EMPOWERING KNOWLEDGE DRIVEN TURKISH START-UPS: A PRACTICAL RULE-BASED DECISION SUPPORT SYSTEM INTEGRATED WITH BUSINESS MODEL CANVAS

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF SOCIAL SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

SEYED HESAMODDIN NABAVI

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF ARTS
IN
THE DEPARTMENT OF BUSINESS ADMINISTRATION

SEPTEMBER 2015

Approval of the Graduate School of Social Sciences

Prof. Dr. Meliha Altunışık
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science.

Prof. Dr. Ramazan Sarı
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

Assoc. Prof. Adil Oran
Co-Supervisor

Assoc. Prof. Dr. M. Sinan Gönül
Supervisor

Examining Committee Members

Prof. Dr. Özlem Özdemir (METU, BA) _____

Assoc. Prof. Dr. M. Sinan Gönül (METU, BA) _____

Assoc. Prof. Dr. Adil Oran (METU, BA) _____

Assoc. Prof. Dr. Eminegül Karababa (METU, BA) _____

Asst. Prof. Dr. C. Itır Göğüş (Bilkent Univ., MAN) _____

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last Name: Seyed Hesamoddin Nabavi

Signature :

ABSTRACT

EMPOWERING KNOWLEDGE DRIVEN TURKISH START-UPS: A PRACTICAL RULE-BASED DECISION SUPPORT SYSTEM INTEGRATED WITH BUSINESS MODEL CANVAS

NABAVI, Seyed Hesamoddin

Master of Business Administration

Supervisor: Assoc. Prof. Dr. M. Sinan Gönül

Co-Supervisor: Assoc. Prof. Dr. Adil Oran

September 2015, 127 pages

Entrepreneurship is the core engine of economy and value creation (Baumol, 1968) where the Turkish entrepreneurship has recently become a center of interest, both for policy makers and academicians. Empowering entrepreneurs, above all the knowledge driven entrepreneurs who transform knowledge into value (Stam et al., 2007), by strategic decision making tools, especially those tools utilized to formulate business models would help the ventures to develop faster and with minimum step backs possible. Tools such as Business Model Canvas by Osterwalder (2009) have become popular and useful methods of strategic decision making for entrepreneurs across the world. Business Model Canvas' utilization in Turkey can be taken under careful analysis in order to understand the challenges and difficulties faced by knowledge driven Turkish entrepreneurs when crafting their business models. Such analysis can have valuable insights that lead to construction of a decision support system, helping entrepreneurs formulate their business models based on Business Model Canvas. This thesis finds these challenges by quantitative and qualitative research methods, where a major problem observed is the product market mis-fit and then a construction of a decision support system addressing product market fit is undertaken accordingly. Implications and further research opportunities are discussed consequently, where it is hoped that this support system can help Turkish entrepreneurs improve their businesses.

Keywords: Business Model, Business Model Canvas, Entrepreneurship, Rule-Based Decision Support Systems

ÖZ

BİLGİYE DAYALI TÜRK GİRİŞİMCİLERİNİ DESTEKLEYECİ İŞ MODELİ KANVASINA ENTEGRE PRATİK KURALLARA DAYALI KARAR DESTEK SİSTEMİ

NABAVI, Seyed Hesamoddin

Yüksek Lisans, İşletme Bölümü

Tez Yöneticisi: Doç. Dr. M. Sinan Gönül

Tez Yardımcı Yönetici: Doç. Dr. Adil Oran

Eylül 2015, 127 sayfa

Girişimcilik, Türk girişimciliğinin son dönemde hem politika belirleyiciler hem de akademisyenler için bir ilgi alanı olmaya başladığı temel ekonomi ve değer yaratma motorudur (Baumol, 1968). Girişimcileri, özellikle de iş modellerini formüle etmek için kullanılan araçlar olmak üzere stratejik karar verme araçları aracılığıyla bilgiyi değere dönüştüren bilgiye dayalı girişimcileri güçlendirmek (Stam et al., 2007), girişimin daha hızlı ve mümkün olan minimum geri adımla gelişmesini sağlar. Osterwaler'in İş Modeli Kanvası (2009) gibi araçlar, dünya çapında girişimciler için stratejik karar verme açısından popüler ve faydalı yöntemler haline gelmiştir. Kanvas İş Modelinin Türkiye'de kullanımı, bilgiye dayalı Türk girişimcilerin kendi iş modellerini oluştururken karşılaştıkları zorlukları ve tehditleri anlamak amacıyla dikkatli bir incelemeden geçirilebilir. Bu inceleme, bir karar destek sisteminin oluşturulmasına yol açacak değerli öngörüler sunabilir ve bu şekilde, girişimcilerin İş Modeli Kanvasına dayanarak kendi iş modellerini formüle etmelerine yardımcı olur. Bu tez, bu zorlukları niteliksel araştırma yöntemleri yoluyla bulur; bu yöntemlerde gözlemlenen önemli bir problem, ürün piyasa uyumsuzluğudur; sonrasında ürün piyasa uyumunu ele alan bir karar destek sisteminin oluşturulması uygun şekilde ele alınır. Çıkarımlar ve diğer araştırma imkanları da dolayısıyla tartışılır; burada, bu destek sisteminin Türk girişimcilerine yardım edeceği ümit edilmektedir.

Anahtar Kelimeler: Girişimcilik, İş Modeli, Kanvas İş Modeli, Kurala Dayalı karar Destek Sistemleri

To my dear wife, ***Demet****, who has always supported, encouraged and helped me, especially during writing of this thesis.*

To my parents, my Father, ***Hassan****, my Mother* ***Shahnaz*** *and my lovely Sister* ***Mahshid*** *who has always helped me pass through difficulties and have supported me no matter what… Especially to my* ***Father****, my main source of inspiration, motivation and who is my life role model.*

This thesis is also dedicated to all my friends, those I met through my academic life, those who have never stopped consulting me and sharing their friendships with me in time of joy and hardship, especially ***Serhat & Berkay.***

Also specialy thanks to ***Deniz*** *for her help while this thesis was written.*

Last but not the least, this thesis is dedicated to all those who helped me develop myself, who had spent time to help me and those whom with me along this long and joyful process.

This thesis is finally dedicated, to all ***Entrepreneurs****…*

ACKNOWLEDGMENTS

I would like to thank and show my deepest gratitude to my advisor, Assoc. Prof. Sinan Gönül and my co-advisor Assoc Prof. Adil Oran for their guidance, passionate teaching and their sharing of knowledge with me during this thesis study. I appreciate all the efforts and supervision of my advisor and co-advisor which helped me develop and complete this thesis and I shall never forget their helps.

I would like to also thank Prof. Özlem Özdemir, Assist. Prof. Itır Göğüş and Assoc. Prof. Eminegül Karababa for being part of my thesis committee and their kind help and guidance besides their valuable comments which will help me in future studies. I would also like to thanks to Assist. Prof. Cağrı Topal For his guidance in my thesis process.

I hereby also thank all academic members of METU Business Administration Department for all these years of support and friendship, as well as Bilkent Faculty of Business Administration.

TABLE OF CONTENTS

LIST OF TABLES

TABLES

LIST OF FIGURES

FIGURES

CHAPTER 1

INTRODUCTION

1.1 Entrepreneurship and Knowledge Driven Turkish Entrepreneurs

Entrepreneurship has been and is a field of interest and discussion in many areas such as academia, politics and economics. Entrepreneurship and its role in the economy have roots in old school economics theories (Baumol, 1968) where discussions, definitions and approaches towards entrepreneurship show variety of ideas and perspectives. Authors of different backgrounds or schools of thought tend to define entrepreneurship in very different manners and ways (Baumol, 1968 & Hebert, 1989). Some define an economic process of creating value (Baumol, 1968), while other focus on cognitive abilities and characteristics which result in entrepreneurship (Baron, 1998). Some few dramatically criticize the approaches of the others and focus on mythicizing of entrepreneurship in very philosophy of the concept (Ogbor, 2000), but nevertheless, they all agree of its importance. Regardless of the efforts made, still many disagree on the real definition of the entrepreneurship and even its applications, but many have serious efforts to create a framework for a formal covering definition (Shane et al. 2000). Not only the importance of entrepreneurship is stressed in policies and economic constructs of countries, but also it is a field of promise for academia, especially for those whom study business administration (Shane et al., 2000).

The concept itself has been, especially, very popular and popularized in 2000s' with the growth of high technology entrepreneurs in Silicon Valley and has spread around the World (Shane et al. 2000), mainly in the countries which has experienced significant economic growth, where one of these countries is Turkey. Entrepreneurship is not only a hot topic today in Turkish academia, but also in Turkish economy and politics. Turkish entrepreneurship can be said to experience its golden age, by having many ideas and attention directed towards the topic itself.

With government expenditures and direct attention rising, the number of entrepreneurs, especially in knowledge driven areas, has risen significantly. However, this does not mean that the Turkish entrepreneurs enjoy the very best of all conditions and supports, where some criticize heavily the government's funding and programs which underutilize the youth and women (Cetindamar, 2005). Authors and researchers, in the mean time, define types and sub-types of entrepreneurship, such as knowledge driven entrepreneurship. The disagreements about definition of entrepreneurship carry on to the sub-titles of the topic, as well as the meaning and definition of knowledge driven entrepreneurship. Many agree that the knowledge is not information and knowledge driven goods are non-rival (Andersson et al., 2010). The transmission of knowledge into products and later into the whole economy will result in a knowledge driven economy with huge competitive advantages, and accordingly those who utilize knowledge in such process to create value are knowledge driven entrepreneurs (Andersson et al., 2010).

As indicated explicitly, importance and significance of entrepreneurship cannot be underestimated, while the global economy becomes more dependent on knowledge and innovation. Stam and Garnsey explicitly argue that "fuel of today's economy is knowledge" (Stam et al., 2007, pp. 1) where many other researchers believe the same such as Andersson and Bascavusoglu (2010 & 2007). Such important two concepts, entrepreneurship and knowledge, that go together and seem to create more value than ever, when come together, do not necessarily create value automatically. Until, they are put in a system that helps entrepreneurs to realize their knowledge and innovation into value, and that is the proposal of this research to assist the Turkish knowledge driven entrepreneurs to develop their strategies and business models better with a decision support system.

1.2 Strategic Decision Making in Entrepreneurship, Business Model Canvas and Turkish Entrepreneurs

Strategy is the essence of entrepreneurship as it is the essence of any business and enterprise. Strategy is the flexibility in response to a changing and dynamic environment and is essential to superior performance (Porter, 1996). Those critical

decisions given when the enterprise starts its activities, or even before it literally begins its operations, are the most important of all decision to come in future as they all shape the company and its future, especially the business model of the enterprise. There is no doubt that strategy matters significantly, specifically for those enterprises just starting their activities (Whittington, 2001). Deciding on the strategy, business model and their elements is a process that needs significant expertise, as all business education reminds and stresses. As Porter indicates "strategy is about the firm creating for itself a 'market position' whereby it can defend itself from competitive forces" (Porter, 1996, pp.66). However, many entrepreneurs lack a formal business education, since most of them are engineers, technical background holders or even without any formal education. It can be said without exaggeration that corporations spend billions of dollars creating, adopting and implementing their strategies which are supposed to be fit to their capabilities, resources, environment and goals. The whole process of such strategy creation is a procedure of decision making, which is complex, costly and hard to do, in reality. If huge corporations fail despite all their expertise and significant resources allocated to define their strategic decisions, it will be a little harsh to expect from entrepreneurs to become successful easily with very limited resources they have in hand, besides considering the dynamic environment of the process of competition and environment (Porter, 1991).

Lack of expertise and education in terms of business strategy and strategic decision making ends up mostly in dramatic strategic changes, pivots or mostly failures. It can be discussed and concluded that the essence of strategy creation is linked with the initial entrepreneurial business model (Osterwalder et al., 2009). Many entrepreneurs focus only on the product development until the point they understand what they have developed is not what the market wants. It cannot be denied that a venture only focused on product development will become unsuccessful, as this irony has been a grave topic for many authors and case studies where it can be found the product market fit problem, such as case studies by Canetta and Winn (2002) and Tompson (2003) regarding companies like Colorado Creative Music and Zandigner confirm existence of such trouble. For entrepreneurs who carry significant technical knowledge and expertise, there must be a solution to ease their process of designing and implementing their strategy and business models. There are significant efforts

such as Business Model Canvas, which has been a very successful method in showing the entrepreneurs how must their business model be designed and created. Business Model Canvas (please refer to literature review chapter for more details) can be said to be a major strong tool being used today, almost in every entrepreneurial consultancy program or course (Osterwalder et al., 2009). However, it seems obviously that having a good method is not going to result in having the same tool being applied perfectly or even correctly. During the interviews conducted for this research, the author has seen clearly that despite of almost all subjects knowing Business Model Canvas, applying it to their business in reality was hard, time consuming and mostly faced by failures. Business models of Turkish knowledge driven entrepreneurs were iterated over time, but with consideration of lots of pivots resulting from mistakes done in the first place (Please refer to analysis chapter of this thesis for further details). Many other reasons such as ease of use and misunderstanding because of lack of education background are the sources of such failures. That is exactly why, the author has decided to develop and decision support system that is based on Business Model Canvas and can address difficulties of Turkish entrepreneurs while creating their strategy and business model. This thesis has discovered that the strategic decision making and planning of Turkish entrepreneurs both are under-developed and lack of expertise, especially in sales and marketing (Please refer to analysis section of this thesis for further details), result in a need for a support tool which can help these entrepreneurs develop their strategic decisions better and accurately, especially their business model.

1.3 Necessity of Decision Support Systems for Turkish Entrepreneurs

As mentioned earlier, the entrepreneurs, especially knowledge driven entrepreneurs in Turkey, lack managerial/entrepreneurial education and expertise. The literature review of this thesis suggest that there is a gap and need for a decision support system that is easy to be used to formulate strategic decisions such as formulation of business models. Decision support systems are popular tools of helping enterprises make more accurate and faster decisions in a structured fashion (Keen 1987). Decision support systems are used in many areas, as well as management, but still there is not a specific example of such systems to be applied to business model

generation (Houben et al., 1999). While a decision support system may seem a convenient way of helping entrepreneurs to make their most important strategic decisions, a complicated system for those whom already have trouble adopting their mind set towards a new way of thinking will not be of any help. For such reason the proposed decision support system must be very simple to use and able to be iterated frequently whenever needed. In order to create such system, one of the best methods seems to be a rule-based decision support system that is integrated with Business Model Canvas to empower and help knowledge driven Turkish entrepreneurs create their business model and strategy as soon and as effective as possible. Rule-based decision making and support systems are easy to be used and are well structured without anu need for prior familiarity where they all follow simple linguistic logic, resulting them to be ideal for the propose of this thesis (Schauer, 1991).

The necessity of such system is justified by Mulders (2012) and his work which shows that entrepreneurs and academicians present different results for business models of the same enterprise, because of biases entrepreneurs have. When considering Turkish entrepreneurs, and because of relatively weaker education and infrastructure of Turkey compared to developed countries, these biases are expected to be more and stronger considering the entrepreneurial education in Turkey still is significantly behind form developed countries (Cetindamar, 2005). This thesis and its findings also support the fact that Turkish entrepreneurs suffer from lack of business and management knowledge, especially the knowledge driven entrepreneurs. Evidences found show that all Turkish entrepreneurs who have been interviewed knew the concept of business model and most knew about Business Model Canvas, yet experienced huge troubles formulating their strategy, because they have failed to understand the concepts in the Business Model Canvas. The evidence also demonstrates that most of Turkish entrepreneurs, before starting their venture, have almost no idea about business models and the concept of strategy in the meaning the concepts must have been used, and after establishment of their firm they have learned the importance of these concepts. These evidences convinced us that there is a need for development of a rule-based decision support system to help the Turkish entrepreneurs formulate their business model, based on Business Model Canvas. Such a system cannot replace the need for conferences and entrepreneurial education

or courses that participants asked for, but a support system could help entrepreneurs get accurate business models and a solid ground with least time required.

1.4 Organization and Goals of This Thesis

As it will be clarified in more details later, this thesis is an attempt to explore the problems and difficulties knowledge driven Turkish entrepreneurs experience in strategic decision making, especially in terms of formulating business model. Then this research will construct a decision support system based on those areas the entrepreneurs find most difficult and challenging based on Business Model Canvas. This research intends not to solve all the problems Turkish entrepreneurs' experience, but those which are most critical and need more attention. The thesis constructs its premises upon the fact that entrepreneurs, especially Turkish entrepreneurs, need a system that helps them save time and resource and in the mean time make decisions regarding their business model easily. It is important to notice that this research is consisted of two parts, the first part is an exploratory effort to understand the knowledge driven Turkish entrepreneurs' quandaries and challenges faced during formulation of business model, where the second part is an effort to craft a system that helps them develop their business model accurately. The second part is where the decision support system is proposed and constructed.

First, the research will evaluate the literature and analyze the works, researches and studies done before on entrepreneurship, strategic decision making, decision support systems, Business Model Caanvas and rule-based decision support systems. As presented later in this research, there are not any similar studies or models as the theme of this thesis suggests, yet there are decision support systems which are rule-based and are used in entrepreneurship, but not to define the general business model of the firm. Also this research has discovered that these efforts and crafting rule-based decision support systems are recent works and studies, done in the field of entrepreneurship. It is believed a significant gap exists in literature in terms of studies offering what this thesis is promising.

The research will later present its method of data collection, its interview design, sample structure and methodological approach. The sampling is judgmental, while it fits with the exploratory nature of this thesis and the interview questions are designed accordingly to help the author get as much as information from the entrepreneurs as possible. It is important to notice that to recognize, in depth, the problems and challenges of entrepreneurs during formulation of the business model using Business Model Canvas, thematic analysis is used to investigate the insight from the in depth interviews done by 12 technology and knowledge driven entrepreneurial firms in Ankara. As it will be explained later in detail in the analysis chapter of this research, it is discovered that there are four main themes under which the challenges of entrepreneurs are categorized. Form these four, two of themes are structural problems that are experienced because of Turkish entrepreneurial ecosystem and macroeconomic factors and other two are business related. From those two business related themes, one (value and value delivery) addresses a problem from literature, which is the product market fit problem. Accordingly, the thesis focuses on that theme and later proposes a rule base decision support system to help solve the issue and lighten the challenges. In the mean time, the analysis also considers the requests of entrepreneurs in order to build a useful decision support system accordingly.

As the second part of this research, based on the analysis provided, a decision support system is proposed and constructed to resolve the product market fit dilemma, including three separate rule-based decision support systems, which are customer segmentation decision support system (DSS), value proposition DSS and channel/customer relationships DSS. These support systems are separated, but are part of a whole system that allows the entrepreneurs to develop their business model faster and more accurately compared to using Business Model Canvas directly. Finally, the thesis concludes that there is a contribution to the literature under two major topics, one is exploring and discovering Turkish knowledge driven entrepreneurs' challenges of formulating business models using Business Model Canvas and second is a decision support system which actually can be applied in firm level by entrepreneurs to form a solid business model with a product market fit. The thesis also concludes that this effort must be tested empirically and must be experienced in the field and later the results can provide valuable information on

development of a further sophisticated even software based decision support system. The limitations of this research besides the further research opportunities are also discussed and it is hoped that this research will both open a new perspective towards entrepreneurial research and also provide a ground for further applications that would help Turkish entrepreneurs to become more competitive and more successful.

CHAPTER 2

LITERATURE REVIEW

2.1 Entrepreneurship and Turkish Entrepreneurs

2.1.1 Entrepreneurship and Knowledge Driven Entrepreneurship

As discussed earlier, defining entrepreneurship in different disciplines result in different differentials, and still there exists disagreements. Baumol investigates the entrepreneurship concept in economic theory while comparing and contrasting different economic school theories and their views on entrepreneurship (Baumol, 1968). Regardless of the differences, he finds a critical similarity which indicates creation of value resulting in economic growth and development and its significance. Others, such as Hebert and Link define entrepreneurs as "someone who specializes in taking responsibility for and making judgmental decisions that affect location, the form, and the use of goods, resources, or institutions" (Hebert et al., 1989, pp.39). This definition emphasizes the decision making process by the entrepreneurs. Some other authors like Baron tries to find the cognitive differences between entrepreneurs and others, and based on differences in the process they define entrepreneurship as a process of cognition (Baron, 1998). Some authors like Sarah Dodd and Sarasvathy, however, see entrepreneurship as a social process of creating value. Sarah Drakopoulou Dodd indicates "to conceive the entrepreneur as an atomistic and isolated agent of change is to ignore the milieu that supports, drives, produces and receives the entrepreneurial process" (Dodd et al., 2007, pp.341). Sarasvathy tries a different perspective that considers entrepreneurship as a social process, but not only relying on primitives such as market and product, and also the human factor in social context and his imagination that "shifts the economic inevitability to entrepreneurial contingency" (Sarasvathy, 2001, pp.244). More popular works focus on characteristics of entrepreneurs and tries to profile the entrepreneurs where authors like Audia and Rider encounter the myths of entrepreneurial characteristics and

especially the "garage" concept, but still such authors only redefine the characteristics of entrepreneurs and investigate some key success factors (Audio et al., 2005). From all those who try to define entrepreneurship, there are some who critically deconstruct the concept such as Ogbor. Ogbor says "It is shown that the concept of entrepreneurship is discriminatory, gender-biased, ethnocentrically determined and idiotically controlled, sustaining not only prevailing social biases, but serving as a tapestry for unexamined and contradictory assumptions and knowledge about the reality of entrepreneurs" (Ogbor, 2000, pp.605). However, despite of all disagreements in the philosophical discussions or definitions, most authors agree with the importance and implications.

Knowledge driven entrepreneurship can be said to be a type of entrepreneurship that is based on knowledge creation and knowledge resulting in creating value. Mostly these concepts are used when analyzing the knowledge based economy and they are used interchangeably (Andersson et al. 2010). Some authors take knowledge as seriously as an engine of today's economy, such that Stam and Garnsey say "If the industrial economy ran on coal and iron ore, the fuel of today's economy is knowledge" (Stam et al., 2007, pp.1). Accordingly, those entrepreneurs that create value from knowledge and transform it into a significant product or service can be called knowledge driven entrepreneurs (Armstrong, 2001). It is remarkable that knowledge and technology were always there for economies to develop, but recently, especially in current decades, the importance of knowledge has been stressed even more (Stam et al., 2007). Regarding to all that is indicated, the importance of knowledge driven economies, especially those with rapid economic growth such as Turkey, cannot be neglected, and as came before to be noticed, no neglect can be directed towards knowledge driven entrepreneurship.

2.1.2 Turkish Entrepreneurship

Popularity of entrepreneurial activities in Turkey, with no doubt, has risen almost from zero to a very significant interest level especially in the last decade. Indeed, the interest may be raised rapidly towards the topic, but existence of Turkish entrepreneurial activities goes back almost to 50s' and 60s' (Alexander, 1960).

Relative rapid growth of industry compared to Ottoman era, and also starting years of Turkish Republic introduced industrial entrepreneurs where government policies also had significant influence (Alexander, 1960). The rapid growth and government policies however were not enough though since state owned firms hold most of Turkish economy output (Kozan et al., 2006). But still, when looked in more detail 99 percent of Turkish companies in manufacturing, in terms of number counting, are SMEs and it results in 76.7 percent of total employment in this sector (KOSGEB, 2005). Besides, SMEs own 38 percent of total value added created in Turkey (KOSGEB, 2005). While SMEs are indicated, Yetim and Yetim say "The entrepreneur, being a founder, a transformer, a producer, and a reproducer of the organization with its norms and values, is a central and vital factor of SMEs" (Yetim and Yetim, 2006, pp.257), which indicates SMEs and entrepreneurship move together in Turkey.

Development of Turkish entrepreneurship has later been transformed into more value creation and on technical knowledge dependent, especially in the last decade and half. Some researchers argue that the Turkish economy still lacks significant support to entrepreneurs as Cetindamar explicitly indicates "Turkey underutilizes youth and women entrepreneurial resources" (Cetindamar, 2005, pp.187). It is not something unexpected as the infrastructure for Turkish entrepreneurship has been establishing recently including government funds, incubators, angel investors and even venture capital firms. Özdemir also indicates that "early-stage entrepreneurial activity in Turkey is much lower than in developing countries, whereas, established business entrepreneurship activities are relatively high" (Özdemir et al., 2009, pp.40) and she also concludes that the government support is mostly favoring the large firms than small enterprises (Özdemir et al., 2009). Not only the government support, funds and infrastructures are not enough, but also there are evidences showing that the education system is not providing enough knowledge and background for potential entrepreneurs in Turkey. Askuna and Yıldırım indicate that "Research findings showed that entrepreneurship courses in public universities in Turkey are not sufficient to provide skills or mindsets that are required for creating entrepreneurs that can contribute to economic growth and employment for students." (Askun et al., 2011, pp.663). In contrary to these findings, international researchers and authors

such as Baker indicate that "In developing countries' national settings, potential entrepreneurs may not be able to choose from several attractive options, therefore, in poorer countries, the only option will be to pursue an entrepreneurial venture" (Baker, et al., 2005, pp. 492), where some researches focused on Turkey also mentions the same motives as Kara says "According to the factor analysis, small and medium-sized enterprises owners are driven more by income rewards than intrinsic rewards." (Kara et al., 2008, pp.63). But there is no doubt that Turkey needs more to do in many aspects to empower its entrepreneurs, not only in terms of policies or funding, but also in terms of education, mentoring and supporting the entrepreneurship to reach developed countries' status.

2.1.3 Knowledge Driven Turkish Entrepreneurship

The research about Turkish entrepreneurship just like the interest towards the concept has grown drastically, however it is harder to find detailed research regarding the knowledge based entrepreneurship than entrepreneurship itself in Turkey. Some researchers suggest that innovation and knowledge driven entrepreneurship are bounded and entrepreneurship is a mechanism to convert knowledge into growth (Bascavusoglu-Moreau, 2007). Bascavusoglu indicates such mechanism to work properly requires "well connected and interacting institutions" such that a "National System of Innovation" framework would be constituted which was addressed by Freeman (1987) (Bascavusoglu-Moreau, 2007, pp.2). Bascavusoglu concludes that there is a weakness in Turkish national innovation system and accordingly firms' entrepreneurial behavior (Bascavusoglu-Moreau, 2007). According to Global Entrepreneurship and Development Index (GEDI) Rankings published in March 2010 Turkey ranks 43rd with score of 0.27 where Denmark ranks the first by 0.76 (Acs et al., 2010), as quality of the human resource, innovation and new technology play a significant role in this index. Knowledge driven economies and countries rank much higher than Turkey according to this index. Such can bring a serious critical view towards how sophisticated the Turkish knowledge driven entrepreneurship is and how well it is developed. Another comparative study, however, reveals some interesting insights of comparing Turkish knowledge driven IT firm clusters with a clusters in Finland (Akpınar et al., 2013).

The results show that R&D intensity and knowledge dynamics are the most influential dimensions to drive entrepreneurial activity in clusters such as Technopolises, however the study also includes the fact that clusters themselves are not enough and there must exists an ecosystem of dynamic innovation and knowledge (Akpınar et al., 2013). From all studies above, one can conclude that the importance of knowledge and innovation could not be neglected, and knowledge driven entrepreneurship still needs support and development in Turkey, where significant system of innovation and knowledge creation and transfer are all required.

2.2 Decision Making in Entrepreneurship

2.2.1 Decision Making

Decision making and its process of realization has long been an interesting subject for the scholars and the academicians. The history of decision making goes back to quite old times, sometime around 6th century BC. Regardless of decision making history, its importance in daily life of human kind since he began his journey on this earth cannot be undermined. In general there are two major approaches towards decision making. One is a deterministic, mathematical approach, and the other is more human dependent, heuristic based decision making. Also one can divide decisions as if they are taken by individuals or by groups. All these categories can be summed in another fashion, as did by Ivanova and Gibcus. In their study, and many others, the decision theory in general is divided into Classical Rationality, Bounded Rationality and Neoclassical Rationality (Ivanova et al., 2003). This approach is a historic development approach, but can precisely divide the decisions theories. Accordingly, the Classical Rationality "suggests that people are driven in their economic actions by pure rationality, hence are able in every given situation to rank with almost mathematical precision their preferences and to pursuit the optimal outcome" (Ivanova et al., 2003, pp.7) and the economic agents try to maximize their utility. On the other side, stands the Bounded Rationality which tries to explain the abnormalities that cannot be explained by the Classical Rationality theory, which mean "economic agents do seek to maximize utility, but within limits posed by incompleteness and uncertainty of the information available" which Ivanova recalls

from Simon (1986) (Ivanova et al., 2003, pp.8). Finally, there is a view of Neoclassic Rationality and is quite recent compared to other theories. As Ivanova mentions works of Tversky and Kahneman's (1983 & 1986) and their prospect theory is the most famous of its models. The theories of Neoclassic Rationality take into consideration the environmental factors affecting the decision process. Tools used in strategic decision making such as SWOT analysis and cost benefit analysis can be said to be associated with this theory (Ivanova et al., 2003).

Of course, in the context of this research one can ask for specific place of the entrepreneur in the development of decision theories. As mentioned earlier, entrepreneurship was part of classic economic school concepts (Baumol, 1968). And so the concept was developed by development of decision theories. It is known fact that rational classical theory agent considers entrepreneur to be rational and all other agents to be rational too. But as described earlier in the literature review of this thesis, especially in the part regarding entrepreneurship the human factor cannot be neglected as entrepreneurship is for sure both social and cognitive process. Ivanova mentions that in classical view, there is no room for innovation as all agents have same access to information, but if true then entrepreneurs are only mathematical agents calculating the decision making process (Ivanova et al., 2003). So that most researchers such as Ivanova suggest that prospect theory considers more rational place for the entrepreneurs, considering human factor and also environmental factors and elements.

2.2.2 Strategic Decision Making

Strategic decision making plays a very significant role for entrepreneurs starting their venture with very limited resource. Decision making itself would not serve enough if not done strategically and for strategy itself. As of goal of this research to concentrate on developing a decision support system that helps the entrepreneurs to create their business models and make their strategic decision, strategic decision making and its perspective must be considered and studied. Strategic management has been increasingly in the center of management discussions since work of Miles and Snow (1978) and then by Porter's detailed framework (1980), and as Zbaracki

mentions that central among strategic process issues is strategic decision making. It is crucial because it involves those fundamental decisions which shape the course of a firm and then he concludes "strategic decision makers are bloodedly rational" (Zbaracki et al., 1992, pp. 18). Such studies illustrate that research towards strategy and strategic decision making has similar aspects to the decision making itself. As an example, Schwenk, organizes his research as it "includes strategic decision models and characteristics, biases in decision making, individual and organizational minds, and upper echelons" which are all themes of decision making process analysis (Schwenk, 1995, pp.471).

Strategic decision making mostly takes place in top level management, needs to be fast and future oriented. Such requirements result in many outcomes, where the most important is the cognitive behavior of the decision makers in the strategic context. Schwenk, in another study, takes a deeper look at the simplification processes coming from cognition in the strategic decision making (Schwenk, 1984). He indicates that strategic decision making is "a special kind of decision making under uncertainty" and he concludes that because of the nature of the context there are cognitive simplifications in the process that can result in errors (Schwenk, 1984, pp. 471). Nevertheless, in his earlier works and studies, he emphasizes on the cognitive aspect of strategic decision making and its importance (Schwenk, 1988). Some other studies take deeper look at the process of strategic decision making.

Eisenhardt and Bourgeois investigated the effects of politics on strategic decision making process (Eisenhardt et al., 1988) and they have found results showing "politics within top management teams are associated with poor firm performance" which can be said to be an outcome of wrong strategic decisions (Eisenhardt et al., 1988, pp.25). Other researchers have tried to evaluate the process or strategic decision making and its effectiveness. Dean Jr. and Sharfman looked at "whether strategic decision-making processes are related to decision effectiveness" (Dean Jr. et al., 1996, pp.368) where they have gather evidence which illustrates "decision-making processes are indeed related to decision success" (Dean Jr. et al., 1996, pp.368). Such extensive research efforts show that the process of strategic decision

making is important and such importance even gain more significance when entrepreneurs are the decision makers.

2.2.3 Strategic Decision Making and Business Models in Entrepreneurship

As described earlier, strategic decision making is very central for the firms and enterprises for the future success. The importance of strategic decision making can be claimed to be even more for the entrepreneurs. The first set of strategic decision made by the entrepreneurs should be their business model. Such model shapes business's basic strategy towards the environment and its future. But first, one needs to understand the importance of strategic decision making for entrepreneurs. Thomas Wheelen and Hunger in their book, write that there is lack of strategic decision making in SMEs and entrepreneurial ventures, because of lack of time and resources and also informality (Wheelen et al., 1983). In the same book, the authors indicate that there are several levels and aspects of strategic decision making in entrepreneurial firms such as internal and external assessment, develop basis business idea, analyze strategic factors and then decide what strategy to peruse (Wheelen et al., 1983). In the mean time, the book emphasizes that all of such are of great importance and crucial for the business to succeed. Another study by Ivanova and Gibcusgathers up all literature regarding the decision making process of entrepreneurs (Ivanova et. al., 2003). In this study, the decision making processes frameworks and methodologies that are assessed to be used by entrepreneurs to be used in their strategic decision making process are illustrated (Ivanova et. al., 2003), and impacts of decision making in entrepreneurship is investigated. The major theme, however, states that entrepreneurs face more of uncertainty than established firms and that is why the process of decision making in such ventures are different and such difference brings another significant level of importance (Ivanova et. al., 2003).

Other studies such as the one done by Uru, goes backwards and looks at the entrepreneurial characteristics in the strategic decision making, such that in this reverse attempt, the authors define a set of characteristics by entrepreneurs that actually shapes the strategic decision making (Uru et al., 2011). Another study by

Busenitz, and Barney investigates “Differences between entrepreneurs and managers in large organization” and those biases and heuristic difference in strategic decision making, where the findings show “that entrepreneurs are more susceptible to the use decision-making biases and heuristics than are managers in large organizations” (Busenitz et al., 1997, pp.9). Such reverse approach shows how two concepts of strategic decision making and entrepreneurship are bounded together and are crucial.

Strategic decision making in entrepreneurship has an impotent aspect in opportunity recognition process, where this process is defined as a process of set of decisions. Maine explains “the role of entrepreneurial decision-making in opportunity creation and recognition” is very noticeable and actually drives a model of entrepreneurial decision making process (Maine et al., 2015, pp.53). Opportunity, as a major discussion in entrepreneurship, drives more attention though, where many other researchers also try to explain or describe the strategic decision making process behind it, such as Eckhardt and Shane (2003) (Maine et al., 2015). As a part of whole entrepreneurial process, especially in the beginning, the opportunity recognition decision making process and business models come next to each other.

The reason why business models play a key role in entrepreneurship and strategic decision making of them is, as Daganova explains, “the business model is a narrative and calculative device that allows entrepreneurs to explore a market and plays a performative role by contributing to the construction of the techno-economic network of an innovation” (Daganova et al., 2009, pp.1559). The same study concludes that “models are not pure abstractions” and “they enable manipulation and experimentation” (Daganova et al., 2009, pp.1559). The importance of business models and its place in the strategic decision making process of entrepreneurs is elaborated, however differently by Magretta, saying “business modeling is the managerial equivalent of the scientific method” (Magretta, 2002, pp.90), but he explicitly mentions that business model is not the same thing as strategy, but the two words have been used interchangeably (Magretta, 2002). He defines the business model as a tool used in developing strategy and strategic decisions, while the model has many other uses such as “a good tool to tell a good story” (Magretta, 2002, pp.89). Authors may have different views regarding whether business models are

tools for strategy or they come both in hand, however they all agree the fact that business models are part of a great strategic decision making process and those strategies that work for entrepreneurs have a model elaborating, expressing and planning the future of the enterprise.

2.2.4 Tools of Strategic Decision Making in Entrepreneurship

2.2.4.1 Business Model Canvas

Despite of the fact that some authors may disagree on the concept of business model and its relationship with strategy, it is obvious that the business models are good tools in at least developing firm strategy and crucial for the entrepreneurs (Daganova et al., 2009) either to formulate a system or to tell a good story that is possible to be implemented and experimented (Magretta, 2002). Thus, in this section a review over major business model tool which is also this thesis base for development of a decision support system will be done.

Business Model Canvas was developed by Osterwalder (2009) base on previous work of his Business Model Ontology. The Business Model Canvas is a strategic and entrepreneurial tool (Osterwalder et al., 2009) that helps the start-up and existing firms to develop a business model. It is a popular, powerful tool that has been adopted and delivered in many entrepreneurship courses and also formal education courses. With being centralized and constructed on the concept of value proposition, the canvas helps the users define what the most strategic elements in their business are. Figure 1 is the illustration of Business Model Canvas. The canvas is actually a visual realization of all strategy fit concept, which is simplified and prepared such that the users can easily fill the template and address their strategic decision making (Osterwalder et al., 2009). As it can be seen, there is left and right side of the canvas. The left side is about the supply, production and creation of the value, where the right side is about delivery of that value to the customers.

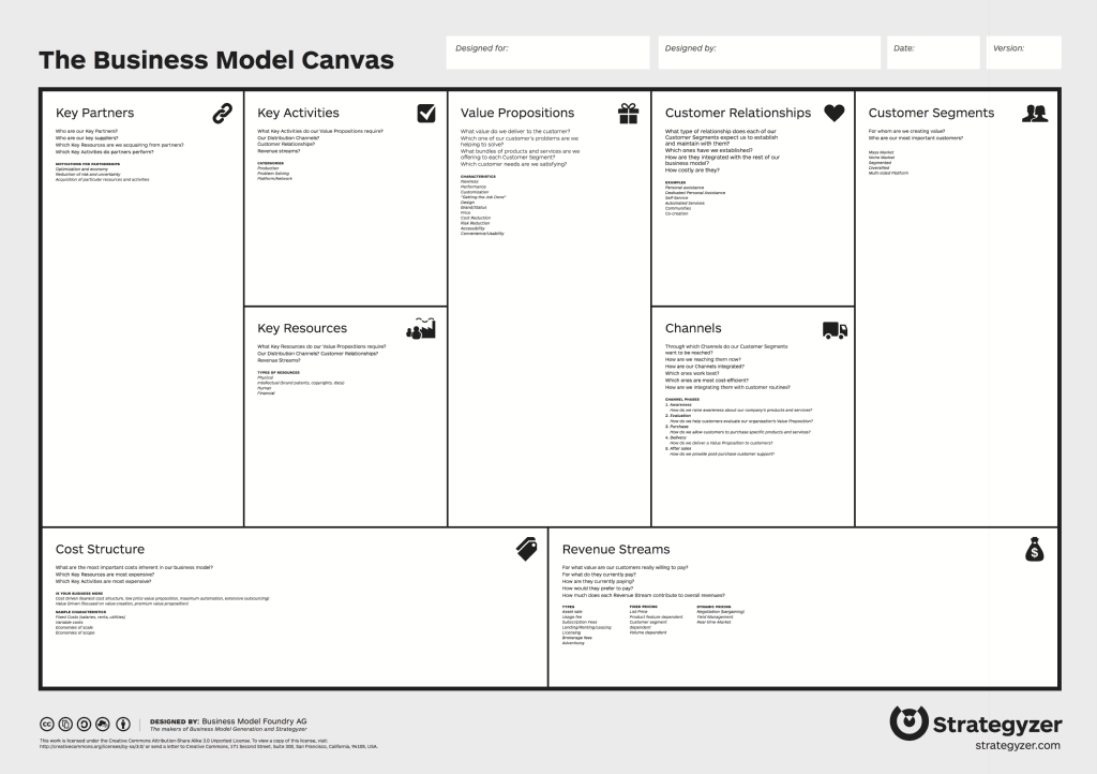

Figure 1 - Business Model Canvas (Adapted from "Business Model Generation" by Osterwalder, A, & Pigenur, Y. (2009), USA: John Wiley & Sons. Limited)

Each box given must be filled after the value is designed and proposed. Below, there are two boxes regarding the revenue model and the cost composition of the good or service provided. The book itself explains how each box must be filled (Osterwalder et al., 2009). The canvas, despite being just recently developed, has also experienced development. The value proposition is central to the canvas, and it seemed that there were hardships defining the value concept so another canvas called value proposition canvas was just recently introduced, which is illustrated in figure 2.

The value proposition canvas, as a part of the original canvas helps the users and start-ups to design their product and service better based on the value they propose to their customer (Osterwalder et al., 2015). This tool is the core base of this thesis, since the whole construction of this research to provide a decision support system is going to be integrated with the canvas. The value proposition canvas is based on the concept of business model fit, resulting from product market fit that is created from problem solution fit. If no fit is achieved at any level, then the product or service offered is not going to satisfy the market. Product market fit problem is one of the

major reasons why entrepreneurs fail in their business models as they propose a solution for a problem that either market does not care about or a wrong problem is solve by a wrong solution.

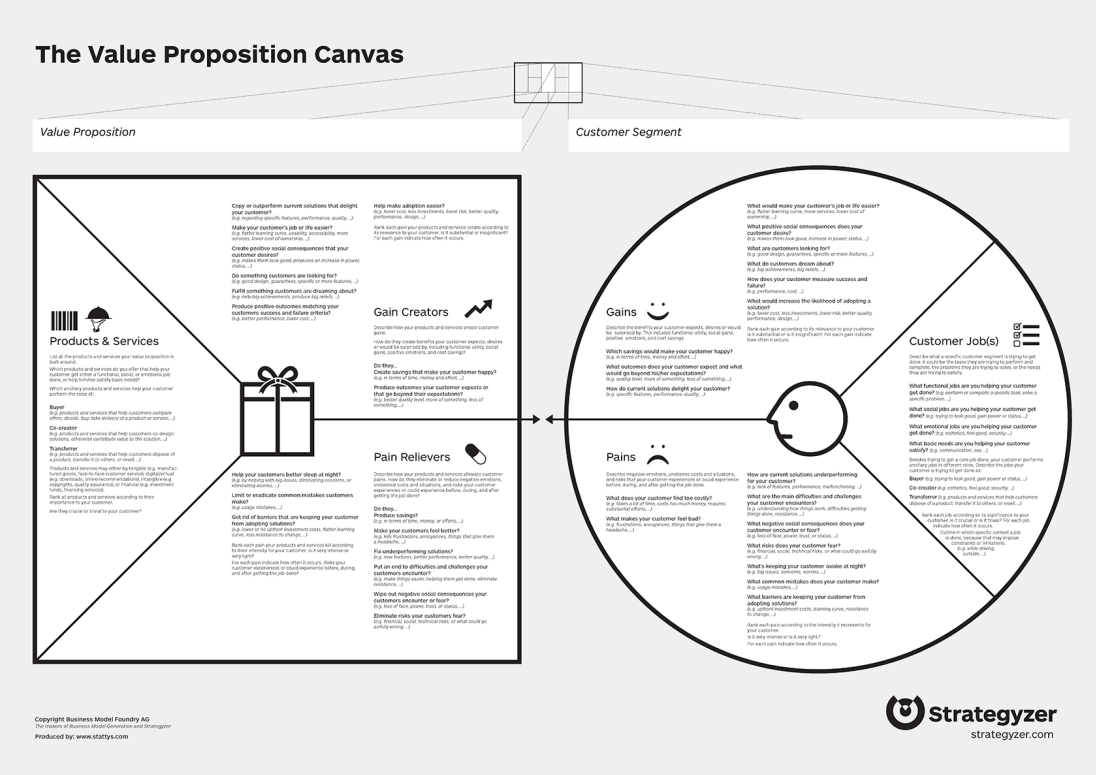

Figure 2 - Value Proposition Design and Canvas (Adapted from "Value Proposition Design" by Osterwalder, A, Pigenur, Y., Bernarda, G., & Smith, A. (2015), USA: John Wiley & Sons. Limited)

Despite of being a popular and widely used tool, there are criticisms towards the Business Model Canvas. According to Ching (2013), BMC has several problems where these are competition being missed in the model, distinguishing of customers and partners, the revenue structure not being comprehensive enough. Ching (2013) takes under consideration the fact that BMC is a good tool, but must be filled with some substitutes that have emerged such as "The lean business model canvas" by Maurya (2010), or "Advances Business Model Canvas" by King (2010). Other such as Kraaijenbrink (2012) claim there are three shortcomings of BMC which are excluding an organization's strategic purpose, notion of competition and mixing levels of abstraction in different items. Level of abstraction is one of the reasons that knowledge driven entrepreneurs with no entrepreneurial education cannot understand

the concepts well. Items like value are too abstract, where cost and revenue structures are totally mathematical. Such can create a good level of confusion that can result in bad formulation of business models based on Business Model Canvas. Coes (2014), in his thesis, assesses the strengths and limitations of BMC too, where he finds that BMC excludes the external forces to a business model, such as competition, market factors and other external forces, and the narrowness of the value proposition. Of course, the narrowness of value proposition has later been taken care of by Osterwalder (2015) value proposition design and canvas. Accordingly, all critics agree on the fact that BMC does not consider the external factors in the industry and environment, especially the competition, and also the business model not being the "perfect" tool and it needs to be followed by other tools to make sure that there is no point forgotten or missed. Also almost all criticism indicate the relationship and the mechanisms between items to be hard and very abstract to be understood. Limitations of BMC, in the mean time, do not make a bad tool, yet these limitations must be understood and analyzed so that the business models constructed would be fit.

2.2.4.2 Other Tools

Business Model Canvas is not the only tool to be used in strategic decision making by entrepreneurs. There are other tools driven from the decision theories that have been applied to help the businesses and entrepreneurs to develop their decision making accuracy and assessment. In terms of strategic decision making, there are studies that integrated AHP (Analytic Hierarchy Process) and strategic decision making. A book by Bhushan and Rai (2004) is dedicated to analysis of AHP and its use in strategic decision making. The authors first define the decision making process and the decisions that are strategic, where decisions involve existence of choice and strategy involves the concept of the fit (Bhushan et al., 2004). Later the book shows real outputs achieved by applying AHP in business, defense and governance. The book presents a significant explanation of the method, and it proves that as a tool, AHP can be used in order to make strategic decisions (Bhushan et al., 2004).

In another study by Yurdakul (2004), that is related to production strategies. The author applies "AHP as a strategic decision making tool to justify machine toll selection" in which AHP is shown to provide significant accuracy, time saving and ease of use to strategically select machining tools which are themselves very strategic decisions in production (Yurdakul, 2004, pp.365). Apart from AHP as a tool, there are studies to use other methods. Wainfan (2010) introduces "principles, methods and tools" to be used in Multi-perspective Strategic Decision Making. The author defines multi-perspective strategic decision making as "Multi-perspective strategic decision making is the process of making long-term decisions that shape the course of an organization, while taking into account diverse perspectives" (Wainfan, 2010, pp.3), and the research defines tools that can help the group to converge to a strategy rather than diverging because of different perspectives of group members. There are other studies introducing tools to help the decision maker achieve accurate results in their decisions, but mostly these studies focus on specific problems rather than the whole concept of strategic decision making.

2.3 Rule-Based Decision Making

2.3.1 Rule-Based Decision Making in General

Rule-based decision making or fuzzy logic decision making is "A set of user-supplied human language rules, used in solving inventive problems, can be better handled by fuzzy logic (FL), specifically, by a fuzzy inference system (FIS). A FIS can consist of a number of conditional "IF-THEN" rules" (Malinin, 2014, pp.458). A st of rules that are logically and consequently connected that help the decision maker to get accurate output based on required information by the system can be another definition of rule-based decision making. Schauer (1991), in his book, indicates that rule-based decision making is easy to use, helps to make decisions like experts and is very structured. The rules in the system shape the flow of information during the decision process, and the rules are only working well if the information and input/output sequence is right (Schauer, 1991). In the same work, the author indicates that such systems of decision making are reactive and not flexible as the rules are very well defined. However, this does not mean that rule-based decision making is

inaccurate, but it needs modifications when situation and environment change (Schauer, 1991). Some other advantages of rule based decision making is that the systems are documented and very suitable to be recorded and no special skill is needed to be used by the decision makers (Schauer, 1991). An earlier work by Hayes (1985) that "Rule-based systems are automated problem-solving and know-how systems that provide a means for capturing and refining human expertise, and are proving to be commercially viable" (Hayes, 1985, pp.922). The simplicity and ease of use make these decision methods and system suitable tools for those decision makers who have no or very limited background information on the context that the decision is going to be made. This does not necessarily mean that rule-based decision systems are perfect tools of helping people make perfect decisions. The limitations of such systems sometimes make the system redundant. A study by Clancey (1983), takes into consideration a specific rule-base decision system used in medical problem solving and he finds that it is very hard and confusing for the users to adopt and change the rules which are originally put in the system, and this reduces the chance of adopting the system into changes occurred in the environment (Clancey, 1983). When the decision outputs are very technical changing rules can become a serious problem.

2.3.2 Rule-Based Decision Making in Entrepreneurship

Rule-based decision making seems to have found its place in entrepreneurship literature specifically in terms of one subject which is opportunity evaluation. There are quite some researches showing that the process of opportunity evaluation is a rule-based process. Corbett and Katz (2012), in their book show a collection of studies and works providing evidence that such rule-base process exists. They claim the rules become part of individuals' knowledge structure within which a system of rule-based decision system is developed (Corbett, 2012) as discussed in the work and study by Sloman (1996) and Smith and Sloman (1994). The rule-based decision system in recognition and identification of opportunity is actually a cognitive process that characterizes the entrepreneurs' cognitive process facing uncertainty and ambiguity (Corbett, 2012). The entrepreneurship studies and research has shown the importance of opportunity evaluation and how significant it is in the entrepreneurial

process (Choi et al., 2004 & Cardozo et al., 2003). Finally, Corbett mentions that "from a theoretical standpoint, the emphasis on rule-based cognitive process is directly consistent with the notion that opportunity-ideas are *ex ante uncertain*" (Corbett, 2012, pp.25). Wood and Williams (2014), in a recent study, draw "from cognitive science literature on rule-based thinking to develop and empirically test a theoretical framework of entrepreneurial opportunity evaluation" (Wood et al., 2014, pp.573). The authors argue that entrepreneurs use a set of socially constructed rules to evaluate opportunities and they find out that "entrepreneurs' use of rules regarding opportunity novelty, resource efficiency, and worst-case scenario significantly influences entrepreneurs' evaluations of opportunities and that individual differences in opportunity market and technology knowledge augment the effect of the rules on opportunity attractiveness" (Wood et al., 2014, pp.573). All these studies suggest the same point which a rule-based system of decision making that is also cognitive and social exists in entrepreneurial evaluation and identification of opportunities. In another work by Gustafsson (2006), the author indicates that there are several major differences between corporate decision making techniques and those used by the entrepreneurs. She finds rule-based decision making based on cognition as one of the main differences (Gustafsson, 2006). The study claims the heuristics even differ significantly, even the same problem and same rule-based decision system is taken into consideration. Gustafsson also refers to another study by Sarsvathy (1999) saying that in non-existing markets it is no surprise to see entrepreneurs utilize effectuation and rule-based decision making rather than analytic systems of decisions (Gustafsson, 2006). Form all studies reviewed above, one can easily drive the fact that rule-based decision making in entrepreneurship is a topic of interest and has been studied specially in opportunity evaluation process.

2.4 Decision Support Systems

2.4.1 Decision Support Systems as in General Perspective

Decision support systems are relatively new concepts in the field of management and have been part of interest after the extensive entrance and usage of computers and information systems. Keen (1987) says that in 70s' decision support systems were

new tools which was a radical concept of empowering decision making, where in 80s' it has already become part of the mainstream (Keen 1987). He remarks that DSS (decision support system) "meshes human judgment and the power of computer technology in ways that can improve the effectiveness of decision makers, without intruding on their autonomy" (Keen 1987, pp.233). In a more recent study, Power, Sharda and Burstein define decision support systems as a class of computerized information system that supports decision-making activities. Decision support systems are designed artifacts that have specific functionality (Power, 2014). The same book categorizes the DSS into five main categories, i) communications-driven, ii) data-driven, iii) document-driven, iv) knowledge-driven, and v) model-driven systems (Power, 2014), where "Communications technologies are central to communications-driven DSS for supporting decision-making. Data-driven DSS provide access to large data stores and analytics to create information. Document-driven DSS use documents to provide information for decision making. Knowledge-driven DSS are sometimes generically called expert systems or recommender systems. Model-driven DSS use quantitative models for functionality and have been called model-oriented DSS and computationally oriented DSS" (Power, 2014, pp. 26&27).

Other books such as Salvendy and Sage (2007) book have the same approach and categorization of DSS. From the categories above, model based decision support systems have been more studied and researched, since they use mathematical models to help the decision makers, and actually they were one of the first DSS to appear. Studies such as Power and Sharda's (2007) research suggest that "model-driven DSS use algebraic, decision analytic, financial, simulation, and optimization models to provide decision support" (Power, 2007, pp.1044) and the article rises many fields of potential research because of current development in technology and web-based advances. Further studies have shown specifically that the decision support systems can become actually part of the management process by becoming management support systems. Turban (1990) in his book, despite of being almost 25 years old, has a comprehensive treatment of decision support theory and how it is applied (Turban, 1990). The book created a framework for further up-to-date coverage's of DSS to be used in management directly. Decision support systems not only focused on

individuals' decision outputs or processes, but also has been developed to help the group decisions too. Gray (1987) in his work mentions "Whereas conventional Decision Support Systems (DSS) help individual decision makers, GDSS are designed to help groups of senior management and professional groups reach consensus" (Gray, 1987, pp. 233). Back then, he mentions viability of GDSS (group decision support systems) is not proven but shows potential in future.

A study just few years after, by Benbasat and Nault (1990) suggests that there are empirical results showing GDSS actually helps group decisions to improve its accuracy. The same study not only focuses on GDSS but on expert systems and MSS (managerial support systems) and suggests empirical evidence that they actually help the decision makers in the process, but raising more research questions (Benbasat et al., 1990). Despite all these studies promising results, another study critically approaches DSS and aims to understand the future trends and problems which are by Er (1988). But still, the current studies show that DSS have been developed through time and still shows future potential. A study by March and Hevner (2007) indicates "successfully supporting managerial decision-making is critically dependent upon the availability of integrated, high quality information organized and presented in a timely and easily understood manner" (March et al., 2007, pp.1031) and it suggest that integrated DSS can help the firms make much better decisions. From the trends existing today, DSS applications and implementation has gone much far than expected and is expected to be utilized even more in any aspect of business.

2.4.2 Decision Support Systems in Entrepreneurship

Utilization of decision support systems, in many forms, in the business to help managers to make accurate decisions has been discussed in the previous section. However, using DSS in entrepreneurship does not to be as popular as in established corporations. But still, there are studies and worked which have either instigated to designed such systems for entrepreneurs or entrepreneurial proposes. From these studies, one is tackles a very critical point. A study by Houben, Lenie and Vanhoof (1999) describes "the development of a knowledge-based system is described that can assist managers of small and medium sized companies in performing a SWOT-

analysis" (Houben et al., 1999, pp.125) with concentration on identification of internal strengths and weaknesses. The authors mention that despite of the importance of SWOT analysis, many SMEs have not a clear idea about the concepts, and accordingly they need a system to conduct this analysis as a DSS.

An older study, if not directly designed for entrepreneurs but still focused on small firms, by Wedley (1984) focuses on how DSS and computer systems can be used to track financial health of a company, especially for the small businesses. The study mentions that with use of DSS and computers a fast, accurate and cost effectives way appear to help monitoring the financial status of companies (Wedley et al., 1984). Some more recent studies focus on more detailed issues that can be addressed by DSS especially for entrepreneurs. Kengpol and O'Brien (2001) construct "a decision support tool to assess the value of investing in Time Compression Technologies (TCTs) to achieve rapid product development" (Kengpol et al., 2001, pp.177). They claim that in a competitive markets product design strategies can change rapidly and rapid product development is a major challenge. The study proposes a model AHP and cost/benefit analysis, and develops a DSS that can be utilized easily (Kengpol et al., 2001). The system can be both used for entrepreneurs or start-up and for established firms, and the authors do not make any distinguishing remarks, however the utilization of such DSS of entrepreneurs seems possible.

A study Wen, Chen and Chen (2008) which presents knowledge based decision support system for measuring enterprise performance is one of the studies that can also be addressed to entrepreneurs, but with consideration that start-ups may not have enough information as inputs for the DSS and the firms are newly established and lack of information is very natural. As indicated before, the number of studies specifically done to help entrepreneurs with DSS is very limited and mostly the focus is on the established firms, but in some studies the outcome and models can be used in entrepreneurship with some modifications.

2.5 Rule-Based Decision Support Systems

2.5.1 Rule-Based Decision Support Systems in General

As described in Rule-Based Decision Making section of literature review, the definition and application of rule-based decision making has been discussed. When rule-based decision making is used as a decision support system, many different applications in many different areas can be found. Such support systems utilize the same approach in fundamental sense, but based on the field of use, the rules and technical approaches may change. A study by Deng and Wibowo (2008) uses rule-based decision making in a DSS aimed in "facilitating the adoption of the most appropriate multicriteria analysis (MA) method in solving information systems (IS) project evaluation and selection problems" (Deng et al., 2008, pp. 1). This study is an example of direct use of rule-based decision making DSS in a real management context. The study proposes this model and then tests the model in a real life example to show its applicability and it provides evidence that using this DSS helps reduce time and increase accuracy (Deng et al., 2008). Some other studies also exist that shows application of rule-based DSS that help solving managerial problems as one study already mentioned by Malinin (2014) that proposes an "application of Fuzzy Logic to Decisions Making in Solving Inventive Problems" and the study uses the IF-THEN linguistic rules to create a support system to handle "handle all linguistic derivations that allow "IF-THEN" formulation by applying Fuzzy Logic" (Malinin, 2014, pp.458). Applications of ruled-based DSS extend to far beyond management, as indicated before. A study by Prapinpongsanone (2011) shows application of such systems in civil engineering. The author proposes a "rule-based decision support system for sensor deployment in drinking water networks" that can help the engineers find the best places to place sensors that can test the venerability of water quality and possible contaminations (Prapinpongsanone, 2011, pp.4). This study is very similar to this thesis in the sense that the support system is designed to help engineers, in a different field, to solve a complicated process and decision faster and with least complexity possible.

Another field that used rule-based decision support systems in very extensive manner is medical science, especially in terms of clinical assessment. The same problem with entrepreneurs exist with the nurses in clinics as their expertise in seeing and concluding the symptoms are very limited, so a decision support system that is easy to be used in required in many cases, even for less experienced doctors. A study by Kuo and Fuh (2009) constructs a rule-based clinical decision model to support interpretation of multiple data in health examinations (Kuo et al., 2009). More detailed studies on more specific areas of medicine also exist using rule-based DSS such as "rule based clinical decision support system for hematological disorder" by Chen, Y.Y., Goh, K.N. and Chong, K. (2013, pp43). One can find many of these systems in medicine and clinical field. The relevance in importance of time and ease of use in medicine overlaps with our purpose in this research for entrepreneurs and it makes the author of this thesis more confident that such utilization has already been done in many other fields.

2.5.2 Rule-Based Decision Support Systems in Entrepreneurship

Despite the fact that use of rule-based decision support systems in management and other fields is quite popular, there are very few studies that utilize this approach in entrepreneurship. As discussed before, there are works that show decision making process, rule-based decision making and even support systems in entrepreneurship. Some of these researches are focusing on decision making process itself in entrepreneurship but not many woks present a decision support system using rule-based approach to provide decision making results for specific problems in entrepreneurship field. It must be remembered that business model is also a strategic decision to be made and then one can see almost no work close to the subject of this thesis, which is proposal of a rule-based DSS for business model as a strategic decision. From those few works a study by Fakhry (2010) seems a close study to ours. He proposes "a fuzzy logic based decision support system for business situation assessment and e-business models selection" where the author claims "The proposed system solves important challenges such as the use of linguistic terms to capture the executives' assessments of the key business measures" (Fakhry, 2010, pp.61). He defines the variety of e-business models, and then based on fuzzy logic approach he

makes the selection based on the inputs. The system is claimed by the author to be tested and empirical results to be collected for further studies (Fakhry, 2010). Still, this study is a close subject to the theme of this thesis. Another study, which also considers a strategic decision to be used either by entrepreneurs of established firms, proposes "a decision support system for business location based on open gis technology and data" by Ghiţă (2014, pp.101). The location decision is quite strategic and can be one of the first decisions to be given by entrepreneurs, also by established firms too. The system asks the users relevant information and inputs then they "are returned two sets of results: one based on own options, and another one aggregate for the industry they operate in" (Ghiţă, 2014, pp.101). Such rule-based DSS provides some advantages for both entrepreneurs and managers reducing search time, site assessment and quantifying users' needs (Ghiţă, 2014). These two studies show that rule-based DSS can be used for specific proposes and goals to help entrepreneurs with their very strategic decisions and accordingly there are strong evidences of existence and development of such systems.

2.6 Rule-Based Decision Support Systems Based on Business Model Canvas

The most relevant study to the subject and theme of this thesis is a work by Mulders (2012), a recent study that aims to see how different the evaluation of entrepreneurs and researchers is according to business model and strategic decisions made by the entrepreneurs. The paper aims to "to clarify how managers are able to take business decisions more objective and based on facts rather than on gut feeling" (Mulders, 2012, pp.18) and empirically the paper shows a gap between researcher and entrepreneurs strategic decision making. The paper uses Business Model Canvas as a medium for entrepreneurs and researchers to formulate a business model, and is used as a shared language for both sides (Mulders, 2012). The author says "The Business Model Generation is realized by people who strive to defy outmoded business models. They are visionaries, game changers, and challengers who want to design tomorrow's enterprises" (Mulders, 2012, pp.8). The paper finds interesting results of how and why there is a gap between business models generated by researchers and entrepreneurs. The work explains there are three main biases causing such differences, input bias, output bias and operational bias. The author remarks that the

entrepreneurs, even using the same tools as the researchers, use heuristics and are biased when formulating their business model by the help of Business Model Canvas (Mulders, 2012).

This work may not seem to be as relevant as those studies mentioned in the previous section of the literature review; however it is the only study that includes Business Model Canvas and its role in strategic decision making, while having no consideration of rule-based decision making or any decision support system implementation. The most important fact that one can extract from this study, is that entrepreneurs, when formulating business models from tool like business canvas, make mistakes and biases based on their heuristics. This study and those discussed before, can make a conclusion as such that, Business Model Canvas alone may result is errors in strategic decisions, and a rule-based decision support system can help entrepreneurs, as it helped entrepreneurs in some other areas, to craft an accurate business model that can guarantee future success. The whole literature review shows that there is a gap and need of a decision support system, providing ease of use and accuracy for entrepreneurs to formulate their business model, a very strategic decision to be made.

CHAPTER 3

DATA COLLECTION, SAMPLING AND METHODOLOGY

3.1 Methodology

This thesis is an explanatory research that aims to explain the difficulties and challenges of knowledge driven Turkish entrepreneurs when deciding on making strategic decisions regarding their business model based on Business Model Canvas. This research considers the challenges as the main interest, and then transforms the knowledge and insights gathered to construct a decision support system which is rule-based and also is integrated with Business Model Canvas. The first half of the thesis is mainly focused on the exploring and discovery of the problems which Turkish entrepreneurs face, while the second part utilizes the explanations to construct a proposed solution as a decision support system. When exploring the hardships and challenges the entrepreneurs face, this research use both quantitative and qualitative research methods to find out in depth the reality of the problems in strategic decision making specially regarding the business model. It must be reminded that since most of the firms which were interviewed here develop High-Tech products and work with Defense industry, their information and names are kept confidential and each firm is given a hypothetical name as of their representative staff who has been interviewed.

The analysis of this research is thematic and categorizes the answers given by the subjects who later are systematically analyzed in a deeper manner by discovering the patterns creating sub-themes and themes. To obtain themes and sub-themes, hierarchical axial coding was used, where a relationship tree is constructed as can be seen in figure 3 and 4. The content analysis is a quantitative research approach by considering the frequency of occurrence of each theme and sub-theme, where later those themes which occurred the most will be undertaken under interpretation by qualitative approach since that specific theme presents an important problem in line

with the literature (product market fit will later be stressed and analyzed deeply). Throughout the analysis section of the thesis where the qualitative analysis attempts to understand this themes in depth, direct examples and quotations are provided form the interviews to help the reader in terms of subject statements and understanding of the discovered results. Interpretations of the findings and their meanings are explicitly discussed accordingly.

During the data collection, almost 17 hours of interviews took place, where these interviews were transformed into transcripts of more than 495 pages. All the recordings from interviews were put into transcripts such that axial coding could be done carefully. When the subjects were answering the wrong question title or were confused, the interview was cut and the questions were asked again or explained in detail. Also the author has decided to cut the interviews, when the subjects were disturbed by other factors, and in some cases he interview took place in different days and dates. The answers which were not clear for the author were asked again during the interviews, where in transcripts, if an answer was unclear, the subject was contacted again in order to clarify the answer given. Also the author has studied all of the interviews prior to coding where any suspicious or incomplete answer was referred back to the subjects. All these helped to increase the reliability of this thesis. In the mean time, peer evaluations took place by the supervisor and co-supervisor of this thesis in order to have more credible results, where some answers were found either meaningless or biased such that those answers were traced back to the subjects for re-answering. Some more visits took place, besides those needed for clarification to make sure that the collected data from the subjects is still valid in their perspective. Such helps the dependability of the research to be kept on solid grounds. As the interview design section of this chapter would explain, the author believes that good interview techniques were used, such that the integrity of the answers and gathered data is sufficient. The author has tried to direct more questions whenever it was sensed that the subject is avoiding answering a question, and the author tried to dig as much as possible by breaking down the questions into smaller pieces for the subjects whenever the subjects were confused. Also trust between author and subjects was built, since all the firms which were visited had a strong reference of the author for the interviews from another entrepreneur.

Following the analysis, three decision support systems will be proposed to help the Turkish knowledge driven entrepreneurs in order to develop their business models. These three decision support system are later explained in more detail and are based on the exploration and discovery of the problems of the subjects whom had been interviewed. It is noticeable that this is the second part of the research which is the implication of the discoveries of the results from the first part of this thesis.

3.2 Sampling

Sampling for this research is judgmental sampling based on the expertise of the author and advisors of this thesis. Accordingly, as it was expected, since Ankara is a major entrepreneurial center for Turkey especially because of existence of Technopolis', it would be quite representative to select 12 firms from 3 different Technoparks here from Ankara, which are Bilkent, ODTÜ and Hacettepe Technoparks. The sample of 12 firms was then selected by filtering Knowledge Driven firms which are developing any products or services other than games. It was decided to not include games as it is hard to underline if gaming sector is knowledge driven or not. The companies which were interviewed must had a product or service, which transforms human knowledge into a solution for customers. Mostly the first which do direct R&D process or propose brand new products (nationally or globally) were selected and interviewed. It is noticeable that all the firms interviewed are heavy dependent on knowhow and transformation of this knowhow, which can be concluded as knowledge intensive firms. Of course, no one can claim that this sample is statistically representative because the study is a qualitative research based on content analysis; however, in further research section of this thesis, more comprehensive study conditions will be discussed. Finally, when the sample is considered, one can see that the selection was such that it would cover almost all of the firm types available in terms of knowledge driven entrepreneurship in Ankara and Turkey.

3.2.1 Sample Characteristics

The table below is designed to summarize the sample characteristics.

Table 1 - Description of the firms which were interviewed by the age of the company, the sector it operates and who was interviewed in the firm.

Sector	Firm Age	Firm Major Activity	The Interviewee
R&D	*Below 12 months*	Nano sensor for defense industry	Ali, Co-founder and Manager
	Below 12 months	Nano coating for defense industry	Murat, Co-founder and Manager
	Between 12-24 months	Image processing for helicopters (defense industry)	Serhat, Co-founder and Manager
	Above 24 months	Airborne or ground drones for defense industry	Numan, Co-founder and Manager
High-Tech consumer products or services	*Between 12-24 months*	New generation medical implant (Medical industry)	Pelin, Co-founder
	Above 24 months	Infant diagnose tools (medical industry)	Kerim, Co-founder and Manager
	Below 12 months	New generation door lock and security system (consumer electronics)	Onur, Co -founder and Manager
	Between 12-24 months	New generation smart home systems (consumer electronics)	Erşan, Co-founder and Manager
	Between 12-24 months	Customer counting systems (Retail Electr.)	Nurcan, Co-founder
	Below 12 months	Olympiads question creator platform (Education industry)	Miraç, Co-founder and Manager
	Above 24 months	Academic evaluation software	Mert, Co-founder and Manager
	Between 12-24 months	Quality control software for clinical evaluations	Mehmet, Co-founder

From the 12 firms selected to be interviewed, 4 were founded 6 or less than 12 months ago, other 4 were 12 to 24 months from their foundation and the also 4 where above 24 month from the foundation date. Six of these firms are doing R&D activities, where 4 are in defense industry and other 2 in High-Tech Medical

industry. Other 6 firms are in High-Tech consumer products, where 3 have developed/developing consumer or B to B electronics goods and other 3 are in web based consumer software business. Such selection helps this research to cover almost all types of knowledge driven Turkish entrepreneur business categories.

The main reason to select different companies with different ages was to make sure that not only the primary decision inputs and outputs are captured, but also to ensure the iteration of this decision making process and capture insights regarding applicability of our proposed support system to be used in time after foundation too. Also this helped a lot to capture the mistakes firms make generally and how they treat these mistakes and how they change their strategies and decision making process through time. The firms interviewed, had mainly funded by government programs, yet five were funded first by equity and 3 of them later had obtained government funding. Only one of the firms had co-founders with previous entrepreneurial experience (serial entrepreneur), who had an unsuccessful venture for 2 years, the rest of interviewees experienced their first venture.

It must also be noticed that from 12 subjects 11 knew the Business Model Canvas, where 10 has already used the Canvas in their business model generation. From those 11, six learned the process from educational conferences or courses, where four had learned the model from fellow entrepreneurs. All ten has used experience and iteration to fill their business models, where only 2 knew the concept because of their background in university they have attended.

3.3 Data Collection

The unit of analysis for this thesis is the knowledge driven entrepreneurial firms located in Ankara, Turkey. However, there must be subject to answer to our questions, and in order to capture maximum insights it was decided to interview either the co-founders of these companies or manager who is the co-founder who has been a shareholder and has been in the firm from the start. The author has tried to show flexibility and provided the subjects with information regarding this research

whenever necessary to make sure that the subject answer the right question. More on interview design and question categories is explained in the next section.

3.3.1 Interview Questions and Design

During the design of the question for the interviews, it was decided to put semi-structured open-ended questions as much as possible to capture subjects' insights and information as much as possible. There was a partial pre-planning yet the flexibility was achieved by semi-structured interviews, and it was made sure that whenever necessary the interview was interrupted to give more information to the subjects if they misunderstand the question. Whenever the subjects needed more information and lacked the information to answer the question or misinterpreted the question the author also intervened. It must also be reminded that the author gave a brief introduction of his research to the subject to make sure that they understand the context and for some time the subject and the author worked together to make sure that the questions are understood well. For the sake of confidentiality, even if the subject gave mistakenly information which must be disclosed, the author has taken out these parts out of the analysis.

The design of the interview questions was such that the subject would start from the general information regarding the firm and it product or service and later, the subject was directed to answer more detailed questions about the planning process of the business, its business model and plan. The subjects were explicitly asked if they had prior knowledge towards BMC and if not what other tolls they have utilized. All subjects were also asked about their major daily challenges and those challenges faced during formulation of strategy and business plan. At the end the subjects were free to add more personal comments regarding their experience about business model, challenges and advices. The questions can be found in the Appendix A of this thesis. The structure of the interview questions is such that there are 4 sections; the first part is the general information of the firm, its structure and its products. The second part is consisted of questions that aim to understand if the company has developed a business model and plan, before and after establishment, and how this process has gone through, where the knowledge of subjects towards BMC and its

utilization is questioned. The third section is about personal experiences of entrepreneurs regarding Business Model Canvas and personal experiences towards this tool. Finally, the fourth part is about comments of entrepreneurs regarding their ideas of a system to help them construct a method helping them develop better business models. These sections are not linearly put in the interviews, but rather such classification is for the sake of this research to gather adequate in depth information.

CHAPTER 4

ANALYSIS AND RESULTS

4.1 Thematic Analysis Structure

As discussed in the methodology chapter, the research has utilized a hybrid of quantitative and qualitative research approach with thematic analysis. The content analysis resulted from coding and constructing the themes, is actually a quantitative approach considering occurrences, however, as later it would be explained, the theme that has occurred the most and addresses an important problem from literature is analyzed in more detail by qualitative approach. Before making details of these themes and findings, some more fundamental issue must be discussed in advance. As the title of this thesis suggests and the first part of this research is about, the research question can be translated as "what are the problems and challenges faced by knowledge driven Turkish entrepreneurs while conducting their business models based on Business Model Canvas?", where such research question's results can leads to proposal of a decision support system helping entrepreneurs based on the explored challenges. Initial scanning of the interviews showed that there are significant patterns regarding the problems faced and shared by all 12 subjects which were interviewed. The design of questions allowed the author to have deeper insights that could show the reasons and categories these challenges fall into. Axial coding allowed the author to make categories, and sub-themes leading to main themes which helped to separate the BMC areas from each other. Multiple interconnections were found between themes and such leaded the author to discover that the Turkish knowledge driven entrepreneurs suffer massively from lack of strategic decision making skills and skills leading to formulate a sound business model. It was only after such deeper analysis that it was realized what major troubles must be addressed the most and what the reasons were behind these challenges. It was also revealed that the interconnections of themes is natural to the process of entrepreneurship, since crafting business models requires intellectual and educational background backed by

availability of resources. Isolating the concept of business model is neither possible, nor sensible, since business model, in nature, is a product of coexistence of many factors. These factors not only formulate the business model, but also create the company and design its strategies, whether conscious or unconscious. Following is a figure illustrating the major themes found and the connections between themes and the research question.

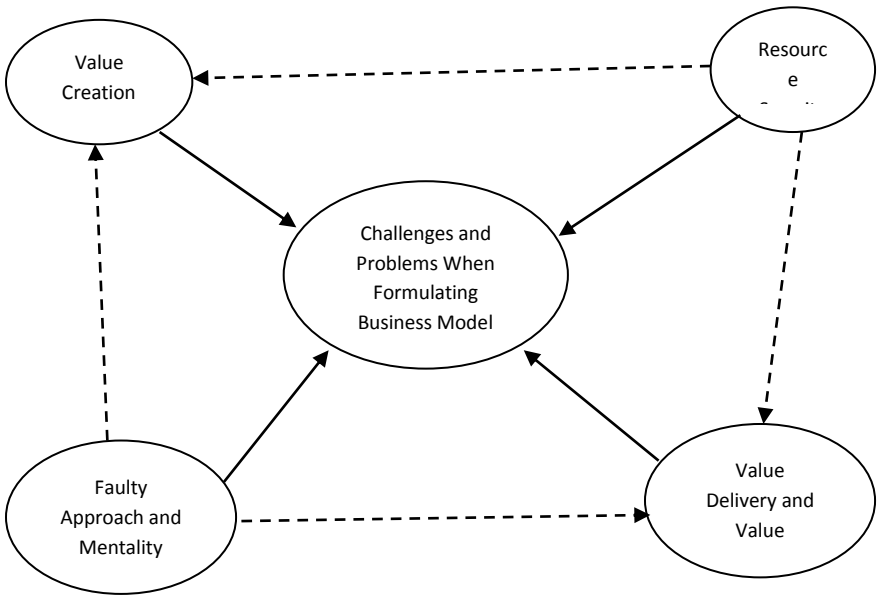

Figure 3 - Illustration of themes found based on patterns in interviews and their interconnections.

As illustrated in both figure 3 and 4, it can be seen the sub-themes of faulty approach and resource scarcity are affecting the value, value delivery and value creation. Table 2 is a detailed table describing themes, sub-themes and content categories used during the construction of theoretical framework of this study. A more detailed figure, figure 4, with sub-themes is presented in the next page, where the sub-themes of each theme is illustrated element by element. This may seem to be confusing and complex when there are interrelationships between themes. However, this can be explained and justified. Lacks of resources and faulty approach or mentality are structural problems in Turkey. As Turkish national education system does not provide adequate education and support, it can be driven that faulty approach and mentality results in business model formulation problems (Bige Askuna et al., 2011).

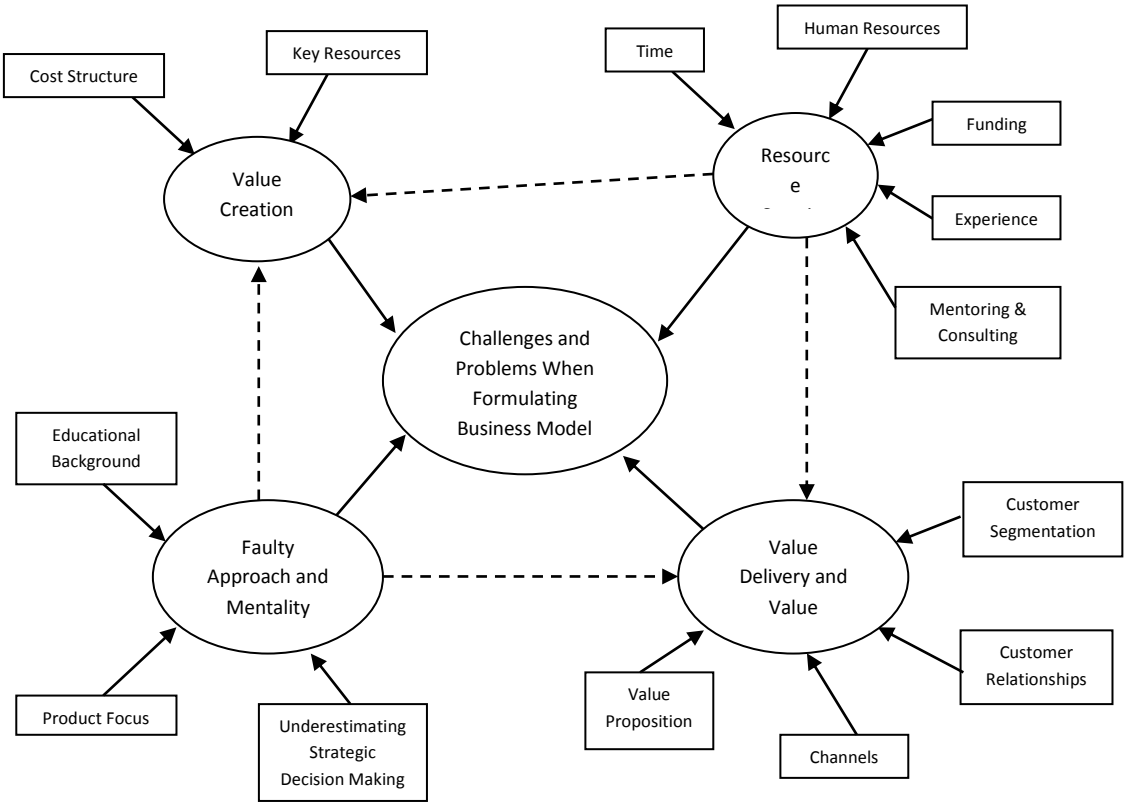

Figure 4 - Illustration of themes and sub-themes found based on patterns in interviews and their interconnections.

Faulty approach and mentality have sub-themes of product focus and underestimating strategic planning implications, where these two sub-themes are also education related at certain level and also cultural (Bige Askuna et al., 2011). Despite for the fact that most knowledge driven entrepreneurs are engineers, it has just very recently been started to give proper business model and strategic planning courses to those entrepreneurs getting funds. Such lack of knowledge resulted from education results in miss-leaded thoughts about the strategic decisions such as business model of a firm. Mentality towards business models is mostly a personal issue of entrepreneurs in Turkey which has its own roots with further macro policies and institutes, so still it is a structural problem. Accordingly, as the goal of this research is not to advice policy or craft an optimal policy, this theme is only considered based on its affects and influences towards the other themes, value delivery and value creation, where these two themes are basically a business related issue and their implications are related to this study.

Table 2 - Detailed illustration of themes, sub-themes and content categories, the numbers in brackets are the number of each content's occurrence in interviews.

Themes	Sub-Themes	Content Categories
Value Delivery and Value Definition	***Value Proposition (61)***	What meets customer needs (12) What problems is solved for the customer (11) What jobs are being done (11) What benefits/gains were provided for customers (10) What was the offering for each customer set defined (8) What pains are resolved for customers (9)
	Customer Segmentation (60)	Who to sell the product to (13) What needs customers have (11) What characteristics customers have (7) Assumption about the customers (11) Customers' behaviors (5) Customer wants (9) Customers differentiation (4)
	Customer Relationships (48)	How to get the customers (10) How to keep customers (9) How to grow customers (7) After sales solutions (8) Customer loyalty (6) Customer satisfaction (10)
Value Creation	***Channels (52)***	How to reach to customers (12) Where to sell the products (12) How to sell the products (10) Customer interaction (10) Reaching out to customers (8)
	Cost Structure (15)	Going over budget (12) Cost control (3)
Resource Scarcity	***Key Resources (42)***	What resources create difference in product (9) Recourses that product is dependent to (8) Resources needed for success of venture (12) Resources needed for transformation of knowledge to product (13)
	Time (36)	Having many things to do and not being able to (15) Time management (11) Passing deadlines (10)
	Human Resources (31)	Not having enough staff (13) Not having expert staff (9) Only having one type of staff with one expertise (9)
	Funding (25)	Being funded by government (11) Not having internal funds (6) Not being able to find external funds (investors) (8)
Faulty Approach and Mentality	***Experience (50)***	Not being a manager or entrepreneur before (12) Being the first venture to be started (12) Not experienced in product development (7) Not being able to foresee future (9) Lack of experience resulting in decision making failures (10)
	Mentoring & Consulting (37)	Not being able to hear from successful entrepreneurs (19) Not being able to be consulted by experienced entrepreneurs(10) Not having a formal/informal mentor (8)
	Educational Background(42)	Being an engineer (14) Not having a business major partner (8) Not having adequate entrepreneurial education (10) Not having formal/informal education courses or conferences regarding entrepreneurship (10)
	Product Focus (47)	Overestimating the power of product (15) Feature oriented mind set (12) Features are needs mind set (11) Product is the value mind set (9)
	Underestimating Strategic Decision Making(28)	Not being able to foresee future of the venture (9) Lack of forecasting skills (6) Lack of understanding of strategy (7) Lack of knowledge of strategic tools (6)

The same analysis and approach is also valid for resources scarcity and this concept and theme must not be confused with the concept of key resources in Business Model Canvas. The resource scarcity, a structural national problem, has its roots in government support, funding and national policies. It was already discussed, in the literature chapter that Turkish funding policies of entrepreneurs still is very focused

on the large enterprises (Özdemir et al., 2009). Also underutilization of youth and support regarding the youth and their entrepreneurial activities result in misallocation of resources by government and many other institutes in the country (Dilek Cetindamar, 2005). Resource scarcity is not only caused by macroeconomic policies, but also at some level it is personal deficiency of the entrepreneurs. Resources may exist, but still entrepreneurs may fail to find and utilize them. This whole concept can be related to the faulty mentality theme and education too. This approach shows that there is another connection, actually between these two structural themes themselves.

But still, it would be of no interest to create a decision support system helping entrepreneurs in terms of these two themes, as it would be both irrelevant to the nature of this study and out of the interest of this thesis. Policy and culture related researchers can focus on these two structural challenges in more detail. It would be totally out of scope of analysis of this research to consider these two themes, as this thesis focuses on the business related implications and crafting a decision support system for policy and macro level related concepts is almost impossible and does not make any sense. In the mean time, as illustrated and explained, there are interconnections between the structural themes and business model related themes. The figure below demonstrates what sub-themes of structural issues affect and influence the themes related to business model and the business. This figure will be referred frequently later, when the business related themes are analyzed and structural issues' influences on these themes are discussed.

Figure 5 shows the interconnections between the themes which are structural and those themes related to the business level and business model. The interactions were shown in more general way in figure 3 and 4, where figure 5 shows interactions and influences directly between individual sub-themes. It was discovered that occurrence of concept of value and value delivery in the interviews was followed with another pattern of occurrence in structural themes, same for value creation.

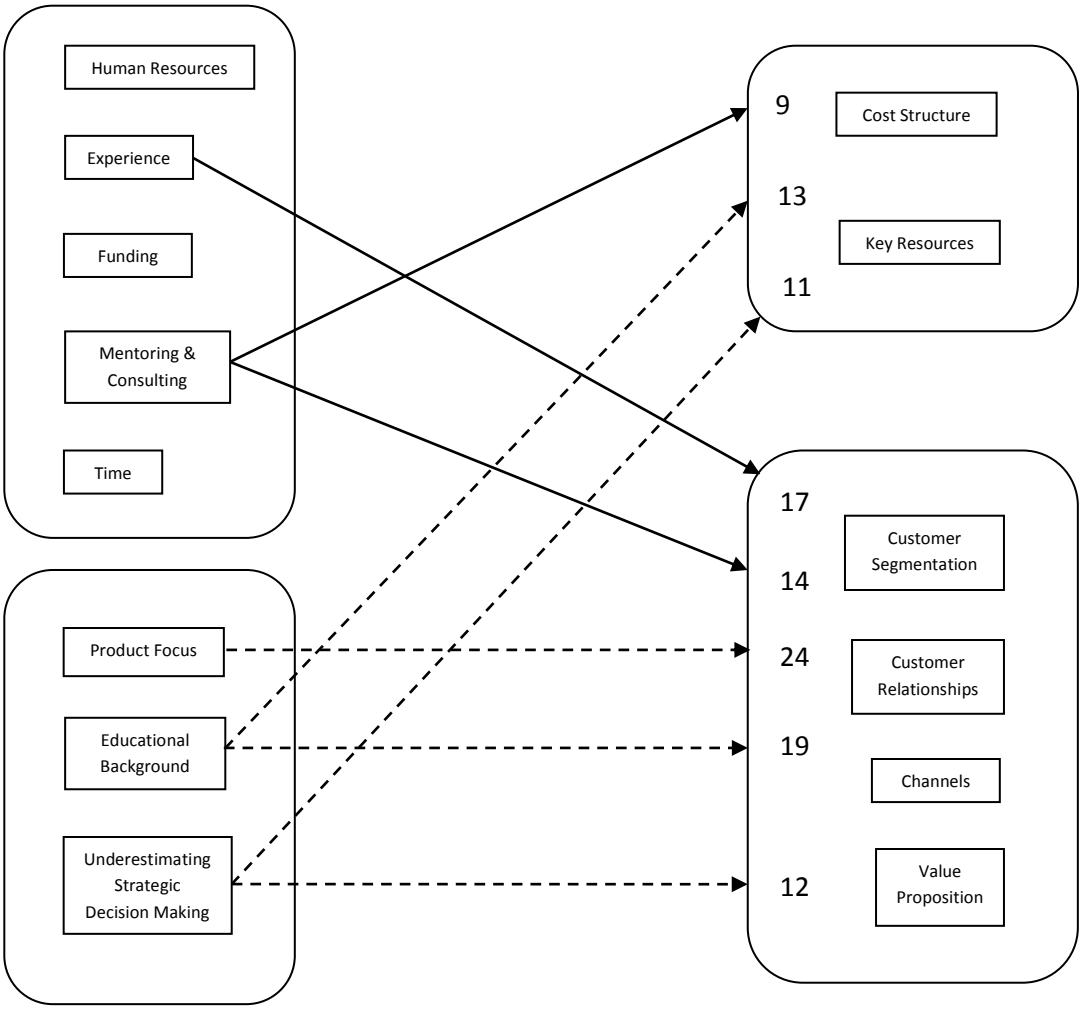

Figure 5 - Interconnections of structural challenges' sub-themes and business related themes; numbers on the lines are the number of occurrence of sub-themes together with the related theme.

Such consequential occurrence let the author to try making relevant patterns between themes and sub-themes, where results presented in the figure 5 have been obtained. This was not a coincidence especially from theoretical framework perspective, where product focus can result is mistaken definition of value, value delivery and value creation (Osterwalder et al., 2015). Same is valid for educational background, experience and all sub-themes demonstrated. The occurrences of each sub-theme together are also presented in the figure, and such influential relationship cannot be neglected. Further steps of analysis will take these relationships into more serious consideration.

Two related themes of value and value delivery, besides value creation are then left to be analyzed and later to be used as inputs for a decision support system. Analysis based on generated sub-themes and categories confirms the intensive pattern in value and value delivery theme and sub- themes, as the value sub-theme has been indicated in the interviews by 61 times, segmentation by 60, customer relationships by 46 and channels by 52. These are the highest occurrence of all sub-themes which were observed compared to other sub-themes of any major theme, which indicates the major challenge for entrepreneurs in business model formulation is under the theme of value and value delivery. It must be reminded that the value, value delivery and value creation are part of the Business Model Canvas directly, where each were discussed in the literature chapter. Also, since the questions of interviews were designed to capture the concepts regarding the Business Model Canvas' sub-items, it is quite natural to see the same concepts and items to show up in the analysis as themes. The first general finding that shapes the upcoming structure and roadmap for this thesis is the fact that the concept of value and those sub-concepts of value delivery are brought together almost always by the entrepreneurs. This reminds a crucial notion which is the product market fit issue. Product market fit can be defined to be the fit between the offering and value provided and the market requirements created by the needs of customers, and this fit creates the first step in formulating a successful business model (Andreessen, 2007). This is exactly why, after introducing Business Model Canvas, the value proposition canvas was crafted by Osterwalder (2015). The whole idea behind value proposition canvas is to achieve a fit between customer needs, pains, gains and jobs with the value provided by the enterprise. Having a fit does not necessarily mean success as if this fitted value cannot be delivered to the customers in a right manner; it effectively does not have any implications (Osterwalder et al., 2015). Value delivery would be the channels used and customer relationships established, so that one can remember the Business Model Canvas' right side. The product market fit problem exists and creates a major challenge for Turkish entrepreneurs as this thesis will illustrate according to the analysis done in the next section exclusively. Accordingly, one can see that there are major challenges under this theme and the thesis will focus on creating a decision support system than can help entrepreneurs develop a better and effective value and value delivery. This is in line with the initial claim of this research that there is a

need for a support system during formulation of business models. For each sub-theme of value and value delivery, this thesis will make detailed analysis in the following sections, so that more comprehensive insights would be provided and a sound decision support system can be crafted.

In the mean time, one may also ask about the value creation theme and concept. This would be a valid and relevant question; however, the theme and its sub-themes show much less pattern and number of observations, where compared to the value and value delivery theme. Key resources occurred 42 times where cost structure was occurred only 15 times, which both are much less than the occurrence of sub-themes for value and value delivery theme. Where all sub-themes of value and value delivery are from BMC and are presented strongly in the interviews, only two sub-themes are observed from value creation section of BMC and one of these sub-themes is actually stated by entrepreneurs "to occur naturally" and that is the cost structure. The entrepreneurs' interviews explicitly mention that problems occurred regarding the cost structure is actually confronted by entrepreneurs as natural. As an example, Serhat indicates "in every project, the projected costs are always wrong and the forecasts never match the reality, it was the same when I used to work in a big defense company too". Most entrepreneurs see this as a deal of daily operations and a challenge faced by everyone, which effectively makes it not a necessarily part of this analysis which must be directly related to the Business Model Canvas and value creation.

The other sub-theme for value creation theme is, however, found relevantly more occurring in the text interviews (by 42 times), but still finding product/market fit problem and focusing on that issue would be the concern of this thesis. The concept of fit is already very complex and sophisticated; besides all internal items and factors related to this problem are in line with each other based on the theoretical framework, making it more sensible to create a decision support system for. As a result, it would be out of scope of this research and it will create a lot more complexity to add a decision support system only for key activities, and this will damage the focus and convergence of final proposed decision support system as an implication of this thesis. Accordingly, only the product market fit problem, themes

and sub-themes of value and value delivery will be analyzed in detail, but before, some general insights and findings will be presented in the following section.

4.2 Additional Findings

In the light of the themes, sub-themes and categories identified so far, approaching from general perspective, this research has findings that confirm closely that the thesis has expected correctly about existence of a need for a decision support system empowering knowledge driven entrepreneurs in terms of business model and strategic decision making. This section of analysis is only concerned with additional patterns which are not related to themes found, but can help readers better understand the general attitudes and behaviors of the entrepreneurs.

From all the firm managers or partners being interviewed, eleven knew Business Model Canvas where only one has never heard of the tool. From those eleven, ten has used Business Model Canvas somehow, before or after establishment of their company. The interviewee who did not, used other tools such as SWOT, business plan and PESTEL analysis, but in the same time the same subject, Onur, claimed "BMC is a great tool to be used, I simply forgot about it, since I learned in university, but I believe it must be used". However, there are entrepreneurs who have used Business Model Canvas with other tools like SWOT and PESTEL. The matter of fact is that entrepreneurs appreciate the applications and usefulness of Business Model Canvas.

First of all, there is convergence from all 12 subjects, mostly explicit; that planning before starting the company plays a great role in terms of success. Explicitly mentioned, the entrepreneurs have realized that planning and tools to do so are crucial for success, but mostly this was realized after the establishment of the company and the concept is indicated with regret of entrepreneurs. As an example, Murat says "I wished I had known more about business plan canvas or strategy before starting our company, we were not so careful, and we thought that just planning the technical part would be enough, but now I see that if we had better planning and more business oriented perspective we would be achieving our goals

much better and faster". Mert, another co-founder, says "me and my friends, we have not actually planned anything, I mean in the sense now I know what planning is" and Pelin indicates "it is liking go to a trip, you plan before going, you plan better you will have a better trip otherwise you will be confused, so planning ahead is not only crucial but also necessary". A subject, Mehmet, manager and co-founder, indicates a different perspective but still implicitly he agrees with the importance of planning, he said "plans are to be changed, plans are never what you follow in reality, strategy changes, plans change everything change, but it does not mean you should go blind". One can find all such indications in interviews, illustrating that despite of previous and pre-establishment perception towards planning, companies of different age from different sectors stress over the importance of planning, and strategic planning. In the same time, most these entrepreneurs can be said to be under the same condition stating that because of their lack of planning, they have committed mistakes that could have been prevented and these had reflections on strategic decision making of the company. Erşan, co-founder, explicitly indicates "we have changed our strategy 3 times from establishment which is about a year and half, and this is because we have not planned and we have not thought about it before carefully, this was a big mistakes".

Another finding that has fascinating insights, especially in the next section of this research, is the fact that most of entrepreneurs interviewed all agrees, mostly explicitly, that they have focused typically on the product rather than asking from the customer what they really need. This topic is a sub-theme for one of the structural themes already discussed which is faulty approach and mentality. Despite of the fact that it is out of the scope of this thesis to discuss it, it has multiple implications in product market fit problem, accordingly, the subject and findings will be presented here as a general finding. Nine co-founders or managers have all indicated explicitly that they have worked out very hard on product features and technology behind the final product and they have spent most of their time on product development, where the remaining interviewed firms implicitly indicated that their major time consuming item was product development. This can seem natural because of the fact the products are generally high-tech which requires the development process to be long and exhaustive, however this must not confuse the entrepreneurs to underestimate the

importance of business related issues which also need care. As example, co-founder Ali says “we had an idea about how to develop the technology behind our product, we planned for it we had time lines and many other things, but frankly we did not do 10% of the same effort on the marketing or sales planning or even organizational planning”. Another entrepreneur, Nurcan says “well we simply though that a good product with good characteristics would sell and people will buy it because it is a good product, but that is not what happened”. Change in the strategies of these entrepreneurs can also be claimed to be caused by not only lack of planning, but also from sole focus on product development. Seeing the mistakes and misplaced assumptions, entrepreneurs change their strategies, which are the same case here as the study shows, however the intensity of mistakes is the matter. It is important to be noticed that even those firms with some entrepreneurs having official business education also failed somehow in predicting customer needs and wants. Onur, co-founder and a business manger said “despite my educational background, we were so into product development, that we have answered the wrong questions, for example in terms of our customer segments, this caused a serious time loss and also loss of revenue”. This clearly shows that it is about the mentality and approach towards technology based products which cause the entrepreneurs to be blinded. Not only this finding is important in terms of product market fit, but also it leads the research to find out that entrepreneurs are convinced that they must develop a product which is “perfect” without considering what the customers actually want. The reason behind this could be educational background and the environmental factors. Being mostly engineers, even if there is business major co-founder or partner, the focus shift unconsciously towards the product. A co-founder, Numan, says “we are engineers, we want a perfect working product, we want it to be the best, someone needs to tell us it is not the case, we thought like this for too long, but with progress of the work we figured we cannot sell such perfect product!”. Similar quotes are observed in the interviews, which also established the thesis claim to be stronger which implies there is a need for support system that would help entrepreneurs.

One other finding shows that there is a misunderstanding regarding the concepts of strategy, business model and business plan in some of the subject we have interviewed. Turkish entrepreneurs mostly know about the concept of business plans

as they also mostly know about the concept of business model. However, some of the subjects interviewed do not seem to be able to distinguish exclusively the differences. One of co-founders, Miraç says "we had business plan prepared and later we tried to create our business model" were business models are more general and business plans must be prepared after. The entrepreneurs whom were interviewed also have used concept of strategy and goal interchangeably, causing the author to believe that there is confusion about the concepts that can also lead to misunderstanding and formulation of mistaken business model. A subject, manager and co-founder, Kerim indicates "our strategy is to be the market leader in our sector" where another subject, co-founder Pelin says, "we had developed another product compared to what we thought at the first place, and our strategy of becoming everybody's choice in the market also changed". Examples like these exist in the interviews; however it is believed that such confusions are natural, as no business major co-founder has made such a mistake, only those who had engineering backgrounds made such confusions.

Last but not the least of additional findings is the fact that, most ideas of entrepreneurs come from their previous jobs or academic projects they have done before. There are many studies in the literature confirming this finding. Scott Shane (2000) indicates that the technological innovations have their roots, in terms of idea, in entrepreneurs experience and background (Shane, 2000), where Amar Bhide (1994) indicates by data that 71% of ideas of entrepreneurs come from previous employment. This thesis has the same findings, as nine entrepreneurs whom were interviewed said they had their ideas from their previous employment, from those three indicate they had the idea from their academic research and two had seen the idea somehow and modified it for use of Turkish market and customers, the rest ha dthe idea directly from previous employment. An example would be what Numan said "I was working in a defense company and I saw an opportunity, my managers did not take it, but I did", where another subject, Murat, says "I have worked on the same idea when I was doing my masters and then I said why not create a product based on the technology I was working on". The evidence suggests strongly that the process of knowledge driven entrepreneurship is an iterative process of knowledge transformation from experience.

Finally, one other fascinating and dramatic finding that concerns this thesis very closely is the fact that the entrepreneurs indicate they know the importance of the business models. Most entrepreneurs express their idea regarding the concept of business model as an evolutionary process. Entrepreneurs, first and before establishing their ventures, did not even know mostly about the concept of business model, however, after the establishment, it seems the entrepreneurial environment and ecosystem has helped them understand the importance of this concept. Besides, the difficulties and challenges they faced made them understand the importance of such strategic tools. Literature suggests that business models with no doubt are crucial. Magretta (2002) says a business needs a good story to be told and it is a business model that tells the story, besides it has managerial insights provided for the entrepreneurs. On the other hand Doganova and Eyquem-Renault (2009) suggest business models are devices providing many helps for technology entrepreneurs. Many entrepreneurs, after being exposed to challenges and information from the ecosystem around them, understand that such a tool can actually help them understand their business better than what they have thought of it. Kerim, Co-founder, says "we did not have a business model in the first place, then a friend who had MBA told us we need it, we did not believe him in the first place, but later when we started struggling then we went back and said teach us what it is" where another subject, Nurcan, gives a more interesting story "we came to Technopark got settled and started visiting our neighbors, one of our friends had this huge paper on the wall full of writings and papers on it, I asked what it is, he said this is what is going to make you rich and he smiled, that is when we were introduced to the business model". These insights demonstrate that concept of business model is not generally a concept that entrepreneurs know and this can be a crucial item for those who plan on educating entrepreneurs. Also, almost all of entrepreneurs we have been interviewed stress on the fact that Business Model Canvas is an important tool that can help entrepreneurs developing their venture. This is a confirmation of our approach towards a strategic decision making tool and a need to create decision support system helping entrepreneurs use Business Model Canvas.

4.3 Product Market Fit Problems

As discussed before in the previous section of analysis chapter, knowledge driven Turkish entrepreneurs clearly put more effort on product or service development rather than planning or focusing on the business side of the whole picture covering their ventures. This can be observed in the occurrence of the sub-theme related to product focus that was observed by 47 times in the interviews. Focus on development of "perfect" product causes the entrepreneurs to lose track of the market requirements. Entrepreneurs are so much focused on the product and its features, they almost forget about the value of the product and the customers they must serve (Osterwalder et al., 2009). As an example, Onur says "we thought our product can be sold to customers who need more security at their houses, however this is was not enough since the customers asked us what difference we had from normal security systems provided by bigger firms, we got it all wrong from the beginning" where Miraç, co-founder and manager, says "we could not define who will buy our products, we knew who will buy but when trying to identify them to reach them it turned out to be a hard job to do, as we had to think it before finishing the product development". Almost all of the subjects interviewed, except firm 6, have all agreed that they have focused on the product so much that they had not enough time or resources to focus on the concepts such as value, marketing, segmentation or even basic budget planning. Even some of the firms such as Onur and Mehmet's companies have done a good job creating business plans, also indicate the fact that their business plans were far from the reality they have faced later. This can be seen as one of the reasons that product market fit problem can occur. It was defined earlier in this chapter when the themes were introduced what product market fit is, but yet it can be explained in more details as one needs to understand the underlying causes of the problem.

Product market fit is defined as "Product market fit means being in a good market with a product that can satisfy that market" by Marc Andreessen (2007). As the writer and author of Business Model Canvas, Osterwalder has published another book, as indicated before, which is the Value Proposition Design, including value proposition canvas that was discussed earlier in literature section (Osterwalder et al.,

2015). In the book the author indicates three types of fit, in regard to business model concept, which are problem solution fit, product market fit and business plan fit (Osterwalder et al., 2015). Problem solution fit is actually existence of a problem by customers and entrepreneurs solution to it, but yet this fit is only conceptual and does not provide any proof of general fit of your proposed value to the customers (Osterwalder et al., 2015). This alone is useless for customers, until entrepreneurs achieve product market fit which is the evidence of providing value meeting customer needs, and then the whole business model must have a fit, meaning value, value delivery and value creation must be fit (Osterwalder et al., 2015). The important issue to be discussed is that concept of value and segmentation is the market fit issue, and value delivery factors in between must also be fit so that product market fit could be achieved. Based on arguments and discussions in 4.1 Thematic Analysis Structure section, it was claimed that the main themes suggest there are challenges in defining value and value delivery faced by entrepreneurs during formulation of business plans using Business Model Canvas, followed by product focus problem, resource scarcity and educational background issue, which leads to product market problem. The total of occurrence of value and value creation theme is higher than any occurrence in the themes, leading to the evidence that product market fit problem is obvious. Here, the evidences for such theme which was observed and underlying causes were explored in detail to support the claim of this thesis, the product market fit is where the focus will be in order to create a helpful decision support system (if needed refer to section 4.1 to see the reason why product market fit and related theme is selected).

Asking from the entrepreneurs their major challenges and problems while formulation of business plan, has provided valuable insights as the interview questions were designed such. When looking at the responses, ten firms gave almost the same response of defining value right side components of Business Model Canvas besides the concept of value itself. From these ten firms, 9 saw concept of value challenging, 8 saw segmentation as a major challenge, where 5 indicated channels to be challenging and 6 customer relationships. From the two other firms, coding of the interviews showed, they saw right side challenging but yet not as crucial as the other 10, where the nature of their business which was B to B could

have affected their judgment. Still one of these two firms confirmed that they had struggles with customer segment definition. As an example of interviews showing these findings, a company co-founder, Erşan, explains “marketing and selling the product is hard for us, and was also hard even during planning to do so, we have a wide range of customers, reaching to them making promotions even defining their characteristics took a long time and of course we made several mistakes”. Another subject, Pelin, indicates “we read Business Model Canvas and we try to write down customer needs, but simply we do not know the needs and at first, to be honest, we did not even know what need means in core, so all the things following were designed wrong”. It can be claimed that the concepts are hard for entrepreneurs, especially those without management degree, which is the majority of subjects we interviewed.

Not only based on Business Model Canvas, but also based on the daily operations and challenges faced by entrepreneurs, same results presented above were found. When the entrepreneurs tried to apply their business models, under different conditions, many have agreed that what they have planned, especially regarding the product, was later rejected by the customers. A subject, Erşan, presented “while our product was introduced, everything seemed fine, but in a very short time requests of more customization of security systems has started, then almost in a month nobody was buying our product as they wanted it customized and we have not thought about this in our business plan” confirming the statement made and there are 4 other explicit examples in the same manner. Not only the product, but also how the entrepreneurs decided to deliver the product also changed. The channels were actually a serious problem here as 6 of interviewed firms confirmed they have changed their methods of reaching to the customers in reality because, either channels were not reaching their customers, or these channels were actually the wrong channels to reach the customers. “First we believed that customers want to buy our product from internet, but our attempt of selling from internet turned out to be disaster, information e have confirmed that they will buy from internet, but they actually wanted to test the product and we found this later” says a subject, Kerim, in confirmation of the point presented.

The evidence clearly shows that there exist a serious concern and challenge regarding the right side of the BMC which indeed is the product market fit issue. As pointed out before, the theme of value and value delivery is actually the product market fit issue, and accordingly as this theme needs to be analyzed in more detail, following sections will consider all sub-themes of this theme, where the sub-themes occurred the most compared to the other sub-themes under three different issues stated. It is crucial and remarkable that showing existence of challenge as product market fit requires this research to analyze the components of product market fit concept in more detail, which is why the next 3 sections will focus on the sub-themes of value and value delivery.

4.3.1 Value Proposition

Value proposition is one sub-theme and concept that creates a lot of challenges for the entrepreneurs. When it was asked what part of business plan canvas was challenging and the asked the real life daily operational challenges, lots of same in meaning answers from subjects were seen. Sub-theme of value was counted to occur the most in the interviews (61 times) and it shows a great need for evaluation and analysis. Value and its definition is where most people start the BMC and that is where if the assumptions and definition of product or service is considered unrelated or inappropriate then the whole business model fit will be under questions, as the product market fit would be. It must also be remembered that product market fit requires matching of value with the customers. The value proposition is consisted theoretically, by the perspective of BMC, of solving problems of customers, creating gains and benefits, reliving pains and getting the jobs done, but all these concepts are naturally connected to the needs of the customers (Osterwalder et al., 2015). When asked from the subjects, about formulation of business model and challenges, in the first step, they seemed to all had difficulties, even those entrepreneurs and firms with longer history, having still trouble defining their value. This can also be referred in literature as being subjective towards the venture and being overconfident regarding the assumptions made (Mulders, 2012). The analysis yet shows that all content categories of this sub-theme are occurring very similar to the concepts introduced by BMC itself. It is strange that the entrepreneurs have assumptions regarding customer

needs, for example, co-founder Numan says “we worked with our customers to understand what they need, and we developed our product accordingly, but actually after what we developed as our prototype in the first place” and this is an indication of knowing the concepts, but not being able to put them together. When needs are to be matched with the value then it seems to be the hardest part for the entrepreneurs. Serhat says “I have worked for years with the same customers in a different company, I knew their needs, but when my product was launched they said this is not what they really wanted”, which clearly shows that the value defined from the customer needs was not properly defined. The difficulty does not end here, since according to Osterwalder (2009 & 2015) the identification of needs is not adequate and entrepreneurs must understand what pain they relief, what gains they create and what jobs are being done, which will lead to the bundle of the product that later will be offered to the customer segments which have been identified. Most entrepreneurs who have been interviewed start from problems the customer face, and later they develop the product without thinking about the product value, gains, pains and jobs. This is again related to the approach and mentality caused by product focus which was explained in previous sections. A subject, Murat, says “we started by the fact that our customers, Turkish air force, needed a coating material to reduce radar contact and we started working on our product, later we tested our product and showed the results to authorities, but it was not enough, they said they had a product from U.S that was certified” which shows the fact that the company has missed the fact that it needs the job to be done by certain certifications. Another co-founder , Kerim, mentions “our device is the only device that can diagnose the infants’ major disease, but people still want to see a doctor to make sure, making our product a bit useless!”, where it is clear that the entrepreneur has missed the importance of how to relief the pain of the customers. There are various other examples showing that the concept of value and needs is not accompanied with the sub-concepts introduced above.

It is finally important to remark that value proposition, as the core of BMC, needs to be done while the customer segments are being identified so that there would be no conflict between the value proposed and value delivered to the customers. Such conflicts can be observed in the interviews where the entrepreneurs have a value that

does not match the customer set defined. This does not mean the value is not what customers need, it means a right value is defined but the customer set targeted is wrong. Co-founder and manager, Erşan, says “we had designed our product and its implications of how it will meet customers’ needs, but unfortunately a very small mistake caused lots of damage. We thought that our customers were people who want their houses to be smart, but actually our customers were the big construction corporations”. There are many other evidences of the same pattern that indicate the concept of value is complex, hard to imply and apply where the knowledge driven entrepreneurs with product focus perception face the challenge even more. As a sub-theme of the theme being the major focus point for this thesis, it can be concluded, there is need for a support system that will help the knowledge driven Turkish entrepreneurs define and design their value. This claim is again based on the discussion that value proposition is a crucial part of product market fit problem.

4.3.2 Customer Segmentation/Segments

As a sub-theme of value delivery and value, customer segmentation and segments play a crucial role in product market fit. If the value is defined right, but wrong set of customers are targeted, then this will directly result in product market fit failure and essentially causing serious challenges in formulating business models and their implementation. To define customer segments, entrepreneurs need to have assumptions with relatively a simple market research that can show them the needs and characteristics of customers. The same information is also needed to define a proper value, as discussed earlier (Osterwalder et al., 2009). Besides, as claimed by this research, the structural themes presented in section 4.1 can have significant influence over the sub-theme of segmentation. As illustrated in figure 5, the product focus, lack of experience and educational background are connected to the segmentation just like they are influencing the value proposition. It is also important to notice, that customer segmentation and segments is the second most occurred sub-theme in the interviews, which can actually be explained by the fact that if there is a product market fit problem, it is natural to observe such a pattern together with value proposition’s significant occurrence level.

Looking into the concept as a major challenge in formulation business models and considering the product market fit, as the literature suggests the view of customers and their needs is essential to understand the product development process (Blank, 2006) and a product development process without presence of customers is not going to serve a purpose. This problem is observed in this thesis, where the entrepreneurs start their product development; stay focused on the product without asking the customers, resulting essentially in customer segment needs fulfillment. A subject, Miraç, indicates "when I had my thoughts about the product we developed I have asked my friends and those near me about this product, which is a platform of exam questions, my mistake was that those close to me already had the problem of obtaining Olympiad exam questions, but yet others who really were my customers, I have never reached them". What this co-founder mentions is the main reason that the product development failed as the true customers were not asked, and the true customers were not segmented either. A different co-founder and partner, Mert, mentions a different story that can have different implications, she says "it was a great challenge to see what customer wants, as there are many customers and actually all of them want different things, this is where things get tricky, as we have used Business Model Canvas but we could not segment our customers, we could not put them in a cluster!". This case shows a different reason for customer segmentation to be a challenge for the entrepreneurs and it is an application related issue. Understanding the concept of needs and customer segments may not lead immediately to the right customer segmentation in reality. Since, most of these entrepreneurs, almost all of them, had not applied customer segmentation in a real life case; it can be frustrating to apply the concept. This can also be looked from this thesis' perspective that claim of the research for the need of a decision support system is necessary and important to be noticed.

As mentioned in the value propositions section of the analysis, the value proposition is generally the first place that entrepreneurs start their formulation of their business plan, but it must be remembered that the assumptions of the entrepreneurs is based on the customers and the segments they want to serve. In fact, some authors claim that it is better to have the segmentation filled in the BMC before value proposition. The assumptions regarding the customers, if wrong can also have reverse effect on

the value proposition, such that the proposed value will not make sense. An evidence to such case is actually observed in the interviews, where Pelin, a co-founder, states "we had prepared all the requirements for our product and we have defined finally (after using BMC) our product's value, but we have missed the fact that the customers we were thinking to capture and serve were very different in their nature, I mean we had segments in our mind but the reality was that there were too many of them to serve, and eventually, we had to look back again and find the most promising customer segment and this resulted in change of definition of our value and features". Such cases exist in the research of this thesis, as 4 more entrepreneurs indicate explicitly that when the customer segmentation was going to be formulated the entrepreneurs had to go back to value proposition as they faced either mistaken assumptions about the customer or they had to redefine their value proposition especially because their customers were much different from each other in the segments. Realizing this important insight, has very important implications for this research as a need for a decision support system seems essential, but when designing it must be remembered that if the entrepreneurs face such problem, it is better the system starts form the segmentation rather the value proposition to make sure that entrepreneurs will not face conflicts later. This will be discussed in more detail in the next chapter of this research where the decision support systems are introduced.

Finally, there is another insight and finding that can be addressed. The segmentation process does seem to be complex, confusing and time consuming as much as the value proposition module of BMC. Having been observed just a bit less than the sub-theme of value proposition, it made the author wonder how challenging the segmentation in its nature is. When asked form the entrepreneurs about their challenges and their daily challenges besides the business model formulations, those with consumer products have all implied that in the reality the segmentation which had been done does not work properly in the real venture. This can be claimed to be natural by some, where this thesis finds it interesting and sees the concept worth analyzing. A manager and co-founder, Miraç, says "we have designed everything, we thought everything was ready to go, and then, customers were asking weird questions, just like they did not know they needed this product, we were pretty sure they needed it as it solved lots of problems, but still the segmentation we did was

mistaken apparently, it was surprising and disappointing". This is not the only entrepreneur stating such a problem, six more entrepreneurs have claimed that the characteristics, needs and differentiations they have provided based on their segmentation actually did not work when applied. This can be seen as also a lack of experience and operational problems, yet it shows there exist a challenge of implication and it can be explained based on the fact that BMC is a tool of formulation and it is not a tool for application. This finding is in line with the purpose of the thesis, besides it reminds that a decision support system to solve product market fit problem cannot only consider the theoretical framework of BMC but it must also consider the applicability of the results, especially for a concept such as segmentation that has direct implications and applications and is not as abstract as value proposition.

4.3.3 Customer Relationship and Channels

Customer relationships and channels are the concepts connecting the value proposition to customer segments, sustaining the product market fit (Osterwalder 2009 & 2015). These two concepts are separated in the Business Model Canvas, yet, there are reasons why they will be analyzed under the same section. There are basically two reasons, one is regarding the analysis and the other is regarding the structure of the decision support system to be proposed in the next chapter. For the second reason, please refer to customer relationship and channel DSS section in the next chapter. However, when the analysis is concerned, it must be discussed under this section.

Customer relationships and channels have been observed to be occurring in the interviews together most of the times. As the practical framework suggests (which will be discussed in the next chapter), the concepts are interrelated and entrepreneurs apparently like to use the concepts together. In the interviews, it was revealed that the sub-theme of channels and customer relationships are observed 52 and 48 times respectively in total according to the total of content categories, where 29 times they have occurred together in order. As an example Ali said "we had to rethink the way we must reach to our customers and then try to keep them as our customer, in our

sector it is really important to get into the buyers (defense companies such as TAI or ASELSAN) and keeping them happy is the only way to prevent them buying from foreign suppliers". "Reaching to our customers" and "keeping them happy" are clearly followed each other, showing the relationship between channels and customer relationships. In another passage, Pelin indicates, "implants are not easy to be sold, as you need represents going around the doctors, convincing them that the product you are selling is better than the other brands, the same sellers must also go frequently to doctors visit them on frequent bases". Examples as such repetition are many, showing actually that there is a connection between the two concepts. It is indeed understandable and predictable, since the concepts are theoretically close and related, besides separating these concepts by entrepreneurs in a professional manner is not possible with lack of expertise and also knowledge. These two sub-theme value and value delivery are the value delivery concepts in Business Model Canvas, and the author here sees no reason to keep them separate from each other, considering the insights explored above.

More detailed analysis, shows that where the main challenges lie. It was revealed that entrepreneurs have changed their initial idea of channels. Eight firms confirmed that they had to change their channels as the primary idea of reaching customers was actually not working. Serhat indicates, as an example, "we thought that we can go into the door of companies like TAI and sell them our product, we were not wrong, they liked our product, they wanted our product, but since we never had any contract with a defense company before, and we never have sold anything in the records, we were not qualified to enter to the auction, and we never actually thought it would be a problem as we are the only ones producing this product in Turkey and we thought they shall show some flexibility, and they did not, so we had to find a bigger defense contractor to sell the product for us". Kerim, as an entrepreneur producing consumer electronics in medical industry, said "we wanted to sell from internet, it seemed easy and practical. Then we faced the problem, no one buys a medical product that is supposed to protect their child". Both examples illustrate clearly that the entrepreneurs had wrong assumptions regarding their customers that resulted in wrong channel selection. The assumptions regarding customers are already discussed in the segmentation section of analysis, yet one can see if the assumptions are wrong,

what can happen in reality and application. The channel selection process was and is a dilemma for the entrepreneurs and seems to be in need of a support system.

When looking at the customer relationships, the results were same as what was observed and found in terms of channels. Customer relationships, like channels, seem to iterate quite, especially when the entrepreneurs start launching their product to market. This has two implications, one, the entrepreneurs do not think about customer relationships until they have to, and two is the fact that even if they have planned, they have not planned the customer relationships as they must have. Erşan says "we thought that we had enough modular systems to provide our customers lots of combinations with their smart home systems, but since our major customers actually ere the big construction companies, the story has changed. For a single customer, he or she can customize the system, let's say from internet, but these corporations were different, to keep them happy and satisfied, we had to give a basic system then when the final customer comes and buys the home we must add new modules as the house owner wants". This example clearly shows that entrepreneurs such as Erşan are confused as the concept of customer relationship is very actually complex and needs specialists only to deal with it. Another example is from Miraç saying "two different customer sets, one is the colleges who buy questions from our system and then the normal individual users who are the students; there is conflict of interest between these two, colleges want as much as questions as possible where individual users want few but relevant questions to where they have weakness, how can you make both happy?". As channels have iterated and developed over time, customer relationships do too, but it is already too late starting to design both channels and customer relationships, when the product is ready.

More examples around channels and customer relationships can be provided, yet the topic is actually more complex than expected. The author expected the value and segmentation to be the most challenging parts of entrepreneurs' problems, and the evidence supports this expectation as the sub-themes of value and segmentation have occurred more. Yet, since channels and customer relationships are actually the applied parts of the Business Model Canvas; the challenges faced can also be harder to be resolved. When said they are more complex, it is not only because of the

application of each concept, but also because of the nature of concept to be deeper and more detailed than abstract concepts such as value proposition.

According to the finding presented above, it is believed that the entrepreneurs need a ground base to construct their channel and customer relationship upon. This can be provided by a decision support system, yet it is hard to have the system cover these two concepts which are each more complex and vast than segmentation and value combined. A decision support system can provide a general perspective, where the entrepreneurs can later add and develop their customer relationships and channels according to this initial general plan. More about this will be discussed in the next chapter of this thesis.

4.4 Turkish Entrepreneurs' Requests Based on Business Model Canvas

It was already discussed that the author has put a specific question asking what entrepreneurs expect the business model to offer them and another question asking the general perspective of the subjects about what they think is the most important form of support for entrepreneurs. Also it was asked if the entrepreneurs prefer a person to help formulate their business plan or a guideline like system. These questions have provided the thesis with valuable information of what the potential users of the product of this thesis would expect from it. First of all, interviewed knowledge driven Turkish entrepreneurs seem to all agree on the fact that Business Model Canvas is a valuable tool for strategic decision making purposes (this was already discussed in the general finding section of this chapter), only one entrepreneur, Mehmet, stated that "BMC is just a tool, entrepreneurs must not trust it, it is just a guideline, it will not make miracles and it will only help us to see a bit clear". But other subjects have different views such as Ali saying "BMC is a great tool, I did not know it in the first place, and I learned it later and I think it was one of the things that help us succeed, it is great tool" where another subject, Erşan, says "I have used it in my previous employment, not directly but I was in the middle of all people using it, and I think and believe, it is a single tool that gathers all of what my company needed to start its work, it is not detailed and it does not need to be, it is an umbrella." As most subjects agree that BMC is a good tool, then an integrated

decision support system with the tool will be a “to the point” effort and it is proper to accept the BMC as a sound ground for development of a decision support system solving product market fit problem.

Secondly, it was shocking that most of the subjects agreed on a single fact that experience of other entrepreneurs is the most important support item that can help them in terms of their business operations and product development. The frequency and intensity of statements of subjects was so high that the author has considered this an important perspective that can help the thesis develop better decision support system. A subject, co-founder, Murat states “I wish, instead of frequent asking of successful entrepreneurs who have already been sold out or acquired to come for conferences, they bring people who have failed and are in the same situation as us, I mean early stages, then a knowledge platform is created as we can all share”. The entrepreneurs with more experience on the interview list, have the same approach as the young companies and entrepreneurs, Numan says “my company is almost 3 years old, and yet I feel that I need experience of others, you know the old saying that when I fell down from the tree do not bring the doctor, bring who has fallen too”. Then it can be concluded, there is a definite need for experience mentoring and consultancy, and it would be unrealistic to claim that a decision support system can help as much as the experience of other entrepreneurs. Yet, a decision support system can consider the major advices of other entrepreneurs while crafting its system. A sophisticated system can embed these advices for more flexibility and more expertise on special cases, however, in the case of this thesis and scope of this research, it is not possible, as the number of firms interviewed is very limited and there is a need to create a a data base and a powerful software. But still, this can be taken as a further implication for development of a more sophisticated decision support system.

It is interesting that half of the subjects see a person to be better to advise them when formulating their business models; while other half thinks that a guideline would be a better choice. From those 6 who believe a person is a better choice, 2 have business major partners or co-founders, while other 4 are all companies less than 12 month of activity from the establishment. This provides a valuable insight which is the new companies have lots of things to do and a consultant or an actual person can reduce

the burden or their work load, while those companies with business majors as co-founders have other concerns, as these business majored entrepreneurs need more insights and they know more than other co-founders who are engineers. They need more flexibility and more case based approach, and that is why a person is their preference. A business major entrepreneur, Onur, said “I already know what the general idea is, and I have many things to do, for details a person would be just perfect, will save lots of time and I can learn a lot more in detail”. All those who agreed on a guideline based help are engineers and think it will be more time saving and more practical and cost saving if there is such a guideline. A subject, Mert says “I would like to do it myself, learn and then apply the procedure, I can do then at home or before I sleep, it is more practical”. Considering the fact that most Turkish knowledge driven entrepreneurs are engineers and did not have any official managerial experience or education, proposal of a decision support system that has a schematic approach and is just like a guideline is going to be what the majority of entrepreneurs want, so that constructing such DSS seems to be useful.

Not only being a guideline or a person, but also what must be offered was also asked and the answers have provided as much valuable results as the previously discussed matters. Most entrepreneurs require the consulting party or method to be step by step, understandable system that they can review overtime. Even those who want a person want him or her to advise them not theoretically but practically and entrepreneurs do not want to be overloaded by information. A subject, Nurcan, clearly states “well I do not want it to be like reading a book that I do not understand its concepts and I need to go find other five or six books explaining what these concepts are; I would like to have a guideline that does not confuse me because the concepts are already confusing for us”. Simplicity in terms of understanding and also application is a major request and concern of the entrepreneurs. If someone or something is going to help the entrepreneurs the process must also be clear which means that the entrepreneurs could know what concept belongs where and where this concept and its applications will go after a certain stage. An explicit statement by a subject, Numan, indicates “personally, I have been an engineer for 8 years, and my mentality is that everything must be at a certain place at a certain time, I mean there must be an explanation of a what is where, especially if it is about something important such as a

business model of a company". Such a statement and example confirm the fact that if a DSS is going to be constructed, it must ease the process of business model formulation not make it harder, which means, it must clearly show how the process is happening and if needed provides the entrepreneurs with related important materials, not a load of conceptual approaches.

Finally, also it must be indicated that, the entrepreneurs require more course, conferences and educational materials, where this may not be part of the scope of this research, yet it can open sight to some insight relevant. Requesting for more education means that essentially the entrepreneurs know, or figured out at some point, they have lack of formal or informal business and management skills. The daily operations have shown them that managing a company is more than just developing a good product, as a subject, Murat, states "well when it comes to accounting for example I have no idea what is going on, this is a serious problem, I have to trust my accountant everyday for something I cannot even control, this is a daily problem I face". Erşan, a co-founder, also says "we have some conferences around, of course we cannot go to all of them as we have a product to be developed, but when I look at the topics I see I can use these conferences in my business and I hope I had more time to attend all of them". These daily based problems may not be part of the business model process, but can help one to understand what entrepreneurs lack and what may help them such as a DSS. A decision support system cannot fill the gap of education and training required, but it can ease the process of learning and it can help the entrepreneurs develop their businesses faster, since such DSS will help the entrepreneurs apply the educational materials faster, than actually the general educations themselves.

CHAPTER 5

PROPOSED RULE-BASED DECISION SUPPORT SYSTEM

5.1 Addressing Product Market Fit Problem

As discussed in section 4.2.1 of this thesis, the analysis and findings regarding the existence of product market fit problem is obvious. Product market fit problem is discussed to be a result of many factors, including lack of entrepreneurial/managerial education, too much product focus, lack of experience and finally mismatch between the value and customer segments. This essentially results in misunderstanding, especially, the concept of value, customer relationships, segmentation and channels, where these concepts are also the most challenging for the entrepreneurs to overcome. Misunderstanding these concepts followed by too much focus on product and development results in incorrect business model formulation that creates the product market fit problem, which will essentially result in business model mis-fit (Osterwalder et al., 2015). Clearly, to address such a problem, one must help the entrepreneurs to craft their business models better by guiding them through each step and item of the right side of the Business Model Canvas. Product market fit problem can be solved by offering a simple yet structured and comprehensive decision support system (Keen 1987). Such decision support system must not overload the entrepreneurs to do lots of readings or knowledge gathering; instead, it must be user friendly and refer to only important definitions when required. As discussed earlier, the right side of the Business Model Canvas, delivery of the value to customers, and value itself seem to be the most challenging part, so that if all concepts are covered in a decision support system, the problem must be reduced to a minimum level, yet a decision support system cannot guarantee full solution if assumptions of entrepreneurs and information gathered by them is not sufficient enough. Since these concepts are interrelated, yet separated in the Business Model Canvas, the author has decided to create separate decision support systems for each item concerning product market fit issue. Of course, it must be remembered that customer relationships and

channels are put in the same support system, where value proposition and segmentation are separate systems, however the user is required to refer from one to another, because of the segmentation and value proposition's nature to be closely related. These references are explicitly mentioned in the support systems and also are explained in more detail in the following sections.

Decision support systems that are going to be proposed in the following sections of this chapter is designed to use fuzzy logic, rule-based approach (Malinin, 2014). The main reason for such selection is the fact that rule-based decision support systems are constructed on linguistic rules that can be easily communicated with the entrepreneurs (Malinin, 2014).. No calculation is required, yet the system takes the entrepreneur through a well defined step by step process. Since rule-based systems are easy to understand and are documented, users can go back and iterate over the previous processes (Schauer, 1991). A rule-based decision support system can be said to be the best choice for addressing product market fit and help entrepreneurs formulate their business models, also since it does not require previous experience, and no especial knowledge. Accordingly, entrepreneurs who already have problems with the time and lack of entrepreneurial education can easily use such a system (Hayes, 1985). In the following sections, proposed decision support system is explained in detail, and finally its implications are discussed in the last section of this chapter. It is important to notice that, this support system is intended to help the entrepreneurs design more accurate business models, yet it does not aim to solve all entrepreneurs' problems, as the system is designed as sophisticated as possible yet as simple as possible, since it is a requirement by the entrepreneurs that such a system would be easy to use and not confusing (these requests are analyzed and explained in the last section of analysis chapter).

5.2 Decision Support Systems

Before starting to illustrate and discuss each decision support system in detail, some notes must be made. First, the round edge boxes are decision nodes, where sharpe edge boxes are information boxes. The decision lines all have directions that show the user how to proceed. Some of these lines are dot lines, which technically are no

different, but they are dot lines to avoid confusion because of existing intersections. There are especial reference links which are explicitly mentioned in the decision support systems. Many notes and definitions are provided when needed, but still the references are tried to be kept simple and not overloading.

The user must notice that there are logic loops to make sure that the process of decision making is done correctly and whenever the user starts to loop, he or she must understand it is because of a lake of certain information from previous steps of the decision support system. There are some time lines that are not decision lines which are just direction lines to information boxes that provide deeper information especially if the concept is important or confusing. These extra information boxes are put to ease the process of understanding. When user faces different color boundaries, he or she must read the note provided separately, since generally in our systems it means there is a repeating cycle or that this specific section must be referred later to, again. The user must also be aware that, there are output situations, where the user must go back to the beginning as the system has detected a serious conflict or lack of a certain important information. When the boxes have different colors, it means either the box contains important information or it is the end of the process of decision making. It was tried and aimed to help the users by only providing yes or no answers and questions such that the process would be as easy as possible.

It must be remarked that all three separate decision support systems are part of a single system, where only because of ease of use and applicability issues, these systems have been presented separately. Also it must be indicated that the user must see this as a whole process and he or she should not avoid any of the steps provided or any of the decision support systems.

5.2.1 Customer Segmentation/Segments

Despite of the fact that many would agree on the issue that value proposition is the heart of the Business Model Canvas, to construct a decision support system; this thesis would start from the customer segments. The entrepreneurs have assumptions regarding the product or the service they want to develop, and these assumptions are

the underlying bases of the product idea which is developed by entrepreneurs' experiences. These assumptions are the ground on which the whole idea of business is constructed on. As discussed previously, most of the ideas for entrepreneurs come from the previous employment or previous education research processes (Shane, 2000 & Bhide, 1994) and this was explained in the additional findings section of this thesis. The basic idea of the product that comes from the assumptions has its root in the concept of need. Need of the customers is where the whole concept of value, segmentation and product market fit starts. Starting from segmentation would help the entrepreneurs cross check these assumptions, and then formulate their value, since the concept of need comes from the customers, yet is indicated the most in value proposition design.

Starting from these assumptions and the segmentation would help the entrepreneurs to examine their assumptions about their customers resulting in better value definition (Osterwalder et al., 2015). Segmentation DSS is, however, connected to the value proposition DSS. Starting from segmentation does not mean that the entrepreneurs must do the value proposition formulation later. Segmenting the customers, in the mean time, clarify the concept of the needs that leads to clarification of the concept of value. Starting from value requires lot of effort and thinking that can end up in defining the wrong value proposition, since the concept is very abstract. However, segmentation is more solid ground to start understanding the needs, characteristics and nature of the customers. To make sure that value proposition design and segmentation goes by each other, there are direct links and reference points that the user needs to refer between two DSS. These links also make sure that product market fit problem is taken care of.

Following figure is the rule-based decision support system designed for segmentation process. Since the system is complex and its size is large, a general picture is presented and in the following pages, detailed views are illustrated in separated sections. It must be noticed that there are numbers presenting each section's detailed picture. In order to make following the sections easier, the first detailed illustration iis section one and other sections continue in the mathematical order.

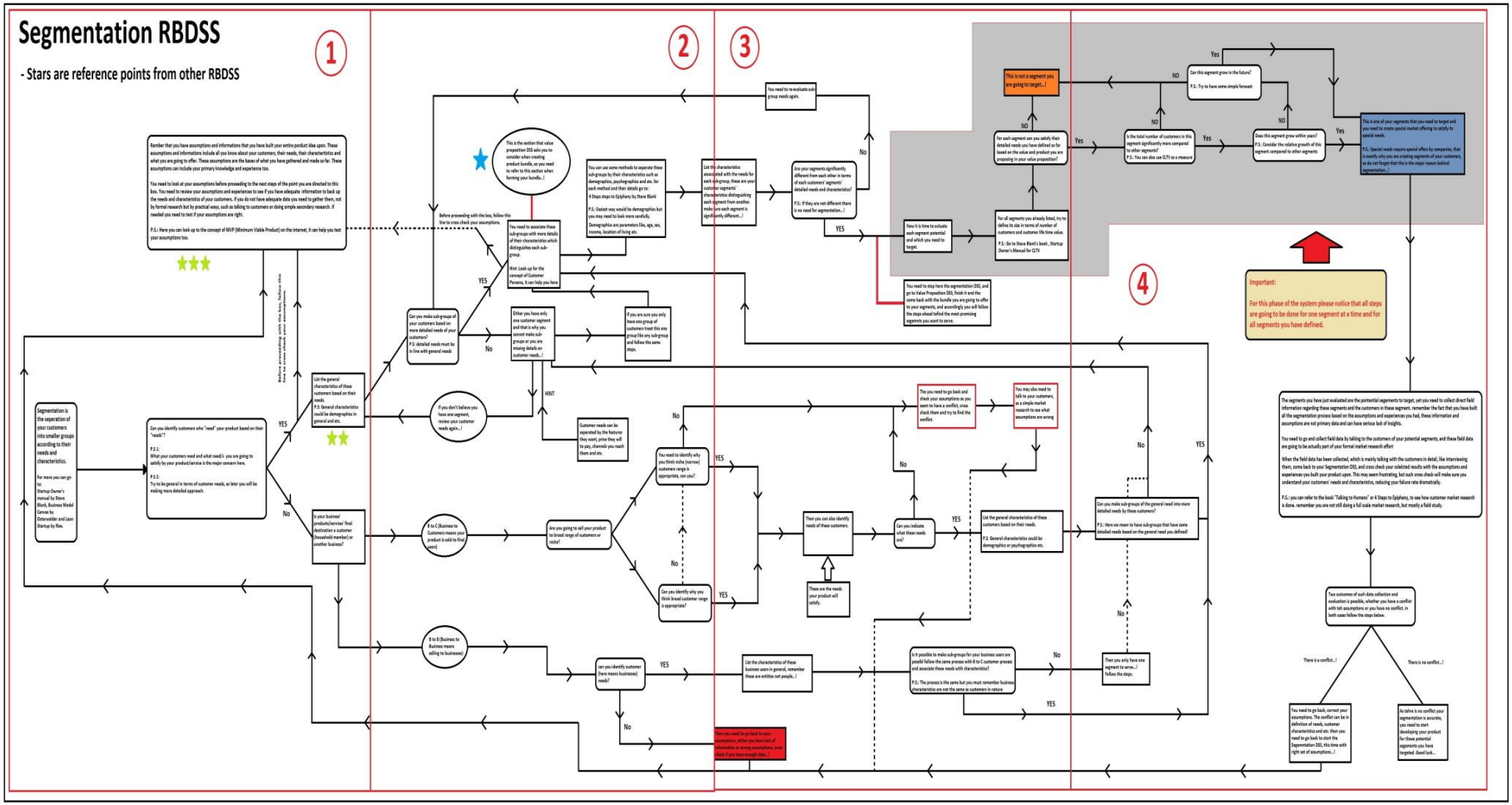

Figure 6 - Segmentation Decision Support System

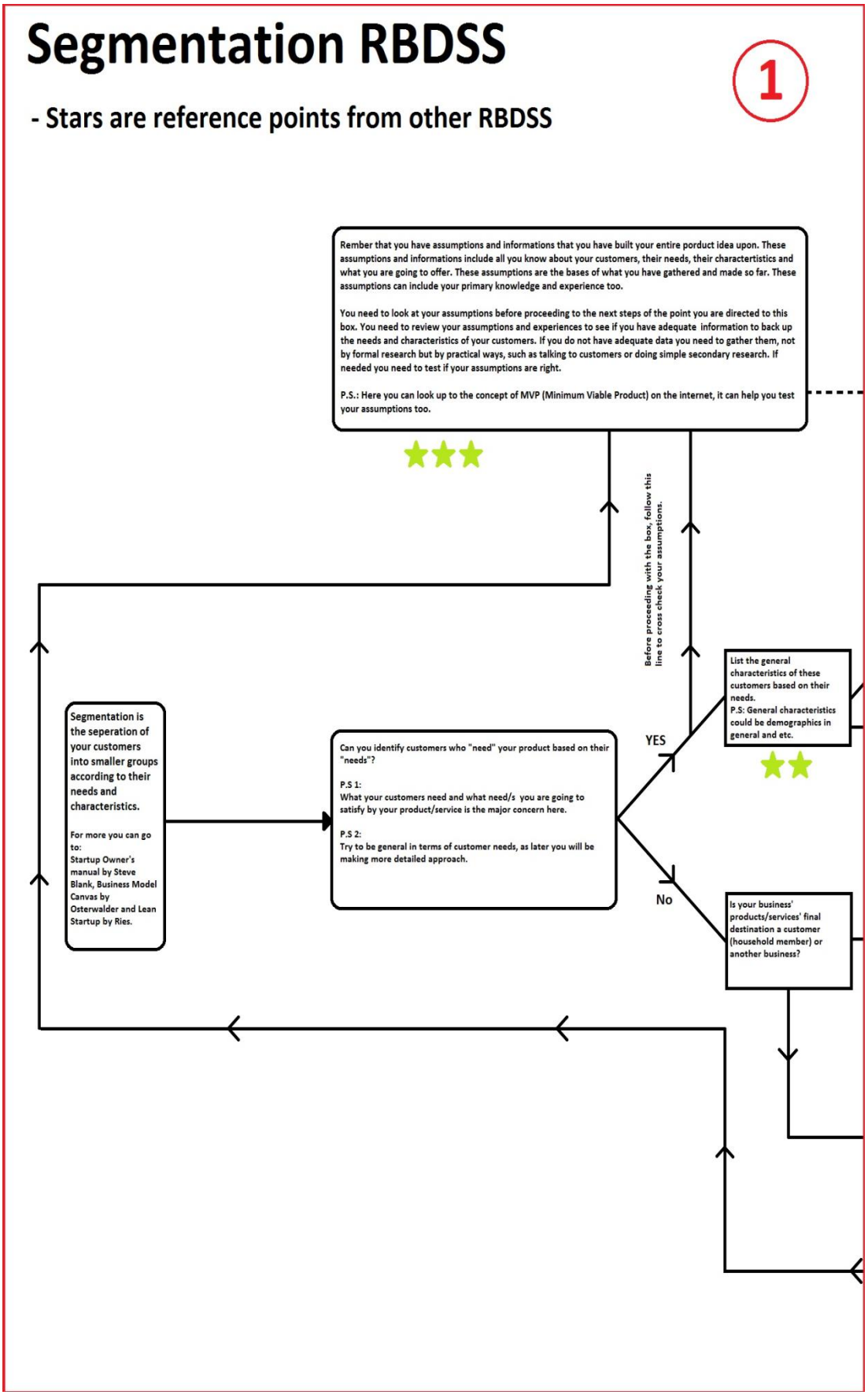

Figure 7 - More detailed view of section 1 of segmentation DSS

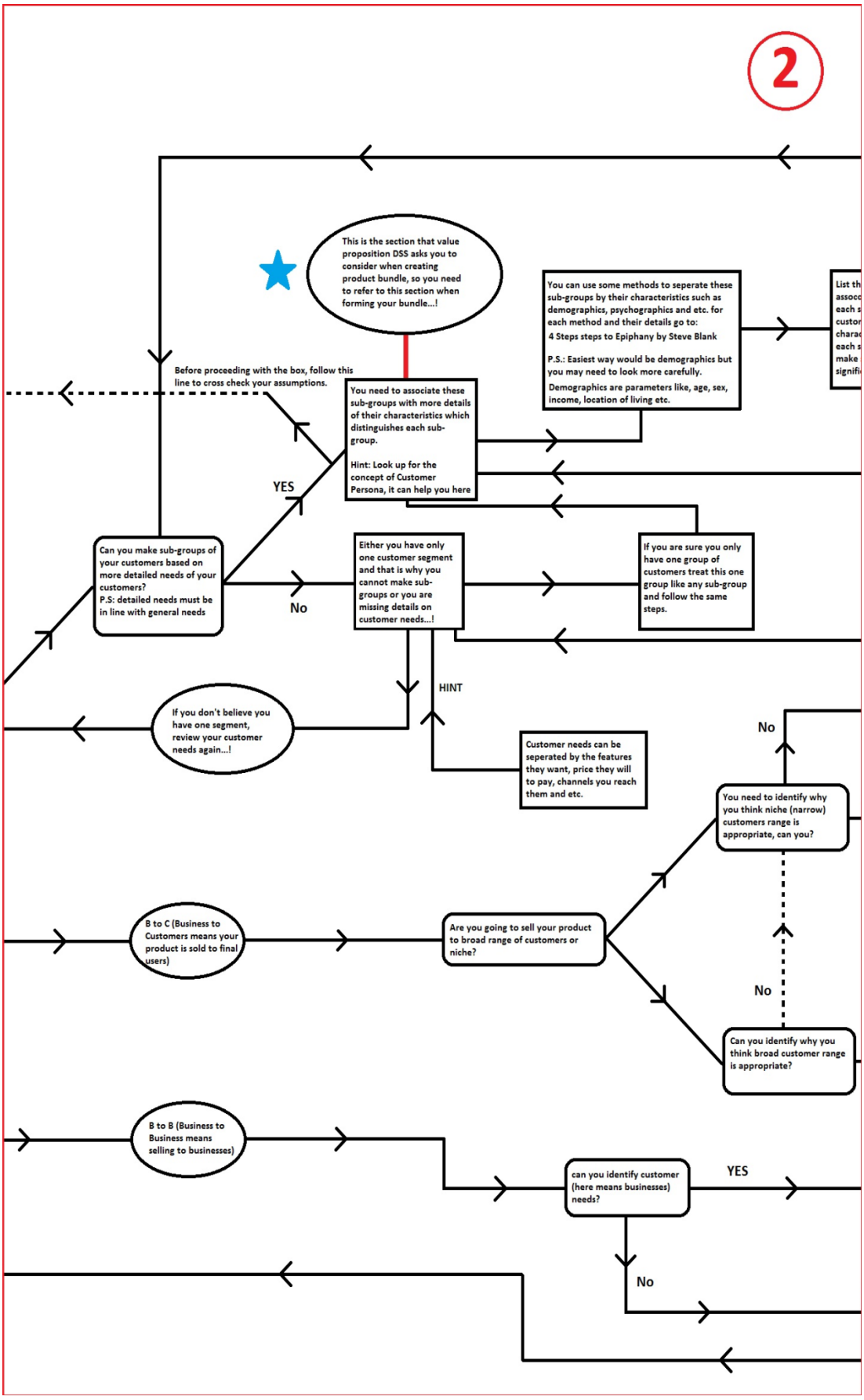

Figure 8 - More detailed view of section 2 of segmentation DSS

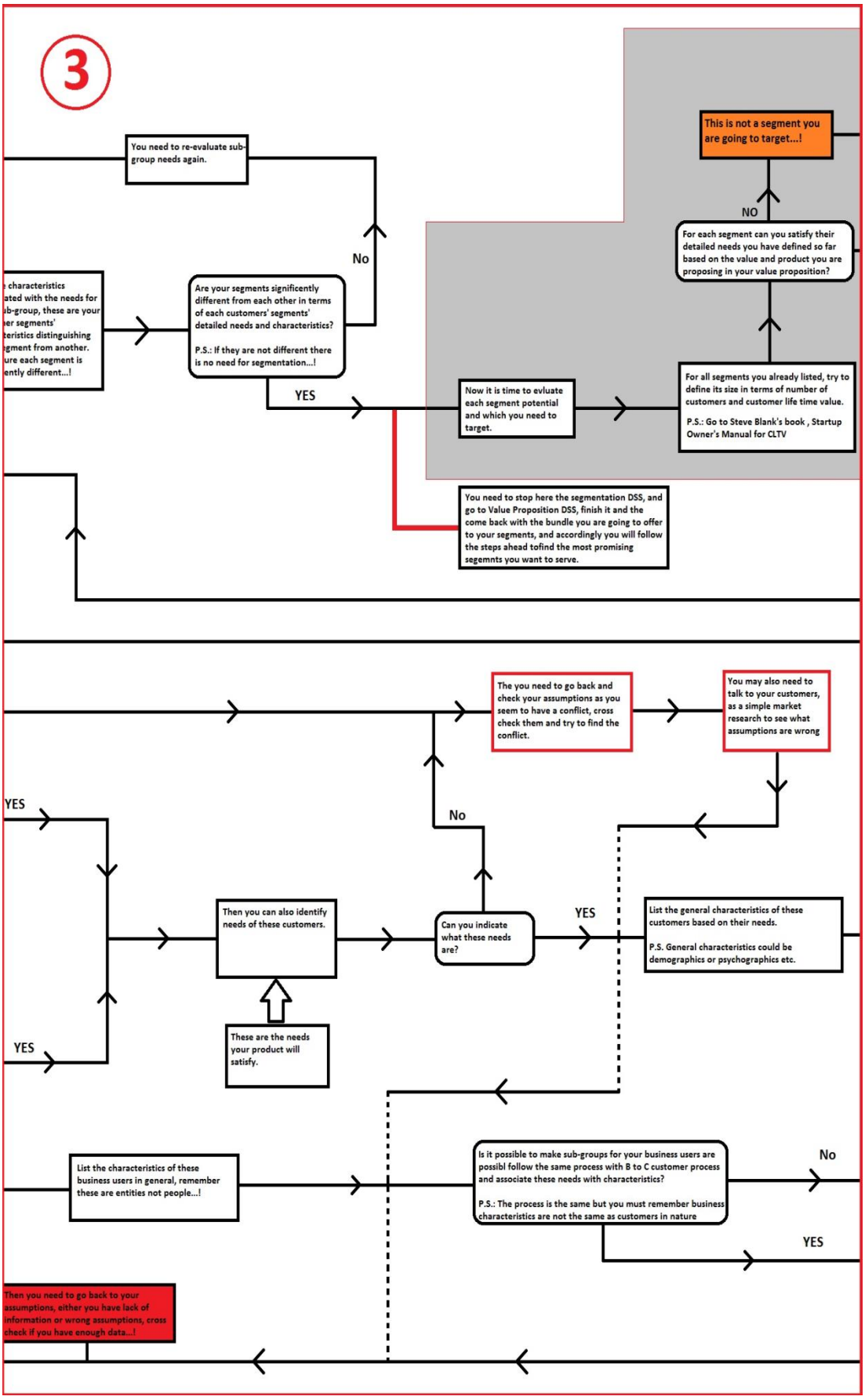

Figure 9 - More detailed view of section 3 of segmentation DSS

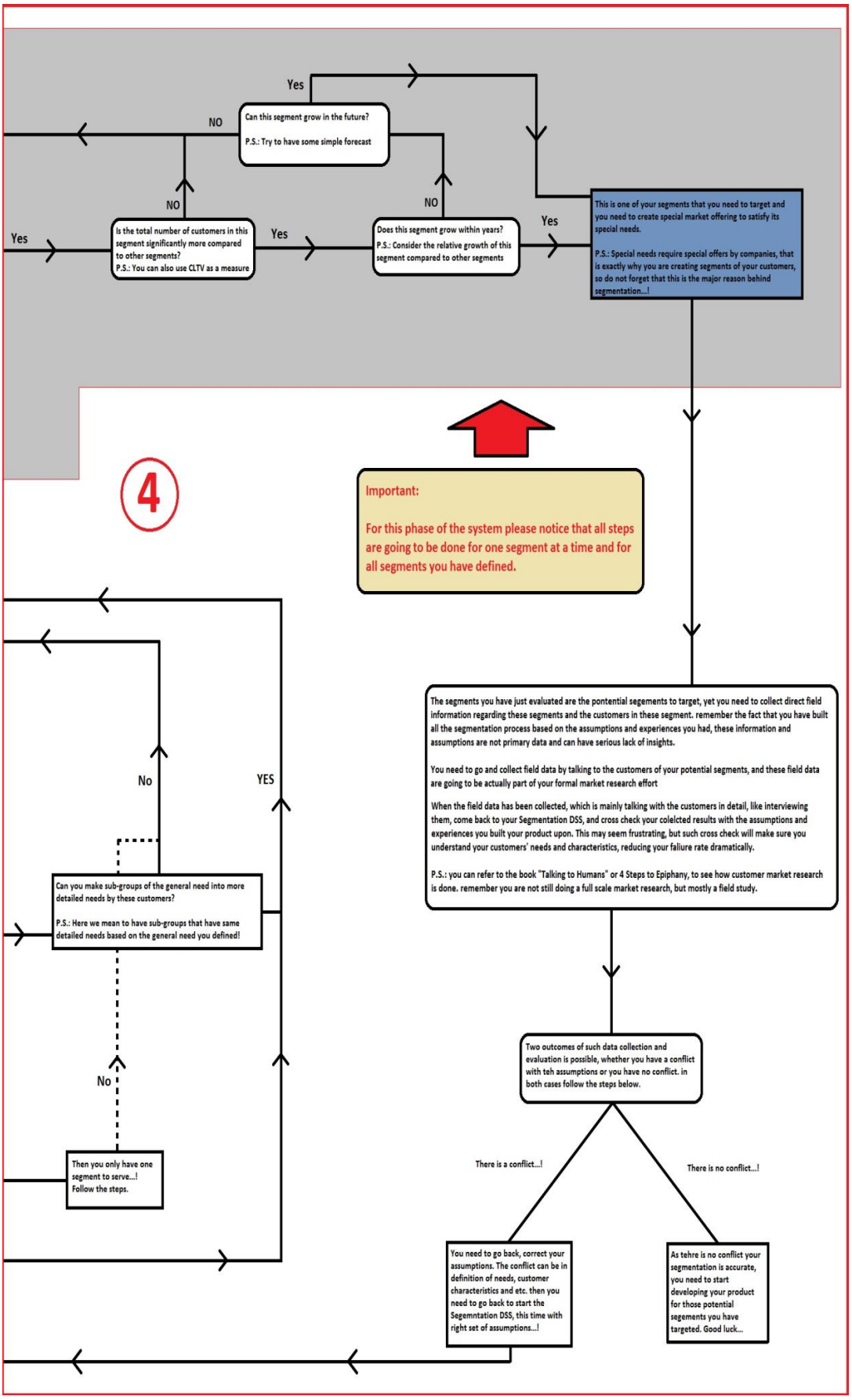

Figure 10 - More detailed view of section 4 of segmentation DSS

As illustrated above, the segmentations decision support systems constructs the whole segmentation process, by making sure that the user, entrepreneur, understands the needs of the customers. This decision support system, starts from defining the customer based on their general needs, then goes through various steps to make sure that the user can identify the needs and then detailed needs of the customers, which later is associated with customer characteristics, and different segments are created and tested in terms of their size and growth to conclude a set of segments which are promising to be served. The assumptions of entrepreneurs can be seen in a significant box in figure 7. This system also provides the opportunity for the users to start from nothing than their assumptions. Even if the entrepreneurs do not know what the customer needs are, the system helps them to figure out their customers' needs by going to very basic questions like if the product is B to B or B to C and then step by step the user goes through processes to understand customer needs.

Specifically for segmentation decision support system, the user is required to leave the system at a certain point (can be seen in figure 9) and go to value proposition decision support system and come back later to complete the system. Segmentation DSS, as a start point of the whole system, is the most complex system which has the most link and connection to other systems such as value proposition DSS. This system for segmentation asks frequently from the entrepreneurs about their assumptions and later tests their assumptions by guiding the user to collect field data and compare this data set with the primary assumptions they had. This way, the system makes sure that customer needs and characteristics are not taken only by guess, and this will reduce the chance of facing product market fit problem. It must be reminded that it is recommended that entrepreneurs start segmentation DSS while having the value DSS available, because they will be referring to both systems very frequently. This is a result of making sure that the first step towards defining customers is solid so that the user can continue with other systems without any doubt or concern.

5.2.2 Value Proposition

Value proposition is the core of Business Model Canvas. Value proposition, in the same time, can be claimed to be the hardest part of the canvas to be formulated. As shown in the analysis, even there were business major partners within some firms, it was a challenge to understand and write down the value that was proposed by the firm as explained din the analysis chapter. However, starting from segmentation as a first step has made things easier in terms of defining value using a decision support system. As mentioned before, the segmentation DSS requires the user to frequently comeback to value proposition, as the user is required to go back to segmentation DSS when filling out the value proposition DSS. Just like the segmentation DSS, value proposition also starts from the concept of need and continues with the concepts that has already been introduced by Osterwalder in Business Model Canvas and Value Proposition Canvas. The whole system first tries to identify the problems causing the needs not to be satisfied, the accordingly the value is defined and expanded by the concepts of gain, pains and jobs exactly as proposed by Osterwalder (2015). However, this system takes more than this into consideration. It helps the users to create a product bundle and define product features, besides, since that section must be formulated parallel to the segmentation DSS, it makes sure that the bundles proposed by the user according to the values defined, are actually in line with each promising segment created by the segmentation DSS. This is crucial as it literary solves the problem of product market fit. It is important to notice that this DSS tries to keep a concept that is abstract as applicable as possible by asking strait questions from the entrepreneurs. One may discuss the theoretical framework which is based on Osterwalder's (2015) Value proposition canvas, and accordingly the concept of value can be questioned in philosophic manner. Yet, this thesis does not have any intention to discuss the nature of value and it would be out of the scope of this study. The whole decision support system and its parts offered here are applications which were driven from the Business Model Canvas and Value Proposition Canvas. In the following pages, the value proposition DSS is presented and illustrated in pieces with more detailed pictures of the whole system. References to other decision support systems are clearly indicated and relevant readings and notes are given whenever necessary.

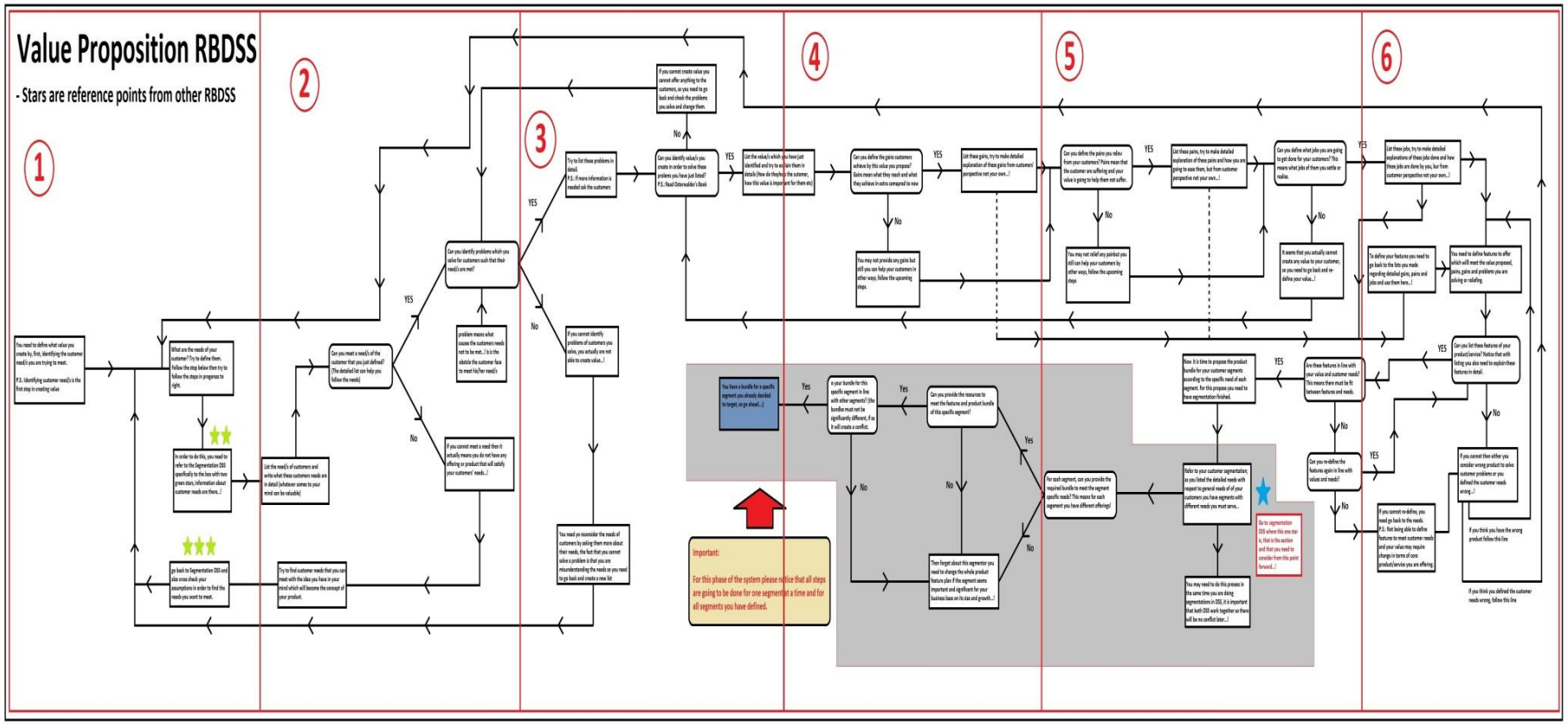

Figure 11 - Value Proposition Decision Support System

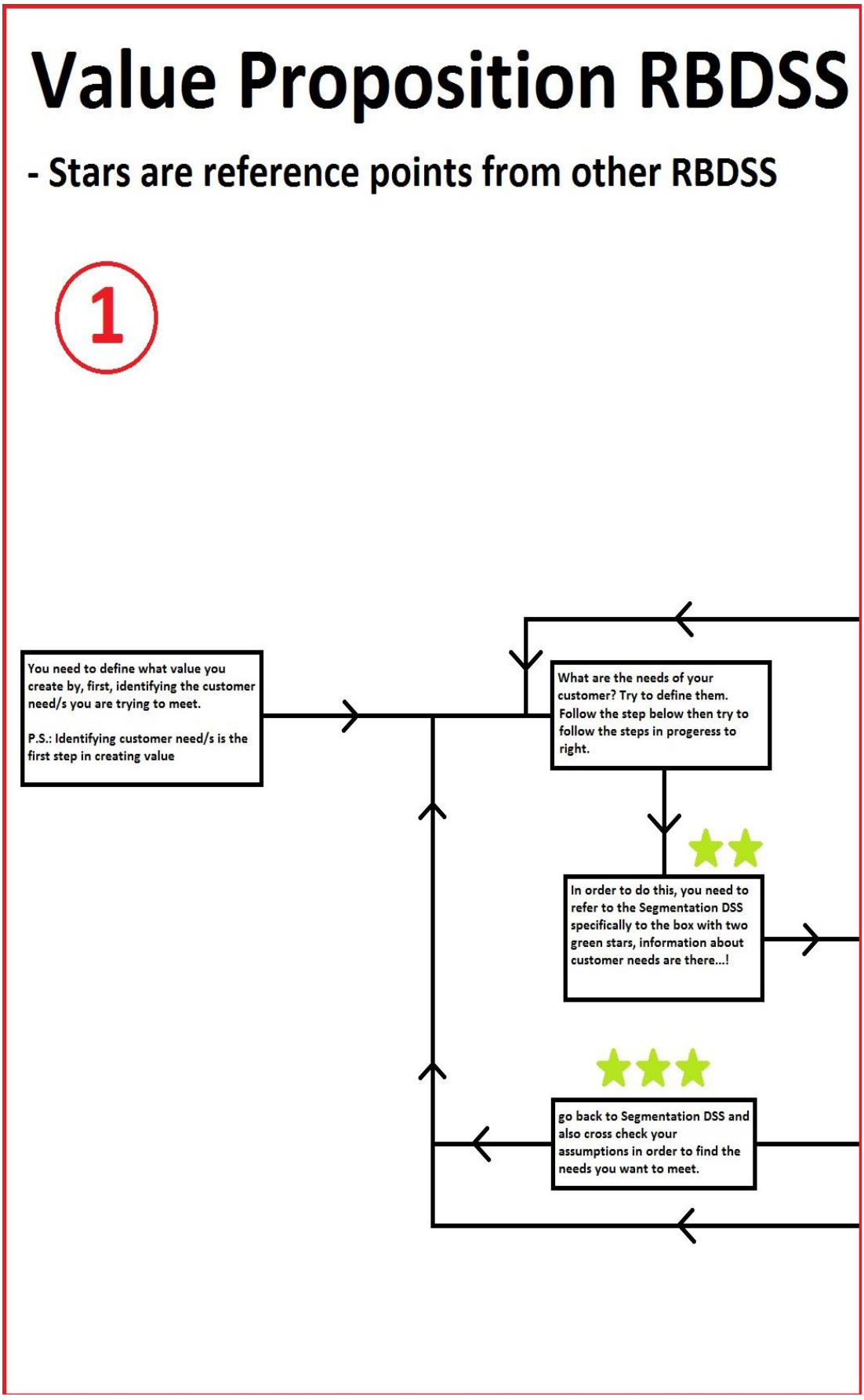

Figure 12 - More detailed view of section 1 of Value Proposition DSS

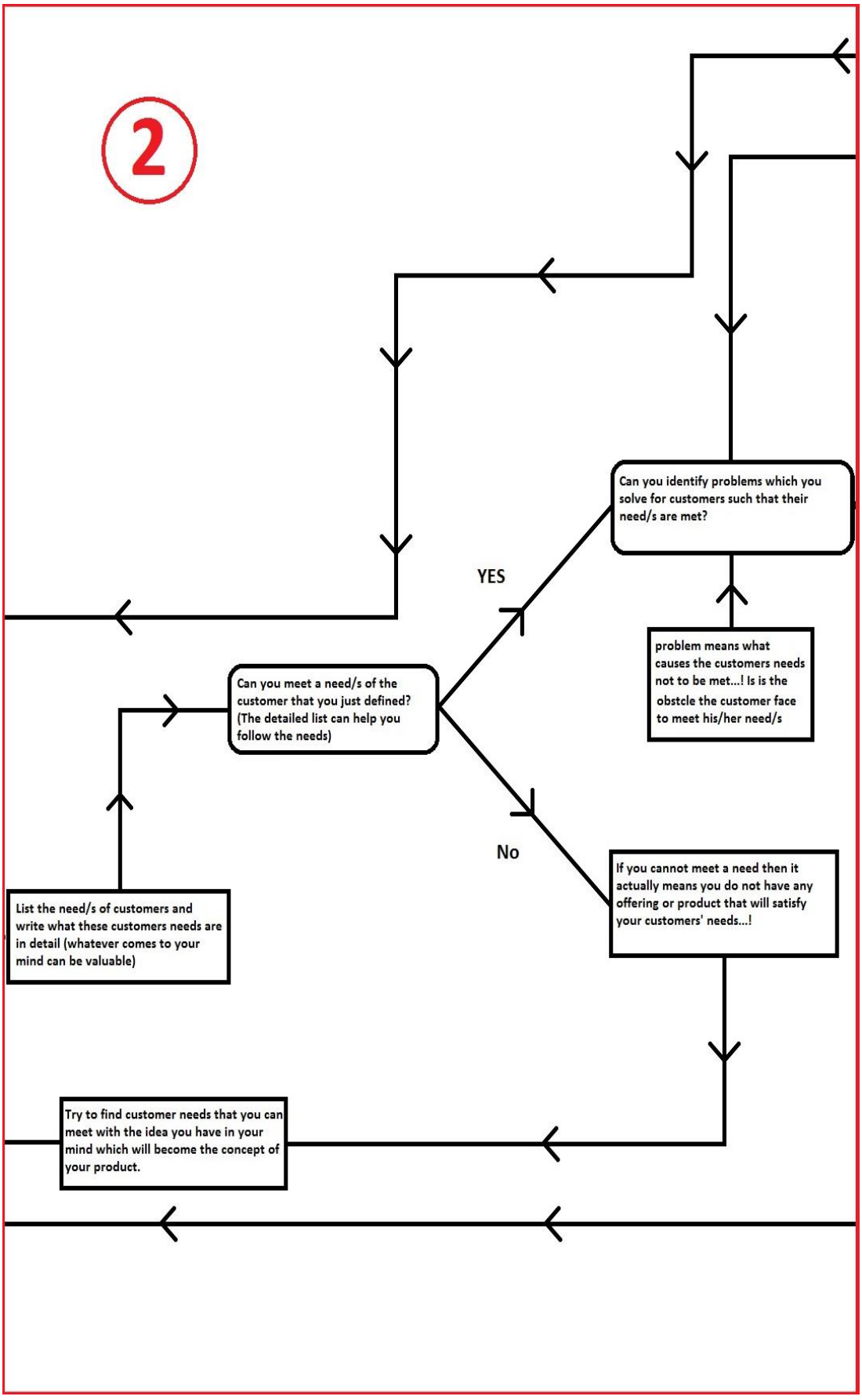

Figure 13 - More detailed view of section 2 of Value Proposition DSS

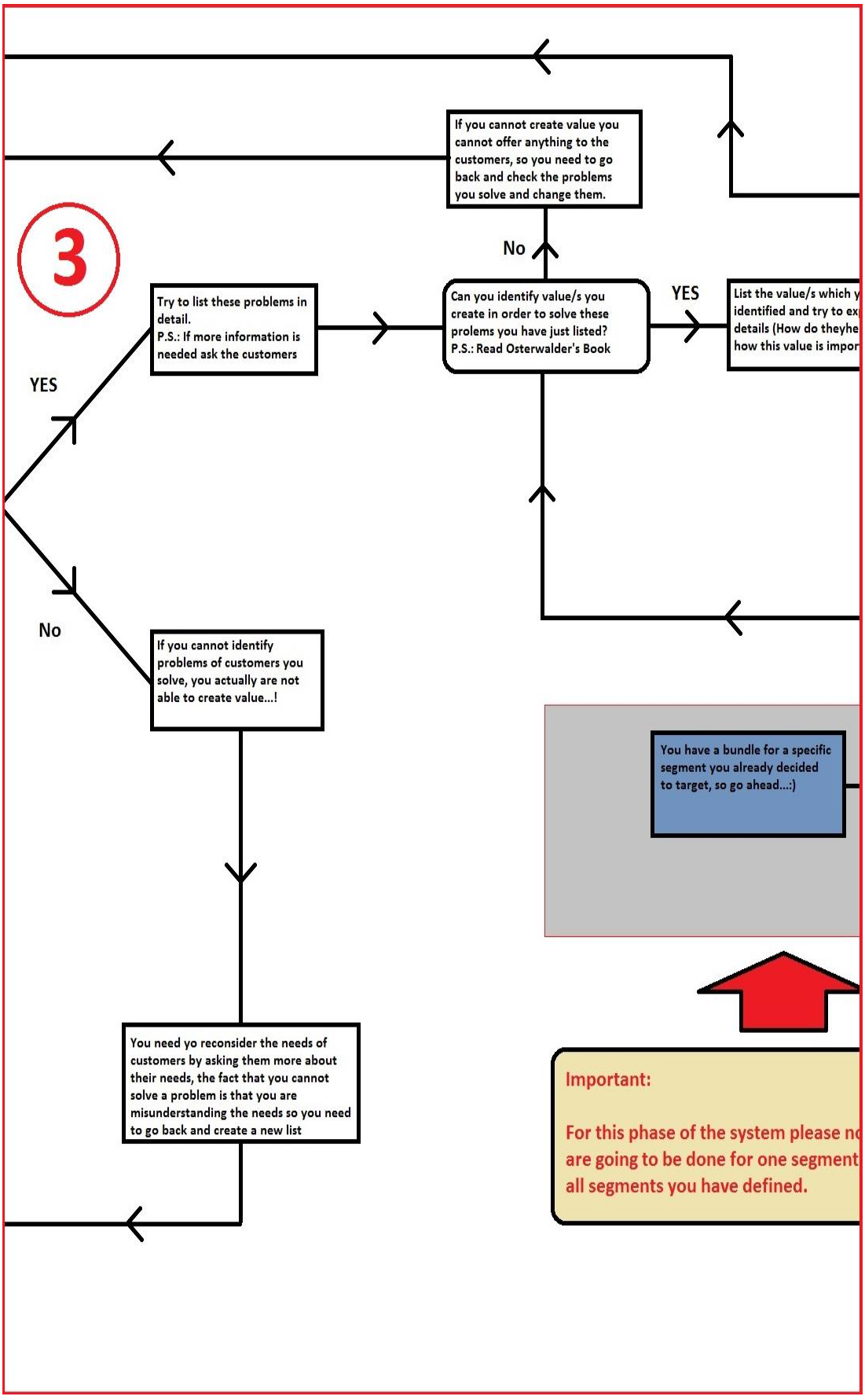

Figure 14 - More detailed view of section 3 of Value Proposition DSS

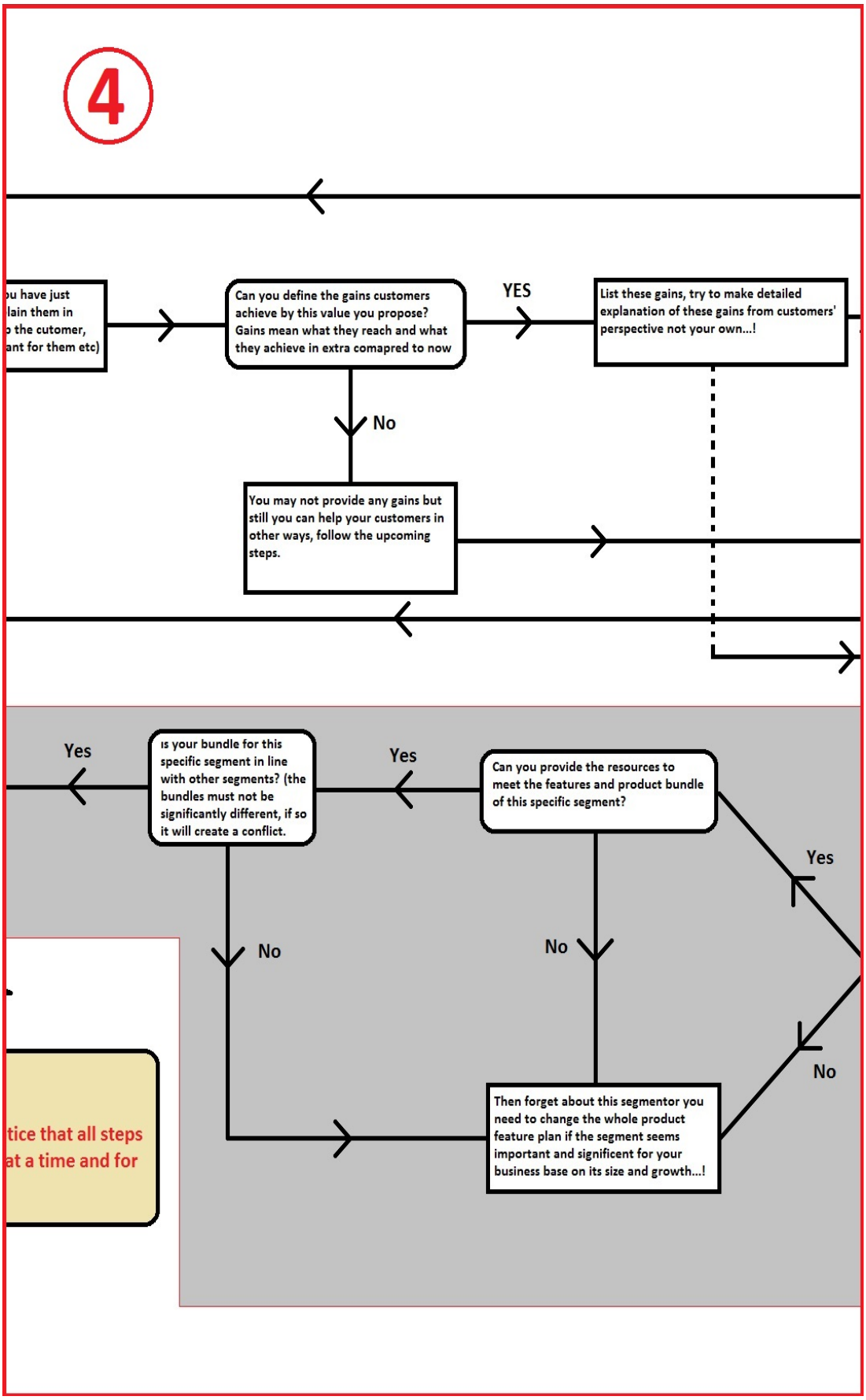

Figure 15 - More detailed view of section 4 of Value Proposition DSS

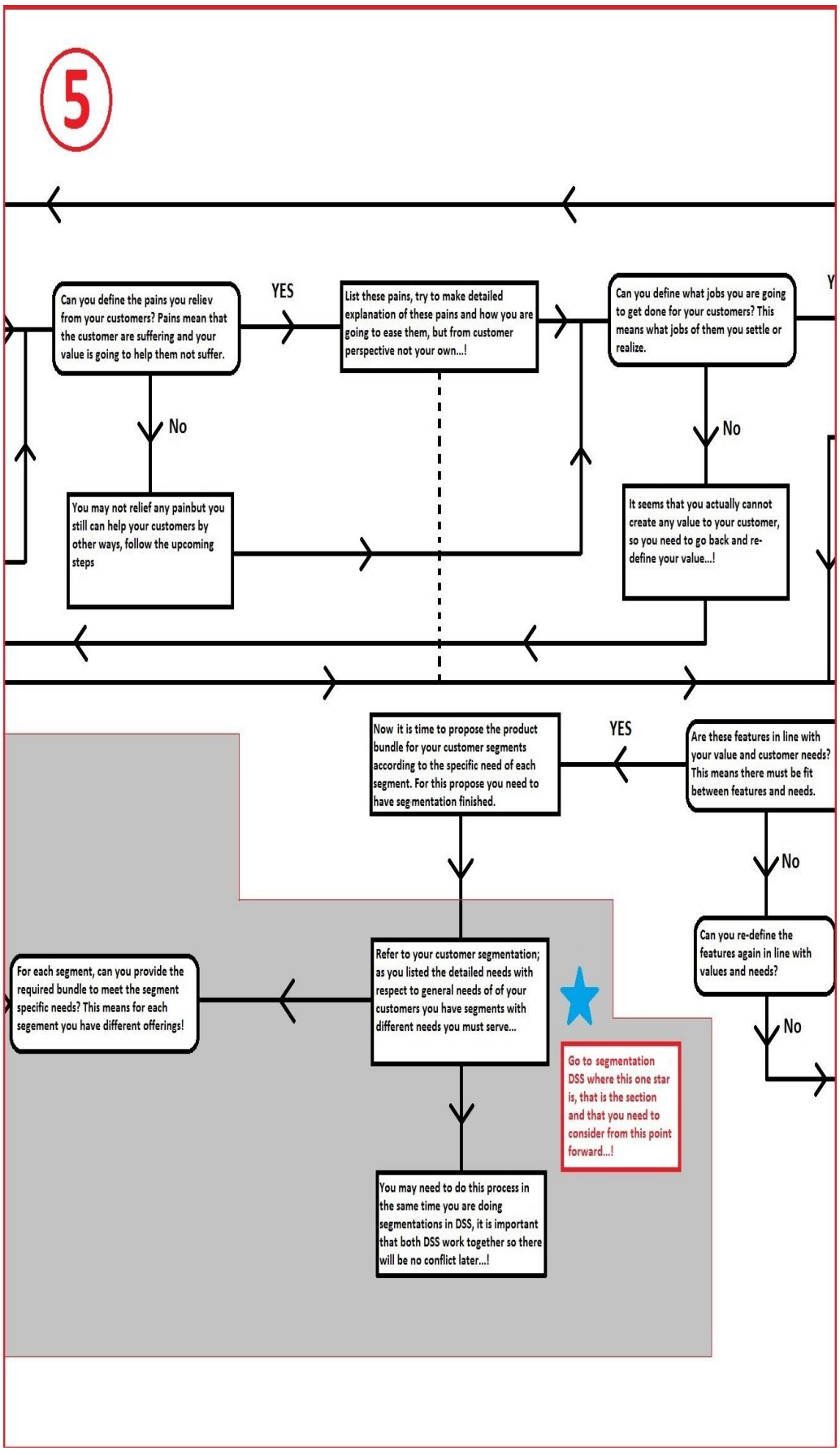

Figure 16 - More detailed view of section 5 of Value Proposition DSS

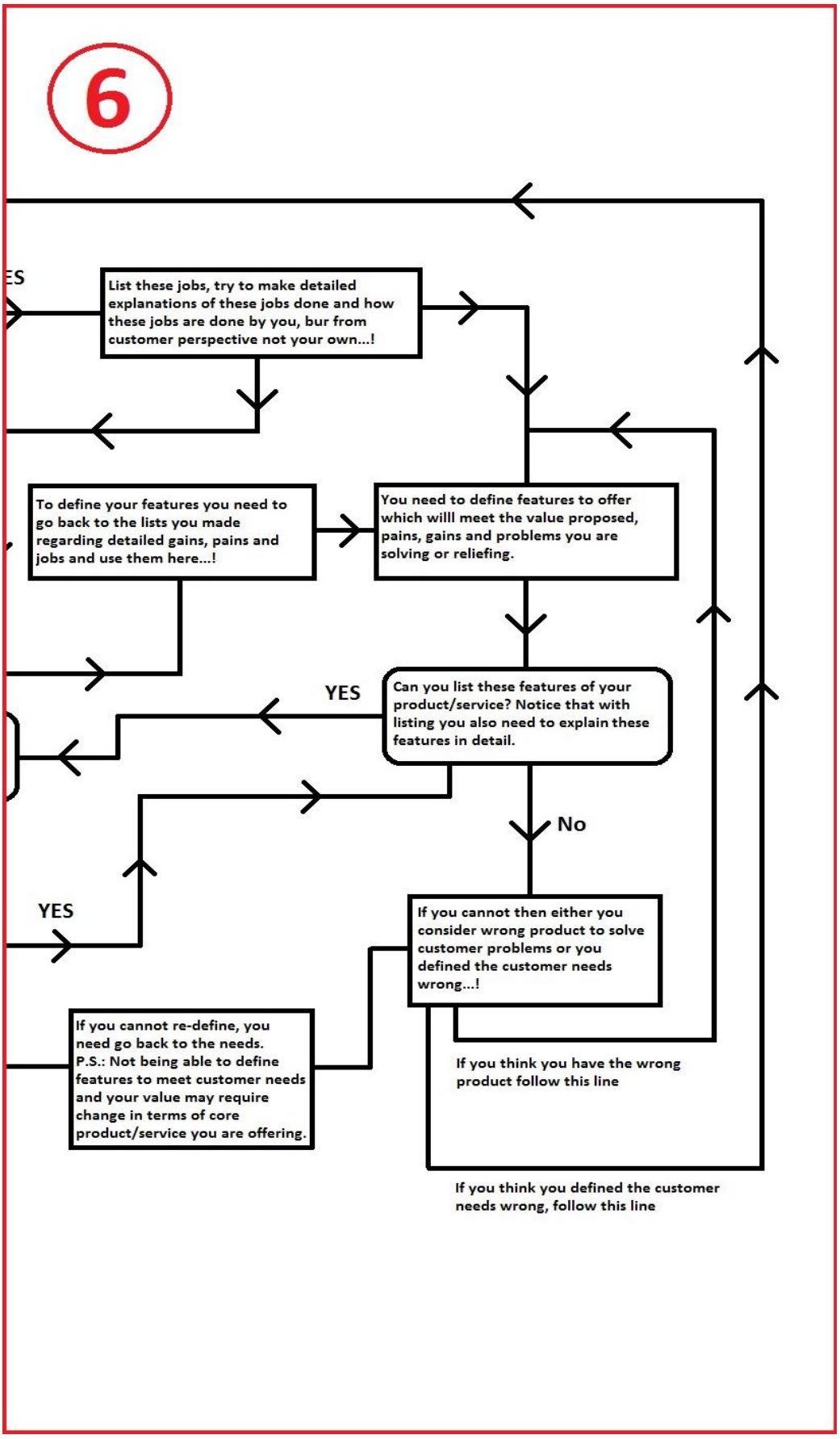

Figure 17 - More detailed view of section 5 of Value Proposition DSS

As illustrated in previous pages, there are some notes to be made regarding the support system. When the user is trying to define the features and later the product bundle, frequent reference to gains, pains and jobs done are made, so the user must have a list of all these items in detail when defining the features and accordingly the product bundle. When the bundle is being created, the user must also refer back to segmentation DSS. As the assumptions around the product and customer needs are presented in segmentation DSS and the user is required to complete the value proposition DSS before evaluating the promising segments and do a field research, the user must not forget to go back to the segmentation DSS after finishing the bundle section of value proposition. The assumptions in the segmentation are carried out to the value proposition DSS too, so in case of conflict the user must return back to segmentation DSS and review his or her assumptions. If the user cannot pass the first loop of value proposition, it would be obvious that there is a conflict in the assumptions made in the first stage of segmentation decision support system.

While the value proposition DSS and segmentation DSS is being completed, it is not advised to the users to work on customer relationships and channel DSS. It is a requirement to finish both primary systems regarding the product market fit problem and then look at the value delivery. The value delivery decision support system, presented in the next chapter, can only be applied well, if there is a well defined product market fit and assumptions regarding the product, value and customers are well defined.

5.2.3 Customer Relationship and Channels

As one can see, customer relationship and channels are under the same topic to be proposed in the same decision support system. There is a sound reason for such allocation and the logic is the fact that customer relation and channels are the connecting factors of value and customer segments. From the Business Model Canvas perspective product market fit is the concept of parallel flow between value and segmentation where customer relationship and channels are required concepts to exercise and execute the fit. Besides, channels and customer relationships are two concepts which are much interconnected and are hugely dependent. Not only these

theoretical framework related issues, but also practical issues lie behind the fact that customer relationships and channels are integrated into a same system. Having two separate systems that cover all the issues regarding channels and relationships, is possible yet very complex, confusing and none user friendly. Concept of channel is a very wide and complex network. There exist channels of product delivery, channels of communication with customer, channels of promotion and many other channels. During construction of decisions support systems, the author has figured out it would be almost impossible for the entrepreneurs with almost no prior knowledge to go around all these channels and try to design them. As indicated in the analysis section regarding the channels, entrepreneurs construct their channels overtime and iterate over and over again so that the channels develop over time. Based on this finding, it was decided to keep the channel DSS simple and general, since no entrepreneur can design all of the channel and its inquiries when he or she has not yet constructed a well defined business model. Here, the main objective is to create a sound ground for the channels and the customer relationships concepts to be developed later overtime. There is a tradeoff between completeness of these concepts and simplicity issue. Entrepreneurs suffer from overload of information and have limited time, so that if the proposed system for channels is too much complex, essentially it will not help the users. The same argument is valid for the customer relationship. The concept is very vast and needs specific expertise. The same trade off issue is holding up here as did for channels. Accordingly, with the knowledge of these two concepts being interconnected and related, it was decided to avoid two different complex systems, but one system integrating both in a general yet covering way.

When a user starts to follow this support system, first the channels of sales are considered as a distinguishing parameter. Here when it is said the channels, it essentially and practically means the sales channels, not promotion channels or communication channels. As explained, this system is not meant to cover all channels but the one that needs to be designed first, and that is the sales channels. Simply, a firm can either sell its own product by itself, or give the product to a third party to sell it for the firm. This is the distinguishing parameter that this system is constructed on. One may discuss that there exist other factors, yet simplicity is considered here so this parameter is followed. If the firm wants to do the sales by

itself, the system takes the user through several steps of cross checking if the firm has enough resources and capabilities such as financial and HR. The system also provides the opportunity for the firm to have outsourcing options for certain items such as sales staff, maintenance of sales system or promotion, yet it notifies the entrepreneur that if all steps are outsourced, then there is no reason not to give the product to be sold by the other firms. While analyzing the third parties, the system takes the user through similar stages of evaluation, such that the entrepreneur would easily see which third party is the most suitable party for handling the sales of the product. The evaluation includes evaluation of resources, competencies and expertise of the third party. Eventually, the user can compare and contrast results from different parties and choice the fit way and partner.

Regarding the customer relationships, the same principle of simplicity and generality is considered. After the user has selected his, her sales channel and evaluated the results, the system makes the entrepreneur make sure that he or she has a sound sales and marketing plan. This does not mean that the user must craft a very detailed marketing plan, but it means the user needs to have a plan to see how to communicate to customers who have been identified in the segmentation DSS and how to create programs to get, keep and grow these customers. Then the system asks the users to evaluate basic yet fundamental parts of this marketing and sales plan, such that entrepreneurs can see if they have a sound customer relationship or not. If the plan is not sophisticated enough, again the system encourages the users to delegate the sales into a third party and work together with that third party to create a sound customer relationship. There is a loop that evaluates the customer relationship after the point just mentioned, regardless of whether the company sales its own product or a third party does. This last section of DSS evaluates and cross checks the customer relationship program of the firm and then the outcome provided would be the fundamental basic customer relationship driven from the channel decision done previously. Yet, again, the user must be aware of the fact that this system is a start point and is the basic ground, later with time passing, the channels and customer relationships must be re-designed and be developed in more sophisticated manner. Following pages present the decisions support system with detailed snap shots just like previous decision support systems presented for segmentation and value.

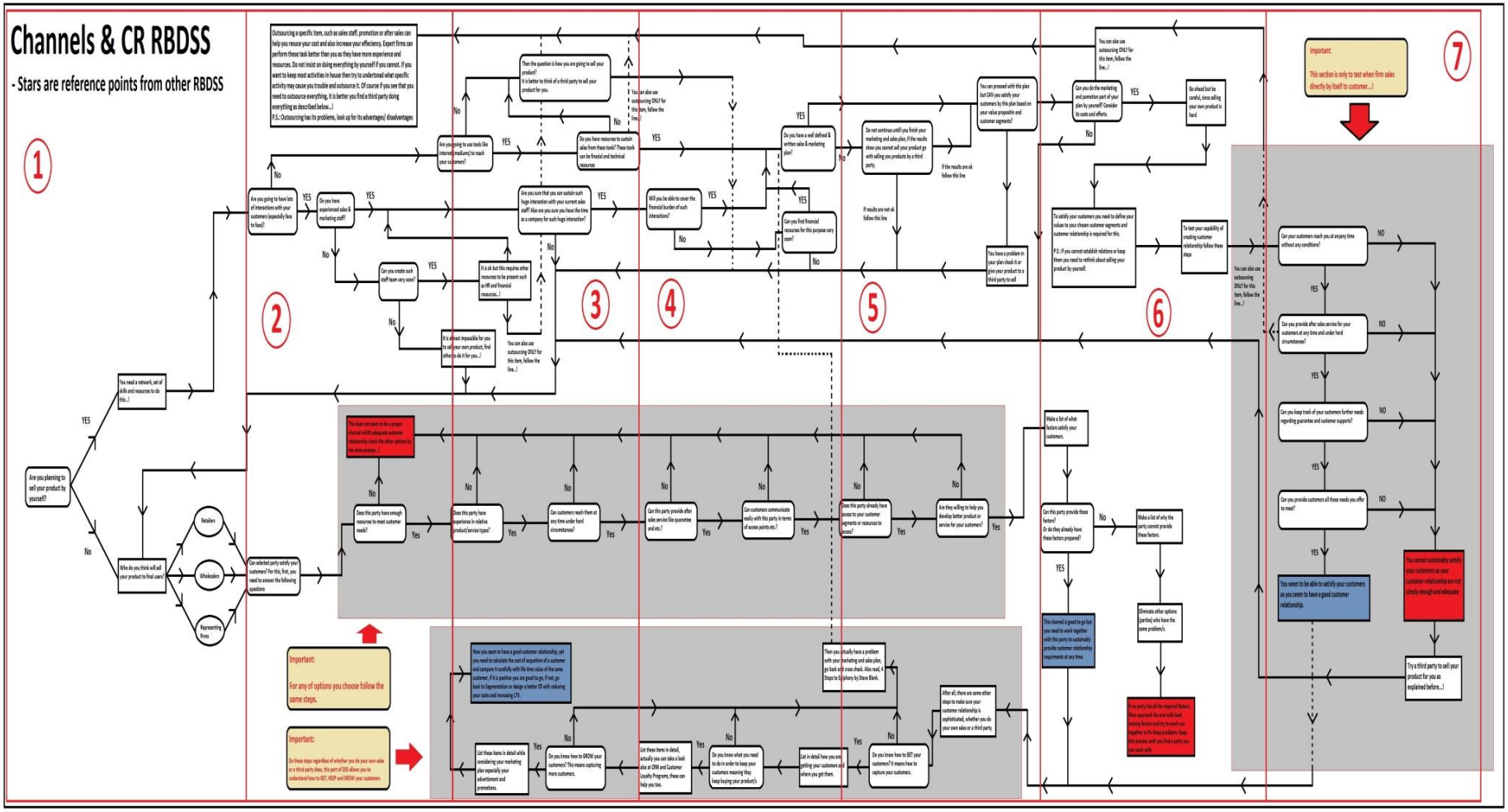

Figure 18 - Channels and Customer Relationship Decision Support System

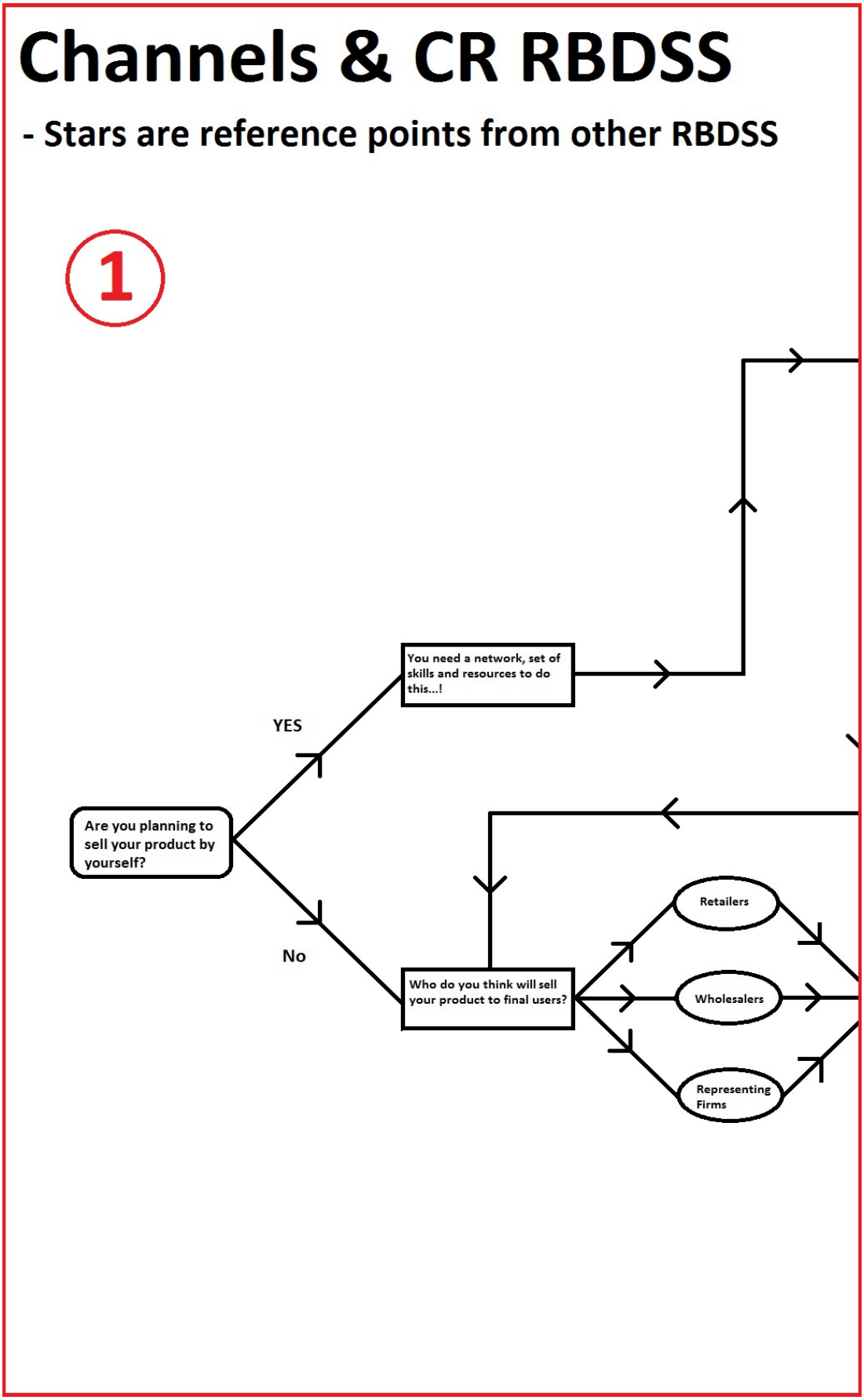

Figure 19 - More detailed view of section 1 of Cannels and CR DSS

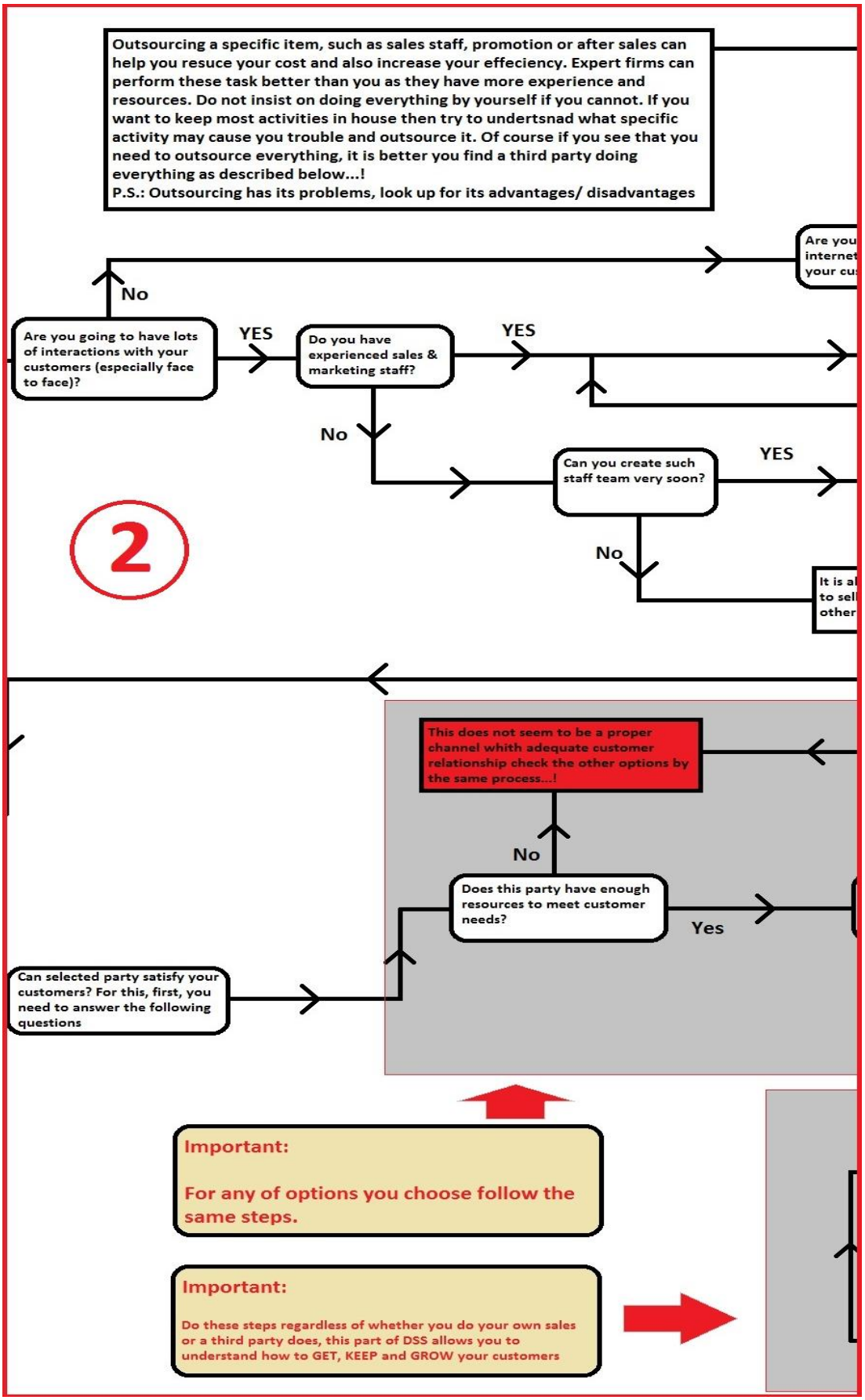

Figure 20 - More detailed view of section 2 of Cannels and CR DSS

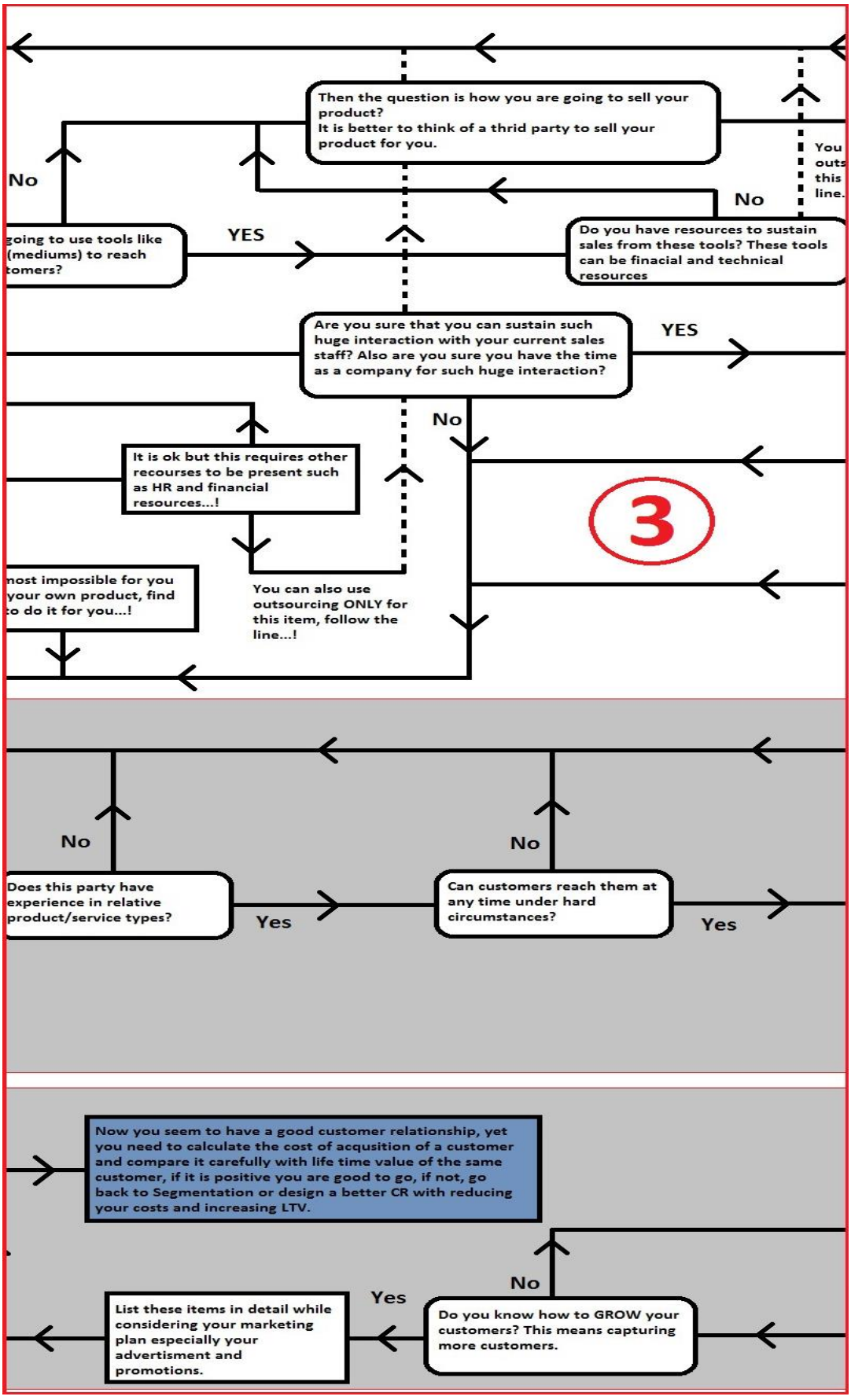

Figure 21 - More detailed view of section 3 of Cannels and CR DSS

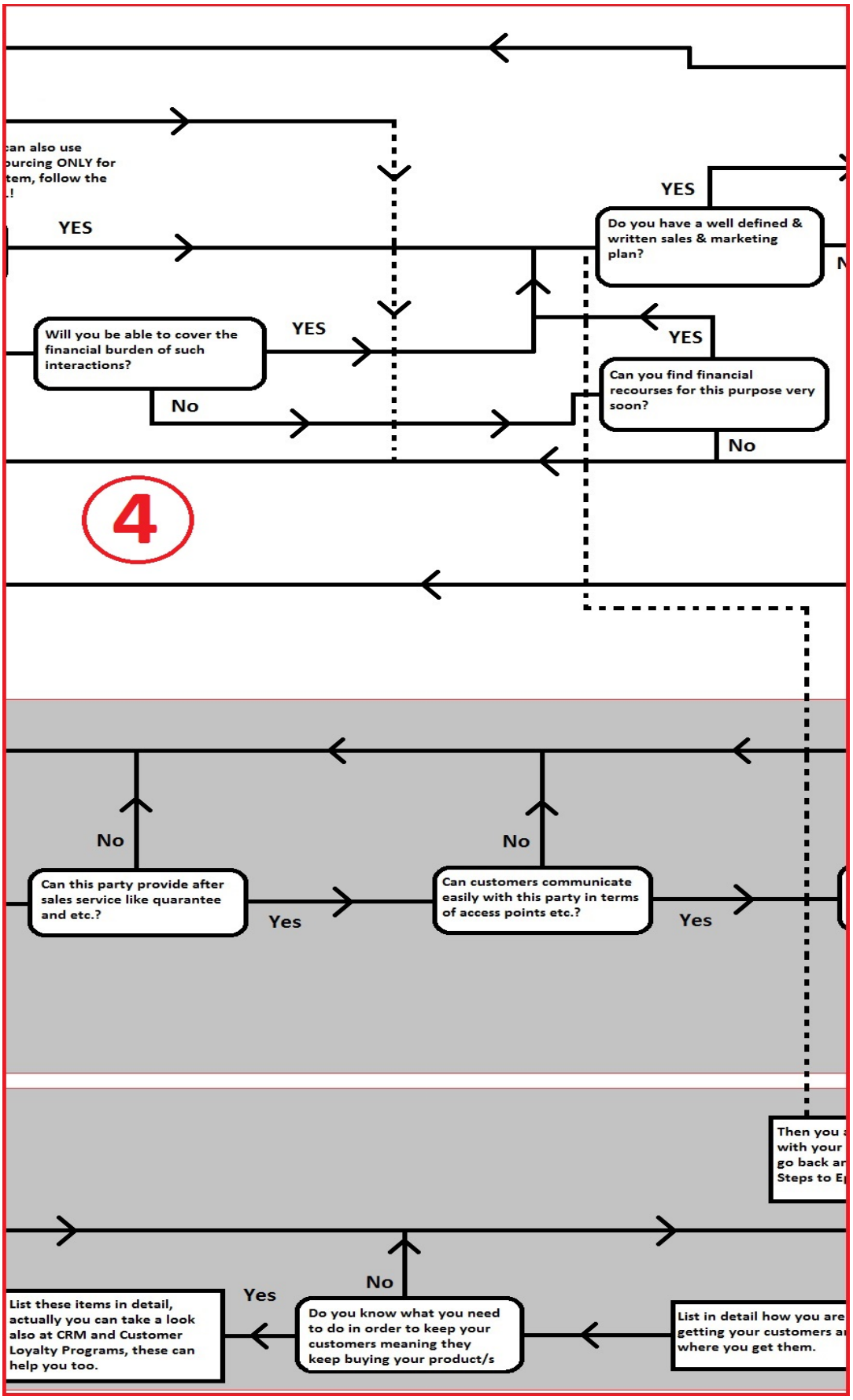

Figure 22 - More detailed view of section 4 of Cannels and CR DSS

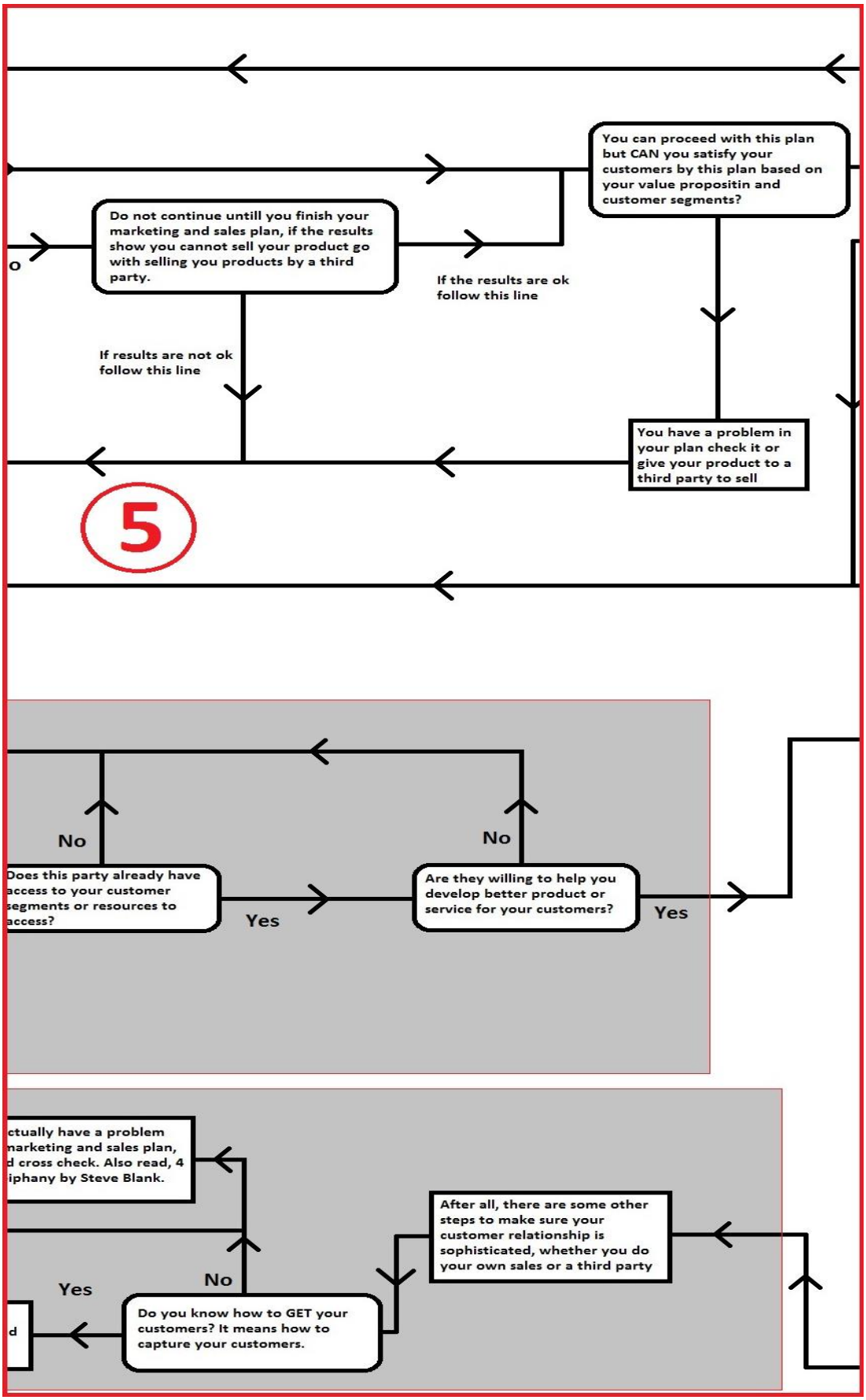

Figure 23 - More detailed view of section 5 of Cannels and CR DSS

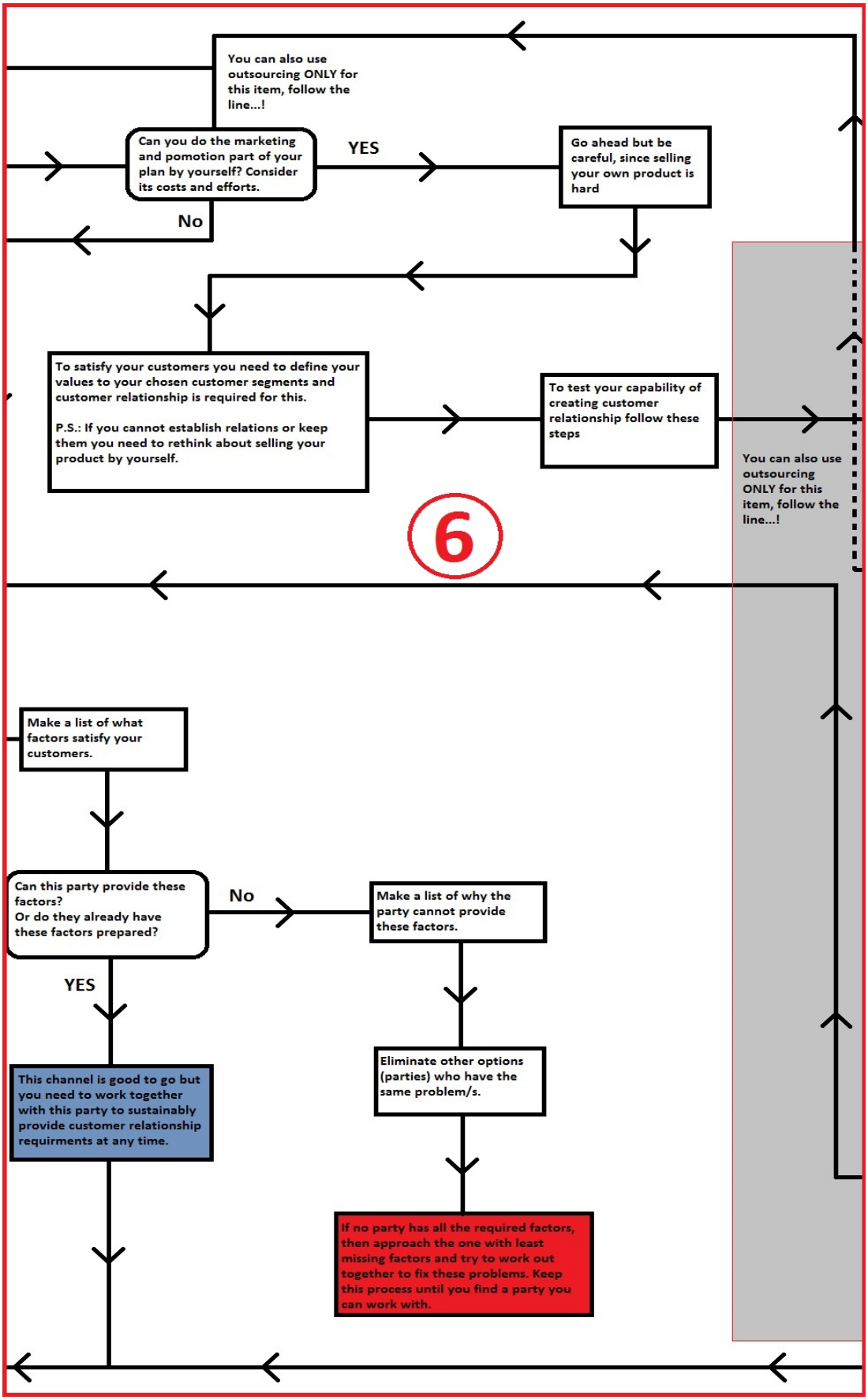

Figure 24 - More detailed view of section 6 of Cannels and CR DSS

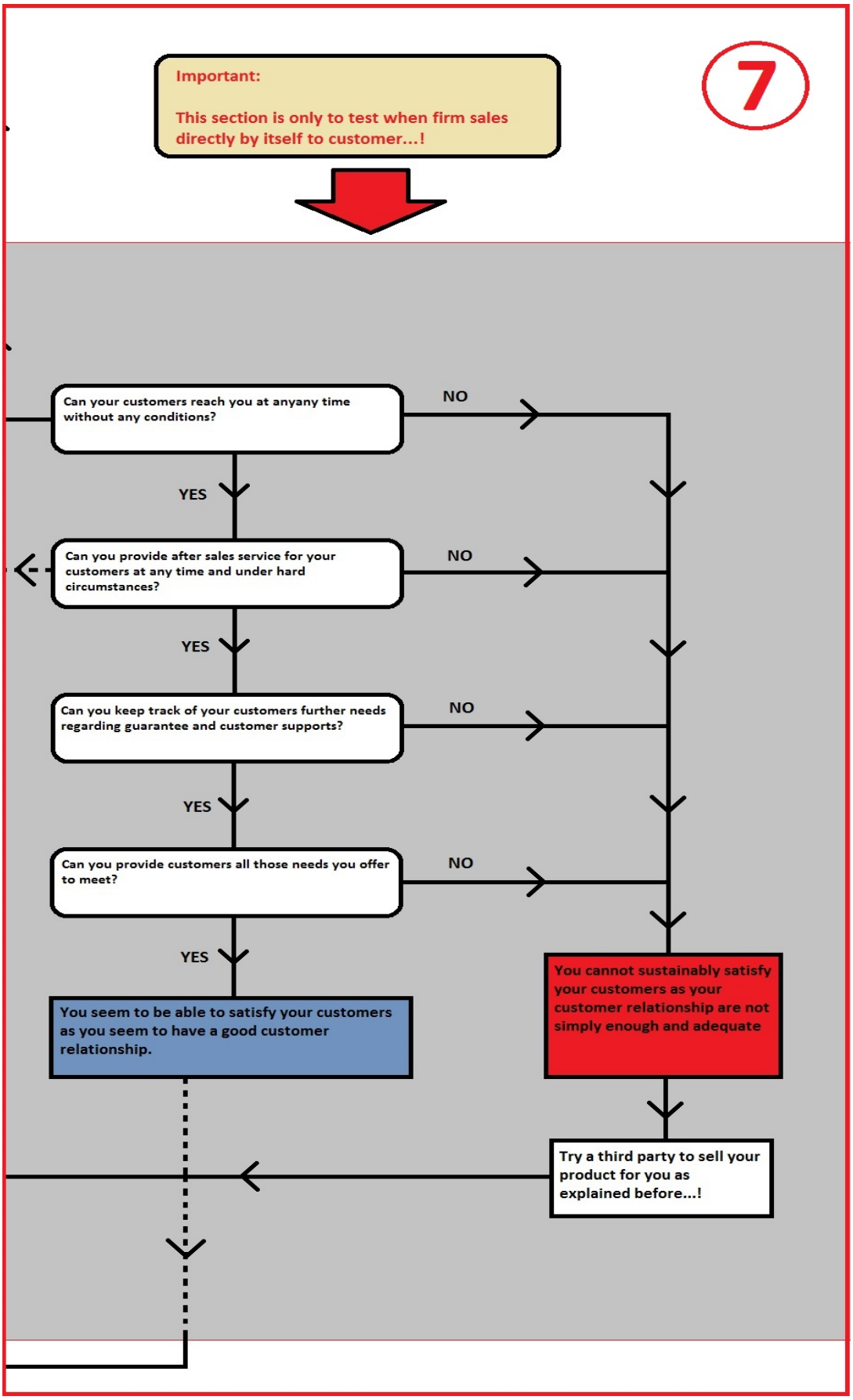

Figure 25 - More detailed view of section 7 of Cannels and CR DSS

Regarding the system, and as explained before, first of all the user must have finished value and segmentation DSS before starting this system. As it can clearly be observed, there is a major different between this DSS and the previous ones. This DSS has many cross check points and has more loops. This is because of the fact that there are more factors and parameters in this system that needs to be validated. Yet, the system is still as simple as the previous DSS and the user is encouraged to take one of the two options at a time. As described before, there is possibility for the user to take outsourcing option, and yet the user must be careful with outsourcing. The system clearly explains that outsourcing has its own problems and challenges so that the user must, depending on what is to be outsourced, do some research and understand the outsourcing advantages and disadvantages. One may say that the system encourages the entrepreneurs to give up selling their own product. This is not true indeed, the system does not try to discourage the entrepreneurs, it tries to warn them that selling a product or service, that requires a lot of interaction (especially face-to-face) is not an easy task. It must again be reminded that this is a general system and it attempts to help the entrepreneurs give the first strategic decision regarding their channels and customer relationships. Finally, it must be noticed encourages the entrepreneurs to work together with the third party if they cannot sell their own product, as it is believed by the author that entrepreneurs need to work together with any third party included to develop a well defined and executed value delivery system. That is why there are actually questions and cross check points confirming that if the third party is ready to work together with the firm.

5.3 Implications of Proposed Rule-Based Decision Support System

When looking from general perspective, considering all of the three decision support systems, it can be seen that there exist a complete system which would answer to the product market fit problem. There are several implications of such integrated system of decision support "sub-systems". Firstly, it can be implied that, a very comprehensive research can provide decision support systems for all of the items in the Business Model Canvas. The findings in this research has guided the scope of this thesis to focus only on product market fit issue, yet it does not mean that there would not be opportunity to develop decision support systems for other items too.

Second implication of constructing such systems is that entrepreneurs have variety of daily problems and these problems need decision processes to be resolved. As this research has figured, issues like accounting, daily management of cash flow, payment schedules and many other daily based operations are consuming too much time of the entrepreneurs who already have difficulties regarding resources. It can be said, decision support systems can also be developed for these types of daily problems to help the process of decision making to become faster and more accurate. There are studies and efforts of such systems as described in the literature chapter of this thesis which are either at strategic level or only are concerned about financial monitoring of the firms (Houben et al., 1999 & Wedley et al., 1984). Also these systems are not mostly rule-based that makes it harder for entrepreneurs to understand and utilize in a fast manner.

It can also be recommended, as an implication of proposed decision support system, those corporations who want to establish a new company, in a new sector, can use these provided tools too. The system is designed to be simple and understandable, yet there is no limitation for corporations to use it either. In a general and strategic level, these decision support systems can help the executives reduce lead time of the establishment, yet these systems will not be sophisticated enough for the large corporations. Yet benefits of simplicity can be utilized to save time even in corporations or large companies.

Another implication from the system which was presented is that this system can be adopted and even modified based on the sector or industry in which specific companies and entrepreneurs show activity. If the entrepreneurs have time and they have access to materials related to each system separately, they can improve the system by adding or deducting parts and items. If entrepreneurs have a specific sector requirement, it can be added to any of the relevant systems. Yet, they must remember and be careful not to break the logical flow of the decision systems. It is recommended that a business major with entrepreneurial education do the development in order to keep the sequence of items from general to specific. Especially, the evaluation phases in each decision system are the easiest to be adopted and developed. Such developments, if connected to a data base, can provide

huge feedback stream and lots of potential for various systems to be developed base on user requests.

Finally, it can be claimed that the systems which are suggested in this research are meant to help the entrepreneurs construct and formulate better business models. But, there could be case that the entrepreneurs can find the system hard, or may require more flexibility rather than well structured systems as such. There is no guarantee that all entrepreneurs would use the proposed systems and find relevant results or even useful results. This will be discussed also in the limitation section of next chapter of thesis. It is not claimed in any case that these systems are the perfect methods of constructing business plans and anyone using them will for sure not face product market fit problem. Such a claim would be as unrealistic as suggesting a method to solve all entrepreneurial problems. This is quite important to understand that these tools must be tested in field and must also be empirically tested before making and comment about the performance of them.

CHAPTER 6

DISCUSSION AND FURTHER RESEARCH

6.1 Discussions & Contribution

In the light of concluding the analysis, results and proposals of this thesis, it can be claimed that this thesis has two major contributions to the literature. Firstly, and as related to the first part of this thesis, the research has explored and discovered major challenges and difficulties faced by knowledge driven Turkish entrepreneurs when formulating their ventures' business model based on Business Model Canvas. There are no studies that have taken into consideration exploring the challenges faced by Turkish entrepreneurs when formulating business models, let alone to knowledge driven entrepreneurs. This contribution has several implications. The first would be explanation of success and failure rates of knowledge driven entrepreneurs based on the business models of their firms. The second implication that comes in line with the findings of this thesis is the fact that there seems to exist a strong challenge regarding product market fit, which is a crucial factor in success of business models formulated by Business Model Canvas (Osterwalder et al., 2015). Such finding can be elaborated in further studies, yet it explains the higher pivot and strategy change rates of knowledge driven Turkish entrepreneurs. Product market fit, as explained, has been an interesting topic in literature and has been researched outside of Turkey (Osterwalder et al., 2015 & Andreessen, 2007), yet no attempt to systematically explore this problem has taken place until this thesis, in Turkey. An attempt to see the reasons of product market fit based on challenges of formulation of business model can help further researches to focus on this topic and evaluate in more detail the underlying factors.

The second major contribution of this thesis is the proposed rule-based decision support system specifically designed for knowledge driven Turkish entrepreneurs facing product market fit problem, as explained above. No study attempt as such has

been done before, neither national wise, nor globally. A decision support system that is easy to use and helps the entrepreneurs to get rid of possible confusions and redundancies to address the value and value delivery (product market fit concept) based on Business Model Canvas has never been designed or constructed before. This contribution opens a new window in the literature. A gap that exists between the application of Business Model Canvas and actual results that are obtained by entrepreneurs have been discussed in the literature (Mulders, 2012) and yet there are no sensible solutions to reduce the gap, such as a decision support system. This contribution can also be fragmented later into more specific and sophisticated systems leading to have many decision support systems each especially designed for a country and for an industry.

In addition to these contributions, several discussions around the main theme of this thesis can be constructed. First, it would be reminded that proposed decision support systems here are specifically designed to support knowledge driven Turkish entrepreneur. Other knowledge driven entrepreneurs may use it from different countries since it still is a system designed for entrepreneurs when looked from a general perspective where, yet it needs empirical evidence that the system is actually working. Large corporations have expert systems and decision support systems for well established businesses and operations that are also well defined. On the other hand, this system is built on a strategic decision making tool, Business Model Canvas. Such tool is to support the start of entrepreneurial venture and later be used as a reference point. So that, strategic decision support systems used in large corporations would not answer to the need of entrepreneurs, since entrepreneurs, especially those who are about to start a venture or just started it, have different needs, experiences, resources and expectations. Entrepreneurs have much less resources and much less time, and the strategic level of decisions is very high which essentially will shape the future of the company. That is why a different system, especially designed for entrepreneurs must exists, where also product market fit problem plays a great role in the need for such system. The corporate level decision support systems cannot meet these requirements, and that is why a new support system is required. Still, if proven effective and efficient, however, the corporations

and large businesses can use the systems when a new company or strategic business unit is established, yet the model created would be basic and general.

Another discussion would be the point that has already been introduced and is which the proposed decision support systems in this thesis are not perfect solutions for entrepreneurs' strategic decision making problems. It would be a very bold statement to say that what is proposed can solve all problems regarding the business models, where in the mean time no one can actually have any similar claim about any decision support system (Keen 1987). As the research has already suggested, the major challenge were found to be related to product market fit, and that is why it cannot be asserted that the proposed system can solve value creation related challenges, since there is no system proposed for that part of Business Model Canvas. Also the system is designed to empower the entrepreneurs, which essentially mean that it still is dependent on the assumptions, expectations and calculations of the entrepreneurs or users (Turban, 1990). The problems of entrepreneurs in designing their business models can be caused by also other possible reasons, which were not investigated in this research. For such reasons, no claim can be made that these systems are perfect tools of helping entrepreneurs, yet the systems can create a solid ground and guideline for the entrepreneurs in many ways. Entrepreneurs would be able to see the process of business model construction and also can be able to at least have a business model with as less as possible troubles in terms of product market fit.

More points can be discussed around the relationship between the Business Model Canvas and proposed decision support systems. It is noticeable that the entrepreneurs, currently, work on business models in an unstructured, unsystematic and iteration based experience. The entrepreneurs either try to apply what they learned from education courses or from fellow entrepreneurs who has used the BMC before. This approach can cause problems as many of these problems have undertaken during this research. Besides, the systems proposed in this thesis, are greatly dependent on the knowledge of BMC and knowing BMC can be said to be a pre-requirement. It can then be an argument that if knowing BMC is a pre-requirement the why should an entrepreneur bother using proposed decision support

systems. However, this argument is week, since knowing a tool or theory does not necessarily mean that the user can apply it well and without step backs, so still a decision support system's existence is justified. Such argument, in the mean time, will result in a discussion that the proposed decision support systems can also be used as education and training tools. Those educations around BMC can use these DSS' to take the entrepreneurs through the process of crafting the business models, especially those areas related to product market fit. Such application opens new windows towards opportunities of implications of these systems.

The last discussion would be that the systems proposed faced a dilemma of simplicity versus completeness. Since the entrepreneurs has made it clear that a guideline to help them needs to be simple, the decision support systems has been attempted to be kept as simple as possible, yet covering as much as possible. There exists a tradeoff between simplicity and completeness of the systems as expected. The more complicated and the more covering the systems are the less simplicity would be achieved. In the mean time, one cannot make the system extremely simple as there are fundamentals to be covered, once this is achieved the author then attempted to add as many as details as possible without making the systems confusing. Accordingly, all necessary decision factors to create a solid and sound business model based on the finding in this research and Business Model Canvas is presented in the systems. There could be disagreements over the level of simplicity and completeness, and that can be tested empirically to realize if more detailed items can be covered in the system according to the users' feedbacks.

6.2 Limitations

First of all, limitations of this research can be explained in two parts, the part regarding exploring the major challenges of Turkish entrepreneurs regarding their business models, and second limitation set is about the proposed decision support system. Regarding the limitations of this study, first the sample can be taken into consideration. The sampling was judgmentally selected, where some biases may have existed. The fact that almost all of subjects knowing Business Model Canvas may be considered such a bias, yet this cannot be confirmed because of the nature of

the study. A hypothesis to explain this would be the fact that Ankara has a very developed entrepreneurial ecosystem compared to any other city in Turkey and that is why almost all subjects knew about the BMC. Second limitation related to the representativeness of the sample. The sample is small, because of the exploratory nature of first part of the research, yet when the systems are proposed based on the findings, the representativeness issue is a limitation of this study, binding first and second parts of thesis together.

Regarding the limitations of proposed decision support systems, firstly, channel and customer relationships DSS did only consider sales channels, not the communication or promotion channels. This was explained earlier to be a result of keeping simplicity, but still it is a major limitation. Secondly, the proposed systems are well structured, yet not flexible and this can result in over generalization in different sectors where the knowledge driven Turkish entrepreneurs show activity. This limitation is actually an outcome of rule-based decision support systems which in systematically rigid nature. Thirdly, the system cannot be claimed to work for all knowledge driven entrepreneurs, as the sample size is small and the users' experiences can be different towards such systems. The systems may help some and confuse others. Since there are not empirical results regarding the efficiency of the proposed systems, no one can tell for sure. Finally it must be said that most of these limitations are constructs of the simplicity factor, especially the first limitation, yet the flexibility limitation cannot be solved by adding more inputs or decision processes. Only user involvement and feedback can add flexibility to rule-based DSS.

Not only the limitations of research can be indicated, but also the limitations of BMC must be remembered. As discussed in the literature section of this thesis, BMC has its specific limitations such as ignoring competition, different abstraction levels and ignoring the purpose of organization. Such limitations are carried out to the proposed decision support systems that have been constructed based on Business Model Canvas and product market fit problem. The DSS' do not consider the external forces on the business model and they all ignore competition, as does BMC itself. Yet, it

solves the problem of relationship between items of BMC. Accordingly, the user must be warned about these limitations that are carried over to the proposed DSS.

Last of all limitations is related to the applicability of proposed decision support systems. The systems, in the first look, are complex and confusing, such that the users may be afraid and give up even before starting the process, which will result in going back to BMC itself. This can be overcome by providing a computer based system which will help the users not to become confused or scared, as a computer based DSS is one of the further study opportunities too and must be constructed even when one wants to simply test the system performance.

6.3 Further Research

This thesis and research has provided a decision support system that focuses mostly on the right side of the Business Model Canvas, which is the value delivery, however another research, can also provide a decision support system regarding the right side the value creation part of canvas. Value creation part of the business canvas, was not found to be very problematic for the entrepreneurs who were interviewed for the purpose of this research, however a deeper study, only focused on those subjects can unleash potential problems and challenges faced by the entrepreneurs. Built on this assumption, another research can provide a decision support system as done for this research based on rule-based decision making.

Regardless of value creations part, the finding here in this thesis can be tested empirically in a large scale representative sample all over Turkey, to test if challenges identified in this study are statistically significant. Such a research also opens a new ground, if the results are statistically significant, that the proposed decision support systems to also be tested empirically in terms of their performance and usability. Such empirical study needs a time based evaluation and needs close monitoring of the process of formulation of business models by the proposed decisions support systems and performances by the firms using the systems compared to those who do not. Later, according to the results, the systems can be

revised, and developed in much more sophisticated manner, such that the systems can cover more aspects of each challenge found here in this thesis.

Another potential field for further research can be the adaptation of the model proposed here as a fuzzy logic based computer integrated decision support system. Such research's software can help the entrepreneurs to utilize the model constructed here in faster and better way. Also such research can provide more inputs by investigating more detailed needs and requests of entrepreneurs. However, this will require the research to do another data collection to completely cover Turkish entrepreneur's needs. Such research may also include direct case examples from the experiences of other entrepreneurs and gather all those in a large data base to provide more specific information and bring in more flexibility.

As indicated, the research is driven from a national and domestic perspective, a cross sectional study comparing the challenges of different countries based on formulation of business models can also be done. Following such, the results can be compared and if differences exist, then the underlying results can be analyzed. Accordingly, distinct support systems can be proposed in different countries and again an empirical study can look at the performance of each country's firms before and after utilization for such decision support systems. It must be remarked that such a study is highly complex because of requirements for international research partners and the time required to complete such research is much more than just empirically testing the results domestically. It must be indicated, if the results are empirically significant globally, such a research can provide huge and dramatic benefits to entrepreneurs all over the world.

REFERENCES

Acs, Z., & Autio, E. (2010). The Global Entrepreneurship and Development Index: A Brief Explanation, GEDI delegate paper for the event: How to make the UK more entrepreneurial? The entrepreneurial profile of the UK in light of the GEDI Index.

Akpinar, M., & Mermercioglu, M. (2013). Knowledge-Driven Entrepreneurship in Clusters: A Comparative Study of Two Information Technology Clusters in Turkey and Finland. *Academic Summit: Innovation and Business Models in Clusters*. TCI Conferences 2013.

Acs, Z., & Autio, E. (2010). The Global Entrepreneurship and Development Index: A Brief Explanation, GEDI delegate paper for the event: How to make the UK more entrepreneurial? The entrepreneurial profile of the UK in light of the GEDI Index.

Akpinar, M., & Mermercioglu, M. (2013). Knowledge-Driven Entrepreneurship in Clusters: A Comparative Study of Two Information Technology Clusters in Turkey and Finland. *Academic Summit: Innovation and Business Models in Clusters*. TCI Conferences 2013.

Alexander, A. P. (1960). Industrial Entrepreneurship in Turkey: Origins and Growth, *Economic Development and Cultural Change*, Vol. 8, No. 4, Part 1, pp. 349-365.

Alter, S. (1978). Development Patterns for Decision Support Systems, *MIS Quarterly*, Vol. 2, No. 3, pp. 33-42.

Andreessen, M. (2007). Product/Market Fit: The only thing that matters is getting to product/market fit, *Unpublished manuscript*, Stanford University.

Andersson T., Formica P., Curley M. G. (2010). Knowledge Driven Entreprenuership: The Key to Social and Economic Transformation, New York: Springer Science+Business Media.

Ardichvilia, A., Cardozo, R., & Ray, S. (2003). Theory of Entrepreneurial Opportunity Identification and Development, *Journal of Business Venturing*, Vol. 18, pp. 105-123.

Armstrong, P. (2001). Science, Enterprise and Profit: Ideology in the Knowledge-Driven Economy, *Journal of Economy and Society*, Vol. 30, Issue 4, pp. 524-552.

Askun, B., & Yıldırım, N. (2011). Insights On Entrepreneurship Education In Public Universities In Turkey: Creating Entrepreneurs Or Not?, *Procedia - Social and Behavioral Sciences*, Vol. 24, Pages 663–676.

Baker, T., Gedajlovic, E., & Lubatkin, M. (2005). A Framework for Comparing Entrepreneurship Processes Across Nations, *Journal of International Business Studies*, Vol. 36, pp. 492–504.

Baron, R. A. (1998). Cognitive Mechanisms in Entrepreneurship: Why and When Entrepreneurs Think Differently Than Other People. *Journal of Business Venturing*, Vol. 13, pp. 275-294.

Bascavusoglu-Moreau, E. (2007). Entrepreneurship and National System of Innovation: What is missing in Turkey?, *WIDER Working Paper*, Vol. 2010/54.

Baumol, W. J. (1968). Entrepreneurship in Economic Theory, *The American Economic Review*, Vol. 58, No. 2, Papers and Proceedings of the Eightieth Annual Meeting of the American Economic Association, pp. 64-71.

Benbasat, I., & Nault, B. R. (1990). An Evaluation of Empirical Research in Managerial Support Systems, *Decision Support Systems*, Vol.6, Issue 3, pp. 203-226.

Benzing, C., Chu, H. M., & Kara, O. (2008). Entrepreneurs in Turkey: A Factor Analysis of Motivations, Success Factors, and Problems, Journal of Small Business Management Vol. 47, Issue 1, pp. 58–91.

Betsch, T., & Haberstroh, S. (2005). The Routines of Decision Making, Ney Jersey: Psychology Press.

Bhide, A. (1994). How Entreprenuers Craft Their Strategies That Work, *Harvard Business Review*, March–April 1994 Issue.

Blank, S. G. (2006), The Four Steps to the Epiphany: Successful Strategies for Products that Win, New York: K & S Ranch Press.

Blank, S. G., Blank, S., & Dorf. B. (2012). The Startup Owner's Manual: The Step-by-step Guide for Building a Great Company, USA: K&S Ranch, Incorporated

Bhushan, N., & Rai, K. (2004). Strategic Decision Making: Applying the Analytical Hierarchy Process, London: Springer-Verlag Limited.

Busenitz, L. W., & Barney, J. B. (1997). Differences Between Entrepreneurs and Managers in Large Organizations: Biases and Heuristics in Strategic Decision-Making, *Journal of Business Venturing*, Vol. 12, Issue 1, pp. 9–30.

Canetta, R. D. & Winn, J. (2002). Colorado Creative Music, *Entrepreneurship: Theory and Practice,* Vol. 26, No.3, pp.101-114.

Cetindamar, D. (1960). Policy Issues for Turkish Entrepreneurs, International Journal of Entreprenuership and Innovation Management, Vol. 5, No. 3/4, pp. 187-211.

Chen, Y.Y., Goh, K. N., & Chong, K. (2013). Rule Based Clinical Decision Support System for Hematological Disorder, Published in: Software Engineering and Service Science (ICSESS), 2013 4th IEEE International Conference, pp. 43-48.

Ching, H. Y. & Fauvel, C. (2013). Criticisms, Variations And Experiences with Business Model Canvas, *European Journal of Agriculture and Forestry Research*, Vol.1. No.2, pp. 26 -37.

Choi, Y. R., & Shepherd, D. A. (2004). Entrepreneurs' Decisions to Exploit Opportunities.*Journal of Management*, Vol. 30 , No.3, pp. 377–395.

Clancey, W. J. (1983). The Epistemology of a Rule-Based Expert System —a Framework for Explanation, *Artificial Intelligence*, Vol. 20, Issue 3, pp. 215–251.

Coes, B. (2014), Critically Assessing The Strengths And Limitations Of The Business Model Canvas, *Unpublished Master Thesis*, University of Twente.

Corbett, A. C., & Katz, J. A. (2012). Entrepreneurial Action, London: Emerald Group Publishing Limited.

Daganova, L., & Eyquem-Renault, M. (2009). What Do Business Models Do? Innovation Devices in Technology Entrepreneurship, *Research Policy*, Vol. 39, pp. 1559-1570.

Dean Jr., J. W. & Sharfman, M. P. (1996), Does Decision Process Matter? A Study Of Strategic Decision-making Effectiveness, , *Academy of Management Journal*, Vol. 39, no. 2, pp. 368-392.

Deng, H., & Wibowo, S. (2008). A Rule-Based Decision Support System for Evaluating and Selecting IS Projects, *Proceedings of the International MultiConference of Engineers and Computer Scientists* 2008, Vol. II.

Dodd, S. D., & Anderson, A. R. (2007). Mumpsimus and the Mything of the Individualistic Entrepreneur, *International Small Business Journal*, Vol. 25, No. 4, pp. 341-360.

Eckhardt, J. T., & Shane S. A. (2003).Opportunities and Entrepreneurship, *Journal of Management*, Vol. 29, no. 3, pp. 333-349.

Eisenhardt, K. M., & Bourgeoism, L. J. (1988), Politics of Strategic Decision Making in High-Velocity Environments: Toward a Midrange Theory, *Academy of Management Journal*, Vol. 31, no. 4, pp. 737-770.

Eisenhardt, K. M., & Zbaracki M. J. (1992), Strategic Decision Making, Strategic management Journal, Vol. 13, Special Issue, pp.17-37.

Er, M.C. (1988). Decision Support Systems: A Summary, Problems, and Future Trends, *Decision Support Systems*, Vol. 4, Issue 3, pp. 355–363.

Eroğlu, O., & Pıçak, M. (2011). Entrepreneurship, National Culture and Turkey, *International Journal of Business and Social Science*, Vol. 2, No. 16, pp. 146-151.

Fakhry, H. (2010). A Fuzzy Logic Based Decision Support System for Business SituationAssessment and e-Business Models Selection, *Communications of the IIMA*, Vol. 10, Issue 4, pp. 61-76.

Freeman, C. (1987). Technology Policy and Economic Performance: Lessons from Japan. Pinter.

Ghiţă, C. (2014). A Decision Support System for Business Location Based on Open GIS Technology and Data, *Managing Global Transitions*, Vol. 12, Issue 2, pp. 101–120.

Gray, P. (1987). Group Decision Support Systems, *Decision Support Systems*, Vol. 3, Issue 3, pp. 233-242.

Gustafsson, V. (2006). Entrepreneurial Decision-making: Individuals, Tasks and Cognitions, Massachusets: Edward Elgar Publishing Limited.

Gürol, Y., & Atsan, N. (2006). Entrepreneurial Characteristics amongst University Students: Some Insights for Entrepreneurship Education and Training in Turkey, Education + Training, Vol. 48, Issue 1, pp. 25-38.

Hayes-Roth, F. (1985). Rule-Based Systems, *Communications of the ACM Journal*, Vol. 28, Issue 9, pp. 921-932.

Hebert, R. F., & Link, A. N. (1989). In the Search of the Meaning of Entrepreneurship, *Small Business Economics*, Vol. 1, Issue 1, pp. 39-49.

Houben, G., Lenie, K., & Vanhoof, K. (1999). A Knowledge-Based SWOT-Analysis System as an Instrument for Strategic Planning in Small and Medium Sized Enterprises, *Decision Support Systems*, Vol. 26, Issue 2, pp. 125–135.

Isen, A. M. & Means, B. (1983). The Influence of Positive Affect on Decision-Making Strategy. *Social Cognition*, Vol. 2, No. 1, pp. 18-31.

Ivanova, E., & Gibcus, P. (2003). The Decision-Making Entrepreneur: Literature Review, *EIM Business & Policy Research*, Scientific Analysis of Entrepreneurship and SMEs Working Paper, Paper N200219.

Keen, P. G.W. (1987). Decision Support Systems: The Next Decade, *Decision Support Systems*, Vol. 3, Issue 3, pp. 253-265.

Kengpol, A., & O'Brien, C. (2001). The Development of a Decision Support Tool for the Selection of Advanced Technology to Achieve Rapid Product Development, *International Journal of Production Economics*, Vol. 69, Issue 2, pp. 177–191.

King, R. (2010a). Advanced Business Model Canvas: 3 Questions You Must Ask Before Mapping Your Business Model. Business model innovation hup. Retrieved September 10, 2013, from http://businessmodelhub.com/profiles/blogs/advanced-business-modelcanvas.

King, R. (2010b). Advanced Business Model Canvas. Retrieved October 9, 2013, from http://de.slideshare.net/RodKing/advanced-business-model-canvas.

KOSGEB Small and Medium Industry Development Organization, 2005, Turkey-Germany, XI. Period Cooperation, *Council Meeting*, Berlin, Available: www.bdi-online.de/Dokumente/ Internationale-Maerkte/DTKR_KOSGEB.pdf

Kraaijenbrink, J. (2012). What are the shortcomings of the business model canvas?, http://businessmodelhub.com/forum/topics/what-are-the-shortcomings-of-the-business-model-canvas, July 18, 2012.

Kuo, K. L., & Fuh, C. S. (2009). A Rule-Based Clinical Decision Model to Support Interpretation of Multiple Data in Health Examinations, New York: Springer Science+Business Media.

Maine, E., Soh, P., & Santos, N. D. (2015). The Role of Entrepreneurial Decision-Making in Opportunity Creation and Recognition, *Technovation*,Vol. 39–40, pp. 53–72.

Malinin, L. (2014). On Application of Fuzzy Logic to Decisions Making in Solving Inventive Problems, *International Journal of Computer and Information Technology*, Vol. 02, Issue 03, pp. 458-463.

Magretta, J. (2002). Why Business Models Matter? *Harvard Business Review*, May-June 2002 Issue, pp. 86-92.

March, S. T., & Hevner, A. R. (2007). Integrated Decision Support Systems: A Data Warehousing Perspective, *Decision Support Systems*, Vol. 43, Issue 3, pp. 1031–1043.

Maurya, A. (2010). Why Lean Canvas vs Business Model Canvas? Practice Trumps Theory. Retrieved October 9, 2013, from http://practicetrumpstheory.com/2012/02/why-leancanvas/

Mazzucato, M. (2002). Strategy for Business, London: SAGE Publications Ltd.

Miles, R. E., & Snow C. C. (1978). Organizational Strategy, Structure and Process. New York: McGraw-Hill.

Mulders, M. A.W. (2012). Entrepreneurial Decision Making and The Effect on Business Models, *Paper for Entrepreneurial Activities and Support of Entrepreneurs EFMD*, European Foundation for Management Development March 5th and 6th 2012.

Ogbor, J. O. (2000). Mythicizing and Reification in Entrepreneurial Discourse: Ideology-Critique of Entrepreneurial Studies, *Journal of Management Studies*, Vol. 37, Issue 5, pp. 605–635.

Osterwalder, A, & Pigenur, Y. (2009), Business Model Generation, USA: John Wiley & Sons. Limited.

Osterwalder, A, Pigenur, Y., Bernarda, G., & Smith, A. (2015), Value Proposition Design, USA: John Wiley & Sons. Limited.

Özdemir, Ö., & Karadeniz, E. (2009). Entrepreneurship in Turkey and Developing Countries: a Comparison of Activities, Characteristics, Motivation and Environment for Entrepreneurship, *MIBES Transactions*, Vol. 3, Issue 1, pp. 30-45.

Porter, M. E. (1980). Competitive Strategies for Analyzing Industries and Competitors, New York: Free Press.

Porter, M. E. (1991). Towards a dynamic theory of strategy, *Strategic Management Journal*, Vol. 12, Issue S2, pp. 95–117.

Porter, M. E. (1996). What Is Strategy?, *Harvard Business Review*, November–December 1996 Issue.

Power, D. J., & Sharda, R. (2007). Model-Driven Decision Support Systems: Concepts and Research Directions, Decision Support Systems, Vol. 43, Issue 3, pp. 1044–1061.

Power, D. J., Sharda, R., & Burstein, F. (2014). Decision Support Systems, Volume 7. Management Information Systems, *Wiley Encyclopedia of Management*, John Wiley & Sons, Ltd.

Prapınpongsanone, N. (2011). Rule-Based Decision Support System for Sensor Deployment in Drinking Water Networks, Unpublished PhD. Thesis, University of Central Florida.

Ries, E. (2012). Summary - the Lean Startup ... in 30 Minutes, Garamond Press Rockridge University Press.

Salvendy, G., & Sage, A. P. (2001). Handbook of Industrial Engineering: Technology and Operations Management, USA: Jhon Wiley & Sons Inc.

Sarasvathy, S. D. (2001). Causation and Effectuation: Toward a Theoretical Shift from Economic Inevitability to Entrepreneurial Contingency, *Academy of Management Review*, Vol. 26, No. 2, pp. 243-263.

Schauer, F. (1991). Playing by the Rules: A Philosophical Examination of Rule-Based Decision Making in Law and in Life, New York: Oxford University Press.

Schwenk, C. R. (1984). Cognitive Simplification Processes in Strategic Decision-Making, *Strategic Management Journal*, Vol. 5, Issue 2, pp. 111–128.

Schwenk, C. R. (1988). The Cognitive Perspective on Strategic Decision Making, *Journal of Management Studies*, Vol. 25, Issue 1, pp. 41–55.

Schwenk, C. R. (1995). Strategic Decision Making, *Journal of Management*, Vol. 21, No. 3, pp. 471-493.

Shane, S. (2000). The Promise of Entrepreneurship as a Field of Research, *Academy of Management Review*, Vol. 25, No. 1, pp. 217-226.

Shane, S. (2000). Prior Knowledge and the Discovery of Entrepreneurial Opportunities, *Journal of Organization Science*, Vol. 11, No. 4, pp. 448-469.

Simon et al. (1986), Decision-making and problem solving, Washington, DC, National Academy Press.

Sloman, S. A. (1996). The Empirical Case for Two Systems of Reasoning, *Psychological Bulletin*, Vol. 119, No. 1, pp. 3-22.

Smith, E. E., & Sloman, S. A. (1994). Similarity- versus rule-based categorization. *Memory & Cognition*. Vol. 22, No. 4, pp. 377-386.

Stam, E., & Garnsey, E. (2007). Entrepreneurship in the Knowledge Economy, University of Cambridge, Judge Business School, Centre for Technology Management (CTM), *Working Paper*, No. 2007/04.

Tompson, G. H. (2003), Zandinger!*, *Entrepreneurship Theory and Practice*, Vol. 28, Issue 2, pp. 193–204

Turban, E. (1990). Decision Support and Expert Systems: Management Support Systems. New Jersey: Prentice Hall PTR Upper Saddle River.

Tversky, A. and D. Kahneman (1983), Rational choice and the framing of decisions, *Journal of Business*, Vol. 59, pp. 251-279.

Tversky, A. and D. Kahneman (1986), Rational choice and the framing of decisions, *Journal of Business*, Vol. 59, pp. 251-279.

Uru, F. O., Caliskan, S. C., Atam, Ö., & Aksu, M. (2011). How Much Entrepreneurial Characteristics Matter in Strategic Decision-Making? *Journal of Global Strategic Management*, Vol. 09, pp. 109-133.

Wainfan, L. (2010). Multi-Perspective Strategic Decision Making: Principles, Methods, and Tools, *Electronically Published PhD Thesis*, Pardee Rand Graduate School.

Wedley, W. C., & Wyckham, R. (1984), Monitoring Corporate Financial Wealth, *Journal of Small Business and Entrepreneurship*, Vol. 2, No. 1, pp. 13-19.

Wen, W., Chen, Y.H., & Chen, I.C. (2008). A Knowledge-Based Decision Support System for Measuring Enterprise Performance, *Knowledge-Based Systems*, Vol. 21, Issue 2, pp. 148–163.

Wheelen, T. L., & Hunger J. D. (1983), Strategic Management and Business Policy, New York: Prentice Hal.

Wood, M. S., & Williams, D. W. (2014). Opportunity Evaluation as Rule-Based Decision Making, *Journal of Managment Studies*, Vol. 51, Issue 4, pp. 573–602.

Yetim, N., & Yetim, U. (2006). The Cultural Orientations of Entrepreneurs and Employees Job Satisfaction: The Turkish Small and Medium Sized Enterprises (SMEs), Case, *Social Indicators Research*, Vol. 77, pp. 257-286.

Yurdakul, M. (2004). AHP as a Strategic Decision-Making Tool to Justify Machine Tool Selection, *Journal of Materials Processing Technology*, Vol. 146, Issue 3, pp. 365–376.

APPENDICES

APPENDIX A: INTERVIEW QUESTIONS

1- Please tell us about your company, its foundation, its products and strategies? A brief history of your company. This can include who has started the company, who had the idea in the first place, what you have gone through and so far. Please feel free to add any details you see necessary.

2- Before starting your company, did you do some research about the product or service you would offer? Also before the establishment, did you have a business plan? Or a business model? How did you formulate this plan and model with the strategies around it?

3- Do you know about the Business Model Canvas, or have you heard about it? Have you used it? If you did not, please indicate why, and what instead you used to formulate your strategy and business model. If yes, please indicate the process of building your business model by BMC.

4- Let's talk about your company and BMC, where was the major challenges? Where did you experience the major difficulties when formulating your BM? Please explain in details or by examples. (If you did not use BMC, then the same questions are valid for the tools or methods you have used to develop your business model and strategies).

5- If someone or some method existed that could help you fill BMC as it is and must be, can it help entrepreneurs like yourself? How do you think it can and what must this person or method offer to you?

6- Besides formulation of your business model, in reality and your daily operations, what are the major problems and hardships you experienced in your business model and your strategy while trying to implement them? Please use details or examples.

7- Have you tried to change your strategy or business model? Why and how? Details here are very important if you can explain or by examples.

8- Lets go back to BMC and your personal experiences. Do you think in overall and detail, it is good tool to help entrepreneurs like you formulate their business model? If yes please explain. If no please explain too.

9- Please mention, by your experience, what are the most important supports entrepreneurs like you need before starting the company and after, especially regarding the business model of the firm.

10- Please add anything you like whom you think are necessary for this research and you feel you need to add.

APPENDIX B: TURKISH SUMMARY

Girişimcilik; akademi, politika ve ekonomi gibi birçok alanda bir ilgi ve tartışma alanı olmuştur ve olmaya devam etmektedir. Girişimcilik ve onun ekonomideki rolü, girişimciliğe karşı tartışmaların, tanımların ve yaklaşımların fikir ve perspektif çeşitliliği gösterdiği geleneksel ekonomi teorilerine (Baumol, 1968) dayanmaktadır. Farklı düşünce arka planları veya okullarını oluşturanlar, girişimciliği çok farklı yön ve yollarla tanımlama eğiliminde bulunurlar (Baumol, 1968 & Hebert, 1989). Bazıları değer oluşturmanın ekonomik bir sürecini tanımlarken (Baumol, 1968), diğerleri girişimciliğe yol açan bilişsel yetenekler ve özelliklere odaklanırlar (Baron, 1998). Az sayıdaki bazıları çarpıcı şekilde diğerlerinin yaklaşımlarını eleştirirler ve kavramın tam felsefesi içinde girişimciliği mitleştirmeye odaklanırlar (Ogbor, 2000); ancak yine de, hepsi onun önemi konusunda hemfikirdir. Gösterilen çabalara rağmen hala birçoğu girişimciliğin gerçek tanımı ve hatta uygulanması konusunda çelişmektedir, ancak birçok kişi, resmi bir kapsam tanımı için bir çerçeve oluşturmak amacıyla ciddi çaba göstermiştir (Shane et al. 2000). Girişimciliğin önemi sadece ülkelerin politikalarında ve ekonomik yapılarında vurgulanmakla kalmamaktadır; bu aynı zamanda, özellikle iş yönetimi eğitimi alanlar için olmak üzere, akademi için bir umut alanıdır (Shane et al., 2000).

Girişimciliğin tanımı ile ilgili anlaşmazlıklar, ayrıca bilgiye dayalı girişimciliğin anlamı ve tanımı, konunun alt başlıklarını oluşturur. Birçok kişi, bir haberin bilgi olmadığını ve bilgiye dayalı varlıkların rakipsiz olduğunu kabul eder (Andersson et al., 2010). Bilginin ürüne ve daha sonra tüm bir ekonomiye dönüşmesi, muazzam rekabet avantajlarına sahip olan, bilgiye dayalı bir ekonomi ile sonuçlanır ve dolayısıyla, değer oluşturmak için bu gibi bir süreç içinde bilgiyi kullananlar, bilgiye dayalı girişimcilerdir (Andersson et al., 2010).

Osmanlı zamanı ile karşılaştırıldığında nispeten hızlı sanayi büyümesi ve aynı zamanda Türkiye Cumhuriyetinin başlangıç yılları, hükümet politikalarının da önemli bir etkide bulunduğu endüstriyel girişimcileri getirmiştir (Alexander, 1960). Hızlı büyüme ve hükümet politikaları ise, devlete ait şirketlerin Türk ekonomi

çıktısının büyük çoğunluğunu elde bulundurduğu için yeterli değildir (Kozan et al., 2006). Yine de, daha ayrıntılı olarak bakıldığında, sayısal olarak ele almak gerekirse, üretim alanındaki Türk şirketlerinin yüzde 99'u KOBİ'dir ve bu rakam, bu alandaki toplam istihdamın yüzde 76.7'si demektir (KOSGEB, 2005). Ayrıca, KOBİ'ler Türkiye'de oluşturulan toplam katma değerin yüzde 38'ine sahiptir (KOSGEB, 2005). Türk girişimciliği altyapısının son dönemde devlet fonları, ticari kuluçka merkezleri, melek yatırımcılar ve hatta girişim sermayesi firmaları dahil olmak üzere yeni kurulumlarda bulunması beklenmedik bir durum değildir. Özdemir ayrıca "Türkiye'deki erken evre girişim faaliyeti, gelişmekte olan ülkelere göre çok daha düşük iken, kurulu iş girişimciliği faaliyetleri göreceli olarak yüksektir" (Özdemir et al., 2009, pp.40) ifadesini kullanmış ve aynı zamanda, hükümet desteğinin büyük oranda, küçük işletmeler yerine büyük işletmelerin yanında olduğunu da eklemiştir (Özdemir et al., 2009).

Strateji, her işin ve işletmenin özü olduğu gibi, girişimciliğin de özüdür. Strateji, değişen ve dinamik bir ortama yanıt olarak esnekliktir ve üstün performans için çok önemlidir (Porter, 1996). İşletme faaliyetlerini başlattığı zaman ve hatta işlemlerini başlatmadan önce alınan bu kritik kararlar şirketi ve şirketin geleceğini, özellikle de işletmenin iş modelini şekillendirdikleri için gelecekte ortaya çıkacak tüm kararların en önemlisidir.

Bu tezin edebiyat açısından incelenmesi, iş modellerinin oluşturulması gibi stratejik kararların formüle edilmesi için kullanılması kolay olan bir karar destek sistemi eksikliği ve ihtiyacı olduğunu öne sürer. Karar destek sistemleri, işletmelerin daha yapılı bir üslup içinde daha doğru ve hızlı kararlar almalarına yardım edecek popüler araçlardır (Keen 1987). Karar alma geçmişi ne olursa olsun, insanlık bu dünya üzerindeki seyahatine başladığından beri bunun insanın günlük hayatındaki önemi yadırganamaz. Genel olarak, karar almaya yönelik iki ana yaklaşım mevcuttur. Bunlardan biri belirleyici, matematiksel yaklaşımdır; diğeri ise daha çok insana dayalı, buluşsal karar almadır. Kurala dayalı karar alma ve destek sistemlerinin kullanımı kolaydır ve önceden bir aşinalık gerektirmeksizin iyi yapılandırılmıştır; bunların hepsi basit bir dil mantığını takip ederler ve sonuç olarak bu tezin teklif edilmesi için ideal oldukları ortaya çıkar (Schauer, 1991).

İş stratejisi ve stratejik karar alma açısından uzmanlık ve eğitim eksikliği, çoğu durumda önemli stratejik değişiklikler, dayanaklar ve çoğu zaman başarısızlıklarla sonuçlanır. Strateji oluşturmanın özünün ilk girişimsel iş modeli ile bağlantılı olduğu tartışılabilir ve bu sonuca varılabilir (Osterwalder et al., 2009). Birçok girişimci, geliştirdikleri şeyin piyasanın istediği şey olmadığını anladıkları noktaya kadar sadece ürün geliştirme üzerine odaklanırlar. Alexander Osterwalder tarafından geliştirilen Kanvas İş Modeli (2009), onun bir önceki İş Modeli Ontolojisi çalışmasına dayanır. Kanvas İş Modeli (Osterwalder et al., 2009), başlangıç ve mevcut şirketlerin bir iş modeli geliştirmelerine yardım eden stratejik ve girişimsel bir araçtır. Bu, birçok girişimcilik kursunda ve ayrıca resmi eğitim kurslarında benimsenen ve sunulan popüler ve güçlü bir araçtır. Orijinal kanvasın bir parçası olarak değer teklif kanvası, kullanıcıların ve başlangıçların kendi ürünlerini ve hizmetlerini, müşterilerine teklif ettikleri değer üzerine dayanarak daha iyi bir şekilde tasarlamalarına yardım eder (Osterwalder et al., 2015). İşlerin ve girişimcilerin kendi karar alma doğruluğu ve değerlendirmelerini geliştirmelerine yardım edecek şekilde uygulanan karar teorilerinden elde edilen diğer araçlar da mevcuttur. Stratejik karar alma açısından AHP (Analitik Hiyerarşi Süreci) ve stratejik karar almayı bütünleştiren çalışmalar mevcuttur.

Kurala dayalı karar alma veya bulanık mantıkla karar alma "Yaratıcı sorunları çözmede kullanılan, kullanıcıdan tedarik edilen bir dil kuralları setidir; bulanık mantıkla (FL), özellikle de bulanık müdahale sistemi (FIS) ile daha iyi ele alınır. Bir FIS, birçok "EĞER İSE" koşul kuralını içerir" (Malinin, 2014, pp.458). Kurala dayalı karar alma, özellikle imkan değerlendirme açısından girişimcilik literatüründe yerini bulmuş gözükmektedir. İmkan değerlendirme sürecinin kurala dayalı bir süreç olduğunu gösteren birçok araştırma mevcuttur. Andrew C. Corbett ve Jerome A. Katz (2012), kitaplarında bu gibi kurala dayalı bir sürecin mevcut olduğuna dair kanıt sunan bir çalışmalar ve işler koleksiyonu göstermektedirler.

Karar destek sistemleri, yönetim alanında göreceli olarak yeni kavramlardır ve bilgisayarların ve bilgi sistemlerinin kapsamlı girişi ve kullanımı sonrasında ilgi alanı olmaya başlamıştır. Peter G.W. Keen (1987), 70'lerde karar destek sistemlerinin yeni araçlar olduğunu ve karar alımını güçlendirme konusunda radikal bir kavram

olduğunu; ne var ki 80'lerde ana akımın bir parçası haline geldiğini söylemiştir (Keen 1987).

Bu tez, Kanvas İş Modeline dayalı olarak kendi iş modelleri hakkında stratejik kararlar alırken bilgiye dayalı Türk girişimcilerin karşılaştıkları zorlukları ve tehditleri açıklamayı amaçlayan, açıklayıcı bir araştırmadır. Bu araştırma, zorlukları ana ilgi alanı olarak ele almakta ve sonrasında, toplanan bilgi ve öngörüleri, kurala dayalı olan ve ayrıca Kanvas İş Modeli ile bütünleşmiş olan bir karar destek sistemi oluşturmak için dönüştürür. Tezin ilk yarısı temel olarak, Türk girişimcilerin karşılaştıkları sorunların incelenmesi ve keşfedilmesine odaklanırken ikinci yarısı, bir karar destek sistemi olarak teklif edilen bir çözüm oluşturmak için açıklamaları kullanır. Bu araştırma, girişimcilerin karşılaştığı zorlukları ve tehditleri incelerken, özellikle iş modeli ile ilgili olarak stratejik karar almadaki sorunların gerçekliğini derinlemesine bulmak için hem nicel hem de nitel araştırma yöntemlerini kullanır. Burada görüşülen şirketlerin çoğu İleri Teknoloji ürünleri geliştirdiği ve Savunma sanayisi ile birlikte çalıştığı için, bu şirketlerin bilgilerinin ve isimlerinin gizli tutulduğu ve her bir şirkete, görüşmede yer alan temsilci personeli aracılığıyla farazi bir isim verildiği göz önünde bulundurulmalıdır.

Bu araştırma için örnek alma, bu tezin yazarı ve danışmanlarının uzmanlığına dayanan yargılayıcı örnek almadır. Dolayısıyla, beklendiği üzere, özellikle Teknokent varlığı sebebiyle Ankara'nın Türkiye için önemli bir girişim merkezi olması nedeniyle, buradan yani Ankara'dan 3 farklı Teknoparktan, diğer bir deyişle Bilkent, ODTÜ ve Hacettepe Teknoparklarından 12 şirket seçmek oldukça temsili olacaktır. Mülakatlar için soruların tasarlanması sırasında, yarı yapılı, açık uçlu sorular koymaya karar verilmişken aynı zamanda mümkün olduğunca kişinin öngörülerini ve bilgilerini almak da hedeflenir. Mülakat sorularının tasarlanması, kişinin şirket, ürünleri ve hizmetleri hakkında genel bilgisi ile başlayacak ve sonrasında kişinin iş, kendi işletme modeli ve planını planlama süreci hakkında daha ayrıntılı sorulara yönlendirileceği şeklide oluşturulur.

Metodoloji bölümünde tartışıldığı üzere araştırma, tematik analize sahip nitel ve nicel araştırma yaklaşımının bir birleşimini kullanır. Konuları kodlama ve oluşturma işlerinden sonuçlanan içerik analizi aslında oluşumları ele alan nicel bir yaklaşımdır;

ancak, daha sonra açıklanacağı üzere, en çok ele alınan ve literatürden önemli bir sorunu ele alan konu, nitel yaklaşım ile daha ayrıntılı şekilde analiz edilmektedir. Bu konuların ve bulguların ayrıntılarını oluşturmadan önce, bazı diğer önemli konular da önceden tartışılmalıdır. Bu tezin konusunda belirtildiği üzere ve bu araştırmanın ilk bölümünde bahsedildiği üzere, araştırma sorusu "Kanvas İş Modeline dayalı olarak iş modellerini uygularken bilgiye dayalı Türk girişimcileri tarafından karşılaşılan sorunlar ve zorluklar nelerdir?" şeklinde çevrilebilirken bu araştırma sorusunun sonuçları, keşfedilen zorluklara dayalı girişimcilere yardım eden bir karar destek sistemi teklifine yol açabilir. Mülakatların ilk incelenmesi, mülakata alınan 12 kişinin hepsi tarafından karşılaşılan ve paylaşılan sorunlarla ilgili önemli modellerin olduğunu göstermiştir. Soruların tasarlanması, yazarın daha derin öngörülere sahip olmasına izin vermiştir; bu durum, bu zorlukların yer aldığı kategorileri ve sebepleri göstermektedir. Eksenel kodlama, yazarın kategoriler ve ana konulara ulaşan alt konular oluşturmasına izin vermiştir, bu da BMC alanlarını birbirinden ayırmaya yardımcı olmuştur. Konular arasında çoklu ara bağlantılar bulunmuştur ve bunlar yazarın, bilgiye dayalı Türk girişimcilerin büyük oranda stratejik karar alma becerilerinden ve sağlam bir iş modeli formüle etme becerilerinden yoksun olduklarını keşfetmesini sağlamıştır. Bu şekilde daha derin analizlerden sonra hangi ana sorunların en çok ele alınması gerektiği ve bu zorlukların arkasında hangi sebeplerin olduğu keşfedilmiştir. Ayrıca, iş modellerini oluşturmanın kaynakların mevcudiyeti ile desteklenecek düşünce ve eğitim altyapısı gerektirmesi sebebiyle, konuların ara bağlantılarının, girişimcilik sürecinde doğal oldukları da ortaya çıkmıştır. İş modeli, kendi doğası içinde, birçok faktörün aynı anda var olmasının bir ürünü olduğu için iş modeli konseptini soyutlamak ne mümkündür ne de mantıklıdır.
Bilgiye dayalı Türk girişimciler açıkça, kendi girişimlerini kapsayan tüm resmin iş kısmına odaklanmak ve bunu planlamak yerine ürün veya hizmet geliştirmesi üzerine daha fazla çaba gösterirler. Bu, mülakatlarda 47 kez gözlemlenen ürün odağı ile ilgili alt konuların oluşturulmasında gözlemlenebilir. "Mükemmel" ürünün geliştirilmesi üzerindeki odak, girişimcilerin piyasa gereksinimlerinin izini kaybetmelerine yol açar. Girişimciler ürüne ve ürün özelliklerine o kadar çok odaklanırlar ki neredeyse ürünün değerini ve hizmet sunacakları müşterileri unuturlar (Osterwalder et al., 2009). Değer oluşumu ve değer oluşturma konusu toplamı, konulardaki tüm diğer

oluşumlardan daha yüksektir ve ürün piyasası uyum sorununun açık olduğunun bir kanıtıdır.

Değer önerisi, girişimciler için birçok zorluk oluşturan bir alt konu ve kavramdır. Kanvas iş planının hangi kısmının zorlayıcı olduğu sorulduğunda ve gerçek hayatın günlük işlem zorlukları sorulduğunda, kişilerden çoğu aynı anlama gelen yanıtlar alındığı görülmüştür. Değer alt konusu, görüşmelerde en çok ortaya çıkan konudur (61 kez) ve büyük bir değerlendirme ve analiz ihtiyacını gösterir. Değer ve tanımı, birçok kişinin BMC'yi başlattığı yerdir ve ürünün veya hizmetin varsayımlarının ve tanımının alakasız veya uygun görülüp görülmediği yerdir; sonrasında tüm iş modeli uyumu ve ürün piyasası uyumu sorgulanır. Değer sunumu ve değerin bir alt konusu olarak müşteri bölümlendirmesi ve bölümleri ürün piyasası uyumunda önemli bir rol oynar. Eğer değer doğru tanımlanırsa ancak yanlış bir müşteri kitlesi hedef alınırsa bu doğrudan ürün piyasa uyumu başarısızlığı ile sonuçlanır ve iş modelleri formüle edilmesinde ve bunların uygulanmasında önemli derecede ciddi zorluklara yol açar. Müşteri ilişkileri ve kanalları, değer önerisini müşteri bölümlerine bağlayan ve ürün piyasa uyumunu sağlayan kavramlardır (Osterwalder 2009 & 2015). Bu iki kavram Kanvas İş Modelinde ayrılmıştır; ancak aynı bölüm altında incelenmelerini gerektiren sebepler mevcuttur. Temel olarak bunun iki sebebi vardır; biri analiz ile ilgili iken diğeri, bir sonraki bölümde teklif edilecek olan karar destek sisteminin yapısı ile ilgilidir. İkinci sebep olarak, lütfen bir sonraki bölümde yer alan müşteri ilişkisi ve kanal DSS kısmına bakınız. Yine de, analiz söz konusu olunca bu bölüm altında tartışılmalıdır.

Ürün piyasa uyumu sorunu, girişimsel/yönetimsel eğitim eksikliği, çok fazla ürün odağı, deneyim eksikliği ve son olarak değer ile müşteri bölümleri arasındaki yanlış eşleştirme dahil olmak üzere birçok faktörün bir sonucu olarak ele alınmıştır. Bu temel olarak, özellikle değer kavramının, müşteri ilişkilerinin, bölümlendirmenin ve kanalların yanlış anlaşılmasıyla sonuçlanır ve burada, bu kavramlar aynı zamanda, girişimcilerin üstesinden gelmesi gerektiği en zorlu konulardır. Bu kavramların yanlış anlaşılması ve ardından, ürün ve geliştirme sonuçlarına çok fazla odak, temelde iş modeli uyumsuzluğuna yol açacak olan ürün piyasa uyumu sorununu oluşturan yanlış iş modeli formülasyonudur (Osterwalder et al., 2015). Açıkça, bu

gibi bir sorunu ele almak için, kişinin girişimcilere Kanvas İş Modelinin doğru tarafında her bir adımda ve maddede rehberlik ederek onların kendi iş modellerini daha iyi bir şekilde oluşturmalarında yardım etmesi gerekir. Ürün piyasa uyum sorunu, basit ancak yapılı ve kapsamlı bir karar destek sistemi teklif ederek çözülebilir (Keen 1987). Bu karar destek sisteminin, girişimcilerin çok fazla okuma veya bilgi edinme işleri ile aşırı yüklememesi gerekir; bunun yerine, kullanıcı dostu olmalı ve sadece gerekli olduğunda önemli tanımlara değinmelidir. Daha önce tartışıldığı üzere Kanvas İş Modelinin doğru tarafı, değerin müşterilere sunulması ve değerin kendisi, en zorlayıcı kısım gibi gözükmektedir; böylece bir karar destek sisteminde tüm kavramların yer alması durumunda problemin minimum seviyeye indirgenmesi gerekir; ancak girişimcilerin varsayımları ve topladıkları bilgiler yeterli değilse bir karar destek sistemi, tam çözümü garanti edemeyebilir. Bu kavramlar birbiriyle bağlantılı ancak Kanvas İş Modelinde ayrı olduğu için yazar, ürün piyasa uyumu konusu ile ilgili olarak her bir madde için ayrı karar destek sistemleri oluşturmaya karar vermiştir. Tabii ki, müşteri ilişkilerinin ve kanallarının, değer önerisi ve bölümlendirmesinin ayrı sistemler olduğu aynı destek sistemine konduğu ancak bölümlendirme ve değer önerisi niteliğinin birbiriyle yakinen ilişkili olması sebebiyle kullanıcının birbirinden referans alması gerektiği göz önünde bulundurulmalıdır.

Analizi, bu tezin sonuçları ve tekliflerini sonuçlandırma ışığında, bu tezin literatüre iki önemli katkısı olduğu öne sürülebilir. İlk olarak ve bu tezin ilk bölümü ile ilgili olarak araştırma, Kanvas İş Modeline dayalı olarak kendi girişim iş modellerini formüle ederken bilgiye dayalı Türk girişimcileri tarafından karşılaşılan önemli zorlukları ve tehditleri incelemiş ve araştırmıştır. Bilgiye dayalı girişimciler bir yana, iş modellerini oluştururken Türk girişimciler tarafından karşılaşılan zorlukları keşfetmeyi göz önüne alan hiçbir çalışma şimdiye kadar yapılmamıştır. Bu tezin ikinci ana katkısı, yukarıda açıklandığı üzere, özellikle ürün piyasa uyumu sorunu ile yüzleşen, bilgiye dayalı Türk girişimcileri için tasarlanmış olan, teklif edilen kurala dayalı karar destek sistemidir. Daha önce ne ülke içinde ne de dünya çapında bu gibi bir çalışma girişiminde bulunulmamıştır.

Bu katkılara ek olarak, bu tezin ana konusu çevresinde birçok tartışma oluşturulabilir. İlk olarak, teklif edilen karar destek sistemlerinin burada özellikle bilgiye dayalı Türk girişimcilerini desteklemek üzere tasarlandığı hatırlatılabilir. Diğer bilgiye dayalı girişimciler bunu farklı ülkelerden kullanabilirler çünkü bu, genel perspektiften bakıldığında girişimciler için tasarlanmış bir sistemdir ancak, yine de sistemin fiili olarak çalıştığını gösteren deneysel kanıta ihtiyacı vardır. Büyük kurumların, iyi tanımlanmış sağlam işletmeler ve işlemler için uzman sistemleri ve karar destek sistemleri vardır. Diğer taraftan bu sistem, stratejik bir karar alma aracı olan Kanvas İş Modeli üzerine kurulmuştur. Diğer bir tartışma, daha önce belirtilen bir noktadır ve tezdeki teklif edilen karar destek sistemlerinin, girişimcilerin stratejik karar alma problemleri için mükemmel çözümler olmadığını ifade eder. Bu arada hiç kimse herhangi bir karar destek sistemi hakkında benzer bir iddiada bulunamazken teklif edilenin, iş modelleri ile ilgili tüm sorunları çözebileceğini söylemek oldukça cesur bir ifade olur (Keen 1987). Son tartışma ise, teklif edilen sistemlerin, sadeliğe karşı bütünlük ikilemi ile karşılaşmalarıdır. Girişimciler, kendilerine yardım edecek bir kılavuzun basit olması gerektiğini açıkça belirttiklerinden beri karar destek sistemleri de mümkün olduğunca fazla ayrıntı kapsayarak, mümkün olduğunca basit tutulmaya çalışılmıştır.

Teklif edilen karar destek sistemlerinin sınırlamaları ile ilgili olarak, öncelikle, kanal ve müşteri ilişkileri DSS, iletişim veya promosyon kanallarını değil sadece satış kanallarını ele almıştır. Bu daha önce, sadeliği tutmanın bir sonucu olarak açıklanmıştır ancak yine de büyük bir sınırlamadır. İkinci olarak, teklif edilen sistemler iyi yapılandırılmıştır ancak esnek değildir ve bu da, bilgiye dayalı Türk girişimcilerinin faaliyette bulunduğu farklı sektörlerde aşırı genelleme ile sonuçlanabilir. Sadece araştırma sınırlamaları gösterilmekte kalmayıp aynı zamanda BMC sınırlamaları da hatırlatılmalıdır. Bu tezin literatür bölümünde tartışıldığı üzere BMC, rekabeti, farklı soyutlama seviyelerini göz ardı etme ve organizasyon amacını göz ardı etme gibi belirli sınırlamalara sahiptir. Tüm sınırlamaların sonuncusu, teklif edilen karar destek sistemlerinin uygulanabilirliği ile ilgilidir. Sistemler ilk bakışta karmaşık ve kafa karıştırıcıdır; öyle ki, kullanıcılar korkabilir ve süreci başlatmadan önce bırakabilirler, bu da BMC'ye geri dönüş ile sonuçlanır.

Değer oluşturma bölümüne bakılmaksızın, bu tezde belirtilen bulgular, bu çalışmada belirlenen zorlukların istatistiki açıdan önemli boyutta olup olmadığını test etmek için, Türkiye çapında geniş çaplı bir temsili örnek içinde deneysel olarak test edilebilir. Bu gibi bir araştırma, sonuçların istatistiki açıdan önemli boyutlarda olması durumunda, teklif edilen karar destek sistemlerin de performans ve kullanılabilirlik açısından deneysel olarak test edilmeleri için yeni bir adım oluşturur. Daha fazla araştırma için başka bir potansiyel alan, burada teklif edilen modelin, bir bulanık mantığa dayalı bilgisayara entegre karar destek sistemi olarak benimsenmesi olabilir. Bu araştırmanın yazılımı, girişimcilerin burada oluşturulan modeli daha hızlı ve iyi şekilde kullanmalarına yardım edebilir. Ayrıca, bu araştırma girişimcilerin ihtiyaçlarını ve taleplerini daha ayrıntılı şekilde araştırarak daha çok girdi sağlayabilir. Ancak bu, araştırmanın Türk girişimcilerin ihtiyaçlarını tamamen kapsayacak başka bir veri toplaması yapma araştırması gerektirecektir. Bu araştırma aynı zamanda, diğer girişimcilerin deneyimlerinden doğrudan durum örnekleri içerebilir ve tüm bunları, daha spesifik bilgi sağlamak ve daha fazla esneklik sağlamak için geniş bir veri tabanı içine toplayabilir.

APPENDIX B: TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü	☐
Sosyal Bilimler Enstitüsü	✓
Uygulamalı Matematik Enstitüsü	☐
Enformatik Enstitüsü	☐
Deniz Bilimleri Enstitüsü	☐

YAZARIN

Soyadı : NABAVI
Adı : Seyed Hesamoddin
Bölümü : İşletme

TEZİN ADI: "EMPOWERING KNOWLEDGE DRIVEN TURKISH START-UPS: A PRACTICAL RULE-BASED DECISION SUPPORT SYSTEM INTEGRATED WITH BUSINESS MODEL CANVAS"

TEZİN TÜRÜ : Yüksek Lisans ✓ Doktora ☐

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. ☐
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. ☐
3. Tezimden bir bir (1) yıl süreyle fotokopi alınamaz. ✓

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: