

Integral viability analysis of entrepreneurial projects in critical contexts: Application to the case of the management of a shea mill in Kumbungu, Ghana

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Abstract

Purpose: This research presents a method proposal to analyse the viability of entrepreneurial projects in critical contexts of developing countries.

Design/methodology: The method proposal is applied to a case study on the integral viability analysis of a shea mill in Kumbungu (Ghana). Based on a qualitative design, different ad hoc participatory tools are implemented, such as a daily routine schedule, combined with other research techniques (focus groups, interviews, etc.).

Findings: The proposal includes ten specific steps to analyse the viability of entrepreneurial projects. It involves, on the one hand, the active participation of the members of the community in order to be able to make a real analysis of their needs; and, on the other hand, an integrating analysis that allows evaluating the sustainability of the project from an economic, social and technological perspective. The method is applied to the start-up and management of a shea butter mill in Ghana. Some core aspects are highlighted: 1) people are considered key when making decisions, thus participatory tools (such as the daily routines workshop) can be essential in ensuring the sustainability of the enterprise; 2) the need to adapt the tools to the context. This is crucial in contexts such as Ghana, where language may be a barrier or because the illiteracy rate is high. And 3) from the method, it is concluded that it is necessary to prioritise the sustainability of the enterprise in general, not just efficiency.

Originality/value: The research combines the classic tools of business viability analysis with those of development cooperation. In this sense, it is proposed to carry out an integral viability analysis that includes not only the economic sustainability of the project, but also the social and technological aspects and, more important, where the active participation of all the stakeholders is considered.

Keywords: Community participation, Development, Social entrepreneurship, Sustainability, Viability analysis

Jel Codes: O22, E22, M11, Q01

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1. Introduction

Several studies have demonstrated the importance of entrepreneurial actions as generators of economic growth (Achtenhagen, Ekberg & Melander, 2017; Meyer & Jongh, 2018; Urbano, Aparicio & Audretsch, 2019, for example). In addition, these actions are usually accompanied by strategies and public policies that support the creation of companies. However, in the literature there is an increasing consensus on understanding entrepreneurship as the discovery, evaluation and use of opportunities to create future goods and services; that is, as a process that can be applied to any form of business, not limited to the creation of small and medium enterprises (Luke, Verreyne & Kearins, 2007). Nevertheless, when these entrepreneurial projects are undertaken in critical contexts, such as many rural areas in developing countries, there are a series of context-specific factors that must be considered (Amoah, Berbegal-Mirabent & Marimon, 2022; Corner & Kearins, 2021; Doran, McCarthy & O'Connor, 2018; Sergi, Popkova, Bogoviz & Ragulina, 2019; Vivarelli, 2013).

Aspects such as participation, gender, power relations, corruption or inclusive technologies become relevant in the development agenda (Alonso, 2018; Zimmermann & Smith, 2011).

In recent years there has been a growing interest in analysing the processes linked to entrepreneurship due to their direct impact on regional development (Coulbaly, Erbao & Metuge Mekongcho, 2018), although this impact is not always positive (Malecki, 2018). This analysis must be approached not only from an economic angle, but also from a social, community and technological perspective (Neumann, 2021), due to the dynamic impact that ventures have in these three areas. However, before commencing an entrepreneurial project, it is necessary to study its viability in order to avoid possible failures. Traditionally, this has been understood from a purely economic point of view, aiming for these entrepreneurial projects to be profitable over time or, at least, sufficiently so to avoid possible financial risks. However, in the last few decades, a shift occurred in which enterprises not only had to guarantee the financial sustainability of the project but also create a positive social impact. Thus, the concept of social entrepreneurship was created (Agrawal & Hockerts, 2013; Austin, Stevenson & Wei-Skillern, 2006; Gupta, Chauhan, Paul & Jaiswal, 2020) in which the social impact is as important as the purely economic viability; although it is true that it presents the added difficulty of being more complex to measure (Lane & Casile, 2011). Although there is an extensive literature on social entrepreneurship (Gupta et al., 2020), most of it focuses on the social impact of these ventures and how to measure their success (Gali, Niemand, Shaw, Hughes, Kraus & Brem, 2020; Rawhouser, Cummings & Newbert, 2019; Zeyen, Beckmann & Akhavan, 2014). However, the importance of the process itself and the participation of the community when these entrepreneurial projects are developed in critical contexts is not usually considered. Our article aims to fill this research gap by considering social enterprises from a more innovative and inclusive paradigm, combining business techniques with strategies and tools used in development studies and, thus, highlighting issues such as participation, empowerment or the gender perspective, among others, as key elements for the success of these projects.

Under this new paradigm of integral development, and considering the importance of economic growth as a lever for development, this article presents an investigation that proposes a method for the viability analysis of an entrepreneurial project in a critical context. The novel aspects of the method are, on the one hand, that it combines classic business viability analysis with tools used in the area of international development cooperation promoting the active participation of all the stakeholders and, on the other hand, that the business viability is considered from a holistic framework, going from analysing the purely economic viability of the project to analysing its integral viability, seeking the sustainability of the project in the economic, social and technological areas. The proposed method is implemented through a real case study: the start-up and management of a shea butter mill in Ghana. This is an international cooperation initiative of the Universitat Politècnica de València (UPV) (Spain) with the Bobgu N-Nye Yaa women's association in Kumbungu, a town located in the northern region of Ghana.

To address the work, the article is structured as follows: the next section presents the literature review and the method designed to analyse the integral viability of entrepreneurship projects in critical contexts. Then, the results of applying the methodological proposal to the case study of the shea mill in Kumbungu are shown. Finally, the main conclusions of the research are presented.

2. Literature review

Development projects that provide goods or basic services to improve the well-being of people are generally welcomed by rural settlements. It is for this reason that donors, non-governmental organizations (NGOs) and other stakeholders dedicate a considerable amount of their aid to basic infrastructure technological projects (Fernández-Baldor, Boni, Lillo & Hueso, 2014) or to run small business (Achtenhagen et al., 2017). However, in complex environments such as the least-developed areas of the world there are many different considerations to be taken into account when planning a project or starting a micro firm (Griffin, 1991; Unceta, 1996; Achtenhagen et al., 2017). The existing literature shows us the importance of planning when implementing a development project or a venture in a developing country. It ensures that resources are used effectively (Kumar & Russell, 2002; World Bank, 2015), local needs are met (Chambers, 1983, 1997), risks are identified and addressed (Ackerman, 1997; Mercer, 2010), local capacity is built (Eade, 2009; Chambers, 1983), and transparency and accountability are promoted (Smith, 2003; Goel & Nelson, 2016). Two of the main methods for planning development projects are the Logical Framework Approach (LFA) and the Theory of Change (ToC). In the following lines we will briefly develop both methods and analyse their limitations.

The LFA, developed by the United States Agency for International Development (USAID) in the 1960s, is the main planning tool for designing, monitoring and evaluating development projects. It is concerned with the planning procedures of problem analysis, the development of objectives and indicators and the identification of risks and assumptions, which feed into the overall programme plan (NORAD, 1999). The LFA sets out a number of standard steps to be completed, which may include some form of participatory problem assessment and identification of aims and objectives, some form of risk assessment and so forth. The output of the LFA, the project or programme plan, is usually required to be summarised in a logical framework. However, this tool has been criticised because it embodies a linear logic associated with things rather than people, with simple and controlled conditions and with closed systems (see for example Dale, 2003 or Bell, 2000) and for disempowering people in the process (Chambers & Pettit, 2004).

An alternative to the LFA when planning is the ToC. It is difficult to trace precisely when the term “theory of change” was first used, but a hint at its origins can be found in the work of Kurt Lewin in the 1950s (Zand & Sorensen, 1975), focusing attention on people’s behaviour and change in organizations. In this theory, Kurt Lewin shares a specific model of change called the Unfreeze-Change-Freeze or 3-step model. Later on, in the mid 1990s, it also can be found in the considerable body of theoretical and applied development in the evaluation field, especially among the work of people such as Huey Chen, Peter Rossi, Michael Quinn Patton, and Carol Weiss (see an example of ToC origins at Weiss, 1995). Its purpose at that time was to address some of the problems faced when assessing the impact of complex social programmes developed with LFA methods. These problems included poorly articulated assumptions, a lack of clarity about how change processes unfolded, and insufficient attention being given to the sequence of changes necessary for long-term goals to be reached (O’Flynn 2012). ToC thinking has progressed rapidly since then and is becoming increasingly popular. Guides and literature reviews on ToC have been published by Comic Relief (James, 2011), DFID (Vogel, 2012a), ESPA (Vogel, 2012b), The Asia Foundation (Stein & Valters, 2012), UNICEF (Rogers, 2014), ODI (Valters, 2015), HIVOS (van Es et al, 2015) and UNDAF (UNDG, 2017). ToC can be developed in many ways, but common elements include 3 steps (Vogel, 2012a): 1) an articulation of how change happens in a particular context, 2) clarification of an organisation’s role in contributing to change, and 3) the definition and testing of critical assumptions. Developing a ToC normally involves carrying out some analysis of the forces which have the potential to affect any desired outcomes (Jones 2010). The first step, therefore, is normally an assessment of how change could happen in relation to a particular issue. The second step attempts to explicitly identify an organisation or programme’s own contribution to change. The main purpose of this stage is to be able to identify which changes an organisation and its partners can contribute to directly and/or indirectly, and which areas of change are beyond their scope. At the end of this step it is necessary to develop a conceptual pathway: identifying an achievable long-term goal and clarifying the key changes which need to be in place for this goal to be realised. The third step is critical in the ToC planning and is related to the articulation of assumptions. These assumptions can be seen as conditions that are necessary for change at one level to influence change at another level.

However, ToC are most useful for complex organisations and programmes involving multiple partners, as they enable a shared understanding of how change happens and an organisation or programme's own role in bringing about change (James, 2011). But very little or not at all has ToC been used to start small businesses. Some are also concerned that ToC often involve a large amount of time and resources if they are to be done effectively (Vogel, 2012a). In addition, ToC has been used mainly for planning non-profit actions, but there is no literature on how to use ToC for small businesses.

Given the limitations of LFA and ToC, in this research we propose a method divided into ten specific steps (Figure 1) for the viability analysis of an entrepreneurial project in a critical context that, as has been mentioned, considers the active participation of the community to guarantee success. Any idea, project or new business needs to be tested to ensure the potential viability and success (Arvanitis & Estevez, 2018). Feasibility studies are the first and one of the most important steps before undertaking a project (Shen, Tam, Tam & Ji, 2010) and provide essential information to defining how the project can be successfully implemented to maximize the benefits for organisations and society (McLeod, 2021). In the context of a new business idea or project, the feasibility it is often misunderstood as the determination whether it is technically feasible, in financial terms. However, other aspects such as the social or environmental sustainability should also be considered. Different models can be used to this end, but all of them are based on three main steps: (i) data collection, (ii) establishment of the project objectives and (iii) definition of indicators to measure the accomplishment of the proposed objectives. What is new about our proposal is not what is analysed, but how it is analysed and who participates in the process. Accordingly, the proposal involves, on the one hand, the active participation of the members of the community in order to be able to make a real analysis of their needs; and, on the other hand, an integrating analysis that allows evaluating the sustainability of the project from an economic, social and technological perspective.

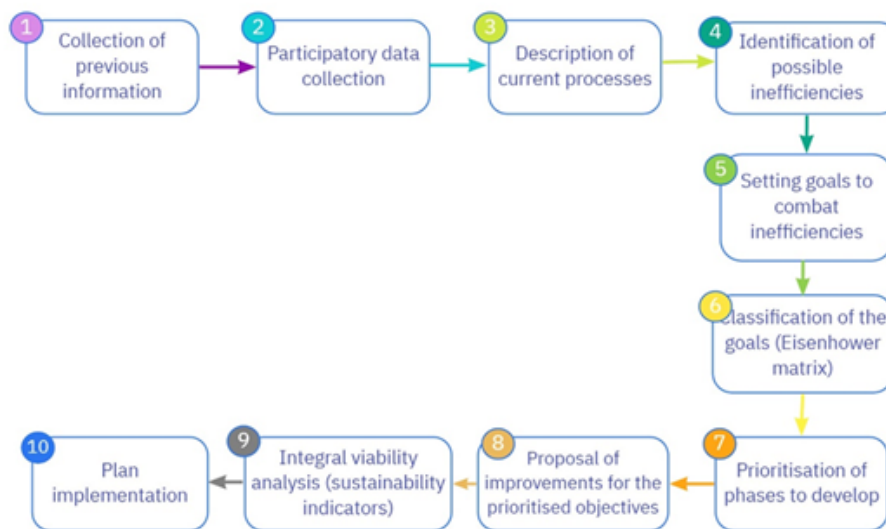


Figure 1. Steps of integral viability analysis method

As typical viability analysis, the first steps are to collect and analyse reliable data (Reynolds et al., 2005). Systematic collection of information is generally undergo using secondary sources, however, in critical contexts, this information is frequently scarce. For this reason, the proposal is to complete it with primary sources such as personal interviews with collaborators and/or project promoters (Step 1). Moreover, collecting field data directly from the stakeholders enables an understanding of the economic, social, demographic, cultural, environmental and political factors, as well as the interrelationships between them, which may affect the viability of the project (Step 2). To this end, techniques and instruments known in development cooperation as participatory tools should be used, which are intended to involve the members of the community so that they are the transforming subjects of their own development (Domínguez Narváez, 2012).

From the data collected and through direct observation, the next steps are (i) to describe the processes (Step 3), to identify possible inefficiencies (Step 4), to set goals to overcome inefficiencies (Step 5), to classify goals (Step 6), to prioritize phases to develop (Step 7) and, finally, to propose improvements for the prioritised objectives (Step 8).

To these steps, simple visual tools can be used. Visual tools facilitate communication with the community in this type of context, where illiteracy is usually high, as well as communication difficulties derived from language differences or even the impossibility of speaking with women from certain communities without the presence of their husbands. For the success of the project, it is essential to use all the data collected in previous steps in order to contextualize the project in its reality, and the involvement of the members of the community, who assume roles as transformers of their own project whereas external agents should simply take on the role of facilitator without participating.

The novelty of this proposal is the inclusion of an integral viability analysis (Step 9) to analyse whether the project is “sustainable”, rather than whether it is “efficient”, this being distinct from the usual practice in conventional business contexts that mainly focus on financial aspects. Sustainability includes the interaction and integration of ecological, social, and economic systems (Hutchins & Sutherland, 2008). Although, broadly speaking, the term sustainability refers to the quality that ensures meeting present needs without compromising the needs of future generations (WCED, 1987), its specifications and its evaluation are, even today, ambiguous. However, there is a common consensus that sustainability is context-dependent (Bosevska & Kriewaldt, 2020; Zacher, 2017; and that is determined by the needs and opportunities of the environment in which it is located. In short, it is proposed to carry out an integral viability analysis that includes not only the economic sustainability of the project, but also the social and technological aspects. Other authors have made similar proposals in specific contexts, such as Scheyvens, Banks, Meo-Sewabu and Decena (2017), who propose a series of indicators grouped into three areas (economic, social and environmental) to measure the sustainability of indigenous companies in the Pacific islands. In the present study, the indicators proposed by Dunmade (2002) are extrapolated to analyse the viability of projects that implicitly imply the use, adaptation or reuse of some technology, which is usually the case of enterprises in critical contexts. Dunmade (2002) proposed a list of primary and secondary indicators for evaluating the sustainability and adaptability of any foreign technology in a developing economy. We expand this idea by adapting these indicators to measure the sustainability of a complete project, which may include or not a foreign technology. In this sense, we propose, for example, not to measure only the access to resources for maintaining the technology (affordability indicator) but to measure if the project encompasses all the required resources for its success. These indicators are classified into three areas: economic, social and technological.

Finally, the implementation of the selected improvement or improvements must be planned (Step 10), describing the changes, strategies and resources necessary to be able to carry them out.

In summary, Table 1 below compares the features of the two prevailing methods with our 10-step proposal:

Main features / Method	LFA	ToC	10-step viability analysis (our proposal)
<i>Logic</i>	Linear, simple and controlled conditions	Complex reality	Complex reality, but simple 10-steps proposed
<i>Empowering process</i>	Disempowering	Empowering	Empowering
<i>Cost</i>	Cheap	Expensive	Cheap
<i>Focus on</i>	NGOs	Big organisations or companies	Small companies or NGOs

Table 1. Comparison of the key features of the three planning methods

3. Methodology

3.1. Research settings

The research approach adopted in this study is a qualitative approach, specifically, a single case study. A single case study is appropriate where it represents a critical case and allow researchers to investigate phenomena in

depth to provide rich description and understanding (Darke, Shanks & Broadbent, 1998). The single case study allows researchers to study a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and its context are not clear (Yin, 2009). More concretely, this study analyses the integral viability of a shea mill of Bobgu N-Nye Yaa, a women's association located in Kumbungu (Ghana) in collaboration with UPV (Spain). To get the project started, the UPV collaborated with the women's association to raise the necessary funds to buy a mill to produce shea butter. The association has had a mill since 2008. Since its construction, production in the workshop was constantly interrupted as a result of the economic difficulties involved until, towards the middle of 2018, it was definitively closed due to the substantial electricity debt which they were unable to pay. Due to the cessation of activity in the workshop, many women stopped producing shea butter and, according to the association's leader, those who continue to produce do so in much smaller quantities and less frequently than before. The aim of this research is to investigate the viability of putting it into operation again following the method presented in the previous section.

The study covered a period of 8 months and was divided into three main phases: Phase 1, carried out in Spain from May to July 2019; Phase 2, the field data collection, carried out in Kumbungu from August to December 2019; and Phase 3, the data analysis, carried out in Spain from January to November 2020. At the time the research was carried out, a total of 72 women participated in the association.

3.2. Data sample and collection

Data collection combined different sources and different qualitative techniques (interviews, participant observation and participant workshops), depending on the research phase (see Figure 2).

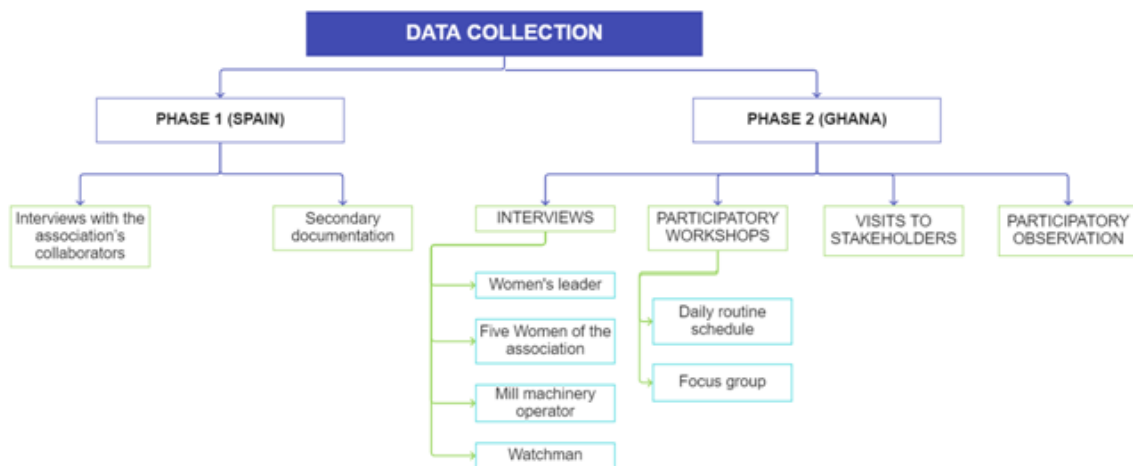


Figure 2. Data collection techniques used in each phase

In the first phase, carried out in Spain, secondary documentation was reviewed, mainly various studies carried out in Ghana and its neighbouring countries published by non-governmental organisations that work with groups of women who process shea butter. This information was complemented with a total of five interviews with the association's collaborators in Spain to obtain information about the history of the project and a certain context about the life of the community, which expedited data collection in the field. The detail of the interviews are in Annex 1.

In the second phase in Ghana, primary data was collected to carry out an analysis from a more realistic perspective and propose solutions that really focus on improving people's quality of life. Firstly, two participatory techniques were used: participant observation and participatory workshops. For the participant observation, one of the researchers was able to spend five months living in the community and establishing interpersonal relationships with its members, giving her the opportunity to learn first-hand about the intrinsic characteristics of the country. Information was obtained about sociocultural aspects of the community, such as the way in which relationships between its members are established, the way of doing business, the rhythms of life of the population, among others, as well as other particularities that would have been very difficult to obtain by other

means. For participatory workshops, work was done directly with the population in order to determine their preferences and the reasons behind them. Specifically, with the aim of obtaining the gender roles of the community, two ad hoc participatory workshops were designed, in which only the women from the association participated. First, a daily routine schedule was made, a tool that served to identify the activities (reproductive, productive and community) that the women carry out in their daily lives. To this end, 24 of the 72 women from the association were gathered and divided into three groups of eight people. Next, they were shown a series of images representing the various daily occupations carried out by women and were asked to order these drawings chronologically according to the time of day they perform them. Subsequently, from all the activities of their daily routine, they had to select the five tasks that they generally perceived as the most important. Then, they were shown tasks of an exclusively productive nature and were again asked to prioritise them. In this way, it was intended to understand what role the production of shea butter plays in the lives of women of the association. The second participatory workshop consisted of a focus group with the women in which the researcher in the field, acting as a facilitator, led the discussion so that all of them could establish what the rules of the mill should be, which enabled the elaboration of a group constitution. In addition, a total of seven semi-structured interviews were also carried out with different members of the association: the women's leader, the mill machinery operator, the watchman and five of the 72 women of the association. Table 2 summarizes the main information collected from the interviews. The detailed content of these interviews is in Annex 2.

Research phase	Interviewed	Information collected
Phase 1	Bobgu-N-Nye Yaa members from Spain	<ul style="list-style-type: none"> • Group organization • History of the group
Phase 1	Bobgu-N-Nye Yaa members from Spain	<ul style="list-style-type: none"> • Previous problems with the mill • Fabrication process • Sales process • Budget
Phase 2	Group's leader	<ul style="list-style-type: none"> • Fabrication process • Final product characteristics • Sales process
Phase 2	Machinery operator	<ul style="list-style-type: none"> • Machinery maintenance • Responsibilities of the machinery operator
Phase 2	Watchman	<ul style="list-style-type: none"> • Responsibilities of the watchman • Payment
Phase 2	Group's leader	<ul style="list-style-type: none"> • Group organization • Supplies • Financial organization • Fabrication process • Facilities • Final product characteristics

Table 2. Information collected during the interviews (own elaboration)

Finally, various visits were made to other stakeholders, with the aim of obtaining additional information; for example, to understand how other cooperatives work or to receive advice from other entities.

3.3. Data analysis

Data analysis was performed in 4 steps and combining different tools. The first step was to describe how the shea mill produced in the past and to identify the main inefficiencies of the process. Considering the high illiteracy rate and language barriers, a simple visual tool was selected: process flow diagrams. This tool allowed to, firstly, describe the production processes and, secondly, to identify inefficiencies when they were compared with other mills in Ghana and according to the information obtained with the participant tools used for data collection. This step was implemented between January and November 2020.

The second step was then to define and prioritise the goals for the Bobgu N-Nye Yaa group. In this step, the Eisenhower matrix was applied to classify the tasks or goals in relation to two dimensions: most important-least important and urgent-not urgent. This tool was again chosen because its visual simplicity. The elaboration of this classification was carried out with the collaboration of four association's partners who reside in Valencia. In

addition, information from interviews conducted in the field was considered, in which women were asked their opinions on what the main problems of the Bobgu N-Nye Yaa butter workshop currently were.

The third step was to determine the integral viability of the project. To this end, the indicators proposed by Dunmade (2002) were adapted. They allow measuring the sustainability of the project from the economic, technological and social axes.

First, economic sustainability can be evaluated according to the following indicators:

- **Affordability:** it encompasses the financial capacity, not only to acquire the necessary resources, but also to maintain them at maximum performance throughout their useful life.
- **Reuse:** the relevance of this factor lies in the fact that the net benefit of the resources increases if these resources or part of them can be sold at the end of their useful life, as this would allow recovering part of the initial cost, a critical element in situations of financing difficulties.
- **Local availability of the necessary resources:** it is essential that the community has access to the necessary materials and technicians, since in the event of breakdowns, the costs of reactivation would be reduced. In addition, slowing down or even stopping the activity would be avoided, as this could mean that the community would disengage from the project, which would result in its failure.

Secondly, technological feasibility refers to the analysis of those factors that allow us to know if the different proposals are physically implementable in the new environment. The project is considered technologically sustainable if it exists:

- **Accessibility of parts:** as already mentioned, it is essential that there is access to spare parts at the destination in the event of breakdown of machinery or technological resources.
- **Availability of technical knowledge:** this consists of assessing the existence of members in the community who know how the technology works, so that they are able to operate it and take care of its maintenance and repair when necessary.
- **Adequate replacement time and time between repairs:** it is important to take both into consideration when analyzing the feasibility of the project as they have a direct effect on it.

Third, social feasibility consists of a qualitative analysis using mainly the information gathered from the primary sources in step 2, emphasizing the importance of gathering information in the field through participatory techniques. The following indicators are used to assess social sustainability:

- **The level of awareness of the project:** it is important to assess whether the people involved are aware of the project and the resources and processes required for its implementation, as well as its benefits and drawbacks.
- **Social acceptability:** the better known the project is in society, the greater its acceptance among the people involved. It is clear, therefore, that an entrepreneurial project that is not socially accepted will result in a loss of the resources provided.
- **Government policies:** there should be no obstacles on the part of the government or public administrations that hinder the implementation of the project.
- **Socio-cultural influence:** as already mentioned, the cultural factors and customs of the place of destination must be well known in order to be able to predict how the society will view the entrepreneurial project.

Finally, for planning the implementation of the project is proposed using a Gantt chart since it allows to easily understand what tasks are necessary, who is responsible for carrying them out, and what is the established timeframe.

4. Application to the case of the shea project in Kumbungu, Ghana

4.1. Contextualisation of the case study: Shea butter

Shea is a tree belonging to the Sapotaceae family called *Vitellaria paradoxa* (Hatskevich, Jenicek & Darkwah, 2011). It is estimated that the tree covers an area of Ghanaian savannah of about 77,670 km². When its fruits ripen, they fall from the tree from their own weight, and it is then that the local inhabitants collect them. After boiling and grinding, a vegetable fat is obtained that has multiple uses. Traditionally, these fruits have been treated to be used as oil and creams for skin or hair, especially to protect them from the strong harmattan winds that blow in the northern part of the country. The vegetable fat contained in shea nuts is beneficial because it promotes cell regeneration, improves circulation and is a good natural sunscreen. In cooking, it is used as a substitute for butter due to its oily composition. Once the shea butter is extracted, the residue can be used as fuel or to plaster traditional mud huts. In addition, the wood can also be used to make hoes, kitchen mortars or even traditional drums, which play a fundamental role in Ghanaian culture (Hatskevich et al., 2011). There is currently a growing international demand for shea butter, mostly for cosmetic industry and food sector. This, together with the instability of the world price of cocoa since 1970, makes shea butter a sector with a booming potential (Bello-Bravo, Lovett & Pittendrigh., 2015).

Shea butter production is one of the main sources of income for many rural women in northern Ghana. Although some workshops are equipped with machinery to increase their production, the manual method still predominates. The fundamental problem in the industry is that shea butter producers are unable to obtain high economic returns for four main reasons: poor quality of the product after the process, lack of attractive packaging, illiteracy, and difficulties in obtaining raw materials when suppliers increase their prices at the end of the season. The combination of these factors means that the women involved in the process barely receive financial remuneration, with the consequent effects of their children dropping out of school, malnutrition, famine, emigration and disease (Esinam, 2010). It is for all these reasons that this sector has aroused the interest of many Metropolitan, Municipal and District Assemblies, Non-Governmental Organisations, private companies and other institutions that have provided resources for its development.

Bobgu N-Nye Yaa is a women's association located in Kumbungu (Ghana). This region has the highest multidimensional poverty index (MPI) in the country (its MPI is 0.491). If its incidence is taken into account, a figure is obtained that 8 out of 10 people in this area are multidimensionally poor (GSS, 2020).

In 2007, the group of women expressed to the UPV the need to create a space equipped with electrical machinery that would allow them to produce more shea butter and in better conditions. At the beginning of 2008, the mill was built and the necessary machinery was installed and in December 2008, the group was formalised as an association and the rules that still apply today were established. However, in 2018 the mill was abandoned. The method proposed in this work allow an understanding of the inefficiencies that led to the abandonment of the mill to be obtained, as well as an analysis of the viability of putting it into operation again.

4.2. Results

At this point, the results obtained after applying the integral viability analysis method proposed to the case study are presented.

Step 1: collection of previous information

Most of the documents reviewed in this step were contextualised in Ghana, therefore they were used as a basis in order to be able to compare the processes followed by other cooperatives and, thus, detect some of the possible inefficiencies. These publications also made it possible to determine what improvement actions these NGOs have carried out to help women's groups and what results they have obtained.

Step 2: Participatory data collection

The next Figure 3 illustrates the results of the daily routine participatory workshop.



Figure 3. Results of the daily routine schedule participatory workshop

Very similar results were obtained among the three groups analysed, so the conclusions of the daily routine schedule activity are shown together. As can be seen, women carry out tasks of a productive nature after the morning housework, once they have prepared food for the whole family, which occurs at approximately 1:00 p.m. However, within these types of tasks, their work priorities are as follows: in first place, they prioritise going to the farm fields to work on the harvest, which implies a high load between the months of April and August; second, they perceive the sale of food in the local market, which takes place once every six days, as important. In the event that they do not have to perform either of the two previous tasks, this is when they would go to the mill to produce the butter (before shutdown). This latter activity represents mainly a personal economic motivation for them, since their current economic sustenance comes primarily from what their husbands give them, although a few raise some money of their own by selling their own products in the local market. According to them, the money they earn for their sales tasks is for themselves and they do not have to share it with their husbands. Normally, these financial resources are invested in school fees for the children and in supporting themselves. Lastly, members of the three groups mentioned that they need their husband's permission to go to the butter mill and that, at the precise moment that their husband asks for them, they abandon whatever activity they are doing to attend his call.

The focus group with women of the association led to establish the group constitution. From the suggested rules it can be seen that the way to penalise a member of the community is to make her pay an amount as a fine.

Step 3: Description of current processes

Current manufacturing processes were represented by using process flow diagrams. Prior to the closing of the mill, the productive activity was carried out following five phases (Figure 4) executed chronologically, except for the management, which is parallel to the productive process and is not carried out by the women butter processors but by an administrator hired for this purpose.



Figure 4. Phases of the shea butter production process followed by the Bobgu N-Nye Yaa association

Regarding the obtainment of the nuts (first phase), there is no standard procedure to obtain this raw material in Bobgu N-Nye Yaa. Some women prefer to pick the fruits themselves in the forest and extract their nuts, while others prefer to buy the nuts directly from the local market.

The butter manufacturing (second phase) is carried out following a semi-mechanised method. From the beginning of the butter manufacturing phase, it takes between two and three days to carry out all the steps described above, taking into account that for its computation the necessary rest times between some tasks have been considered and that around four women have been involved in the extraction. According to calculations made in the field, from a bag of nuts containing 87 kg, the Bobgu N-Nye Yaa group obtains approximately 26 kg of butter, which means that only 29% becomes a final product, while cooperatives of the area with similar characteristics extract between 32% and 40% of butter from the nut. Regarding the packaging phase (third phase), this varies depending on where the product is to be sold, so both stages are analysed together.

Normally, the women sell the butter in the local market both in Kumbungu itself and in larger nearby towns. For this type of sale, the butter is packaged in small bowls of 5 kg of product, or in larger bowls whose weight is between 18 and 25 kg. These containers are stored on the mill floor until they are sold. On the other hand, every time a volunteer from Valencia stays in Kumbungu for a period of time, he/she brings back shea butter to be sold in small quantities back home. If the butter is manufactured for this purpose, it is weighed beforehand and placed in 2 kg bags that are pressed using a specific machine.

The management stage was carried out by a man from outside the group who was hired to carry out this task, since, as mentioned above, the women in the mill are illiterate and do not have sufficient knowledge to do so. The person in charge does not follow a standard procedure to carry out the administration of the workshop, as illustrated in Figure 5.

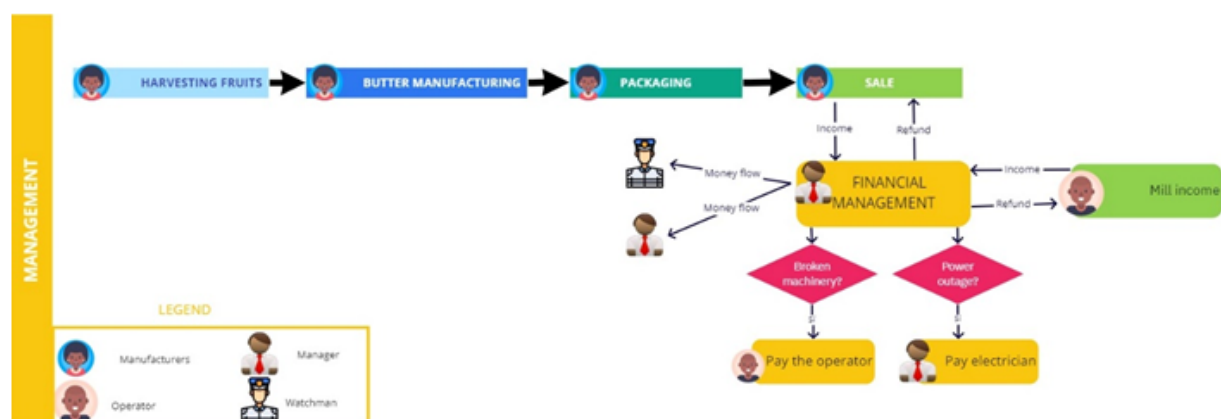


Figure 5. Process flow diagram of the management phase

Having sold the butter, the women take the money obtained to the administrator, who, depending on the money existing in funds at that time, returns a part of the amount contributed. It should be borne in mind that it is the women who manage the phases mentioned in the previous sections, so it is they who finance the raw material necessary for the manufacture of the final product.

Additionally, the workshop also receives income from the people of the community who come to the mill to grind grain for their personal use. These profits are collected by the operator, who also gives a part (not established) to the administrator. The economic resources obtained in this way are not constant, although according to the operator, they add up to around 450 GHC per month. The busiest days are the day before the local market, since the women who live in the area of the mill come to grind grain in order to be able to sell it the next day in the form of already cooked food. Despite the fact that the price for the service is standardised, customers frequently do not pay immediately as they do not have the money at the time, or negotiate with the operator to pay lower prices.

Step 4: Identify potential process inefficiencies

The inefficiencies detected at each phase of the process are shown below. In the phase of obtaining the nuts, seven inefficiencies were identified (Figure 6):

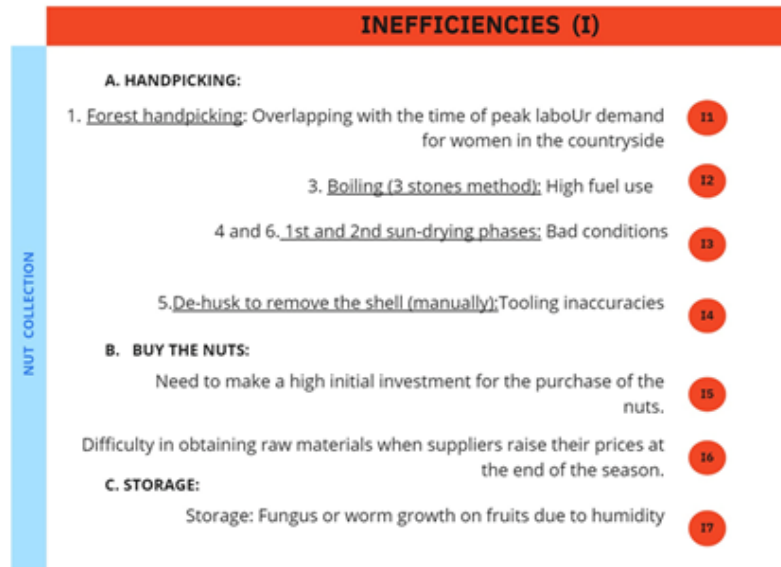


Figure 6. List of inefficiencies detected in the phase of obtaining the nuts

Regarding the manufacturing phase of the butter, deficiencies were detected in practically all the phases of the procedure (Figure 7):



Figure 7. List of inefficiencies detected in the butter manufacturing phase

Only two inefficiencies were detected in the packaging phase: I21. Contamination due to storage conditions and I22. And regarding the sales phase, three problems were identified, depending on the market where the butter is sold: I23. Lack of costumers in the local market and low prices; I24. Lack of women’s knowledge of selling; and I25. Difficulty in finding customers abroad.

In the management phase, multiple inefficiencies were discovered (see Figure 8), since in the current process there is no standard procedure established by the administrator to carry out this task.

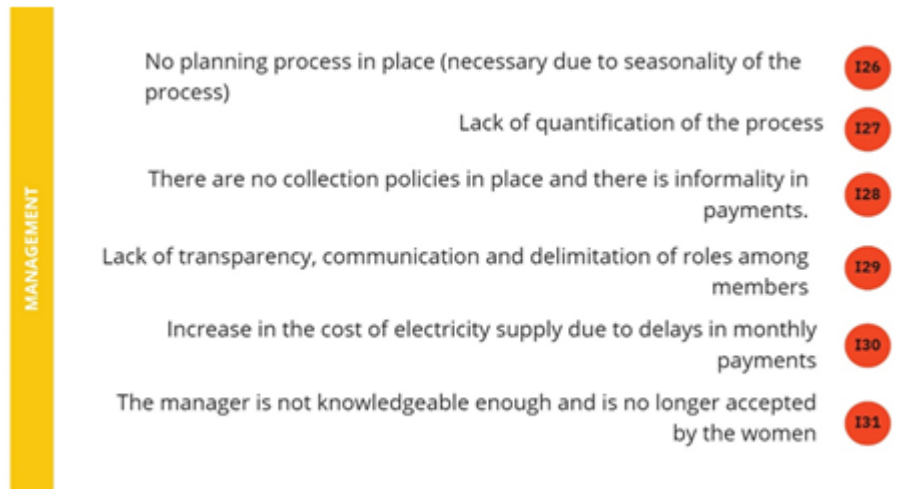


Figure 8. List of inefficiencies detected in the workshop management phase

Step 5: Setting goals to combat inefficiencies

According to the inefficiencies detected in the previous step for each production process, the goals that each production phase must meet were established. These goals were established based on the collaboration of 20 women of the association and taking as main starting data the information collected through the participatory techniques of step 2. In the first stage, obtaining raw material for the production of butter, the established goals depend on the method of obtaining the fruit (see Figure 9).

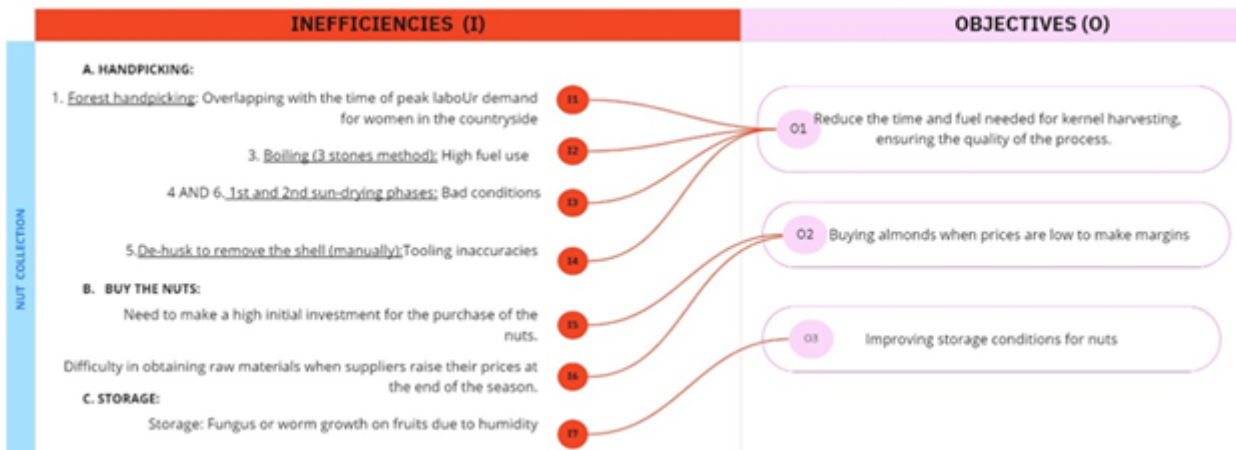


Figure 9. Goals proposed in the phase of obtaining the nut

In the butter manufacturing phase, the achievement of two goals was stipulated, as presented in Figure 10.

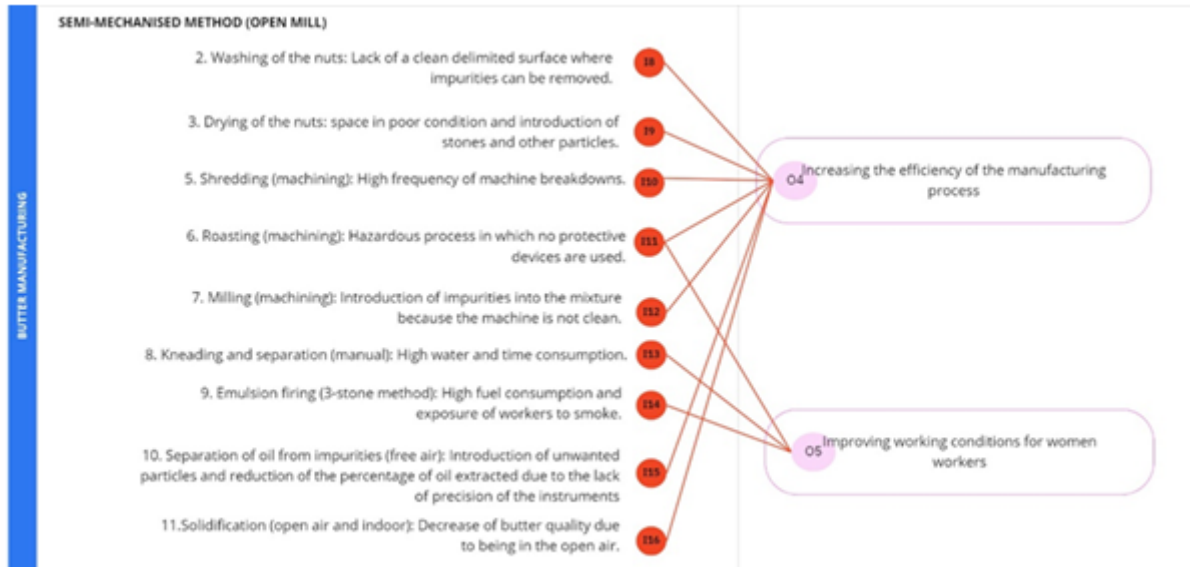


Figure 10. Proposed goals for the improvement of the butter manufacturing phase

In the packaging phase, two goals were defined, each of the related to an inefficiency: O6. Improve butter storage conditions, and O7. Standarding the packages process. Regarding the sale, two goals were established: O8. Improve women’s capacities to sell in the local market and O9. Expand the customer base outside the local market. Finally, the two goals of the butter workshop management phase are: O10. Implement an administrative management and control process, and O11. Delineate the roles of members and encourage more effective communication between them.

In summary, it can be seen that for the 31 inefficiencies detected in the association’s butter workshop, 11 goals were proposed.

Step 6: Classify the goals according to the Eisenhower matrix

In this step, the Eisenhower matrix was built in which the 11 previous goals are located according to their level of importance and current urgency (Figure 11).

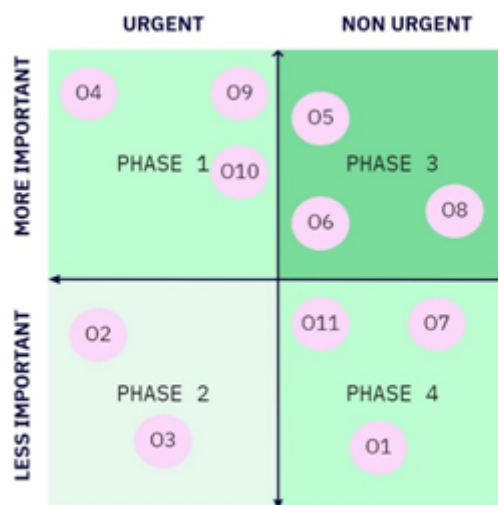


Figure 11. Eisenhower matrix result

Step 7: Prioritisation of phases to develop

In this step, the proposals that achieve the goals located in the first quadrant (phase 1) were prioritised, since these are the most urgent and important aspects, which, therefore, must be executed in the first place. In this case, Phase 1 includes Goals 4, 9 and 10.

Step 8: Proposal of improvements for the prioritised goals

Three possible proposals for improvement are described below:

- Improvement Proposal M1: Reopening of the mill
- Improvement Proposal M2: Establishment of relations with Savannah Fruits Company
- Improvement Proposal M3: Election of a new administrator

Step 9: Integral viability analysis of each improvement proposal according to the sustainability indicators

Of the three proposals for improvement, this work further examines the viability analysis of improvement proposal 1 (M1). In addition, due to the unavailability of data to carry out the environmental viability analysis, the Dunmade indicators focus on the economic, technological and social axes.

Regarding the economic viability, an analysis of the costs that the implementation of the M1 proposal would entail was carried out (presented below) and its sustainability was evaluated according to the factors of affordability, reuse and local availability of the necessary resources.

In the field data collection phase, data on the prices of the elements necessary for the mill's reactivation were collected, the results of which are detailed in Table 3. As can be observed, this proposal requires a high investment (5,044 GHC) for its implementation.

Initial investment	Price
Construction of areas A, B and C	1,700
Bowls	280
Spoons	85
Electricity repairs	51
Scales	400
Electricity supply debt	1,000
Repair of machinery	440
Containers	200
Hose	60
Transport and subsistence	78
Current expenses first month	750
TOTAL COST (GHC)	5,044

Table 3. Analysis of the costs of proposal M1

Having determined the costs of said investment, an analysis was made of the indicators used to guarantee that the use of the mill for the manufacture of butter will be an economically sustainable activity:

- Affordability of the machinery: the group is dependent on external funds (such as the relationship between the UPV and Bobgu N-Nye Yaa) to acquire and reactivate the technology of the mill; however, once the initial investment is made, it is expected that they will be able to maintain this equipment during its useful life.

Nevertheless, for this to occur, not only the manufacturing phase of the process must be improved, but inefficiencies in other areas, such as management, must also be resolved.

- Reuse: some parts of the workshop's machinery are reusable, since the parts that are damaged are stored in the mill until scrap dealers come to take away the metal parts that do not work. However, the earnings obtained from this reuse are very low, since they usually only pay around 3 or 4 GHC.

- Local availability of the necessary resources: the necessary material can be purchased in the city of Tamale, located 22 km from Kumbungu, which implies travel costs of 4 or 5 GHC each way, depending on whether local buses are used or a shared taxi. In addition, the fact that the repair can be carried out on the same day means that production outages are much shorter, so losses due to downtime do not pose a serious danger to the group. For this reason, it can be affirmed that the association enjoys a local availability of the necessary resources for the maintenance of the technology. Finally, regarding the electricity supply, this is quite consistent, especially in the dry season. In the rainy season, there may be power outages that normally last several hours, although they can sometimes last for days. This means that the mills in the community have to pay about 3 or 4 GHC for its reactivation, in addition to the productivity losses caused by the stoppage during that period.

Regarding the technological viability, a qualitative analysis will be carried out of those factors that provide knowledge on whether the reopening of the workshop is physically implementable in the current conditions and after two years of inactivity of the mill. To this end, the following elements are focused on:

- Accessibility of parts: from Kumbungu there is easy access to the necessary spare parts in the event that the colloid mill or crusher breaks down. It is worth mentioning at this point that the toaster cannot be repaired because the element is a whole piece, so if it breaks, a new one must be purchased; but it can be easily found even in the locality of Kumbungu on market days at a relatively cheap price. Regarding the blender, according to the local inhabitants, the way it was broken means that it is not currently repairable, for this reason it would be necessary to acquire a new one in the city of Tamale. However, it has not been possible to assess whether this conclusion is due to a lack of local knowledge, it being an unusual breakage and the parts necessary for its repair not being known, or whether the damage really is irreparable.
- Availability of technical knowledge: it is the mill operator who knows how to repair the different machines in the usual cases and where to buy the necessary elements for them. Normally, this type of knowledge is passed on from parents to children. However, in this case the operator learned this task after previously working in another mill belonging to another family nucleus. It should be noted that, even though some of the women are able to operate the mill in the absence of the operator, he is the only person capable of repairing it in the event of a breakdown.
- Adequate replacement time and time between repairs: as has been referred to in the “local availability of necessary resources” indicator of the economic analysis, the repair time of the existing machines in the mill is low. In fact, as the operator himself states, it takes longer to travel to the city of Tamale than to carry out the repair itself (less than a day in total).

Finally, the social viability of the M1 proposal will be studied, taking into account the following indicators:

- The level of awareness about the technology: as it is not a new technology for the community, they have been working with it for almost ten years, the members of the association are aware of the existence of the mill machinery and understand its usability, its benefits and drawbacks.
- Social acceptability: acceptability among community members is high, for various reasons — it is a well-known technology among the society; it has been used prior to the closure by the women themselves; and there are several mills in the locality and in the surroundings using the same machinery. In addition, regarding the improvement of the proposed semi-mechanised process, the delimitation of spaces and the establishment of cleaning plans are actions that have already been implemented in other cooperatives that have worked hand in hand with NGOs, which facilitates the possible acceptance on the part of the members of Bobgu N-Nye Yaa. With regard to the operator carrying out a follow-up of a maintenance plan to reduce breakages in the machinery, an awareness-raising process on the relevance of performing this action would be necessary in order for him to accept it as something important and begin to incorporate it into his work routine.

- Government policies: currently, there are no obstacles by public entities that hinder the reopening of the mill or its future maintenance. In fact, as the shea sector is booming, the government is becoming aware of the high foreign demand and is considering supporting this type of activity.
- Socio-cultural influence: the knowledge system surrounding the processing of shea butter that women acquire from an early age has been passed down for generations from mother to daughter. Butter production is an identity marker for rural women and allows them to strengthen their social ties (Boffa, 2015). Therefore, the proposed semi-mechanised method allows them to increase the quality of the butter produced, which is a source of recognition and good reputation for them among the members of the community. On the other hand, as was determined through the participatory workshop, the women in the workshop must ask their husbands for permission to go to the mill to produce butter. However, due to the high social acceptability of butter production through the use of machinery, the possibility that the husband will not allow his wife to work in the workshop is quite small.

Step 10: Planning and implementation of viable improvements, represented on a Gantt chart

Focusing on improvement M1, a plan for its implementation is proposed using a Gantt chart (Figure 12).

ACTIVITY	OWNER	MONTH 1				MONTH 2				MONTH 3				MONTH 4				MONTH 5			
		W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	W18	W19	W20
INITIAL PHASE																					
Knowledge of members and adaptation in the area	Volunteer	■	■	■	■																
Situation analysis on arrival	Volunteer			■	■	■	■	■													
IMPROVEMENT PROPOSAL PHASE																					
M1: Reopening of the mill																					
Material purchase	Volunteer					■	■	■	■												
Construction of new work areas	Volunteer					■	■	■	■												
Activation of the power supply	Administrator						■	■	■	■											
Repair of machinery	Operator									■	■	■	■								
Cleaning plan	Women's leader											■	■	■	■	■					
Operator training (maintenance plan)	Volunteer											■	■	■	■	■					
Election of leaders	Women's leader											■									

Figure 12. Gantt chart for improvement M1

5. Discussion

The discussion of the results is divided into two major findings. In the first place, the results of applying the proposed method to the case study will be discussed. Next, other broader findings related to the proposed method, its applicability and its contribution to the literature will be discussed.

With regard to the case study, having carried out the analysis with the proposed method, the following results can be discussed. From the economic viability study, it appears that the Bobgu N-Nye Yaa mill is dependent on external funds to acquire the proposed technology. This is quite common in critical contexts, so for the initial push and its implementation, help from international cooperation or the regional government would play a decisive role. For its maintenance, on the other hand, it is believed that the group can meet this type of expense due to the local availability of resources; however, for this to occur, further inefficiencies must be resolved in other areas of the workshop, such as management or sales. For this reason, the proposed improvement proposal will be economically sustainable if the increases in productivity and quality of butter are accompanied by the obtainment of a greater number of clients, which in turn requires more efficient management that guarantees the proper allocation of resources. Regarding the technological feasibility of the proposal, since the machinery is used by many other groups in the area, it is easy to source the necessary resources locally both for its acquisition and for its maintenance throughout its life cycle. In addition, there are people in the community, such as the operator, who have the essential knowledge for its repair; and, as part of this improvement, it is intended to increase their ability to carry out maintenance on a regular basis that reduces the extensive need for repairs. However, it would be recommendable that one of the women or another member of the community also learn the repair process to prevent the consequences that the operator's absence would have on the mill. Finally, it can be affirmed that this proposal is clearly socially sustainable, since the suggested technology to be implemented in this improvement is not new to the community. However, it would be necessary to impress upon the workers the

importance of increasing precision in the butter production process and continually improving the quality of the shea. Therefore, it is concluded that the improvement proposal is technologically and socially sustainable, and will be economically so if, in turn, other areas of the workshop are improved and the necessary external financing is received.

But other broader results can be discussed in light of the research. The results of the previous section show the importance of analysing the viability of an entrepreneurship project in order to assess its potential for success and profitability (Achtenhagen et al., 2017; Goel & Nelson, 2016; Mercer, 2010; Kumar & Russell, 2002). When this analysis occurs in critical development contexts, as in the case of a rural area of Ghana, the need to approach the analysis from an integral perspective becomes evident. This includes not only to analyse the economic sustainability of the project, but also the social and technological aspects.

The following evidences emerge from the research: on the one hand, the study proposes a method divided into ten specific steps in which the novel aspect is not what is analysed but how, and who participates in each phase. Effective participation helps us understand what people prioritise and why, and also minimises the biases that our Western culture may want to impose on a vision of entrepreneurship. In addition, people are considered key when making decisions, thus participatory tools (such as the daily routines workshop) can be essential in ensuring the sustainability of the enterprise. Following this argument, it is importante to adapt the tools to the context (Chambers, 1983, 1997). Visual methods such as images, videos, and diagrams can help people to participate in developing countries where illiteracy rates are high. Visual tools empowers individuals to understand and engage with the project, while visuals can also assist with knowledge acquisition and understanding of analysis content.

The application of the method to the case study has allowed us to verify that it is possible to apply the ten steps method proposed to a real case. Instead, the need to adapt some of the tools to the context becomes evident. In other words, there is no single recipe, but the method itself requires the adaptation of the proposed tools to each particular context in which it is going to be applied.

On the other hand, the research shows that the search for information from secondary sources, in critical contexts such as the rural areas of Ghana, must be complemented with information from primary sources. Interviews can play a key role in expanding reported information and statistical data such as cost of raw materials or supplies, or proportions required to produce the shea butter.

Lastly, given the limitations of methods such as the LFA or ToC, we consider they are not appropriate for analysing the viability of small entrepreneurial projects. On the one hand, the LFA method has a linear logic, suitable for simple and controlled conditions (Dale, 2003) and it is designed for non-profit projects (Bell, 2000), so the methodology is not adapted to the business environment. In addition, the LFA do not encourage real and active participation of the population in the initial phases (such as in the viability analysis) (Chambers & Pettit, 2004). On the other hand, ToC is very complex to operationalise and specialised human resources are required as well as a large amount of time and money to be able to put it into practice (Vogel, 2012a; James, 2011). Instead, the method proposed here is very well adapted to critical contexts such as Ghana in the specific area of entrepreneurship. First, it overcomes the limitations of the LFA by actively involving the different stakeholders in the steps proposed. Some of the steps even promote the empowerment of the people involved through their participation in important decision-making, which overcomes some of the criticisms of LFA as a disempowering tool (Chambers & Petit, 2004). Second, it overcomes the limitations of ToC because it integrates complexity in the analysis, but the proposed method is relatively simple and does not require large amounts of money. In short, we believe that the method proposed here can be a useful and simple tool for analysing entrepreneurship projects in critical contexts that overcomes some of the limitations present in the two dominant planning tools.

6. Conclusions

This article presents a study that suggests a method for the viability analysis of an entrepreneurial project in a critical context. The novel aspect of the methodology is that it proposes combining the classic tools of business viability analysis with those used in the area of development studies. Specifically, the proposal focuses on promoting the active participation of all the stakeholders throughout the analysis and on understanding the

sustainability of the project as an integral process that unites the economic point of view with the social and technological perspectives.

Indeed, a broad vision of entrepreneurship projects is proposed, centred on people, which in addition to providing a product or service, questions aspects related to equity, participation, appropriation and sustainability. This is in line with what the United Nations 2030 Agenda for sustainable development recommends: there is no growth if it is not inclusive, equitable and sustainable. To this end, the present study proposes a method divided into ten specific steps in which it is proposed to adapt the sustainability indicators proposed by Dunmade (2002) to analyse the viability of these social enterprises, seeking not only that they be efficient from a purely economic point of view but also sustainable. To this end, three areas of sustainability are analysed, each with its own indicators: economic, technological and social sustainability, thus achieving a comprehensive vision of the project.

The proposed method is implemented through a real case study: the start-up and management of a shea butter mill in Ghana. It is concluded that it is necessary to prioritise the sustainability of the enterprise in general, not just efficiency. For this reason, it is proposed to include technological, social and environmental indicators when analysing viability.

Several studies support the importance of developing entrepreneurial actions to promote regional economic development. However, these entrepreneurial projects do not always have a positive social impact, nor does all economic growth translate into development. For this reason, it is necessary to analyse these entrepreneurial actions within the context in which they are carried out, and include the agents involved in the process in order to detect their real needs and motivations. In this regard, this work proposes a detailed method in which business tools are combined with instruments from the area of development studies, where the participation of people is the key to success in its implementation. Thus, ten steps are suggested to analyse the viability of entrepreneurial projects in critical contexts from an integral perspective, where the social component acquires special relevance with participatory techniques that enable the true needs of the community to be understood. This method can be implemented in other critical contexts where participatory techniques must be adapted to the context of their development, but some of the techniques and tools presented here can be extrapolated from the case study, which gives this research greater practical applicability.

Finally, it is essential to comment on the methodological limitations of the study. In the first place, due to the intrinsic socio-cultural characteristics of Ghana, it has not been possible to access some sources of information in the field, or not in the desired way. This has been motivated mainly by the fact that the researcher who carried out the fieldwork was a woman and, due to Ghanaian gender differences, the presence of a man as a companion was always required to carry out the different procedures. It should also be considered that the women of the association only speak the language of the region (Dagbani). Since none of them have been to school, they have not learned English. For this reason, this language barrier made it difficult to communicate directly with them, since a translator was always needed. Another methodological limitation was the difficulty of obtaining reliable quantitative data from secondary sources. This was due, in part, to the lack of literacy of the women in the community and the lack of documentation of the existing process by any member of the association. Lastly, it was difficult to collect information that would allow an analysis of environmental viability to be carried out, which is why it was finally decided not to include this variable in the case study. These limitations can distort the results and affect the generalisability and validity of the findings. In the case presented, several methodological limitations were encountered during the study, which may have had an impact on the results. For example, the fact that a woman conducted the fieldwork, and the presence of a man was always required to carry out the different procedures, might have affected the researcher's ability to gather information from some participants. Secondly, the language barrier might have affected the accuracy and reliability of the information obtained. The need for a translator could have resulted in a loss of information and misunderstandings in translation, leading to inaccurate data. Finally, if possible it would be important to include an analysis of the environmental viability, as it is an essential factor to analyse the integral viability. To overcome these limitations the researcher implemented several strategies during fieldwork: to overcome the cultural barriers they engage with the local community and build relationships with their members. The researcher spent several weeks living in the community to understand the cultural norms and expectations. To overcome language barriers, the researcher used a trained

and experienced translator who is fluent in both languages to facilitate communication. It is important to stress that the translator had a good understanding of the context and culture of the study population to minimise misunderstandings in translation. Finally, to overcome the lack of quantitative data researcher adopted a mixed-method approach that combines qualitative and quantitative data collection methods. This approach provided a more comprehensive understanding of the study phenomenon and help to triangulate the data collected.

Despite these methodological limitations, we argue that this study will help researchers and entrepreneurs to analyse the viability of entrepreneurial projects in critical contexts, considering not only the economic aspects but also the social and technological perspectives. The study highlights the importance of analysing entrepreneurial actions within their context and involving the community in the process to understand their real needs and motivations.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Annex I. Interviews phase 1 of data collection

First interview with Bobgu N-Nye Yaa members from Valencia: 06/05/2019

1. How did the relationship with Kumbungu and Valencia started and when?
2. How does the university help the women group in Kumbungu?
3. How many members are helping from Valencia?
4. Who are the members from Kumbungu?
5. Which projects have been done previously?
6. Which is the current way of communication with the members living in Kumbungu? How often?
7. How big is Kumbungu? How is the culture over there?
8. Who was the last one to travel to Kumbungu and when?

Second Interview with Bobgu N-Nye Yaa members from Valencia: 10/06/2019

9. Why was the mill started? When?
10. Why was it closed?

11. Who was leading the group over there? Why?
12. How many women were involved?
13. How is the process of obtaining shea butter?
14. Are they the only ones processing shea butter in the area?
15. Where do they sell the shea butter?
16. How does right now those women get paid?
17. What are the expectations of my stay over there?
18. What is the current budget for the project?
19. Is there any documentation from the other students that went to Kumbungu before?

Annex 2. Interviews of phase 2 of data collection

Interview with the women's leader: 10/09/2019

1. How long does the whole process take in total? Which phase takes the longest?
2. Are there any phases that you consider dangerous?
3. How many kilograms do you usually produce per month? How much raw material do you need for this?
4. How many women does the association currently have and how are they organised?
5. What are the minimum elements necessary to start producing again in the workshop? What are their characteristics? Where can they be obtained? How many units are necessary?
6. Do all the women have enough money to buy the raw materials?
7. How do you communicate with the other women?
8. How do they relate to each other?
9. Do you know other processing groups in the area?

Interview with the mill machinery operator: 15/10/2019

1. Where can you buy the elements to repair the machinery? How much does it cost?
2. How long does it take to repair the machinery? How often do you used to do it?
3. Where do you dispose of damaged parts that are no longer useful?
4. How did you learn how to operate the machinery? How long have you been doing this work? How long for Bobgu N-Nye Yaa?
5. Do the women know how to start the machinery by themselves?
6. Do you find it easy to go to the mill?

Interview with the watchman: 20/10/2019

1. How long have you been the caretaker of the association (school and mill)?
2. What does your work consist of?
3. What are your working hours?
4. How much do you earn, is it regular?
5. Who pays you?
6. Have there ever been any altercations?
7. Which buildings usually have guards?
8. Do the other mills also have guards?

9. Do you have keys to the school and to the butter workshop?
10. Is it easy for you to go to the workshop?

Interview with the leader of the women: 10/09/2019

1. Who was in charge of the management of the mill?
2. What relationship does this person have with the group?
3. What electricity company is contracted and do you know how much the monthly payment is?
4. Does the group have any bank accounts?
5. Where do you get the water for the process? How much water is needed?
6. Where do you get the firewood for the process? How much is needed?
7. If the nut is stored for a long period of time, does its quality decrease?
8. Currently, to join the association, what do you have to do?
9. What do you think the quality of the butter obtained depends on?
10. Have you gone to school or do you know of any woman in the group who has gone to school?
11. Are there any rules in the workshop?
12. Are there any latrines or toilets nearby?
13. Prior to its closure, did the workshop cover the women's living expenses while they were working?
14. Prior to its closure, was there any kind of timetable?
15. From the butter, do you know how to make other types of products such as soaps or creams?
16. During the time you are working, who takes care of the children?

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