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# Embryonic tech ventures' orientation and performance

DOI: 10.7595/management.fon.2023.0008

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## Abstract:

**Introduction and objectives:** A broad body of knowledge is developing around the influence of market and entrepreneurial orientation on business performance. However, high-tech firms in the embryonic (R&D and start-up) phase of development have stayed off the research radars. Taking a resource-based view, this study examined the role of market and entrepreneurial orientation on the performance of new ventures within a growing entrepreneurial ecosystem of Serbia.

**Methods:** The study is based on primary data gathered via a questionnaire and examined tech ventures founders from Serbia whose ventures are in either research and development or start-up phase. **Results:** The findings confirm that both market and entrepreneurial orientation play an immense role in the embryonic phase and throughout the process of launching a new tech firm. **Conclusion:** The study found that market orientation primarily influences problem discovery, value proposition and product designing, as well as team gathering. Entrepreneurial orientation more significantly affects performance in the context of MVP creation, first customer acquisition, initial revenue stream and investment for the next phase of tech venture development. **Implications and research limitation:** The study suggests that new ventures leaders have to develop both market and entrepreneurial competences. At the beginning, they should invest more into the activities related to market orientation, and during the further tech venture development, entrepreneurial orientation leads to finalization of a product/service development and its commercialization. Even though this study provides useful and valuable insights, it does not reflect all concepts of entrepreneurial success and a larger sample size from other geographical regions would be more suitable for the generalizability of study findings. Yet, the implications of the study are highly relevant for Serbian ecosystem as the business environment is not stimulating enough for growth and development of new ventures, and consequently founders have to rely on their own competencies and knowledge.

**Keywords:** market orientation, entrepreneurial orientation, tech venture, venture performance

**JEL Classification:** M13, M31

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## 1. Introduction

A broad body of knowledge is developing around the interplay of market orientation (MO) and entrepreneurial orientation (EO) and their effect on business performance (Zacca & Alhoqail, 2021; Genc et al., 2019; Montiel-Campos, 2018). Most studies indicate that the singular or combined effect of these two orientations is beneficial to firms (Boso et al., 2013). However, a consensus with regard to the positive effects of one or both of these orientations on the firm performance has not yet been reached. For instance, some studies imply the negative effects on the development of new products (Morgan et al., 2015) or the total performance of new ventures (Su et al., 2013). These inconsistencies merely mean that this is a cutting-edge research topic. Still, the extent studies are focused on mature product markets (Vega-Vazquez et al., 2016) and large-scale firms (Reijonen et al., 2015). A paucity of attention has been paid to new ventures, particularly at their embryonic stage of growth (Hughes & Morgan, 2007).

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To the best of the authors' knowledge, none of the studies thus far has covered tech ventures in the earliest phase of development. Some scholars advocate that MO and EO are less formalized in young and fast-growing industries (Svatosova, 2018). The abundance of cost-efficient intangible resources for young firms in high tech industries is relatively high, and business models and orientation supposedly play an immense role in their existing performance and future success. To fill the gap in the present body of knowledge, we address how MO and EO affect the performance of embryonic tech ventures. With highlighting the market and entrepreneurial competencies that new embryonic tech venture leaders should develop to be successful on the market as 90% of new ventures fail in the early years (Kalyanasundaram et al., 2021).

The term embryonic tech venture refers to the new technology-based ventures in the earliest stage of their development – R&D and startup phase. As a form of technology venture in early stage of development, technology ventures refer to a „temporary organization designed to search for a repeatable and scalable business model” (Blank & Dorf, 2020) that are characterized by high levels of uncertainty, risk, and rapid growth potential. Accordingly, the aim of the study is to examine how embryonic tech ventures shape their business models - the way they do business and achieve their goals (Massa et al., 2017). The study was conducted in the Serbian entrepreneurial ecosystem. According to Mason and Brown (2014), an entrepreneurial ecosystem is comprised of a collection of interconnected components, including entrepreneurial individuals (those who have the potential to become entrepreneurs and those who already are), entrepreneurial organizations such as firms, venture capitalists, banks, and business angels, institutions such as universities, public sector agencies, and financial organizations, and entrepreneurial processes like the rate of new business creation, the number of high-growth firms, the level of ambitious entrepreneurship, and the degree of "sell-out" mentality within firms. These elements come together in both formal and informal ways to facilitate and govern the performance of the local entrepreneurial environment.

The remainder of the paper is organized as follows. Section 2 reviews the current body of knowledge and develops testable hypotheses. Section 3 depicts the methodology used in the study, in particular the sampling procedure, data collection, and development of research instruments. Section 4 elaborates on the study results. Section 5 is reserved for discussion of key findings, contributions and implications, strengths, limitations and recommendations for further work. The last part of this section is reserved for the concluding remarks.

## 2. Literature review

To gain an advantage in a highly competitive market, firms deploy various physical, human, and organizational resources and competencies. The resource-based view (RBV) of the firm shifts the focus for explaining performance differences from the outside the firm – such as industry dynamics and characteristics to the inside the firm – core competencies and firm assets (Hooley et al., 2008). Barney et al. (2001) explained the contribution of this concept to several fields, including entrepreneurship as well, and argued that opportunities arise when entrepreneurs have insights about the value of resources that others do not. The RBV posits that if these resources and capabilities are valuable, rare, and hard to imitate, they have the potential to unlock a strategic advantage in the marketplace. In the context of a new venture, technology is certainly an important resource (Chorev & Anderson, 2006). In the long run, however, technology can be easily replicated. On the other hand, business orientation is one of the most important resources, as it is deeply integrated into everyday processes and activities, which in turn makes it hard to imitate (Lonial & Carter, 2013).

Following a Resource-Based View line of reasoning, market orientation and entrepreneurial orientation are important resources for any further value delivery of new ventures (Martin & Javalgri, 2016). Leaders of tech ventures are mainly focused on technology and product development and are usually lacking in business orientation (Kim et al., 2018). Cunningham (2000) infers that the main reason for the failure of new ventures is often found in entrepreneurs' business orientation.

Business orientation comprises market orientation, entrepreneurial orientation, orientation to production costs, sales orientation, and quality orientation works (Vitale et al., 2003). In this paper, however, business orientation will be narrowed down and focused only on MO and EO. The rationale for breaking down business orientation into only two constructs is the authors' belief that these two create the greatest resource tension. Empirical evidence suggests that EO drives radical, whereas MO affects incremental change and the performance of small and medium-sized firms (Kocak et al., 2017). Morgan et al. (2015) claim that these 'two orientations may be complementary in some regards, the underlying characteristics of the orientations

may be a cause for concern. Market orientation requires the ability to generate external information, whereas EO is resource intensive and inward-looking.

## 2.1 Market orientation

Market orientation was conceptualized in the early 1990s as part of organizational culture (Narver & Slater, 1990; Zafer Acar et al., 2013). It presents the implementation of the marketing concept (Kohli & Jaworski, 1990; Lafferty & Hult, 2001) and authors implement a variety of perspectives in exploring market orientation (van Raaij & Stoelhorst, 2008). Still, the dominant definition and conceptualization of market orientation relates to the culturally-based behavioral perspective; where market orientation consists of three behavioral components, (Narver & Salter, 1990) customer orientation, competitor orientation and interfunctional coordination. Also, market orientation is approached as the generation of market intelligence, dissemination of it across departments and organizational responsiveness to it (Kohli & Jaworski, 1990; Jaworski & Kohli, 1993). Furthermore, it stimulates organizational behavior that generates superior value for customers and further leads to potentially establishing long-term relationships with them (Dlagic & Zabkar, 2012). Consequently, a superior value for the business is also generated, in the most effective and efficient way.

We based our study on this approach, which encompasses three market-related components (customer orientation, competitor orientation, and inter-functional coordination). This approach, however, is not unanimously accepted by scholars. Another group of authors views MO mostly as organizational behavior (Kohli & Jaworski, 1990; Murgolo-Poore et al., 2003), through the activities that are being implemented. These activities include intelligence generation, intelligence dissemination within the organization, and responsiveness through carrying out tasks that are in line with acquired knowledge.

Although both approaches have some inconsistencies, it is generally assumed that they lead to higher performance in the firm (Bhuiyan et al., 2005; Buratti et al., 2021). But to respond to market needs in timely fashion strong supplier relationships are important (Martin & Grbac, 2003) as they through enhancing customer responsiveness also improve firm's market orientation. Furthermore, strong ties with suppliers and sharing information also help firm to acquire necessary information and to obtain resources to provide superior value to customers, hence, leading to superior performance in comparison to competitor (Lee et al., 2004; Min et al., 2007). Market orientation has raised its importance in enhancing firm's competitiveness over the time (Soniewicki, 2022).

Therefore, we hypothesize that:

H1. Market orientation positively affects tech venture performance at the embryonic phase.

## 2.3 Entrepreneurial orientation

Scholars perceive EO as a set of intentions and actions leading to the launch of new entrepreneurial ventures (Rauch et al., 2009). It refers to the process, practice, and decision-making that results in a market novelty. Entrepreneurial companies (Anderson et al., 2015) are innovative (constantly introducing new products, processes, or business models), proactive (actively searching for and entering new product or market spaces and seeking market leadership), and risk taking (with a strategic decision to develop new projects and ideas with uncertain outcomes) companies. Hence, companies with such a behavioral pattern and implementation of these concepts (Wales et al., 2013) are employing EO. Zafer Acar et al., (2013) explain entrepreneurship as the process of creating a new value with financial, physical, and social risks, using a given amount of time and energy to achieve personal satisfaction and the independence of the organization. Although the EO phenomenon is amorphous, we rewarded the widely used construct of Lumpkin and Dess (2001), based on the following components: autonomy, innovativeness, proactiveness, risk-taking, and competitive aggressiveness.

The relevance of EO for a firm's performance has already been elaborated in the extant body of knowledge (Rauch et al., 2009; Lee & Chu, 2017; Palmer et al., 2017). Lee and Chu (2017) mapped the territory for a positive association between EO and performance and found that studies reporting insignificant results lack the important factors of the internal and external environment. Entrepreneurial success is not only explained through the strategic firm-level EO, but also through the individual-level perspective of CEOs as an important factor to be integrated (Palmer et al., 2017). In the context of a new venture, EO also contributes to

performance and survival rate (Shan et al., 2016). Furthermore, some research (Vega-Vazquez et al., 2016) posits a mediating role of MO in the link between EO and performance. Following all the aforementioned, we hypothesize that:

H2. Entrepreneurial orientation positively affects tech venture performance at the embryonic phase.

### 2.4 Performance of embryonic tech venture

Scholars are still struggling to define a meaningful set of indicators to assess the performance of technological ventures at the embryonic stage. Traditional performance indicators, such as revenue or profitability, are rarely achievable at a firm's inception. Although a consensus on the best measures for early entrepreneurial success has not been reached, scholars do agree that it is a multifaceted phenomenon (Shi et al., 2021). For instance, Chorev and Anderson (2006) identify entrepreneurs, strategy, marketing, technology and product management, finance, and control as important components of performance at the embryonic stage. As for entrepreneurs, the embryonic phase relates to the creation of an entrepreneurial team with adequate expertise in technology and entrepreneurship (Cooper & Saral, 2013). Furthermore, in this phase, the relevance of leadership and the founder's management skills is high, as is that of team cohesion. Strategy as a component of performance reflects a business model that defines means of value creation, communication, and delivery (Duening et al., 2015).

One of the key challenges for the success of a new venture is the development of a product/service that holds value for customers through collaboration and value co-creation (Ranjan & Read, 2014). Accordingly, marketing measures encompass creating a list of customers and a unique value proposition for them, as well as initiating a revenue stream. The theory finds technology and product management to be an essential part of success. Ries (2011) infers that a minimum viable product (MVP) presented to customers sets the foundation for receiving customer feedback. Even though feedback from customers is received, the task is not completed. An important quality of these embryo-level firms would be the ability to set the minimum required product features and then continuously improve them (Aramand, 2008).

Following the previous analysis of related works, the theoretical model is illustrated below:

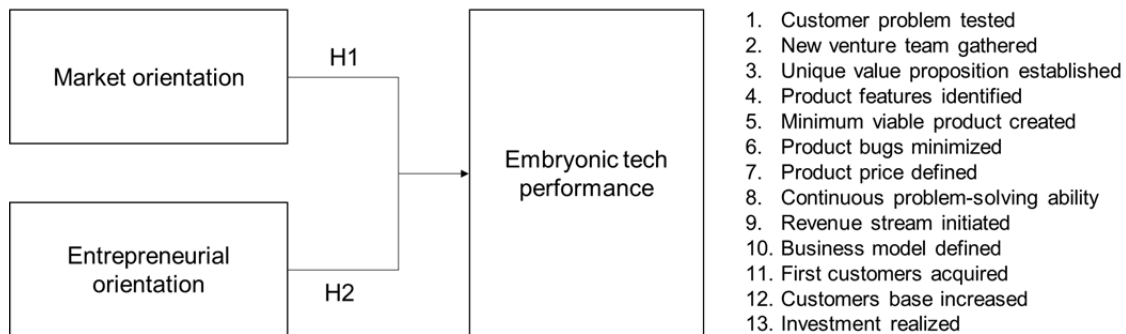


Figure 1: Theoretical model

## 3. Methods

### 3.1 Research instrument and measures

We used a questionnaire to collect the data. The questionnaire had four sections. The first section was used to generate data on the respondents' demographic features.

The second section examined the performance of new tech ventures at the embryonic stage: customer problem tested, new venture team gathered, unique value proposition established, product features identified, a minimum viable product created, product bugs minimized, product price defined, continuous problem-solving ability, revenue stream initiated, business model defined, first customers acquired, customers base increased, investment realized. The performance can be measured as either an objective or subjective performance (Milosavljevic et al., 2023). We measured it as the latter, as it is less robust and allows for a comparison between non-quantitative performance measures. We used the approach of Radonic

et al. (2021), and asked respondents to assess how good the company was in terms of a specific performance measure compared to the industry average. At this point, these factors are only listed as an underlying measure of embryonic tech venture performances. For the final construct, exploratory factor analysis and the principal components method were used.

The third section was related to respondents' market orientation. For that purpose, we made use of the MKTOR scale (Narver & Slater, 1990). This scale incorporates 15 items, grouped in three dimensions: customer orientation, competitor orientation, and inter-functional coordination.

The final section referred to EO. As elaborated in the literature review, EO is a multidimensional construct (Anwar et al., 2021). The dimensions of EO depend on the level of abstraction. We based our study on a five-dimensional approach, which included: autonomy, innovativeness, proactiveness, risk-taking, and competitive aggressiveness (Lumpkin & Dess, 2001). These five dimensions were further operationalized into 14 inquiries following Hughes-Morgan scale (Hughes & Morgan, 2007). All the items were measured with a seven-point Likert-type scale.

### 3.2 Sampling and data collection

As the total number of new tech ventures is unknown (to the best of the authors' knowledge, there is no comprehensive database), we based our study on a "snowball" sampling technique. This sampling relies on peer-to-peer recruitment of study participants and the formation of a referral chain. Although it can be the subject of various biases, the referral chain was actively controlled – particularly at the stages of initiation, progress, and termination.

The sample was formed within Serbian incubators as they hold most technology ventures in developing countries. As organizations that help start-ups in technology commercialization, business development and growth, they represented a relevant pull for this research. Four incubators were selected: Business & Technology Incubator Belgrade, Impact Hub Belgrade, ICT Hub, and Business Incubator Novi Sad. The main criterion for the respondents was that they were tech venture founders and that their venture was in either research and development or start-up phase.

In total, 73 respondents correctly fulfilled the questionnaire. The full dataset is available upon the request to the authors. As specified by the managers of four incubators, this number represented nearly half of the total population of tech ventures in the embryonic phase. As for the gender distribution, the sample was highly unbalanced – 83.6% of respondents were male, a pattern similar to that of other studies exploring new technology-based firms (see Robb & Coleman, 2010). The youngest examinee was 21-year-old, while the oldest was 45 years old. The average time of having worked at the new venture was 1.58 years, which represents the point Spinelli and Adams (2012) explain as the moment when tech ventures shift from R&D to the Start-up phase.

## 4. Results

### 4.1 Pre-analysis

First, we reduced the 13-item list of new venture performance elements. For this purpose, we used exploratory factor analysis and the principal components method. The exploratory factor analysis indicated that the majority of variables are statistically correlated with correlation coefficients higher than .3. The Kaiser-Meyer-Olkin's value was .627, which exceeds the recommended value of .6. The analysis shows that Bartlett's spherical test is significant (Sig. < .000), so the correlation matrix is factorable. The principal component method showed that four components with specific values higher than 1 explain 39.1%, 11.6%, 10.5%, and 8.2% of the total variance, respectively. Jointly, these factors comprise 69.6% of a factor's structure. This means that 69,6% of information is included in 13 items, which are then further sorted into four factors. The internal consistency (Cronbach Alpha) tests indicate satisfactory values for all generic factors (Table 1).

**Table 1:** Score coefficient matrix and internal reliability test

Items	Factors				Factor name	Cronbach Alpha
	1	2	3	4		
Customer problem tested	<b>.832</b>	.170	.169	.203	Ideation (ID)	.808
New venture team gathered	<b>.816</b>	.116				
Unique value proposition established	<b>.759</b>		.315	.118		
Product features identified	.160	<b>.887</b>		.133	Value proposition (VP)	.708
Product bugs minimized		<b>.779</b>	.225			
Product price defined	.413	<b>.534</b>		.453		
Continuous problem solving	.284	<b>.447</b>	.345		Value Exchange (VE)	.788
MVP created	.344	.323	<b>.745</b>	.223		
First customers acquired	.220		<b>.734</b>	-.205		
Revenue stream initiated		.273	<b>.722</b>	.366	Business modelling (BM)	.710
Investment raised	.138	.484	<b>.517</b>	.234		
Business model defined				<b>.898</b>		
Customers base increased	.316	.181	.244	<b>.748</b>		

Afterward, we conducted a correlation analysis (Pearson correlation). Several statistically significant correlations were found (Table 2). MO has the strongest dependence on the Ideation factor ( $r_1 = .604$ , Sig. = .000), while for the remaining three factors, dependence is moderate ( $r_2 = .475$ , Sig. = .000;  $r_3 = .349$ , Sig. = .004;  $r_4 = .265$ , Sig. = .031). EO has the strongest linear dependence on the Value Proposition factor ( $r = .401$ , Sig. = .000), while dependence on Value Exchange ( $r = .375$ , Sig. = .002) and Ideation ( $r = .307$ , Sig. = .009) factors is weaker. No dependence on the Business Modelling factor was identified. The research also identified a strong link between the MO and EO of tech ventures ( $r = .689$ , Sig. = .000).

**Table 2:** Correlation matrix

	MO	EO	ID	VP	VE	BM
MO		.689**	.604**	.475**	.349**	.265*
EO			.307**	.401**	.375**	.173
** $p < 0.01$ , * $p < 0.05$						

#### 4.2 Main analysis

The influence of MO and EO on the success factors of new technological ventures is analyzed by bivariate regression models (Table 3). Through regression, one continuous dependent variable is predicted by one or more independent variables. A total of seven bivariate regression models were generated. The variability of Ideation in the development of a tech venture was best explained with MO, which explains 36.5% of the variability of this factor. For the remaining three linear regression models, MO explains 22.5%, 12.2%, and 7% variability of the dependent variable. The influence of EO was identified through three models of single bivariate regression. EO largely explains the variation of the Value Proposition (16.1%) and Value Exchange (14.1%) factors and to a lower extent the variation of the Ideation (9.4%) factor.



Table 3: Regression analysis

	Independent variable	Model summary			Parameter Estimates	
		R Square	F	p	Const.	Beta
Market orientation	Ideation	.365	39.135	.000	-.004	.604
	Value proposition	.225	20.051	.000	1.033	.475
	Value exchange	.122	8.719	.004	1.346	.349
	Business modelling	.070	4.847	.031	1.928	.265
Entrepreneurial orientation	Ideation	.094	7.167	.009	2.104	.307
	Value proposition	.161	13.432	.000	1.682	.401
	Value exchange	.141	10.341	.002	1.270	.375

**Discussion and conclusions**

Key findings, contributions and implications

Numerous recent studies (Aminova & Marchi, 2021; Ondas & Akpınar, 2021; Prohorovs et al., 2019; Santisteban & Mauricio, 2017) have already shown that most tech new ventures fail in the early years, with a failure rate of about 90% worldwide (Kalyanasundaram et al., 2021). This sheds light on understanding the causes of failure in order to take remedial actions and help new ventures achieve their performance. Scholars and practitioners still have not come up with an unambiguous list of success/failure factors, and we explored market and entrepreneurial orientation and their influence on new ventures' performance. Our study attaches particular importance to market and entrepreneurial competencies that new venture leaders should develop, highlighting those that are more important at the beginning of a venture journey, and those that are more significant as the venture continues to develop.

To contribute to identifying and overcoming potential pitfalls of new tech ventures' success, our aim was to analyze the role of business orientation (in particular, market orientation and entrepreneurial orientation) at the embryonic stage of development. First, we identified 13 items of tech venture business performance and reduced them to four factors of business success: Ideation, Value Proposition, Value Exchange, and Business Modelling. The sequence of loaded factors indicates the chronology (or milestones) at the early stage of firm development. This finding allows for closing an interrogative set by Hughes and Morgan (2007) - at what point in time or in the evolution of firm do stage of business development do other business orientations become important or less important?

Generally, we found that both market and entrepreneurial orientation are statistically proven to affect the performance of tech ventures in the early stages of development (implying that both H1 and H2 are accepted). Our findings indicate that market orientation in particular plays a crucial role in the success of entrepreneurial ventures, especially in the ideation phase. This is in line with Zanella et al., (2016) research results, which found customer involvement to be relevant for business model ideation and development. Moreover, when developing firms, teams should put the effort into and emphasis on customers' expectations. It could be speculated that co-creation would be the best strategy during the process of development (Kim & Slotegraaf, 2015).

Respecting the role of market orientation in value proposition refers to the implementation of knowledge generated with customers about a set of desired product features that are not included in existing competitive products. Based on this knowledge, one can determine the price customers are willing to pay for a new product's defined set of features, as well as a revenue model for rapid penetration and growth in the market.

To create a minimum viable product, customer orientation and inter-functional coordination are also important in revealing bugs and problems that can arise during the use of products. Accordingly, the new venture team should develop continuous problem-solving abilities. Thus, market orientation should lead to the creation of a minimum viable product, which can provide first customers, revenue stream, as well as investment for the next phase of tech venture development.

As the study results indicate, market orientation significantly affects business modeling. This implies that the future successful business model is affected by external rather than internal factors.

The influence of entrepreneurial orientation on performance was also identified in the paper, and it is explained by the implementation of innovations in the offer of new ventures, as well as a creative change in the way existing activities are carried out. In the context of value proposition, entrepreneurial orientation is recognized externally in the interaction with customers and internally in the processes and activities of the new venture.

Furthermore, entrepreneurial orientation is a prerequisite not only for the success of the concept and idea, but also for the initial launch of a new venture, since it involves identifying new opportunities, taking initiative, and initiating activities in relation to competitors.

Additionally, also recognized is the relevance of entrepreneurial orientation for the process of value proposition and exchange, which depends on the research of the competition, an aggressive approach to competitors, and the neutralization of competitive advantage. This research did not reveal the influence of entrepreneurial orientation on the development of business models.

As for the practical implications, tech venture leaders in the embryonic phase should be ambidextrous. This means that they have to develop both market and entrepreneurial competencies. The study results, however, imply that the development of these competencies does not have to be simultaneous. At the very beginning, they should invest more into activities that would generate insights from the market, related to competitors and customers. Particularly, customer feedback should be integrated in the ideation and value proposition phases and thus pave the way for further product/service development. During the further tech venture development, in the value exchange phase, entrepreneurial orientation leads to the finalization of a product/service development and its commercialization.

In particular, these implications are highly relevant for the Serbian ecosystem as the business environment is not stimulating enough for the growth and development of new ventures (Minovic et al., 2017). Consequently, new venture leaders have to rely on their own competencies and knowledge. In addition, based on Startup Genome Report (2019), the tech start-up ecosystem in Serbia is in the activation phase, where the most successful start-ups are bootstrapped. Thus, research like this one contributes to the decrease of new tech venture failures and supports the undergoing processes of transition or transformation of Serbian society.

#### Limitations and further recommendations

Being quantitative by nature, our study has some flaws. First, the measure of business success is based on a notable theoretical concept and the 13-item scale does not reflect all financial and non-financial concepts of entrepreneurial success. This paves the way for further studies, which should focus on the incorporation of various individual-, firm-, and macro-based aspects of success. Second, the sample size is limited, which raises the issue of the generalizability of study findings. Further studies should encompass other tech ventures and include other geographical regions. Third, this study is cross-sectional by nature and was done at a specific point in time. For a more prolific study, a longitudinal analysis would be needed. Only then would the evolutionary characteristics of market orientation, entrepreneurial orientation, and early-stage performance be captured.

#### Concluding remarks

Young tech firms usually lack business orientation because they are mainly focused on technology and product development. However, these resource-constrained and dynamic start-ups should focus on their business orientation. Neglecting business orientation could lead to the suboptimal performance of new ventures. This study detects the interplay between marketing and entrepreneurial orientation and the performance of tech firms at the inceptive stage of development and thus contributes to the understanding of how new ventures can operate and generate value.



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### Acknowledgements

*This research study has been supported by the University of Belgrade – Faculty of Organizational Sciences and the University of Rijeka under Grant project number Uniri-drustv-18-235-1399.*

*Received: 2022-10-25  
Revision requested: 2023-03-06  
Revised: 2023-04-14 (1 revision)  
Accepted: 2023-04-26*


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