Digital Entrepreneurship: Doing Business for Smart and Sustainable Bio-Based Economy

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Abstract. Bio-based products can have a lower environmental and climate footprint than products based on non-renewable raw materials. There is a high potential for the production and use of renewable raw materials for industrial applications, notably the use of lignocellulose from agricultural and forestry residues, industrial crops, by-products/co-products and waste. New low-carbon, resource-efficient and sustainable value chains can be set up using this agricultural and forestry biomass to produce bio-chemicals, biomaterials and bioenergy. These chains will contribute to the diversification of the rural economy and the reinforcement of the industrial base. It will create rural growth and employment, and will help to meet energy and climate policy targets for 2030. This paper aims to study the role of digital entrepreneurship as an essential factor to increase the creativity and innovativeness for sustainable growth of Bulgarian bio-based economy. The results show that socially responsible behavior of the digital enterprises can provide added value based on a favorable reputation that they create.

1. Introduction

The theme significance takes a central position in discussions, researches and organisational activities connected with digital entrepreneurship. This has an essential role in the Bulgarian economic environment as well as the national strategies for economic growth. All statements lead to the necessity of investigating the opportunities for transformation of bio-based organizations in different way of doing business in digital era. The digital economy in the European Union is growing much faster than the rest of the economy, which will lead to the creation of more jobs and the continuation of the digital transformation of the European economy. Bio-based economy as a part of circular economy covers all sectors and systems that use biological resources. It is one of the largest and most important sectors of the EU and includes agriculture and forestry, fisheries, agro-food, biomass and bio-based products. Its annual turnover is about 2 trillion euros, and it employs about 18 million people. Bio-economy is also a key area for stimulating growth in rural and coastal areas.

1.1. Literature Review

Nowadays, the largest global firms are no longer those operating in the industrial sectors but those belonging to the digital economy. The concepts entrepreneur spirit and entrepreneur ecosystem in Bulgaria are mentioned a lot but barely in the last few years can be observed the standing out of pronounces examples and good practices. The Republic of Bulgaria is situated in Southeastern Europe, located in the east part of the Balkan Peninsula. Its uniqueness is hidden in the balanced combination
of incredible nature, black sea strip of wonderful beaches, beautiful mountains for summer and winter tourism, rivers and so on. Besides all these natural resources, Bulgaria is a country with poorly developed economy and is far behind the economics of other countries in the European Union [1]. In terms of Global Competitiveness Index, Bulgaria also lags behind the majority of the EU member states [2] but data of The Global Competitiveness Report 2018 presents a positive tendency and the country takes 41st place of 140 countries. Bulgaria still poorly utilizes the advantages of the global process for raising the national competitive power, realizing an economic structural reorganization and modernization of the technical manufacture [3].

During the period of planned economy, large state-owned industrial enterprises using mass production methods and relatively inflexible production processes and producing for geographically restricted markets, dominated the economies in Central and Eastern Europe [4]. Transition to a market economy involves profound economic changes and sometimes – but not necessarily – political change as well [5] in all Eastern European countries. The transition economies have lower rates of entrepreneurship than are observed in most developed and developing market economies [6].

Bulgaria was from those nations that had little or no experience of a market economy because communist planning and industrialisation were contemporaneous. In line with Estin and Mickiewicz [6] as a result, laws and market supporting institutions had to be developed from scratch. Bulgaria started the transition process in 1989 and was one of the first transition countries to adopt a new constitution. The preparation of the accession of Bulgaria to the European Union exercised a positive influence on the environment for enterprise development [2]. In 2007, after fulfilling economic and political criteria, Bulgaria joined the European Union. The transition created many opportunities for entrepreneurship in transition countries and entrepreneurship became an important factor for the transition from centrally-planned to market economy [4].

In summary, during the last decade, the Bulgarian economy has achieved macroeconomic stability and growth. Various measures were implemented in order to improve the environment for doing business especially for SMEs [2]. Entrepreneurial Orientation (EO) may be seen as an important organizational resource for international involvement. The governmental restrictions of economic freedom appear to impact entrepreneurial activity differently depending on the particular freedom restricted by government and the entrepreneur’s motive for engaging in entrepreneurial action [7]. Entrepreneurs exploit new opportunities and are associated with disturbing the market equilibrium. They often revolutionize industries overturning long-established technologies, business models and dominant companies [8]. In order to do so, they innovate and take risks. Entrepreneur is a person who acts in hazardous circumstances, or in other words, a person who buys products with a known price, to sell them with unknown price in the future [9]. Drucker’s [10] concept of management by objectives and self-control states the need to manage business by balancing a variety of needs and goals, rather than subordinating an institution to a single value.

1.2. The Concept ‘Digital Entrepreneurship’

In the last ten years, empirical evidence suggests the rise of a new category of Entrepreneurship: Digital Entrepreneurship, as a relevant socio-economic and technological phenomenon, which can be considered as the joining of traditional entrepreneurship with an emphasis on leveraging new digital technologies in novel ways, such as social, mobile, analytics, cloud and cyber-solutions, all in order to shift the traditional way of creating and doing business in the digital era [11].

Digital entrepreneurship can be defined as embracing “new ventures and the transformation of existing business by creating and using novel digital technologies. Digital enterprises are characterised by a high intensity of utilisation of new digital technologies (particularly social, mobile, analytics and cloud solutions) to improve business operations, invent new (digital) business models, sharpen business intelligence, and engage with customers and stakeholders through new (digital) channels” [12]. Researchers argue that a nation's digital entrepreneurial capacity depends largely on digital entrepreneurial behaviour, culture, and strategies as well as a supportive innovation ecosystem in
which governments, industry, business, educational institutions and NGOs (non-government organizations) work together [13].

The concept ‘Digital Entrepreneurship’ has been used by some researchers and policy makers but its definition remains quite elusive. The research is in its infancy and the scholarship of this field is poorly developed. Several review articles on entrepreneurship identify other gaps in understanding the use of digital technologies by entrepreneurs [14]. A matter of interest represents the elaborated conceptual model to study digital entrepreneurship by Zhao and Collier [13]. They selected as the theoretical foundations three theories, given the social and networked nature of digital entrepreneurship: social network theory; social capital theory; and institutional theory. By using these theories, their model helps explore how social networks at individual, institutional and societal levels, and social capital, online and offline, affect digital opportunity identification and exploration as well as entrepreneurial outcomes.

Other researchers propose conceptual model of the implementation of digital entrepreneurship in the family business [15]. Basly and Hammouda’s model describes the main aspects that might be affected by digital entrepreneurship in family businesses, explains the aims of the necessary digital transformation and provides recommendations for that a conducive context and necessary conditions could be implemented in order to succeed in this organizational change process.

### Table 1. A Model of Entrepreneurial Culture

| Dimension                  | Definition                                                                 | Key Characteristics/Attributes                                                                 | Opposite Characteristics/Attributes                                                                 |
|----------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Organizational Enthusiasm  | A pattern of values, assumptions, and practices demonstrating an excitement and passion for the organization, its goals, and purposes. | • enthusiasm for accomplishing organizational goals and the organization’s mission               | • failing to know or understand what success for the organization is or how it can/will be achieved |
|                            |                                                                          | • understanding the organizational vision                                                        | • failing to beliefs or support the organization’s direction or purpose                           |
|                            |                                                                          | • passion for the work                                                                            |                                                                                                  |
|                            |                                                                          | • sense of unity of purpose                                                                       |                                                                                                  |
| Stakeholder Alignment      | A pattern of values, assumptions, and practices demonstrating the importance of building and maintaining mutually beneficial relationships with key stakeholders, such as customers, suppliers, partners, and investors. | • a focus on building and maintaining relationships with key stakeholders                        | • viewing stakeholders as a means to an end                                                     |
|                            |                                                                          | • appreciating how stakeholders impact the business                                              | • viewing stakeholder relationships as necessarily zero-sum                                      |
|                            |                                                                          | • emphasizing strong relationships based on loyalty and fairness                                | • viewing relationships as only valuable if benefits outweigh costs in the short term          |
| Learning & Development Support | A pattern of values, assumptions, and practices demonstrating individual and group self-improvement, learning, and professional development. | • optimism toward improvement valuing efforts to change, learn, and improve one’s self and others. | • organizational members lack ambition, initiative, or an interest in improvement               |
|                            |                                                                          | • encouraging employee professional development                                                 | • resistance to acquiring new knowledge or skills                                              |
| Opportunity Driven Change  | A pattern of values, assumptions, and practices demonstrating a willingness to change in order to identify/develop opportunities and execute on them. | • pursuing innovation and change to better execute on existing opportunities                      | • reluctance to try new things or experiment                                                     |
|                            |                                                                          | • pursuing innovation and change as a means for creating new opportunities                      | • hesitancy in the face of uncertainty                                                          |
|                            |                                                                          |                                                                                                  | • disinterest in hearing new ideas or approaches to existing problems                          |
| Cohesiveness               | A pattern of values, assumptions, and practices demonstrating organizational members’ bond and commitment to each other and the organization, irrespective of circumstance. | • organizational members take responsibility for their actions                                  | • organizational members shirk responsibility or hide in the group                              |
|                            |                                                                          | • members feel like the organization can do things on its own (internally)                       | • members lack confidence in the abilities of one another                                      |
|                            |                                                                          | • trust that everyone gives best effort                                                         | • members are secretive and uncooperative                                                      |
|                            |                                                                          | • members feel like they can rely on others to participate                                     |                                                                                                  |

Source: Own interpretation

### 1.3. A Model of Entrepreneurial Culture Applied in Digital Entrepreneurship

An example of digital entrepreneurs are all those pro-active people who create, maintain and take on the financial risks of an internet business. They are the new breed of Internet entrepreneurs who have started businesses such as Google, Yahoo, MySpace, Facebook, YouTube, Second Life, LinkedIn, eBay and others. The measurement challenge of digital entrepreneurship lays in the pervasive nature of the phenomenon itself that cannot be captured by count-based measures of individual-level entrepreneurial action. Therefore it becomes important to monitor the conditions which set the business context of entrepreneurs in the different EU countries [16]. The European Index of Digital Entrepreneurship Systems (EIDES) addresses the measurement challenge by appraising the
framework and systemic conditions for stand-up, start-up, and scale-up activities in the EU28 countries. Furthermore, the EIDES index also attempts to disentangle the digital component of the just-mentioned entrepreneurial conditions and stages of development.

Numbers of authors explore corporate entrepreneurs who had deployed the technology in the international speed in the digital entrepreneurial era successfully and identified the entrepreneurship opportunities in the same arena [17]. The development of digital technologies leads to changes in existing business models and the creation of new ones, the introduction of new products and services, and the increase in the efficiency of business processes and therefore making enterprises more competitive. M. Turuk claims that ‘enterprises that fail to adapt adequately to the digital environment will inevitably face a decline in competitiveness, and some of them may face the very survival on the market’ [17]. His research examines the use of digital technologies in business and argues the importance of using them for the growth and development of an enterprise, and to emphasize the importance of digitization for local development and the strengthening of the national economy as a whole. Therefore, it’s significant the role of applied entrepreneurial culture at a national level that is a base for digital entrepreneurship development.

A preliminary research of the authors of this article connected with entrepreneurial culture addresses the manner in which the facets of Entrepreneurial Culture combine to give the construct meaning. To reiterate, an additive relationship is appropriate when the effect of each facet on the focal construct is independent of the effects of the other facets. This proposed five dimension framework aims to comprehensively describe Entrepreneurial Culture as a cultural subtype. It aims to accurately describe entrepreneurial culture as an Organizational Culture centrally concerned with opportunities. We argue that these facets are necessary and jointly sufficient for the meaning of the construct. This implies that each facet must have some non-zero level of all attributes to possess an Entrepreneurial Culture. The proposed model can be applied successfully in elaboration a digital entrepreneurship. However, the training of human resources in the era of high technology digital enterprises is a leading purpose, which is a factor in ensuring the sustainable development and growth of the Bulgarian economy [18].

2. The Concept of “Bio-based economy”
Bio-economy covers all sectors and systems that use biological resources. It is one of the largest and most important sectors of the EU and includes agriculture and forestry, fisheries, agro-food, biomass and bio-based products. Its annual turnover is about 2 trillion euros, and it employs about 18 million people. Bio-economy is also a key area for stimulating growth in rural and coastal areas. The new bio-economy strategy fits in with the Commission’s efforts to further boost jobs, growth and investment. It aims to improve and expand the sustainable use of renewable sources to overcome global challenges such as climate change and sustainable development.

Biological resources and ecosystems in the world are limited, so efforts and an innovative approach are needed to feed the population and provide clean water and energy. Bio-economy can turn algae into fuel, recycle plastics, produce furniture or garbage from waste, and create organic fertilizers from industrial waste products. It has the potential to create 1 million new green jobs by 2030.

There is a need for a change in the system, the way we produce, consume and dispose of goods. By developing its bio-economy - the renewable segment of the circular economy – EU countries can find new ways of providing food, goods and energy without depleting the limited biological resources of the planet. Moreover, not only environmental protection and climate change make them reconsider their economic paradigm and modernize their production patterns: there is also a significant potential for new green jobs, especially in rural and coastal areas. The EU has to pave the way for the transformation of waste, residues and unnecessary items into high value products, environmentally friendly chemicals, feed and textiles. Research and innovation play a key role in accelerating the building of a green European economy and achieving the goals of the United Nations for sustainable development. This strengthening of the bio-economy can make a significant contribution to achieving a wide range of EU objectives, including mitigation of climate change, circular economy and resource
efficiency, environmental protection, job creation, growth and revenue. Achieving a sustainable circular bio-economy requires concerted work by the public and private sectors. Major sectors of the bio-economy are agriculture and forestry, fish and aquaculture, bio-energy and biofuels, food industry, bio-based products and processes.

3. Digital Marketing and its Implementation over the Design for Digital Entrepreneurship

Globalization and Information Technology (IT) are the cause of changing business models [18]. The unpredictability and dynamics of today's business requires connecting all participants in business processes and an immediate response to the market. Business needs to be done in real time. Many agricultural and bio-economic companies, based on customer loyalty, improve their quality of e-services [9] [18]. The need to introduce digital marketing has become more and more tangible over the years and, alongside traditional marketing tools, Internet and digital technologies are increasingly being used to reach marketing goals. Digital marketing uses a wide range of information technologies to achieve greater value through effective segmentation in the market, geared towards differentiation and positioning, effective planning and distribution, product and service pricing and product pricing, and sales that will satisfy consumers as individuals and achieve the organization's goals. Digital marketing is also closely matched with e-commerce. For companies in the bioeconomy sector and the production of biobased products, the internet can be a valuable tool on the market to complement commercial activities [19]. The agricultural and food sector is not fully competitive in the use of new information technologies. For this reason, information technologies, especially the Internet, have the potential to promote the economic characteristics of the agricultural sector. Digital marketing in agribusiness brings many benefits, such as reduced agency costs (wholesale and retail), reduced time consumption, collection, selection and processing of information, resulting in improved supply chain management, and to expanding market participation and / or expanding new markets.

3.1. Results and Discussion

The main goal of this research is to identify the Internet and the digital marketing involvement in the bio-based economy sectors in Bulgaria and explore the attitudes of the employees in these sectors. The data on the use of digital marketing and digital entrepreneurship in Bulgarian companies from the bio-economy sectors were collected through an online survey conducted in December 2018. 123 companies representing key sectors of the Bulgarian bio-economy participated in the survey. The questionnaire includes general business information, respondent characteristics, web sales and web site between business entities and Internet business views. Single-band (frequency and distribution) and binary (chi-square) data analysis methods were used to analyze the collected data. Data is analyzed using the SPSS statistical package.

The total number of survey respondents included a total of 70 limited liability companies, 26 family agricultural companies, 13 joint stock companies, 10 craft enterprises and 4 cooperative societies. Their share of the total number of respondents is shown on figure 1. Of the surveyed, 92.5% are private, and only 7.5% are public companies (See fig.2).

The majority of enterprises surveyed are manufacturing (77.5%). Commercial enterprises are 26.1% and those in the service sector 20.4%. The majority of respondents are micro-enterprises with up to 10 employees (51.4%), respondents with up to 50 employees are 22.6%, 19.7% are medium-sized enterprises with 51 to 250 employees and only 6.3% companies are large with more than 251 employees.

The largest number is the number of respondents, producers of organic food - 34, 27 are the companies from the bioenergy sector, 17 are the agrarian farms, followed by companies, producers of heat and electricity - 14, 9 are the companies from the fish industry and aquaculture and at least the representatives of the forestry industry - 6. The distribution of respondents by sectors of the bio economy is shown in figure 3.
The majority of respondents have an annual turnover of more than 50,000,000 BGN (47%), followed by those with an annual turnover between 10,000,000 BGN and 50,000,000 BGN (25%). Businesses with an annual turnover between 850,000 BGN and 10,000,000 BGN make up 15% of the respondents, while those with an annual turnover between 50,000 BGN and 850,000 BGN account for 11% of the respondents. The share of companies with annual turnover between 5,000 BGN and 10,000 BGN (2%) is the lowest. More men were involved in the study, compared to 58% and 42%, respectively. The respondents aged between 35 and 50 are dominated, and the lowest is the number of participants over the age of 50. Almost 74% of respondents have secondary or high education and 12% of respondents with a doctorate degree. The respondents with less than 10 years of service experience in the current business unit dominate (78.8%) while only 3.0% of the respondents in the current business entity work for more than 20 years. Even 68% of the surveyed businesses have their own website, which is a smaller proportion compared to the results of the research conducted in Greece, where 78% of the surveyed businesses have a website and in Spain, where even 93% of them have a website. Among those who do not have a website, most of them plan to make their own website in near future, while 21% of the respondents do not intend to make a website.

The conclusions that can be made are that companies in different sectors of the bio economy with higher annual turnover are more likely to get a website than those with lower turnover. There is a correlation between company incomes and their presence in the Internet space. However, there is no link to the website with other business characteristics (number of employees, business level, company seat, business sector), ie (p≥0.05). Out of all 83 respondents who have a web page, more than half (60%) believe that the website’s creation moderately impacts its recognition on clients and their
potential partners, 22% said it had a significant impact on recognizability of business and 8% consider that the impact of the webpage is insignificant. Only 10% of the respondents believe that the impact of the website is very important to create visibility of their business among customers and potential partners. The webpages of bio-based businesses with the broadest coverage are general information about their business (62%) and the catalog of their products (53%), while online trading and electronic payments are neglected. (See table 2).

Table 2. Profile of Companies in the bio economy sectors on the indicators for digital marketing

| Web site content                                                                 | N  | %  |
|----------------------------------------------------------------------------------|----|----|
| Business profile – general information                                           | 76 | 62 |
| Links to other useful information                                                | 7  | 6  |
| Product catalog                                                                  | 65 | 53 |
| Methods of electronic payment                                                    | 6  | 4.9|
| Online retail                                                                    | 15 | 12 |
| Information about physical stores or locations where products can be purchased   | 56 | 46 |
| Internal employee communication                                                  | 5  | 4.1|
| Price list                                                                       | 12 | 9.8|
| Online wholesale                                                                 | 4  | 3.2|
| Sections with special facilities for specific customers                          | 10 | 8  |
| Professional advice for customers                                                | 27 | 22 |
| Link to professional associations                                                | 9  | 7.3|

Source: Own data

About 85% of respondents believe their websites cannot fully meet the needs of advertising. Only 14.3% of respondents sell their products online, while the remaining 85.7% do not trust e-sales. The survey results show that the annual turnover of the bio-based companies is related to the online sale of products (p≤0.05). Companies with low annual earnings often offer an opportunity for e-sales compared to businesses with high annual earnings. The number of employees is also related to electronic sales (p≤0.05). Companies with fewer employees often take electronic sales. An important reason for the untapping of e-sales is the unwillingness of customers to use this method due to the risk of billing or theft. The high price for such a service is considered to be less important. Some of the other reasons why e-sales are not used are: people's ignorance, a small number of products, the inadequacy of products for such a form of sales, lack of time and staff.

Table 3. Attitude to digital business

| Item                                                                 | N   | min | max | Mean | Standard deviation |
|----------------------------------------------------------------------|-----|-----|-----|------|-------------------|
| Organic food and bio-based products can’t be sold via Internet      | 121 | 1   | 5   | 2,83 | 1,134             |
| Digital business is a necessary precondition for successful business in the future | 123 | 2   | 5   | 4,13 | 0,723             |
| Information on more complex bio-based products is difficult to present on the Internet | 121 | 1   | 5   | 2,56 | 0,999             |
| Digital business will significantly reduce the importance of intermediaries in our bioeconomy sector in the next three years | 123 | 2   | 5   | 3,24 | 0,923             |
| Internet will not have a very high impact on the business of my company in the future | 122 | 1   | 5   | 2,98 | 1,134             |
| Competitors are pushing for the need to use digital business        | 123 | 1   | 5   | 3,87 | 0,798             |

Source: Own data

Respondents believe that e-commerce is essential for business development in the future (average of 4.13 on a scale of 5 degrees, where 1 means that it disagrees and 5 means completely agree). They consider that competition requires the use of electronic sales (average 3.87). Respondents believe that information on sophisticated products can hardly be represented on the Internet (average 2.56) and that
they can not sell organic foods and bio-based products online. Also, the surveyed enterprises believe that the Internet has a major impact on the business.

**Conclusion**

As a global medium the Internet has a major impact on today's business world. Today we receive all the necessary product information via the Internet. From the digital marketing in the marketing strategic objectives the biggest part belongs to the creation of a website, which is the first step to attract new customers and keep the old ones. The results showed that the companies from main bioeconomy sectors are aware of the advantages and disadvantages of the digital marketing, and the use of e-marketing is to be a target of this kind of trade. The basic limit, in the opinion of the respondents, is the ignorance of the business partners where occurs the need for education of the subjects of agriculture and related industries as well as within the consumers about the opportunities and advantages of the e-commerce.

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