Recognizing early success criteria to attain funding and enhance university spin-off potential

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ABSTRACT

The purpose of this paper is to contribute on the raised research gap between early successful funding attainment by university spin-off firms. The factors that the paper explores comprises some of the potential characteristics that are involved in a spin-off. A particularly important element of the modern economic development is transfer of knowledge from the level of research into the real economy and the creation of commercial enterprises that will produce economic benefits for a given industrial context. This transfer is done with the creation of university spin-offs (USO's), and USO's might be one of the solutions for the healthy growth of the economy, since they play an important role on raising sustainable development goals and in the process of transfer of knowledge. In USO's, universities and governments are involved in assessing criteria of whether or not funding will be provided, thus, it is essential to better understand which factors could augment the likelihood of attaining governmental funding, and therefore the chances of survival and further success. Based on a Dutch data set of 242 USO's, this study highlights potential success criteria that could foster the likelihood of governmental funding. Our findings reveal that business model and motivation are the main variables that affect governmental funding. Based on this result we suggest that managers and other policymakers take a broad view of this result to better understand, where and how could these factors have been determined.

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Keywords

University spin-off, success factors, funding acquisition, motivation, transfer of knowledge

1. INTRODUCTION

The transfer of knowledge from universities to industries is a significantly important element for the modern economic development of technology as well as the creation of commercial enterprises that will produce these benefits for the founders, the employees, and the society at different levels (Beltran et al., 2020; Bolzani et al., 2020; Castillo et al., 2016; Gubitta et al., 2015; Huyghe et al., 2013) . Transfer of knowledge can play a role in levels such as individual, organizational and institutional, by providing a source of innovation for industries and society, and a source of economic development for policy makers (Philipson, 2020). This transfer is done with the creation of USO's (University spin-offs), and in this paper we will examine and clarify the fundamental factors to funding acquisition, and a successful USO development.

Universities play an important role in the process for production of highly specialized human capital and consequently in the production of new innovative knowledge and technology of USOs, as they also have to invest in the time consuming and costly research processes which inherently solves grand societal problems and challenges (Moscardini et al., 2020). Different than new technology developed in commercialized companies, USO'S (University spin-offs) go through a process of transforming from a non-commercial environment to a commercial environment (Vohora et al., 2004). In this process, academic entrepreneurs may lack for instance business skills, commercial skills, and resources and other assets which could lead to specific obstacles and challenges, like conflicting objectives between key stakeholders. Therefore, to foster the development of USO's and the creation of new impact, governments and universities are trying to facilitate this by seeking to develop a framework that would encourage spinoff creation; since they need to increase the likelihood of high-growth innovative firms that could potentially have significant positive impact (Fini et al., 2016). Yet, despite all the policy arrangements and support mechanisms, there is limited systematic cross-country comparative analysis of the influences. And results are still not promising (Sciarelli et al., 2020; Fini et al., 2016). Hence, we need a better understanding of critical success factors at the early stage of development. The most prevalent of such initiatives is the establishment of (TTO) at university level but the effectiveness of such initiatives is debated (Cunningham et al., 2020). In some industries, USO's are the dominant type of firms, like in the biotechnology (Fernández, 2019), but usually spin-offs can lead to larger more established firms with a variety of advantages in commercializing technologies like market knowledge, distribution systems and related products.

The need for further research and further re-establishment of critical success factors in today's world is necessary in order to help raise the "success" bar, resulting in further societal and economic benefits. The current available literature highlights several factors that might be playing a role, such as the ability to overcome critical junctures (Vohora et al., 2004), availability of commercial skills and protection of intellectual property (Lockett & Wright, 2005), the lack of university assistance (Rasmussen & Wright, 2015), amount of training offered to USO promoters, as well as the influence from bureaucratic areas (Vega-Gómex et al., 2020). Other suggestions focus on the importance of training and recruitment of skillful commercial officers and on the need of intellectual property protection, in order to attract external equity finance; since in that way they can increase their development capabilities (Lockett & Wright, 2005). This can be interconnected with the amount of assistance spin-offs get from universities either directly or indirectly, since universities have seemed to be struggling to become effective supporters of spin-offs (Rasmussen & Wright, 2015).

One important thing to note, is the difference of freedom in funding, between general startups and USO's, since in USO's universities and governments are involved in assessing the criteria of whether or not the funding will be provided. Therefore, USO's might be sharing an increasing responsibility for multiple stakeholders, in comparison to other ventures. The criteria for USO's are based on sustainable development goals(SDG), such as the improvement of well-being, increasement of responsible consumption, improvement of life on land and below water, renewable energy etc. (UN., n.d.). Since USO's are guided to focus on SDG's, it can be expected that their focus could possibly solve grand business challenges and address several SDG's. Yet, as mentioned before, governmental funding parties are involved, in order to perform this complex evaluation amongst the USO's to allocate the funding in a manner. Thus, it is important to understand which criteria could give higher chances in acquiring funding and how can that play important role and be used optimally. Hence, the main research question of this study is as follow:

Which early stage criteria, will increase the chances of a USO in attaining governmental funding ?

In this paper, we will contribute to the raised research gap between early successful funding attainment by USO's, recognizing early success criteria that would increase the likelihood of attaining funding and enhance USO's further potential. We will perform an analysis on 242 USO cases to try and contribute new findings that would help better assess which criteria are important in the early stage of a spin-off, and how do they affect the funding process, in order to have a better future potential as a university spin-off.

2. THEORETICAL FRAMEWORK

Today, the number of university spin-offs significantly increases all over the world, and more and more countries start to realize the crucial role of labs and research centers in innovation and economic growth (Mathisen & Rasmussen, 2019). USO's can grow rapidly and the most successful and innovative of them could even scale up into billion dollar companies. Some startups might just be performing better but except for the clear pattern that historical success leads us, the number of successful university spin-offs still remains modest. However, the potential of USO's in the industry has remarkably strengthened, and the number of technological patens and important research developments that they carry along has significant impact on the economic and social development (Aaboen et al., 2016, Giménez, G., 2018). The technological development that is generated by the spin-offs can have economic impact by new technology ventures with a possible economic growth; and this can help make new jobs, tax income, and a fortunate business that could eventually

compete internationally. Businesses around the world compete with each other either by creating new and better technologies or by increasing the quality of services and products they are already producing. For ventures to create new products, they mainly need highly specialized and scientifically trained human capital, and such research staff is produced daily in major universities and public research organizations. Something similar is now happening in the business sector which utilizes human capital while creating research departments with the intent to invent new products (Wennberg, 2011). In modern knowledge-based economies, universities play a pivotal role by generating new knowledge through research and by transmitting knowledge to new generations. The role of universities in the 21st century is rapidly changing, and this draws extensive consideration due to the potential improvement of monetary returns in economy, the chances of innovation and disruptive technology, and the possibility of creating superior firms; this process for universities raises entrepreneurship in addition to teaching and researching.

University spin-offs (USO) have remarkably strengthened the linkage between universities and industry and thus the number of successful USOs has a significant impact on the rapid development of societal innovation, since the more number of USO's there are, the more often innovations and developments will arise. USO's have many definitions, some depicted in Table 1. Pirnay et al, (2003) defines USOS generically as "new firms created to exploit commercially some knowledge, technology or research results developed within a university", but there are almost as many definitions of the phenomenon as there are researchers looking at it, and despite the growing interest in USOs, there is not one universally accepted definition for the concept, and significant variations exist across different studies (Pirnay et al. 2003). Thus, after reading through some of the prior definitions, I will try to join some of them, in order to set the basis for the definition of this research paper.

Authors, Year	Definitions
Clarysse, B., Heirman, A., Degroof, J. J. 2000	"…spin-offs are defined as new companies that are set up by a host institute (university, technicalschool,public/private R&D department) to transfer and commercialize inventions resulting from the R&D efforts"
Shane S. 2004	"high-tech companies whose core business is based on the commercial valorization of results of a scientific and technological research".
Conti et al. (2011)	"those companies that grow from a University, where a group of researchers compose the entrepreneurial unit aiming at the exploitation of skills and results from the research developed within the University"

Table 1. Existing University spin-offs (USOs) definitions

After assessing several prior research, we conclude that in this research paper we will be referring to university spin-offs, as a new firm, that is focused on exploiting skills and research capabilities, in order to raise transfer of knowledge from which innovation emerges. Making new business entities, in the form of university USO's, is an effective way for universities to contribute to development by cooperating with private firms, in response to the lack of financial resources. USO's in this way set out business opportunities by translating research results into functional advancements which prompt to market solutions and USO's regularly conduct the majority of their activities locally, like hiring, supplying, and producing, which fundamentally creates a critical multiplier for the local economy. In addition, USO's help enhance possible developments of technology by providing mechanisms for firms to commercialize inventions that are high in uncertainty, whose interest is reduced from other large organizations (Etzkowitz, 2003). USO's further achieve inventor involvement because most scientists also perceive spinoffs as better environments to work on, than already established firms, where their projects could potentially be hindered, less interesting and or less challenging (due to the potential numerous projects that a firm holds). Furthermore, scientists and researchers prefer working on startups since they focus more on technology development as opposed to other aspects of business, like finances. And since university spin-offs and researchers tend to be more inclined into technology development, people are more willing to work with new companies when they are seeking to commercialize a new invention, and that they can work on in order to establish a future company. Not limited into commercialization and other potential benefits, but equity of course plays a role as well into the contribution of researchers and inventors. Universities have the time and the capital to invest in the time consuming and costly research processes, but the issue the transfer of resources and knowledge into a successful production. USO's go through a process of transformation, from a non-commercial environment to a commercial environment. During this process, they may lack e.g., resources and commercial skill, and therefore face significant obstacles and challenges. Moreover, USO's might also face extra difficulties by conflicting with objectives from key stakeholders (e.g., the university, the academic entrepreneur). A model that helps clarify this situation, recognizes five stages of development for university spin-offs. The model of Vohora et al. (2004) is utilized for the basic structure, consisting of: research phase (initial idea), the opportunity framing phase, the pre-organization phase, the re-orientation phase and the sustainability phase. In order to move from one stage to another, a couple of obstacles named "critical junctures" have to be overtaken, and if it is done successfully then the "company" can move to the next phase of development. These critical junctures are opportunity recognition, entrepreneurial commitment, threshold of credibility and threshold of sustainability. Some facilitators that help overcome these critical junctures according to Vohora et al. (2004) are human capital, social capital and financial capital. In Figure 1, the stages and critical junctures are displayed in a diagram.

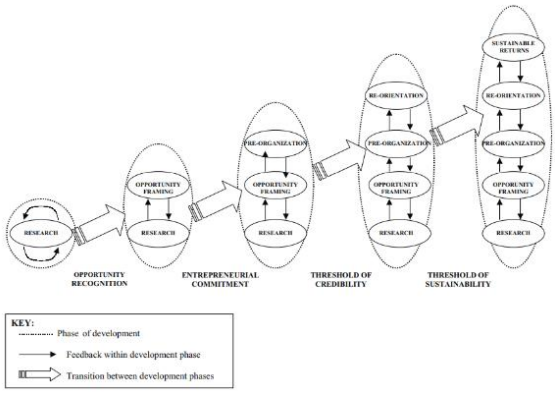

Figure 1. The phases and critical junctures in the development of university spin-offs (Vohora et al., 2004)

2.1 Development of Hypotheses

2.1.1 The role of entrepreneurial competence

The entrepreneurial competency literature that is available, commonly conceptualizes entrepreneurial competencies as knowledge, traits, attitudes, and skills, which try to capture and explain the ability of an entrepreneur to start and grow a venture and successfully and identify and combine a variety of resources (Wright, Clarysse, & Mosey, 2007). USO's depend on this capability of entrepreneurs to transform an idea or a technology into a successful venture. Entrepreneurs are believed to hold fundamental positions in the organization they have created and are agents of monetary change (Jamie Pepple & Oliver Enuoh, 2020). The complexity of tasks undertaken by entrepreneurs dictates that they need to be proactive to ensure their success and survival in the industry, and some of these proactive assets that are needed are motivation and the construction and ability to change of a well-defined business model (Mamun et al., 2017). Therefore, entrepreneurs that have the ability to identify and combine resources and develop unmet opportunities, are able to create a primary source of competitive advantage, hence, increasing their chances of success and further survival and the ability to attain funding (Gümüsay & Bohné, 2018). Consequently, entrepreneurial competencies have the potential to positively contribute unique insights and advantages to the creation of a USO, hence, enhance their possibility of attaining funding.

H1. Entrepreneurial competencies have an effect on the early success of a USO in obtaining funding.

2.1.2 The role of market selection

The majority of empirical studies (Buratti, Profumo, & Persico, 2020; Cesaroni & Abbate, 2016; Grasmik, 2015) highlight that market selection is related positively with business performance over the long run, in terms such as with monetary performance (e.g., growth in revenue, sales growth, and cash-flow), with market performance and execution (e.g., market share, product performance, customer satisfaction and customer loyalty), with organizational learning (e.g., gain and transfer of knowledge), and with firm innovativeness (e.g., licenses, patents, and generation of new knowledge). Taking these aspects into consideration, we underline that market selection has a significant role to the USO's innovations and their success, and therefore in their ability to attain funding. However, the relationship between market selection and business depends also on the environmental uncertainty, referred to the unpredictability and instability of external environment. Therefore, having a clear upfront market plan, in regard to the market selection, can play a pivotal role towards the attainment of funding and the success of the USO.

H2. Market selection of USO's has an effect on the early likelihood of obtaining funding.

2.1.3 The role of intellectual property

Literature shows that USO's have been less successful in patent applications than large companies due to the insufficient knowledge of the intellectual property rights (IP/IPR) system, the lack of information, and the low access to legal counseling (Bekkers, Gilsing, & van der Steen, 2006; Sey et al., 2010). The importance of IP helps obtain innovation returns, complementing assets, and secrecy (Singh, 2015).

IP protection can be very important for the USO's competitive intensity in the event that it is considered as a methodology that takes into account knowledge of the benefits and can ensure effective IPR enforcement, while seeking other competitive strategies, such as improving the nature and quality of the products and services provided (Sey et al., 2010). From this point of view, the use of IPR seems to increase the USO's competitiveness and therefore its likelihood of achieving funding. Even though, getting a patent can be a timely and costly process, and every minor change could possibly require high costs (Biagioli, 2018), for investors, it is usually critical that most of the IPR, are acknowledged and owned by the client. If that is not the case, it could mean an immediate red flag for them (Noon et al., 2018), and IPR is also a sign of tech expertise in a team, which could expand the long-term competitiveness of the venture (Teixeira & Ferreira, 2019). Therefore, IPR could not only be vital for attaining governmental funding, but also for further possible investments.

H3. Intellectual property has an effect on the early success of a USO in the likelihood to obtain funding.

3. RESEARCH DESIGN

3.1 Subject of Study

This study analyses 242 anonymized and aggregated university spin-off (USO) grant proposals submitted for evaluation in the Valorization Grant (VG) program (between 2007 and 2014) managed by the Dutch Research Council (NWO). NWO is "*.. one of the most important science funding bodies in the Netherlands and realizes quality and innovation in science. Each year, NWO invests almost 1 billion euros in curiosity-driven research, research related to societal challenges and research infrastructure*" (NWO, 2021). NWO mission is to advance world-class scientific research that is generating and producing scientific and societal impact by means of curiosity-driven disciplinary, interdisciplinary and multidisciplinary research (NWO, 2021). NWO additionally selects and funds "*.. the personnel and material cost for scientific research and knowledge exchange and impact activities of Dutch universities and public research institutes. NWO invites partners from industry, the government and societal*

organizations to contribute with their own knowledge agendas and questions to the programming, realization and co-funding of research" (NWO, 2021). Hence, Valorization Grant program (now, Take-off) was one of the financing instruments targeted at academic entrepreneurs from Dutch research institutions to help further develop knowledge innovations within high-tech domain into new activity and entrepreneurship. It may concern product, process, care or service innovations in the broadest sense of the word (NWO, 2021).
The VG has two phases: Phase 1 is the feasibility study with a maximum funding of 25,000 Euro that has to be completed within 6 months. Projects that successfully complete Phase 1 could submit their applications for Phase 2 - the valorization phase with a maximum subsidy amount of 200,000 Euro (NWO Annual Report, 2014). Phase 2 projects which received the funding have to be completed within two years, including an interim evaluation (NWO Annual Report, 2014). In this study, we focus on USO proposals submitted to Phase 2 of the program and therefore reflecting active preparation for valorization phase.

We define the USO as the unit of analysis in this study as a new firm, that is focused on exploiting skills and research, in order to transfer knowledge from which innovation emerges. A USO is solely created to overcome challenges and market uncertainties inherent in the todays' perceived market.

3.2 Measurements

3.2.1 Dependent variables
We measure the early success of USO based on the attainment of funding which is dichotomous in nature and is calculate it using the scale from 0 to 1, with 0 (not receiving funding) and 1 (successfully receiving funding).

3.2.2 Independent variables

3.2.2.1 Entrepreneurial competencies
The assessment for the variable entrepreneurial competencies will be separated in two split variables; on the ability to formulate a sufficient business model, and the level of motivation of the entrepreneur. This will be constructed separately using numeric variables. For the assessment of the business model, we will count -1 for negative influence, 0 for neutral or no presence; where the model is not worse than -1 but not better as 1. Then, 1 for a lacking/weak model, 2 for a sufficient model, and 3 for a strong model. The level of the business model will be measured based on elements such as the level of application development and thought process, the need for the provided product or service, and how well it is presented. For the level of motivation and enthusiasm, we will take a scale where 0 will count as neutral, -1 will count as negatively mentioned, and 1 as a positive mention drive of motivation (Mamun et al., 2017).

3.2.2.2 Market selection
For the market selection variable, it will be calculated using 0 for neutral, where nothing is mentioned, -1 as low or negative influence in identifying and choosing a market, and 1 for a high and or positive influence on the selection of the according market. If the application solves a problem in the selected market, is well thought, is applicable, and or has good potential to strive it will be forwarded as 1. If the market expectations are too high, the market is large or complex, and or has major threats it will be forwarded as -1, otherwise if there are no mentions it will be counted as 0.

Intellectual property rights
For the variable of intellectual property, the presence of IP protection will be counted down into a -1 for "negative presence" of IP protection, 0 for "neutral or no presence", and 1 for "positive presence". Neutral or no presence, describes the situation where the inventors' USO, is in an IPR state that does not affect in any way the, neither negatively or positively, whether IPR is applied or not.

3.2.3 Control variables

3.2.3.1 Industry
Every business is classified into different industry categories based on the products and services they make. Therefore, depending on the nature and the environment of the industry, the implications can differ. For this research, the variable industry will be used as a control variable by grouping the USO's according to their industry type, based on NACE codes. The NACE categories of different industry types are derived from the European Union, NACE code list (NACE, 2010).

3.3 Data collection

To conduct a comprehensive analysis and test our proposed hypotheses, this study builds on a fully aggregated and anonymized research dataset provided to the author of this study. To construct a part of our independent variables, we used content analysis on the aggregated evaluation results regarding feasibility and valorization potential of selected USO proposals. To further enhance our research model, we retrieved information regarding the performance of business incubators and technology transfer offices of the leading Dutch technical universities from their websites and open-source reports. We also retrieved scientometric information about the scientific output and its impact (i.e., the number of peer-reviewed publications, citations, citation networks) in the past 20 years by the leading Dutch technical universities. We further matched the research fields of publications and USO grant proposals with the NACE industry codes.

3.4 Analysis

For the analysis we will be taking advantage of binary logistic regression in order to predict the odds of the dependent variable and highlight the relationship with the independent variables. Binary logistic regression provides us with a quantified value for the strength of the association we are testing by examining the influence of various factors (independent variables) on a dichotomous outcome (dependent variables), i.e., values of 0 or 1in order to indicate absence and presence of some categorical effect.
In addition, in order to analyze the data, we will use "grounded theory", which refers to theory that is developed inductively from a corpus data. Grounded theory can help provide in-depth perspectives and also give rise to new theories which can emerge from coding the data into

categories. Particularly the way Strauss develops it (Corbin & Strauss, 1990), the grounded theory approach consists of a set of steps whose careful execution is thought to "guarantee" a good theory as the outcome. The essential idea of the grounded theory approach is to read a database and identify or label variables and their interrelationships, merging both data collection and analysis (Cullen & Brennan, 2021). This will provide us with a framework, which will help us understand the concept and phenomena that is being studied. Open coding, axial coding, and selective coding are all steps in the grounded theory method of analyzing qualitative data. In open coding for instance, after you read through your data several times, you create tentative labels for chunks of data that summarize what you see. It is the part of the analysis, concerned with identifying, naming , categorizing, and describing phenomena found in the text. Axial coding consists of identifying relationships and connections amongst the open code through a combination of inductive and deductive thinking. Lastly, in selective coding, the essential idea is to develop a single storyline around which everything else is draped; so we figure out the core variable that includes all of the data, and connect all your categories together around one core category

4. RESULTS

To test the impact of the independent variables on USO funding, we developed 6 different models, one for each independent variable, each of which included the control variable industry in Table 1.2. For each independent variable, we carried out a step back procedure with backward elimination to identify the best model. Model 1 only estimates the relationship of funding with the industry, and from Model 2 we start including one independent variable each time for every other model. For instance, for Model 2, business model, industry, and funding, Model 3 for motivation, industry, and funding, and the like. Table 2 includes the B-values (Beta), estimates the relationship between the independent variables and the dependent variable. The B value in this case depicts the slope of the line between the independent variable/ predictor and the dependent variable. By then looking at Model 2 of Table 1.2, we notice that the slope having a good business is B = .79, which implies that for each one unit increase in business model, funding would increase by .79. As we can see in this example, for H1, in Table 1.1, both the coefficients of the two variables, from entrepreneurial competencies, are statistically significant while the others are not. And for the independent variables that are not significant, the B coefficients are not significantly different from 0. To note, the B coefficient can be compared to one another to determine which variable carries the most "weight" or influence in predicting the dependent variable. In this case, both business model, and motivation, seem to outscore the other variables, moving closer with the dependent variable, and therefore, also the likelihood to increase funding attainment. Now in Table 1.2, the log likelihood reflects a measure of goodness of fit, and it explains how likely is that you will get a similar dataset, hence, the higher the value of log likelihood, the better the fit of the model. We ought to recall that Log Likelihood can lie between - Inf to + Inf, and any supreme value will not give any indication. However, the values can be used in order to analyze them amongst the each model.

In regard to the dependent variable, in Table 1.1 it is indicated that on average, 41% of the university spin-offs attained funding ($\mu = .41$). The observed number of spin-offs that were registered as 1, being funded, is in fact 99, and the rest not funded USO's 143. Now with respect to the independent variables, in Table 1.1 the descriptive statistics outcome shows that only two variables are influential in the early stage likelihood of attaining funding, that being business model, and motivation. The table 1.1 also shows that intellectual property has more negative reported cases then positive ($\mu = -.08$), in fact 70 were reported as -1, 122 as neutral, and 50 positive cases as 1. To better understand the importance of intellectual property rights, more data would need to be tested and focused on the specified variable. Same for market selection, we did not observe a significant influence from the data, but a more extensive and focused research could alter our conclusion. To address, there were 72 cases where a negative influence was registered, 75 cases for neutral, and 95 cases for a positive influence.

Concerning hypotheses testing, H1 suggested that the entrepreneurial competencies, business model and motivation, had a positive impact on the likelihood of obtaining funding. Table 1.1 and 1.2 show us that these entrepreneurial competencies seem to have a positive significant effect in the likelihood of attaining funding ($B = .79$, $p < .01$, $B = .98$, $p < .01$). In Table 1.2 both the independent variables, business model, and motivation, show to have an impact against funding, whether they stand alone against funding and industry, in Model two and three ($B = .79$, $B = .98$), or together, in Model six ($B = .73$, $B = .97$). Therefore, H1 can be confirmed. Expressing that motivation, and a good business model are both important and have a positive effect in the chances of attaining funding.

Concerning H2, market selection, we proposed that it had an effect on the likelihood of obtaining funding. The results depict that market selection is not significantly linked with the likelihood of attaining funding, and therefore cannot be confirmed ($B = .26$, $p > .10$).

Next, our H3 must be rejected, as there was no relationship between intellectual property and the likelihood to attain funding ($B = .17$, $P > .10$).

Worth clarifying is the fact that the control variable, industry, was not treated as categorical. It was not treated as such after the notice that no industry seemed to have a significant relationship with funding, and there was no difference when formulating it as categorical in the linear regression. Since the industry types appeared not to be significant, they do not play an important role in the process of governmental funding acquisition.

In order to examine a potential multicollinearity among the independent variables, we computed and analyzed a correlation matrix, and check the VIF values. The VIF values, or inflation values, tells us if a variable is redundant with another one. In our case, none of the variables were even above the medium threshold, hence, we recommended keeping them. For this purpose, we also used Pearson's r correlation coefficient, which measures the strength and direction of a linear relationship between two variables, shown in both Table 1.1, and 1.3 which also includes acquired meta-data of a survival variable. As shown in table

1.1, the independent variables do not correlate highly with each other but only depict the strong relationship of business model and motivation with funding. By looking at Table 1.3, with survival as the dependent, we notice that business model, does not seem to have a significant relation with survival, but motivation does (r = .19 ,p < .05), however the regression analysis does not indicate a significant relationship (p > .10). To add, in Table 1.3, we can see a correlation relationship among funding and survival, with a substantial high B value (B = .75, r = .23, p < .05) (Torres, 2020). But alike motivation, this relationship between funding and survival is not significant either (p > .10).

Our results, highlight that university spin-offs with a better business model, and more motivation, can increase the likelihood of attaining early governmental funding (B = .73, p < .01, B = .97, p < .01).

B		Range	Minimum	Maximum	Mean	S.D	Sig.	1	2	3	4	5
Business model	.71	4	-1	3	.40	.89	.00	1				
Motivation	.96	2	-1	1	.31	.62	.00	.12	1			
Market Selection	.27	2	-1	1	.10	.83	.12	.09	-.12	1		
Intellectual Property	.20	2	-1	1	-.08	.70	.33	-.01	-.03	-.08	1	
Funding	-1.01	1	0	1	.41	.49	.00	.30**	.27**	.09	.04	1
Valid N (listwise)		242										

**. Correlation is significant at the 0.01 level (2-tailed).

Table 1.1. Range, means, standard deviations and correlations of the variables (N = 242)

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	B	S.E	B	S.E	B	S.E	B	S.E	B	S.E	B	S.E
Constant	-.13	.22	-.39	.24	-.46	.24	-.16	.22	-.13	.22	-.73	.18
Business model			.79**	.17							.73**	.25
Motivation					.98**	.24					.97**	.18
Market Selection							.21	.16			.26	.21
Intellectual Property									.09	.19	.17	.02
Industry	-.03	.02	-.04	.02	-.03	.02	-.03	.02	-.03	.02	-.04	.26
-2 Log likelihood	235.65		300.95		306.66		323.95		319.96		282.93	
Nagelkerke R Square	.01		.14		.11		.02		.04		.23	
N = 242												

Table 1.2. Binary logistic regression results. Dependent variable: USO funding

B	S.E.	Wald	df	Sig.	Exp(B)	1	2	3	4	5	6
Business model	.01	.26	.00	1	.96	1.01	1.00					
Motivation	.56	.39	2.06	1	.15	1.76	.12	1.00				
Market Selection	.28	.27	1.01	1	.32	1.32	.09	-.12	1.00			
Intellectual Property	-.02	.33	.00	1	.96	.98	-.01	-.03	-.08	1.00		
Funding	.75	.51	2.22	1	.14	2.12	.30**	.27**	.09	.04	1.00	
Constant	-.39	.26	2.29	1	.13	.68	.07	.19*	.10	-.06	.23*	1

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 1.3. Significance, correlation of the variables (Survival as dependent).

5. DISCUSSION

There are numerous of approaches to start a new firm, from the "Start-up" to passing through small and medium family businesses; among these, there is another type of doing business, university spin-offs. USO's might be one of the solutions for the healthy growth of our economy, and perhaps the vehicle for overcoming the economic recession and crisis, since they play an important role in the process of producing highly skilled human capital and consequently in the production of new innovative product, services, technology, and most importantly knowledge to then contribute to their circle of transfer of knowledge. The issue of producing new innovative technology and knowledge is that of transferring it from "research" to production, driving it to success, which fundamentally needs capital/funding. The government, in cooperation with universities and research organizations, must intervene in this effort to identify any new scientific research, that has potential for commercial exploitation; and try and contribute necessary resources in order to help it become a commercial product that will bring economic benefits, jobs, serve the general public, and ultimately contribute and reflect upon sustainable development goals. To point the factors that increase the chances of attaining governmental funding and potentially help solve the issue of commercialization we analyzed our dataset using binary logistic regression. In this way, we can detect interrelations amongst our varables and test their influence strength against funding. In order to test the effect of our independent variables on USO governmental funding acquisition, we formulated six separate models. Each, shows the strength of every variable

independently against industry and funding, as displayed in Table 1.2. Following our examination of USO's, we talk about our outcomes for each variable independently, whose insights and statistics are portrayed in Table 1.1 and Table 1.3. Looking at the effect of the independent variables on funding acquisition, we found that a good business model can have a positive effect. Business model innovation ordinarily requires a principal on the ability to change, and for many this process is major challenge. Thus, university spin-offs have to understand the importance of a good business model, that can have a significant effect on their sustainable competitive advantage and further success. At the same time, our outcomes highlight that spin-offs with more motivation can also have a better result in attaining governmental funding. Being motivated helps in challenging ourselves to stretch our perceived limits in order to achieve something greater, thus, motivation helps increase job satisfaction and job performance. However, sometimes people force others to achieve what they want, and this can lead to temporary motivation, hence, one needs to ensure that motivation is grounded and aspired with the right aims.

5.1 Theoretical implications

The objective of this paper was to investigate potential early stage factors for university spin-offs being related with the likelihood of attaining governmental funding. To this end, we analyzed 242 Dutch USO's, and tested the impact, of entrepreneurial competencies, market selection, and intellectual property on the likelihood of enhancing USO funding attainment. We conducted a systematic analysis, making use of the grounded theory and binary logistic regression, to predict the relationship between the variables.

Our findings have several theoretical implications. To begin, this research paper studies the influence of different variables in the increase of USO funding attainment in the Netherlands, and adds data to the existed literature from Korea, United Kingdom, Germany, and Indonesia(Jung & Kim, 2017; Prokop et al., 2019; Schleinkofer & Schmude, 2013; Sallatu & Indarti, 2018) .
The descriptive data that we have obtained shows that the spin-offs, under Dutch institutions, can benefit by adopting our view of research. Our study shows that university spin-offs which take a more adequate approach to their business model, and have more motivation, have a stronger likelihood in attaining early governmental funding. This could be characterized as a good practice for universities that want to foster economic development

5.2 Managerial & Policy implications

The findings of this study imply that by having a good business model, and positive motivation influence, it can increase the likelihood to attain early stage governmental funding. Having a business model will allow a spin-off to explicitly focus on their goals and changes, without ending up compromising their strengths and weaknesses. The business model is simply a description that includes the general details about the operations and competencies of a business, in our case a USO (e.g. corporate structure, functions, business purpose/goal, business plan, offerings). To mention, part of the business model, has increasingly been used in symbiosis with sustainability and adaptability (Peric et al., 2017). Aside from the raised and impactful importance of a sustainable future (Roös, 2020), being able to acquire sustainability, will allow the spin-off to show its ability to be resourceful, and capable to lead, therefore increasing the chances of its survival and potential future success. On the other hand, motivation, is what drives and sustains behavior, and it is important due to the reflection of employee productivity upon business performance. It can also be vital for reducing potential rise of stress, which could occur from the unexpected changes and or obstacles, due to the disruptive early stage environment, that the spin-off would stumble upon.

Our suggestions that business model and motivation are seen as early stage important factors is not meant to imply that USO's should start balancing their funding and focus only amongst the business model and in the creation of motivation. Instead, we suggest that USO's and other policymakers take a broad view of this result to better understand, where and how could these factors have been determined as the most leveraged ones in attaining governmental funding.

5.3 Limitations & Future research avenues

Finally, our study does have some limitations that provide possibilities for future research directions. One of the major gaps in the literature, that is related with the same concept of successful spin-off factors, is the study of the variables across countries (Jung & Kim, 2017; Prokop et al., 2019; Schleinkofer & Schmude, 2013; Sallatu & Indarti, 2018), since most of the literature has focused locally, or just even in the survivability perspective excluding funding. Our research data limits our sample to Dutch institution spin-offs, and therefore in order for these findings to get extended to other institutional environments, it would require new studies to be conducted in cross-country settings. In addition, other possible contingency variables that could potentially increase the likelihood of attaining funding were not included in our study. For instance, the technological or commercial score of the USO, as well as university, or h-index of the entrepreneur. Worth noting is that we used cross-sectional data, and causality needs to also be taken into consideration. Given these limitations, we suggest that there needs to be a repeat of this study over time, with the purpose to obtain better consistent data, which would yield greater insights, and with a greater number of observations.

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