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# An Action Plan for Designing a Service Business Model of a Smart Irrigation Solution

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Besides the content of this paper, this thesis is an outcome of also a journey that I enjoyed very much. This nice journey started already by making the right choice to join the Industrial Management program at Metropolia. Additionally, family, colleagues and instructors, all contributed to the success of this journey.

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<p>The objective of this thesis is to provide an Action Plan to design the Building Blocks of the Service Business Model of the Smart Irrigation Solution for the case company.</p> <p>The Action Plan developed in this paper consists of two parts. The first part covers the Pre-Steps needed to start designing the service business model. The second part implies the Action Points required to design the elements of the building blocks of the service business model.</p> <p>This study is based on an Action Research approach. The investigations for this study are done through interviews, workshops as well a mix of qualitative and quantitative data from internal and external sources.</p> <p>The study started with defining the key criteria of the CVP of the Smart Irrigation Solution. Next, the study continued by developing the key actions required for the design of the CVP, the Profit Formula, the Key resources and the Key processes of the service business model of the Smart Irrigation Solution, in the context of B2B, middle-size farming.</p> <p>The implication of this paper comes in the context of Farming Technology Innovation. The case company aims to commercialize the Smart Irrigation Solution as a service, to generate a new source of revenue and contribute in the ecological innovations.</p>	
Keywords	Smart Irrigation, Farming, Service Business Model, B2B, Customer Value Proposition

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# 1 Introduction

In the context of the global water scarcity, agriculture in particular is a predominant sector in high water consumption. 70% of the freshwater available in the world is used for agriculture (The World Bank, 2018). Additionally, the farming activities are more complex today than before. Factors such as the unpredictability of the weather, control of pest and weeds, market price development, scarcity of natural resources and such makes the farming activity more and more challenging nowadays.

Technology can have an important role in overcoming the farming activity challenges and making the farming activity more profitable but also more ecological. In fact, smart technologies, in particular, can have a relevant impact in optimizing the agricultural production, increasing the farm profitability and saving the natural resources for a growing world population. Saving the natural resources by E.g. optimal water management in irrigation systems.

However, farming is generally based on traditional ways. Consequently, farmers' openness to using technology-based solutions can be challenging. Thus, it is important to consider a financially affordable and technically accessible technology when it comes to agricultural and farming technologies.

## 1.1 Business Context

Lily Global Engineering is a Morocco based company of three employees: the researcher as manager and industrial automation engineer, an agricultural engineer and an electrical technician. The company provides consultancy services and technical studies of automated systems in the fields of industry and farming. The company is operating locally in Morocco and is looking forward to extending the business in the global market in the future.

Among other sectors, the case company operates actively in the farming business. In this context, the case company wants to develop a Smart Irrigation Solution that focuses on irrigation particularly from the perspective of preserving natural resources.

The company wants to develop a new service for its local farming customers, in Morocco to start and in the global market in the future. The new service is a web-based user interface and mobile application that allows farmers to remotely control their irrigation system and visualize sensor data in real time. The case company considers four key elements in the offering: ecology, cost-efficiency, simplicity and real-time.

With this project, the case company aims to enable small and medium farmers to access smart technology, even those with limited finances and educational background.

At this stage, only the prototype of the technical hardware of the solution is ready and an idea of how to operatively commercialize the rough business/ solution is needed.

## 1.2 Business Challenge, Objective and Outcome

Irrigation management consists of important recurrent operations such as opening the valves, starting and stopping the pumps. A typical irrigation activity process consists of a number of daily, weekly, monthly and seasonal activities.

Hence the Smart Irrigation Solution comes in the perspective of a more efficient information management related to the fields of the farm. This information helps the farmers to make better decisions regarding the crop management of the farm fields.

On the other hand, with this new service, the case company aims to strengthen its customer loyalty by being a reliable partner for its customers. The case company sees it as an opportunity to build a long-term service relationship that does not end with the end of a project delivery.

Therefore, the case company wants to dig deeper in the customer's need and define the target customers besides the cost-efficient and simple criteria of the solution. For the purpose of the present paper, an idea of how to operatively commercialize the rough solution is called for, besides the technical aspects of this solution.

Thus, this thesis is about developing an Action Plan for designing a service business model for the Smart Irrigation Solution described above, as a new service of the case company. The action plan provides the case company with a clear roadmap to develop a business model for the service, with key action points for each step of the action plan.

The objective of this master thesis is to develop an Action Plan for designing a business model for the Smart Irrigation Solution.

The expected outcome from this research is an Action Plan for designing the service business model framework of the Smart Irrigation Solution.

### 1.3 Thesis Outline

Based on the above-mentioned study objectives, the current research is organized by the following four steps: The first step is to explore theory through a literature review. The literature review provides empirical support to propose a conceptual framework to develop the action plan for designing the business model for the Smart Irrigation Solution, as a new service for the case company. Second, a starting point analysis is conducted based on the conceptual framework generated in the first step and qualitative as well as quantitative investigations. In the starting point analysis, the target customers is selected for the Smart Irrigation Solution and defines their needs. Furthermore, a benchmarking is conducted in order to compare the competitors' customer value propositions. Third, as initial proposal, the action points for designing the elements of each block of the business model for the Smart Irrigation Solution are proposed. Fourth, a feedback is received on the initial proposal. Based on the feedback, the corrections and the feedback propositions are applied in order to validate the final proposed action plan for designing the business model for the Smart Irrigation Solution.

Thus, this paper contains seven sections. Section 2 presents the research method followed to conduct the present research. Section 3 reviews current literature on business modeling. Section 4 discusses the implementation of the two methods of target customer selection, the identification of the target customer needs approach and the analysis of the competitors' CVPs approach. Section 5 presents the action points for designing the elements of each of the four building blocks of the service business model. The action points are presented for designing the CVP, designing the profit formula, defining the key resources and last, defining the key processes. Section 6 overviews the results of discussions on the proposed action plan draft. Section 6 provides the feedback

and validation of the proposal. Finally, Section 7 provides the overviews the contribution of the research to the case company and provides a summary of the results of the research.

## **2 Method and Material**

This section describes the research approach, data collection and analysis methods used in this Thesis. It also gives a plan of the evaluation criteria.

### **2.1 Research Approach**

A research approach is the way a research problem is roughly tackled/approached.

There are several research methodologies to approach a problem, most of them rely on a mix of qualitative and quantitative data. The choice of the methodology in a research is based on different criteria to take in consideration including the relationship between theory and practice, the purpose of research, the research role, the research type of questions (open, structured etc.) and the format of the responses (text, numbers, etc). (Kananen, 2013)

Design research is a popular method in business contexts and different terms are used to refer to it. According to Kananen (2013:P41), In English literature, design research is considered the same as action research, but in Finnish language they are slightly different concepts. Basically both consist of iterative cycles (actions, planning and follow up), the difference is that in action research the researcher participates himself in the research in collaboration with other partners in the research. In design research, the researcher does not, necessary, participate himself or alone in the iterative cycles. (Kananen 2013:201)

This study uses action research as a research approach, mainly based on qualitative analysis with some numerical data. According to Kananen (2013: P32), differently from quantitative research, there is no defined framework for a qualitative research. Qualitative research helps to get findings “without statistical methods or other quantitative methods” (Strauss & Corbin, 1990). Coghlan and Brannick (2005), state that action re-

search is “the concern of practitioners who want to improve organizations and communities”. The contextual circumstances of this study drove the choice of action research as research methodology. In fact, this research requires a grounded interaction between theory and practice to create/develop a business model. The researcher in this case is actor on his own as a founder/manager of the case company. The author is actor in the iterative cycles and tests himself the functionality of the research outcome. Interviews and surveys will mainly be open.

## 2.2 Action Research

The research action plan that will lead the researcher along this research in solving the business challenge, relies on four stages. Figure 1 below shows the research design for this study.

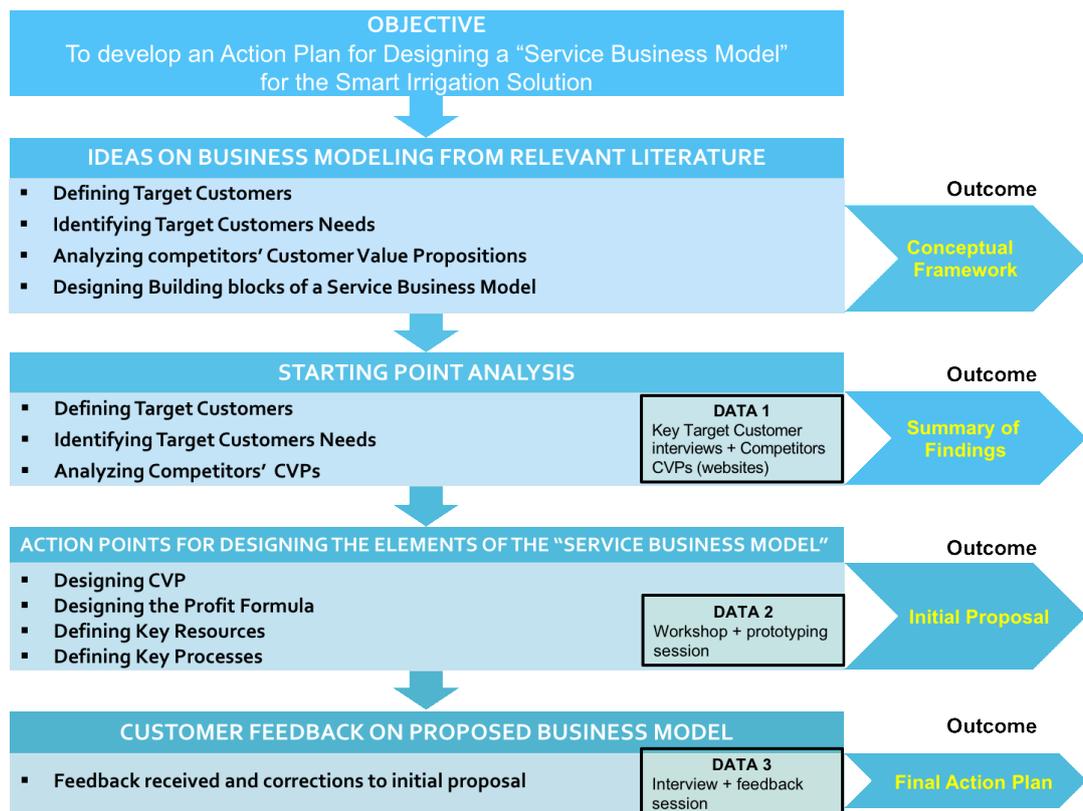


Figure 1. Research design for the current thesis

As seen in Figure 1, The objective of the present paper is to develop an Action Plan for designing a service business model for the Smart Irrigation Solution. For this purpose, the researcher starts with (1) collecting ideas from the existing knowledge and making a selection of relevant literature that provides practical tools, practices and approaches on business modeling. To start, the writer collects ideas on defining the target customers, identifying their needs and analyzing competitors customer value propositions (CVPs). These previous ideas helps the writer to conduct the starting point analysis (Step 2) of this research. Furthermore, the researcher also collected ideas on designing the elements of the main building blocks of a service business model. The main building blocks of a service business model are: the customer value proposition, profit formula, key resources and key processes. This literature part enables the researcher to define the action points for designing these components. The findings of this literature review part are applied in step (3). The literature research enables the writer to generating a conceptual framework.

After that, the researcher makes a (2) starting point analysis. In this step, the researcher defines the target customers for the Smart Irrigation Solution, identifies their needs by conducting qualitative and quantitative investigation with the selected key target customer.

The researcher also analyses the key competitors' customer value propositions, from the key competitors' websites. At the end, the researcher comes up with a summary of findings (DATA 1). These Data 1 allows the researcher to (3) develop an action plan for designing a business model for that Smart Irrigation Solution, in the context of the selected key target customer and his needs. At this stage, the researcher relies on a combination of the key findings from both literature (1) and the starting point analysis (2) and build a service business model for the Smart Irrigation Solution. This basically means defining the action points for designing the elements of the CVP, the profit formula, the key resources and the key processes. The researcher conducts this step with the help of a workshop and co-creation session together with the selected key target customers At the next stage, the researcher comes up with the initial proposal of the action plan for designing the business model for the Smart Irrigation Solution (DATA 2).

At the final step, the initial proposal is subject to feedback from video-conference workshop with both the customer and the internal team of the case company (DATA 3). In this last stage the researcher receives feedback on the proposed Action Plan and makes the relevant corrections to the initial business model. After the feedback on the initial proposal, the research comes up with final business model of the Smart Irrigation Solution to the case company and gets the validation of the final proposal.

### 2.3 Data Collection and Analysis

This study draws from a variety of data sources and collected data in several data collection rounds. Table 1 below shows the different collected data and describes the content, source, informant, the data collection timing and the final outcome from each type collected data.

**Table 1. Details of interviews, workshops and discussions in Data1 to 3**

	CONTENT	SOURCE	INFORMANT	TIMING	OUTCOME
<b>DATA 1 STARTING POINT ANALYSIS</b>	<ul style="list-style-type: none"> <li>- Defining target customers</li> <li>- Identifying target customer needs</li> <li>- Analyzing key competitors CVPs</li> </ul>	<ul style="list-style-type: none"> <li>- Internal documents</li> <li>- Existing target customer interviews</li> <li>- Internet</li> </ul>	<ul style="list-style-type: none"> <li>- Internal</li> <li>- Farmer – key target customer</li> <li>- Competitors website</li> </ul>	FEBRUARY-APRIL	<b>Summary of findings</b>
<b>DATA 2 BUILDING PROPOSAL</b>	<ul style="list-style-type: none"> <li>- Designing CVP</li> <li>- Designing profit formula</li> <li>- Defining key processes</li> <li>- Defining key resources</li> </ul>	<ul style="list-style-type: none"> <li>- Workshop (Video-conference)</li> </ul>	<ul style="list-style-type: none"> <li>- Internal team</li> <li>- Key Target Customer</li> </ul>	APRIL	<b>Initial proposal of business model for the smart irrigation solution</b>
<b>DATA 3 FEEDBACK &amp; VALIDATION</b>	<ul style="list-style-type: none"> <li>- Receiving feedback</li> <li>- Corrections to initial proposition</li> </ul>	<ul style="list-style-type: none"> <li>- Evaluation Session</li> </ul>	<ul style="list-style-type: none"> <li>- Internal team</li> <li>- Key Target Customer</li> </ul>	MAY	<b>Final Action Plan</b>

As seen in Table 1, data for this project was collected in three rounds.

The first round was collecting Data 1 from February to Mid-April. Data 1 was for the starting point analysis. In this round, the collected data was about three parameters. First, identifying the target customers for whom the Smart Irrigation Solution will add value and fulfill the needs. This data was collected through interviews with existing key customer of the case company. The second parameter is about identifying the target customer needs and build the value proposition of the Smart Irrigation Solution. Then the third parameter of this round is about analyzing the Customer value proposition of three key competitors. This data was collected mainly from internet and key competitors websites.

In the next round, Data 2 was collected to gather suggestions from the case company for developing the proposal. This data included developing the action points for designing the elements of the business model building blocks. To cite: the customer value proposition, the profit formula, the key resources and the key processes as main components for building a business model for the Smart Irrigation Solution. This second round data was collected mainly from the internal team, with insights also from the potential partners with whom the case company can collaborate to provide a “good” customer value proposition, and the customers themselves which helped the case company to make an initial proposal of a business model for the Smart Irrigation Solution. This round lasted for one month (April).

The final data was collected when receiving feedback for the initial proposal resulted of the previous rounds, from the case company and the selected key customer. This feedback included also the corrections to the initial proposal. It lasted from March to April. This final round was the last data set that allowed the researcher to build the final business model proposal of the Smart Irrigation Solution.

In this study, interviews were the typical method of data collection. The interviews were both face-to-face and “videoconference”.

The face-to-face interviews were conducted by the agricultural engineer located in Morocco, based on three structured questionnaires that the writer created in advance. A first questionnaire was created to initiate the collect basic data from the key target customer

about the acceptability of the project idea. The second and third questionnaires came after, based on the results of the interview and the quality of the collected data from interviewing the customer.

A video-conference interview was conducted with the key target customer the end of the Data 1 collection process (starting point analysis) in order to wrap-up the data stage and validate the understanding of the customer value proposition from the key target customer perspective.

The interviews are conducted with a mix of Arabic and French languages. The questions for the interview are documented in French. Data analysis is based on the summaries of field notes from interviews. Thus, the work is done on the basis of the results of interviews.

Data 1 includes also internal documents of the case company (Table 2), as well as external documents from the key target customer such as profit and production trends and other qualitative and quantitative information from the key customer own documents.

**Table 2. Internal documents used in the current state analysis, Data 1**

	<b>Name of the document</b>	<b>Number of pages/other content</b>	<b>Description</b>
A	LISTE CLIENTS SOLAIRE.xlsx	1 Sheet	List of the customers of the case company - Archive
B	PROJETS KAMA	10 Files	Data Field for the delivered projects to the key target customer (KAMA)
C	FACTURES KAMA.xlsx	71 Sheets	Invoices for different purchases from the key target customer

As seen in Table 2, this study also analyzed a number of internal documents. The main documents included (A) a list of the customers of the case company, (B) a data field

with quantitative information on the delivered projects to the key target customer and (C) invoices for different purchases from the key target customer. The documents were analyzed in order to make the quantitative calculations to select the target customers. All data were analyzed using content analysis.

The biggest part of the data analysis were used in the starting point analysis. The data analysis helps in selecting the target customer, define his needs and analyze the competitors CVPs. The findings from the starting point analysis are discussed in Section 3.

### **3 Ideas on Business Modelling from Literature**

This section discusses best practices of business modeling based on a critical review of the literature. The researcher selects relevant material as guidance in building a conceptual framework for developing an action plan to design a business model for the Smart Irrigation Solution.

In this section, as roadmap to defining the action points for designing the business model, the writer starts with building an idea on how to define the target customer. Next, the writer collects guidelines on how to construct a customer value proposition based on target customer needs and competitors CVPs. Last, the writer collects ideas on the composition of the building blocks of a business model in order to define the action points for designing the case company's business model.

#### **3.1 Defining Target Customer**

Defining target customer helps the company suggest and deliver personalized products and services to the customers (Jiang and Tuzhilin, 2009). At the same time, defining target customer and their needs enables companies to customize the marketing plans and operate optimal resource management (Christy et al., 2018). According to Kaplan and Norton (2004), identifying and selecting target customers is dependent on the skills of the company manager.

As this study is done in the context of one key customer of the case company, the writer as manager of the case company preselected a key target customer. The assessment of the choice of the preselected customer using relevant tools and approaches from the literature. Thus, this section discusses the tools and approaches used to assess the choice of the selected target customer.

### 3.1.1 Customer Lifetime Valuation

According to Jiang and Tuzhilin (2009), customer segmentation can be performed using a variety of customer dimensions such as CLV (Customer Lifetime Value), RFM (Recency, Frequency and Monetary), Customer Behavior and so forth. The customer lifetime value is a tool to quantify the value of acquiring or/and retaining a customer or group of customers (Loshin 2013: 20, 240). Therefore, the Customer Lifetime Value (CLV) guides helps companies as well as the key stakeholders, in shaping their strategies with long term-view of sustaining and managing the customer relationship.

There are several approaches to calculate the CLV. From a general perspective, the calculation of CLV can be based on “the net present value of the average predicted profit expected from sales to any customer”. However, CLV calculation is based on eight concepts as illustrated in Table 3. These concepts are quantified in the form of values.

**Table 3. Key Concepts of CLV calculation.**

<b>ACQUISITION COST</b>	Is the cost that would be generated from the process of convincing a prospective customer to purchase the product or service.
<b>CUSTOMER LIFETIME</b>	Is the duration of the relationship between the company and the customer
<b>RETENTION RATE</b>	The annual retention rate is the percentage of customers who remain engaged with the company
<b>RETENTION COST</b>	Are costs incurred from the active processes of maintaining the customer relationship (e.g. rebates or elimination of service fees)

<b>REVENUE PER CUSTOMER</b>	The annual average revenue per customer is the cumulative revenue divided by the total number of engaged customers.
<b>SERVICING COST</b>	Are costs incurred from supporting the customer and providing service (e.g. Transport fees).
<b>GROSS PROFIT</b>	Gross profit is the difference between what is brought in as revenue and the cost of creating and providing the product and/or service prior to deducting the operating expenses.
<b>DISCOUNT RATE</b>	In this context, It is the rate used to calculate the current value of future cash flows.

Table 3 shows the eight key values that are taken in consideration in the customer lifetime value calculation. The CLV is a “function of the net present value of the revenue per customer over the customer’s lifetime minus the acquisition, retention, and servicing costs” (Loshin, 2013:240-242). As seen in the table above, there are eight key values/ concepts that are involved in the CLV.

The first value, Acquisition Cost is the cost generated from the processes that the company engage to convince a “prospective customer” to hire the company’s service/ offering. The second, Customer Lifetime indicates how long the collaboration between the company and the customer has lasted, so far. The third, the retention rate is the amount (in percentage) of the total customers who remain engaged with the company. The fourth, the Retention Cost is the total amount of costs resulting from the customer relationship management processes and activities. It can be activities such as rebates or totally eliminating some services costs. The fifth, Revenue per Customer is the annual average revenue resulting from the cumulated revenue divided by the total number of engaged customers. The sixth, Servicing Cost involves the costs generated from after-sales

and support services done by the company to the customer. The seventh, Gross Profit is the result of the difference between the revenue and the production and development cost, before taxes and operating expenses. The eighth value, Discount Rate is the current value from the future cash flows.

In this paper, the researcher uses the ideology of Customer Lifetime Valuation (CLV) to evaluate the customer value for the proposed service by the case company. Thus, in order to evaluate the value of the selected target customer for the Smart Irrigation Solution at the case company, the researcher uses the Customer Lifetime Valuation.

### 3.1.2 Opportunities Prioritization

There are several approaches that companies can use in order to prioritize their selling opportunities, targeting and engaging stakeholders as well as executing sales processes. In the context of nowadays, customers are more proficient in finding their own solutions to the problems that a company can solve through its offering. Consequently, Traditional ways in predicting the worthiness of pursuing a customer opportunity as potential buyer are no longer efficient. Instead, Adamson et al. (2012) developed a new scorecard to help companies in evaluating opportunities of pursuing a customer and assessing the promising opportunities.

The Opportunities prioritization approach from Adamson et al. (2012) is based on a concrete tool in the form of a scorecard. The logic of the scorecard is based on two main criteria. First, the customer agility. The customer agility in taking the action for hiring the companies offering. The customer agility is evaluated on the basis of the speed and the decision-making autonomy of the customer. Second criteria is based on the consideration of customers with emerging needs. Customers might have emerging needs due to external factors such as new regulations or due to internal factors such as the company's strategic changes.

Accordingly, Adamson et al. (2012) have created a scorecard where the two criteria are developed at different levels from the company perspective. Thus, the scorecard is

structured in five groups. Figure 2 below illustrates the opportunities' prioritization scorecard from Adamson et al. (2012).

1. Organizational basics		YES	NO	
Does the customer have significant current or potential spend?	<input type="checkbox"/>	<input type="checkbox"/>	IF EITHER ANSWER IS NO, DO NOT PURSUE A DEAL	
Is the customer financially sound?	<input type="checkbox"/>	<input type="checkbox"/>		

2. Operating environment		YES	NO	UNKNOWN	
Does the customer face external pressures to change, such as new industry regulations or loss of market position?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 POINT FOR EACH YES	
Are there internal pressures to change, such as new management or a rethinking of strategic direction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

3. View of the status quo		YES	NO	UNKNOWN	
Is there organization-wide discontent with the status quo?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2 POINTS FOR EACH YES	
Does the current supplier fall short of expectations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Is the customer unhappy with existing workarounds?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

4. Receptivity to new or disruptive ideas		YES	NO	UNKNOWN	
Do internal stakeholders frequently share best practices?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3 POINTS FOR EACH YES	
Do they attend conferences and other learning events?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Do leaders look to the broader organization for ideas?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

5. Potential for emerging needs		YES	NO	UNKNOWN	
Do stakeholders engage in constructive dialogue when their assumptions are challenged?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4 POINTS FOR EACH YES	
Do they seek to continue conversations about industry benchmarks and trends?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Is there at least one confirmed "Mobilizer" in the company?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

TOTAL		<input type="checkbox"/>		
-------	--	--------------------------	--	--

**Scoring**

<p><b>0-10</b> Consider not pursuing the opportunity</p>	<p><b>10-20</b> Consider pursuing with limited resources</p>	<p><b>20+</b> Consider pursuing with full resources</p>
--	--	---

Figure 2. Opportunities Prioritization Scorecard (Adamson et al. 2012)



Figure 2 above shows the scorecard developed by Adamson et al. (2012) in order to help companies to evaluate the potential customers. The scorecard evaluation is structured in five groups of elements. Each group has a set of questions that are answered with yes or no or unknown.

The first group enables the evaluation of the monetary significance of the customer. In fact, it evaluates if the customer is having important spends in the company, in other words if the customer buys significantly the company's offering. The first group also evaluates how solid is the customer, financially speaking.

The second group, tackles the operating environment of the customer. It evaluates the external and internal factors of pressure that can affect the customer perception of the companies offering.

The third group views the status quo of the organization, the supplier and the customer. Indeed, here is done the evaluation of the negative shortcomings affecting the different stakeholders' status quo.

The fourth group evaluates the receptivity and openness to new ideas. It includes the frequency of best practices sharing, the frequency of participation in learning sessions and finally, the flexibility and eagerness of the integration of new ideas.

The fifth group evaluates the potential of the customer for emerging needs. In this group is evaluated the flexibility and communication quality between stakeholders (customers included) in challenging situations with the company. This group also evaluates the decision-making power of the customer inside its company.

At the end of the scorecard evaluation, a final score is deducted based on the points collected from the answers to each of the questions. The score guides the company in deciding to consider the customer opportunity or not. If the score is ten or less, the customer opportunity it is recommendable not to pursue the opportunity. If the score is between ten and twenty, the customer opportunity is seen as an opportunity to be considered but with limited resources. If the score is twenty and above, then the customer opportunity is considered as important and worth to be pursued with full resources.

According to Nascenzi and Robert (1988: 37), understanding and defining target customers' needs is another important step in defining target markets and thus in designing a successful business model. Indeed, it is "just as important as" defining the target customers. Thus, the next sub-section is about best practice in defining customers' needs.

### 3.2 Identifying Customer Needs

According to (Woodruff 1997), customer value is a relevant source of competitive advantage. Customers perceive value through different parameters among what utility, benefits and emotional links are key elements. Therefore, defining the needs of the customers of the company is an important step in building the customer value while designing a successful business model.

Christensen et al. (2016) stated that it is important to start with focusing on the customer's job to be done, when identifying new market opportunities. In accordance with Christensen et al. (2016), Osterwalder (2010) recommends starting with seeking the insights from the customers is not to neglect when designing value propositions. Customer insights guides companies in providing their customers with the solution that would satisfy their actual needs. Accordingly, understanding customers is a prerequisite in designing a successful business model. Understanding customers involves taking in consideration their environment, habits, purposes and aspirations. In this way companies can satisfy the "unmet needs" of the target customer.

In order to understand the pre-selected target customer needs in this study, a framework composed of a list of questions inspired from Osterwalder (2010: 130-131) is used. The set of questions helps the company to emphasize and deeply seek in customers' needs. In other words understand "the job to be done" that the customers wants and hires a company for. The framework is composed of six questions as shown in table below (Table 4).

Table 4. Framework to understand the customers' needs (Osterwalder & Pigneur, 2010)

<b>"JOB TO BE DONE"</b>	
<b>1</b>	<p>What does the customer <b>SEE</b> ?</p> <p>Describing what the customer sees in his environment (e.g. What does he looks like? what surrounds him? Who are his friends?)</p>
<b>2</b>	<p>What does the customer <b>HEAR</b> ?</p> <p>Describing how the environment influences the customer (e.g. How do other persons influence him when they say something? which media/channels influence him?)</p>
<b>3</b>	<p>What does the customer <b>THINK AND FEEL</b> ?</p> <p>Trying to draw what goes in the customer's mind (e.g. what he might not say publicly and what could be important to him? What are his emotions? Aspirations?)</p>
<b>4</b>	<p>What does the customer <b>SAY AND DO?</b></p> <p>What the customer might say or how he might behave in public (what is his attitude? What is he telling others? Is what he says truly what he feels?)</p>
<b>PAINS</b>	
<b>5</b>	<p>What are the customer <b>PAINS</b> ?</p> <p>E.g. What are the customers biggest frustrations? What are the obstacles to his needs? What risks he might fear taking?</p>
<b>GAINS</b>	
<b>6</b>	<p>What does the customer <b>GAINS</b> ?</p> <p>E.g. What he truly wants to achieve? How does he measure success?</p>

Table 4 above shows a list of relevant questions that, according to (Osterwalder and Pigneur, 2010), helps companies to better and deeply understand the customers' needs. These questions can be developed in different ways according to the subject-customer. The table is organized in three group of questions.

The first group of questions help the company to empathize with the customer and understand what job the customer wants to achieve by hiring a company. This group contains four main questions that guides the company in understanding and familiarizing with the environment of the customer. Additionally, the company gains a better knowledge of the elements that influences the customer positively or negatively. Influencers such as people (e.g. friends, family), emotions/aspirations, media/channels.

The second group helps the company to detect the elements of pain in the current processes that customer uses. In fact, here, the company try to understand the biggest frustrations of the customer, the risks that the customer might be afraid of taking and what are the current factors that stops him to satisfy his needs.

The third group helps the company to define what are the gains the customer want to achieve out of the offering. In other words, the company gains a clear idea about what the customer wants to achieve, and how the company could successfully respond to the identified customer needs. In this stage, the company also tries to build an idea on how the customer measures success. (Osterwalder, 2010: 130-131)

Getting insights from the customer through the questions in Table 4 is an important step. It allows companies to shape their offering in accordance to what the customers really need and wants to achieve. Consequently, companies gain consistent knowledge to design convenient Customer Value Propositions (CVPs) and reach their customers.

According to Anderson et al. (2006), constructing a Customer Value Proposition requires at least a good knowledge about customers but also about competitors. Therefore, next section discusses best practice of comparing competitor's Customer Value Propositions in order to build a superior customer value proposition with a competitive advantage.

### 3.3 Analyzing Competitors' Customer Value Propositions

Companies sustain the lead by taking into account also the strengths of competitors (Treacy and Wiersema 1993). When a company wants to highlight the value the proposed value proposition to a target customer, it is more pertinent to show why should the target customer buy the company's offering instead of the alternative offerings from competitors. Hence, constructing a superior customer value proposition requires a prior research to build a meticulous knowledge of the alternative offerings from competitors. (Anderson et al. 2006)

A company's offering can have different elements that delivers value to the customer. Anderson et al. (2006) sorted the value elements into three groups, in order to facilitate the comparison of Competitors' Customer Value Propositions.

The first group consists of the points of parity. The points of parity are the elements of similarity the company is offering comparing to the competitor's offering. These elements concerns typically the utility and performance of the offering.

The second group consists of the points of difference. The points of difference are elements that the company's offering has in addition to competitors or does not have comparing to competitors. Therefore, the points of difference can either highlight the superior value out of the company's offering or an inferior value comparing to the competitor's value proposition.

The third group concerns the points of contention. The points of contention are the elements on which the company and the customer differ regarding the value out of it. In other words, they are elements of performance or functionality in the offering that the company sees as advantageous point of difference comparing to the competitors. While in other the other hand the customer doesn't share the same view, but sees it as a point of parity with the competition. Another scenario is also possible regarding the points of contention. The company my see an element of value as point of similarity with the competitor while the customer sees it as a positive advantage in the advantage of the competitor.

A Customer Value Proposition involves the different elements of value discussed above. According to (Anderson et al. 2006) there are three types of Customer Value

Propositions. The first type is based on a benefit assertion where the company lists the benefits of its offering that would bring a value to the target customer. Second type consists of highlighting the favorable points of difference comparing to the competitors. This approach is based on a value presumption as the company presume that the highlighted points of difference are points of strengths comparing to what competitors offer. Third type consists of focusing on one or two points of difference and maybe also one point of parity. Accordingly to these points of focus, the company stresses the “most worthwhile” that its offering brings as a superior value comparing the alternative offering from competitors. This approach that Anderson et al. (2006) named *resonating focus* necessitate a decent customer value research by leading a benchmark on competitors Customer Value Propositions (CVPs).

Anderson et al. (2006) prefer the last and third type of Customer Value Proposition. They argue that following a *resonating focus* approach, companies can provide a customer value proposition that translates a worldly understanding and consideration of the target customer priorities. Indeed, focusing on “the few elements that matters most to target customers” enables companies to demonstrate and communicate the value of the superior performance/ utility/ functionality of the offering comparing to the competition.

CVP is the first building block of a service business model. The next section is about best practice in designing the service business model building blocks.

### 3.4 Designing Building Blocks of a Service Business Model

#### 3.4.1 Business Modeling

Amit and Zott (2001: 494) defined a business model as “a careful design of content, structure and governance of transactions so that it creates value for the company, the stakeholders and the customer”. Accordingly with this definition, Osterwalder and Pigneur (2010), Chesbrough (2006), Amit and Zott (2010) and Johnson (2010) added that a business model describes the value logic of an organization in terms of how it creates and captures customer value. However, there are multiple Business model definitions in the literature; Yet, most of the definitions agree that a business model is based

on a mix of different views/ approaches of the interactions between the strategic, operational levels or even technological levels (Chesbrough and Rosenbloom 2002). A business model framework defines the elements and the relationships between the elements in a Business Model. (Gordijn et al. 2005).

There are two most well-known and widely used business model frameworks. The first one is the Business Model Canvas developed by Osterwalder and Pigneur (2010). The second is the Four-Box Business Model from Johnson et al. (2008, 2011).

The Business Model Canvas has many commonalities with the Four-Box Business Model. The main difference is that the Business Model Canvas has a customer block while the Four-Box Business Model does not have a separate customer box. However, the Four-Box Business Model covers customer aspects in way, in the value proposition block.

This paper combines both theories in defining the action points for designing the service business model for the case company. The Four-Box Business Model (Johnson et al. 2008, 2011) is used as main structure for the business model framework. In the other hand, elements from the Business Model Canvas (Osterwalder and Pigneur 2010) are used in order to define the elements of the four building blocks in the context of the case company. Figure 3 shows the four-box business model framework proposed by Johnson et al. (2011: 93).

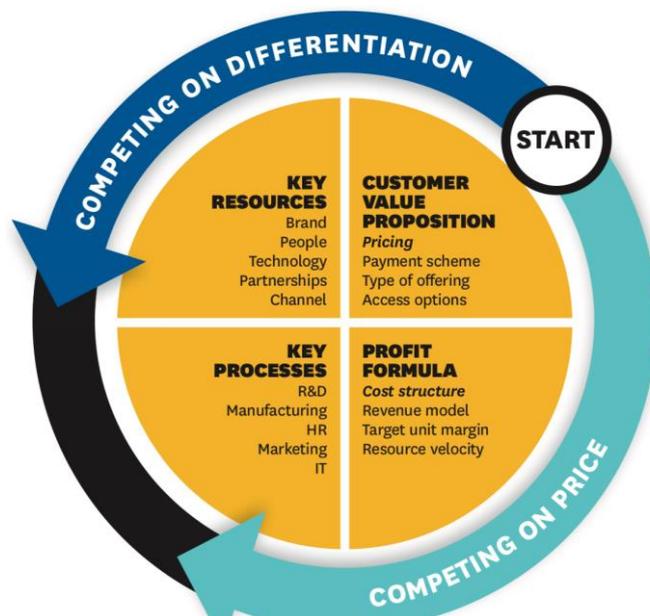


Figure 3. Four-Box Business Model Framework (Johnson et al. 2011: 93)

As seen in figure 3 above, the business model framework of Johnson et al. (2011) is composed of four building blocks: Customer Value Proposition (CVP), Profit Formula, Key Resources and Key Processes. The first building block, CVP defines the offering that the company provides to the customers in order to help them get "a job-done" and solve a problem. The second building block, profit formula, defines the way the company creates value for itself and for the stakeholders including the target customers. The third building block, Key resources defines the resources to integrate in order to deliver the value to the target customers. Resources such as people, technology, products, equipment, channels, partners. The fourth and last building block, Key processes are processes by which the company delivers the CVP such as hiring, development, training, marketing and manufacturing.

Collectively, resources and processes define the company's capabilities, "how it does things". The customer value proposition and profit formula characterize the company's priorities, "what it does, and why". (Christensen et al. 2016).

Designing a business model always starts with designing the first block – the CVP. The order of designing next blocks depends on the company chooses to compete based on the price or based on the differentiation comparing to the competitors' offering. If the company wants to compete based on the offering, next start defining the resources and processes needed to deliver the CVP. The prospective fixed and variable costs of the needed key resources and processes defines the price required in the next building box of the business model framework, the profit formula.

Accordingly, the next subsections describe the elements of design of each of the four building blocks according to the competition based on differentiation. Thus, the order of the next subsections is as follow: CVP, Profit Formula, Key resources and key processes.

### 3.4.2 Designing the CVP

Christensen et al. (2016) define value proposition as the offering that provides customers with a more effective, convenient and affordable solution to "do a job they've been

trying to do”. Osterwalder and Pigneur (2010) add that the value proposition is the reason why a customer chooses a company over another one. Indeed, value proposition involves a mix of quantitative and qualitative values for a customer segment. (Osterwalder 2014).

According to Treacy and Wiersema (1993), in order to deliver a superior value proposition to customers, companies can consider three key criterion in their offering. The first criterion is operational excellence, which translates in providing an efficient and cost-effective offering/ CVP. The second criterion is customer intimacy, which illustrates in building loyal and long-term relationship with the customer. The third criterion is product leadership. Companies enhance their product leadership opportunities by being creative and continuously innovative considering external innovation as well.

On the other hand, Osterwalder, (2014) highlights other elements that can create value for a customer segments such as newness, performance, customization, brand/ status and convenience/ usability. Newness refers to a new perceived value by a customer out of a totally new product or service. Newness often involves technology. Performance means the improvement of the offering power. Performance is a usual value-creation enabler. Customization occurs by when companies tailor the offering to the specific needs of the target customer. Customization happens usually through the value-cocreation process with the target customer.

Design is another element that can create value for the target customer. However, it is important to note that superior design is not a condition and does not always mean enable value creation. Design is particularly relevant in some customer segments such as fashion over other segments. Brand/ status can play a significant role in the target customer preference. Some customers may perceive value simply by using a brand. Last, convenience/ usability is how the offering makes the job easy and convenient to the customer while usage. Indeed, it is very important value enabler as it can create substantial value to the target customers. (Osterwalder and Pigneur 2010). Furthermore, Johnson (2018) states that “there are four main barriers to consumption, : skills, access, time and wealth”. Therefore, accordingly with Johnson (2018), Osterwalder (2014) stresses the importance of considering time, money and savings while companies design their CVP.

Based on Osterwalder (2014), the CVP block consists of three key elements: the offering, the pain relievers and the gain creators.

The first element, the offering refers to the “list of items” (products and/ or services) that the companies wants offers to the target customers. In other words, the offering refers to what the value proposition of the company builds on. The company’s offering may include physical/tangible items, intangible, digital or financial items.

The second element, the pain relievers refers to the elements of the offering that mitigate the specific pains of the target customer. The pain relievers is the list of the component of the value proposition that the company include in the offering in order to remove or diminish the things that are frustrating or annoying for the target customers while, before and after they are trying to accomplish a job. The efficient approach for a company to pains to base the offering on is to focus on the most painful things rather than trying to tackle all the identified pains. In other words, while designing the pain relievers it is important for companies to consider the elements that would help the target customers to save money, time and effort by using offering of the company.

The third element, gain creators are the component of the value proposition that “produce outcomes and benefits that customers expects, desires, or would be surprised by.” Osterwalder (2014: 33). The gain creators involves the functional utility, the social gains, the positive emotions and cost savings values that the target customer can get out of the value proposition. Gain creators are the elements that creates money, time and effort saving for the target customers.

While the company designs the customer value proposition and builds the three element discussed above, it is important to evaluate relevance of each of the three element. Obviously, no value proposition can take in consideration all the listed elements while identifying the offering or the pain relievers or the gain creators. Thus, companies may rank the identified element from nice to have up to essential, and consequently design a CVP that takes in consideration the most relevant elements.



(Osterwalder 2014: 28-33)

Hence, this paper draws the action points to design the CVP block based on the relevance of each of the elements: offering, the pain relievers and the gain creators.

### 3.4.3 Designing the Profit formula

Christensen et al. (2016) defines the profit formula as the assets and fixed cost structure in addition to the margins and velocity needed to cover the assets and the fixed costs.

Based on Johnson et al. (2008), the profit formula box is composed of four main elements: the Revenue Model, the Cost Structure, the Margin Model and the Resource Velocity.

The first element, Revenue Model, takes in consideration the prospective amount of money that the company intend to make through the offering. The revenue model is the result of the multiplication of the prospective offering price and the prospective sales volume. The company can estimate the prospective volume taking in consideration factors such as the market share, or the purchase frequency. The revenue model also takes in consideration the revenue streams. (Johnson et al. 2008). A Revenue Stream is the way the company will make customers pay for the offering. According to Osterwalder and Pigneur (2010) Revenue streams can be generated in different ways. Revenue streams can be generated based on e.g. Asset sale, usage fee, Subscription fees, Lending/ Renting/ Leasing or Licensing. Every revenue stream can have a different pricing logic. There are two main kind of pricing. First, fixed Pricing mechanism based on static and predefined variables: price, features, market share and volume. Second, Dynamic pricing based on market conditions. Dynamic Pricing takes in consideration market variables such-us supply and demand, yield management, negotiation ability/ possibility, auctions. In conclusion, the Revenue Model includes the pricing, the payments formulas/ revenue streams and the volume.

The second element, Cost Structure describes the direct and indirect costs that will be endured by the company for generating the value proposition (Johnson et al. 2008). According to Osterwalder and Pigneur (2010), the Cost Structures include fixed and variable costs as well as other costs such as the economies of scale or economies of scope.

Fixed costs refer to the costs occurred by the company independently of the service or product volume, e.g. cost of key assets, salaries, rents. Variable costs change proportionally to the service or product volume. Economies of scale are advantages of costs such as lower purchase rates that big companies for instance benefit from. Economies of Scope are the advantages that a company benefits from e.g. by using the same resources to support its different offerings. Companies may have this advantage cost due to larger scope of operations. (Osterwalder and Pigneur, 2010) distinguish two types of cost structures: Cost-driven and Value-driven cost structures. A Cost-driven cost structure is based on maximizing the low-cost of the value proposition. Johnson (2018) refers to this approach by low-cost Business. On the other hand, Value-driven cost structures are more focused on high-degree and personalized CVPs (Osterwalder and Pigneur, 2010: 41). Johnson (2018) refers to this approach by premium Business.

The third element, Margin Model refers to the net profit that the company desires to have out of each transaction. In other words, the margin model is the outgrowth of the revenue model and the cost structure.

The fourth element, Resource Velocity refers to the frequency of need of the required resources in order to meet the target volume in a given period. Resource Velocity includes cycles speed of e.g. inventory turns or lead times or assets usage. In other words, the resource velocity defines the capacity of the business model to deliver the CVP.

This paper focuses on developing action points to design the Revenue Model and the Cost structure as key component of the profit formula box, in the context of the case company.

#### 3.4.4 Designing the Key resources

Christensen et al. (2016) refer to the key resources by all the kind of means/resources (e.g. products, technology, human resources, brands, cash) that a company needs in order to deliver the value proposition to the target customers.

According to Johnson (2018), companies design the key resources box of the business model framework based on the key resources that must be called in order to deliver the value proposition. The key question here is to define the “unique combination” of people, partners, technologies, channels and equipment needed to support the value proposition taking in consideration the constraints related to the designed profit formula.

Osterwalder distinguish four categories of resources. The first category, Physical resources. This category includes physical assets alike facilities, vehicles, machinery, distribution networks or point of sales. The second category, Intellectual resources. This category involves resources such as the brands, status, Business intelligence and intellectual property, patents and copyrights, partnerships, databases. The third category, Human Resources such as scientists or sales force. According to Johnson (2010) “people are the critical resource to a professional service firm”. Accordingly, Osterwalder (2014) adds that people are “crucial” resource of intensive knowledge and creativity. The fourth category, Financial resources refers to cash, loans and stocks that the company considers as financial guarantees to be able to deliver de value proposition.

As stakeholders in the creation of the value proposition, Partners are key component of the key resources building block of a business model. According to Osterwalder, partners choice can be driven by three main motivations. First, based on the optimization and economy of scales. Typically, companies outsource activities and resources in order to optimize and reduce costs. Second, companies may build partnerships in order to lower uncertainty and risks related to such environments. Third, companies may approach other partners in order to provide and co-create a part of the value proposition offered by the company. In fact, companies allies with other partners to acquire needed elements of the CVP such as knowledge or brand or license, etc.

Hence, the writer identifies the key partnerships as well as the Physical, Intellectual, Human and Financial resources, as the key components of the key resources box.

### 3.4.5 Designing the Key Processes

Christensen et al. (2016) describe the key processes as the “ways of working together to address recurrent tasks in a consistent way” (e.g. training, development, manufacturing).

The Key Processes are the second element of the business model framework that enables delivering value to the target customers. Indeed, companies design the key processes by taking in consideration processes required to produce the CVP such as product development and design, or Manufacturing, or Marketing, or Customer Relationships Management. Likewise, the logic behind defining the key resources, defining the key processes relies on defining the “right combination of the processes that allows the company to scale up within its CVP Johnson (2018). Key processes includes marketing, product design and development, contract management processes, accounting rules and metrics as well as procurement, manufacturing, CRM processes and support services.

Osterwalder and Pigneur (2010) refer to the Key processes by Key activities. Osterwalder categorized the key processes in three groups. The First group, Production processes such as design and conception, product development. The second group, Problem-solving processes referring to processes that brings new solutions to specific target customer problems. The third group, Platform/ Network are processes such as platform management, or service provisioning, or platform promotion. Platform/ Network such alike software platforms or matchmaking platforms, websites, etc.

The key criterion that companies should consider while designing the key processes box is that the processes should be replicable, scalable, sustainable and manageable. (Christensen et al., 2016; Johnson, 2018)

Thus, in this paper the writer defines the action points to design the Production, Problem solving and Platform/ Network processes, as key components of the key processes building block of the business model, in the context of the case company.

### 3.5 The Conceptual Framework

As a result of the literature review findings, a conceptual framework is drawn to help in developing an Action Plan to Design a Service Business Model for the Smart Irrigation system. The conceptual framework of the present research is composed of two parts. The first part is used as literature support in conducting the starting point analysis investigations in Section 4. The second part is used to support the building of the proposal in section 5. Figure 4 below shows the details of the conceptual framework of the present research.

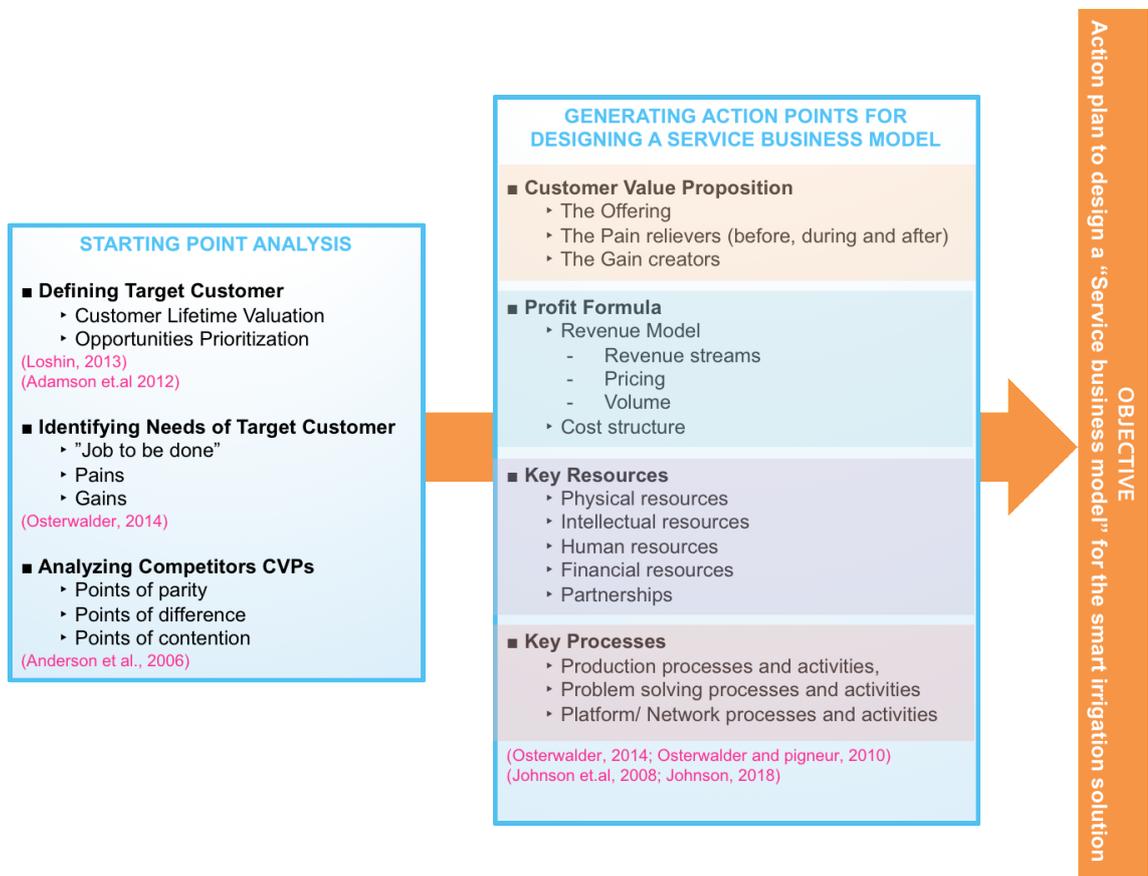


Figure 4. The Conceptual Framework

As seen in Figure 4 above, the conceptual framework for developing the Action Plan to Design a Service Business Model for the Smart Irrigation system is divided in two parts. The first part supports in conducting the starting point analysis investigations in Section 4. This part is organized in three steps:

The first step focuses on defining the target customers for the Smart Irrigation Solution. The target customer is defined by using two methods. The first method is based on the customer lifetime valuation approach discussed by Loshin (2013). The second Method is based on the opportunities prioritization scorecard from Adamson et al. (2012).

The second step concentrates on identifying the needs of the target customers based on Osterwalder and Pigneur (2010). In this step, the “job to be done” as well as the pains and the gains of the target customers are identified.

The third step concludes this part by analyzing the competitors’ Customer Value Propositions based on the approach of Anderson et al. (2006). This step compares the Points of parity, Points of difference and Points of contention in CVPs of the Key competitors.

The second part is used to support the building of the proposal in section 5. This part defines the action point to design the key elements of the building blocks of a service business model. It uses best practices of business modeling based mainly on Osterwalder and Pigneur (2010), Osterwalder (2014), Johnson et al. (2008) and Johnson (2018). This part is structured in four blocks. The first block contains the offering, the pain relievers and the gain creators elements. The second block contains the Revenue Model and the Cost structure. The third block contains the Key Resources and the fourth and last block contains the Key Processes.

As discussed above, the starting point analysis is the first step of developing the Action Plan to Design a Service Business Model for the Smart Irrigation system. Therefore, the next section overviews the results of the starting point analysis investigations.

## 4 Starting Point Analysis

This section discusses the data collected and the results from the investigations that were conducted as a starting point before building the initial proposal.

The starting point analysis was conducted in three stages. First, the target customer for the Smart Irrigation Solution was defined. Second, the needs of the selected target customer were identified, in the context of using the Smart Irrigation Solution. Third, based on the identified needs, a comparison of the competitors' CVPs was conducted, based on a benchmark of similar solution providers.

This section ends with selecting the key findings for defining the action points to design the service business model for the case company and suggesting an initial proposal of the action plan.

### 4.1 Overview of the Current State Analysis Stage

The rest of section 4 hereby is structured in three main steps. This section uses different methods of data collection.

First, this section starts by defining the target customer for the Smart Irrigation Solution. At this stage, quantitative and qualitative data are used from internal documents in order to perform the evaluation of the relevance of the target customer choice. The evaluation of the target customer selection is done based on the tools presented in the literature review in Section 3.1. The approach that used for this stage is to insure the validity and reliability criteria of the used data, in the context of Action Research.

Second, the section continues by identifying the needs of the selected target customer. At this stage, a sequence of interviews is conducted with the key target customer in order to identify the needs and the value out of a Smart Irrigation Solution would be perceived by the key target customer. This stage is approached by using interviews, in order to provide substantial consistence for the research and insure its reliability.

Third, the writer conducts an analysis of the competitors' CVPs, based on a benchmark of smart irrigation solutions providers. At this stage, the data is collected by consulting

the key competitors websites. This step is conducted using the direct corporate websites as sources in order to guarantee the reliability and credibility of the research.

## 4.2 Defining Target Customer

The case company wants to commercialize a Smart Irrigation Solution as new service. The writer initially pre-selected a key target-customer, being the project owner and the manager of the case company. The competency and position of the writer justifies the validity of this action. However, the pre-selection of the key target customer is based on an initial argument as described in 4.2.1.

In the other hand, an evaluation is conducted in order to confirm or not the relevance of the pre-selected target customer. For this purpose, qualitative and quantitative data is used as substance for the evaluation. Hence, two main evaluation tools (described in 4.2.2 and 4.2.3) are applied in order to assess the significance of the pre-selected target customer.

### 4.2.1 Description of the key target customer

The key target customer is an existing customer of the case company. The key target customer is a middle-size farmer. In middle-size farms (10-50 Ha), there is typically a mix of traditional and modern technologies tools. The prior subscription of such farms to modern technologies substantiate their potential of acceptance and openness to the Smart Irrigation Solution that the company wants to develop. Hence, the openness drove the choice to pre-select the key target customer described below.

Table 5 below, provides a description of the pre-selected key target customer. The description of the key-target customer is based on two parameters. Firstly, general information that the case company knows ahead about the key target customer. Secondly, further information collected from the first interview with the key target customer. In the first interview more information is collected about the profile of key target customer

and assessed the prior general information assumed about the key-target customer profile.

*Note: In this section, the term culture refers to sowing. The term program(s) refers to the software program of the irrigation system controller.*

**Table 5. Description of the pre-selected key target customer.**

1. DESCRIPTION OF THE FARMER		
Name	Kama Abdelkbir	
Activity	Farming Production of five varieties of lettuce/ salad Local Distribution of Lettuce/ salad	
Age	40 years old	
Farming Background	Practicing agriculture since 18 years old Practicing several other type of culture, besides lettuce/ salad Participation in dozen of professional trainings in agriculture in Morocco and abroad	
Openness to Technology	Member of the International Association of Promotion of Salad culture Participated, so far, in four sessions of technology transfer in Germany and Spain	
2. DESCRIPTION OF THE FARMS/ LANDS		
Total number	3	
Regions	Rabat region (Morocco)	
Surface (Ha)	23 + 15 + 12. (50 Ha in total)	
Facilities	Warehouse and Packaging Building Agricultural Machinery Building Maintenance Building Offices Building Sanitary	
Employees	Function	Number
	Manager - the key target customer	1
	Agricultural Technicians' Supervisor	2
	Sales Representative	2
	Administrative and accountant agents	2
	Permanent Agricultural employees	6
Seasonal Agricultural employees	40	
3. INFORMATION ABOUT THE FARMING ACTIVITIES/ TECHNIQUES RELATED TO THE LETTUCE SPECIES		

Sowing	
Specie	Lettuce
Number of Varieties	5
Sowing cycle	60 days typically can be reduced up to 45 for some varieties
Irrigation Needs	
Type	Drop by drop
Water frequency Needs	40 m <sup>3</sup> / Ha/ Day
Irrigation Frequency	40 m <sup>3</sup> /h
Existing Water Source	6 wells
Energy Source	Solar plants
Farm Management Activities	
Irrigation Activities	<b>1. Daily Operations</b>
	1.1. Upstream and downstream measurements of: <ul style="list-style-type: none"> <li>a. Climate data</li> <li>b. Soil moisture</li> <li>c. Dose and irrigation frequency per irrigation point</li> </ul>
	1.2. Fertilization planning in accordance with the irrigation requirements
	1.3. Checking and update if needed of the irrigation current day schedule
	<b>2. Weekly Operations</b>
	2.1. Week maintenance operations ( E.g. checking of sensitive equipment, checking of irrigation material, etc)
	2.2. Update and set-up of the week irrigation schedule and program
	<b>3. Monthly Operations :</b>
	3.1. Statements of the Irrigation related Expenses
	3.2. Summary of the daily follow-up notes
<b>4. Seasonal Operations :</b>	
4.1. Re-adjustment of the irrigation material in accordance with the new sowing cycle	
4.2. Readjustment of the cyclic irrigation program	
4.3. Preparation of the fertilization planning	

	<b>5. Annual operations :</b>
	Elaboration of the annual report analyzing all the collected data during the year in order to generate the result of the year production efficiency as well as the forecast for the next year.
<b>Agricultural Activities</b>	Fertilization Phytosanitary treatments Soil work, and culture maintenance Other real-time or afterword control and maintenance activities
<b>Schedules Management</b>	Sowing planning Treatments planning Crop planning Estimated irrigation planning

<b>4. Other activities</b>	
	Employees check-in (real-time)
	Employees pay slips
	Due dates to deliver customer's orders
	Sales forecast
	daily sales and purchases check-list
	Monthly and yearly financial statements <ul style="list-style-type: none"> <li>- Due dates for debts to suppliers</li> <li>- Due dates for debt by customers</li> <li>- Bank financial statement</li> </ul>

Table 5 above describes the key target customer profile, the farm criteria and the typical farm management activities of the key target customer. This table is drawn from interviewing the key target customer.

The data marked in different colors in the table are key points that supports the significance of the Smart Irrigation Solution in the context of the pre-selected key target customer. These elements are also considered as key aspects of the target market in the perspective of the Smart Irrigation Solution commercialization.

*Note: The case key target customer will be referred to by his name: Kama, for easier reading purposes in this section.*

The first key point refers to the interpretation driven from the group of data marked in green color. Indeed, Kama is a Farmer, a Producer of five varieties of lettuce, and a Local distributor of the five varieties in Morocco. Being a farmer is an initial condition for the targeted group by the Smart Irrigation Solution. As Producer Kama is an example of the type of farmers considered as a relevant group that the case company aims to target for selling the Smart Irrigation Solution. In fact, middle-size farmers (50 Ha in the case farmer) are typically also producers. Producers have a reasonably important amount of activities. Additionally, time and quantity constraints have an important role in such context. For the case of the pre-selected key target customer, the quantitative data collected shows that Lettuce, as case product, is a 45 to 60 days cycle with a need of water of 40 m<sup>3</sup>/ Ha/ day and 40 m<sup>3</sup>/hour. Being a Local Distributor enhances the criticality of the factors of time and quantity in addition to quality. Indeed, market variations together with the delivery constraints that such key-target customer faces increases the need of optimal management ways.

Thus, for the purposes of efficiency in time, quality and quantity, a call to a smart kind of solution/ services is potential to be taken in consideration in such context of Middle-size B2B market in the farming sector, alike Kama's case.

The second key point refers to the group of data marked in yellow color. As seen in Table 5, Kama shows an active participation in e.g. technology oriented agricultural practices and training sessions, as well as an involvement e.g. lettuce promotion association. This proves the incentive, the interest of Kama in continuous development in the field. Thus, it is an advantageous point that shows the openness to a technology-based service alike the Smart Irrigation Solution that the case company wants to offer. Furthermore, Kama is already using solar plants as source of energy. This element shows his awareness and openness to an ecological kind of agriculture in alignment with the value behind the Smart Irrigation Solution that the company wants to offer.

The third key point shows the amount of typical Farm Management Activities as shown in table 5, endorses the importance of calling a smart solution in similar contexts to the case key target customer. In fact, the Farm Management Activities includes three main

dimensions: Irrigation Activities, Agricultural Activities as well as Schedules Management.

The Irrigation Activities involve operations on a daily, weekly, monthly, seasonal and yearly basis. The daily operations are typically measurement, updates and control of the irrigation program and schedule as well as the soil fertilization planning. The weekly operations includes the updates and the set-ups of the irrigation system according to the planning and other factors that may occur and affects the irrigation as pre-planned such as climate or equipment maintenance. The weekly operation also involves the preventive maintenance and equipment checking. The monthly operations include the statement of expenses related to the irrigation activities e.g. cost of equipment replacement or purchase of fertilizer. The Irrigation activities include also seasonal or cyclic operations. The seasonal operations occur typically after each crop, which implies the start of a new sowing cycle. Hence, the seasonal operations implies typically Re-adjustments of the irrigation material, programs and schedules in accordance with the new sowing cycle. By the end of every cycle there is also a summary of the season follow-up notes. This summary helps the farmer to keep a record of the events during the cycle. At the same time, it enables the farmer to optimize the next schedule, better plan the production and perform the production forecasts. The yearly operations are mostly reporting and analysis activities. The annual reports allows farmers to generate the result production of the year as well as the production forecast for the next year.

The Agricultural Activities involve the activities related to the fertilization and treatment of the cultures and soil work as well as the sowing and the cropping operations. At the same time the agricultural activities include real-time or afterword control and maintenance activities such as soil heat/ cold/ moisture or equipment functioning and parameters.

The Schedule Management includes all the planning related to the agricultural activity including equipment replacement and/ or reconfiguration according to the related influencing factors.

In this respect, the complexity and recurrence of the operations and activities related to the farm management and Irrigation management especially support the potential advantage of a smart solution in enabling an optimal and efficient management of the Resources (human, material, natural etc.), the Production as well as the Schedules.

The fourth group is marked in Purple. This group includes a sum of other important activities that are operated in a farm. These activities are related to employees, logistics and financial/ profit management activities. In the context of this research, these elements are not considered in the initial offering of the case company, however they might be called to be considered in the offering in the future, in the perspective of product development.

In conclusion, the pre-selected key target customer described as a B2B customer, who is a middle-size farmer represents a preliminary example of the potential target market for the Smart Irrigation Solution that the case company wants to offer. Therefore, the next sub-section, evaluates the choice of Kama as key target customer using the Customer Lifetime Valuation (CLV) approach from Loshin (2013).

#### 4.2.2 Evaluation of the pre-selection of the key target customer – Customer Lifetime Valuation

The CLV approach from Loshin (2013) is used in order to assess the pre-selection of the key-target customer described in the previous sub-section 4.2.1. The data used in this evaluation is collected from internal documents such as purchase records, invoices, project delivery reports, etc. **Table 6** below shows the key data that supports the evaluation of the customer lifetime value of Kama as key target customer and thus assess the significance and relevance of this choice.

Table 6. CLV of Kama as key target customer.

<b>ACQUISITION COST</b>	~ 1300 € cost generated mainly from the incurred costs of preparing a prototype/ sample of the Smart Irrigation Solution.
<b>CUSTOMER LIFETIME</b>	~ 3 years
<b>RETENTION RATE</b>	40 %
<b>RETENTION COST</b>	5% less of the profit margin
<b>REVENUE PER CUSTOMER</b>	47.5 % of the case company revenue is generated from the business relationship with Kama within three years.
<b>SERVICING COST</b>	0.05% (transport, first visit, and after sales support services fees)
<b>GROSS PROFIT</b>	Unavailable
<b>DISCOUNT RATE</b>	10% of the normal price of the Smart Irrigation Solution + 3 months of free subscription.

Table 6 shows the relevant values to evaluate the customer lifetime value of Kama as key target customer for the case company. The values included in table 6 are calculated

or estimated based on internal data collection issued from the case company. Table 6 evaluates eight values.

The first value is the Acquisition cost. In order to convince Kama to purchase the Smart Irrigation Solution the case company does not generate any marketing costs so far. However a total cost of ~ 1300 € is generated from the incurred costs of preparing a prototype of the Smart Irrigation Solution. The prototype serves as a sample to simulate and describe the service to the customer.

The second value is the Customer Lifetime. The pre-selected key target customer started the collaboration with the case company since the beginning of the case company activity in the year 2016. Thus, the customer lifetime is around three years.

The third value is the Retention Rate. Since the beginning of the case company's activity, four out of ten (40%) of the customers remained engaged with the case company. This rate concerns the service of providing turnkey projects that is the most profit generating service among all the other services that the case company provides.

The fourth value is the Retention Cost from the active processes of maintaining the customer relationship with the key target customer Kama, the case company incurs costs such as rebates, elimination of service fees, etc. The total of these costs is estimated to 5% less of the profit margin as compared with the profit margin generated from transactions with other customers.

The fifth value is the Revenue Per Customer. As the evaluation is in regards of Kama as key target customer for this study, the cumulative revenue divided by the total number of engaged customers will not be taken in consideration. Instead, here is presented the percentage of revenue generated from Kama only as one of the total engaged customers. Thus, 47.5 % of total revenue on the basis of 9 projects out of 20 during the 3 years of business relationship with Kama. The value of the Revenue per customer in this case (47%) is a key substance in assessing the value generated from sustaining a long-term relationship with Kama as case key target customer.

The sixth value is the Servicing Cost. 0.05% generated mainly from transport fees, first visit fees and after sales support services fees.

The seventh value is the Gross Profit. The gross profit from selling the smart solution to Kama cannot be estimated at this stage. The reason is that the pricing as well as the cost of creating and providing the irrigation smart solution, the operating expenses and the pricing are not yet fixed.

The eighth value is the Discount Rate. The Discount Rate in this case is composed of 10% of the normal price and 3 months of free subscription. The 3 months of free subscription is considered in the case where the revenue stream is based on a yearly subscription (the revenue stream is discussed in Section 5).

Therefore, the next sub-section applies the scorecard of Adamson et al. (2018) to the selected key target customer, Kama. The scorecard enables the evaluation if Kama as a key target customer, represents a significant opportunity to pursue the commercialization of the Smart Irrigation Solution.

#### 4.2.3 Opportunities prioritization scorecard

The Opportunities prioritization scorecard from Adamson et al. (2018) is used In order to evaluate the potential of pursuing the selected target customer as considerable opportunity for the commercialization of the Smart Irrigation Solution. Qualitative and quantitative data are used from internal documents in order to fill in the scorecard. Figure 5 below shows the result of the evaluation of selecting the key target customer as an opportunity.

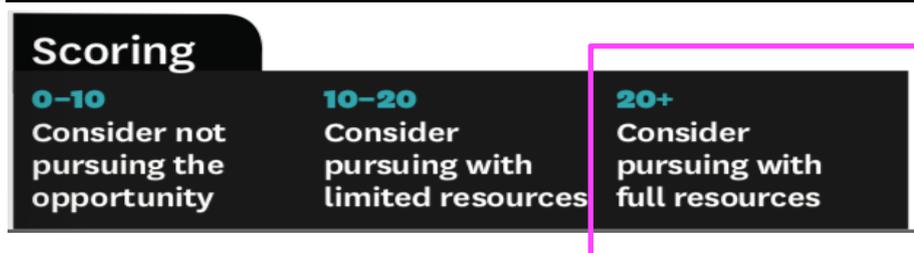
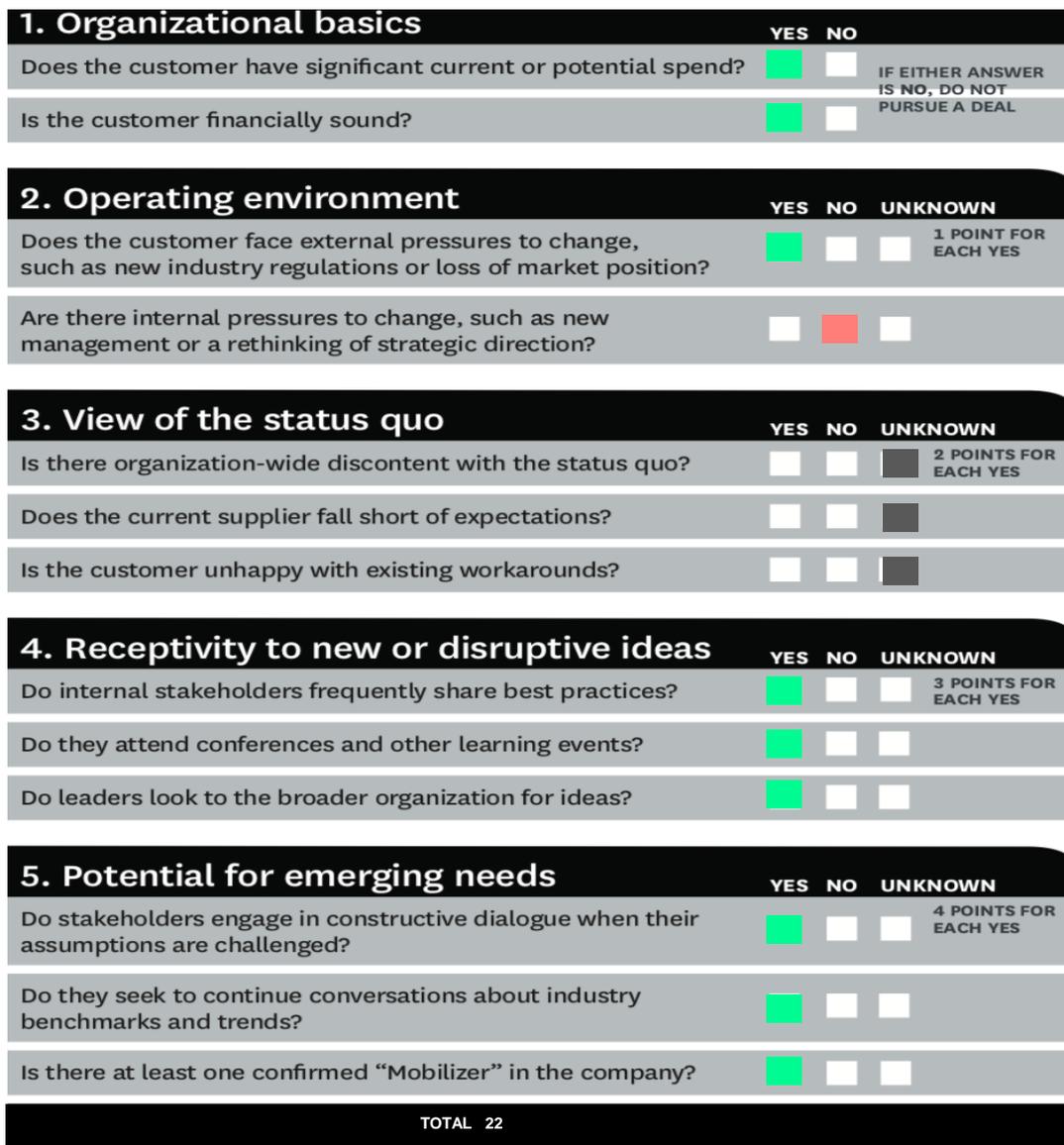


Figure 5. The Scorecard of evaluation of the key target customer as opportunity

Figure 5 shows the result of the evaluation of selecting the key target customer described in the previous sub-section as an opportunity. As seen in Figure 5, the scorecard has five groups of questions. The “yes” answers are marked in green, the “no” answers are marked in red and the “unknown” answers are marked in grey.

The first group of questions shows that Kama is a customer that is financially significant to the case company. Indeed, the records of the business collaboration between Kama and the case company shows repetitive and important purchases and solicitation of the existing services from the case company. Furthermore, as B2B customer, the financial results of Kama's business registers a healthy growth and profitability for his business, since the start of his activity in year 2014.

The second group shows that the operating environment of Kama's business does not face any internal pressure because he is the owner of the business which means that he has an independent decision-making authority in the business. However, the business is potential to incur external pressure such as new industry regulations or market position. In fact, as the agriculture is a sound sector in the Moroccan economy, the local market and regulations are subject to change. Lettuce production in particular is becoming a tendency in the farming activities due to the easy and fast process of production. Hence, it may be subject to changes.

The third group of questions could not be answered due to the inexistence of the substance yet. In fact, as Kama does not currently use any similar solution to the Smart Irrigation Solution that the case company wants to offer, the evaluation of the status quo could not be done in this case.

The fourth group shows that Kama is a customer who is receptive to new/ disruptive ideas. As discussed in 4.2.1, Kama participated in a dozen of professional trainings in agriculture in Morocco and abroad as well as in four sessions, so far, of technology transfer in Germany and Spain. Furthermore, Kama is a member of the International Association of Promotion of Salad culture. This association promotes the research and development as well as best practice sharing related to the lettuce culture. Indeed, this confirms Kama's openness and receptivity to such technology-based solutions such as the Smart Irrigation Solution that the case company wants to offer.

The fifth group shows that Kama often shows good listening and engages in constructive dialogue when needed. Furthermore, Kama as Owner and Manager of the business is the only mobilizer in the business he is managing.

The result of the evaluation shows a score of 22. The score is above 20, which means that the opportunity is worth pursuing with full resources according to the interpretation guidelines from the tool. Thus, based on the scorecard, the selected key target customer is considered a good opportunity.

In conclusion, the choice of the selected key target customer is assessed. Hence, the next section digs deeper in the needs of the selected key target customer (Kama). The goal is to identify the relevant needs of the key target customer and construct a suitable value proposition for the identified needs.

### 4.3 Identifying Target Customers Needs

This section discusses the main needs of the key target customer identified from the interviews with the key target customer.

This section starts with identifying the “job to be done” and continues with identifying the pains and then the gains from the current processes utilized by the key target customer. This section ends with a conclusion of a list of prospective competitive advantages that would support the case company in building a suitable value proposition.

#### 4.3.1 The Job to be done

In order to understand the target customer needs in this study, the writer conducts the interview using a list of questions inspired from Osterwalder (2010). The interviews that the case company conducted with the key target customer (Kama) resulted in identifying seven problems that the key target customer faces in the current processes. Table 7 below shows the summary of the job that the key target customer seeks to be done, supported with some examples of quotes from the discussion with the key target customer.

Table 7. Summary of the jobs to be done

<b>"JOB TO BE DONE"</b>	
<b>1</b>	Farming Best Practice & Expertise – Irrigation Schedule Optimization
	<p><i>“ ... Although I gained consistent expertise thanks to my background and practice of farming since my 18 years old, it is challenging to schedule optimal production based on hand-written irrigation planning. Furthermore, we base our schedule optimization on the reports of previous periods, thus I believe that if a smart solution can bring better predictive substance based on scientific expertise and best practices, the activity is going to be optimal and more profitable.”</i></p>
<b>2</b>	Instant Climate Risk notifications – SMS alert
	<p><i>“ ... Of course we got more farming best practice by the time of the experience, and people working here are mostly experienced farmers, but still as you know, in this activity you can plan as much as you can, but the climate factors remain the judge... from our records, I can cite at least two recurrent and unpredictable parameters that influence the cultures, in this region: evapotranspiration due to hot weather and frost due to cold weather... Hence, during May to July there are hot winds that represent a risk for the cultures if there was a gap between the moment of the winds and the moment of irrigation adjustments according to the climatic change..., we call it curative irrigation. On the other hand the frost during the period from December to February influences the production if the dispositions of protection are not taken on time”</i></p>
<b>3</b>	Real-time and Remote Visibility of the soil heat, cold and moisture
	<p><i>“The soil moisture is the most common factor that we control. Factors such as soil heat and cold are usually neglected, however the control of their measures can be game changer in risk management related to the climate... The summer of the year 2017 in particular was a concrete example that illustrates our need to control these parameters. As I showed you in the records we got a drop of -14% in our production which led to an important loss in that year... it was related to a technical defect in some on-site irrigation equipment that we didn’t notice. Thus</i></p>

*the sudden heat of soil and the lack of water in-time wasted a great amount of the sown lettuce ...”*

**4** Geo-localized Weather Forecast

*“ ... As I have lands in different location, it is very often challenging to keep track of the weather conditions In, fact I check the weather forecast for each of the location separately and the forecast is even not precise as it is a regional/ city forecast. Thus, if the service you offer provides a precise weather forecast of the different lands and in a one-view platform, it will solve a critical problem for our activity.”*

**5** Resources Optimization

*“... As local distributor, we have critical time and quantity constraints in order to be able to deliver the planned production on time and keep the scale with our competitors... As I showed you, we had situations where we got to use great amount of electricity, people, logistics, etc just to solve shortcomings that could've been avoided if we had better resources management ... Indeed, the resources management affects considerably the profit as well as the optimization of our business...”*

**6** Regular Update on concurrent product market offer

*“ ... As far as I know we are five distributors of lettuce in the market of Rabat-salé-Zemmour-Zaer region, however it would be of great added value for our business to be aware of the market offer and the concurrent products offer... we are also flexible to consider other type of cultures ...”*

**7** Regular Update on price changes in the local market

*“ The price variation of lettuce is usually constant in the same interval, however some offer-demand conditions might affect the price at some points as it happened*

*in the agriculture season 2015-2016, where there was a drought , and the farms that wasn 't equipped with good tools didn 't succeed to manage the effects... ”*

As seen in Table 7, the interviews with the key target customer led to identifying seven main problems that the case company can provide a solution for. The company can solve the identified problems by offering a value proposition that takes in consideration the seven identified jobs that the key target customer seeks to be done. However, the initial proposal is limited to the five first problems.

The first job to be done is to offer a solution that provides expertise and best practice knowledge of farming. In fact, the key target has a significant experience in farming, it is important for him that the offering provides a more efficient service in prediction based on scientific farming expertise besides the best practice and the common knowledge.

The second job to be done is to receive instant SMS notifications of climate risks that may occur unpredictably. Indeed, the cold and hot unpredictable events that may happen during the year affects considerably the production if they are not taken in action on-time.

The third job to be done may be related to the previous one in some case. In other cases it can also be related to technical defects in the irrigation material. Indeed, in addition to soil moisture, the heat and the cold of the soil are important parameters that affects considerably the health of the culture. Thus the key target customer wants to be able to have a visibility and control of moisture as well as the heat and the cold of the soil.

The fourth job to be done is related to the weather forecast precision. In fact, the key target customer wants to have a geo-localized visibility on the weather forecast, for the farms that he has in their different locations. In this way he can see and efficiently plan and adjust the planning of irrigation based on the climate circumstances.

The fifth job to be done is to provide a better, smart and automated farm management in the perspective of resources optimization. By resources is meant the human resources,

the natural resources such as energy or water as well as time and the financial resources such as costs of logistics or defective equipment. A suitable solution for the key target customer provides smart and automated management of the latter resources by controlling the required actions immediately when needed. In this way, the key target customer is able to reduce the human resources, the unnecessary energy consumptions and operate preventive maintenance to save time and money when incidents happens.

The sixth and seventh jobs are related to the commercialization activity of the key target customer. In fact, the key target customer wants to be updated of the market changes such as price and offer variations in the local market. As initially the Smart Irrigation Solution tackles the irrigations matters only, these two parameters are not taken in consideration in the value proposition in the context of this paper. However, these two jobs are considered in terms of the product development perspective of the Smart Irrigation Solution.

#### 4.3.2 Pains

The discussions with the key target customer led to concluding the pains that the key target customer faces in the current processes of the farm management activity. Table 8 below shows a summary of the identified pains.

**Table 8. Summary of identified pains**

<b>PAINS</b>	
<b>5</b>	<b>What are the identified customer PAINS ?</b>
	<b>Farming activity</b>
X	Consolidation and improvement of the yield growth rate
X	Rationalization of the irrigation expenses (resources & energy)
X	Optimization of the use of resources for the irrigation activity (HR, financial resources, logistics, etc.)
X	Production Risk management (climate and market factors)
	<b>Selling activity</b>
X	Prospection new market opportunities locally and globally
X	Awareness of market offer price and quantity availability forecast

As seen in table 8, the discussion with the key target customer led to identifying two groups of pains. The first group of pains is related to the farming activity and the second group is related to the selling activity.

The first group involves four main pains. The first pain is the current processes that the key target customer uses in the farming activity lack of tools that would help him to consolidate and improve the rate of the yield growth. The second pain is that the key target customer lacks an efficient management tool that would better rationalize the irrigation expenses such as energy expenses or raw material or other type of resources. The third pain is related to the lack of optimization tools for rational use of resources needed for operating the irrigation activity. This third pain is very important. Indeed, it is relevant for the business profitability to efficiently use the scarce resources such as people or finances or logistics or energy. The fourth pain is related to the production. The current processes that the key target customer uses in the irrigation management do not take in consideration climate or market factors of risks. Thus, the Production Risk management is a critical pain for the key target customer.

The second group includes two main pains. The first pain is related to the lack of tools that enables the business to prospect local and/ or global new market opportunities. The second pain is about the awareness of price variations and the offer-demand variations of the market.

In the context of this research, only the first group of pains is taken in consideration. However, as for the sixth and seventh jobs to be done evoked in the previous section 4.3.1, the pains related to the selling activity are considered in terms of the product development perspective of the Smart Irrigation Solution.

### 4.3.3 Gains

After identifying the pains, this section identifies the gains that the key target customer aims to benefit from by hiring an offering such as the Smart Irrigation Solution that the case company wants to offer. Table 9 below shows the identified things the key target customer wants to gain from such a service.

**Table 9. Summary of identified gains**

GAINS	
6	What does the customer <b>GAINS</b> ?
✓	Real-time
✓	Cost and Energy Efficient
✓	Simple and Easy-to-use
✓	Remote

A suitable value proposition for the key target customer is a solution that takes in consideration these gains and at the same time solves the problems identified in section 4.3.1 and relieves the pains identified in section 4.3.2.

As seen in table 9 above, there are four key points that the key target customer aims to gain from a value proposition. The first gain is real-time. It means that the key target customer wants to benefit from an offering that enables him to have a visibility and control of the key pains in real-time. The second gain is cost and energy efficient. It means that the key target customers seeks a solution that adds value by enabling him to save energy resources and financial resources. The third gain is simple and easy to use. It means that the key target customer wants a value proposition that does not necessitate advanced usage proficiency. Instead, a suitable solution is easy and simple to use. The fourth gain is related to the space and time availability of the service. In fact, the key target customer wants a service that he can use independently of his location and at any time.

#### 4.3.4 Prospective competitive advantage

The discussions with the key target customer resulted in identifying the jobs to be done, pains and gains that should be considered in the value proposition that would be significant to the key target customer. Consequently, a set of four key criterion that describes a successful value proposition of a smart irrigation solution is concluded. These four elements are features of a prospective competitive advantage used in the selection of the

key competitors in order to conduct a relevant benchmark. Table 10 below shows the four features of the prospective competitive advantage.

**Table 10. The four parameters/features that represent a prospective competitive advantage for the Smart Irrigation Solution.**

<b>Adaptability with existing infrastructure</b>	<b>Irrigation Schedule Management</b>
<b>Cold/ Hot Spots Alerts</b>	<b>Sensors Status</b>

As seen in table 10 above, the first feature that represents a competitive advantage is the adaptability of the Smart Irrigation Solution with the existing infrastructure. It means that the solution should be compatible with the existing equipment and does not require additional equipment purchase or investments. Typically, the smart irrigation solution includes stations such as weather stations or soil moisture stations as well as telematics for remote systems and solar radiation sensors for the weather stations or other sensors.

The second prospective competitive advantage is the Irrigation Schedule Management. It means that the solution enables the user to program the schedules for the irrigation.

The third prospective competitive advantage is the Cold/ Hot spots Alerts. This parameter provides a control of the soil temperature. The control of this parameter prevents the cultures from being destroyed because of unmet water needs.

The fourth parameter is the visibility and control of sensors' status. This parameter allows the farmer to keep track of the sensors status and operate the preventive as well as curative maintenance in the case of detected equipment/ sensor by replacing it on time.

Based on the prospective competitive advantage parameters described above, a benchmark is conducted to compare the competitors CVPs. Therefore, the next subsection overviews the analysis of the key competitors' CVPs.

## 4.4 Analysis of Key Competitors CVPs

This section overviews the findings from the analysis of the Customer Value Propositions of (CVPs) the key competitors. The selection of the key competitors is based on the findings from previous.

Indeed, as a starting point three key competitors were selected. The key competitors have a CVP that includes at least one of the four prospective competitive advantages described in section 4.3.4. Next, the writer continues with the analysis of the whole value propositions offered by the three key competitors. The analysis is based on the data available on the websites of the key competitors. The analysis is structured in such way to compare the points of parity, points of difference and points of contentions following the approach of Anderson et al. (2006).

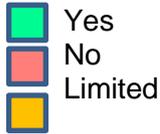
### 4.4.1 Overview of the three key competitors.

In order to analyze the key competitors CVPs, the writer starts with conducting a benchmark on the similar value propositions to the Smart Irrigation Solution that the case company wants to offer. The benchmark resulted on selecting three key competitors who's CVP includes at least one of the prospective advantage features.

Table 11 below illustrates the existence of the four prospective competitive advantages in the value propositions of the three key competitors: DAVIS, DACOM and Demand Side Instruments.

Table 11. Comparing the competitor's CVPs based on the four features of prospective competitive advantages.

	DAVIS	DACOM	Demand Side Instruments
<b>Adaptability with existing infrastructure</b>	Yellow	Red	Green
<b>Irrigation Schedule Management</b>	Yellow	Red	Green
<b>Cold/ Hot Spots Alerts</b>	Green	Red	Red
<b>Sensors Status</b>	Red	Green	Red
<b>Earning Logic</b>	~2300 € / Station	250 € / Station / Year	N/A



■ Yes  
■ No  
■ Limited

As seen in table 11, three key competitors are selected based on the integration of the prospective competitive advantages. Furthermore, table 11 shows also the earning logic adopted by each of the key competitors. The existence of each of the features of the prospective competitive advantage in the value proposition of each of the key competitors is coded using a color code. The green color means that the feature exists. The red color means that the feature does not exist. The yellow color means that the feature exists but with limited functionalities.

The first key competitor is Davis. Davis CVP has a limited flexibility with the existing infrastructure at the farm of the user. The offering of Davis enables the user to add-on only sensors as third party equipment. At the same time, Davis offering provides a limited possibility of irrigation schedule management. The irrigation solution from Davis provides in-field evapotranspiration and soil moisture tracking and visibility. These measures enable the user to optimally schedule the irrigation by himself. In other words, the solution doesn't generate automatically the irrigation schedules based on the soil data and the water-plant needs. However, Davis offering includes the feature of cold and hot spots alerts that was evoked as a relevant parameter during the discussions with

the key target customer of the case company. On other hand, Davis CVP does not provide information about the sensors status. Davis offers the smart irrigation solution at the price of ~ 2300 € as one-time purchase of the solution.

The second key competitor is Dacom. Contrary to the two other competitors, Dacom CVP includes the Sensors status that is a very advantageous feature for the user. Furthermore, this competitor was chosen because of the revenue stream model. Indeed, Dacom offers the service for a price of 250€/ Station/ year. The discussions with the key target customer showed a preference of a subscription-based payment formula. Thus, Dacom offers a competitive revenue stream that is reasoned in terms of station/ year.

The third key competitor is Demand Side Instruments. Demand Side Instruments has two features that represents a competitive advantage. The smart irrigation solution provided by Demand Side Instruments enables the user to track the cold and hot spots as well as the sensors status.

#### 4.4.2 Comparison of the key Competitors' CVPs

This section discusses the findings from the analysis of the three key competitors' CVPs. This section presents a summary of the comparison between the key competitors' CVPs. Table 12 below shows the key points of parity, difference and contention in the CVPs of the key competitors.

**Table 12. Comparison of the three key competitors' CVPs.**

<b>POINTS OF PARITY</b>
Functionality: Real-time, remote, accurate, precise, easy to use
Solar powered equipment → energy efficient
Cloud based
Weather-forecast-based Schedule Management of Irrigation
Soil Moisture, Soil temperature Tracking
Alerts notification (SMS & Mob-App)
<b>POINTS OF DIFFERENCE</b>
Davis
Plant-water demand based irrigation (+)
15 min cycle Soil temperature tracking (++)

Cold spots alerts
Dacom
Patterns for each layer of 10 cm (+)
Period Filter feature for seeing soil moisture in a selected period (+)
Sensor Status (++)
Subscription for Crop Recording Pro (300€/y) or higher is required (-)
Demand Side Instruments
Remote control of sprinklers (++)
Creation and management of irrigation schedules (++)
<b>POINTS OF CONTENTION</b>
Add-on third-party equipment
Davis: Limited
Dacom: No
Demand Side Instruments: Yes

There are six points of similarity in the CVPs of the key competitors. The first similarity is regarding the functionality of the solution provided by the three key competitors. All of the three CVPs provides the user with Real-time, remote, accurate and precise data. The second similarity is concerning the type of the hardware that accompanies the service. All the three of the key competitors provide solar powered equipment that are in accordance with the energy efficiency needs of the user. The third similarity is that the smart solutions provided by the three key competitors are cloud-based which enhances the practical aspects of the solution. The fourth similarity is Weather-forecast-based Schedule Management of Irrigation. It means that the solution enables the user to schedule the irrigation based on the weather forecast provided by the solution. The fifth similarity is the possibility of tracking the soil moisture, soil heat and soil cold measures. The sixth similarity is the alerts sent by SMS and to the mobile application in order to notify the user of the different kind of risks and disfunctions.

The points of difference between the three key competitors are of different value for the user. The points of difference are analyzed the from the engineering perspective as well as from the customer perspective during the interview with the key target customer. Consequently, a rational evaluation of the degree of relevance of each point of difference is done as shown in table 12. The sign (+) refers to the points that represent an added value without being a necessary element to consider in this case study. The sign

(++) is used for points that are considered as valuable added value to consider in the offering. The sign (-) refers to the point that represents a disadvantage in the value proposition. Hence, Davis CVP provides a valuable point that is the 15 min cycle of soil temperature tracking. The tracking enables the record of progress of soil status and consequently enables optimal set-up of crop growth targets. In this way, the farmer can improve the harvest forecast accuracy in the next sown cycles. On the other hand, the solution provided by Dacom provides the user with information about the sensors status. As discussed in previous section, this point of difference is very important to consider in the Smart Irrigation Solution that the case company wants to offer. Demand Side Instruments has two valuable points in the CVP. The first is the remote control of sprinklers. The remote control of sprinklers enables the user to save time and human resources that are typically involved in the sprinklers control operations/ actions. The second is the possibility to create and manage the irrigation schedule instead of only having the data to manage the irrigation schedule manually.

The points of contention found in this analysis are mainly related to the compatibility with third-party equipment and/ or services. This point is the same evoked also as prospective competitive advantage in the previous section: the adaptability with existing infrastructure. As seen in table 12, Davis provide a limited possibility to add-on third party equipment and Dacom does not provide the possibility at all whereas Demand Side Instruments provide a flexible solution that allows adding-on third party equipment and or services.

In conclusion, the key competitors' CVPs analysis resulted in the conclusion of three more relevant points to consider in the case company CVP in addition to the four features evoked in the previous section as prospective competitive advantage. The three points are: 15 min cycles of soil measures tracking, Remote control of sprinklers, Creation and configuration of irrigation schedules.

## 4.5 Key Findings from the Starting Point Analysis (Data Collection 1)

This sub-section provides an overview of the key findings from the starting point analysis conducted in section 4. As result of the investigations and interviews conducted with the key target customer in the starting point analysis, a summary of the key findings is drawn. The key findings supports the writer in developing an Action Plan to Design a Service Business Model for the Smart Irrigation system in the next section 5. The summary is structured in three groups of findings according to the roadmap for conducting the starting point analysis. Figure 6 below shows the details of the key findings in each step of the starting point analysis.



Figure 6. Summary Of Key Findings From The Starting Point Analysis

Figure 6 above shows three groups of key findings from the starting point analysis. Each group corresponds to the results of the research conducted in each of the three steps of the starting point analysis.

The first group of key findings is related to the definition of the key target customer. The selected one key target customer is a middle-size farmer and local distributor of lettuce in Morocco. His name is Kama. The validity of the selection of the key target customer is supported by three main points as shown in figure 6. The first point is the openness of the key target customer to a technology-based service. The second point is the resulted score from the scorecard evaluation: 22 points, that means this it is an opportunity to pursue with full resources. The third point is the relevant Customer Lifetime Value from maintaining a long-term business relationship with Kama.

The second group of key findings shows the main identified needs of the key target customer. The main needs are translated in terms of four features that bring a competitive advantage for the Smart Irrigation Solution offering. The first parameter is the compatibility of the solution with the existing infrastructure. The second parameter is the optimized possibility of Irrigation Management by enabling the creation and configuration of Irrigation Schedules. The third parameter is the alerts notification of cold and hot spots in the farm. The fourth parameter is the availability of sensors' status.

The third group of key findings shows the key points concluded from the comparison of the Three Key competitors' CVPs. This group is structured in two elements. The first element is the functionality criteria of the CVPs. The functionality criteria of the CVPs provides the user with a solution that is Cost and energy Efficient, Simple and easy-to-use, Real-time and Remote, Accurate and precise and Cloud based. The second element is the key features of the CVPs. As seen in figure 6, there are seven key features. The first feature is the adaptability with existing infrastructure. The second feature is the Irrigation Schedule Management. The third feature is the Cold and Hot Spots Alerts. The fourth feature is the visibility and tracking of the sensors' status. The fifth feature is the Weather-forecast-based Schedule Management of Irrigation. The sixth feature is the Soil moisture and temperature Tracking. The seventh feature is the SMS and Mob-Application Alerts.

In conclusion, the starting point analysis provides a necessary substance to build the Customer Value Proposition for the Smart Irrigation Service. The Customer Value Proposition is the first building block of the business model of the Smart Irrigation Solution. Therefore, the next section 5 overviews the action points needed to build the four blocks of the business model of the Smart Irrigation Solution, starting by the customer value proposition as first building block.

## **5 Building Proposal on Defining the Action Points to Design the Building Blocks of the Business Model for the Smart Irrigation Solution.**

In this section merges the results of the findings from the starting point analysis and the conceptual framework towards the building of the proposal for the action points needed to design the building blocks of the Smart Irrigation Solution business model.

The building of the proposal is conducted in four steps described above in sections 5.2 to 5.5. The data collection for building the proposal is based on the workshop conducted with the internal team by video-conference. For the design of the first building block of the business model, the CVP block, the case company conducted an interview with the key target customer in order to objectively define the action points for the CVP building.

At the end of this section, section 5.6 provides a draft for an initial proposal for the case company on the Action Points needed to Design the Building Blocks of the Business Model for the Smart Irrigation Solution.

*Note: As the promise for the current paper is to develop the action plan for the Smart Irrigation Solution, the actual values and calculations of the elements of the building blocks of the business model are not done in the context of this thesis. Hence, the suggestions covers the action points for designing the building blocks of the business model for the Smart Irrigation Solution.*

### **5.1 Overview of the Proposal Building Stage**

This section overviews the results of the key suggestions from the workshop conducted with the internal team and the key target customer in order to define the action points for designing the building blocks of the business model for the Smart Irrigation Solution at the case company. Furthermore, the writer uses the results of the findings from the starting point analysis and the conceptual framework.

In the process of building the initial proposal of defining the action points for designing building blocks of the business model of the Smart Irrigation Solution, the writer together with the internal team of the case company as well as the key target customer came up with suggestions. The suggestions are discussed in Section 5 hereby.

Section 5 hereby is structured in four elements of proposal presented from section 5.2 to 5.5. Each element of proposal shows the suggestions for the action points needed to design each of the building blocks of the of the business model for the Smart Irrigation Solution. The first element of proposal shows the action points defined for designing the CVP. The first element of proposal shows the action points defined for designing Profit formula. The first element of proposal shows the action points defined for designing key processes. The first element of proposal shows the action points defined for designing key resources. At the end section 5.6 provides a draft for an initial proposal for the case company on the Action Points needed to Design the Building Blocks of the Business Model for the Smart Irrigation Solution.

## 5.2 Action points for designing the elements of the CVP

This section overviews the action points suggested from both the case company stakeholders and the key target customer, in order to design the elements of the Customer Value Proposition proposal. Based on the conceptual framework, the CVP block of a service business model contains three elements as shown in table 13 below.

**Table 13. The action points suggested for designing the elements of the CVP.**

<b>Customer Value Proposition</b>
<b>The Offering</b>
Mobile Application for Irrigation Management (Essential) Web Application (Optional) Weather Station (Essential) Telematics for the remote functionalities (Essential)
<b>The Pain Relievers</b>
Compatibility with third-party equipment Renewable-energies-based equipment Simple and easy-to-use User Platform Remote, Real-time and Accurate Control and Notification Cloud-based (data storage and archive) Cost efficient
<b>The Gain Creators</b>
Irrigation Management : Schedules Creation, Configuration and Storage Geo-localized Weather-Forecast Sensors Status

Soil Moisture/Temperature Tracking + Cold/ Hot Spots Alerts (SMS & Mobile-App) Expertise Service – Consultancy from the case company on Data Analysis for optimal irrigation schedule management
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Table 13 above shows the result of suggestions for designing the key elements of the CVP. As described in section 4.5, the starting point analysis resulted on a set of key functionality criteria and features that compose the value proposition of the Smart Irrigation Solution as a service that the case company wants to offer. These elements were combined together, adjusted and discussed with the engineering team at the case company as well as the key target customer. The discussion led to defining the key points to conceptualize the element of the CVP box: the offering, the pain relievers and the gain creators.

The first element is the Offering. The offering is a Mobile Application Service for the Irrigation Management as software. On the other hand, the service is accompanied with a Weather Station(s) as well as the Telematics needed for the remote functionalities, as hardware. The service offers a possibility of having a web application as option with additional cost. This option can be added in two cases: if the customer has a specialist who can provide the expertise on the data analysis to optimally manage the irrigation, or if the customer decides to hire the service, as consultancy from the case company.

The second element is the set of the Pain relievers. There are six pain relievers suggested from the discussions. The first pain reliever is the Compatibility of the offering with third-party equipment. The second pain reliever is the conception of the offering based on Renewable-energies equipment in the perspective of energy efficiency. The third pain reliever is that the offering is based on a simple and easy-to-use User Platform that does not require advanced level of technology knowledge. The fourth pain reliever is the availability of the service control and notification in Real-time, Remotely, and accurately. The fifth pain reliever is that the offering is Cloud-based and provides the availability of data storage and archive.

The third element is the set of gain creators. There are five gain creators suggested for the CVP. The first gain creators is the possibility to Create, Configure and store the previous Schedules for Irrigation Management. The second gain creator is the dispense of Geo-localized Weather-Forecast from different farms that the customer has. The third gain creator is the visibility of the Sensors' Status. The fourth gain creator is the Soil Moisture/Temperature Tracking with sending SMS & Mob-App alerts for Cold/ Hot

Spots. The fifth gain creator is the Expertise Service from the case company. It means that the customer can hire the service from the case company to provide him with consultancy on Data Analysis for optimal irrigation schedule management.

### 5.3 Action points for designing the Profit Formula

This section overviews the action points suggested by the case company stakeholders for designing the elements of the Profit Formula. Based on the conceptual framework, the profit formula block of a service business model contains three elements as shown in table 14 below.

**Table 14. The action points suggested for designing the elements of the Profit Formula.**

<b>Profit Formula</b>
<b>Revenue Model</b>
<b>Volume:</b> 50 in first 2 years
<b>Pricing:</b> Dynamic pricing
<b>Revenue Stream:</b> Year Subscription Payment Formula
<b>Cost structure</b>
Cost-driven cost structure <i>Focus on the Economies of scale and Economies of Scope by considering the resources and the processes that contributes in the potential of these benefits.</i>

Table 14 above shows the suggestions discussed between the writer and the internal team in order to design the elements of the Profit formula box of the business model of the Smart Irrigation Solution. The discussion covered two elements of the Profit formula.

The first element is the Revenue model. The revenue model proposed for the case company is based on three parameters. The first parameter concerns the prospective sales volume of the Smart Irrigation Solution. The case company estimates a sales volume of 50 package of the service in the first two years. This estimation is based on the number of potential target customers who have a similar profile as the key target customer described in section 4 (middle-size farmers and distributor). On other hand, the case company estimates that the market share of similar offering is subject to variation in the

coming years due to the tendency towards smart technology since last five years. Consequently, the purchase frequency may vary visibly after two years. Thus, the variable conditions of the market share and the purchase frequency drove the suggestion of a Dynamic pricing logic as second parameter of the Revenue Model for the case company. The third parameter is the Revenue Stream. The revenue stream suggested for the case business model is based on a yearly subscription payment formula. This suggestion is driven from the discussions with the key target customer as well as from the analysis of the key competitors' CVPs discussed in section 4. Furthermore, the choice of a yearly subscription instead of a monthly subscription or a one-time purchase is supported by two other factors. The first factor is that the farming activity knows gap periods during a year, consequently a monthly subscription would give the users the possibility to stop or pause the subscription in the inactive period of need. The second factor is that a one-time purchase does not meet the cost efficiency value proposition of the Smart Irrigation Solution due to the high cost of the solution.

The second element is the Cost Structure. A Cost-driven Cost Structure is suggested for the case company. In order to lower the cost of the offering, the focus on increasing the Economies of scale and the Economies of Scope is stressed. The case company suggests considering "aggressive" negotiation processes to benefit from advantageous rates from the suppliers and the different stakeholder involved in the value-chain. On the other hand, it is suggested to increase the Economies of Scope by not raising the fixed costs more than 20%. And thus, maximizing the potential use of the current assets and the existing resources as well as the external resources.

#### 5.4 Action points for designing the Key Resources

This section overviews the action points suggested by the case company stakeholders for designing the key Resources of the Smart Irrigation Solution Business Model. Table 15 below shows the physical, intellectual, human, and financial resources as well as the key partnerships suggested by the internal team at the case company.

Table 15. Action points for designing the elements of the key resources.

Key Resources
<b>Physical Resources</b>
<ul style="list-style-type: none"> <li>- Additional point of sale in the target area of selling</li> <li>- Warehouse</li> <li>- Logistics</li> </ul>
<b>Intellectual Resources</b>
<ul style="list-style-type: none"> <li>- Brand and status of the case company</li> <li>- Database</li> <li>- Weather software (precise and intelligent)</li> <li>- CRM Software</li> <li>- Data analysis software</li> </ul>
<b>Human Resources</b>
<ul style="list-style-type: none"> <li>- Two IT (To hire)</li> <li>- Graphic Design Specialist (To hire)</li> <li>- One Sales Specialist (To hire)</li> <li>- Purchasing Specialist (To hire)</li> <li>- Contracts Manager ( Existing freelance HR)</li> <li>- On-site Commissioning team (2-3 people to hire on project)</li> <li>- Data analyst (to hire in freelance)</li> <li>- Other field engineers and experts + technicians (existing)</li> </ul>
<b>Financial Resources</b>
<ul style="list-style-type: none"> <li>- Funding for smart tech incentive</li> <li>- Stock and cash - 30% of the case company capital invested</li> </ul>
<b>Partnerships</b>
<ul style="list-style-type: none"> <li>- Cloud provider for farming applications E.g. Smart Cloud Farming company</li> <li>- Digital platform provider for agriculture E.g. AgroNET company</li> <li>- Network and Community Partnerships E.g EIP-AGRI Agricultural Innovation Commission</li> <li>- Suppliers – focus on local suppliers such as Nextronic in the perspective of cost efficiency in order to avoiding logistics expenses and benefit quickly from the after sales services when needed. At the same time in the perspective of increase of the economies of scale, as local suppliers are close to approach.</li> </ul>

Table 15 shows the Key resources suggested for the business model of the Smart Irrigation Solution. Considering the maximization of the potential of the existing resources in the perspective of the increase of the economies of scope (as evoked in 5.3), the physical, intellectual, human and financial resources includes existing resources also.

The Physical Resources suggested physical resources for the case company are three. The first physical resource is an additional point of sale in the target area of selling, more precisely in Rabat Region, Morocco. The second physical resource is a specific Warehouse to stock the solution package. As the package contains electronics equipment, the storage is constraint to specific conditions to avoid the usury or dysfunction of the material. The third physical resources are the Logistics involved in the value chain of the Smart Irrigation Solution.

The Intellectual resources proposed for the case company are five. The first intellectual resource is the Brand and Status of the case company. Indeed, the variable conditions of the market share and the purchase frequency that drove the Revenue Model suggested for the case company (as discussed in 5.3), urges the stress on maintaining a strong and reliable status and the brand of the case company. The market share is in favor of the case company at the moment, however the situation may change in the next years, the reason that justifies the focus the brand/ status resources. The second intellectual resource is the Database. The case company is able to build a relevant database in the farming sector thanks by the service of the Smart Irrigation Solution. The Database can also be a source of revenue if the company decides in the next stages to build partnerships with the service providers. In one hand, the case company sell the database information as other source of revenue. On another hand, the case company can lower the cost of the service supply needed for the Smart Irrigation Solution and consequently increase the economies of scale and the economies of scope. The third Intellectual resource is an intelligent and precise weather forecast software. This resource is used to enable the value proposition expected from the customer by hiring the case company's offering (as discussed in section 4.3 and 5.2). The fourth Intellectual resource is the Customer Relationship Management Software suggested to keep track of the customer satisfaction by using the Smart Irrigation Solution. The fifth Intellectual resource is the Data analysis software that will enable the case company to provide the value proposition discussed in 5.2, that is the Expertise Service / Consultancy from the case company on Data Analysis for optimal irrigation schedule management.

The Human Resources proposed for the case company are mainly eight competencies. The first competency is in the IT field. The suggestion is to hire two IT experts in order to insure the product development and design activities. The second competency is a

Graphic Design expert that needs to be hired to ensure the marketing, packaging and user interface design activities. The third competency is a Sales Specialist that needs to be hired in order to insure the marketing and customer accounts building activities. The fourth competency is a Purchasing Specialist to hire in order to insure the business-relationship with the suppliers and the procurement and purchase activities with best benefits to enable the optimization of the revenue model. The fifth competency is a Contracts Manager that the case company collaborates with as a freelance contractor. The contract manager is suggested to insure the business-collaborations with the customers as well as the suppliers and the other partners. The sixth competency is the people for the On-site Commissioning of the smart irrigation system. A team of 2 to 3 people needs to be hired on the basis of the project. The sixth competency is a Data analyst to hire in freelance. The data analyst insures the databases management as well as the data-based services that the case company delivers in the context of the Smart Irrigation Solution. The eight group of human resources are other field engineers and experts and technicians that already exist at the case company.

The financial resources suggested for the case company are two sources. The first source suggested is to apply for the local and international programs of funding for Smart-Tech incentives. The second source is the stock and cash. The case company suggests investing 30% of the capital revenue in the Smart Irrigation Solution business.

The partnership processes suggested to the case company are four key partnerships. The first proposed key partnership is with the smart farming cloud provider such as the Smart Cloud Farming company. This type of partnership is suggested to deliver the cloud-based value proposition criteria of the case service. The second key partnership is with digital platform provider for agriculture such as AgroNET. This type of partnership allows the case company to outsource the conception and design processes of the Smart Irrigation Solution platform. Consequently, it can reduce the cost of permanent human resource at the case company. Precisely, Instead of hiring two IT people as evoked above, the company can hire only one IT expert. The third key partnership involves the Agricultural Innovation Communities and Networks such as EIP-AGRI (Agricultural Innovation Commission). This type of partnership enhances the cost efficiency in terms of resources such as Databases. The fourth key partnership concerns the long-term and

trust business-relationships with the suppliers. The suggestion involves focusing especially on local suppliers such as Nextronic from the perspective of cost efficiency in order to avoid logistics expenses and benefit quickly from the after sales services when needed. At the same time in the perspective of increase of the economies of scale, local suppliers are preferred as they are close to approach and engage negotiation processes.

## 5.5 Action points for designing the Key Processes

This section shows the action points suggested by the case company stakeholders for designing the key Processes required for the delivery of the Smart Irrigation Solution. Table 16 below shows the Production processes and activities, the Problem solving processes and activities as well as the Platform/ Network processes and activities suggested by the internal team at the case company.

**Table 16. The action points suggested for designing the elements of Key processes.**

<b>Key Processes</b>
<b>Production processes and activities</b>
<ul style="list-style-type: none"> <li>- Design and Conception processes: Mobile interface &amp; accompanying equipment + User manual + Web-interface + Packaging</li> <li>- Product development</li> </ul>
<b>Problem solving processes and activities</b>
<ul style="list-style-type: none"> <li>- Purchase activities</li> <li>- Customer Relationship Management</li> <li>- After sales and troubleshooting</li> </ul>
<b>Platform/ Network processes and activities</b>
<ul style="list-style-type: none"> <li>- User Interface and accompanying networks</li> <li>- Marketing platforms</li> <li>- CRM software</li> <li>- Service Provisioning Database</li> </ul>

As seen in Table 16, the suggestions for the production processes involves the design and conception activities required for the Mobile interface, the equipment, the user manual, the Web-interface as well as the packaging design. At the same time, the production processes calls product development activities that insure the value perception for the customers.

The problem solving processes includes the purchase and procurement activities, the Customer Relationship Management processes as well as the After-Sales and troubleshooting services after delivery of the solution.

The Platform/ Network processes contains four main type of software. The first software is related to the user interface of the Smart Irrigation Solution as well as the “accompanying” networks software required. The second software is the marketing software such as social media or other software that enables the case company to reach the target customers. The third software is the software related to the Customer Relationship Management Software. The fourth software is the software related to the provisioning and procurement databases.

## 5.6 Proposal Draft

An initial proposal of the action points to design the elements of the building blocks of the business model for the Smart Irrigation Solution is generated from the From the suggestions described above. Figure 7 below overviews the proposal draft suggested by the writer to the case company.



**Figure 7. The Proposal Draft of The Key Points For Designing The Elements Of The Business Model For The Smart Irrigation Solution**

As seen in Figure 7 above The proposal draft suggested to the case company is composed of four building blocks.

The first building block is the Customer Value Proposition block. This block describes the initial proposal of the value proposition for the Smart Irrigation Solution. The description shows the package content of the smart farming solution, the key features of the solution and the key value-creation enablers suggested for the service.

The second building block is the Profit Formula. This block overviews the earning logic suggested for the case company to generate revenue from the Smart Irrigation Solution. The Profit formula for the Smart Irrigation Solution is based on a Yearly-Subscription payment formula and a Cost-Driven cost structure.

The third building block is the Key Resources. This block overviews the physical, intellectual, human and financial resources as well as the key partnerships suggested for delivering the value proposition from the case company.

The fourth building block is the Key processes. This block covers the Production, Problem solving and Platform Network processes suggested for delivering the value proposition of the Smart Irrigation Solution.

In conclusion, the writer combines the findings from the empirical study (section 3) and to the starting point analysis (section 4) as well as the workshop discussion with the internal team and the key target customer (section 5) for building an initial proposal to the case company. Therefore, the next section reviews the feedback received on the initial proposal overviewed above.

## 6 Validation of the Proposal

This section reports on the results of the validation stage and recommendations for further development of the initial proposal. The feedback is received from the internal team and the key target customer in a video-conference session.

The validation process of the proposal is structured in three main steps. The first step reviews the suggestions for the Action Points to design the Building Blocks of the Smart Irrigation Solution Business Model. The next step presents the corrections and recommendations for further development of the initial proposal. In the last step a final validated proposal is generated.

At the end, this section provides the validated proposal for the case company on the Action Points needed to Design the Building Blocks of the Business Model for the Smart Irrigation Solution.

### 6.1 Overview of the Validation Stage

This section overviews the validation of the proposal developed in section 5. The validation is based on the evaluation session with the internal team together with the key target customer. The evaluation was conducted during a feedback session via video-conference with the stakeholders mentioned.

The rest of this Section is organized in three main sub-sections. The first sub-section 6.2, overviews the findings from of the feedback on the proposal draft generated in section 5. The second sub-section 6.3 overviews the implementation of the corrections and recommendations based on the feedback collected in 6.2. The third sub-section overviews the final proposal with the implemented correction.

### 6.2 Evaluation of the Initial Proposal

The evaluation of the Initial proposal involved four main stakeholders. The first stakeholder is the writer being the CEO at the case company. The second stakeholder is the Agricultural Engineer at the case company, being the COO at the case company and key

interviewer and reporter in the face-to-face interviews with the key target customer. The third stockholder is the IT engineer at the case company. The involvement of the IT engineer in the evaluation of the proposal is justified by his contribution in the conduction and reporting during the starting point analysis interviews as well as the building of the initial proposal for designing the CVP. Furthermore, the IT engineer shows a decent involvement and concern in the smart irrigation solution project. The fourth stakeholder is the selected key target customer (Kama). The implication of the selected key target customer is driven by the relevance of his value-perception (as justified in section 4.2) from the value-proposition suggested in the initial proposal, in the context of this research.

Following the structure of the proposal draft, the outcome proposal is composed of four building blocks: The CVP, the Profit Formula, the Key resources and the Key processes. Based on the literature, these building blocks represent the main components of the service business model. Hence, the evaluation is conducted on each of the building blocks suggestions separately.

The writer and the Agricultural Engineer at the case company participated together in the evaluation on the four elements. Whereas the IT Engineer and the Key target customer participated in the CVP feedback only.

Overall, the evaluation revealed to be in agreement with the proposal draft in most of the points. However, the different participants on the feedback session addressed several constructive insights and development ideas on the suggested action points in the initial proposal.

The evaluation of the Profit Formula and the Key Processes doesn't induce any changes.

However, the evaluation of the action points related to the CVP induces two main changes in the Package Content proposal. On the other hand, the evaluation of the Key Resources induces four main changes concerning the Physical resources, the human resources, the financial resources and the Partnerships.

Based on the evaluation, the resulted development points to the initial proposal are presented in the next sub-section 6.3.

## 6.3 Developments to the initial Proposal Based on the evaluation

This section overviews the development points recommended during the feedback session. As explained in 6.2. The Proposal drafts is overall “agreed” by the key stakeholder at the case company. Therefore, The proposal of the action points for designing the CVP and the key resources for the business model of the irrigation solution, induced several correction translated to development recommendations in the next sub-sections. 6.3.1 overviews the development to the CVP whereas 6.3.2 overviews the development to the Key resources.

### 6.3.1 Development to the CVP

The evaluation of the suggestions for the CVP design resulted in two corrections mainly in the perspective of optimal management of the related resources and processes. Figure 8 below shows the main development made on the CVP proposal.

**THE CUSTOMER VALUE PROPOSITION**

**Smart Irrigation Solution**

**Package Content:**

- Mobile-Application and **Optional** Web-Application based Service
- Accompanying equipment  
(Weather Station and Telematics for the remote functionalities )
- User Manual → **Electronic version**

**Key Features:**

- Irrigation Management : Schedules Creation, Configuration and Storage
- Geo-localized Weather-Forecast
- Sensors Status
- Soil Moisture/Temperature Tracking + Cold/ Hot Spots Alerts  
(SMS & Mobile-App)
- Expertise Services: Data Analysis Consultancy

**Key criteria – Value-Creation enablers :**

- Compatibility with third-party equipment
- Renewable-energies-based equipment
- Simple and easy-to-use User Platform
- Remote, Real-time and Accurate Control and Notification
- Cloud-based
- Cost efficient

Figure 8. The development points to the cvp proposal

As seen in Figure 8 above, the first correction is marked in red color. This development propose to integrate the web-Application in the basic package instead of having it as an optional choice. The correction is justified by the irrelevant difference of cost of the resources involved in the production and delivery of application weather Mobile or web applications or both. Furthermore, the integration of the web application in the basic package will immediately allow the execution of the Data Analysis Consultancy as service (optional feature on the value proposition), saving the time and resources that would be involved in the opposite case.

The second development is marked in green color. This development concerns the User Manual of the solution. The IT engineer proposed an electronic version of the User Manual instead of the paper that composed the initial package.

### 6.3.2 Development to the Key Resources

The evaluation of the Key Resources resulted in four main corrections mainly related to the cost reduction by optimizing the use and the management of the scarce resources. Figure 9 below shows the Development points to the Key resources proposal, suggested in section 5.

## THE KEY RESOURCES

### The Physical Resources

- Sale point in the target area of selling + Warehouse space in same local
- Logistics

### The Intellectual Resources

- Brand and status of the case company
- Databases
- Weather software (precise and intelligent)
- CRM Software
- Data analysis software

### The Human Resources

- Two IT (To hire)
- Graphic Design Specialist (To hire) → Outsource or hire freelance designer when needed
- One Sales Specialist (To hire)
- Purchasing Specialist (To hire)
- Contracts Manager ( Existing freelance HR)
- On-site Commissioning team (2-3 people to hire on project)
- Data analyst (to hire in freelance)
- Other field engineers and experts + technicians (existing)

### The Financial Resources

- Funding for Smart-Tech incentive
- Stock and cash - 30% of the case company capital invested
- Bank loan for Smart-Tech

### The Partnerships

- Cloud provider for farming applications
- Digital platform provider for agriculture
- Network and Community Partnerships
- Outsource IT Services
- Suppliers – (focus on local suppliers)

Figure 9. The Development points to the Key Resources proposal

Figure 9 shows The Development points to the Key Resources proposal. As seen in figure 9, the green color is used to refer to the new action points based on the development. The red color refers to the action points that are deleted from the initial proposal.

The first correction is to postpone the warehouse acquisition, as separate local, to a later time, when the case company has a clear visibility of the sales volume and demand. Instead, the case company can consider allocating a space in the sale point, with the quality requirements for the storage of the smart irrigation solution packages.

The second correction is on outsourcing the IT services when needed, instead of hiring two IT specialists. Knowing that the existing IT Engineer is a key stakeholders at the case company and is able to provide the long-term required IT services.

The third correction is to Outsource or hire a Freelance graphic Designer for the Production processes of the value proposition.

The fourth correction is to increase the focus of the Funding as main financial resource and apply for a bank loan to cover the additional financial needs meanwhile the solution generates profit.

#### 6.4 Final Proposal

A new proposal that was validated with the key stockholders described in 6.2, is generated after the evaluation of the proposal draft. The proposal draft also occurred the application of the corrections to the Initial proposal of the Action Points to design the elements of the business model of the Smart Irrigation Solution. The new proposal involves the development points induced to the CVP and the Key resources as discussed in 6.3. Figure 10 below shows the final proposal of the Action Points for Designing the Building Blocks of the Service Business Model for the Smart Irrigation Solution.



**Figure 10. The final proposal of The Action Points For Designing The Elements Of The Business Model For The Smart Irrigation Solution**

As seen in figure 10, six main development points are implemented to the proposal draft. The changes are marked in green color.

The first change is on the Customer Value proposition. The CVP becomes based on a Mobile Application and a Web-Application as basic package in the offering.

Additionally the second change concerns the User Manual does not anymore belongs to the physical package, but will be available as an electronic version.

The third change is to the key Physical Resources. The warehouse for storing the physical package of the solution will be allocated in the same local of the point of sale. Considering the quality restriction of the warehouse in order to protect the equipment.

The fourth change is to the key Human Resources. The graphic designer can be hired on the basis of a freelance contract when needed.

The fifth change is to the Financial Resources. The case company will stress the focus on getting funding and use bank loans to cover the rest of the financial needs.

The sixth change is to the partnerships. The case company will outsource the IT services by building trustful and long-term business relationship with the IT service Providers.

## 7 Conclusions

This section provides a summary of the results of the research and overviews the next steps towards the implementation of the final validated proposal.

### 7.1 Executive Summary

The objective of this paper is to provide an Action Plan to design the Building Blocks of the Service Business Model of the Smart Irrigation Solution for the case company.

Indeed, the implication of this paper comes in the context of Farming Technology Innovation. The case company aims to deliver to the target customers an accessible, ecological and yet profitable Smart Irrigation Solution. Hence, a roadmap to commercialize the rough business is needed.

The Action Plan developed in this paper consists of two parts. The first part covers the Pre-Steps needed to start designing the business model. The second part implies the Action Points required to design the elements of the building blocks of the service business model.

Based on an Action Research approach, this study is conducted in four stages. The first stage is based on the literature review. The literature review done at this stage, provided guidelines, tools and approaches to design a service Business Model. Based on the empirical substance, this stage resulted on a conceptual framework for conducting the next stages. The resulting conceptual framework has two parts. The first part supports the processing of the second stage that is the starting point analysis. The second part supports the processing of the third stage that is the proposal draft.

The second stage is conducted through interviews with the key target customer and online benchmarking, as starting point analysis for this study. This stage resulted on defining the key target customer and identifying the key needs of the key target customer. On other hand the analysis of the key Competitors' CVPs led to primarily identify the prospective competitive advantage of a CVP for the Smart Irrigation Solution. The outcome of this stage is two key findings. Firstly, the defined key target customer is a B2B

customer described as a middle-size farmer and Distributer/ Producer. Secondly, the identified needs of the key target customer combined with the key competitor's CVPs analysis led to build an initial Customer Value Proposition for the Smart Irrigation Solution.

The third stage is the building of the proposal draft. The proposal draft consists of the key action points needed in order to design the building blocks of the Service Business Model of the Smart Irrigation Solution. This stage is conducted based on a two rounds workshop conducted firstly with the key stakeholders and the key target customer then secondly with the COO/ Agricultural engineer at the case company. The outcome from the first round of the workshop is the suggested key points for the design of the CVP building block of the service business model. The outcome from the second round is the suggested key points for the design of the Profit Formula, the Key resources and the Key processes building blocks of the service business model. The result of this stage is an initial proposal of the action points suggested to the case company for designing the building blocks of the service business model of the Smart Irrigation Solution.

The fourth stage consists of the evaluation and feedback on the proposal draft resulted from the previous stage. The evaluation is done through an evaluation session with the key stakeholders and the key target customer. The evaluation of the initial proposal resulted on six main changes. Two changes concerns the action points proposed for the design of the CVP building block. Four changes applied on the action points proposed for the design of the Key Resources building block. The outcome of this stage is the final validated proposal of the action points suggested to the case company for designing the building blocks of the service business model of the Smart Irrigation Solution.

In conclusion, the outcome of this study contributes in providing the case company with a business roadmap to commercialize the Smart Irrigation Solution in the local market as first step before going global.

## 7.2 Next Steps and Recommendations toward Implementation

In the perspective of commercializing the Smart Irrigation Solution in the local market as first step before going global. This section overviews the next steps needed toward the implementation of the validated proposal.

The first step is to define the total cost of the offering based on the final action points proposed for designing the CVP of the Smart Irrigation Solution. Concretely the offering is consists of developing the User Interface for the mobile and web applications, acquiring the equipment (station, telematics, etc) and developing the electronic version of the User Manual.

The second step is to design the Profit Formula based on the action points proposed in the final proposal. In particular, the volume, the variable costs and the key business collaborations that would enable generating benefits from the economies of scope/ scale.

The third step is to determine the total cost of the key resources and processes suggested in the final proposal in order to proceed with the application for the funding and loan.

The fourth step is to proceed with the application for the funding and insure the financial resources for producing the Smart Farming Solution. In this step are taken in consideration the costs determined in all the previous steps.

The fifth step is to proceed with the contract management and the building of the key partnerships proposed in the final proposal of the Action Plan.

In the perspective of going global, the case company might consider in the future to revise the Business Model after operating the business in Morocco and making profit. Hence, the Action Plan, that is the outcome of this thesis, would serve the case company to efficiently and quickly process the adjustments of the Business Model for commercializing the Smart Irrigation Solution in the global scale.

### 7.3 Thesis Evaluation

The research evaluation enables the researcher to judge about the relevance of the data (Quinton and Smallbone, 2006:126). The evaluation plan of this present thesis takes in consideration four evaluation criteria: *Credibility*, *Transferability*, *Dependability* and *Confirmability*.

The first criterion is *Credibility*. According to Guba (1981), Credibility is a key criterion in establishing trustworthiness. The easiest way to assess the credibility is to make the informant(s) read the researcher's interpretations and results. (Kananen 2013:190) In this way the researcher can assess the credibility the information in respect of the source of information. (Kananen 2013:191).

In this paper Credibility is insured by the iterative cycles of interviews done with the key target customer as well as the COO of the case company, with a clearly defined objective, solution and proposition. In fact, At different stages of the research, the key target customer was involved to confirm the right understanding and interpretation of the needs, problems and solutions that he is seeking by hiring the case company's value proposition. The key target customer and the COO were also involved at the evaluation of the proposal draft. Hence the validation of the final proposal resulted from their confirmation.

The second criterion is *Transferability*. Transferability measures the degree of consistency of the results in comparable contexts to the case study (Kananen 2013). This research is done on the context on key target customer. In such situation where the findings of a research are specific of small samples of individuals or environments, Shenton stated that "*it is impossible to demonstrate that the findings and conclusions are applicable to other situations and populations*" (Shenton, 2014:69). However, Shenton argued that there are six key *issues* that can be relevant to the evaluation of transferability. Table X below evaluates this paper based on the six key issues addressed by Shenton (2014).

Table 17. Transferability Evaluation of the thesis

Measures of transferability		Applicability in this research
1	The number of organizations taking part in the study and where they are based	One organization located in Morocco.
2	Any restrictions in the type of people who contributed data	External data was collected from the owner and manager of the informant company.  Internal data collected from key stakeholders at the case company.
3	The number of participants involved in the fieldwork	3 Internal participant from the case company.  1 external participant from the informant company.
4	The data collection methods that were employed	Electronic questionnaires, field notes, voce/video calls, face-to-face Interviews, workshop discussions.
5	The number and length of the data collection sessions	5 interviews (30-45 minutes/ each)  2 Workshops ( 2 + 1 hours)
6	The time period over which the data was collected	Starting Point Analysis (February -Mid-April)  Initial Proposal building (April)  Final Proposal validation (May)

The third criterion is *Dependability*. This criterion is addressed by generating a detailed report of the research processes in such way to enable the repetition of the work with same results. At the same time, the dependability criterion evaluates the extent to which research methods and practices have been applied and prove effective results from the study. (Shenton, 2014:70).

In this paper, dependability is insured by a clear and structured Action Plan research based on four processes/ steps. Firstly, a research based on the literature review was done to generate a conceptual framework. Secondly, a starting point analysis was done based on the guidelines summarized in the conceptual framework. The starting point analysis covered the familiarization with the research environment, criteria and key gaps. The research environments involves the key target customer, the key competitors as well as the case company strengths and weaknesses. Thirdly, an initial proposal was drawn from the results of the previous investigations. Fourthly, a final validated proposal was generated based on the evaluation and adjustments to the suggested initial proposal. As future perspective for the case company's business, the case company intend to adapt the final proposal in the commercialization of the Smart Irrigation Solution in the global scale. Dependability was indeed verified by implementing an effective research process with credible validated results.

The fourth criterion is *Confirmability*. Confirmability refers to the extent to which the research is based on proven results from a methodological research rather than preferences or assumptions of the researcher (Shenton 2014).

In this paper confirmability is insured by verified tools and evaluation approaches such as the scorecard (Adamson et al. 2012) or CLV (Loshin, 2013). The results of the evaluations are based on numerical and analytical data from internal and external sources.

#### 7.4 Closing Words

Technology-based services have obvious efficiently and optimization dimensions. However, in contexts such as farming, it can be challenging to renounce on traditional tools and solicitate technology-based tools instead. Furthermore, although the competition in the local market is not harsh, the significance of the value proposition of such services is crucial from the customer point of view. Therefore, a grounded business model for such service business is of relevant importance. This study is done to help the case company in designing a grounded Service Business Model for the Smart Irrigation Solution, based on a clear and applicable Action Plan for the commercialization of the Solution.

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