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A Systems Engineering -Inspired Method for Studying Entrepreneurship Programs

Abstract

Entrepreneurship has gained increasing attention in higher-education. Outshoot of this interest are entrepreneurship programs, which train and fund nascent entrepreneurs with university background. These programs utilize a plethora of well studied innovation and entrepreneurship tools. What is not well understood, however, is how we should factor in the unique motivations and needs of the entrepreneurs themselves. The current entrepreneurial motivation research has the problem of being too abstract to be practically useful for program managers. In this paper, we hope to find a new research methodology and as a result claim to have found one in object-process methodology (OPM). We demonstrate the applicability of the methodology by using it to model a Finnish university-funded micro-funding program targeting students and researchers with new innovative business ideas.

Key Words

entrepreneurship, entrepreneurship programs, object-process methodology, entrepreneurial motivation

JEL Classification: C21, R13

Introduction

There exists a lot of research about and methods for nascent entrepreneurs and organizations involved in the process of developing new business opportunities. Bulk of these methods have focused on the questions of business viability and uncertainty reduction. Methods like the discovery-driven planning by McGrath and MacMillan (1995), the lean startup by Eric Ries (2011), the DEFT by Innosight's Scott Anthony (2014) are focused on testing and validating business ideas efficiently. Business model canvas generation by Alexander Osterwalder (2008) is a widely popular tool in entrepreneur programs worldwide with a focus on modelling and innovating at the level of the whole business model. More approaches include Outcome-Driven Innovation by Strategyn's Anthony Ullwick (2005) and the Jobs-to-be-Done theory by Clayton Christensen et al. (2016), which focus on recognizing and understating the customer needs deeply before putting actual effort in developing and implementing any business ideas based on them.

Another set of tools and thinking utilized in many programs is the design thinking approach made famous during the 90s by design company IDEO (Camacho, 2016). Like more evolved versions of the same thinking, design thinking emphasizes understanding the customer's perspective by careful observation and interviews. Von Hippel's lead-user theory (1986) is based on the idea that knowledge of customer needs is best captured by customers themselves. Lead users are users of the product, and they use the product in

more demanding context so that they have unique intuition about the direction the product should evolve next.

Outshoot of the customer centric thinking are the user-driven innovation practices, which seek to involve all types of users, not just lead users, and other stakeholder as active participants in the innovation process (Melkas & Harmaakorpi, 2011). However, these workshop-based methods are rarely utilized in entrepreneurship programs, probably due to considerably time and effort required in implementing them.

All of the above innovation methodologies and approaches implicitly assume that the entrepreneur or the innovating organization has the motivation and (limited) resources to implement what ever the methodology suggests. By letting go of this assumption we have to factor in the entrepreneur and his/her motivation to develop a business. This is important, because all innovation processes fail, if there's nobody implementing it.

In order to design better entrepreneurship programs, we need to have a crisp understanding what the customers of those programs i.e. entrepreneurs, or soon-to-be entrepreneurs, are actually trying to achieve and what motivates them.

In their review of entrepreneurial motivation research, Carsrud and Brännback (2011) say that the topic had not been studied much in for over two decades. They explain how research on this topic started initially by borrowing heavily on other social disciplines, but for example trait theorists failed to find actual entrepreneur-traits. In their review, Carsrud and Brännback recognize two main types of motivation theories: drive theories and incentive theories. The first one has psychological origins seeing a person animated because of need to release tension generated by internal tension. The second type look at motivation through the lens of economic theory and see it as something generate via the "pull" of external goals. This research is more in line with the latter type of research tradition.

Temporal Motivation Theory by Steel and König (2006) is one of the emerging theories that combines several former psychological and economic motivational theories. They write that "TMT indicates that motivation can be understood by the effects of expectancy and value, weakened by delay, with differences for rewards and losses." From our point of view the key unknown in terms of entrepreneurship as a choice in here is the question of value: what is the value a person is hoping to gain when starting on the entrepreneurial path?

From Carsrud and Brännback we get some indication on the types of value entrepreneurs gain. They list four major categories of entrepreneurial motivation: economically motivated entrepreneur, socially motivated entrepreneur, lifestyle entrepreneur and artist or craftsmen. According to this classification only the economically motivated entrepreneur is interested in maximizing economic gains. For all others economic gains motivate only to some extent, other outcomes need to be factored in.

From our point of view, the current research on entrepreneurial motivation has suffered from issue of staying at a too abstract level resisting the move to context specific analysis (Carsrud and Brännback, 2011). For people running entrepreneurship programs a more complete understanding of people's motivations is crucial. From a design perspective, the

customer's need should be understood much better in order to develop a product or solution answering that need. The question is: how should we study that need, what tools should we use utilize?

1. Methods of Research

We want to discover a set of tools that is loosely based on a customer need centric framework of Jobs-To-Be-Done by Clayton Christensen et al. (2016) and is aligned with Temporal Motivation Theory of Steel and König (2006). To differentiate ourselves from Christensen's approach, we are especially interested in implementing highly formal and specific approaches, perhaps similar to works of Ullwick (2006). Ideally, these approaches would focus solely on developing products and processes that satisfy customer needs i.e. customer requirements, and taking in to account contextual factors and other requirements from all the stakeholders involved.

The aim is to find a suitable methodology and then illustrate its applicability on an entrepreneurship program. The methodology should allow us to recognize patterns and similarities in different programs and individual journeys by harmonizing how they are expressed and modelled. Also, the methodology should allow the modeller to verify if he or she has understood the stakeholders perspective correctly.

The applicability will be demonstrated targeting a Finnish university-operated micro-funding program. One of these micro-funding programs is the Draft Program® (Karelia University of Applied Sciences, 2019), which grants micro-funding to teams of students and faculty members developing new innovative business ideas and who are coming from two different cities in Eastern Finland: Joensuu and Kuopio. From Joensuu participating educational institutions are Karelia University of Applied Sciences, University of Eastern Finland and Riveria Vocational College. From Kuopio the organisations are Savonia University of Applied Sciences, University of Eastern Finland and SAKKY Vocational College. These programs have open calls every four months, granting funding each time up to 8 new applicant teams and 4 older teams. Programs in both locations operate to somewhat independently of each other.

Draft Program was originally a technology transfer project under national TULI program. This early version from 2008 – 2011 focused on looking innovative business ideas from student population and university employees, and then paying outside consultants for services such as novelty search, patentability evaluations and business potential estimations. This early version of the program was not seen as very effective (Helin, 2012), and eventually the program's implementation at Karelia UAS evolved and re-launched with it's current name in 2012. The program also started to have more emphasis on teams instead of lone inventors and helping teams to build and test their ideas, or some parts of it. In other words the program became more of a proof-of-concept program or a micro funding program.

Similar programs or competitions exists in other cities in Finland including Kuopio, Lappeenranta, Kotka, Mikkeli, Hämeenlinna, Helsinki and Jyväskylä. Key shared feature of these programs is the fact that they grant micro funding that can range from few hundred

euros to few thousands euros. Also, they all tend to emphasize innovativeness of the business ideas and teams at expense of lone inventors. Some have bigger focus on students, but some also grant funding to employees.

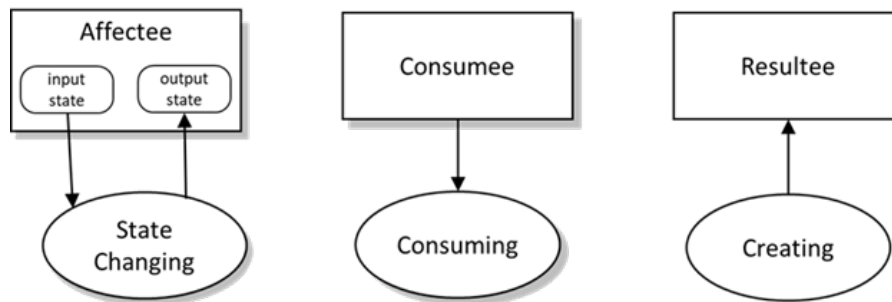
We feel that micro-funding programs and their „customers“, i.e. participants, offer an excellent opportunity to study entrepreneurship and offer an opportunity to discover better and more efficient entrepreneurship services.

2. Results of the Research

Object-Process Methodology (OPM) was recently (ISO, 2015) adopted as ISO 19450 standard. OPM is a conceptual modelling language, which allows organized research and design of complex systems. OPM is founded on minimal universal ontology. This ontology states that the world consists of only objects, processes and relations between them. Further, object can be physical or informatical and together they represent the things that exist.

Processes on the other hand are not detected directly, but through how they transform objects. Three fundamental transformations that are (1) creation, (2) consumption and (3) change in the state of an object. Figure 1 shows the basic symbols of objects (rectangle) and processes (ellipses) and their relations (connecting links). A gray shadow signifies that a process or object is physical, while shadowless rectangle or ellipse signifies that the object or process is informatical.

Fig. 1: Basic symbols of OPM.

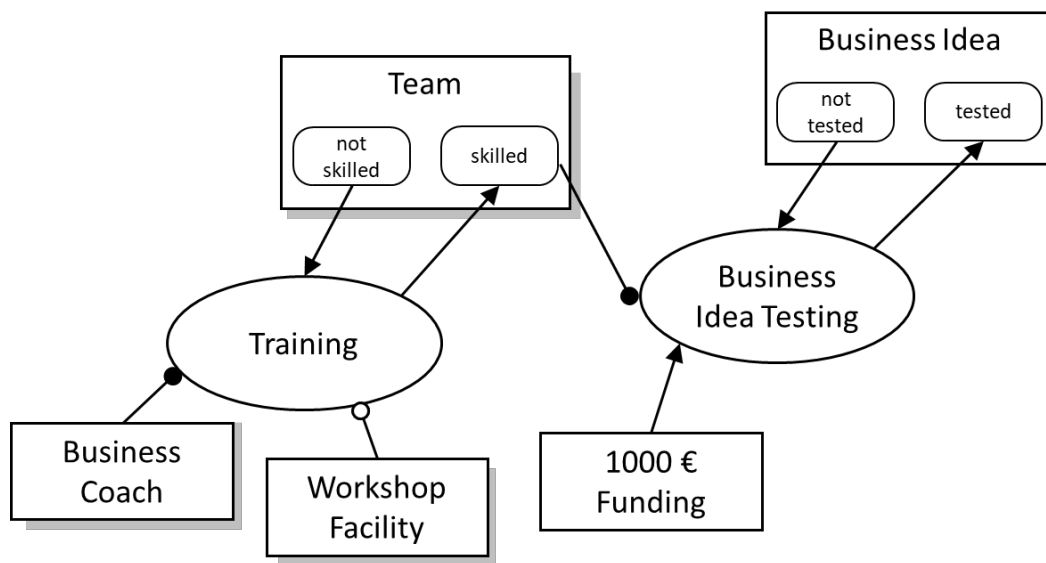


Key aspect of OPM is that it is a dualistic modelling language in the sense that all visual diagrams have text-based counterpart in a way that each one of them can be re-produced based on the other counterpart. This feature makes modelling various types of phenomena from technological systems to natural and social systems (Dori, 2016) simple. For example, customer need or the value customer expects to gain from a service or product can be defined using one the three fundamental transformation. The value a weight-loss program delivers could be expressed as a lowering (a process) of the bodyweight (a state) of a person (physical object), which will lead to improving (a process) looks (a state) and improving (a process) health (a state).

Next we will test the applicability of OPM by using it to model an existing entrepreneurship program i.e. the Draft Program®.

Application of OPM means that through careful observation we aim to recognize the relevant objects and processes and their relations. For example the defining (a process) of a business model (an object) is process that produces a document, but it's main effect is likely best captured as how it changes how the entrepreneur (an object) understands the goodness (a state) of the business idea (an object). In figure 2 we present a high-level model of the Draft Program® using OPM. The model is based on the information publicly available on the Program's website (Karelia University of Applied Sciences, 2019).

Fig 2: OPM Diagram of the Draft Program®



Arrows with rounded ends in Figure 2 symbolize instruments (white circle point) needed in the proces and agents initiating (dark circle point) the proces.

3. Discussion

Object-Process Methodology presented above seems like a promising tool in the study of entrepreneurship programs. The model presented in figure 2 captures some of the core outcomes and processes of one such a program. Importantly the model clearly differentiates different things and their relationships.

Next step would be zooming deeper in to the processes of Training and Business Idea Testing so that their internal structure could be decomposed in detail. Further, the applicability of OPM could be tested in other programs. Resulting models could then be validated by collecting feedback from the program stakeholders.

Conclusion

In this paper we presented the field of entrepreneurship programs in higher education. We argued that studying the motivations and needs of the nascent entrepreneurs taking part to these program is highly important. Also, we stated that psychological theories of motivations tend to float at too abstract level, giving limited tools for programs managers to improve their offering.

To solve this problem, we wrote that it is important to find a methodology that makes it possible to study the contextual factors of entrepreneurship in such a way that it opens doors for design improvements of Entrepreneurship programs. As a solution we presented the Object-Process Methodology (OPM), a systems engineering modelling language, with origins in the technical fields such as the aerospace industry. To demonstrate the usefulness of the language we illustrated how the language can model different types of systems. In this case, we did a simple high-level model of a Finnish university-run micro-funding program.

OPM is a promising new toolset that has the potential further entrepreneurship research. Larger and more in depth studies on it's applicability are needed.

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