

Product Development and Commercialization, Technology Risk

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Executive Summary

This study is a fundamental analysis on the release of a smart features blind stick for people who are visually impaired. The competitive environment in which we live sees the introduction of various new and inventive items to the market on a regular basis. The company currently conducts its business under the name Medical service innovation company, in accordance with the business case that is discussed in the paper. However, as part of a strategy to expand the company, they are intending to launch a revolutionary electronic blind stick or white cane in the near future. The new business case for MSI products or devices is explained in the report's first section, along with the measures the company will take to launch the new product and how they correspond with the milestones of the new product development process. Funding is crucial to any company's success, but it is especially crucial for those looking to bring innovative goods to market. In the second part of this research, we will compare various funding strategies to determine which is most suited for the MSI business. The third half of the paper examines MSI's efforts to secure patents and trademarks in preparation for the commercial release of its unique blind stick. In the final half of the paper, we will discuss the external factors or barriers that MSI must confront when introducing the new revolutionary product, and how the business can work to overcome these obstacles.

Introduction

Blind persons often use their white canes as a means of self-identification in addition to serving as one of the traditional aids for navigation (Elsonbaty, 2021). It has a cheap cost, is dependable, efficient, and straightforward, and it enables direct physical engagement with the ground through the impacts of signalling. It enables blind people to adopt numerous strategies such as obstacle detection, echolocation, and shorelining, which increases their sense skills and improves their understanding of the environment around them. This helps blind people live more independently. It gives the blind user the ability to identify impediments within a range of 1.2 metres while standing on the ground. In order to detect steps, drop-offs, and curbs while walking (in the forward direction), a blind user will sweep the white cane to the left and right as they walk (Tirupal et al. 2021). This allows them to determine whether or not they will run into the obstacles. Sweeping the white cane, also known as dragging and tapping, is a technique that helps people create mental maps of their environment by assisting them in comprehending the nature of items, such as their shape, hardness, and dimensions, among other characteristics. The use of echoes to identify objects with sound-reflecting surfaces, such as walls, parked cars, and other such items, enables blind persons to navigate using a technique known as echolocation. Echolocation is able to give a perception of the surrounding environment in the shape of an object, as well as its location, size, and density, and it does this by capitalising on individual differences in the sound that they produce. Blind persons will employ a method called shorelining, which is a form of trailing or tracking, to follow the edge, or "shoreline," of the path they are travelling. When the user needs to discover a certain item or location along the edge of the journey path, such as intersecting hallways, a mailbox, or a sidewalk, this method is typically appropriate since it uses the edge of the travel path as a guide (ANI & ANNI, 2019). This method is also utilised by users in order to continue their contact with particular landmarks when moving from one location to another and in order to circumvent wide open areas. For shorelining, blind individuals will typically follow a border of (wall, corridor) or pavement marks expressly constructed for the blind user in public places such as bus stops, shopping centres, and crosswalks. These markings are designed to help blind people navigate their surroundings (Bharatia et al. 2019).

Medical Service Innovation (MSI) is company who is going to innovate a smart features or electronic blind sticks for visually impaired peoples. The very definition of innovation is the introduction of something brand new. Innovation, construed in a broad sense, has the potential to confer significant benefits and is one of the most essential skills for the success of a firm.

Competitive advantage

The term "competitive advantage" is used to describe the advantages a corporation has over its rivals due to improvements in core capabilities. The specifics of which ones depend on the business's strategy and the industry in which it competes (Reyes et al. 2021).

Aim for the highest possible rate of return:

Productivity and efficiency tend to go hand in hand with a company's ability to stay ahead of the competition and to innovate constantly.

Productivity arises

As a result of reduced production costs and increased productivity, innovation and technological progress are a driving force in the expansion of the industrial sector. By automating routine things, businesses may devote more time and resources to initiatives that generate greater returns for their operations. Innovation flourishes when a company has strong cultural values and sustaining systems in place (Mazhar Gul & Khan, 2022). Some argue that innovation is the driving force behind transformation, with culture serving as a crucial component of this creative process. Organizational innovation refers to the introduction of a new product, service, process, or technology into a company. Culture at an organisation can have an effect on how innovative it is. In particular, a culture of adhocracy has a positive influence on the innovative processes of a company, whereas a culture that is hierarchical has the opposite effect. The vision sets the way for innovative strategies to be used in order to achieve it. It is the basis upon which objectives, key performance indicators, and strategic methodologies are built. The organisation will be able to get from where it is now to where it wants to be in the future with the help of a creative vision (Loganathan et al. 2020). Businesses that do not have a mission statement or vision statement for innovation are more likely to become stale and obscure. The interaction of the leaders with

the workforce would consist mostly of listening to connect, acting as a motivator to explore potential solutions to open difficulties, and looking for new ideas based on the experiences of customers. They ponder the various ways in which the current state of the customer experience may be enhanced beyond its current state.

New product development

Acquisition and new product development are the two methods that are utilised in new product development plan to gain new production. New product development is also an option. The term "new product development" (NPD) refers to an essential component of product design. This will continue until the product life cycle in its entirety has been finished. This can include continuing to collect feedback from customers and developing new versions by either adding new features or improving the functionality of existing ones. The following is an identification of each of the eight stages of NPPD.

Idea generation

During the time that they were running their business with a variety of western products, Medical Service Innovative was given a variety of feedback from their clients. Additionally, by analysing the various market trends, blind sticks was able to identify new business ideas that would allow them to expand their company. Therefore, Medical Service Innovative (MSI) has looked to a variety of outside sources in order to uncover the business concepts that can be employed to grow the company. The following is a list of some of the ideas that have been uncovered up to this point:

- Developing the company's presence in a variety of locations around the United Kingdom
- Create a website offering a variety of medical services, and sell them online.

Idea screening

The ideas that were generated in the first stage without any kind of filter will need to be filtered out during this stage, and the number of ideas will need to be reduced. The electronic blind stick is the chosen unique business idea by Medical Service Innovation after appropriate screening of the trends in the market and the feedback received from customers. The company plans to launch the product for the market in the near future.

Concept developing and testing

They need to acquire the appropriate raw materials and have the appropriate machinery in order to build the concept, and the thought of launching the electronic blind stick should be thoroughly confirmed with the essential parties that have the professional knowledge on that.

Concept testing

By making the newly unveiled product freely available to MSI's regular customers, the company can collect their input on the product before it is officially released. Given that this is a medical product, MSI should always make it a priority to collect any and all comments from customers since it is the most valuable.

Development of marketing strategy

Utilizing social media platforms as a marketing strategy is the step that is considered to be both the most effective and the one that is advised for the medical service product. Aside from that, the MSI is able to employ a variety of techniques, such as disseminating booklets in hospitals that contain all of the pertinent information. Additionally, MSI has the ability to sponsor an influencer by providing them with free access to the product. These are the marketing techniques for the MSI electronic blind stick.

Business analysis

At this point in the process, Medical Service Innovation (MSI) is able to carry out this analysis by displaying the total sales predictions, expected costs, and profit margins over the set objectives. It is likely that the company's primary objective is not to turn a profit but rather to build a name for itself in a different sector.

Product development

After conducting the research described above, MSI came to the conclusion that they have successfully satisfied the expectations by making a substantial investment. As a result, they have determined that they must immediately begin developing the product. It is recommended that all of the professionals who have understanding of blind stick, product designers, and other

parties collaborate in order to launch the prototypes of the electronic blind stick that were designed by MSI.

Test marketing

Before beginning the process of commercialization, this is one of the most important stages that must be completed. At this point in the process, it is necessary to carry out both alpha and beta testing in order to challenge the validity of both the product and the planned marketing strategy (Mohapatra et al. 2018).

As the name implies, alpha testing is when the product is evaluated by the test engineers.

A product's viability can be gauged by the responses it receives during "Beta Testing," which involves actual users.

At this point, each and every comment is becoming increasingly significant. MSI needs to test the defined marketing strategy to determine whether or not it can meet the expectations, as well as test the product to determine whether or not it satisfies all of the quality standards, such as SLAS, and whether or not it is able to meet the expectations of the customers using a variety of Alpha and BETA testing techniques.

Commercialization

It is the responsibility of the suppliers of the raw materials for this product (an electronic blind stick), as well as the production teams with the experts, the promoting team of the MSI, the marketing and sales team, and any other relevant teams, to work together to incorporate the product and make it available on the market while also conducting any necessary advertising.

Trade secrets include - You can use this to determine which trade secrets are included in your idea. Financial data, formulas, methods, business plans, product recipes, customer lists, and concepts pertaining to MSI electronic blind stick items are included here.

Throughout the entirety of the new product development cycle, the primary focus must and always will be on increasing the innovative value provided to customers.

Advantages and disadvantages of sources of funding option

The availability of sufficient funding is the single most important factor in determining how smoothly a corporation is able to carry out its activities, grow, or expand. In addition, the MSI corporation needs to make a decision regarding its investment intentions before it can grow the business and introduce new MSI electronic blind stick goods. The following is a list of the various funding possibilities that MSI can consider. After carefully weighing the various benefits and drawbacks of each possibility, the company will be able to choose the finance model that is most suitable for its electronic blind stick products.

Source of finance	Advantages	Disadvantages
Personal savings	<ul style="list-style-type: none">• There is no participation in any paperwork.• When it comes to lending money for the company, the owner does not need to provide any collateral.• There are no predetermined rules, regulations, or limits, nor are there any predetermined payback durations, predetermined payback amounts, or predetermined interest rates.	<ul style="list-style-type: none">• If the company needs a significant amount of capital for the investment, then this choice is not an appropriate one.• The entrepreneur and the company will come to this understanding on an informal basis. Therefore, there is a considerable likelihood that some problems with cash flow will arise.

Loans	<ul style="list-style-type: none"> • The best choice for an investment with a long-term horizon. • Option that is both the simplest and the quickest. • Can receive fixed instalments & fix time period. • The maximum amount that can be earned all at once. 	<ul style="list-style-type: none"> • To be able to make the interest payments • Have to get used to the ever-evolving policies, procedures, and guidelines of the bank. • The payment of the instalment is due on the date that was previously agreed upon. • Invest some effort on the documentation.
Family and friends	<ul style="list-style-type: none"> • Over the course of the business, it will bring you and your loved ones who are blind or visually impaired closer together. • This money can be acquired rapidly, but the conditions are dependent on the relationship. • Less paper works. • The terms and circumstances will be 	<ul style="list-style-type: none"> • Because of their financial investment in the company, it will be more difficult to seek guidance from the family side of the business. • This will be additional strain on the personal relationship, putting it under stress.

	amenable to negotiation.	
Retained Profits (The undistributed profits of the company)	<ul style="list-style-type: none"> • Due to the fact that they are the company's personal savings, those obligations must be repaid. • No interest payment. 	<ul style="list-style-type: none"> • In the event that the company has been operating at a loss during the preceding time periods, there is no retained profit that is currently available. • This implies the loss of potential earnings.

In light of the findings of the aforementioned investigation, the application for a bank loan to expand the business is the mode of financing that MSI should pursue in order to launch their new electronic blind stick. Since there is a greater demand for electronic or smart blind sticks for visually impaired people in the market, and since MSI is already established as a stable company in the market, they are able to make the necessary plans to get adjusted on paying the monthly loan instalment along with the interest because of both of these factors. The fact that this is the only way for MSI to obtain the sum of money necessary to run the business without any hitches is the primary factor that led to the decision to go with the loan as the most suitable method of obtaining financial backing.

Intellectual property (IP)

It is common practise for companies to believe that if they want to protect themselves from being exploited by others without their consent, the best course of action is to seek legal protection on their intellectual property. A production of some kind, such as symbol, an invention, or secret, or simply a name, might be considered intellectual property. There are four primary categories of protection for intellectual property:

- Trade secret
- Patent
- Copy rights
- Trade marks

These four are the known as intellectual property. Several strategies are available as possible recommendations for protecting intellectual properties. It is possible to recognise them as the methods that businesses can utilise in order to preserve their intellectual properties. Trademark law, patent, and copyright law are all included under the umbrella of intellectual property law, which was enacted so that artists could be safeguarded. Therefore, intellectual property is a catch-all phrase that includes both copyright and industrial property, which includes things like trademarks, patents, and innovations (Hussain & Hakro, 2022).

Trade secret

Trade secrets are a sort of intellectual property (IP) right that are attached to sensitive information and can either be licenced or sold. In general, in order for information to be considered a trade secret, it must meet all of the following criteria: have significant economic value due to the fact that it is secret; be known exclusively to a small group of people. Furthermore, trade secrets are specific pieces of information that are kept under wraps because they are deemed to be confidential and because the business relies on them to maintain a competitive advantage in the market. If a competitor company were to steal a trade secret, it could cause harm to the original holder of the knowledge. Recipes for electronic blind stick, new innovations, procedures, and even various marketing methods can all be examples of trade secrets.

Patent

The owner of a discovery or model that has been granted a patent has the legal right, for a predetermined period of time, to restrict other people from manufacturing, utilising, or selling the patented invention (Tianyi, 2021). In addition, certain medical services may patent a unique design in order to prevent others from imitating it and gain a competitive advantage.

Trademarks

Brands can be safeguarded through trademarks. Customers are able to identify a product or the manufacturer of a product through its trademark. The brand name (including the MSI brand name) and logos are the two most popular types of trademarks. It is not necessary to register your trademark in order to acquire trademark rights (Bele et al. 2020).

Copyrights

Many different innovations have one or more aspects that qualify for legal protection under copyright laws (Zahedi et al. 2018). Copyright can be used to protect things like the pictures and phrases that are found on goods packaging, labels, and even the products themselves. From this company can help mitigate the financial losses you sustain as a result of unauthorised copies being made of your products.

In light of the information presented above, it is abundantly clear that in order for the MSI company to protect the products that are sold under the brand MSI and the innovative electronic or smart blind stick, it is necessary for the MSI company to obtain trademarks for the products that fall under that brand.

MSI items are works of healthcare because they are the product of medical or healthcare ability to create treatment or solutions. It is essential for businesses across all sectors, but particularly in the medical sector, to protect their intellectual property (IP). To begin, intellectual property enables you to prevent others from stealing your proprietary business information, such as your brand, proprietary tools and methods, innovative features, and unique logos, all of which represent the culmination of a lot of hard work on your part (Mirghafoori et al. 2018). In this sense, intellectual property can be used as a weapon to keep competitors at bay and prevent them from entering the market. In addition, intellectual property is essential if you want to sell licences to others for their use of your IP rights. MSI needs to confirm that your trademark is being used in some capacity. You are not required to actually sell the goods or services in order to qualify as having active use of your trademark; active use merely refers to the act of utilising your trademark to identify products or services in the marketplace. In addition to this, establish a regional market. In general, the courts look at whether or not another trademark that is similar

causes confusion or dilutes the original brand. Having said that, this is only applicable in the regions of the world where MSI's trademark holds a sizeable portion of the market share.

Barriers in MSI and its overcome

PESTLE Analysis is a form of strategic business planning or market research that assists owners of small businesses in analysing, evaluating, and monitoring the primary macro-level external factors that have an impact on their companies both now and in the future (Cheah & Yuen-Ping, 2021). This assists in the identification of business possibilities and dangers, as well as the best business decisions available within the external environment.

Factors	Barriers	How MSI can overcome the barriers
Political factors	<ol style="list-style-type: none"> I. When importing various medical gadgets, one must adhere to all of the necessary political and legal restrictions. II. Even if it is created with the greatest processes and medical gadgets, the product still needs to adhere to stringent criteria because it is classified as a medical device. This is done to protect patients and ensure that the product can be used safely. 	<ol style="list-style-type: none"> I. Ensure that the process of importing and exporting is carried out in accordance with all applicable laws and regulations, and that high-quality materials are brought into the country to ensure compliance with these restrictions. II. Acquire the necessary SLAS certifications in order to demonstrate the product's high level of quality.
Economic factors	<ol style="list-style-type: none"> I. The global dissemination of Covid 19 and the ongoing business of selling products 	<ol style="list-style-type: none"> II. MSI is able to offer this medical product to students and employees

	were both forced to contend with a variety of obstacles as a result.	who are ready to study and keen to go to work by utilising marketing strategies.
Social factors	I. Maintaining a fashionably-late status quo. White canes are expected to dominate the market for the visually impaired. Making sure your business has cutting-edge designs with advanced functionality can bring in more customers.	I. Millennials in today's society appear to prefer the smart characteristics of the white cane above those of western items. As a result, MSI will be able to sell their product without having to worry about this.
Technological factors	I. Utilizing current trends in social media in order to communicate with the clientele and create the most effective marketing techniques II. The administration of the payrolls	I. Employ the services of a digital marketer to handle the management of the various local advertising campaigns your company is involved in. Think about becoming a member of some of the local business directories as well. II. Either the employment of a bookkeeper who possesses specialised expertise in the management of payrolls

		or the outsourcing of this function.
Environmental factors	I. More people in society are buying environmentally friendly items and adhering to the principles of going green. Most especially the microbeads that are formed of plastic are not good for the environment.	I. MSI is selling an environmentally friendly approach, and they are adopting the go green concept in both the marketing and the packaging of their products. Plastic Microbeads are no longer promoted by MSI as an ingredient in their medical device products.
Legal factors	I. Should adhere to the most prominent laws in the medical and healthcare field, as the materials in this industry are notoriously difficult to predict.	I. They are eligible for FDA regulation despite not having received FDA approval. The FDA has the authority to regulate products that fall under the Federal Food, Drugs Act and the Fair Packaging and Labeling Act (FPLA).

Risk Management

There are some risks as well in using electronic blind stick. Blind people rely on the white cane and rely on these fundamental strategies to get around safely, but they still cannot see overhanging items or those at trunk or head level. Direct touch with the impediment is necessary,

and the device cannot warn the user of nearby dangers. Researchers have found ways around these barriers by enhancing the white cane's fundamental capabilities, making it possible for blind persons to autonomously carry out the vast majority of navigation-related tasks. Researchers have made use of technology to create technological navigational and orientation aids that may be divided into three broad categories: Electronic Travel Aids (ETAs), Electronic Orientation Aids (EOAs), and Position Locator Devices (PLDs) (PLDs). Sensors on ETAs gather information from the environment for use in navigation. EOAs are navigational aids that assist impaired users with their orientation. PLDs rely on the Global Positioning System (GPS) in addition to other methods for the purposes of localization and tracking of blind users. The majority of these aids make use of the white cane as the primary navigational tool and enhance it with cutting-edge technology to improve quick tactile information about the ground, drop-offs, direct physical interaction, and signalling effect with surrounding environments.

There are multiple locations on the white cane where the sensors can be attached. The placement of the sensors has an effect on the overall performance of the system as well as the functionality of the white cane. MSI installed one ultrasonic sensor near the bottom of the cane for the purpose of detecting impediments in front of the user, and another ultrasonic sensor near the handle was installed for the purpose of detecting obstructions at head level facing upward. Additionally, a water sensor is installed at the base of the cane in order to detect any water or puddles that may be present on the ground. MSI will position one sensor at the cane handle for the purpose of detecting impediments at the trunk level, and the other sensor will be positioned at the bottom of the cane with the appropriate angle location for the purpose of identifying holes and hitches.

The duration of the battery life is an important factor to consider for ETAs, particularly in situations when the user will be outside for an extended period of time. In areas where power outages are common, this can be a concern even in enclosed spaces. Therefore, consumers have a natural tendency to reject solutions that need a lot of power in these kinds of situations. It is possible for a solution to consume a lot of power if it uses a disproportionately higher number of sensors in comparison to the others and if it requires a greater amount of processing overhead in terms of the number of sensors, the type of sensors, computational devices, functionality,

user-system interaction methods, and so on. In addition, systems that employ a laptop as the computational device will only be able to run for around three to four hours, which is significantly more taxing than the operation of a microcontroller, which may continue for many hours. Kinetic Cane and a co-robotic cane, for example, consume more power than UltraCane does because they have a greater number and variety of sensors in addition to a computing unit. UltraCane consumes less power since it contains fewer sensors.

When it comes to the use of a white cane, it is very important to take into account the cane's weight, size, and shape, all of which are significant yet interconnected aspects. These characteristics influence the natural usage of a white cane and, if not handled with care, can be unpleasant from an ergonomic and cognitive standpoint for a person who is blind using the cane. For example, using a computational device directly on the white cane or the daily usage device that does not label the user as visually impaired will be much more efficient and blind-friendly in comparison to using a back-pack computational device or other bulky hardware, even if it has no effect on the weight, size, or shape of the white cane. This is because the back-pack computational device or other bulky hardware labels the user as visually impaired. In addition, these factors have a direct impact on the social life of a blind user. For instance, a blind user who wears bulky hardware and uses a white cane may attract odd looks from other people and have a low level of social acceptance, especially from children who are playing in the surrounding area. Therefore, a solution should be suitable for the blind user in terms of size, form, and weight, in addition to its social acceptance in the society, so that the blind user can feel secure when navigating in the surrounding environments.

Conclusion

The introduction of a new blind stick known as a smart stick was the primary focus of the report that was produced by Medical service innovation. Therefore, the first part of the study explored the eight phases of introducing a new product to the market, and this topic has been covered in the report on a more advanced level, applying those eight processes to the MSI in a manner that is pertinent to the MSI. Therefore, it is vital to follow these procedures when releasing a product in order to join the market with an original product. Doing so will reduce the risks that businesses

will be required to confront in the future when expanding their operations. The report analysed the various methods of funding that are available, and it recommended that MSI pursue the option of obtaining a bank loan because they require a substantial amount of money to continue operating their business. Businesses are unable to expand without the appropriate financial background.

A writer who is concentrating on the intellectual property (IP) aspects of the product has proposed that the product get a trademark and a patent for the trademark as a tool to protect the IP aspects of the project. In order to succeed in this cutthroat environment, every company had to surmount the challenges presented by their particular industry. When looking at the PESTEL factors, those barriers have been identified for the innovation of medical services, and the suggestions to overcome those barriers have been offered in the latter part of the report. At long last, the various risk management strategies for electronic blind stick have been dissected in great depth.

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