

Transforming Agriculture into a Sustainable Solution to Feed the World: A Case Study of Terra Tech Corporation

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ABSTRACT

Terra Tech Corporation is an urban agriculture equipment company that focuses on the hydroponic farming industry and they specialize in controlled environment agricultural technologies. This company will be analyzed on their core business and how they found ways to diversify into two separate markets with the same applied technology. Terra Tech Corporation applied their corporate expansion into two fields: produce and cannabis.

Terra Tech saw an increasing global problem of the scarcity of food and the strain on the resources to provide it. As a hydroponic equipment company, they believed that their ability to create indoor agriculture products would be a sustainable solution. Their technology for indoor controlled environments allows growing conditions to be manipulated for maximum return on crops in the most environmentally friendly ways. Terra Tech now needs to develop technology that is more proficient in the use of water and energy. Without solving this lack of energy efficiencies, their competitive advantages are being threatened and their plans to help change the way to feed the world endangered. This case can be utilized to examine the impact of social trends and technological developments on a company's vision and distribution of resources.

Keywords: hydroponic farming, diversification, strategy, competitive advantage

INTRODUCTION

While working on Wall Street and making over a quarter million dollars a year, Derek Peterson thought that he was living the good life. That was until a friend of his told him he was making over \$15 million dollars in profit at his medical marijuana dispensary. After analyzing the data using his investment banking background, even he knew there was a future in that business. He also realized that dispensaries were a risk and a better option would be a peripheral business to support the growth of the industry in the coming years. But what if you could make money and make a difference? He was able to combine the two in the development of sophisticated hydroponic equipment which allows for indoor cultivation of agriculture.

Terra Tech Corp. was originally incorporated in Nevada on July 22, 2008 under the name Private Secretary, Inc. Although originally in the VoIP business, after years of generating no revenue, the name was changed to Terra Tech Corporation on January 27, 2012. Terra Tech Corporation decided to merge with GrowOp Technology, which was finalized on February 2, 2012 (SEC Filing Data, 2014).

Derek Peterson, CEO of GrowOp technology became the newly appointed CEO of Terra Tech. This merger was the start to incredible innovations in the urban agricultural industry. This company will be analyzed on their core business and how they found ways to diversify into two separate markets with the same applied technology. Terra Tech Corporation applied their corporate expansion into two fields: Produce and Cannabis. Several trends were also driving the merger: the “green” movement, higher consumer expectations of freshness and demand for ready-to-eat fresh foods, danger of pesticides and herbicides, and developing concerns about food safety (SEC Filing Data, 2014).

The core competencies of Terra Tech Corp lay within its resources. Terra Tech Corporation, as a holding company, has the advantage of using their equipment through their subsidiaries. They manufacture controlled environment agricultural technologies that are sold to different buyers. Their core competencies are from Edible Garden Corporation and the way they use the technology to produce nutritious produce and distribute it to other retailers. Terra Tech has capabilities that come from their technology. Their current technology allows them to have the capability to focus on biotechnology, food technology research, and renewable energy resources.

This organization operates in two distinct markets: Commercial Agriculture and Retail Agriculture. Terra Tech is a holding company that has three wholly-owned subsidiaries: GrowOp technology Ltd, Edible Garden Corporation, and IVXX, LLC. Terra Techs MediFarm, LLC, MediFarm I, LLC, and MediFarm II, LLC subsidiaries, are focused on medical cannabis businesses throughout Nevada. They also have a MediFarm I Real Estate, LLC subsidiary that is a real estate holding company. For their medical cannabis business throughout Nevada (Terra Tech Corporation, n.d.). Terra Tech’s ventures may be up for controversy and there will probably always be a debate on the issues surrounding the use of marijuana to help people with various medical situations. Terra Tech decided to stay out of the debate by being able to assist and control its products where it was legalized in Nevada.

THE VISION

When he left Wall Street and started GrowOp, now Terra Tech, Peterson had three goals for the company’s future: make an impact, create jobs, and contribute to society.

Terra Tech is an urban agriculture equipment company that focuses on the hydroponic farming industry. At the heart, they are a technology company. They specialize in controlled environment agricultural technologies. They use their technology to create sustainable solutions for food development, production, and indoor cultivation. They are helping growers move their production indoors and vertical for higher production rates. Terra Tech has the intellectual resources and manufacturing capabilities to bring their idea to fruition. Farmers are able to control their environments through an iPad. Being able to control and gain analytics, every crop gets better and better for the farmer.

Terra Tech's mission statement is, *"To design, develop and market the most innovative and environmentally friendly agricultural equipment for both commercial and retail markets"* (Terra Tech, 2015). They have done this in both of their business segments. The produce segment involves Edible Garden using Terra Tech's environmentally friendly agricultural equipment for growing nutritious hydroponic produce and distributing the product to retailers. Terra Tech's Vision is, *"To help transform, through innovation, the way we feed the global population through methods that are both sustainable as well as environmentally friendly"* (Terra Tech, 2015). This organization focuses their mission and vision statement on the most positive side of their business that has potential to affect the world through their innovative technology.

ORGANIZATIONAL STRUCTURE

As the CEO of Terra Tech and GrowOp, Peterson came into the industry with little knowledge about agriculture, but he was a savvy business man. When hired as the CEO, he brought the idea, economies of scale, to the table. He knew the cannabis industry was still unsteady and there were opportunities for mergers across the market. The resource-based model looks at an organization's internal strengths along with their resources. Peterson later proposed the idea of vertical integration (Chun, J., 2012).

GrowOp had been focusing on cannabis and Terra Tech had their focus on the agriculture industry (GrowOp, n.d.). He knew that both companies could benefit from one another. Terra Tech has good internal strengths because of the merger they had which makes them one of the few steady organizations in the mixed market they are in.

Terra Tech Corporation operates in two separate business segments within the hydroponic farming industry. The produce segment is defined by the multiple trends that have brought attention to urban agriculture. Consumers are becoming more concerned with sustainability and earth friendly products. There are higher expectations of freshness, higher demand for ready to eat greens, and a more health conscious baby boomer generation. Consumers are becoming more concerned with food safety and gaining the preference of produce that is grown without pesticides and herbicides. The biggest factor of their operational domain is the growing concern for a sustainable, environmentally friendly way to feed our population, which Terra Tech is doing through their wholly-owned subsidiary, Edible Garden Corporation.

Edible Garden Corp is the operator of Terra Tech's Produce business segment. They cultivate a premier brand of local and sustainably grown hydroponic produce, sold through major grocery stores, such as Shoprite, Walmart, Kroger, and others throughout the Northeast, Midwest, and Florida (Terra Tech Corporation, n.d.). Edible Garden Corp is a co-op family of

local growers. They use controlled environment agricultural technologies to cultivating their fresh, all-natural, non GMO, hydroponic produce (Edible Garden, n.d.). They participate in year-round production through climate-controlled greenhouses with their safe, innovative technologies. Edible Garden offers herbs and lettuces that are alive and growing when you buy them from the store. Their produce is sold locally with the root systems attached.

The two biggest contributions Peterson made to gain a competitive advantage was getting into the market early and merging with Terra Tech. He has sustainability with agricultural technology and incredible revenue potentials with the cannabis market on the rise. The two companies may have had different goals at one point but they both need the same technology for their products.

UNDERSTANDING THE OPERATIONAL PROBLEM

The biggest factor of their operational problem is the growing concern for a sustainable, environmentally friendly way to feed our population. Terra Tech has the technology capable of solving this issue. The problem that Terra Tech will have to address in order to maintain a competitive edge in the hydroponic industry is how to become even more energy efficient. They need to develop both indoor and vertical greenhouses that are more efficient in terms of energy and water use.

Terra Tech is a company that wants to be known for their dedication to a greener world. They are in the middle of the new era, farming technology. Globalization and technology are the core reasons for this company's success and sustainability. Globalization has generated numerous positive changes such as manufacturing and trade. It has also led to the social issue we see today that deals with reducing carbon footprints by consuming locally grown produce. During globalization, scientists and farmers needed a way to grow food without being devastated by environmental factors like diseases and weather. Farmers could only produce so much depending on where their geographical location was. People saw an opportunity with a growing need for higher food production, so some companies began locating themselves in tropical regions to take advantage of longer growing seasons.

Science became involved to genetically modify the plants DNA to withstand certain conditions. This was a huge advancement in the food production industry. After numerous advancements in genetically modifying plants, people began to question whether the plants are still as nutritious as they once were. Terra Tech took advantage of this issue by using technology to create better ways for growing produce rather than changing the structure of the produce itself.

Technology is what Terra Tech specializes in. They have been creating the technology needed to produce nutritious products that are higher in quality than the traditional GMO's most of us consume today. The environmental impact of globalization has led to the emphasis we see on "urban farming" and the need for higher production rates that will have minimal environmental impacts

The general environment is composed of external factors that can have dramatic effects on a firm's strategy and usually go beyond a firm's control. General environment is divided into six segments: demographic, sociocultural, political/legal, technological, economic, and global. The two segments of the general environment that would rank highest in their influence on Terra Tech are: sociocultural and the global segment combined with the technological segment of the general environment.

Sociocultural forces influence the values, beliefs, and lifestyles of a society (Dess, G., & Lumpkin, G., 2014). Sociocultural forces affect Terra Tech Corporation and the hydroponic farming industry due to the increasing levels of obesity, greater concern for fitness, and greater concern for the environment. In the United States and across the globe, there is a growing concern for how we will manage to feed our population in a way that is sustainable for our planet. The global economy has allowed to produce better technology along with more affordable products and food alternatives. The biggest influence seen from sociocultural forces is the need for a sustainable, environmentally friendly way to produce nutritious foods that are safe. Consumers are now more aware of what pesticides and other chemicals have been used in the production of the food they consume. The technological segment applies to Terra Tech because they have the technology to influence the way foods are produced.

The global segment relates to influences from foreign countries, foreign market opportunities, foreign-based competition, and expanded capital markets (Dess, G., & Lumpkin, G., 2014). The global segment for Terra Tech Corporation also has a relationship with the technological segment. Terra Tech has the opportunity to access larger potential markets worldwide. Countries such as Australia and New Zealand have strict import and food safety regulations. Regulations such as these may cause complications when it comes to moving their products into certain global markets. For Terra Tech, they would not be exporting food, they would be exporting equipment. The equipment needed to allow countries the opportunity for local, more nutritious grown produce. The global economy has allowed for more countries to develop and become better educated. Development and education have allowed more people to focus their attention on the quality of life. These issues directly relate to Terra Tech's technology because their technology can increase the quality of food produced and distributed.

PORTER'S FIVE FORCES

The five forces of industry competition consist of: Threat of new entrants, bargaining power of buyers, bargaining power of suppliers, the threat of substitute products and services, and the intensity of rivalry among competitors in an industry (Dess, G., & Lumpkin, G., 2014). The two forces of competition that are most significant for Terra Tech Corporation are the bargaining power of suppliers and the threat of substitute products and services. The bargaining power of suppliers in the hydroponic food industry relates to the energy issues seen in hydroponics.

During the winter, the major component of operational costs is heating. The energy used to heat a greenhouse during the cold seasons increase the carbon footprint of these operations. Energy companies may allow their prices to change based on energy consumption to maximize the profits gained from these operations. Terra Tech Corporation has taken steps to evaluate alternative solutions when it comes to how they power their facilities. They teamed up with Rebecca Gasca, CEO of Pistil and Stigma, to further pursue the issues indoor cultivation has on the drain of electricity and other natural resources (Terratech blog, n.d.). According to Rebecca Gasca, "our objective is to make Nevada the poster child for a program that is both patient and environmentally friendly" (Terratech blog, n.d.).

The threat of substitute products and services in the hydroponic industry is a serious issue for Terra Tech's operations. Trade secrets in the industry are difficult for Terra Tech and their competitors to protect. They have taken steps to diversify their corporation into different applications of hydroponics rather than only focusing on manufacturing. They develop

hydroponic equipment, grow produce using hydroponics, grow medical marijuana using hydroponics, and focus on sustainable indoor agricultural equipment. There will be new innovative ways to make hydroponics more environmentally friendly through energy recycling. As they navigate this growth, Terra Tech Corporation appointed Mr. Kenneth Krueger to the Board of Directors. With his 48 years of experience in the financial industry, it is the hope of Terra Tech that his experience in making financial decisions to optimize investment return of their new diversified portfolio (New York Times, n.d.). Terra is taking steps to improve their internal company structure. They have made enhancements to their corporate governance policies and Code of Ethics (PR Newswire, 2015).

Terra Tech Corporation may use their wholly-owned subsidiary, GrowOp Technology, to become more innovative in the hydroponic industry (GrowOp, n.d.). They may start to look at ways to make hydroponics more energy efficient. In order to address the threat of substitute products and services, Terra Tech may invest in biotechnology. This will allow them to come up with more efficient hydroponic systems that excel beyond customer expectations, making it harder for substitute products to enter the market. Terra Tech may address the bargaining power of suppliers by investing in renewable energy resources that produce cheaper plastic solar cells. These solar cells can be established around hydroponic systems to reduce the energy consumption and make them less reliant on suppliers. This could also reduce operational costs, making the hydroponic systems more affordable for the small urban farmers, home enthusiasts, and traditional greenhouse growers.

Terra Tech Corporation is a step ahead in providing safe products and a better quality of life but the real threat lays with the alternative production systems. The threats that are developed in the future to be more efficient in terms of water, energy, and water use can also be considered an opportunity for Terra Tech. Another threat that Terra may see in the hydroponic farming industry is accidental pest and disease introductions that originate from bad growing practices. This threat is one that comes from the new global economy that we see today. This is a free trade economy that has been beneficial to many because they offer cheap products for individuals worldwide as cheap products flood the international markets. The new global economy brings a serious threat to the hydroponics industry because it threatens the stability of existing fresh food markets and increases the risk of exotic new pests that establish themselves in countries where they never existed before.

INDUSTRY CHALLENGES

A major challenge ahead for the hydroponic industry will be to grow crops with a minimal use of safe pesticides. This means the internal debate whether they should be developing more disease-resistant plant varieties or risking millions of established plants due to a new disease. A challenge that could be seen as an opportunity is discovering a wider range of beneficial insects and other biological control agents and developing management protocols to control pest and disease problems (Mission 2015, n.d.).

The global quantity and quality of water available for urban populations and for farming is a serious issue. This is an opportunity for the hydroponic industry because their systems are more water-efficient than traditional farming techniques. When using a closed system in hydroponic farming, they can recycle a great portion of their water usage which also reduces the fertilizer waste. The key opportunity for Terra Tech in this situation is using their technology for innovation. Most hydroponic growers worldwide are still running waste to reduce the risk of

disease problems for their crops. This is because they can't want to take the risk of recycling a disease that will potentially destroy their crops. The opportunity is to modify their systems to recycling technology that is affordable for urban farmers. The recycling technology along with the promotion of better practices in the management of their crops can benefit the world with higher quality and safer products.

CASE QUESTIONS

1. How does the growing concern for nutritious sustainable food production and the growing market of cannabis affect Terra Tech's business strategy and the use of its resources?
2. How should Terra Tech prepare for future stability of their company and its subsidiaries in both business segments?
3. Should Terra Tech focus on biotechnology, food technology research, or renewable resources?
4. What are the biggest threats to Terra Tech in the global environment?
5. What steps should Terra Tech take to prepare for the risks of taxation, regulation, or social change?

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