



<http://dx.doi.org/10.35596/1729-7648-2023-29-1-32-35>

*Original paper*

UDC 004

## CONCEPTUAL FRAMEWORK AND ANALYSIS OF THE BUSINESS INCUBATION PROCESS

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*Submitted 24.11.2022*

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**Abstract.** The main stages of the study and analysis of the business incubation process (in the relevant organizations) are presented, both from the perspective of a resident and from the side of a business incubator. The accepted approach to the specifics and characteristics of the leading business incubators / accelerators and other similar organizations from the point of view of project management is explained. In the process of research, a review of academic works and sources of professional associations / institutional organizations was carried out, in which the existing definitions of a business incubator are analyzed, an overview of the organization / business model (business incubator) is provided together with data collection (from interviews and questionnaires). The most famous business incubation programs have been studied. A functional model of a business incubator has been obtained, as well as a set of key performance indicators (KPIs) and metrics that can be useful for a business incubator to achieve effective company management.

**Keywords:** business incubator, business model, information management system, key performance indicator (KPI), metric, resident, earned value management (EVM).

**Conflict of interests.** The author declares no conflict of interests.

**Gratitude.** The author expresses his deep gratitude to the foreign consultant Prof. D. L. Fusci (PhD, Coventry University, UK), supervisor PhD B. V. Nikulshin (BSUIR, Belarus), PhD D. V. Likhachevsky (BSUIR, Belarus).

**For citation.** Galiyeva N. G. (2023) Conceptual Framework and Analysis of the Business Incubation Process. *Digital Transformation*. 29 (1), 32–35. <http://dx.doi.org/10.35596/1729-7648-2023-29-1-32-35>.

## КОНЦЕПТУАЛЬНАЯ ОСНОВА И АНАЛИЗ ПРОЦЕССА БИЗНЕС-ИНКУБИРОВАНИЯ

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*Поступила в редакцию 24.11.2022*

**Аннотация.** Приведены основные этапы исследования и анализ процесса бизнес-инкубирования (в соответствующих организациях) как с позиции резидента, так и со стороны бизнес-инкубатора. Объясняется принятый подход к специфике и характеристикам ведущих бизнес-инкубаторов/акселераторов и других подобных организаций с точки зрения управления проектами. В процессе исследований выполнен обзор академических трудов и источников профессиональных ассоциаций/институциональных организаций, в которых анализируются существующие определения бизнес-инкубатора, приводится обзор организации/бизнес-модели (бизнес-инкубатора) совместно со сбором данных (из интервью и анкетирования). Изучена наиболее известная программа бизнес-инкубирования. Получены функциональная модель бизнес-инкубатора, а также набор ключевых показателей эффективности (КПИ) и метрик, которые могут быть полезны бизнес-инкубатору для достижения эффективного управления компанией.

**Ключевые слова:** бизнес-инкубатор, бизнес-модель, информационно-управляющая система, ключевой показатель эффективности (КПИ), метрика, резидент, управление освоением объемом (EVM).

**Конфликт интересов.** Автор заявляет об отсутствии конфликта интересов.

**Благодарность.** Автор выражает глубокую благодарность зарубежному консультанту проф. Д. Л. Фуски (PhD, Coventry University, Великобритания), научному руководителю к. т. н. Б. В. Никульшину (БГУИР, Беларусь), к. т. н. Д. В. Лихачевскому (БГУИР, Беларусь).

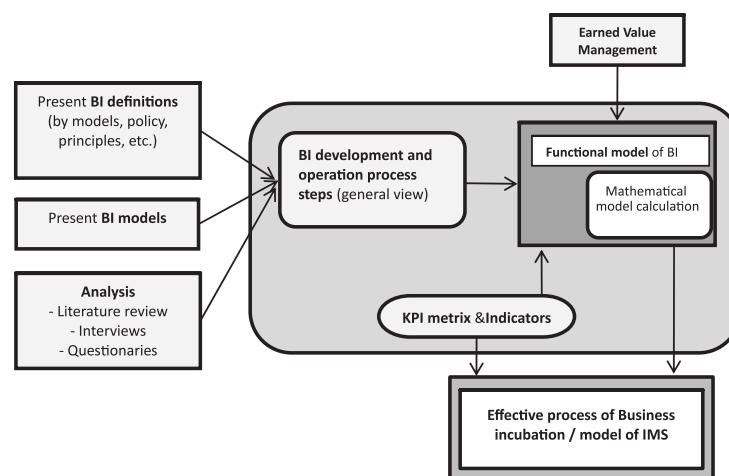
**Для цитирования.** Галиева, Н. Г. Концептуальная основа и анализ процесса бизнес-инкубирования / Н. Г. Галиева // Доклады БГУИР. 2023. Т. 29, № 1. С. 32–35. <http://dx.doi.org/10.35596/1729-7648-2023-29-1-32-35>.

## Introduction

It is widely acknowledged that business incubation is a specific approach for growing a country's economic status. This research has been triggered by the realization that the main problem emerging from a critical analysis of the business incubation literature is the narrow focus on the econometrics and more specifically the performance of the fund acquisition by residents. This fact along with the observation that a large number of start-ups fail (up to 90 %) advocates for a critical analysis of business incubator (BI) processes, their activities and work efficiency and effectiveness. It is well known that all organizations want to be successful in their environment. This is certainly also the case with BI, especially as the expectations are that business incubators deliver successful startups that will contribute to the economic growth of the country. In literature it was apparent that almost every conducted study is interested in understanding the financial performances of the residents' startups once they leave the incubator and the return on investment (ROI) they generate for the investors and shareholders once graduated. Most studies focus on economic side but very few on the social side and social benefit for (community) environment. The social ROI (SROI) is barely addressed if at all and the sustainability of business incubation is substantially not addressed. Therefore, the conducted research has been trying to understand which aspects are important and how to measure the efficiency and effectiveness of business incubator work from engineering and project management approaches. The usage of earned value management (EVM) allows to reconcile the engineering/project management approaches with the financial one as EVM uses financial values as the basis for the efficiency computation.

## Research design

A graphical description of the research structure in terms of sources and outputs is presented in Fig. 1. This can be compared to a conceptual framework. It allows to describe the main steps performed, the sources used, and the output delivered. The diagram should be read from left to right. The blocks inside the curved edged rectangle represent the key components of the research work.



**Fig. 1.** Conceptual framework of performed research: analysis of the business incubation process (*author's own development*)

Operationally, the first steps have been:

- analysis of literature review, interviews, questionnaires;
- identification and analysis of currently available BI definitions and incubator models.

The literature review analysis includes an extensive review of the literature from both academic and professional association/institutional sources, such as InBIA (International Business Innovation Association),

EY (Ernst & Young Global Limited), Nesta, InfoDev, EBN Innovation, etc. Two autumns (2017–2018) were spent focusing on this aspect of the study, the number of visited organizations (business incubators, accelerators, technology parks) accounts to 10 pcs. [1]. During the interview with the administration of each organizations [1], an agreement was reached to send 3 types of questionnaires aimed at collecting data both for the organization itself (business incubators, accelerators, technology parks) and for resident companies (from March to June 2018). The questionnaires were sent to more than 20 BI, accelerators, and technology parks – 20 % of them answered.

From a point of view of clarity is necessary to point out that there are too many different definitions of BI (of the identified 185 definitions found in this study, 53 definitions of “business incubator” [1] were reported having significant differences) that it was necessary to choose one of that could be general enough to accommodate all aspects encountered in the various definition and therefore clearly present the core idea of BI [2, 3]. A similar difficulty was encountered in terms of functioning model descriptions; therefore, it was needed to identify which of the available models could be the best starting point for the research. It was considered that [1, 4] were the most suitable.

As a result of the analysis made during the first steps of this study, the stages of the BI development and operation process (presented in a general form [4]) were identified to reflect the significant aspects that occur in a BI from the initial point of establishing a business incubator as an organization and until the completion of the incubation program taking into account all possible options and risks associated with the program. A schematic representation of the process has been provided for both the BI and the resident.

Based on the previous description, a functional model of the process aimed at managing a BI was further proposed including program execution based on the general process discussed [4]. The proposed functional model, along with its mathematical description, incorporates selected key performance indicators (KPI) and an agreed engineering and design approach exploiting the EVM performance monitoring and management approaches [5]. As mentioned above, the boxes contained in the curved rectangle are the essence of this study, which, when used in BI activities, should lead to a more efficient management of the business incubation process in terms of design and project management.

## Results and discussions

The results of the research can be summarized in the functional model, the set of metrics, the set of indicators, the set of KPI. The functional model describes and connects the incubation program of the BI with the development of the resident. The model allows to estimate the process output, that in turn allows to monitor the progress of the residents. In this respect a collection of scientific literature, professional association reports and guidelines from institutions such as the World Bank, United Nation, CSI, and the EU commission on how to setup BI was built. By combining all gathered information it's been possible to cover a gap identified in the literature, as so the scientific literature has focused primarily on the financial aspect of the resident performance (that is: how that money they are collected, how fast they are developing, how much they contribute to the market and the economy), but doesn't cover the process performance aspects in terms of how much money was needed by the BI, how many companies failed, how many companies were not accepted. If lacking this information, it doesn't allow ascertain the efficiency of the process and therefore the actual economic impact. Comparing the report from the Nesta, United Nation, EU commission, etc., with literature apparent that reports focus on what the resident managed to do but rarely on how to achieve this. From an engineering perspective, when examining the result of the project, it is necessary not only to look at its output, but also, and in particular, to how well the resources available have been used. Since BI is perceived as (and possibly aimed to) support to the economy, if it is not efficient and effective, then what's the benefit?

As it was said [1] is it that S. M. Hackett and D. M. Dilts [6] say that the result of business incubation can be described by a formula where they talk about BI munificence (or in other terms how generous the BI is). This approach raises questions, does it mean that BI do a kind of charity work? UN general Secretary Boutros-Ghali once quoted in his speech the adage: “If you give a man fish, you feed him for a day. If you teach a man to fish, you feed him for a lifetime”. This can also be adapted to business incubation as if BI just gives money and only a few of those residents are successful then there is no real benefit and the result is not as desired. This approach clashes with the engineering one where every time a system is revised, the aim is to achieve more efficiency.

The intent of the conducted research has been therefore to make sure the BI process works as efficiently as possible. Professional association such as InBIA, and research centers such as Nesta or the European Commission and CSI explain that BI provide: space, training, equipment, services [e. g. ad-

vice on what to do], researchers such as R. Cabral [7] provide principles to take into account, but no one focuses on how to measure if what is given leads to the expected result.

Another important aspect of this study is the attention to information system (IS). Its implementation and presence in the BI as an integral part of the organization and the project. In an age of highly advanced technology, when businesses need to act quickly and there is so much to learn and to do. Information systems are a way to make sure the right decision or the right choice are made. It was not possible to find in BI-related literature any attention to this aspect, and therefore, looking at what large companies are doing, the research suggests an approach to the design of a customized IS specifically designed for supporting BI. In the proposed concept the system is structured so as to provide the BI with their own IS & ERP as well as to offer a virtualized access to individualized IS & ERP to residents. This approach has a twofold benefit: it provides the residents with the best of the IT/ICT technology currently available to support a company management and decision-making processes, and it also offers a way to support BI finances as the service can be further provided (at a cost) after residents have completed their studies. Because residents will have used the system, they know it, they are used to it, so they are likely to keep using it. If they want to keep using it, they will have to pay (if they do not want to keep it, they will have likely to get another one, thus keeping the one they are used to is likely to be a preferred choice). It is acknowledged that this approach will have a cost to be set up by a BI and the more the BI operates, the more the system may cost, at the same time, this will represent a business (like Google started by providing search services and is now providing solution and even IT/ICT incubation).

### Conclusion

Business incubators are potentially one of the breakthrough factors influencing the growth of the country's economy. The innovative and inventive ideas that are “nurtured” (cultivated) within the framework of the business incubation program, and later, having left the walls of the business incubator and become independent companies, are likely to effectively drive innovation and generate new and significant sources of a solid growth of the country's GDP. Overall, there is a sufficient number of business incubators, accelerators, technology parks and other similar organizations in every country around the world, but to this date it is still unclear how to evaluate their activities and processes in terms of efficient and effective use of the invested resources when compared to the provided output. This article described the key points of a scientific study dedicated to the evaluation of the effectiveness of business incubators.

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