposed to how) the business wants to accomplish.
- Means: How the business intends to accomplish its ends.
- Directives: The rules and policies that constrain or govern the available means.
- Influencers: Can cause changes that affect the organization in its employment of its means or achievement of its ends. Influencers are neutral by definition.
- Assessment: A judgment of an Influencer that affects the organization's ability to achieve its ends or use its means.

The BMM defines both the structure of the strategic concepts as well as the semantics of the terms used. It not only covers the traditional components of strategic planning, but also includes the concepts of Influencers (e.g. stakeholders) and Assessments. An important feature of this model is the perspective offered on its components by Reference Elements. The ones of most interest from the point of view of BPM are Organizational Units and Process. The message is that every level of the organization and also the processes of the organization should have a model with a consistent structure as depicted by the BMM framework (vom Brocke & Rosemann, 2010).

The BMM helps us to clarify and structure corporate-level concepts such as vision, mission, tactics, influencers etc. To demonstrate the practical usage of this model, we will show how the company's top-level quality manual can be improved and updated with sustainability aspects. The example shown in Tables 1 to 4 is related to a company that produces electrical tools and wants to be more sustainable (this is only an example to demonstrate the usability of the BMM model in the field of sustainability).

Table 1. BMM ***means*** (an example including some sustainability aspects)

Summary: Using MEANS, we achieve business goals. Mission: "Designing and producing electrical tools". ***Sustainable mission*:** "*Designing, producing electrical tools and providing renting services*". Course of action: • Strategy: "Producing of electrical tools for professionals, who can order personalized package of attachments"

- ***Sustainable strategy:*** Same as above + "*providing a service where professionals can borrow tool attachments*"
- Tactic: "Selling them as many tool attachments as possible".
- ***Sustainable tactic:*** Same as above + "*Providing tool attachment exchange service and battery renting service*"

Directive:

- Business policy: (usually unstructured): "If the tool is broken, buy a new one",
- ***Sustainable business policy:*** "*If the tool is broken, rent a new one*"
- Business rule: (usually structured): "Return policy of tools: within warranty period"
- ***Sustainable business rule:*** same as above + "*return old tool (if it still works) or battery anytime and rent a new tool or battery*"

Table 2. BMM **ends** (an example including some sustainability aspects)

Ends:
Vision: "To become the best electrical tools maker in the European Union".
Sustainable vision:
"*To become the best electrical tools maker in the European Union with lowest quantity of electronic waste and most natural resources preserved*".
Desired result:
Goals: Qualitative description, for example: "New tool model launched every year, bigger number of units sold".
Sustainable goals:
Same as above + "*less resources used, lower water and carbon footprint, less units on the junkyard, more serviced units*"
Objective (quantitative description): "To increase sales of tool units by 10% by 2016".
Sustainable objective: *"To reduce the amount of energy spent for production for 5% by 2016 while maintaining sales volume*"

Table 3. BMM **influencers** (an example including some sustainability aspects)

Internal influencers:
Assumptions, habits, (un)written rules, relations among employees, management power and actions, (dis)satisfaction. For example: "*Professionals want to buy, not borrow tools* OR *by lowering the production and providing services I will lose my job as production worker*"
External influencers:
Customers, environment, regulations, delivery, technology etc. For example: *"Information Technology services for mobile phones, which allows professionals to borrow tools from each other"*

- Influencing other organizations. Example: "*Play a role model for a competition."*

Table 4. BMM **assessments** (an example including some sustainability aspects)

Potential impacts:
Risks: "*Convincing professionals to borrow instead of buy tools is difficult*",
Potential reward (**sustainability related**): "*Lower number of tools produced, more units borrowed, cleaner environment and maintaining high profit because of new sustainability related services"*.

By starting integrating sustainability aspects into highest levels of corporate management we ensure that lower levels follow the guidance easier as when using a bottom-up approach. This is called *leadership* (show the way, not enforce it). *"A sustainability leader is someone who inspires and supports action toward a better world"* (Visser & Courtice, 2011).

3.3 Implementing sustainability aspects: process landscape level

After redefining vision and other corporate concepts, we can continue by re-engineering process architecture. Similar approach was used by (Rozman & Geder, 2012), when defining key process areas for higher education institutions.

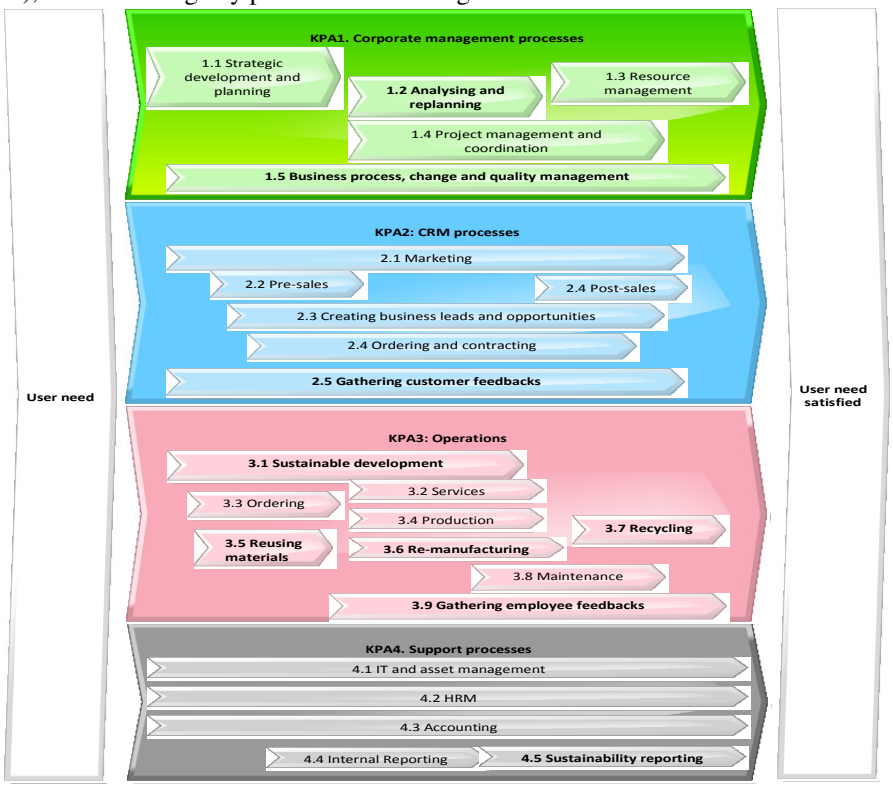

Fig. 1. Process architecture with some sustainability related processes covered

An example of process architecture showing some sustainability aspects already integrated is shown on [Fig. 3]. Key process areas (KPAs marked bold) are those where sustainability aspects were considered:

KPA1: Corporate management processes

1.2 *Analyzing and re-planning* - As mentioned earlier, constant observation of the environment and continuous re-planning is one of most important management tasks to ensure business will survive. Re-planning action means adapting to the environment, building better services with sustainability in mind.

1.5 *Business Processes, Change and Quality management* - A company without established processes, which make sure processes are constantly updated and improved, cannot be sustainable on the long-term. This includes process, change and quality management. Process management approach means that company has defined well all its processes, place and running them as they have established. In ad-

dition, a prerequisite for this is *change management*: gathering suggestions for changes from employees, customers and the environment and implementing it into management system and better processes.

KPA 2: CRM processes

2.5 Gathering customer feedbacks – this is a typical CRM process, which could be modified to gather sustainability related feedbacks from customers. Without a closed loop (feedback-improvement), sustainability cannot be achieved.

KPA3: Operations

3.1. Development – This process is one of the most important processes to achieve sustainable products. Sustainability aspects should be built-in to products already in the product development phase. For example, the development process should incorporate end-of-product-life aspects into new products. This means we should think ahead how our old products can be reused/recycled/remanufactured.

3.5 Reusing materials, 3.6 Re-manufacturing and 3.7 Recycling should be specified as processes too. The example of reusing process is presented in [Fig. 6].

3.9 Gathering employee feedback – this is another process which is necessary for closed-loop development. Without standardized gathering and managing employee's ideas and innovations, the company will have hard time achieving sustainability.

KPA4: Support processes

4.5 Sustainability reporting – This process serves as a main contact point with the external stakeholders. The main purpose is to communicate to stakeholders in accordance with GRI[1]. The input to this process is constant measuring of operational processes resource usage per product. This information can be also used as a competitive marketing information (e.g. *During the development of a product X, only Y liters of water was used*).

For the above description because of the big number of processes and related activities, not all sustainability aspects can be shown on a big picture (as a process landscape diagram). Many of the operating processes or activities should be introduced in lower process levels (depends of each company's specifics).

3.4 Implementing sustainability aspects: process and operations level

To demonstrate how the sustainability related processes can be added to process structure, let us refine key process area "3.5 Reusing materials" from [Fig. 3]. This is an alternative process of the "3.3 Ordering process". This way we are changing a supply chain for the "3.4 Production processes", which previously included only "3.3.

[1] Global Reporting Initiative

Ordering (of new materials)". On the first and second levels of details, we used 'process map' technique from Aris Express tool, which shows only the rough sequence of the processes or process groups. We have refined the 'Reusing materials' process area with 3 sub-processes: "3.5.1. Accepting used batteries", "3.5.2 Disassembling and sorting" and "3.5.3 Warehousing of sorted materials" [Fig. 5].

Fig. 2. Excerpt from 2nd level of process architecture

The next step is to define the process in even greater details. For this purpose, BPMN (Business Process Modelling Notation) is appropriate. For the demonstration purposes, we show the details of the sub-process "3.5.1 Accepting used batteries only".

This process [Fig. 5] is performed by three roles: User of the product, Customer service department, Return center and Disassembly unit. The process starts with two triggers: 1. Customer service department informs customers about battery return policy on yearly basis or 2. When it receives user registration form of his electrical tool.

Then, the return center accepts used batteries from customers. After accepting the used battery, they check for type, weigh it and send it to the disassembly unit. At the same time, they calculate the bonus for the user and send them a bonus in the form of discount for the next purchase or lease of the battery. The Disassembly unit sorts the received batteries, disassembles them and sorts the raw materials.

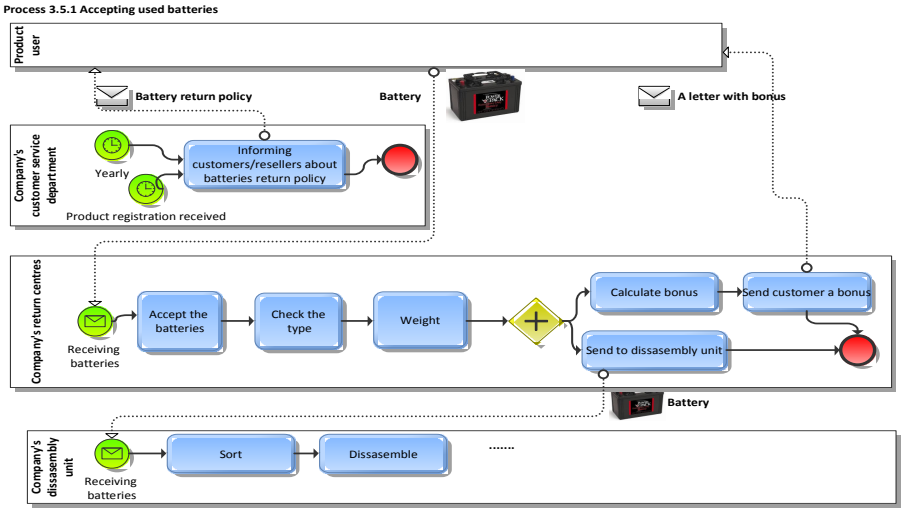

Fig. 3. Excerpt from 3rd level of processes

We have shown only the small excerpt of integrating a new process into organization using BPM approach and notations (Aris process landscaping and BPMN), but the idea should be clear. Integrating sustainability into organization should not be an isolated initiative. It should be integrated right into the entire management system; otherwise it is likely to fail at least in the long run.

3.5 Implementing sustainability aspects into BPM system: a summary

The following table summarizes the recommended usage of BPM related standards and approaches for better sustainability management of organizations. With this summary table we directly address RQ 2: *Which existing BPM related standards could be used to integrate sustainability into organization?*

Table 5. Summary of BPM related approaches with sustainability management

Sustainability related action/task	**BPM related standard / approach**	**Usefulness**
Redefining vision, mission, strategy, tactics of an organization	BMM (Business Motivation Model)	Strategic concepts can be defined in the form of clear structure and related to processes
Redefinition of processes – high level	Process maps (ARIS process landscaping)	High level sustainability related processes can be presented
Redefinition of processes – low level	BPMN (Business Process Modelling Notation)	Sustainability related activities can be clearly defined and incorporated in business processes (operations level)
Maintaining sustainable organization	PDCA (Plan-Do-Check-Act) cycle	Continuous monitoring and improvement of sustainability related processes
Automating sustainability related processes	BPMS (Business Process Management Systems)	Less complex automation of sustainability related processes (in comparison with traditional software development)

As we see, there is a strong relation between BPM and sustainability management. A very good example of such integration (although not directly related to BPM standards), is presented in (O'Hare, C. McAloone, Pigosso, & Howard, 2014).

4 Conclusion

Within this article, different perspectives of the relation between BPM and sustainability have been discussed. The main objective was to propose an approach on how to integrate sustainability related topics (values and principles) into an organization's management system. We focused most on practically oriented solutions of this approach.

Starting with a brief overview of BPM concept and some explanations of different links, aspects and implications with sustainability (part 1 and 2 of the article) we have created the knowledge base for the proposed model of integrated sustainability aspects into organization using existing BPM related standards and frameworks (part 3).

The references analysis in this article has proved that the sustainability concept and its implementation is a major challenge and different successful approaches in organization's practice have proofed that solutions required out-of-the-box thinking. For the BPM discipline, such thinking means increasingly thinking in terms of innovative/creative solutions, services and processes (rather than disciplines) in order to support organizations' sustainable development.

Vice versa, considering the vital role of information in all areas of the modern world, this development can embody a great opportunity for the BPM discipline since it can prove its usefulness. The notion of process and the knowledge of process management can prove particularly helpful since processes are the nucleus of socio-technical work systems, and BPM has proven particularly successful at integrating the perspective of various disciplines (vom Brocke et al., 2012).

The proposed model of integrated sustainability aspects into organization using existing BPM related standards and frameworks could support practitioners (analysts and managers of different levels) to re-engineer, re-design their corporate and operations' level processes having in mind both BPM and sustainability principles (way of actions). However, a coherent training program in the field of sustainability should support these new ways of people thinking and behavior and there have been briefly demonstrated that LeadSUS training program is a feasible solution to this problem.

Through the ideas discussed we can conclude that contributions to theory and innovative solutions will both be needed in order to leverage BPM for sustainability leadership and management. Building on the BPM body of knowledge, research should focus on the specific challenges imposed by the phenomenon of greenness, or sustainability in a wider sense (recognized also by (Pernici et al., 20112)). In addition, finding the right answers on how sustainability approach could be supported by BPM and how it can be better operationalized (in detail) in the case of different type of organizations (small, medium, big, public or private etc.) leads to another major challenge for our future researches.

According to our research, the market of the BPM training (Draghici, Olariu, & Rozman, 2012; Draghici, Prostean, Mocan, & Draghici, 2011) and sustainability training (Draghici, Fistis, Albulescu, & Draghici, 2015) have been developed, but there is a lack of a combination of such training. Therefore, we address this issue by clustering the following ECQA trainings: ECQA Certified Business Process Manager, ECQA Sustainability Manager, ECQA Social Responsibility Manager, ECQA Certified Applied Sustainability and CSR Professional, ECQA Certified Diversity Manager and ECQA Innovation Manager 2.0. This initiative could satisfy better the news of information technology specialists in order to support the sustainable development initiatives in their organizations and also, the analysts in different sustainable development areas to better define, develop and realize (implement) their business processes.

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