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IT IS IN THE "HOW" WHERE THE DIFFERENCE LIES ON

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To my family for their continuous support and to the teachers at UAB from whom I´ve learn more than what they have taught me. I owe Granges Comas all the information they have provided me to produce this work.

ABSTRACT

This project explains how to implement a process management system in a firm. Businesses are not investing much on this discipline and as a consequence they cannot obtain its benefits: better decisions addressed towards improvement of efficiency and gaining customer satisfaction. Firms' managers are not aware of their current process already functioning and so they are not able to detect errors or improvement areas. This is why Business Process Management and Business Process Improvement should be included as another management discipline.

Five steps compose the proposed implementation phases: plan, analyse, improvement, acquire resources and implement. These steps are applied on a yogurt production firm called Granges Comas.

During the first phase three objectives are set: serving customers more efficiently and quickly, reduce production time and lowering errors. To achieve these objectives the project focuses on the firm's operational activities.

The second phase is the longer one because it aims to analyse the operations performed within this organization: they need milk to produce yogurts, they need cows to have milk, and they need forage to feed the cows. To start with, agricultural activities are performed to get natural forage to feed their cows. They are provided with agricultural machinery assistance and, together with a full time employee, they perform the land tasks: plough the soil, spread cows manure and plough the soil again. Once the land is prepared they sow the seeds and after some months they can harvest and silage the fodder produced to feed their cows. The milking process is the next operational activity to be analysed, which aims to obtain supreme quality milk. Four employees are working on their different stables. They are in charge of: cleaning the milking parlour, lining the cows that will be milked, placing them in the correct position inside the complex, start to clean and moisturize the cow's teats and after that fit the machine into the cow teats. Once the cows are milked, the equipment is removed, then the cow's teats are cleaned and finally the cows are returned into the stable. With this process they obtain the milk, which is the main input to produce the yogurt.

Their objective for the yogurt production process is to satisfy all possible customers by ensuring an ecological product with high quality and good taste. The process starts by filling a tank with the milked milk inside the production plant; they warm the milk and homogenize the mixture, after the 88º degrees centigrade are reached the milk is pasteurized, after that the milk is lowered to 45º degrees, which is the optimal

temperature to throw the ferment. After 20 minutes the liquid yogurt is packed and placed into an incubator room during 5 hours. After that, the solid yogurt is placed into a refrigerator room where it is stored up to the moment it is sold to their customers.

Having all the processes analysed, the third implementation phase consists on ameliorating the current processes according to the settled objective. The proposal is to acquire three machines: firstly, a packaging machine; secondly, a labelling machine and finally a packaging machine. This firm will be able to gain efficiency by reducing cycle time, errors and risk. Customers will be more satisfied by getting the product quickly and with a portable package. Moreover, a metrics proposal will also be set to track their performance and as a tool to continue with a non-stop improvement philosophy.

The fourth phase consists of acquiring the material needed such as the three machines and a training programme in order to use them correctly in a coordinated way.

Up to this point, the firm just needs to implement the proposal of a redesigned process and to keep on with a management system based on a continuous improvement.

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INTRODUCTION

What is it considered a good decision? Many firm managers should be asking themselves this question. The truth is that there are plenty of good answers, but in my opinion, a good decision would be the one that leads to a better outcome.

The recent past of Spain has been highlighted for the enormous economic and financial crisis affecting both, citizens and firms. Even though the country is recovering little by little, it is important that we learn from the errors that have been made but not only from the errors: also from the actions that could have been taken. A good possibility is to reflect on the idea that we can always improve and take this idea as a life philosophy, so that we could always be ready to ameliorate and achieve higher objectives.

A continuous self-improvement can be applied to citizens and organizations. But, in order to improve, first we need to analyse how we are currently working and how the organizations are performing the activities needed in order to achieve their goals, therefore after that, we will be able to see where the room for improvement lies on.

The project is developed with this conductive line: "Managers that have knowledge of the different processes of the firm are able to take better decisions." Putting an emphasis on the fact that "different processes of a firm" give us information about "how" the activities are being performed."

Along the following pages, we will get a genuine and deep approach to this idea through both: Business Process Management (B.P.M) and Business Process Improvement (B.P.I).

To give a touch of History about the origins of B.P.M and B.P.I we must mention John Jeston and John Nelis short and deep explanation of it: "Frederic Taylor developed modern industrial engineering and process improvement, though the techniques were restricted to manual labour and production process. (…) The next great addition to process management was created by the combination of Taylorist process improvement and statistical process control, by Shewhart, Deming, Juran and others. Their version of process management involved measuring and limiting process variation, continuous rather than episodic improvement, and the empowerment of workers to improve their own process" (2014: xxiii).

Knowing when B.P.M emerged, a good point will be to homogenize our different concepts of "processes". We can define them in a simple sentence: "*A process is an activity that transforms inputs into desired outputs*": considering inputs as anything that

will be used in the transformation activity and the outcome as the result of that transformation activity.

John Jeston "et al" explain Business Process Management: "B.P.M is a discipline focused on using business process as a significant contributor to achieving an organization's strategy and business objectives by significantly and sustainably improving performance". (2014: 4). Similarly, we can state in relation to Business Process Improvement that: "improvement is about making the business process more efficient and effective or indeed turning an organization or industry value chain upside down or inside out" (2014: 14).

Despite these are the main concepts, we cannot deviate from the main idea: " *The important thing is not to stop questioning" and "If we do the same, we will obtain the same results"* – Albert Einstein.

METHODOLOGY AND SCOPE

I invite you to glance through an approach to implement a process management system in a yogurt production firm. In the first instance we have to understand that this proposal can be implemented to all sort of enterprises and activities. In order to profoundly understand how to define and manage processes we would use our knowledge and apply to it in a product life cycle: from the very beginning until the end.

In the table 1 we will see the recommended phases to implement a process management towards the improvement according the book Improving Business Processes by Harvard Business School Press.

Table 1: Implementation Phases

1. Plan: begin by choosing the process you want to improve
2. Analyse: audit the process by mapping and examining those.
3. Improvement: decide what changes are needed to have a supreme process.
4. Acquire resources: obtain the supplies you will need to achieve the goal.
5. Implement: execute the changes.

Following a structured methodology, the project will be developed applying the mentioned implementation phases to an existing firm, called "Granges Comas". We will begin with a short introduction about "Granges Comas", then we will continue by following the steps proposal putting special attention to process definition: each

operational activity from the firm will be accurately described following the points from table 2. Finally, we will conclude with the three last points from the phase's proposal.
In order to obtain all needed information I have done five interviews with the firm owner from December 2014 to March 2015. Each interview lasts one hour and a half and they are recorded. I asked them about the current way of functioning on their operational areas and they gave me all data and details needed to execute the project. Even though they helped me a lot, the firm decided not to talk about financial matters.

Table 2: Analyse: Process Definition

<table>
<tr><td colspan="3">1. Goals: process objectives and proposals.</td></tr>
<tr><td colspan="3">2. SIPOC table with a later explanation of each concept.</td></tr>
<tr><td>Suppliers: entities that provide you with the goods and services needed in the process.</td><td rowspan="2">Processes: the transformation activities that will transform inputs into desired outputs.</td><td>Output: the result from that transformation activity.</td></tr>
<tr><td>Inputs: the people, material, equipment and procedures required in the process.</td><td>Customers: the stakeholders that will consume the output.</td></tr>
<tr><td colspan="3">3. Process chart: table used as a tool to examine the overall process.</td></tr>
<tr><td colspan="3">4. Process flowchart: illustrative drawing of a process from the beginning until the end.</td></tr>
</table>

FIRM INTRODUCTION:

Granges Comas was founded in 1920. During three generations, the family followed the farming tradition. The farm "Masia Mas Roure" located in Santa Eugènia de Berga (Osona) has its origins selling milk from their cows. Nowadays their business activity has been expanded to all kind of dairy products: milk, yogurts, cottage cheese, ricotta flan and cheese. To achieve the best quality and natural flavour, cows are grazing on the farm fields and are fed with their production of fodder ensuring a careful diet, healthy and completely controlled by specialists. They have clear firm values: achieve supreme quality by being self-sufficient. Their thought is the following: in order to produce yogurts they need milk, in order to obtain milk they need cows, in order to feed the

cows they need forage. According to this idea, the business operational activities that we will analyse are:

1. Agricultural: forage production
2. Livestock farming: milk production
3. Yogurt production

The internal structure of the company is like a family: Ramon and Josep are brothers and owners of the firm, and there are and eight workers that most of them are children and grandchildren that are following the family tradition.

IMPLEMENTATION PHASES:

1. PLAN:

To begin with the process management implementation phase the first step would be to define the scope, goals and schedule.

1.1. Scope:

The scope we will cover are the firm´s operational activities: forage, milk and yogurt production.

1.2. Goals:

- Serving customers more efficiently and quickly.
- Reduce production time.
- Lowering errors

1.3. Schedule:

The first action would take one week: assemble a team to plan and execute the changes. The group would be the whole organization without exclusions; getting everyone involved will help to avoid refusal to changes in their routines. The team will be compound by Ramon acting as project manager and process owner. His responsibilities will encompass to ensure that objectives are achieved on time, to understand the principles of effective process design and to influence others to accept changes. The project users are all the workers employed at "Granges Comas".

To meet the objectives will take longer: to define and examine their current operational processes, it will take them two months. To identify the needed process changes will enable to accomplish the set of objectives that will take one month. Finally, acquiring

resources and the implementation phases will last around six months depending on the workers adaptability. Overall, it will take eight months and one week for the whole business process improvement.

2. ANALYSE:

We will analyse all operational activities following the structure mentioned in table 2, already reproduced. We will start with the forage production process:

2.1. Agriculture, Forage Production Process

2.1.1. Goals:

The main objective behind this process is to obtain fodder to feed their cows with the premise of trying to reach the lowest possible cost when doing it.

A first overview will be taken in order to familiarize with the topic. In the Table 3: SIPOC, there is a quick explanation of the Suppliers, Inputs, Processes, Outputs and Customers.

Table 3: SIPOC

<table>
<tr><td>Suppliers:
Agriculture machine owner firm, seeds specialists and the firm itself.</td><td rowspan="2">Processes:
The activities performed to transform inputs into desired outputs.</td><td>Output:
Cows fodder.</td></tr>
<tr><td>Inputs:
Owner’s manpower, gramineaes seeds, agricultural machines, rotation technique…</td><td>Customers:
The cows from their farm.</td></tr>
</table>

2.1.2. Suppliers:

The suppliers that let this process take place are the firm that provides the services that need to be done with agricultural machines, another firm that sells seeds and finally Granges Comas themselves that provide the manure to be spread in the land.

2.1.3. Inputs:

I will point out different types of inputs:

People:

Ramon Comas plus some external people that have agricultural machinery do the human power needed to perform this process.

Material:

One of the most important materials needed to produce fodder are the seeds. These depend heavily on the weather, which is the reason why they diversify with different types of them.

The seeds more used for them are: Italian rye grass, sorghum, hay, and P1. Each of them has different characteristics.

Italian rye grass or Lolium multiflorum is planted to get green fodder. Its life cycle lasts one year. As it is not enough with grass, they combine it with other gramineaes. They do not plant wheat but they plant a derivate from it, which is called sorghum. Sorghum is also planted once a year and it is considered a good option when the rain is not ensured. This grass has the property to resist dry weather or long periods without rain, property that does not share with the wheat. Shared with wheat, sorghum is also rich in proteins and nutrients. They also plant hay that is commonly used in dry weather conditions. Hay has a lower level of nutrients that compensate the high level of the sorghum. Another property to be highlighted of hay is that is sown every four years. The last fodder to be mentioned is P1. P1 is a compound of different gramineaes commonly used in Osona. It is also characterized for being sown every four years.

Equipment:

As equipment we consider all the agricultural machinery that is used during the fodder production. Among them we have a harrow, a manure spreader, a seed drill, a forage mincer, a mover conditioner, a land mower and a trailer.

The harrow is used for tilling or preparing the soil. The manure spreader is the trailer used to spread the manure, as the name indicates. The seed drill is used to sow. The forage mincer, the mover conditioner and the land mower are used to harvest the different gramineaes types. Finally, a trailer is needed in order to move around the lands and supervise the activities.

Procedures:

- Diversification: seeds are diversified with the aim of reduce risk.
- Rotation: With diversification of seeds, the land plantation is done with rotation. It has been proved that rotate the seed sown in each land partition increases the land productivity as well as the quality of the harvest. The land rotation will depend on the type of seed cultivated, the rain that falls during these years and the harvest grass quality obtained. Nevertheless, the rotation average rate can be found every four years.

2.1.4. Process owner:

The owner of this process is also one of the owners of the farm. He is the one who is entitled to make important decisions about all agricultural activities done within the firm. He manages and supervises such activities as well as working there every day.

2.1.5. Transformation activity: step-by-step:

Step 1: To plough the soil.

It consists of turning up the earth in order to prepare the land. This step is done with the help of a harrow. As they do not have agricultural machines, this task is outsourced to another firm.

Step 2: To spread manure.

The manure is used as a ground fertilizer because it provides nutrients. These nutrients are needed for a good growth of plantation. Imported from Northern European countries, they are using a machine that not only spreads the manure but also covers it. In this way, they are able to save costs coming from the machine because it covers the manure and also eliminates the stench that causes complaints from the neighbourhood. The manure goes from the cows in the farm to the land next to it making the transportation cost of the manure much more cheaper.

Step 3: To re-plough the soil.

It consists of shaking the ground. It is done in order to get a more oxygenated soil with the purpose of ensuring the best conditions to sow it afterwards.

Step 4: To sow.

The weather difficulties must be taken into account because to sow today does not always guarantee to collect it in the future. As they often say, to sow is as risky as

playing the lottery. Consequently, they sow different types of gramineaes in order to minimize risks as well as to maximize their land profitability. They are owners of 70 hectares; with them, they do partitions of the land and they combine the plantation of the seeds mentioned before: Italian rye grass, sorghum, hay, and P1.

The chosen seed depends on different factors. Among these factors the most important is the seed that was planted before in the same land partition. In order to ensure an optimal ground conditions they do rotations of the land. Optimal ground conditions means to have a nourished and oxygenated land. They achieve this objective by doing the following:

A land partition that was sown with either hay or P1 for a four-year life period becomes a non-useful land. This land has become old and it won't let the grass grow. It is easily understandable because during these four years the gramineaes were consuming all the land oxygen and nutrients. In order to repair this damage and renew the land features there is not enough with spreading more manure and ploughing the earth after it. The correct process is to re-start from the beginning and then sowing sorghum. As we have mentioned before, sorghum is rich in nutrients. This process will be applied during the two following years and with it, the land will be fully renewed and ready to start again the sow of hay or P1. The plantation of Italian rye grass is alternated with the plantation of sorghum.

The seeding is done by the same company that also ploughs the land due to the fact that they do not have a seed drill. Nevertheless, it is always done under the farm owner supervision.

Step 5: To spread manure again.

Step only to be taken in rainy years. For the land, a bit of rain is desired but not too much. The logic behind it is that large amounts of water are filtered down the soil towards the aquifers sweeping along with them the land nutrients. When this occurs, the best action to be taken is to spread manure during the beginning of spring, because it is the seed growth season. When it is expected to have a rainy year, what farmers usually do is to divide the amount of manure into two spreads. Not doing it will result into a lower harvest rate.

Step 6: To harvesting

Harvesting consists of gathering the crops. Obviously, it is the moment of the truth; the moment when they will get knowledge of how productive has been the season. There are different ways of harvesting depending on the grass to be collected.

Sorghum is collected through a forage mincer when the grass is still green. Otherwise, if the grass is dry the cows will not be able to digest it unless they mill it. To mill it will imply more time and costs that are now saved by harvesting when the grass is green.

The hay is collected with a mower conditioner. The mover conditioner has disks spinning at a high speed towards the machine that produces a small hit that breaks the hay fibres letting the water go out. After cutting the hay, it stays between three and four days in the ground in order to dry it.

Italian rye grass and P1 is cut with a land mower and then it is left in the ground in order to be dried.

Step 7: Silage.

After the harvest is collected, it is then stored in a way that can be preserved for future usage. Again, depending on the gramineaes they are working with, they will do different storage techniques. The sorghum is stored in silos that can then be stored during two and a half years. Silos are used when the grass requires fermentation with oxygen. The hay is stored in plastic bullets that can be stored one year and a half. On the contrary from silos, plastic bullets are used when the grass requires fermentation without oxygen. Finally, Italian rye grass and P1 are stored in bullets without plastic. This technique allows the forage to be stored during three or four years.

2.1.6. Output:

The output generated during this process is a mixed of different gramineaes types that result in a perfect fodder to feed the cows.

2.1.7. Customers:

The customers will be obviously their cows.

2.1.8. Process Chart:

Almost finishing the first industrial process, we will be summarizing the process main points in the Table 4: Process Chart.

Table 4: Process Chart

Name of the process: Agricultural process	Type of process: Original Nº of process: 1
Goal: Get fodder to feed their cows	Nº of edition: 1
Coordinator: Ramon Casas	Date: 15 February 2015
Start the process: To plough the soil	End the process: Silage
Inputs: Owner's manpower, gramineaes seeds, agricultural machines, rotation technique…	Outputs: The fodder
Suppliers: Agricultural machine owners	Customers: Their cows
Process Steps: Step 1: To plough the soil. Step 2: To spread manure. Step 3: To re-ploughing the soil. Step 4: To sowing. Step 5: To spread manure again. Step 6: To harvest. Step 7: To silage.	

Illustration 1: Agriculture: Forage Production S.I.P.O.C

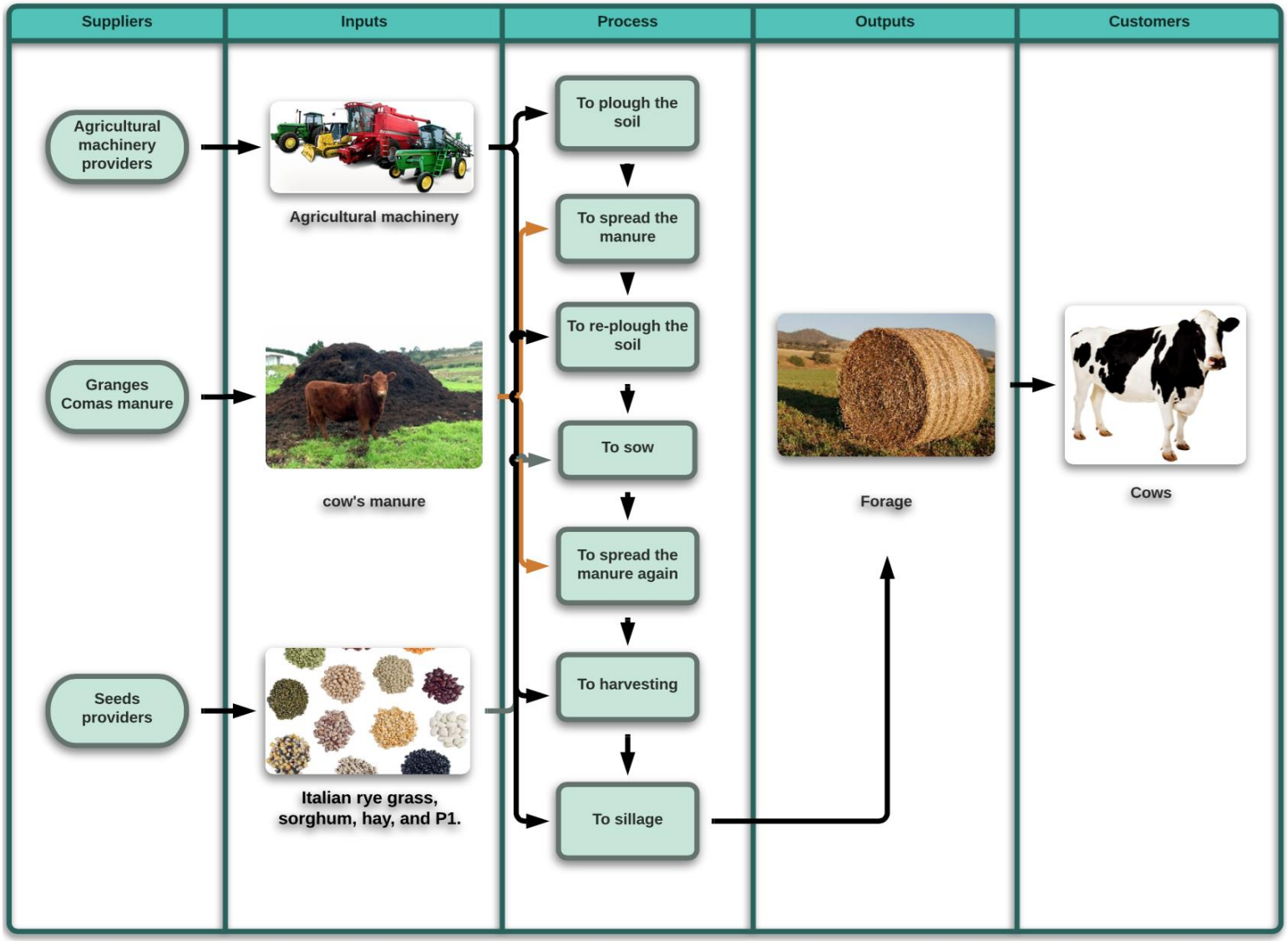
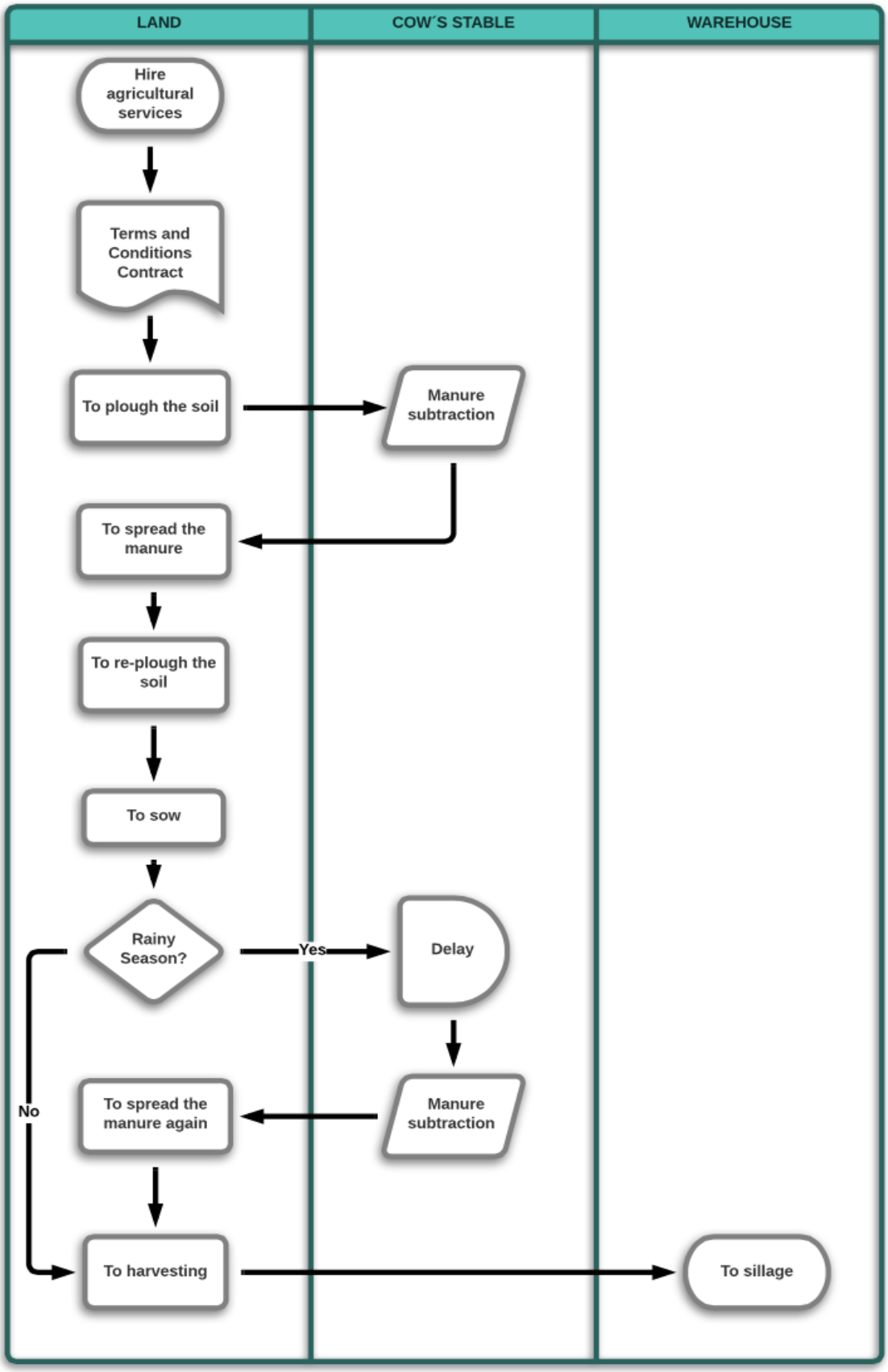


Illustration 2: Agriculture: Forage Production Process



2.2. Livestock Farming, The Milking Process

2.2.1. Goals:

The objective within this process is to get good quality milk that will be used later on as an input to produce their yogurts. The cows will be the main "characters" from the beginning until the end of the process.

Following the same procedure as before, in the table 5: SIPOC a quick view to the suppliers, inputs, processes, outputs and customers will be displayed:

Table 5: SIPOC

Suppliers: The Granges Comas itself, their agricultural part.	Processes: The activities performed to transform inputs into desired outputs.	Output: Huge quantities of milk.
Inputs: 4 internal workers, veterinarian help, the cows, 3 stables, the milking parlour…		Customers: The yogurt production part from the firm and other firms that buy milk.

2.2.2. Suppliers:

The suppliers of this process are not only the agricultural part of their firm but also a chemistry firm that provides a genetically modified semen that guaranties with 70% of probability that the cow descendent will not be a bull but a cow.

Another firm provides them more minerals proteins or energy depending on what it is needed in order to complete their forage properties.

2.2.3. Inputs:

I will differentiate between the different types of inputs, which are: people, material, equipment, methods and procedures.

People:

The work force needed to carry out the daily activities is 4 people; there are two people supervising and complementing the process of milking the cows. The activity of milking is automatized with a milking machine but nevertheless they have to put the cows ready to be milked implying some activities that later on will be explained.

One person feeds the cows with fodder and the last person is in charge of the maintenance of both, the stable and the milking parlour. We have to keep in mind that the cows need to be milked twice a day every day, so no holidays are allowed for them. Apart from them, they also hire a veterinarian team that helps them ensure a healthy environment or when there are newcomers. An animal nutrition expert is also hired when the forage compound is done.

Material:

The main material needed to have milk is obviously the cow. A cow with good genetic conditions is the one that gives birth to three bovines and that is able to generate 40 litres of milk daily. The cow breed, which they work with, is called Friesian. This breed is very well known in Europe due to their milk production capacity. In order to accomplish their objective, they have to be accurate with the cattle nourishment. The cow alimentation requirements are different in their life phases. Calves need their mothers' milk during their first three or four days. However, calves that are fed with their mothers' milk do not breastfeed directly from them: the milk is given to the calves once milked. During the next five months, the calf will be given milk and it will also start to eat wheat or a weak mixt of cereals. In their following four months, the bovine is fed with cereals and sorghum until it is nine months old. After that, they start to eat dry forage with the purpose to grow its belly, knowing that a bigger belly will result in a bigger milk production capacity. Once the calf is eleven months old, she is inseminated and considered mature cattle that can be part of the group of productive cows. Mature cows eat a mixt of forage that is created specially for them by an expert. It contains the energy, nutrients, proteins and minerals that are needed to transform it into good quality milk for the human consumption afterwards.

On the other hand, different from the food, another material needed is the disinfection kit. Obviously, when dealing with food manipulation issues, a healthy and clean outcome is a must.

Equipment:

Different stables are needed depending on the cattle life phase. Differencing between bovines until one year old, mature or productive cows and cows that in two months will be about to give birth. This implies three stables with its feeders, drinkers and straw beds. I want to highlight that drinkers are specially designed in a way that the water is

continuously renewed. It is important because this technique ensures that no dirt is embedded in their drinkers.

Their productive stable has a capacity of 160 cows that luckily for them is full. Next to this establishment there is the milking parlour where all productive cows are milked twice a day. Here we can find the milking machine with all its components and a tank to place the milked milk.

A nursery is also needed because when a cow is ill needs extra attention for some period. Not only for the required attention, a nursery is also needed in order not to spread out the illnesses.

The last used equipment that I want to mention is the one that helps them when the cow is giving birth. Usually they let the cows give birth by their own but when it is late night or it is taking too much time they help them using a machine that holds the newcomer's head and there is a lever that makes force whenever the mother has a contraction helping her to dilate better and quicker.

Procedures:

- Cow life cycle: A strict procedure that cannot be skipped is the cow life cycle. When they reach the age of eleven months they are treated as adults, they are expected to give birth three or four times during the next three or four years and then they die.
- Increase cow´s belly: with the aim to reach the maximum milk production per cow the farmers increase their belly. They achieve this objective by giving them a different type of food depending on their life phase. Explained above when mentioning the materials needed to feed them.
- Nutritionist assistance: By default, every year the nutritionist expert goes there in order to prepare the perfect mixt of forages and extra elements that will be needed to feed the cows.
- Separation among cows with different stables: Another procedure to be mentioned is that they put the cows apart that will give birth in two months. This is done in order to ensure that all nutrients and proteins eaten go directly to the foetus that will result in a healthier calf. In the meantime they are also getting ready for a new lactation period. Notice that the calves are the ones that will replace old cows in the future. In the same way, the cow that has just given birth will wait from three to four days until she starts their production activity again.

It is done because there is a high probability that the milk produced these days will also contain particles of blood.

- Inspections: Methodologically they also are asked to do a yearly inspection in order to ensure everything is fulfilling sanitarian requirements.

2.2.4. Process owner:

The brother of the owner of the agricultural process is the owner of the livestock farming process. Josep Comas manages and controls everything that is related with their cows, specially the milking process.

2.2.5. Transformation activity: step-by-step:

Step 1: To clean.

For safety and healthy reasons the milking parlour must be cleaned. An exhausted revision is done everyday and reinforced during the day. In the same way, the farmers working in the milking process must remove all bacteria by cleaning themselves and specially their hands many times during the process.

Step 2: To line the cows.

The first think they do is to line the cows that will be milked in the next round. The cows are numbered in order to have a fully knowledge of which are the next cows to be milked. Due to the fact that every time they are lined, they are milked afterwards, this step is used as a preliminary activity that helps the cows get ready to be milked. It is important because the cow must know in advance that she will be milked, if she is taken by surprise or she does not expect it, she will get stressed and nervous and thus will result in a bad milking experience with lower quantity of the milk obtained.

Step 3: To place the cows.

The milking parlour has a capacity of twelve cows divided into two lines of six each. The farmers help the cows get in their place in the milking parlour. As the cows are already aligned the activity becomes much easier. Once the cows are in their places the farmers tie them.

Step 4: To clean and moisturize cow teats

The farmers apply foam to clean, moisturize and lubricate the cow teats. At the same time they are doing this, they are also checking that the cows are accomplishing the required conditions to be milked. For example, when a cow has swollen teats it is not milked because this is an infection signal. When this happens the cow finishes here the process and she is sent to the nursery.

Step 5: To dry the foam

The peasants use a paper napkin to dry the foam applied in the previous step. Of course, each cow is cleaned with a new napkin, no reuse is allowed. Meanwhile the farmers are drying each cow, one by one, the cow teats become fully dried. This step is a must before putting them into the machine because any wet factor becomes a bacteria risk.

Step 6: To fit the machine into the teats

The extremities of the milking machine are fitted into their teats.

Step 7: To milk the cows.

Once everything is ready, the milking machine starts the extraction of milk. If everything goes as expected, a cow will produce an average of 20 litters each time, resulting in 40 litters per day. After the milk extraction, the machine drags the milk into a tank.

Step 8: To remove the equipment.

When the cow is already milked, during five minutes, the milking equipment can be removed from them.

Step 9: To cure the teats.

Once the equipment is removed, it is important to apply iodine immediately after it. As the teats are still open there is the possibility that enter the microbes in it. Which is a high infection risk that must be eliminated.

Step 10: To return the cows.

Once the above steps are done, the cows are routed out of the milking parlour and placed again in their stable. After the milking process the cows need to drink a lot of water in order to be hydrated.

2.2.6. Output:

As it is expected, this process output is the milk. It is not convenient to say that its flavour is as good as you can all imagine. Notice that the taste of the milk obtained is the result of the alimentation specially created for the cows. The quantity of milk produced every day reaches the amount of 4,960 litres.

2.2.7. Customers:

The farm has two kinds of customers. The first kind of customers are the ones that use the milk as an input for other processes as it can be their yogurt production plant that uses the milk as the main raw material. For this use, they provide with 1,000 litres per day. The second kind of customer is the one that will sell the milk. They have installed a

distributive machine where the citizens of their village are able to buy their natural milk. Another kind of customers is firms such as Pasqual, which buys its milk in order to sell it afterwards in the supermarkets. The last mentioned customers receive 4,060 litters of milk per day.

2.2.8. Process Chart:

The main points of the milking process are reproduced in the table 6:

Table 6: Process Chart

Name of the process: Milking process	Type of process: Original Nº of process: 1
Goal: Get good quality milk	Nº of edition: 1
Coordinator: Josep Comas	Date: 15 February 2015
Start the process: Clean the milking parlour	End the process: Return out the cows
Inputs: 4 internal workers, veterinarian help, the cows, 3 stables, the milking parlour…	Outputs: The milk
Suppliers: Their firm agricultural part, a chemical firm and a nutritionist professional.	Customers: Their yogurt production plant and other firms that buy milk.
Process Steps: Step 1: To clean. Step 2: To line the cows. Step 3: To place the cows. Step 4: To clean and moisturize cow teats Step 5: To dry the foam Step 6: To fit the machine into the teats Step 7: To milk the cows. Step 8: To remove the equipment. Step 9: To cure the teats. Step 10: To return the cows.	

Illustration 3: Livestock Farming: The milking S.I.P.O.C

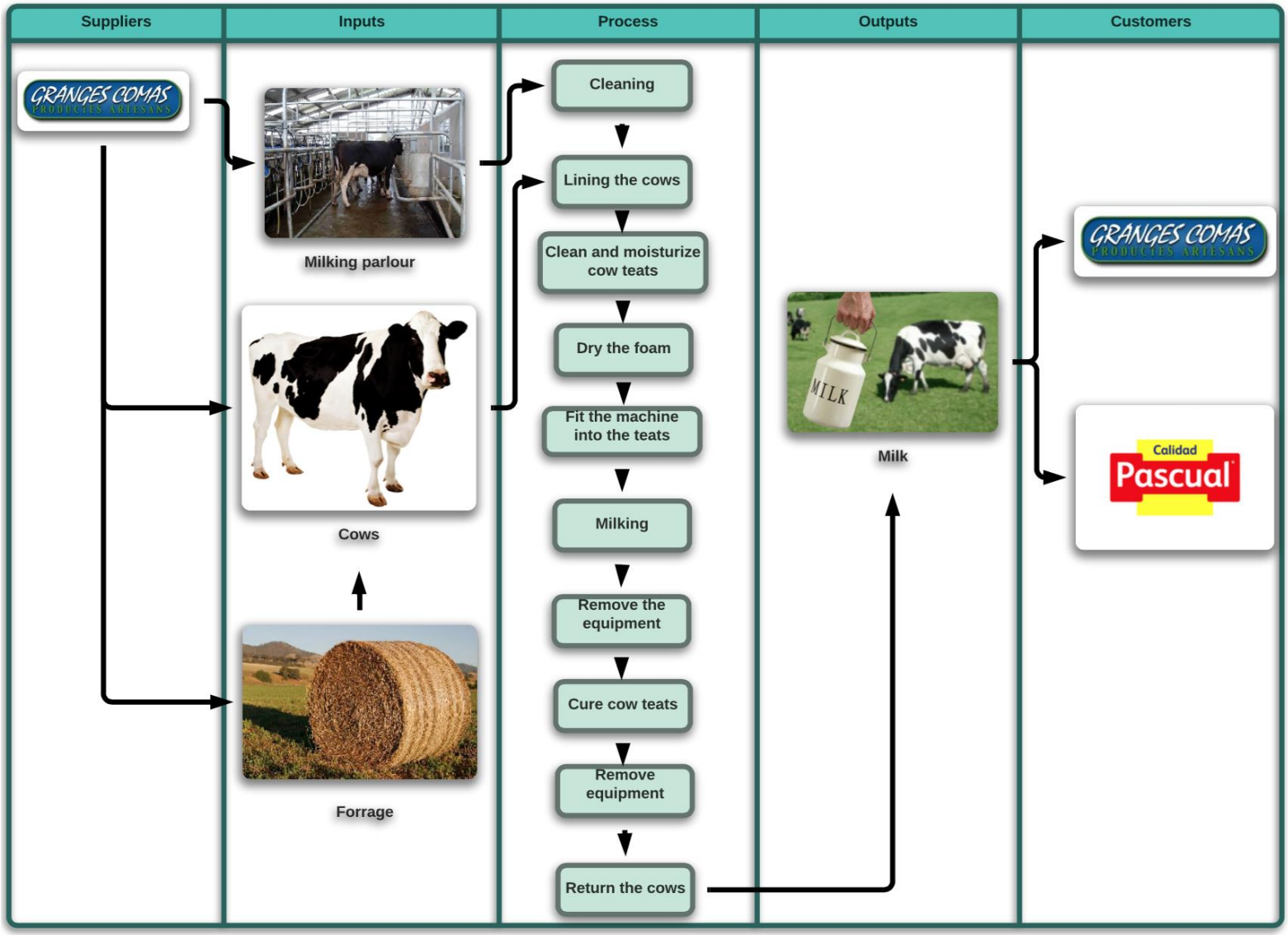
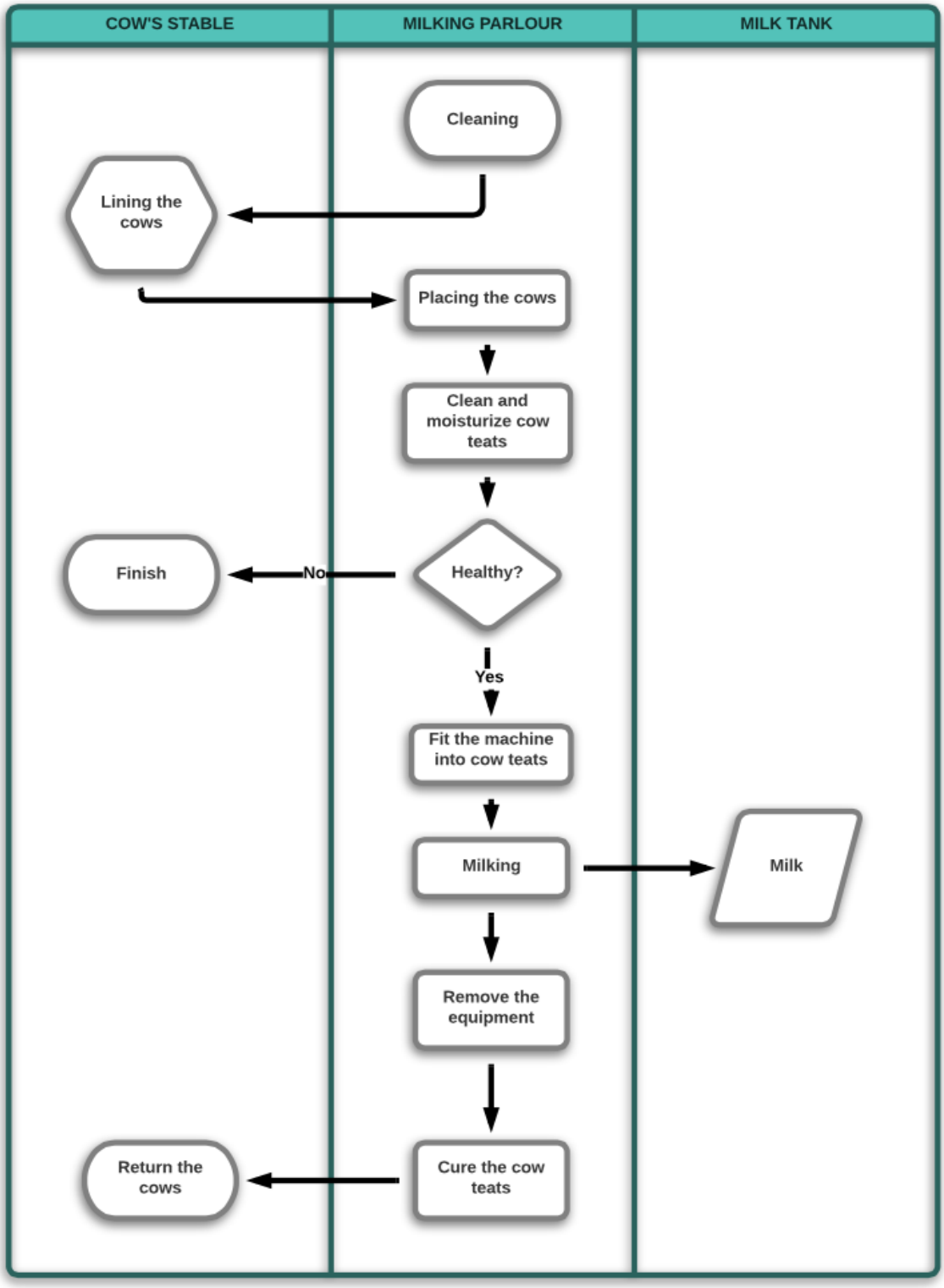


Illustration 4: Livestock Farming: The Milking Process



2.3. Yogurt Production Process

2.3.1. Goals:

The goal behind this process is to satisfy all possible customers by doing a special yogurt. They want to reach everyone, also people who think they do not like yogurts. According to this idea, they offer a rich variety of products. They define themselves as proximity sellers who offer local and high quality products at a reasonable price.

As it has been done in previous processes, we will summarize the key points of the process in Table 7: SIPOC that will enable us to have a first glance.

Table 7: SIPOC

<table>
<tr><td>Suppliers: Different firms that are ensuring natural final products. Having quality as a top mandate.</td><td rowspan="2">Processes:
The transformation activities that allow the milk and other inputs to become a solid and consumable yogurt.</td><td>Output: Yogurt.</td></tr>
<tr><td>Inputs: They use the plant facilities, ensuring ecologic nature and quality. Main raw materials are the milk and the ferment.</td><td>Customers:
Local resellers and particulars.</td></tr>
</table>

2.3.2. Suppliers:

The firm is working with different suppliers around Europe. Their commitment to their clients is to offer them natural products as a fundamental issue. That is why the different products that complement their yogurt are accurately chosen among different providers.
The jam is coming from an Italian supplier. The powdered milk with 0,1% grass is provided from New Zealand and the lactobacillus ferment is sometimes provided from France and other times from Switzerland.
They are aware that natural and ecologic products will result in a better quality of their range of products. Looking for the best quality at reasonable prices are the reasons why these suppliers are for them the best options.

Of course, they also act as suppliers because the liquid milk is provided from their own cows.

2.3.3. Inputs:

We will differentiate among several kinds of inputs: people, material, equipment and procedures.

People:

Four professionals compose the workforce in the yogurt production plant. They are splitting their tasks differentiating among order management and production activities. The split of personnel is reasonable according to the effort needed; they had decided to have two people in each activity. Production activities are the most related with ensuring and complementing the good functioning of the equipment helping them to produce their final product. On the other side, order management activities are the tasks of managing their demand; this consists of planning and organizing their customer requirements.

Material:

The raw materials needed to obtain the final output will depend on the different type of yogurts they are offering. What we can ensure is that all of them will share the milk. Milk will appear in different states of matter; liquid milk that will be directly provided from the milking process and also powdered milk that will be provided from another supplier. They are adding powdered milk because this ingredient is essential to solidify the yogurt. Another material that all yogurts have is the ferment called lactobacillus. Most of their products are also sweetened with sugar and finally, depending on the yogurt they are producing they will also use different varieties of flavours: such as orange, strawberry, cherry, cereal and tangerine jams.

Equipment:

The yogurt production plant has three main areas. The room above, the milking parlour, is the most complete one. There is a pump that raises the milked milk into tanks that have 1,000 litres of capacity. They use a cream separator for fat yogurts. The tanks are surrounded with water pipes that are filled with hot water during the pasteurization process, process that is needed in order to eliminate the bacteria, fungi and yeast from the yogurt. The same water pipes are filled with cold water once the pasteurization is completed in order to get an optimal temperature of 48 degrees. They also use a

homogenization that breaks the fat molecule and transforms the inputs into a unique mixture.

It is also in this room were the yogurts are packaged. There is a packaging machine that distributes the liquid yogurt into their recipients. The machine enables them to pack eight yogurts at the same time.

Another area within the complex is the incubator. There is a room with the optimal humidity and temperature for the growth and reproduction of the lactobacillus ferment so that the liquid yogurt becomes solid.

The last room to be mentioned is the cold chamber where all the yogurt production stays before it is sold.

Procedures:

- Ecologic nature: their products ensure their ecological nature. They do not use transgenic material. Everything is naturally produced without any genetic modification artificially introduced.
- Proximity seller: they are offering local products to their local customers. The idea is to strengthen the products coming from the country instead of continuously exporting material from other countries. What they want is to make the customer aware and conscious of that, they think that if the merchandised product made in our country offers good quality and it is also competitive in price, people will not have the need to buy products made in other countries and they will start consuming local production. A lot of small traders who are affected by the crises consequences now share this view.
- Quality: their yogurts are considered to be as a very good quality product. What matters for them is that the quality is perceived in the taste. The flavour of their product range is trying to fulfil the different tastes of society. There are sweetener yogurts for kids, different tastes for everyone and they are also offering products towards health and nutrition benefits. The firm is conscious about the yogurt health gains and they try to enhance it with different offers such as kefir, which has probiotic benefits.

2.3.4. Process owner:

The owner of this process is Ramon Comas. He is also the tenant of the forage production process.

2.3.5. Transformation activity: step-by-step:

Step 1: To supply the milked milk to the production plant.

The production plant is installed above the milking parlour. As we know from the previous process, the milked milk is drag into a tank. For the yogurt production process this milk is raised from the tank with the help of a pump. With this, we will be able to work with the milk.

Step 2: To warm the milk.

The raw milk coming directly from the cows has a temperature around 3 degrees. What they first do is to increase the temperature with the pasteurizer plates. With that they will reach 44 degrees of temperature.

Step 3: To sweeten.

Applied only on the yogurts containing jam or their sweetened natural yogurts. This step is only about adding sugar into the plate. As the temperature is hot enough the sugar is melted.

Step 4: To homogenize the mixture.

Having a temperature of 44 degrees enable the disjunction of the fat molecules. Once the molecules are broken everything is correctly mixed, the fat and the milk become a unique paste.

Step 5: To pasteurize.

We must remind that the paste is inside a tank that is recovered with water pipes. During the pasteurization process the water pipes are fulfilled with hot water until the mixture gets a temperature of 81 degrees.

Step 6: To cool the temperature.

After reaching the maximum temperature of 81 degrees the water pipes are filled with cool water in order to obtain a level of 44 degrees.

Step 7: To throw the ferment.

It is important that the lactobacillus ferment is introduced at 44 degrees in order to activate it. During the production of the conventional yogurt, the incubation process ranges from 20 to 30 minutes.

Step 8: To pack them.

The liquid milk with the ferment is packaged into a plastic container. The jammed yogurts are produced in the same way but this extra ingredient is introduced manually in each unit. They introduce it meanwhile they are also introducing the yogurt so that it is correctly mixed.

Step 9: To ferment.

Once the yogurts are packed they carefully bring them into an incubator. It is a small room that acts as an oven that gets a temperature of 45 degrees where the liquid milk is converted into a solid and curdled yogurt. This solidification process lasts from 4 to 5 hours until they get the optimal Ph. It happens because of the action of the lactobacillus ferment.

Step 10: To refrigerate.

After they get the optimal Ph. the yogurt goes from the oven room to a cool room. The transportation process is done very carefully because the solid yogurt is still very fragile and it can still be broken. The logic lying behind is that they need to stop the fermentation process and lowering the yogurt temperature can only do this. The refrigerator room has a temperature around 3 degrees and the yogurt stays there at least 24 hours so that they can ensure that it is perfectly curdled and it stays there until it is sold.

2.3.6. Output:

The process explained above generates a rich variety of yogurts. The yogurt produced will depend on their current demand. The options could be from jammed yogurts to a non-fat yogurt. As mentioned previously the taste they get has nothing to do with other yogurt brands, they are smoother and with creamy texture even the ones without fat.

2.3.7. Customers:

The customers are local resellers from Vallès area and also from Osona. The truth is that their products could be reaching much more market than now. The yogurt is produced with the aim to satisfy everyone. According to this, the client could be anyone. Currently the customers are these: small markets and also people who already know them and personally go to their farm to collect their demand.

2.3.8. Process Chart:

Similarly done in the other process, the table 8 is covering the main points of the yogurt production process.

Table 8: Process Chart

Name of the process: Yogurt Production Process	Type of process: Original Nº of process: 1
Goal: Get a different and tasty yogurt.	Nº of edition: 1
Coordinator: Ramon Cases	Date: 15 February 2015
Start the process: Reception of the milk.	End the process: Yogurt Refrigeration.
Inputs: 4 workers, liquid and powdered milk, ferment, sugar, jam. The equipment from the production plant: a pump, cream separator, tanks, and packaging machine.	Outputs: Rich variety of yogurts.
Suppliers: Ecologic conscious firms around Europe and themselves providing the milked milk.	Customers: Local and small resellers and clients that go directly to the farm to buy their yogurts.
Process Steps: Step 1: To supply the milked milk to the production plant. Step 2: To warm the milk. Step 3: To sweeten. Step 4: To homogenize the mixture. Step 5: To pasteurize. Step 6: To cool the temperature. Step 7: To throw the ferment. Step 8: To package. Step 9: To ferment. Step 10: To refrigerate.	

Illustration 5: Yogurt Production S.I.P.O.C

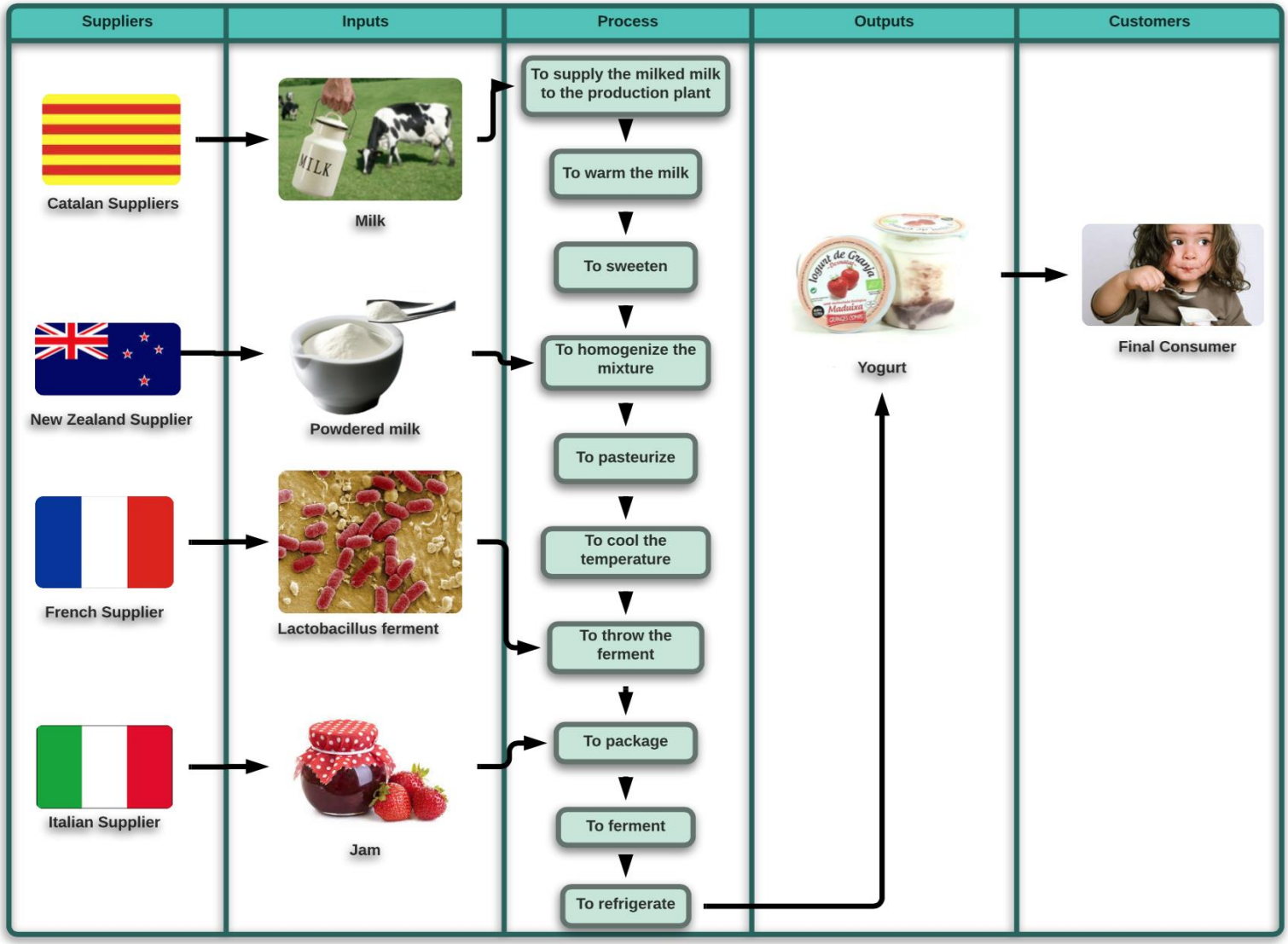
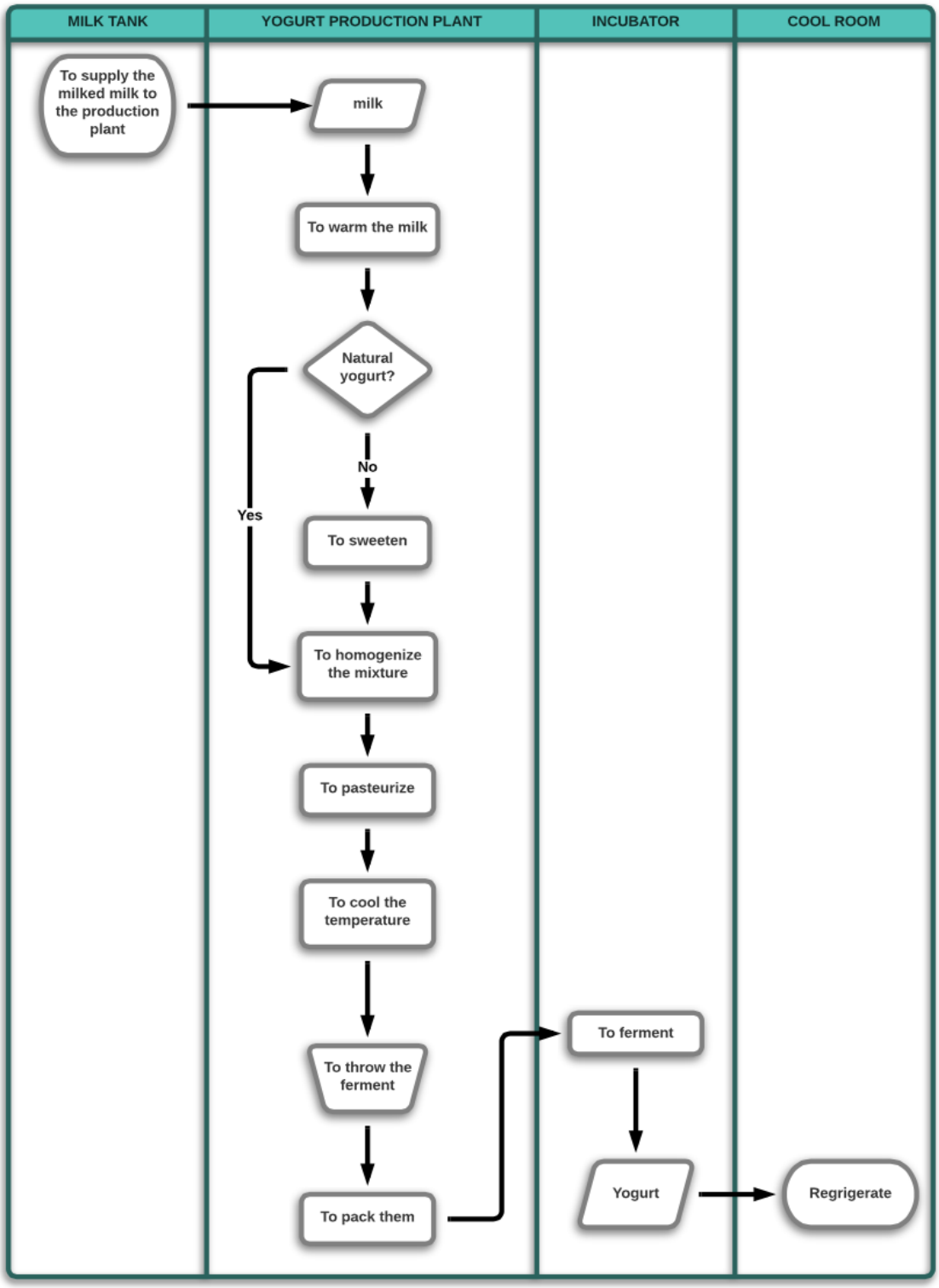


Illustration 6: Yogurt Production Process



3. IMPROVEMENT:

Once the operational processes have been described, we must recognize the key operational activity and identify how we can improve it.

The firm´s revenue comes from two sources: from selling their milk and from selling their yogurts. Clearly, the daily milk production exceeds their requirements of this raw material, whereas, the yogurt production is not equally efficient. Moreover, milk price is decreasing dramatically, as a consequence of the international situation: no quota, free production and industry strategy that are increasingly tightening milk producers; it is for this reason that they use milk as a raw material which would result into greater profitability.

Not to lose sight of the objectives set at the beginning: serving customers more efficiently and quickly, reduce production time and lowering errors.

According to these, what I have done is a research of how competitors were producing yogurt: benchmarking competitor's steps of production and comparing them to the ones applied by Granges Comas.

3.1. Proposal:

Yogurt production process:

Natural yogurts are produced following the same recipe as Granges Comas, so I will not change the traditional successful procedure. Nevertheless, there is still ways to improve:

1. To package: the machine they are currently using to pack only enables them to pack eight yogurts at the same time. Not mentioning that their employees manually introduce jam or other ingredients depending on the yogurt they are producing.

   The tank cavity is of 1,000 litres and 0.125 litres compose each unit of yogurt. So, the current packing procedure is to pack eight yogurts one hundred times per tank.

   The process can become more efficient by acquiring a new packaging machine that enables them to pack 200 yogurts at the same time. With only four rounds, they will get the same yogurt units as before (doing it one hundred times). Increasing the packaging speed will enable to empty the tanks quickly and then fulfil the tanks with more milk to start a new round of yogurt production.

   We have to notice that with this new packaging machine they will be saving time by increasing the speed of each round enabling them to do much more units

with notably less time and cutting down expenses from human power by standardizing the process with this new packaging machine. The process will become much more efficient.

However, it will be even better if this packaging machine also introduces the jam. They can fulfil a recipient with a different jam each round and the machine will do the rest. Eliminating the human power needed to fill each yogurt container with its jam will be costless.

2. To label: currently, the yogurts are not labelled until they are sold. When the customers came to buy the yogurt they manually label each unit with the correspondent tag. Of course, they have to recognize the product they are labelling. A task that is quite difficult because all different yogurts are packed in the same plastic container. Easily errors in this step often occur. Not mentioning the time spent per worker manually labelling all yogurt units sold. Nowadays, labelling machines are adaptable to other equipment. The best way to introduce the labelling machine would be just after the yogurt is packed with a rolling conveyor and labelling the 200 yogurts at the same time. The labels will be previously ordered according to the flavour or texture produced in each series. The main benefit apart from the time saving would be the error reduction.
3. To introduce the product into the final package: this would be a new step. Currently the yogurts are sold to unit-by-unit asking the customers the flavour they want to buy. A good way to gain time without losing customer satisfaction is to prepare a final package of four yogurts. It would be easily transportable for the customer and it has another enormous benefit: as explained above, once the yogurt is packed it needs to be transported from the yogurt production room to the incubator room. This transportation phase needs to be accurately done because the yogurts are still liquid and fragile with high risk to be broken. If the plastic containers are reinforced by a cardboard package it will gain stability and yogurt broken risk will be reduced considerably.

With these three proposals the firm will gain efficiency by reducing cycle time, errors and risk. Their customers will be more satisfied by getting the product more quickly and with a portable package.

They can measure the benefits obtained by tracking their current performance. This will imply to set indicators of their interest, Key Performance Indicators (K.P.I), and for

each indicator they need to set the desired outcome that they want to achieve in order to ensure quality, efficiency, cost control…

A current practise is to set an upper and lower limit and try not to move from this range. When the results are not as expected, the process should be analysed and think about possible changes within the process that will ameliorate the outcome. Implementing a metrics system, enable firms to acknowledge their current performance and compared it with their target, making more visible the situation. Each indicator enables the firm to find out the non-achieved objectives and as a consequence find the possible improvement areas. Tracking their performance and setting their objectives is useful to maintain the standards of quality and a system of continuous improvement.

In the table 9 a possible set of K.P.I for the firm Granges Comas is developed. Each indicator has a target to be achieved and the data to be carefully analysed from which they will obtain the required information.

Table 9: metrics proposal

Metric	**Definition**	**Target**	**Data**
Quality: is the new process free from errors?	Does the cardboard package increases the stability and reduces the number of breakdowns?	No more than 2 per week.	Reports controlling the defective products.
	Is the labelling machine correctly labelling the product?	No more than 2 per month.	Reports about total of yogurts produced and total labels used.
Cycle time: is the yogurt production process being quicker?	The packaging machine has increased the speed?	To pack each unit at 0.15 seconds.	Reports about the timing. The time spend in each step should be recorded.
Customer satisfaction: are the clients satisfy with our product?	Number of claims the service department attend.	No more than 1 per month.	Record all claims and comprise into similar subjects.

Customer satisfaction: how many times does the customer have to wait until he receives its demand?	Is demand more controlled after implementing all measures?	Waiting time cannot exceed more than 24 hours.	Record the waiting time and control products demanded by preventing unpredictable demands by having an appropriate stock.
Cost: is the new process more cost-effective?	Return on investment.	Between €5,000 and €10,000 per €2,500 invested.	Accountancy reports.

4. ACQUIRE RESOURCES:

To carry out the process changes proposal, there must be an investment to acquire three new machines:

1. Packaging machine
2. Labelling machine
3. Final packaging machine: that will introduce four yogurts within the plastic container into a new final cardboard package.

The required inversion to acquire the mentioned machines will be about €50,000 at least according to several industrial machinery webpages. The employees working in the yogurt production plant will be trained to use and manage these machines. To assume these expenses a credit with a banc will be desired.

There is a credit for an agricultural campaign that offers €50,000 at 2.2% of interest returned in 72 months on a trimestral basis. The amortization of this credit will be the following:

$$50{,}000 = A\left[\frac{1-(1+\frac{0.022}{4}^{-4*6}}{\frac{0.022}{4}}\right]$$

Amortization = 2,229.57 per trimester.

After 6 years the final value would be: 2,229.57 * 4 * 6 = 53,509.75

The Return of Investment of the same operation:

$$ROI = \frac{53{,}509.75 - 50{,}000}{50{,}000}$$

Return of Investment: 7.01%

As it is a positive value the investment should be undertaken.

On the other hand, measure system implementation with metrics will be carried out by one of the grandchild that is a technology expert. Fist, he will be trained and acknowledge of the measurement Enterprise Resource Planning (E.R.P) systems that other organizations use. . Not having access to the financial status of "Granges Comas" is difficult to predict when the investment will be returned.

5. IMPLEMENT:

Up to this point, the last step to take is to implement the changes. In order to avoid resistance or refusals, the process owner should remind the benefits they will obtain by applying this new process. A good practise is to first simulate and let everyone understand each new phase. Finally, new process implementation will occur and a management system will be implemented which will enable them a new firm methodology based on a continuous improvement cycle. Along with the process improvement proposal it should be overlapped with a marketing plan to guarantee its success. Paul Arveson article explains the known "Plan – Do – Check – Act" method of continuous improvement: "W. Edwards Deming in the 1950's proposed that business processes should be analysed and measured to identify sources of variations that cause products to deviate from customer requirements. He recommended that business processes be placed in a continuous feedback loop so that managers can identify and change the parts of the process that need improvements. As a teacher, Deming created a diagram to illustrate this continuous process, commonly known as the PDCA cycle for:

PLAN: Design or revise business process components to improve results

DO: Implement the plan and measure its performance

CHECK: Assess the measurements and report the results to decision makers

ACT: Decide on changes needed to improve the process" (2015: 1).

CONCLUSIONS:

The conclusion of the conductive line of this work is certainly that having knowledge of the different processes of the firm is a must to take better decisions. However, this does not mean that they should not be open to new perspectives when studies prove that there is room for improvement. Without the knowledge of the current processes, firms are not able to detect errors or improvement areas, whereas awareness of these can let managers address its efforts to increasing customer satisfaction and enhancement of their efficiency. The product quality achieved by "Granges Comas" is the outcome from an accurate methodology, and culture of improving their offered products followed generation after generation.

The quality is nothing but the result from "how" the company operates. The special attention on the cow's alimentation is perceived on the milk quality that is then used to produce the yogurt. The firm operational activity final outcome, the yogurt, is clearly differentiated from all yogurt competitors because of the following fact: the way the firm operates to get its product and quality reputation lies on the particular process that they use.

It is not my intention in this conclusion to mention new arguments to conclude with which have not being mentioned previously, but if we follow the same common sense with which we started this work, and when coming to an end the overview changes its point and sees the work done as a feature among other features such as strategy, financial, information and other traditional management disciplines.

A question of crucial importance after studying the processes of "Granges Comas" would be: "Is there life beyond this project?" the answer is "yes there is" as long as the owners are prepared to apply the conclusions of this work and expand their business. This study takes for granted that a "small firm" has to follow the rules from EU, Spanish government and The Generalitat of Catalonia but also their clients level of quality requirements in the case of the firm Pascual and the proximity customers.

The point is that this business has passed from generation to generation improving the taste of the dairy products such as the yogurt. Very small variations in the process comparing them with those of other competitors have as a result a special taste distinguishable from the competence. To assert this theory a survey will be made only a few weeks after this work about B.P.M and B.P.I is delivered. The next step would be to expand their own resources, financial loans or partnership with risky investors. This is a matter though that concerns to "Granges Comas".

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