

# Reference Model for Improving the Process of Enterprise Software Product in the Ecuasis Company

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**Abstract**— This research work arose to improve the process of enterprise software products for the creation of software companies, through the development of a reference model based on lean startup proposed methodologies to the effect of selective and comparative study of the main methodologies of the entrepreneurship, the methodology to identify that best suits our purpose to generate the proposed model. Finally, generates and implements the proposed model and check the validity by applying a practical case study.

**Keywords**— Agile Development Methodologies, Reference Model, Business Models, Lean Startup, Entrepreneurship.

## I. INTRODUCTION

The trend in creating software development companies is growing every day, but more than half of these companies fail and disappear, why? How can we manage this risk? What these companies are failing?

According to the Register of Companies of the Internal Revenue Service (SRI) provided by the Department of Economic Statistics of the Central Bank of Ecuador to court to December from 2013; in Ecuador there are 278,062 registered companies from all economic activities (Unit Information Management, 2013). Of this group, only 150,370 are active companies [1]. Figure 1 shows the segmentation of the universe based on the above criteria:



Fig.1: Segmentation of IT Companies

The disadvantages of startups that fail and disappear. In the book, the valley of death mentions the most mentioned

reasons for the failure of the enterprises [2]. The following describes the most important.

- a) Failure of an initiative: Fear of failure can have a good business idea, but not executed for being engaged in other activities.
- b) Left without funding: A startup at the beginning does not generate income, its own assets or entrepreneurial family contributes the money required to fund its assets.
- c) Liquidity management: Main cause of failure of a startup not has sufficient resources to pay expenses of functionality.
- d) Wrong Timing (Time of project implementation): Refers to the time when entrepreneurship was done, it should be done very early or very late.
- e) Waste of effort: It is a risk that appears in technological industries, it is very important to understand how to manage very different to the way enterprises administered companies created.
- f) Capacity too strong: Can operate small businesses that are unattractive to larger competitors. That is, the value proposition to solve a problem that is not resolved or to generate a unique value offers.
- g) Demoralized: The challenges of the enterprise demand a lot of energy, fatigue, and these requirements should include the ability to maintain the energy to drive the project through the difficulties.
- h) Delayed the plan: The projects were delay. The problem is that when a company has can be very serious problem, because although revenues are probabilistic, costs are real.
- i) Mistaken assumptions: A project should learn from market signals to learn from them and how the business actually. Not receive feedback from reality.
- j) Climbing too fast: Corresponds accelerate their growth when they are not yet ready for it, the risk of early climb is not as visible.

## II. METHODOLOGIES FOR LEAN IT UP

### • Characterization of epistemological philosophy Lean Startup

- a) What is a business?: "A company can be considered as a system within which a person or group of people develop a set of activities aimed at the production and / or distribution of goods and / or services, framed in an object social class "[3].
- b) What is Startup "It is a temporary organization in search of a scalable and replicable model of business" [4]. Only temporary organization for a certain period, after which time it becomes a sustainable company and finally disappears.

"A startup is a human institution designed to create a new product or service under conditions of extreme uncertainty" [5]. It focuses more on being in an environment of high uncertainty due to the products or services based on a strong innovation. A startup is not a small version of a large company, so the innovative projects need to be managing in a different way to that traditional companies was manage.

- c) What it is a Lean?: "Lean is a word that describes a comprehensive and sustainable approach to use less of everything to give more" [6]. It means doing various things with less debris, less time, fewer suppliers, less bureaucracy. However, Lean also means more knowledge, agility and organizational capacity, more productivity.
- d) What is Lean Startup?: This trend is originally associated with manufacturing processes and production; Lean method covers all aspects of operations, including internal and external functions. A wide range of industries, aerospace, automotive, banking, manufacturing, health, etc.

### • Business Plan vs. Business Model.

- a) A Business Plan: is a written document that reflects and describes the business model of the company, its strategy aims to achieve the objectives, costs and expected economic results. It is a static document, which is not changed or revised.
- b) A business model: "is dynamic, and it changes over time, as changes in the company or in the environment. Always contains an innovative proposal, which may be product, commercial or production strategy to generate value to the company "[7].
- c) Business Model Canvas: The canvas of the business model is a tool of strategic management and entrepreneurship that allows you to describe, design, challenge, invent and swing a business model. The best way to describe a business model was divide into nine basic modules, which reflect the logic that follows a business for income. These nine modules cover the four

main areas of business. Customers, supply, infrastructure and economic viability [8].

### • Types of Methodologies for Entrepreneurship Lean IT

- a. Design Thinking: The methodology for the practical and creative resolution of problems or issues that result looking for a better future. It was understand as the essential ability to combine empathy, creativity and rationality to meet user needs and drive business success. "Thinking outside the box is recommended in this process, as it can often lead to creative solutions" [9].
- b. Customer Development: It is a development methodology oriented client, is a tool that allows entrepreneurs to develop products focusing on the real needs of customers and the market; spreading out all activities related to the client in the early stage of a company in its own processes, commitment to learn from the customers themselves to develop the product you need really.
- c. Lean Startup: A business approach coined by Eric Ries that aims to change the way companies build and launch new products. It has been base on the validated learning, scientific experimentation and iterative development of products in short cycles, thus, new companies can design their products or services to meet the demands of their customer base without large amounts of seed funding or releases of expensive products.
- d. Lean UX: A process for the design of products and services that allows you to refine progressively, quickly and efficiently offer value for users, is an iterative process as used commonly on design projects focused on the user, a new how to communicate what we do and refocus on what we do.
- e. Lean Development: This process is provision-eliminating waste through continuous improvement, making the product flow at the request of the customer to make it as perfect as possible. It aims to eliminate waste, selecting those features that really add value, and places particular emphasis on speed and efficiency.

### • Comparative Study of Entrepreneurship Methodologies

In order to focus some quality concepts that was relate to each other, it is necessary to consider some selection criteria that serve to select those models that may be of interest to this work.

The data elements have been take from a study by research for a Master in Quality of the National Technological University of Buenos Aires-Argentina. The valuation is measured 1-3 lower value being the least set [10].

C1: Availability: extent to which you can access existing information.

C2: Clarity: extent to which lean methodologies was present and possesses explanatory mechanisms on its use. It refers to

how easy it can be to understand the methodology, influenced by factors such as structure, language, etc.

C3: Adaptability: Extent to which the methodology has the ability to adapt to different situations depending on the software product to which it will apply.

C4: Completeness: Extent to which the methodology described all its parts in its entirety without leaving out important information.

C5: Application area: applicability of the methodology to areas of software products.

C6: Project types: type or project to which the model can be applied level.

C7: Institution recognized: a body or institution of international renown has proposed standard and / or methodology.

C8: Permeability: increased permeability of the proposal in terms of other processes or best practices.

C9: Updated information: The standard or methodology provides updated information.

C10: Adaptation of the business model: the degree to which the business model canvas business or model can be adapted to the methodology.

C11: Entrepreneurship: existing methodologies and this oriented entrepreneurship.

C12: Customer Search: The standard and / or validate methodology real customer needs high value and if the software product solves these problems.

The aforementioned criteria and parameters was comparing

TABLE I. PERCENTAGE OF THE GENERAL SELECTION

CRITERIA	Customer Development	Lean Startup	Lean UX	Design Thinking	Lean Development
C1. Availability	2	2	3	1	1
C2. Clarity	3	2	2	1	1
C3. Adaptability	2	2	2	1	2
C4. Completeness	3	2	2	1	1
C5. Area of Application	3	3	1	1	1
C6. Types of Projects	3	3	3	2	2
C7. Recognized institution	1	1	1	1	1
C8. Permeability	2	2	1	1	1
C9. Update Information	2	3	2	1	1
C10. Adaptation of the business model	3	3	3	2	2
C11. Creating Enterprises	3	3	1	1	1
C12. Search Customers	3	2	3	1	1
<b>TOTAL</b>	<b>30</b>	<b>28</b>	<b>24</b>	<b>14</b>	<b>15</b>

In Table 1, below the methodologies selected as candidates (columns), the criteria (rows) and the fulfillment of each selection criterion:

"H" (3) represents a high degree of compliance with the criterion.

"M" (2) represents the criterion is partially met.

"L" (1) means that the criterion is not satisfied enough.

The following comparison was perform using as a base the study method of similarity between models and standards (MESME), developed by the research group Chair for Software Process Improvement in the Ibero-American Area of the Polytechnic University of Madrid. [11].

From the results, we can see that the customer development methodology successfully meets all the criteria in the selection of lean methodologies for business ventures, which validates it as a reference model. This model offers a clear way to handle an integrated entrepreneurial activities and creation of software companies approach.

TABLE II. PERCENTAGE OF GENERAL SELECTION

Customer Development	Lean Startup	Lean UX	Design Thinking	Lean Development
27,03	25,23	21,62	12,61	13,51

The company does not have a methodology, which includes a planning stage start or where there are several processes such as scoping, identification of resources, among others, the same as are necessary to for business enterprise of software companies.

These elements justify the choice of methodology Customer Development as it meets with a wider aspects, details and information we need for the development of this research and creation of the proposed model.

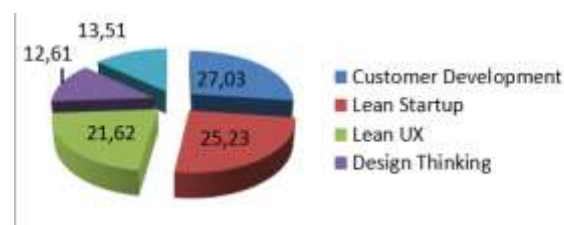


Fig.1:Adaptation of MSSS Method of analysis models

### III.REFERENCE MODEL FOR PROCESS IMPROVEMENT ENTERPRISE SOFTWARE PRODUCT

The proposed model allows entrepreneurs to develop products and create companies large and small software focusing on the real needs of customers and the market, rather than just based on assumptions and uncertainties.

The reference model was divide into four main phases: discovery of the customer, customer validation, customer creation and establishment of the company.

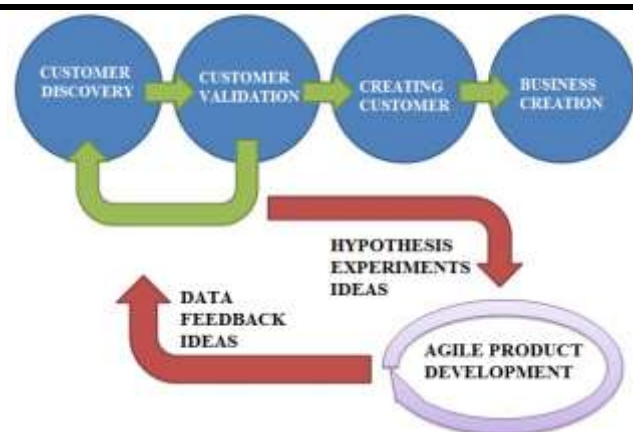


Fig.3:Proposed Reference Model

Each phase a circular track with recursive arrows drawn. Circles and arrows highlight the fact that each step is iterative and represent the entrepreneurial conditions should be evaluate to complete the feedback loops can be repeat as often as necessary until it was done properly or discard.

### 3.1. Client Discovery

This phase starts with a vision of a new product or service to been created, this means finding out who the customers are, as I got the product to customers, and why the customer will buy the product, the main objective is to check whether the hypothesis made in the business plan are correct.

#### • Identify Hypothesis

The first objective once raised the mission and vision of the startup is to define our hypothesis of new software product or service, for it may be the Thought Works technique (Thinking of work), which respond to the questions used (we believe, for, and knowing that we will achieve success when).

Having defined the main idea is necessary to define the assumptions and find out who might be our customers because they buy our product for this we use the tool business of model canvas with nine blocks.

1. Customer segments: Groups of individuals or organizations that the company aims to reach and serve.
2. Value proposition: The goal is to solve customer problems and meet their needs through many products and services that create value for a specific market segment and why consumers choose our company over another.
3. Distribution Channels: They represent the way in which the company value proposition communicates with customer segments.
4. Customer relations: Sets the types of relationships that a company has a specific customer segment and maintained independently in different market segments.
5. Key activities: The Company must create alliances to optimize their working model and reduce risks or acquire resources.

6. Key Resources: These are assets necessary to make the company work, you may own offer and provide the elements described above
7. Key Partners: Some activities are outsourced and certain resources were acquired outside the company.
8. Cost structure: The various elements of the business model make the cost structure.
9. Flow of income: Income sources that the company hopes to reach when customers purchase value propositions offered.

#### • Check the Problem

It should go out, leave the office and go directly to the client to validate the hypotheses, it is important to mention that at this stage not try to sell the product, but ask potential clients if they really have the problem we think we have.

You need a value proposition of low fidelity MVP (Minimum Viable Product) created, can be a prototype of a website done quickly in PowerPoint or with a simple tool for creating landing pages.

#### • Check the product solution

Once it has captured the interest of some customers, we know the disadvantages and problems possibly buy the product, it is time to stop the process and decide whether or pivot continue.

#### • Check Pivot or Continue Business Model

The discovery process usually requires many iterations customers to fully understand the market and find customers who want to buy the product or service. It's time to validate if the idea put forward proposals with updated scenarios and provides a solid foundation to move forward and can be transformed into a scalable and profitable company, or thinking about other ideas you have received in the market.

### 3.2 Customer Validation

The aim is to generate our first actual sales to confirm us that the previous phase is correct.

#### • Preparing to Sell

First, road route sales to major customers must be carries out, those who are interested in buying the product

To achieve this, the team should consider several important aspects to generate the expected impact in its segment of selected customers. Among them, the most important are building the brand (Branding), product name, image, and logo.

#### • Out of the Office and Sell

It tries to sell the product, for it must go out twice, first to understand customer problems, how they worked and the second to confirm whether the new product would solve that problem.

#### • Product Positioning

It focuses on the specific attributes of the product according to the market while positioning the company refers to design a corporate image destined to occupy a distinct place in the mind of the target audience.



### • Check the Validate and Performed

It questions quantitatively and qualitatively, from the analysis of the experimental results if the assumptions are valid (including the assumption of the problem, the solution, Customer, Market and others); i.e. determine if they remain, they are discarded or should be amended.

### 3.3 Creating Customer

It is to create demand for the product and take it to the sales channels. It been based on the first success of the company that has sold the product to the first customers. In this way, you pass the first mass market consumers or the great mass of consumers.

### • Brand Positioning and Product

The main thing is to create or improve a product image and the startup; so far worked to reach the main potential customers with a compelling value proposition, basically, tasks for designing the product brand and its distribution was make.

As the product should been take into account several important aspects to generate the expected impact on the market, like a:

- Building the Brand
- Name, Image and Style
- Logo and slogan
- Material Sales
- Dissemination through social networks
- Videos, wikis, other documentation.

### • Definition of Marketing and Sales Strategies

We must refine marketing strategies and product sales; the team refines startup, scale designs and marketing strategies. At this stage, it is likely to need help from a consultant, expert advice on promoting and locate a brand and product.

### • Refinement of the Financial Model

A financial plan for the startup operation must exist; equipment must formalize its financial plan projecting the short and medium term for operations startup. This should incorporate the cost structure, including fixed and variable costs, expenses, revenues from sales and investment.

### • Iterate, Return or Exit

So here, you have to decide if you are ready to move on. If we answer the following questions:

Are the sales go up as the efforts of creating demand become more effective?

Are the competitors starting to take notice or even starting to copy your position?

Is the business model still work?

The answers are yes, we proceed to the next phase of the construction company. However, in some cases there can be nothing wrong with the positioning activities, messages or creating demand. The problem may be with the market rate. If competitors are crushing you, or if it cannot generate any claims at all, it is time to step back and ask:

### 3.4 Establishment of the Company

Once achieved, the first customers start paying for our products, it's time to grow the company to reach more potential customers, the startup is already running, it is time of transition between informal and confusing oriented company customer, a structured entity with departments responsible for areas such as sales, marketing and business development with a real market is in setting the efforts in each department of the company to jointly exploit the product's success with the eye to scale the business.

### • Established Reaching Customers

It is the culmination of all the hard work in construction since the beginning of the startup, by now you have the first sustainable customers, positioned by the company and product, and you are on the road to creating demand for it you're selling.

### • Creation of Culture and Organizational Management

Construction of the company must prepare the organization focused on learning and discovery to the transition to a modern organization, capable of meeting new challenges silver. For this, it is necessary to develop an organizational culture based on values and principles of the people who make the company.

### • Creating Functional Departments

The company should been organize into units that have specific functions and business processes, to match the needs of the company. The definition of the mission is the raison of the company, why it exists.

### • Creating the Capacity Acquisition Strategies

The strategy to will be implement for the acquisition of new equipment capabilities, allowing about taking the growth of the company was define. We must take into account that this step goes hand in hand with the vision and the strategy defined by the founders as well as its organizational structure implemented.

## IV. RESULTS PRESENTATION

In order to verify the results of a staff survey company Ecuasis City Machala what was decided was applies.

For analysis and obtaining results, we worked with three groups of people, establishing them as follows:

- Population (Department Ecuasis)
- Sample (Task Force)

Poll oriented or first group of people (entrepreneur) based on experience with the application of the reference model.

Poll oriented or second group (Programmer, Tester).

Poll oriented or third group of users.

It was determined that the results of the instrument would be valued between the following percentages:

From 0% to 39.99%: The proposed model is not met or failing fulfilled in partial aspects or have a very low confidence with activities, and corrective action should be

taken with utmost urgency and in general to implement the optimal model.

40% to 59.99%: The proposed model is true, but with weaknesses in terms of software development process or systematic continuity and compliance, or has low confidence in the activities. Corrective action will be take urgently to implement an optimal model.

60% to 85.99%: The proposed model is true, but with minor drawbacks. The failures will be resolved in the short term that the methodology does not cease to be optimal. The tendency to develop a methodology to software development process is very positive. You need to analyze the outstanding questions as to the respective questions with emphasis lowest score.

From 86% to 100%: The proposed model will improve the process of enterprise software product, as a referential framework for the creation of software companies.

a. Presentation of results to potential entrepreneurs.

From the results obtained by the first group, surveyed entrepreneurs detailed in the chart below, the following results were obtain.

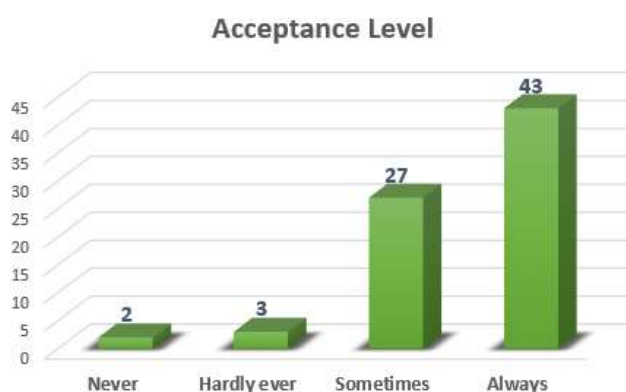


Fig.4:Level of Acceptance of Potential Entrepreneurs upon application of the proposed model

The chart above represents a 87% acceptance at potential entrepreneurs, Therefore, it is concluded in this sub paragraph proposed is necessary, tending to reduce wasted time and costs to establish a framework that provides flexibility to adapt to needs of each entrepreneurial project.

b. Presentation of the results developers and Tester.

From the results obtained by the second group surveyed developers and testers the following detailed results in the Figure 5.



Fig.5:Level of acceptance the Programmer, tester upon application of the proposed model

The chart above represents an 86.33% acceptance in programmers and testers, therefore, we conclude that the proposed model is necessary, aimed at reducing lead times and cost overruns, to establish a logical framework and tidy with valid tools for a good performance of the team.

c. Presentation of results to users.

From the results obtained by the third group surveyed users (business owners) is detailed in the chart below, the following results were obtained.

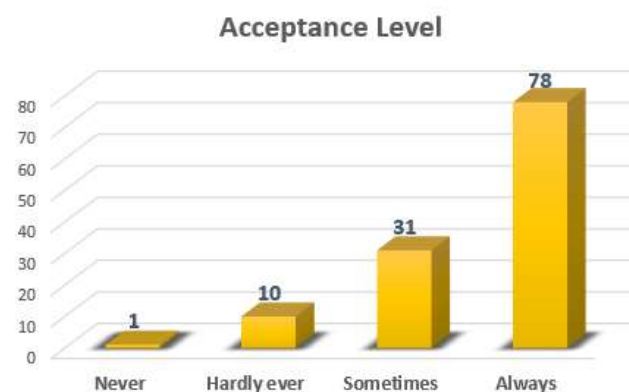


Fig.6:User acceptance level upon application of the proposed model

The chart above represents a 88.75% by users, according to the experience obtained by applying the reference model proposed, Therefore, it is concluded in this sub paragraph, the reference model proposed is necessary so as to establish a correct and important initial planning before creating the software company.

## V. CONCLUSIONS

The present research has yielded a very common problem in undertaking the creation of the software suppliers working in our country, most of these businesses fail by several factors including business initiative with wrong assumptions, liquidity management, and the loss of funding and the very rapid escalation of new businesses.

The proposed reference model for process improvement enterprise software products helps identify, evaluate business idea, customer needs and possible solutions through a

minimum viable product to validate it truly, is delivering a product or service the customer wants to avoid the waste of time and money on products that do not fit into the market, which is why people, entrepreneurs are free to execute each phase depending on their approach and the needs of your enterprise.

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