



The Economic Sustainability of Industrial Potato Production Within Entrepreneurial Strategies

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RESEARCH ARTICLE

Abstract

The study was driven by rising global potato consumption, the potato sector's economic impact, and the need for ecologically sustainable growing methods. The objective of the study was to identify entrepreneurial activity and the spirit in the context of entrepreneurship to achieve economic sustainability via the cultivation of industrial potatoes. Furthermore, it accurately recognized the strengths, weaknesses, opportunities, and threats this agribusiness in Sulaimani Governorate, Kurdistan Region of Iraq is confronting. This study classifies the farmer as an entrepreneur based on his alignment with various entrepreneurial activities, such as product diversification, hiring professional farmers, implementing an irrigation system, owning resources, conducting research and development, adding value to products, engaging in inter-sector interactions, and creating employment opportunities. Additionally, the farmer demonstrates entrepreneurial spirit through activities such as agro-climatic zoning, risk analysis, developing marketing strategies, having a vision, taking advantage of opportunities, encouraging others, employing critical thinking, and displaying resilience. In this study also the SWOT analysis was used. the primary strength identified was the improvement of the economy, whilst the biggest opportunity for the farmer included the establishment of a Lays chips plant by Green Iraq Company. Lastly, the major threats encompassed the lack of financial services and political instability.

Keywords: economic impacts, sustainable agriculture, agriprenurship, SWOT analysis


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INTRODUCTION

The agricultural sector plays a crucial role in facilitating economic growth, significantly contributing around 4% to the overall world gross domestic product (GDP). In many underdeveloped countries, this particular industry may potentially contribute to more than 25% of the Gross Domestic Product (GDP) and is recognized as one of the largest sectors globally, with a workforce of over one billion people (World Bank, 2023; Mupfasoni et al., 2018). And it is one of the most important cornerstones for ensuring food security (Hudhud et al., 2015; Neima et al., 2021; Neima et al., 2023). In recent years, the agricultural sector has experienced economic and productive transformation, especially as a result of agricultural trade liberalization and Common Agricultural Policy changes that have resulted in more market-oriented agriculture (Pindado and Sánchez, 2017). Agribusiness is a broad category of operations that provide economic value. Agribusiness includes not only farming but also all of the various industries and services that link farmers to consumers (Fani et al., 2021). Moreover, the development of agribusiness and entrepreneurship is critical and an important

policy aim to eliminate poverty, stimulate economic growth, solve environmental problems, and attain food security (Saghaian et al., 2022).

For the last three decades, it has been widely recognized that market orientation, innovation orientation, and entrepreneurial push have significantly shifted farmers' roles from those of ordinary producers to those of entrepreneurs (Prifti and Alimehmeti, 2017). In addition, entrepreneurship is the process through which individuals (entrepreneurs) and companies discover, develop, and capitalize on economic opportunities (Emami and Naderi, 2018; Sher et al., 2019).

The Kurdistan Region of Iraq (KRI), as part of the Republic of Iraq, had severe food shortages during the 1990s embargo, when fewer people could afford to buy food. In the two decades since the embargo was removed and the economy flourished, the KRI's need for agricultural products has expanded (Neima et al., 2023). Besides, the potato (*Solanum tuberosum*) is the world's third most important food crop. After wheat (*Triticum aestivum* L.) and rice (*Oryza sativa* L.) in terms of human consumption and total cultivated area. Among root and tuber crops, the potato ranks first in overall output (Muhinyuza, et al, 2022). Thus, Sulaimani Governorate (19030 tons) is the Kurdistan Region of Iraq's third greatest producer of potatoes in 2021, after Dohuk (165711 tons) and Erbil (23266 tons) (KRSO, 2022).

The data presented by the Ministry of Agriculture and Water Resources indicates significant progress in the agricultural industry, namely in the area of potato farming, which has seen remarkable expansion. Over 14 years, there was a significant improvement seen in the potato production levels, with an average rise of 541 units. The production began at an initial quantity of 12,000 tons and reached a final amount of 650,000 tons in the year 2023. According to projections, the anticipated rise in output is expected to provide revenues totaling around \$500 million (Kurdistan Regional Government, 2023; [Agroberichten Buitenland](#), 2023). Meanwhile, several entrepreneurs have emerged operating in potato production, both consuming and industrial potatoes. This study aimed to identify the entrepreneurial activity and, the entrepreneurial spirit through entrepreneurship to achieve economic sustainability through industrial potato cultivation. It also identified the fundamental strengths, weaknesses, opportunities, and threats facing this particular agribusiness in Sulaimani Governorate, Kurdistan Region of Iraq.

MATERIAL AND METHODS

The present research was carried out in Sulaimani governorate, located in the Kurdistan Region of Iraq, namely in the northern part of Iraq. The location of the Sulaimani Governorate is positioned within the latitudinal range of 35° 37' 36" to 35° 28' 08" N and the longitudinal range of 45° 17' 57" to 45° 29' 56" E. The region under question is geographically next to Iran in the northeast, Erbil in the west, and Kirkuk Governorate in the south. The total area of the Sulaimani governorate is 11,789 square kilometers (SHAREF and Hakan 2020). The entrepreneur in the study is from the Penjwin District and relies on agro-climatic zoning to ensure the year-round availability of his crops. The farmer leased more land in several locales, such as Kalar City, Sharazur Plain, Penjwin District, and Mawat as shown in Figure 1. The research area has a Mediterranean climate. The Koppen classification classifies the area as CSA. This group has warm, arid summers and damp, freezing winters. Spring and fall are short transitional seasons between winter and summer. These seasons have warm weather with 23°C highs. Summer typically runs from early May to early October, whereas winter runs from November until early March. The ambient temperature drops to 5°C or even -1°C in winter, especially in January. June through September sees high temperatures of 45°C to 48°C. Significant precipitation occurs from November through April. The average annual precipitation in Sulaimani is 648 mm. Climate and environmental factors have caused a drop in recent years.

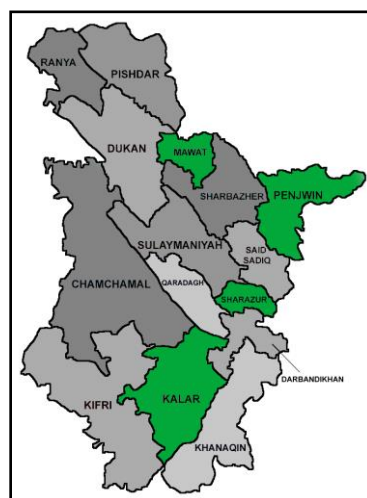


Figure 1. The map of the study area (Sulaimani governorate)
Source: Retrieved from Fassbinder and Ašandulesei (2016)

A case study is a specific approach used in qualitative empirical research, enabling a comprehensive examination of a present-day event inside its authentic contextual setting (De Massis and Kotlar, 2014). This study utilized a single case study design (Tetnowski, 2015) to qualitatively explore how the farmer engages in agricultural entrepreneurship to achieve economic sustainability through industrial potato production. The single case study approach allows for the interpretation of social phenomena as seen through the experiences and viewpoints of the study participants (Packard, 2017). Semi-structured interviews (SSIs) were used as qualitative approaches to get primary data directly from the entrepreneur. The study took place in the Sulaimani governorate in the Kurdistan Region of Iraq from May 2022 to January 2023. The data for this study were gathered through face-to-face interviews, conversations, and observation with the farmer and the data collection period spanned from May 2022 to September 2023. The data were obtained by using qualitative research procedures, namely via face-to-face interviews (FTFI) and observation techniques. In this research, the unit of area measurement used was the "Iraqi dunam," which is equivalent to 2500 square meters.

RESULT AND DISCUSSION

The entrepreneur's characteristics

The socioeconomic traits, the sources of income, and resource ownership of the entrepreneur in this study are covered in this section. The socioeconomic variables include family size, marriage status, age, sex, and marital status.

The Case Studies Socioeconomic and Demographic Characteristics

One farmer was interviewed during the survey. The age of the sample respondent was 55 years old. He was male. Regarding their marital status, he was married, and the members of their household were 6, his educational background was primary level. He has 8 years of expertise with agriculture's modern form, drip irrigation; before that, irrigation was done using surface furrow irrigation. familiarity with potato production, income generation, personal interests, and hobbies motivated this farmer to pursue agricultural production.

The Sources of The Entrepreneur's Income

Agriculture production (mostly crop and animal husbandry), wage employment in agriculture and non-agriculture, non-farm enterprises, transfers, and on-labor income sources are all examples of rural income-generating activities (Mellor and Malik, 2017; Mariyono, 2018; NGUYEN, 2019).

The farmer in this study practices various livelihood and income-generating activities in the agricultural sector mainly industrial potato production in addition to tomato, watermelon, muskmelon, cucumber, and pepper. In terms of factories, this entrepreneur owned a plastic plant producing plastic boxes for packaging agricultural products, as well as a factory producing pipes and T-tape used in field irrigation systems. Furthermore, the agricultural office supplies fertilizer and pesticides. In the nonagricultural sector, he has concrete block factories and a sand and gravel washing plant.

Location

The farm's location is most likely to explain disparities in farmland resources, and hence present farm performance, production strategies, and trajectories (Lacoste et al., 2016). The entrepreneur in this study was from the Penjwin region. He took risks, followed the Agro-Climatic zoning, and rented agricultural lands in other areas including Kalar City, Sharazur Plain, and Mawat in the Sulaimani governorate, Figure 1 to guarantee output availability in more seasons.

The Sulaimani governorate has both hot and cold semi-arid climatic zones. It helps to exist several cultivation seasons in the governorate. Kalar City (34° 37' N, 45° 19' E) is located in the southern part of the Sulaimani governorate (Issa and Alshatteri, 2021). Its climate is continental hot semi-arid due to possible evaporation (Issa and Alshatteri, 2018). While the Penjwin region is located in the eastern part of Sulaimani at 35°37' N and 45°56' E, with a height of 1320 meters above sea level (Ahmed, and Mahammed, 2012). Penjwin has a cold semi-arid climate having an average annual temperature of 14°C and a total annual precipitation of 1032 mm (Hama-Aziz et al., 2022). An entrepreneur in this study was able to exploit and produce in both zones.

Since he was seeking a farm with water, the entrepreneur had no issues with the location of his farms. The little and exhausted farms in Penjwin were the issue. Another issue was getting a sizable area of land and cultivating it for 6 years straight with potatoes. That doing this causes sickness and lowers productivity, and that it is wrong to do so.

The advantages of the lands in Sharazur Plain are that they are very fertile. They have not been turned into potatoes every year. In previous years they were wheat and have not been irrigated or have been irrigated very little. They are very suitable for Potato production. There is plenty of water and we have no water problems in Sharazur Plain. There is no issue with the distance to the factory. There are several routes for transportation.

Financial Resources

According to studies, financial support is a crucial component of cultivating new agricultural business entities and, innovative performance. therefore, special finances such as governmental universal finance and special finance from financing institutions, as well as funds in the hands of family farms, have a significant impact on the cultivation of new rural agricultural business entities, Consequently, boosting financial inclusion is crucial for long-term agricultural growth in rural areas (Zhao et al., 2017; Olaniyi, 2017; Memon et al., 2020).

In the Kurdistan Region of Iraq, there is a lack of financial support for agricultural activities. The only financial service to keep the business operating, raise, and use its financial resources to create wealth from the entrepreneur in this study was saving, and debt from input suppliers.

Agricultural Entrepreneurship (Agripreneurship):

The pursuit of equitable and sustainable development in the agricultural sector within emerging nations may be enhanced by the adoption of agricultural entrepreneurship, sometimes referred to as agripreneurship (Thephavanh et al., 2023; Thephavanh et al., 2022). The agribusiness sector can stimulate sustainable, inclusive, and diverse economic expansion, hence offering possible solutions to a range of pressing issues like poverty, food scarcity, malnutrition, and unemployment (Ephrem et al., 2021). In this study, the farmer is categorized as an entrepreneur due to the alignment of his entrepreneurial activities, and entrepreneurial spirit with the established criteria of entrepreneurship. The subsequent analysis underscores the key characteristics of entrepreneurial activity and the entrepreneurial spirit shown by the entrepreneur that is being studied.

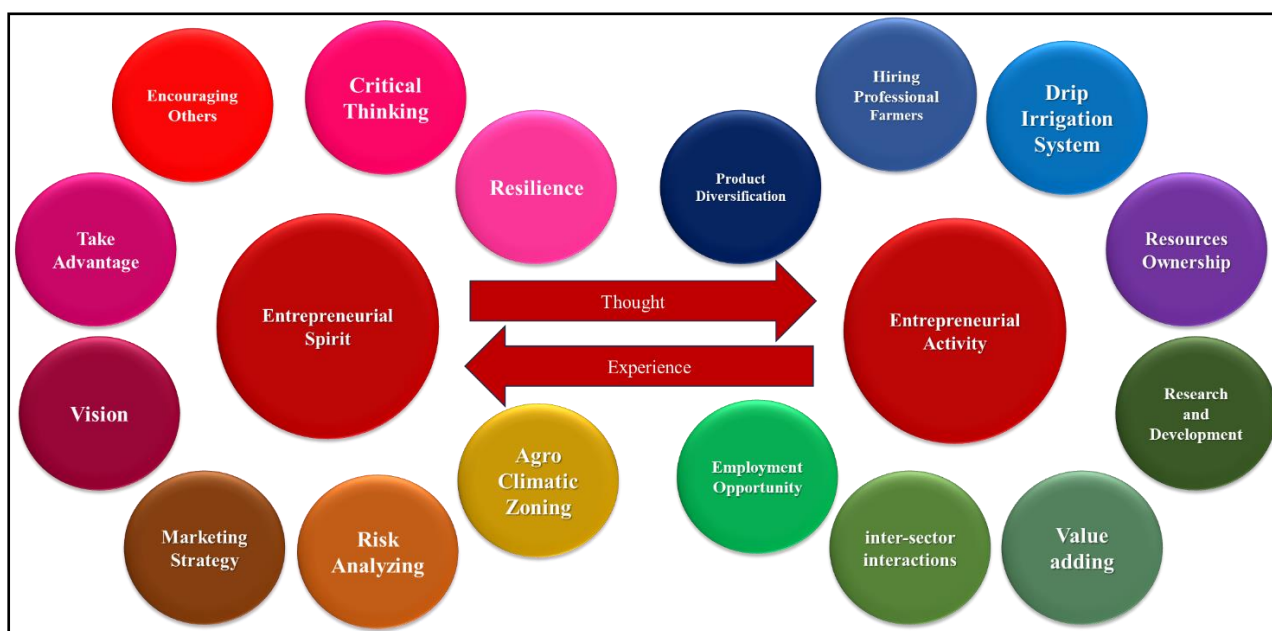


Figure 2. Entrepreneurial activity and entrepreneurial spirit in the entrepreneur from the study

Source: face-to-face interview with an entrepreneur

Entrepreneurial Activities

The overall influence of entrepreneurial activity on sustainable development is contingent upon the nature and characteristics of the entrepreneurial activity (Karabetyan, 2023). Hence, the presence of entrepreneurship and entrepreneurs assumes a significant role in promoting economic growth within nations, as they facilitate the advancement of innovation, the creation of employment opportunities, and the cultivation of competitive environments (Stoica et al., 2020; Ordeñana et al., 2020; Khyareh and Amini, 2021). In addition, the creation of added value, the development of inter-sector interactions, the promotion of social benefits, the reduction of poverty, and the facilitation of a fair society are important objectives (do Adro and Franco, 2020). In this study, we desire to highlight the key entrepreneurial actions demonstrated by the participating entrepreneur. As illustrated in Figure 2.

Product Diversification

To enhance the resilience of agricultural communities in the area, it is suggested that crop diversification be

used as a strategy. This approach would allow farmers to cultivate high-value competitive crops, enabling them to attain more consistent and reliable farm incomes (Rustamova et al., 2023). Additionally, the diversity of income has a crucial role in determining the socio-economic welfare of people residing in families, particularly at the microeconomic level (Kimkong et al., 2023). The entrepreneur examined in this initial study was characterized by engaging in the cultivation of industrial potatoes, while concurrently pursuing a strategic approach centered on the diversification and cultivation of a new line of products. This diversification included the cultivation of crops such as wheat, tomatoes, watermelon, muskmelon, cucumbers, and peppers, in addition to the primary focus on industrial potatoes. The rationale for adopting this approach by the entrepreneur is the fact that diversifying agricultural output serves as a safeguard against potential harm caused by adverse weather conditions. Moreover, the inherent volatility of agricultural product prices necessitates the adoption of a diversified production strategy by this entrepreneur. By engaging in the cultivation of many crops, the entrepreneur safeguards against potential financial losses resulting from the adverse impact of low prices on a specific crop, while simultaneously capitalizing on the profitability of different crops.

Hiring Professional Farmers

Another approach used by the entrepreneur is relying on a group of experienced farmers, each with a substantial 25-30 years of agricultural expertise. Every farmer is allocated a particular plot of land for which they have responsibility and are granted ownership shares varying from 10% to 30%. The objective of this strategy is to facilitate farmers in carrying out their jobs with a high degree of accuracy, similar to doing their duties with a strong personal commitment to achieving the desired results. The entrepreneur has the duty of assuming the role of the daily supervisor for this collective. The entrepreneur's choice to include farmers in his agricultural operations is primarily motivated by his management of large and geographically diverse land holdings.

Drip Irrigation System

The efficiency of a drip irrigation system relative to other irrigation systems, such as surface irrigation or sprinkler irrigation, is contingent upon the effectiveness of its design, installation, maintenance, and operation (Robi et al., 2023). Also, the drip irrigation system is capable of detecting the moisture content in the soil and subsequently providing water in a manner that is cost-effective and highly efficient. As a result, it serves as a viable alternative for farmers operating in regions where water resources are few and must be used judiciously (Sivagami et al., 2018). The farmer has also been a pioneer in the use of drip irrigation systems, representing another area of focus. In the past, irrigation systems were used to facilitate the conveyance of water between adjacent rows of plants, resulting in substantial water consumption. The requirement to use drip irrigation systems has arisen as a result of climate change, mostly due to their ability to minimize water wastage. The entrepreneur is widely acknowledged as the pioneering farmer who introduced the drip irrigation technology to Penjwin, subsequently disseminating its adoption to several other regions.

Resources Ownership

Land, plow equipment, machines, animals, and bee colonies, are used to categorize resource ownership (Mendham et al., 2010). According to the findings of Munamati and Nyagumbo (2010), the possession of resources seems to have a significant impact on farmers' ability to grow their activities, since performance was shown to be strongly correlated with resource ownership. Furthermore, the empirical findings indicate that enhanced agricultural technologies have the potential to significantly contribute to the enhancement of farmers' asset ownership, leading to higher agricultural output and greater revenue generation (Awotide et al., 2015). The entrepreneur's decision to manage vast land areas of around 3000 dunums across various districts and engage in large-scale cultivation of diverse crops can be attributed to his possession of crucial agrarian machinery and equipment required for potato and other product cultivation. These resources enable him to undertake the entire process, starting from land preparation for tillage and concluding with the harvesting and transportation of potatoes to a factory. Furthermore, the individual has a manufacturing facility specialized in the production of plastic boxes for shipping. Additionally, he owns a factory devoted to the fabrication of pipes and drip irrigation tape. Moreover, he oversees an agricultural office that is responsible for the procurement of essential supplies like seeds, fertilizers, pesticides, and fungicides. The land is analyzed in this study as separate plots, the majority of which are rented and some of which are owned.

The cultivation of seed tubers of Dutch industrial potatoes takes place in Penjwin District. In the harvest period, the industrial potatoes undergo a process of classification based on their respective sizes. The factory receives large potatoes, while smaller potatoes are gathered, stored, and afterward replanted on the Sharazur Plain. The surplus seed tubers the farmer generates will be returned to the manufacturer. The manufacturer is the Green Iraq Company. The entrepreneur has a contractual agreement with the company, granting him the privilege to return

any surplus industrial potato seeds above his required quantity. The seeds are then distributed by the company to farmers throughout the Kurdistan Region of Iraq.

Research and Development

Farmers utilize experimental practices as a method of acquiring knowledge and augmenting their ability to effectively respond to changing situations (Leitgeb et al., 2014). also, experimental approaches vary across farms, although there are shared factors that motivate testing, such as the need to adapt to climate change, enhance soil health, and improve nutrition, and income generation (Hockett and Richardson, 2018; Kummer et al., 2017). Moreover, farmers engage in active experimentation, consistently producing noteworthy and regionally tailored inventions. These innovations have the potential to indirectly support endeavors aimed at achieving sustainable agricultural intensification or promoting climate-smart agriculture (Tambo, 2018).

In 2015, the entrepreneur conducted an experiment involving the cultivation of 10 tons of industrial potatoes. The primary objective of this endeavor was to assess the crop's productivity and its ability to adapt to the local environmental conditions. The conducted experiments have contributed to the progress and development of the entrepreneur's respective domain. Currently, he cultivates over 1,500 tons of industrial potatoes every year. Presently, the aforementioned entrepreneur is engaged in an experience involving the cultivation of industrial potatoes throughout two agricultural cycles inside the rural confines of Kalar City. The objective of the experiment is to cultivate a second cycle of industrial potatoes in July, after the harvesting of the first cycle during May. It is worth mentioning that the first planting cycle occurs in December. As well as the trials conducted by the entrepreneur also showed that the sequential cultivation of wheat after the cultivation of potatoes resulted in a productivity increase of two hundred percent. This strategy is used by the entrepreneur in the lands where it is rented.

In the related context, the entrepreneur provides an opportunity for researchers to carry out their studies on his farms. According to studies, the need to transfer tasks applies to both farmers and academics. Farmers are obligated to dedicate their resources and effort toward the generation of significant data and information (Aare et al., 2021). The active participation of farmers in scientific research and the dissemination of scientific findings contributes to a more comprehensive comprehension of agricultural environmental impacts (Kröbel et al., 2021; Runhaar et al., 2018). The field of experimental economics has become increasingly significant in agricultural research within the past two decades. In recent years, there has been a notable increase in the adoption of experimental methods in this field. The primary areas of focus within this context include the farmer, markets, consumer behavior, environmental policy, and public goods. The outcomes derived from these studies hold practical value for policymakers and researchers alike (Mesa-Vázquez et al., 2021). The agricultural population did not get any advantages from the studies conducted by academic scholars and institutions. The only beneficiary of this entrepreneur's association with the universities was the community of researchers. Individuals in the scientific community engage in their professional activities with the primary objective of enhancing their academic titles. However, it is worth noting that the agricultural sector does not reap substantial advantages from the outcomes of academic research endeavors.

Training courses have an essential role in enhancing the productivity of farmers, hence rendering them a significant and efficacious approach (Hameed and Sirwan, 2019; Ismaeel et al., 2019). The entrepreneur engaged in self-development and actively participated in several training programs. Furthermore, the entrepreneur initiated practical training programs aimed at educating aspiring farmers in the field of industrial potato cultivation.

Value-Adding

The accurate meaning of the term "value-adding" is of utmost importance when examining the advantages of value-added programs for community economic development in the food and agricultural industry, since the divergent research outcomes may be attributed to variations in its conception (Clark et al., 2021). The practice of adding value has a significant influence on the results related to value (Wong et al., 2021). The process of sorting and grading potatoes according to their size is undertaken to utilize smaller potatoes as seed tubers. These seed tubers are subsequently cultivated and distributed to farmers who have entered into contractual agreements with the entrepreneur under study. Also, the smaller potatoes that exceed the use of the entrepreneur may be returned to the Green Iraq Company, which assumes responsibility for distributing them to farmers residing in the governorates of the Kurdistan Region. The company purchases potatoes of considerable size specifically to produce Lays chips.

Inter-Sectoral Interactions

The inter-sectoral links are influenced by both their techno-economic interdependencies and their dependence on geographical settings (Mao et al., 2020). Subsequently, the success of farmers as entrepreneurs may be attributed to their aptitude for creativity, invention, and collaboration, frequently in conjunction with agents from non-agricultural domains. Additionally, their capacity to adapt to evolving social needs and expectations about agriculture and food plays a significant role in their achievements (Milone and Ventura, 2019). To illustrate, the

entrepreneur maintains a strong affiliation with the agriculture, food, and commercial sectors sector, as seen by their association with Green Iraq Company. One of the major companies in Iraq, operating in the food manufacturing and commerce sector, is affiliated with PepsiCo. A facility has been created in the Bazian district of Sulaimani Governorate in the Kurdistan Region of Iraq for the manufacturing of Lay's Chips and Cheetos popcorn, according to worldwide quality and standard guidelines (Green Iraq Co., 2023). The entrepreneur provided guarantees to a company over a building valued at one million dollars. Using this mechanism, he can get industrial potato seed tubers from the company to use them for cultivation and also disseminate them to the contracted farmers. Following the extraction of industrial potatoes in the harvest season, the same number of seed tubers is returned to the company. Furthermore, the aforementioned entrepreneur has good connections with governmental institutions, non-governmental organizations, and the Union of Farmers and Agriculturalists. This relationship includes the coordination of field days and practical courses aimed at providing educational opportunities for farmers interested in acquiring knowledge about industrial potato cultivation. On the contrary, the Ministry of Agriculture and Water Resources lacks sufficient knowledge and monitoring mechanisms to oversee the activities of farmers and ensure their adherence to established protocols. Consequently, there is a lack of responsibility in the agricultural sector. The existence of the Agricultural Extension Directorate cannot be confirmed. The level of knowledge among their staff members is insufficient. Their understanding of agriculture is limited.

Employment Opportunity

There is a growing consensus among agricultural experts on the significant potential of agricultural entrepreneurship in promoting economic development. This potential is attributed to its ability to provide job opportunities, both directly and indirectly, for the local population. Additionally, agricultural entrepreneurship plays a crucial role in enhancing food security and nutrition (Adeyanju et al., 2021).

The majority of the labor force comprises individuals of Syrian and Iranian nationalities, as well as displaced Arabs from central Iraq and members of the Yazidi community. The allocation of work is spread among individuals of both genders, with each person being assigned tasks based on their respective talents. The task of carrying watermelons is often assigned to males, whereas the responsibilities of harvesting tomatoes and gathering potatoes are mostly undertaken by females. According to (Wei et al., 2019) study, the presence of immigrant agricultural workers harms the economic prospects of native agricultural workers. In addition to a substantial number of regular employees, the farms owned by this entrepreneur attract a considerable workforce of thousands on an annual basis. This is regarded as a very effective means of generating employment opportunities within rural areas.

Entrepreneurial Spirit

Agro Climatic Zoning

Accordingly, the entrepreneurial approach used by this entrepreneur involves capitalizing on the climatic conditions of hot semi-arid and cold semi-arid areas to maximize agricultural productivity throughout the year. Within this particular context, the entrepreneur engages in the practice of renting expansive areas of land situated in regions deemed conducive to the cultivation of industrial potatoes. Specifically, these places include the Sharazur Plain, the Kalar City, and the Penjwin District. The land areas are allocated among districts 2000, 175, and 750 dunums, respectively (SIRWAN and HARUN, In press). The implementation of this particular approach guarantees the consistent presence of the industrial potato crop within the time frame of May to November. In Mawat, the entrepreneur leased parcels of land of 100 dunams. However, the agricultural conditions in Mawat are unfavorable for cultivating industrial potatoes due to the fragmented nature and uneven topography of the land parcels in the area. Consequently, the entrepreneur utilizes these parcels of land for cultivating various crops, including watermelon, muskmelon, tomatoes, peppers, and cucumbers.

Risk Analyzing

The exercise of entrepreneurial judgment is subject to the effect of perception of risk and prediction orientation, both of which are molded by previous experiences and the surrounding environmental conditions (Markowska et al., 2019; Kerr et al., 2019; Çera et al., 2019). The perception of risk among farmers about floods, heavy rains, hailstorms, severe winds, pests, illnesses, fires in curing furnaces, drought, and price deterioration as well as their risk attitude, are significant determinants that influence the adoption and implementation of agricultural risk management strategies (Sulewski et al., 2020; Akhtar et al., 2018; Lu et al., 2017). Accordingly, to mitigate the impact of price volatility, the entrepreneur in question prefers to cultivate industrial potatoes as opposed to consuming potatoes. The reason for this is that a contractual agreement is reached with the Green Iraq Company, whereby both parties agree to determine the price at the beginning of the production season. Furthermore, this entrepreneur adheres to the philosophy that prevention is more advantageous than remediation, therefore implementing measures to safeguard his crops in advance of pest infestations. Fungi are the primary pest that inflicts damage on

industrial potato crops, while spiders are the predominant pest affecting watermelon cultivation. Also, he follows all necessary measures to avoid the spread of fires to all his crops when a fire breaks out.

Marketing Strategy

A marketing strategy refers to the comprehensive set of decisions made by an organization that outlines its essential choices regarding products, markets, marketing activities, and marketing resources. These decisions pertain to the creation, communication, and/or delivery of products that provide value to customers in exchange with the organization. The ultimate aim of a marketing strategy is to make it possible for the organization to attain specific objectives (Varadarajan, 2010). Also, entrepreneurs, large-scale farmers, and agricultural firms have to design novel management and marketing ideas to establish a lucrative company plan and foster production and sales growth, in response to evolving market and economic conditions (Nebo and Ejionueme, 2017; Cvijanović et al., 2013).

The entrepreneur has established a contractual agreement with Green Iraq Company to market industrial potatoes, which outlines the production of industrial potatoes in any possible quantity by the company's certain requirements. Hence, the corporation will send engineers equipped with comprehensive tools to the fields of this entrepreneur throughout the harvest season to conduct product inspections. If the industrial potatoes meet all the requirements required by the firm, they will be deemed acceptable and thereafter sent to the company for Lay's chip manufacture. In rare cases when the product was found to be undesirable and did not fit the company's requirements, the entrepreneur proceeded to distribute it to wholesale markets. The entrepreneur performs the daily harvesting of industrial potatoes, which are afterward transported to the company's plant. The payments are sent every week to the transfer offices located in Sulaimani city. As well as, tomatoes, watermelons, muskmelons, cucumbers, and peppers are the types of produce that the entrepreneur sell on the spot.

Another marketing strategy used by the entrepreneur is cost reduction via the cultivation of extensive agricultural land and the ownership of all the machinery and equipment for production. Hence, rather than cultivating potatoes that are common from local farmers, the entrepreneur opts to cultivate industrial potatoes. This choice is motivated by the fact that industrial potatoes enjoy a consistent demand from the Green Iraq Company, thereby ensuring a stable market. Additionally, by agreeing upon a predetermined price with the company before production, he can avoid potential price depreciation during the harvest season.

Vision

The success of farmers as entrepreneurs may be attributed to their capacity for creativity, invention, and collaboration, frequently in conjunction with agents from non-agricultural domains. Additionally, their adaptability to emerging social needs and expectations about agriculture and food plays a significant role in their achievements (Milone and Ventura, 2019).

This entrepreneur has significant insights and views about the agricultural sector and the need for sustainable economic development within agriculture. He sees potential in the adoption and integration of advanced technology to enhance agricultural practices. By the use of technology, he has been able to improve agricultural productivity, minimize wastage, and optimize operational effectiveness. Furthermore, the entrepreneur is directing his attention towards sustainable and ecologically friendly agriculture techniques, driven by the growing recognition of environmental concerns and customer preferences. This encompasses the use of chicken manure in organic agriculture and the implementation of regenerative agriculture practices, such as growing wheat on previously utilized industrial potato fields to increase wheat productivity. In addition to reducing water wastage via the use of sprinkler irrigation for industrial potato cultivation, the adoption of drip irrigation is employed for the production of other crops including tomatoes, watermelon, muskmelon, cucumbers, and peppers. Finally, the entrepreneur's efforts have resulted in the promotion of sustainable rural development, achieved via a series of agricultural investments made in rural areas. These investments have facilitated the creation of employment opportunities and have contributed to the fostering of sustainable economic growth. In addition, assistance is sought in facilitating the establishment of essential infrastructure and providing funding to initiate training courses aimed at enhancing the expertise of farmers. The primary objectives of these programs are to increase their understanding of agriculture production, increase productivity levels, and ultimately enhance their overall quality of life.

Take Advantage

This reaction aims to capitalize on business chances that bolster their long-term standing in terms of financial and socioemotional riches (Llanos-Contreras et al., 2021). The entrepreneur exhibits a perpetual commitment to self-improvement, consistently generates novel ideas, and expands its producing areas. Moreover, the entrepreneur demonstrates proficiency in using contemporary advancements and technological tools to enhance job efficiency. He knows global political and economic occurrences.

The entrepreneur in question demonstrates a proclivity for capitalizing on favorable circumstances. While fellow farmers were primarily engaged in the cultivation of consumed potatoes, this entrepreneur astutely

recognized the advent of the Lay's Chips Factory and promptly seized the opportunity to secure a contract with said establishment. By doing so, this entrepreneur effectively became the inaugural local farmer to engage in the production of industrial potatoes. In recent years, the global economy has experienced inflationary pressures resulting from various factors, including the widespread impact of the COVID-19 pandemic, the ongoing conflict between Russia and Ukraine, and the escalating prices of essential food commodities such as seed oil. Against this backdrop, the entrepreneur in question astutely recognized the potential inherent in cultivating sunflowers to produce sunflower oil, thereby seizing upon a strategic opportunity.

Encouraging Others

Promoting the practice of holding people to elevated standards may be a successful approach that has the potential to cultivate collective objectives and accomplishments, thereby enhancing general contentment (Fowler et al., 2018). Hence, the responses that were provided by the entrepreneurs demonstrate comprehensive viewpoints on development that go beyond the economic aspect, including their commitment to collective standards and taking care of both themselves and others (Klapper et al., 2021).

The entrepreneur's objective is to achieve complete localization of potato sourcing for the Green Iraq Company, wherein all industrial potatoes are cultivated by domestic farmers. In pursuit of this objective, he advocates for the cultivation of industrial potatoes among farmers, offering support in the form of seed provision, machinery and equipment assistance, as well as counseling throughout the production process, ultimately facilitating the sale of their resulting products.

Critical Thinking

Critical thinking is a cognitive process characterized by the use of logical reasoning, consideration of situational factors, alignment with specific purposes, and a focus on achieving desired outcomes (Tajvidi et al., 2014). The entrepreneur cultivates tomatoes and watermelon in the Penjwin District due to the high demand for these crops in Iraq. The Penjwin harvest significantly contributes to meeting the country's needs, resulting in profitable returns for the entrepreneur. His decision to refrain from consuming potato production is attributed to the substantial potato output of the Duhok and Erbil Governorates, as supported by available facts and information. Consequently, he is prepared to adhere to the protocols set out by the Green Iraqi Company and engage in the cultivation of industrial-grade potatoes. Another notable attribute of this entrepreneur is his receptiveness to both praise and criticism, since neither deter him from pursuing his objectives.

Resilience

The predictive capacity of entrepreneurial success may be attributed to the three elements of resilience, namely hardiness, resourcefulness, and optimism (Ben Nasr et al., 2021). Entrepreneurial resilience has a significant influence on sustainable performance, and the perception of success, and it also acts as a mediator in the relationship between financial literacy and competence and sustainable performance (Seraj et al., 2022; Santoro et al., 2020; Fatoki, 2018). Accordingly, this entrepreneur is seen as resilient due to his ability to withstand market pressures, his adeptness in devising effective and swift solutions to challenges, and his persistent sense of optimism.

SWOT Analysis

The use of a SWOT analysis is applied as a method to evaluate many areas of a business, specifically focusing on its strengths, weaknesses, opportunities, and threats. (Benzaghta et al., 2021). The SWOT analysis framework acknowledges the significant internal and external factors that contribute to the achievement of a business's objectives. The internal aspects pertain to the characteristics and elements that are within the direct influence and control of the business entity. Conversely, the external aspects include the components and variables that are outside the sphere of control of the firm (Zakeri et al., 2019). The SWOT analysis provides supplementary advantages, like the capacity to see patterns and the adaptability to structure SWOT elements according to certain timeframes (Cheng et al., 2021). The prioritization of methods for achieving economic sustainability in the industrial potato sector was informed by the outcomes of the SWOT analysis and subsequent discussions with the entrepreneur. The process of identifying the most significant themes under each of the SWOT categories was undertaken, as shown in Figure 3, in the following manner:

Strength

Boosting Economics (S1)

One of the main advantages of industrial potato cultivation lies in its capacity to stimulate economic growth and promote sustainability. This is achieved by generating employment opportunities throughout the entire value chain

associated with industrial potato production. The implementation of this initiative resulted in an improvement in domestic output, making a partial contribution towards the retention of capital inside the nation.

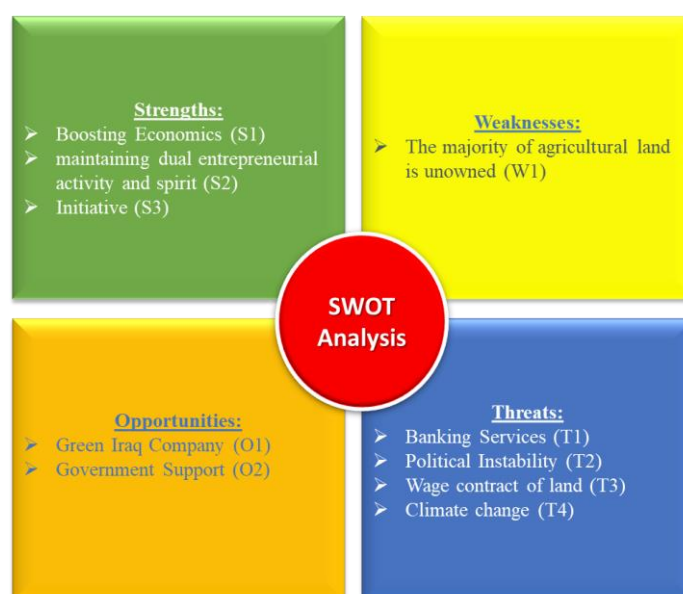


Figure 3. Summary SWOT analysis framework of industrial potato production in Sulaimani governorate. Source: face-to-face interview with an entrepreneur.

Maintaining both Entrepreneurial Activity and Spirit (S2)

The entrepreneur under study effectively integrates both the entrepreneurial spirit and entrepreneurial activity simultaneously. By adhering to effective time management strategies, establishing attainable objectives and priorities, and engaging in meticulous preparation. In addition to prioritizing core competencies in all facets of industrial potato production, the practice of outsourcing work is also emphasized when deemed required. Furthermore, by capitalizing on the potential synergies that exist across the sectors involved in potato production and processing, an opportunity arises to enhance the manufacture and promotion of Lays chips, hence striving for increased levels of success. Moreover, he has strong intrinsic drive and maintains a clear sense of purpose, consistently reminding himself of his objectives and underlying motives. Finally, this entrepreneur has a persistent commitment to continuous learning. He has current knowledge of the most recent trends and advancements in both the industrial potato production and processing domains. The individual actively participates in conferences, engages in extensive reading, remains well-informed, and maintains regular communication with other entrepreneurs.

Initiative (S3)

Another notable attribute possessed by these entrepreneurs is their proactivity and willingness to take initiative. The proposed measures encompass various strategies to enhance agricultural practices, such as providing support to small-scale farmers and guiding them into engaging in industrial potato production, cultivating extensive land areas, propagation and dissemination of industrial potato seed tubers, adopting biofertilizers, optimizing pesticide usage, initiating the implementation of drip irrigation systems within the region, ownership of all necessary agricultural machinery and equipment for field operations, and leasing land with suitable soil conditions and a high level of fertility, with ample water resources, a robust agricultural marketing, and substantial capital available for investment in agribusiness.

Weakness

The Majority of Agricultural Land is Unowned (W1)

One significant limitation of this entrepreneur is the absence of complete land ownership, which restricts his ability to fully use the agricultural advantages derived from these properties. He is responsible for the management of extensive territories spanning around 3000 dunums. The majority of the expenses incurred are to rental payments.

Opportunities

Green Iraq Company (O1)

The establishment of the Green Iraq Company represents a significant opportunity for enhancing industrial potato production in Sulaymaniyah Governorate. This plant ensures the procurement of all quantities of industrial potatoes produced by farmers, contingent upon the fulfillment of specified criteria. The Green Iraq Company is the first snack franchise enterprise established by PepsiCo on a global scale. The establishment of the plant took place in the year 2014 inside the geographical location of Bazian, specifically in Kani Shaytan, which is situated in the Sulaiman governorate of the Kurdistan region in Iraq. The company's products include Lay's potato chips, Cheetos popcorn, and Bugles.

Government Support (O2)

At the economic and financial levels the government's primary focus will be on the agricultural sector, whereby they will strive to enhance its development via the use of new equipment and technology. Additionally, they want to augment both the diversity and volume of agricultural goods by scientific principles. The government places significant emphasis on the protection of local products, the provision of assistance to regional farmers, and the facilitation of appropriate domestic and international markets for their goods (Kurdistan Regional Government, n.d.).

Threats

Banking Service (T1)

The provision of banking services is widely recognized as a secondary activity within the value chain of agricultural products (Van Hong et al., 2021). Its significant contribution lies in the enhancement of agricultural operations and the overall productivity of the sector (Ogbuabor and Nwosu, 2017). The agricultural banks operating in the Kurdistan region are classified as governmental banks. The primary reliance of these banks is on the government's budgetary allocation to provide loan facilities to agricultural producers and investors. The ongoing crises and disagreements between the Kurdistan Region Government (KRG) and the central government of Iraq have prompted the KRG to implement austerity measures, notably the suspension of all loans, particularly those allocated for agricultural projects. Additionally, the remaining private banks provide loans with elevated interest rates.

Hence, it can be inferred that the absence of agricultural banking facilities in the Kurdistan Region of Iraq poses a significant hindrance to farmers and investors engaged in agribusiness, impeding their access to essential banking services such as loans, financial assistance, and advisory support for effective financial planning and management of agricultural ventures. Furthermore, the lack of specialized insurance policies tailored to the requirements of agricultural institutions further exacerbates the challenges faced by this sector.

Political Instability (T2)

The potential consequences of political instability in the Kurdistan Region of Iraq and Iraq include the potential departure of the Green Iraq Company, which serves as the main buyer of this entrepreneur's industrial potato products. Such a departure might result in significant financial losses for the entrepreneur.

An additional political issue is the lack of adherence to the agreement established between the Iraqi government and the Kurdistan Regional Government (KRG) on the closure of borders during the production season. Both governments collaborate on comprehensive agriculture initiatives. When the crops of one party are harvested, it is incumbent upon the other party to block its borders and refrain from importing crops from outside sources. Noncompliance with the aforementioned agreement by either party will result in negative impacts for farmers on the opposing side, leading to a decrease in crop prices and an inability to successfully sell their produce in the market.

Wage Contract of Land (T3)

A land rent contract entered into by farmers pertains to a formal arrangement between a proprietor of land and a farmer or farmers. The agreement typically includes the lease time, rental fee, obligations of both parties, and provisions for contract termination. In several instances, landowners engage in the exploitation of farmers by the imposition of high rents, hence resulting in escalated production costs. One of the significant challenges in this context is the depletion of land due to excessive use and the absence of crop rotation.

Climate Change (T4)

Changes in temperature and humidity patterns provide a significant hazard to climate change, hence impacting agricultural growth and yield. The proliferation of pests and illnesses is also responsible for causing agricultural yield reductions. The phenomenon of climate change has the potential to diminish the availability of water resources, hence exerting an influence on the total productivity of crops. Climate change has been identified as a contributing factor to changes in precipitation patterns, resulting in adverse consequences such as crop failure. Ultimately, climate change has the potential to result in heightened soil deterioration through the processes of

erosion, and nitrogen depletion. This phenomenon has the potential to diminish soil fertility, hence posing challenges in cultivating industrial potato harvests.

CONCLUSIONS

The individual examined in this research was a male entrepreneur of middle age hailing from the Penjwin District. He is classified as an entrepreneur based on the congruence between his entrepreneurial activities, entrepreneurial spirit, and the recognized benchmarks of entrepreneurship. His entrepreneurial activities were product diversification, hiring professional farmers, drip irrigation system, resource ownership, research and development, value-adding, inter-sector interaction, and employment opportunities. whereas his entrepreneurial spirit was agromatomatic zoning, risk analyzing, marketing strategy, vision, taking advantage, encouraging others, critical thinking, and resilience. In this study, the SOAT analysis framework is used to identify and assess the primary strengths, weaknesses, opportunities, and threats associated with the agribusiness sector involved in the production of industrial potatoes in Sulaimani Governorate. The primary fields of strength were boosting economics, sustaining entrepreneurial spirit and activity, and initiative. The significant weakness was the context of unowned agricultural land property. Meanwhile, the most important opportunities in front of the agribusiness of production of industrial potatoes were the excitement of Green Iraq Company and government support. Finally, threats included a deficiency in banking services, political instability, land wage contracts, and climate change.

The following recommendations are put forward to fulfill the study on the economic sustainability of industrial potato production with entrepreneurial strategies:

- The Kurdistan region of Iraq is characterized by its division into several climate zones. This feature is essential for businesses seeking to capitalize on the region's abundant seasonal production opportunities.
- The farmers must cease the act of imitating in the production. Shift focus towards the creation of significant and groundbreaking items that possess a sustained market presence.
- The focus on professional and production specialization is vital for the growth and development of entrepreneurs and their products.
- Future studies should explore the trade-offs between economic sustainability and environmental sustainability in industrial potato production, focusing on both profit maximization and environmental consequences.

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Conflicts of Interest

The authors of this research paper affirm that they possess no conflicts of interest.

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