



SMART PROSTHETIC HAND

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1.0 EXECUTIVE SUMMARY

1.1 Business Concepts and Product Description

Lifix Sdn Bhd is a company that produces advance prosthesis device regarding to hand limb problems which consist technology involvement that can behave like a real hand. Such technology example is muscle sensor which can detect muscle signal or electromyography (EMG). In definition, electromyography or EMG is a study of muscle electrical signals. Sometimes it is known as myoelectric activity. When a muscle tissue makes some movements, it will produce electrical potential similar to the way nerves do and the name given to these electrical signals is the muscle action potential. Lifix is created based on the agreement among three members who are interested to have a strong market position in Malaysia.

Lifix company focusing on rehabilitation technology and trying to reduce the cost for such technology that already existed in markets. With the product, Lifix can help amputee victims around Malaysia peninsular related to loss of hand. This product can mimic several real hand movements and can perform simple tasks such as writing, pointing and do hand symbols.

1.2 The Target Market and Projection

A well-defined target market is the first element to marketing strategy. For Lifix Sdn.Bhd, our marketing manager and management team has classified our target market into several group which could contribute a high profit.

We have used the advertising, sales promotions and public relation as our promotion method in order to achieve the product sales projection. Our business located at Shah Alam, Selangor. There are four target groups that have been identified potential in buying our product which are amputee victims, Non-government Organization, rehabilitation center and hospitals. Since amputee statistic in Malaysia is low, we need to target customers from around Malaysia peninsular to achieve our sales target.

1.3 The Competitive Advantages

Competition occur when there are competitors that offer the same type of services and product in the same area and same target market. This is something that we cannot avoid since there will be always be a new competitors joining the target market. There are several

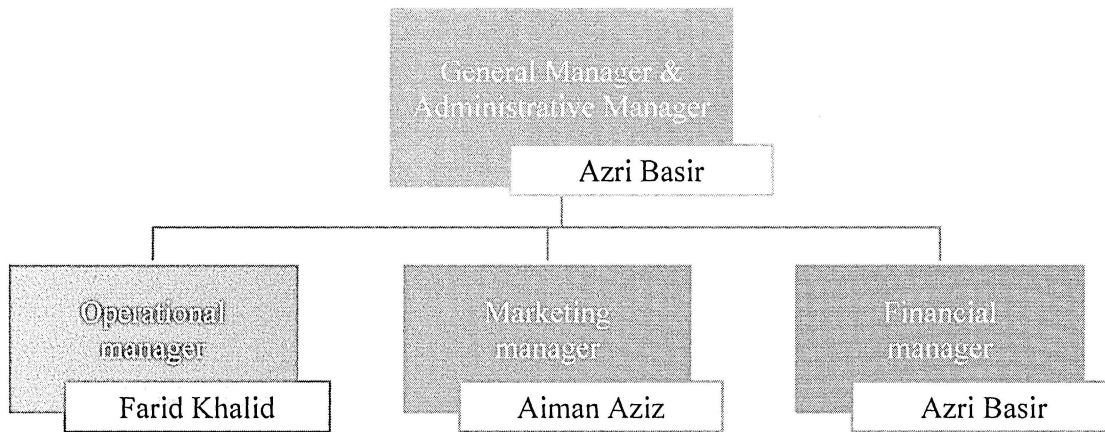


Figure 1: Management Team

2.0 PRODUCT OR SERVICE DESCRIPTION

2.1 Description of Product or Service to be Sold/Produce

The product develop by Lifix company is SPAND or Smart Prosthetic Hand. Our prosthetic hand is opposite from the common prosthetic hand in Malaysia markets which only for cosmetic purpose only without movement capabilities. SPAND is one of prosthesis device which can solve amputee victim problems in performing hand daily routine such as writing, eating, lifting and many others since it can mimic several gesture like grip, peace symbol and pinch.

There are another types of controller to simulating prosthetic hand such as voice recognition and remote controller. But the most common controller used in majority of prosthetic hand technology is electromyography which obtain from the muscle sensor because its provide fastest response in controlling the prosthetic hand activities compare to other controllers and that type of controller also has been used in our prosthetic hand technology. Figure 2 below shows the general system of SPAND.

2.4 Present State of Development Product

In this section, process on printing the prosthetic hand using 3D technology will be explained. Once the printer is well configured and the pieces have been modeled in a specific format to be printed, the next step is to upload them to software for printing in the below Figure 3 which also shows the size of the pieces on the base and the way they will be printed. The program generates a code of coordinates (x, y, and z) to make the extruder move around them and perform the piece layer by layer. This technology is most widely used with two plastic filament material types which are (ABS) Acrylonitrile Butadiene Styrene and (PLA) Poly Lactic Acid.

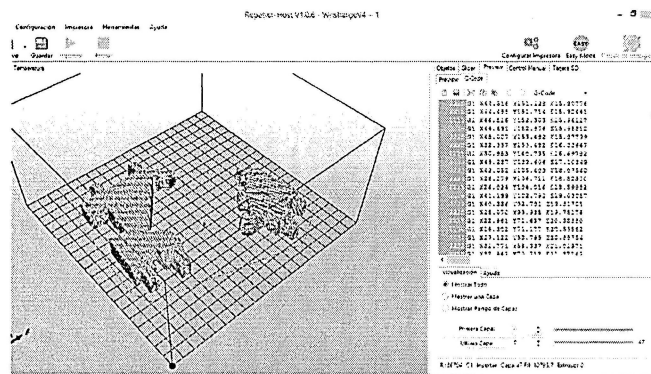


Figure 3: 3D printer software.

In order, the hand can be divided into 3 categories, of groups: the fingers, the palm and the covers that cover the back. Figure 4 and figure 5 will show the design of prosthetic hand and the assembly of the parts respectively.

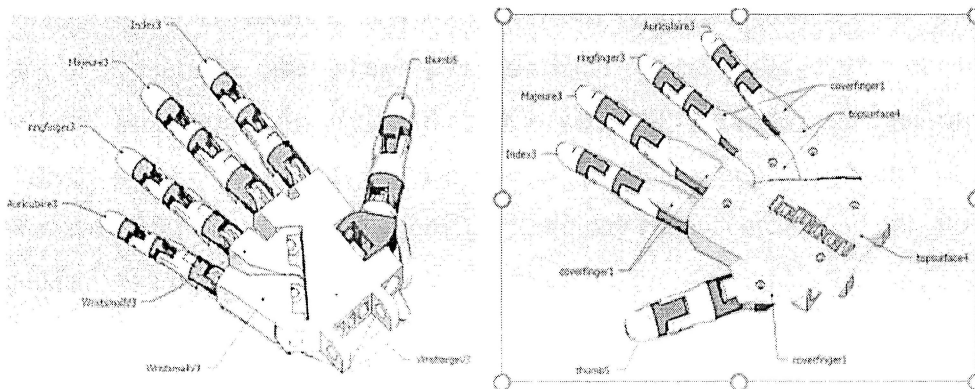


Figure 4: Design of front and back right hand palm.

Figure 7: Assembly of hand with five servomotors.

2.5 Patents or Other Proprietary Features.

An application for a patent in Malaysia must be filed with the Patent Registration Office of the Intellectual Property Corporation of Malaysia (MyIPO). The Patent Registration Office is responsible for the administration, processing and registration of patents and certificate for utility innovations. For the time, our product still not register for its patents due to similar concept with other prosthetic technologies such as the design, the system and the controller. Maybe in the future, if Lifix company has enough funds to create our own muscle sensor and designing much more futuristic design ourselves, we will apply for the pattern.

2.6 Opportunities for the product line or the development of related product.

With some meticulous research, SPAND system can be applied toward other prosthesis innovations. With that, the other limbs other than hand can be replaced with much more multi-functional prosthetic parts. From the other view, SPAND also can contribute in assisting robotic technology such as medical robotic and factory producing technology. We will keep increase our product quality regarding technology enhancement and better design to provide satisfaction among our customers.

3.0 TECHNOLOGY DESCRIPTION

The muscle sensor that has been used in SPAND to detect the muscle signal is MYO armband as shown in figure 8 belows. MYO is a set of gesture interactive system developed by the company Thalmic Labs. This technology has systematic algorithms which are translated into commands to recognize human hand movements. It consists two major things which are physical device and computer application. Figure 9 shows the software called MYO Diagnostic. The technology can be used to study Electromyography (EMG) graphs,