The benefits of IT tools in innovation process for SME sustainability

Elena Simina Lakatos, Laura Bacali, Oana Bianca Bercea, Carmen Maria Muresan, Alina Moldovan

Abstract — Innovation in its both forms – open and closed - is essential for economic growth and it is associated both with processes and organizations and likewise, with social and institutional change. Advancement in information technology (IT) has led to major transformations in the way organizations operate, forcing them to invest in IT infrastructure so as to keep pace with competition and to retain Sustainability. The present paper approaches IT benefits in innovation process of SMEs, grouping them in three major categories: strategic, tactical and operational benefits. In the last section we present the results of preliminary study on IT benefits in SME’s from Romania and following research directions.

Keywords — IT, innovation, strategic benefits, tactical benefits, operational benefits.

II. The Concept of Innovation

Theories of local development and a general view position innovation alongside new processes also as social and institutional changes at the level of an industry, region and nation [3].

Innovation is seen as “a complex activity which proceeds from the conceptualization of a new idea to a solution of the problem and then to the actual utilization of economic or social value” [4]. The concept includes “the intentional introduction and application within a role, group, or organization of ideas, processes, products or procedures, new to the relevant unit of adoption, designed to significantly benefit the individual, the group, organization, or wider society” [5].

Literature on innovation identifies two major types of innovation – open innovation and closed innovation [6][7][8] assuming that firms can use resources and knowledge both from their external environment (open innovation) and their internal organization (closed innovation) in order to attain economic goals [6][8][9]. Specialized literature on organizational learning emphasizes the difference between open and closed innovation as being based on exploratory and exploitative condition of innovation search process [10]. Innovation dimensions based on previously mentioned characteristics are presented in Figure 1 below.

![Figure 1. Open and closed innovation process research dimensions [8]](image)

Open innovation is associated with open governance forms which enable access to a wider dimension of knowledge and which often provides a more powerful motivation for decentralized research that offers response to alternative types of problems that cannot be solved by managers. Felin and Zenger identified four major forms of open innovation governance [11]: (a) market/contracts; (b) partnership/alliances/corporate venture capital; (c) contests/platforms/tournaments and (d) user/community innovation.

Through its power and popularity, information technology – mostly hardware and communication
components - is considered the most reliable in the process of innovation as a result of its continuous advancement. Anyway, the process of innovation requires a careful consideration of both technical and human enablers [12] as the human resource is able to achieve the innovation goal even without information technology, but the information technology tools depend of human knowledge both to function and to be created.

III. SME Sustainability

Sustainability and sustainable development in the Romanian literature were considered synonyms even though in 1988 Lester Brown had written that sustainability, “the concept of support capacity, has already been used for a long while by biologists, but so far has hardly been taken into consideration by economists” [13].

As a consequence of the increasing importance of sustainable development, in 2000, in Friiberg (Sweden) the declaration on the promotion of sustainability science (Statement on Sustainability Science), was adopted which aims at improving substantially in terms of “the interactions between nature and society”, taking also into account that during the last decades the development direction of mankind has not been sustainable and the need to reconcile social development goals with the environmental limits of the planet in the long-term require particular attention to the ways in which environmental changes affect society.

"The Sustainability science differs totally from other current fields of science, with regard to structure, method and content. It deals with new approaches connected to non-linearity, complexity, large gaps of time between economic and social actions and their consequences, the development of specific theories and semi quantitative models. Addressing the challenges of sustainability science requires a clearer delimitation of the responsibilities of the government, an improvement of democracy, a stronger awareness to citizens, new styles of institutional organization to strengthen and support interdisciplinary research, in the long-term, inclusively in developing countries, involving scientists, practitioners and citizens in setting priorities, creating new scientific knowledge, assessment of possible consequences and testing them in practice” [14].

"Business sustainability, defined as the ability to thrive without a foreseeable timeframe is treated as equivalent to the sustainable development concept implemented in the business world” [15]. In the long-term, the economic and societal interests converge; this term is often used in conjunction with and in some cases as a synonym for other terms such as “sustainable development” and "corporate social responsibility”.

Enterprise sustainability admits that corporate growth and profitability are important; profit is also needed to pursue social objectives, especially those related to sustainable development - environmental protection, social justice and equity and economic development.

A review of the literature suggests that the concept of company sustainability borrows elements from four concepts: 1) sustainable development, 2) corporate social responsibility, 3) stakeholder theory and 4) the theory of corporate responsibility [30]. The contributions of these four concepts and their relation with sustainable enterprise are illustrated in Figure 2.

To identify and use this convergence, managers need a strategic vision to ensure, on the one hand, the matching of internal factors determining success and, on the other hand, their alignment to societal determinants. The engagement of corporate societal responsibility is the contribution that the business can make to sustainable development and at the same time, an important factor for business sustainability.

![Figure 2. Evolution of enterprise sustainability (adapted from Wilson, [16])](image)

The interdependence between business prosperity on the one hand, and social prosperity and integrity of the natural environment on the other hand, shows that any discussion on business sustainability loses its meaning if there is no reference to the conditions of sustainable development. In pursuing the sustainability of the business they run, managers need to incorporate into the business strategy objectives related to the social and natural environment, because, in the long-term the business, social and environmental concerns must converge.

The sustainable development implies the adoption of strategies to enable the company to meet the current demands of shareholders and other stakeholders and, at the same time, protect and improve human and natural resources that will depend on its future activities.

IV. Benefits of IT Use

Potential benefits of IT used in firms are depicted by Love and Irani in their empirical study in three major groups [17]: strategic benefits, tactical benefits and operational benefits, adapted to our context and operationalized in Table I.

### Table I. IT use benefits operationalization for innovation [17]

<table>
<thead>
<tr>
<th>Strategic benefits</th>
<th>Tactical benefits</th>
<th>Operational benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Reduced marketing costs;</td>
<td>□ Improved response to changes;</td>
<td>□ Improved data management;</td>
</tr>
<tr>
<td>□ Improved market share;</td>
<td>□ Improved teamwork;</td>
<td>□ Improved communication;</td>
</tr>
<tr>
<td>□ Improved</td>
<td>□ Reduced time to</td>
<td>□ Improved communication;</td>
</tr>
</tbody>
</table>

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Assessed benefit of IT can be found in the following three tables (Table 2, Table 3 and Table 4).

### TABLE II. Strategic benefits of IT use in innovation process

<table>
<thead>
<tr>
<th>Strategic benefits</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced marketing costs</td>
<td>3.318</td>
</tr>
<tr>
<td>Improved market share</td>
<td>3.590</td>
</tr>
<tr>
<td><strong>Improved customer relations</strong></td>
<td><strong>4.090</strong></td>
</tr>
<tr>
<td>Enhanced competitive advantage</td>
<td>3.954</td>
</tr>
<tr>
<td>Improved organizational and process flexibility</td>
<td>3.909</td>
</tr>
</tbody>
</table>

One of the most appreciated strategic benefits from the use of IT in the innovation process is represented by improving relationship with customers, with an average score of 4.090 out of 5, followed by enhanced competitive advantage with 3.954 and improved organizational and process flexibility with 3.909.

### TABLE III. Tactical benefits of IT use in innovation process

<table>
<thead>
<tr>
<th>Tactical benefits</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved response to changes</td>
<td>3.818</td>
</tr>
<tr>
<td>Improved teamwork</td>
<td>3.727</td>
</tr>
<tr>
<td>Reduced time to compile tenders</td>
<td>3.818</td>
</tr>
<tr>
<td>Reduced time to prepare cost plans</td>
<td>3.681</td>
</tr>
<tr>
<td><strong>Improved contract administration</strong></td>
<td><strong>3.954</strong></td>
</tr>
</tbody>
</table>

Within the potential tactical benefits from the use of IT the respondents had pointed at the improved administration of contract with an average score of 3.954, followed by reduced time to compile tenders and improved response to changes, each one with an average of 3.818.

### TABLE IV. Operational benefits of IT use in innovation process

<table>
<thead>
<tr>
<th>Operational benefits</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Improved data management</strong></td>
<td><strong>4.090</strong></td>
</tr>
<tr>
<td>Improved communication</td>
<td>3.954</td>
</tr>
<tr>
<td>Improved decision-making</td>
<td>3.681</td>
</tr>
<tr>
<td>Reduced bottlenecks</td>
<td>3.818</td>
</tr>
<tr>
<td>Reduced labor costs</td>
<td>3.5</td>
</tr>
<tr>
<td>Improved quality of output</td>
<td>4</td>
</tr>
<tr>
<td>Improved ability to exchange data</td>
<td>4</td>
</tr>
<tr>
<td>Improved forecasting and control</td>
<td>3.863</td>
</tr>
</tbody>
</table>

Bruque and Moyano argue that the tensions provoked by the growth of firms are the main drivers of information technology adoption. They linked the growth of the firm with proactive change strategies (innovation) as a response to stakeholder’s pressure (competitors, suppliers and customers) [18].

Debrell et al. address the issue of developing the capacity for sustained capacity and the need for incorporating innovation in the business strategy [19]. The strategy should refer to resource allocation for new products and collaborative structures options and processes of problem solving and connecting innovations with existing businesses [20]. King and Burgess regard IT as vital for this kind of capacity building [21].

### v. A Pilot Study on Benefits of IT Use in SMEs’ Innovation Process

#### A. Methodology

Following the framework provided by Love and Irani regarding benefits of use of IT for firms [17] and the firm activities indicators, depicted in Measurement framework of the Innovation Union Scoreboard [22], we have conducted a pilot survey of Romanian SMEs regarding IT benefits in their innovation process. Due to the narrow sample, only some descriptive statistics can be presented based on responses received, as more complex statistical analyses will not be representative for our population. Therefore, the following preliminary results are based on the responses extracted from 40 questionnaires applied to representatives of companies located in North-West Region of Romania. The questionnaire was applied via e-mail in May and June 2015 and 40 valid responses were obtained for a total of 43 questionnaires.

#### B. Preliminary Results

As our concern is about benefits of IT in the innovation process of SMEs we questioned our subjects about some of the benefits mentioned in Love and Irani paper [17] using a Likert scale from 1 to 5 where 1 = not at all, and 5 = to a great extent. The average results for each
Regarding operational benefits from the use of IT in the innovation process, subjects emphasized the improved data management with an average score of 4.090, followed by improved communication (3.954) and improved forecasting and control (3.863).

The following step of the study implies a bigger sample that will allow us to establish relationships between individual characteristics of firms (e.g., size, operation region, legal status, activity sector) and other variables regarding the use of IT and innovation (types of IT benefits, financial allocation for R&D and innovation, collaboration research activity, etc.). Relationships between collaboration research activity and innovation, product destination market and innovation, financial allocation for innovation and innovation using statistical analysis methods will be our primary focus for the follow-up research.

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**References**


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