

Thinking About the Sustainability of a Start Up Project: UDA-ERP Case

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Abstract

Business plans become an important preliminary step for all Start Up. Properly defining the market segment and penetration, growth and operation strategies are activities that become essential. The objective of this work is to identify the necessary strategies that allowed a product called UDA-ERP to go from research to a business model. For this, a market study was applied by means of surveys to a group of micro and small companies in Cuenca, the third most important city in Ecuador. With the application of various strategic analysis tools, macro-strategies were determined that made it possible to establish a sustainable business model for a product resulting from an academic research project.

Keywords

Business model ERP, Start Up, Research, Sustainability and UDA-ERP

1. Introduction

Technology is constantly evolving at a dizzying pace, which becomes even more evident in the so-called “intelligent society” (Deguchi et al. 2018), an aspect that directly affects one of the axes that influence business growth and the generation of value in business. The wide range of computer systems in this globalized market has exponentially marked a trend in recent years, and business leaders, who embrace information technology (IT) as a strategic pillar, seek to strengthen them making their business processes more efficient (Deguchi et al. 2018). One of the technological tools commonly adopted and used by organizations is the enterprise resource planning - ERP.

UDA-ERP is a computer system aimed at meeting the management requirements of the business resources of MSMEs. This software has had an important development path since 2015 as a part of a research project by a group of professors from Universidad del Azuay (Astudillo-Rodríguez et al. 2020). In the software market context, it is unattainable for a MSME to access a business tool such as an ERP, due to its high costs which include licensing, conceptualization, installation, training, and maintenance services, easily exceeding 50,000 dollars, triggering that only large companies can implement it. In this research, UDA-ERP viability, and sustainability to supply different market segments was analyzed, considering the natural characteristics in which a MSME operates and the resources it must face it. To propose macro strategies oriented to their life cycle in launch and growth stages, a market study was applied to MSMEs in the city of Cuenca, Ecuador, to answer the following research questions:

- q1. What are the market characteristics that must be considered for UDA-ERP to be self-sustaining?
- q2. What are the business strategies that should be considered for the product life cycle?
- q3. What aspects are MSME segments looking for in a business software solution?

Subsequently, tools were applied that allowed to establish the strategic market position and thereby identified the guidelines to be considered for the self-sustainability of the product, considering different commercial and financial scenarios, in addition to sales projections and profitability indicators proposed to establish guidelines for the business model. This paper is structured as follows: i) the theoretical framework, where the concept of ERP system is introduced, the advantages and disadvantages of the cloud implementation and use and characteristics of the UDA-ERP; ii) the data collection methodology and the business model formulation; iii) the results on the application of the methodology, where the business model are exposed based on the analysis carried out and their respective discussion; and, iv) the conclusion that answer the research questions.

2. Literature Review

2.1 ERP Systems (Enterprise Resource Planning) and ERP cloud systems

The objective of an ERP is to coordinate all the logistics of the business, starting from its supply chain (supplier) to the end of it (customer), it is a complex objective for its fulfillment, but each time these systems evolve to adapt better to the information flows of each company (Astudillo-Rodríguez et al. 2018). ERP systems also include 5 main modules such as: i) SCM (Supply Chain Management), ii) CRM (Customer Relationship Management) iii) MRP (Material Resource Planning), iv) FRM (Financial Resource Management); and v) HRM (Human Resource Management).

Cloud ERP is a resource planning system that operates through Cloud Computing services. To obtain shared resources, it is essential that the company or business has Internet connectivity, it should also be noted that the data is hosted on a third-party server, since it is not necessary to invest in infrastructure (Vera R. and Pérez G. 2017). Many companies offering ERP have adapted their products to online versions, among the most recognized globally, according to (Vera R. and Pérez G. 2017) and (Astudillo-Rodríguez et al. 2018), are: i) Sage ERP, ii) SAP, iii) Oracle, iv) Microsoft Dynamics, v) Deltek and vi) ODOO.

The methodology to implement business management software is developed in different stages. In the first instance, the necessary information must be collected in order to later create an organizational culture that is committed to being part of the changes required for the implementation of the ERP (Astudillo-Rodríguez et al. 2018). For the implementation of an ERP system in the cloud, the benefits are more systematized and are described in the following points: i) greater flexibility (Rajan and Baral 2014), ii) cost reduction (Alrousan and Jones 2016), iii) ease of access (Ali, 2019), iv) clear communication (Şener et al., 2016), v) process integration (Bandyopadhyay and Barnes, 2012), vi) increases productivity (Daim et al. 2010), vii) improved decision-making (Emhmed et al. 2019), and viii) agile logistics (Seethamraju 2015). The previously mentioned benefits are obtained from a successful implementation, that is, when there is a notable economic return, optimization of resources and agility in the processes. When implementing an ERP in MSME-type companies, the most significant benefit is the increase in productivity and strategic positioning in the market (Astudillo-Rodríguez et al. 2018).

The deployment of an ERP system for MSMEs can have certain disadvantages such as: i) the non-existent possibility of customizing the configurations; ii) an adequate internet connection is required; iii) the complex understanding of the operation of the ERP system by the user; iv) the incorrect training of the user on the use of the system generates mistrust of the tool by senior management; v) the cost of licensing and software implementation is high; and vi) business processes not properly identified leads to software implementation failure. To these barriers are added: vii) the lack of capital designated by a MSME for the acquisition of technology; and viii) ignorance or lack of advice to MSMEs about trends in information technology.

2.2. MSMEs in Ecuador

MSMES represent an important economic movement in Ecuador, since they mostly use national inputs and raw materials, in addition to generating employment and contributing to the industry with a varied portfolio of products and services. According to (Delgado and Chávez 2018), in the national census carried out by the INEC in 2010 (Menéndez et al., s/f), in Ecuador 99 out of 100 establishments are in the MSME category. These statistics describe the economic contribution of each of the business categories, the microenterprise contributes economically to the country by 44%, followed by the large company with 25%, small company with 17% and finally the medium-sized company with a percentage of 14%.

In Cuenca, MSMEs occupy a low position in terms of competitiveness, innovation, added value and development, because they have a low level of automation in the local industry. There is a weak relationship between the implementation of information technologies in Cuenca industries with the technological development of the materials they process (Seminario et al. 2011). The local industrial sector is in continuous evolution and constant growth, so it becomes essential to consider technological innovation to streamline process flows.

2.3. UDA-ERP

Currently, the project is constituted of 4 professors (authors of this article) and 2 technicians, in addition to university students who carry out their professional practices, who contribute with their experiences and knowledge for its development, covering both the technical and the commercial part, research and computer security. The team involved with the ERP identified that the designed system has the potential to be deployed in the market. Because the project is in a stage of development of complementary modules, tests and close to its commercial release, it is essential to contemplate a business plan, considering the project as a potential Start-up.

This software was developed in several stages according to the identification of the main needs of MSMEs, for which the following modules were developed: i) MRP for production; ii) FRM for accounting, and iii) SCM for distribution (Astudillo-Rodríguez et al., 2020). Through the observation method in different companies in the city of Cuenca such as furniture companies, electrical appliances and tire manufacturing, the intention to implement an ERP system by these companies was analyzed. Based on that analysis, it has been decided to give an approach more general to the developed modules and thus achieve their easy integration.

Through tests carried out with business clients, adjustments are being done to achieve a more user-friendly platform. The main goal is to provide software that can be used with basic computer knowledge. The UDA-ERP project is projected towards a future commercialization due to its great potential, thus it is proposed to clearly define the product and service that will be offered in the market, for this a marketing plan is currently being developed in conjunction with a financial plan.

2.4. Market study

Objectives, depending on the information requirements: i) Define the structure and behavior of the market, identifying existing needs such as software acquisition, prices, and consumer preferences regarding the use of information technologies within MSMEs in the city of Cuenca; ii) Determination of the demand and supply of this type of software in the city of Cuenca, to subsequently calculate the market share available to be part of this business; iii) define the product to offer after obtaining the necessary information, and iv) Identify the additional services that should be provided according to the preferences of the users with respect to the proposed commercial scenarios

Target Market: The Chamber of Small Industry of Azuay (CAPIA 2018) is the first guild to bring together small and medium-sized companies. The (CAPIA, 2018) is a private management organization that brings together the 9 small industrial sectors of the province of Azuay, within them is the food sector, graphic industries, wood-cork, metalworking, non-metallic minerals, textile, leather and footwear, chemical substances and ICT-services. According to the SME observatory of the Simón Bolívar Andean University, 90.8% of companies belong to the micro sector, 7.2% small companies, 1.5% medium-sized companies, and 0.5% large companies (Arguello 2021). According to this observatory, the predominant economic sectors in Ecuador, with 77%, are trade and services. Manufacturing industries make up 8.3%, construction 3.4%, agriculture, livestock, and fishing 11.1%, and mining and quarrying 0.2%. Based on the information obtained, the MSME market has been stratified into the following groups: i) Stratum I-A, 1 to 3 employees and incomes under 3,000 per month; ii) stratum I-B, 4 to 9 employees and incomes between 3,001 to 10,000 per month; iii) stratum 2, from 10 to 49 employees and incomes between 3,001 to 10,000 per month; iv) stratum 3 conformed by 50 to 99 employees and incomes between 84,001 to 167,000 per month; and finally v) stratum 4, from 100 to 199 employees and incomes between 167,001 to 417,000 per month. The groups were established based on the specifications given by the Internal Revenue Service (in Spanish SRI). Stratum I-A and I-B are considered as companies in the micro sector (entrepreneurs, artisans, micro producers), while stratum 2, as a company in the small sector, while stratum 3 and 4 could be classified as organizations in the medium sector.

Sample design: The database maintained by the Chamber of Small Industry registers around 100 affiliated companies, for which it was decided to obtain the sample by the convenience method. The directors of the project were involved in this process, and it was determined that to obtain a trend towards representative results, at least 50 surveys of small and medium-sized companies should be carried out.

Situational market analysis: The macro environment was analyzed considering political, economic, social, and cultural, technological, environmental, and legal scenarios, which are described in Table 1.

Table 1. Overall Rating ERP System

Political Aspect	The Ecuadorian government within the legal framework of the industry registers as the main event the approval and validity of the Organic Code of the Social Economy of Knowledge, Creativity, and Innovation (Ingenios Code). This includes provisions on software intellectual property, use by public and private acts, and benefits related to aspects of technology and innovation. The approach of a National Development Plan to benefit the software industry, contemplates existing conflicts such as the internalization of operations and its own characteristics such as quality and competitiveness (Asamblea Nacional, 2016).
Economic Aspect	In Ecuador, the software development industry generates sales of around \$500 million (0.5% of GDP), with an annual growth of 17% in the previous seven years. The most important activity related to this industry is the computer systems supplying representing the 53% (Calderón et al., 2016). In a study carried out by the INEC in 2015, it ensures that 66.7% of the companies investigated invest in information technologies (IT), of this percentage 24.6% belongs to the manufacturing sector, 23.9 % to the trade industry, 17.3% to services and 0.9% to mining (Calderón et al., 2016). According to Bastos and Silveira (Bastos and Silveira, 2014), sales projection in Ecuador are growing, from 576 million dollars in 2019 to 904 million dollars in 2021.
Social Aspect	Employment is a very important factor, as the years have passed the unemployment rate has presented a somewhat significant variation. According to data compiled by the Central Bank of Ecuador, the unemployment rate has decreased by up to 2% compared to 2016. The software industry in Ecuador for the year 2015 provided employment to more than 10,000 people, mainly in: development, implementation, administration, sales and other types of services such as maintenance, research, training, etc. (Arguello, 2021). On the other hand, Terán (Terán-Ávila, 2021) agrees that the main strength of the software sector is the innovative and entrepreneurial talent of those who develop functional applications that are inserted in the production chains, being the main weakness the lack of knowledge of the national and international market.
Technological aspect	The country works with new technologies, such as BigData, Blockchain, Internet of things, Cloud computing, Machine Learning and other trends that are marked by digital transformation and forces the country to be technological mature. A marked trend is cloud data storage, however, the companies that offer this service in the country are a minority. It can be deduced that there is a lack of technological maturity at a national level, even though in 3 provinces there is a better technification and use of information technologies, most provinces show a lack of digitization and involvement with technology.
Environmental aspect	The sanitary situation that the world is going through due to Covid-19 requires that the strategies for meetings and approaches with clients and/or development professionals for the design, development, commercialization, deployment, and monitoring of technological solutions be carried out under procedures that include strict biosafety protocols. One advantage of technology-based projects is that they can be conducted virtually (Sá et al., 2021).
Legal aspect	According to Terán (Terán-Ávila, 2021), the Articles of the Organic Code of the Social Economy of Knowledge (Ingenios) (Asamblea Nacional, 2016): 115, 133, 142, 145 and 148, are interpreted as impediments to the promotion of the national industry, declining in majority against the use of free software. Although, in the country, the software sector needs to grow, strategies to strengthen the production and use of national software must be established regardless of the type of scheme: proprietary or free.

3. Methodology

To identify the characteristics that motivate software selection, it is important to determine the customer's perspective. For this purpose, an empathy map was applied. Subsequently, an analysis of the internal and external situation was carried out, applying the SWOT tool. In addition, to strengthen the external analysis and to inquire on the strategies maintained by companies dedicated to commercializing similar software products, it was necessary to carry out a comparative analysis of the solutions that can be found in Ecuador, applying the benchmarking technique. The technical evaluation applied in the benchmarking considered: i) the type of programming language in which it is built, ii) the operating systems in which it works, iii) the Internet browsers that support it, iv) the type of architecture it uses,

v) the database manager that is part of the solution, vi) the security mechanisms, and vii) the reference frameworks on which it is built.

To outline the needs of the corporate client, an empathy map was made. Subsequently, based on the collected literature, a survey was constructed to collect information on the intention to use and sustainability aspects of the project, knowing that the organizational model of the University of Azuay does not pursue financial profit. The information collected in the survey added with the PESTLE analysis allowed, first to carry out a SWOT analysis, and consequently to model 3 self-sustainability scenarios for the project. For the strategic framework, the competition that has similar characteristics in relation to the UDA-ERP system was analyzed and identified. In addition, the respective prices of each computer system were considered as a representative similarity characteristic that resembles the proposed price range for the UDA-ERP product.

This strategic analysis tool was used to analyze the different approaches presented by the UDA-ERP system with respect to the systems shown in Figure 6. The analysis was carried out based on two dimensions: a) The relative market share held by the company in each SBU (product, activity, or area), to express its competitive position in the market. This dimension is placed on the horizontal axis. It is divided into high and low and is expressed in logarithmic scale. This position in the matrix expresses the relative participation that each product or business has against the leader of the sector and shows the strength or weakness of the company in that activity; and b) The market growth rate, which reflects the attractiveness and potential of that SBU (activity, product, etc.) for the company. This dimension is placed on the vertical axis and indicates the annual market growth rate of that SBU.

4. Results

4.1 Empathy map

Understanding the needs of the client becomes a fundamental task to design a product or strategies to make it fit in a market. In Figure 2, we expose their needs, using the empathy map.

<p>What do they think and feel?</p> <ul style="list-style-type: none"> - They feel that They don't have money to purchase ERP software - Requires advice in their business to manage the enterprise resources - They think that their competitors can generate more value to their products. - They feel that it is important to manage production 	<p>What do they see?</p> <ul style="list-style-type: none"> - They see technology-driven companies generating greater added value - They see other companies using electronic invoicing to reduce the use of paper. - They see other companies managing production using software for this purpose
<p>What do they hear?</p> <ul style="list-style-type: none"> - They hear that an ERP helps in process management - They hear that ERP is a flexible and adaptable system - They hear that cloud computing is possible and does not require a large computational infrastructure 	<p>What do they say and do?</p> <ul style="list-style-type: none"> - They perform manual control sheets in Excel or similar. Also, register some movements on paper. - They look for accessible options to manage their business resources
<p>Efforts, fears and frustrations</p> <ul style="list-style-type: none"> - Not having the necessary advice to make a decision - Finding interesting solutions but not all of them fit their requirements - The cost of a solution is not affordable for their company - They make unsuccessful attempts to achieve added value 	<p>Results</p> <ul style="list-style-type: none"> - They search for business information in their information system

Figure 2. Empathy Map

4.2 Benchmarking

About 7 solutions were identified: Exxis SAP One, One View, PAC, ODOO, Open Alliance, SAMI, and BEMUS. With a total weighting of 100%, each of the solutions was technically analyzed. The table below shows the overall rating of the systems evaluated, with a base rating of 10 points.

Table 2. Overall Rating ERP System

	Bemus	SAMI	PAC	ODOO	O.Alliance	OneView	Exxis
Rating	6,62	6,92	8,36	7,07	7,01	8,52	8,58

4.3 SWOT

The following, Table 3, exposes the UDA-ERP identified SWOT factors.

Table 3. SWOT Analysis of UDA-ERP

<p>Strengths</p> <ul style="list-style-type: none"> i) high level of knowledge of academics and technicians on project management, application of quality standards, support and use of the product. ii) professionals with experience in gathering information on the needs of the context. iii) support by a highly renowned local university entity. iv) support personnel specialized in after-sales services such as maintenance, consulting and warranty. v) clear definition of the business model with their respective collaborators. 	<p>Weaknesses</p> <ul style="list-style-type: none"> i) the lack of experience in marketing this type of software. ii) the lack of publicity promoting the UDA-ERP system; iii) the learning curve for open-source tools.
<p>Opportunities</p> <ul style="list-style-type: none"> i) the leading companies in the software industry do not provide services to micro and small companies. ii) there is no leading company in the market of the city of Cuenca. iii) MSMEs tend to migrate their computing and information resources to the cloud. iv) the target market is large, contributes significantly to the country's GDP and is constantly growing v) traditional businesses are barely exploiting technological resources to generate competitive advantages. vi) there is a constant growth of the software industry in the country. 	<p>Threats</p> <ul style="list-style-type: none"> i) the lack of knowledge of MSME managers and executives about ERP systems and information management in the cloud. ii) the short life cycle of information and communication technologies. iii) the lack of legal regulations governing the implementation and supply of cloud computing services. iv) the absence of an entity that regulates the sale price of ERP software. v) the presence of many competitors that have been in the market for several years and have a large portfolio of clients.

Table 4. Characteristics of ERP Systems PAC and OPEN ERP. Source: (Paschman 2017)

Company/Product	Type of licensing	Modules
PROVEDATOS S.A/PAC	Annual payment for extra upgrades and maintenance 15.000 a 30.000	Accounting, Inventories, Customers, Suppliers, Banks , Purchases, Electronic invoicing
Open Alliance-MULTICS/OPEN ERP	Annual payment 15.000 a 40.000	Accounting, Invoicing and IRS, Electronic receipts, Treasury, Budgets, Inventories, Human Resources, Documentary management.

4.4 Strategic board

Table 4 shows some characteristics of the PAC and OPEN ALLIANCE systems, which are very similar to those of the UDA-ERP system, both work in a web environment and their prices vary according to the size of the company, emphasizing that these ERP systems were designed exclusively for MSME type companies. Figure 6 shows the key characteristics were evaluated by means of a Strategy Framework based on the following parameters: i) Cost, ii)

Maturity, iii) Backups, iv) Documentation, v) Reporting, vi) Interoperability, vii) Security, viii) Learning Curve, and ix) Business Intelligence (BI).

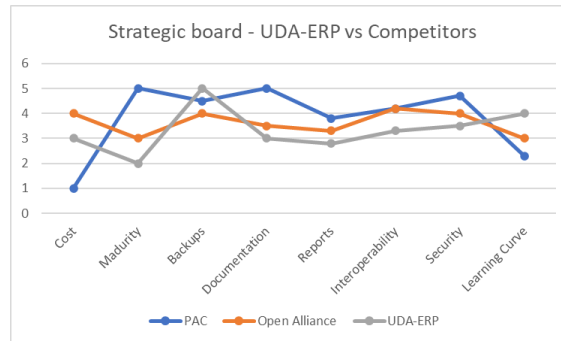


Figure 6. UDA-ERP strategic framework versus competitors

4.5 BCG Matrix

The BCG matrix -Figure 7- shows that the UDA-ERP system, compared to the ERP systems offered by Open Alliance, Provedatos, Smartsys, ONE View and Exxis Group, occupies the "Unknown" quadrant, which indicates that UDA-ERP is in the introduction phase and has a low market share, which has a high growth rate. From this result based on the approximate sales of the competitors, strategic decisions are described so that the product can reach the "Star" position and consequently become a "Dairy Cow" product.

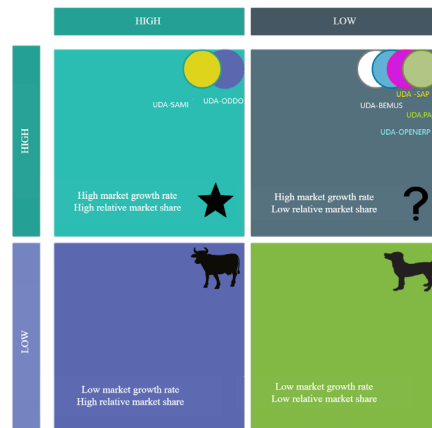


Figure 7. BCG Matrix UDA-ERP System

Strategic decision: The UDA-ERP product with respect to the "Unknown" quadrant must carry out an investment strategy so that it can become a star product, considering that the market is still growing, which is why the commercial scenarios that are most profitable for this software must be analyzed and determined. Within the "Star" position, the strategic decision is to remain to become a "Milk Cow" product, when this market reaches maturity.

4.6 Market Study

In the first section, information was obtained on the constitution of the company, identifying that 35.8% belong to the commercial sector, followed by 34% belonging to the service sector. Another very important piece of information is that most of the companies are in the range of 1 to 49 employees, made up of MSME stratum 1-A, 1-B and 2 (Micro and small companies), with a turnover of up to 300,000 dollars per month in the case of 1-A and 1-B and up to 1'000,000 in the case of small companies. In addition, stratum 3 is medium-sized companies, whose annual turnover ranges between 1'000,000 and 5' 000,000,000 per year. A fourth stratum is made up of accounting professionals (independent professionals who do the accounting for individuals, micro and small companies).

Table 5. Stratum description

Stratum I-A	The first scenario is made up of companies with 1 to 3 employees and monthly invoicing of less than US\$3,000 (comprising micro companies). The proposal refers to a fixed monthly/annual lease.
<i>Stratum I-B</i>	This scenario is aimed at stratum I-B, which consists of 4 to 9 employees with a turnover between US\$3,001 and US\$25,000 per month, composed of micro companies, and is based on sales commissions. For this case, a lease price of US\$45 per month was considered.
<i>Stratum II</i>	This scenario focuses on stratum I, composed of 10 to 49 employees with a monthly turnover between \$25,000 and \$84,000. It is composed of small companies and considered within the context of sales commissions. A monthly lease price of US\$70 is established.
<i>Stratum III</i>	This scenario, framed in stratum III, is made up of companies that maintain between 50 to 199 employees with a monthly turnover between 84,000 to 417,000 dollars. It is made up of medium-sized companies and is within the context of sales commissions. For this case, a lease price of US\$99 per month was considered.
<i>Stratum IV</i>	Stratum IV is composed of accountants (accounting professional license). The established monthly fee is \$30.

In the second section, the intensity of the use of information technologies in the companies was determined, showing that 95% of them can incorporate them. The most used systems within the surveyed companies are the accounting system, distribution-suppliers, inventories, and purchases. The rental investment in software for this type of company ranges from US\$40 to US\$100 per month. The last section explored the degree of knowledge of the organizations with respect to ERP systems, finding that a large percentage of the micro and small sector is unaware of the advantages and disadvantages of this type of software. It was found that the companies that have an ERP or that wish to acquire one, have a certain degree of pleasure in contracting an ERP with cloud technology. Forty-five percent of the surveyed companies prefer to acquire this software under the modality of free product offer and paid consulting services.

4.7 Commercial scenarios identification.

Based on the market study and analysis carried out, 3 sustainable commercial scenarios were identified according to the business size depending on the stratification established for the defined market segment. Therefore, for the market scenarios, stratum I-A, I-B, 2, 3 and 4 were considered, as shown in table 5.

4.8 Business model proposal

Three possible business model scenarios were identified. These are summarized in the table below.

Table 6. Scenario projection

Participation percentage on the net income of the business (Model 1):	In this scheme, the software is provided free, and a lease is charged based on the net profit generated by the company's sales. This motivates the work team that assesses the business to strive to deliver value to the work performed, to which is added the interest in maximizing the profit to the owner of the company. In this scenery, the value proposal is "share of business profits through an ERP generated by the academy. The issue of working on the participation of the business profit is not interesting for the segment studied, because although it may be interesting for a microenterprise, it is no longer interesting for a medium-sized one.
Free software, paid consulting services (Model 2):	In this second scenario, this UDA-ERP business proposal was proposed, which consists of creating collaborative links from the University to the MSME business community, in which advisory and consulting services can be proposed and delivered to multiple issues on business management. In this scenery, the value proposal is "Share of business profits through an ERP generated in the academy". The business proposal then leads to the formulation of a free ERP software delivery scenario tied to the business advisory service.
Fixed-price subscriptions (Model 3):	The third proposed scheme considers a fixed price for the ERP subscription, a variable price depending on the size of the company and the axis to which it is directed: commercial or production. Figure 8 shows the business model for subscription to the fixed-price platform. According to the market study, this is the most viable business model, considering the market reality in the city of Cuenca. The value proposal for its scenery is: "Low cost ERP software for SMEs".

4.9 Financial Scenarios

For the financial analysis of the UDA-ERP project, three scenarios were proposed: realistic, pessimistic, and optimistic, exposed in Table 7. The goal of the business is to increase the number of clients as the years go by, so the 3 cases mentioned above are presented for a clear and defined projection according to the commercial scenarios proposed.

4.9.1 Projections

Table 7. Scenario projection

Scenario	Sales Projection	Profit and loss statement
Realistic Scenario	This scenario reflects the ten-year sales projection. The goal is to increase 15 clients with a distribution of 80% of the total number of clients directed towards stratum I-A and the remaining 20% to stratum I-B. The scheme is shown in Annex 2.	Net earnings are positive as of year 4, since this is considered an acceptable case because the projection is made for 10 years
Optimistic Scenario	In the optimistic scenario, it is expected to obtain 18 more clients per year, with 80% of the total number of clients going to stratum I-A, 15% to stratum I-B and 5% to stratum II. Annex 3	The optimistic scenario presents net profits from year 3 onwards, this case can become a business goal if strategies are implemented that allow for such an increase in demand.
Pessimistic Scenario	In the pessimistic case, the plan is to obtain 5 clients per year and presents a distribution of 90% of the total number of clients directed to stratum I-A and only 10% is expected to be obtained from stratum I-B.	The project presents losses during the 10 consecutive years. It is important to know this scenario because based on this information it is possible to prevent inconveniences and above all to have a clear picture of this possible case for the development of a contingency plan to prevent its discontinuity.

4.9.2 Net Value Added and Internal Rate of Return

Discount Rate.

The formula based on the CAMP model presented in the SBBI Valuation Edition Yearbook was used to calculate the discount rate.

Formula: $k_s = r_f + (\beta \cdot RP)$

Table 8. Breakdown of the formula to obtain the discount rate. Source: (CCG 2018)

Acronym	Definition	Value
k_s	Discount rate	-
r_f	Risk-free rate (obtained from the Guayaquil Chamber of Commerce)	3%
β	Industry levered beta	1,1235
RP	Represents the country risk of Ecuador from January 2016 to June 2019	4,25%

After applying the formula, a discount rate of 7.76% was obtained, which will allow the calculation of the Net Present Value (NPV) and the Internal Rate of Return (IRR) for the UDA-ERP project in the Realistic and Optimistic scenarios, which show values with their respective coherence. In this case, the mentioned above is exposed in Table 9.

Table 9. NPV and IRR of UDA-ERP project/Realistic Scenario and Optimistic Scenario

Realistic Scenario		Optimistic Scenario	
NPV	\$ 29.541,79	NPV	\$ 420.946,40
IRR	9,94%	IRR	32,18%

4.9.3 Financial ratios

Within the financial ratios, the profitability on sales, economic profitability and return over investment were taken as a reference. The results of the 3 scenarios show an amount according to each of the cases according to their profits. There are negative ratios, but this does not mean that the project is not viable or profitable, it indicates that in that period there were money losses, but as in the profit and loss statement these monetary disadvantages are recovered as the following periods progress. In this case, realistic and optimistic scenarios are presented in Table 10.

Table 10. Financial ratios/ Realistic Scenario

	Years										
	0	1	2	3	4	5	6	7	8	9	10
Profit ability on sales	-1627,22	-288,49	-95,85	-23,47	1,68	12,53	7,95	23,21	26,87	29,46	31,95
	-1339,35	-156,55	-26,16	10,74	22,01	28,49	23,91	34,49	36,79	38,62	39,76
	-3138,54	-721,31	-489,39	-349,49	-269,08	-210,75	-267,43	-144,54	-120,33	-98,88	-82,98
Econ. profit ability	-4,88	-2,91	-1,93	-0,75	0,13	1,23	0,96	3,20	4,25	5,17	6,32
	-4,82	-2,39	-0,82	1,00	2,82	4,61	4,46	7,64	9,39	11,10	12,52
	-5,02	-3,44	3,27	-3,06	-2,90	-2,69	-3,95	-2,42	-2,26	-2,05	-1,89
ROI	-0,54	-0,74	-0,49	-0,19	0,03	0,31	0,18	0,78	1,08	1,25	1,52
	-0,93	-0,61	-0,21	0,25	0,71	1,16	0,82	1,86	2,27	2,69	3,00
	-0,97	-0,88	-0,83	-0,78	-0,73	-0,68	-0,73	-0,59	-0,55	-0,50	-0,45

*The shaded area indicates the year in which a positive profit is generated. Realistic, Optimistic, Pessimistic was considered in the same order.

5. Discussion

The reality of MSMEs in Ecuador with respect to the application of information technologies demonstrates a considerable economic contribution to the country, for the same reason these companies remain highly competitive trying to meet the needs of a changing market for which it is essential to have computer systems that will increase their productivity and efficiency. After the technical evaluation of the solutions, it can be said that PAC and ODOO solutions are solutions with an improved language since they are based on a web model. This enables access from different operating systems or from devices with a web browser. The most relevant characteristics of the UDA-ERP system were emphasized, and a visual comparison was made of the state of the product at the ideal stage for its commercialization. The BCG matrix resulted in a strategic decision to take advantage of the available resources to make a representative investment to achieve a firm position in the market and transform the product into a "Dairy Cow" product.

5.1 Commercial launch strategies

The strategies for commercial launching proposed are presented in Table 11:

Table 11. Financial ratios/ Realistic Scenario

Strategy number	Strategy scenery	Description
1	Defensive	Entering the MSME market is an extremely highly competitive advantage since there is no other company with this target market in the city of Cuenca. Conduct continuous research on cutting-edge technology to prevent competitors from imitating the characteristics and structure of the UDA-ERP system; and to have a solid structure of computer security and to generate confidence in the client now of providing the organization's information.
2	Survival	To have highly trained staff in the installation of this type of software in the cloud. Train company managers and provide clear and concise information on the use and management of this system. Motivate employees to work as a team to create an adequate working environment and thus improve the quality of service.
3	Relational marketing strategy	The strategy seeks to manage and develop long-term relationships of trust with customers. It is important to have a customer database that allows the company to interact with customers by offering discounts, promotions or simply to immediately address any complaints or claims that may arise.
4	Price strategy	Price is one of the main aspects to consider since competitiveness is based on a price market. Large companies with more than 200 workers and with revenues over \$5,000,000 acquire ERP systems where prices range between \$40,000 dollars and \$1,000,000 dollars. In Ecuador, the lack of an entity that regulates the selling price of

		information technologies reflects a wide range of prices in the market. Therefore, the UDA-ERP system should set prices according to the size of the company, the type of installation requested and, of course, add consulting and maintenance services to the price.
5	Promotion Strategy	The promotion strategy includes having a website where the features of the ERP software are displayed, detailing each of its modules, benefits, plans, success cases. Social networks play a very important role, because today they use artificial intelligence where advertising is targeted according to user behavior, for this case advertising through the most popular platforms such as Facebook, Instagram, YouTube is key to significant growth. For the social environment "word of mouth" advertising is handled, it is here where the users of the UDA-ERP system will disclose their experience with the acquisition of the system. It is important to consider that this commonly used mechanism generates at least 3 positive comments, but also at least 20 negative comments, the approach to focus on the UE (User Experience).
6	Distribution strategy	A distribution channel should be designed to retain current customers and obtain new ones. In the case of working with a software distribution company, the need to maintain the existing product-customer link should also be considered.

5.2 Business models

Three business models were determined, which are: i) percentage share of business profit; ii) free software and paid consulting services; and iii) software leasing on a pay-per-subscription basis. The financial analysis proposed for three scenarios shows the possibilities in which the UDA-ERP system can be developed, but the most important is the profitable response presented by the realistic scenario and the projection of positive sales from the fourth year onwards for a 10-year term. The UDA-ERP product has acquired enough potential to launch commercially and meet the needs of its target market. Its vision has made companies that never imagined having access to an ERP system, turn towards a new panorama where they can acquire this system at an accessible and reasonable price. The benefits provided by the implementation of an ERP have led companies to invest in it and the results are practically immediate if its management and control is correct. These results are reflected in improved process efficiency and increased productivity. Searching for sustainable business models is the fundamental basis for moving forward with a business idea, understanding the needs that are explicit and implicit in daily life and having the ingenuity and will to transform those needs into an opportunity to generate a significant contribution to society. The proposed strategies for the commercial launch of this system must be carried out with initiative and creativity, always seeking to stand out and highlight the strengths that have been built up over the years.

More continuous work must be done about advertising; this aspect is the next stage for this product to be positioned in the market and to achieve not only a realistic scenario but also an optimistic one. Pricing is another issue that must be managed through continuous analysis. Ecuador does not have an entity that regulates prices within the software industry, therefore, it is necessary to maintain a price that can be accessible to customers, but it is also necessary to avoid entering a price war with the competition and that this could harm the profitability of the company. At this point it is necessary that the quality of the service offered is adequate and meets customer expectations.

6. Conclusion

In response to the research question *"What are the market characteristics that must be considered for the UDA-ERP to be self-sustainable?"*, it can be said that the Ecuadorian market responds to 98% of companies in the MSME sector, which during the pandemic caused by Covid-19 suffered several economic problems, since during the year 2020 there was a reduction in sales, generating a negative impact with the closure of many of them. To this reality, during the government of President Lenin Moreno, a 2% tax was applied on the income from sales, affecting the profit of small businesses that usually range between 10% and 20% of the profit, an aspect that was negative for the business model of the startup UDA-ERP. Under this perspective, the best scenario for the sustainability of the project is to lease the software through a monthly subscription payment, as opposed to the models that pursued a percentage of the net business profit or free software with paid consulting services, the latter being the least profitable for the Start up.

In response to question 2, *"What are the commercial strategies to be considered for the product's life cycle?"*, it can be stated that the commercial strategies should be considered according to the product's life cycle and evolution in the market. The BCG matrix resulted in a strategic decision which consists of taking advantage of the available resources to make a representative investment to achieve a firm position in the market and transform the product into a "Dairy Cow" product. The first strategy is the penetration of the product in the market, which should be initiated with the concept of brand pre-activation. This is undoubtedly the stage in which the greatest advertising effort is made since it consists of attracting the interest of the target market. Another important strategy for the introduction and expansion of the product is the generation of linkage spaces with institutions and management organizations that gather industrial and commercial sectors. In addition, it should be emphasized the difference that UDA-ERP maintains with other ERP

systems in the market, whose competitive advantage is the low subscription cost of the complete package, an aspect that is notably advantageous compared to the products of the competition. Finally, considering question 3 "What aspects are the MSME segment looking for in a business software solution?", it can be argued that these aspects can be summarized in a software that is easy to manage, low cost and accessible from anywhere. These aspects invite to study the corporate customer's behavior in terms of decisions and perceptions of use, a topic that will be analyzed in a study of technology acceptance models (TAM) in enterprise applications, specifically those of enterprise resource management.

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