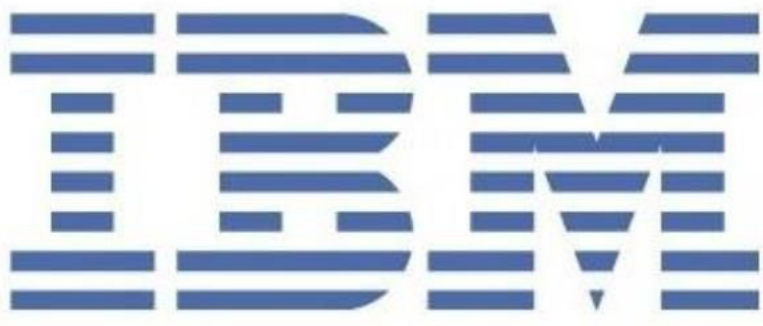


Research and Development Team

IBM Company in China
25th floor, IBM mansion
No. 2, GongTi Street North
Chaoyang District, Beijing

Dear manager:

It's really my honor to give a report to management team of IBM, we all know that our company has built a strong business based on our current range of activities but we want to use the technical and commercial expertise we had, and its strong brand image, to move into a new product or service area. Our R&D team has been working on an idea for a new product for the last six months and we want to obtain further support from the organization's management team so that we can continue our research and development. In order to do this we has created a report to management team of IBM to let you support our idea and group.

This report is centred on a new healthcare product – Dr. Band, which can be seen as an electronic health test instrument, for IBM. As we all know, when the world develops fast, people are getting higher standard of living. And nowadays, people are more concerned about their health conditions than ever. IBM has always been supporting healthcare products and has made some progress. But customers are always demanding more towards products. The product we design is in the form of a wrist band. It can help patients communicate with their doctor in charge. And it also has the function of alarming when emergency comes up.

And in this report we will introduce this new product in four aspects, including strategic fit, technical details, market research and work plan.

Thank you for looking through our progress and plan and giving us good advice. Hope to get your satisfactory answer.

Sincerely,

Qidong Jiao, manager of research and development team

IBM’s Dr. Band Development Progress

For the Management Team of IBM

By Research and Development Team

Prepared June 6, 2015

Executive Summary

IBM's R&D team has worked for a new project for the last six months. In order to apply for further support for the management team. R&D team has to make a summary of their finished work and make a plan to their future development. The result of this research is outlined in the following report.

There are four phases we need to complete before we push this product into market:

Phase1: Concept Development

Phase2: System - level design

Phase3: Detail Design

Phase4: Testing and Refinement

We have already completed two phases and get a good result. We analysis IBM's traditional advantage and its current need combing the market research. Recent years, the term Smarter Planet has become more and more popular as a long-term goal for IBM to realize, including smarter traffic, smarter grids, and smarter healthcare, smarter money, smarter telecommunications, smarter oil etc. After enough data collection and rational analysis, we find that people are much likely to be concerned with smarter healthcare which is much closer to their daily demand, rather than smarter money, oil and so on. Finally we learned the necessity of developing the Smart Band.

Table of Content

Introduction

This report is centred on a new healthcare product – Dr. Band, which can be seen as an electronic health test instrument, for IBM. As we all know, when the world develops fast, people are getting higher standard of living. And nowadays, people are more concerned about their health conditions than ever. IBM has always been supporting healthcare products and has made some progress. But customers are always demanding more towards products. The product we design is in the form of a wrist band. It can help patients communicate with their doctor in charge. And it also has the function of alarming when emergency comes up.

And in this report we will introduce this new product in four aspects, including strategic fit, technical details, market research and description of department.

Strategic Fit

1. Fit into IBM's strategy

Just as the annual reports of IBM have indicated in the recent five years, IBM has a long-term goal of creating a smarter planet including several different sections to accomplish such as smarter traffic, smarter grids, and smarter healthcare, smarter money, smarter telecommunications, smarter oil etc. IBM has worked hard to achieve this goal since it was discovered in 2008. And these five years gives IBM more advanced technology and management to be closer to the target. [1][2]

1.1 Smarter Healthcare

Dr. Band is a product aimed at achieving smarter healthcare. As a step of achieving the general goal of smarter planet, smarter healthcare also requires the enterprise to remix to higher value in offerings and skills, in operations and management practices, and in the transformational capabilities delivered to the clients. This is also what IBM has always wanted to improve and get more progress.

For the smarter healthcare part, we would like to introduce this personal automatic alarming and health examining device associated with the network system of public hospitals. As Ansoff's growth matrix has explained, Dr. Band can fit into the product development strategy facing new products and current market.

1.2 Smarter Computing

This technological device requires not only smarter computing which IBM is now working on but also the infusion of digital intelligence. Smarter computing is a new computing model that IBM is pioneering. And it has three core attributes. First of all, it emphasizes the importance of the advanced analyzing systems for data provided to influence decision-making process. Also the physical status of our clients should be assured by a strict analyzing process to the data that our device collects through a very special examining system (can be thought as a chip with specialized software). Secondly, smart computing is defined by software. Also a software-defined environment is necessary for our product. As Dr. Band has a strong function of getting the clients' physical status such as blood pressure and heart rate etc., multifunctional software is needed. And thirdly, IBM is now pursuing open and collaborative platforms. Also our product is trying to take use of open and collaborative platforms to provide more human centred services.

Thus Dr. Band can strictly fit into the recent strategy of IBM of pursuing smarter computing as well as smarter customer retention, smarter city operations especially smarter illness treatment. Through this new product, serious illness such as cancer can be well supervised in a long distance instead of close observation which may cause inconvenience. In conclusion, we think Dr. Band is a product worth further development.

2. Outline of the 'mission statement'

2.1 Target market

Dr. Band targets the clients with serious illness such as heart attack that has no specific time of attack. Thus it can be supervised automatically to avoid the emergency situation when no one is around the clients. Also it can be used for doctors and scientists for healthcare research with its function of recording physical data of patients. Other target customers include people caring about their physical conditions by using the regular examining function of this device and also organizations such as hospitals that can help patients to cure.

2.2 Business goals

As financial goals, we hope to increase IBM sales related to healthcare by 10% in two years meanwhile maximize the profits. Moreover we aim at increasing market share of healthcare products and maximize the growth of the new products for about 10% in two years.

As social goals, we hope to get business cooperation with public hospitals in big cities around the world so that healthcare services can be improved widely. Also we hope to use this device to figure out cure for serious illness such as cancer also to improve healthcare conditions in some poor areas.

As environmental goals, we hope to take advantage of clean energy to accomplish sustainable development.

2.3 Key assumptions and constraints

To make Dr. Band come to market, we assumed that hospitals are willing to cooperate with us and there are enough technological skills for the new product. And our constraints are the difficulties in developing the software used in the new product and also the communicating system between the clients and the medical organizations.

Technical Details

1. Technology domains

The Dr. Band mainly focuses on the concept of short-range wireless communication technologies in the field of intelligent healthcare applications. It requires designing and developing signal detecting and processing system of body surface potential by adopting microcomputer and data sampling unit. [3]

2. Measurement principle

The human body is an aggregate of a large number of cells, which are constantly growing, developing, differentiating and regenerating. There is continual turnover of neurons - old ones die and new ones are born. There are about 25 million cells in the process of division per second. Blood cells in the human body regenerate themselves at the rate of about 100 million times per minute. In the process of cell division and growth, the atomic nuclei and extra nuclear electron of the cells also keep high speed movement. In other words, they are constantly emitting the electromagnetic wave signals outwards. These signals emitted by the human body reveal the specific conditions of the human body. When we are under different conditions, the emitted signals will be different. As long as we detect these specific electromagnetic wave signals, the health conditions of the human body can be determined. [4]

3. Measurement process

The Dr. Band collects frequency and energy of weak magnetic field in the body by sensors. After the signals being amplified and processed, the data we get will be compared with the standards already set in the chip. According to the result of the waveform analysis, the device will make a judgment to participants about his health conditions and it will also give relative suggestions about the main problems. [5]

4. Device

In this part, the structure, characteristics and work flow of the device will be introduced.

The device of the Dr. Band is made up of four parts, and they are data-acquisition device, information processing platform, health detection system and alarm system. [6]

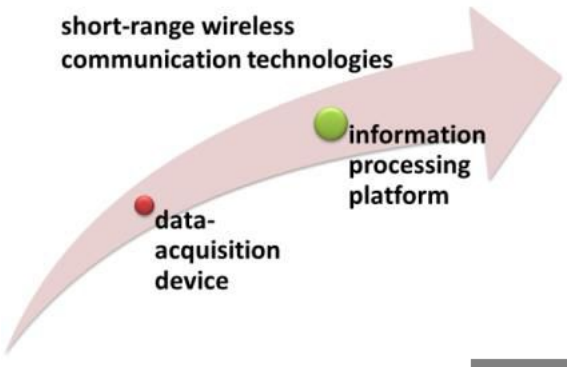


Fig.1 health detection system

4.1 Data-acquisition device

The data-acquisition device consists three parts. Sensors that are used to collect the clients' vital signs, such as the digital blood pressure sensor, digital heart rate sensor, etc. A sending unit that send the data collected by the sensors to the information processing platform by wireless, and the interconnected unit that connect the data-acquisition unit and the sending unit. That is to say, the sensors would collect the clients' vital signs and connect the sending unit through the interconnected unit, thus, the sending unit would send the clients' information to the information processing platform.

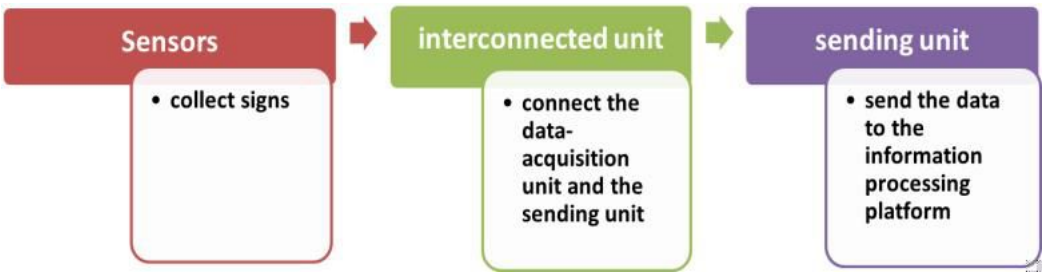


Fig.2 Data-acquisition device

4.2 Information processing platform

The information processing platform has three sections. Those sections are the data receiving unit, database unit, in which store the normal vital signs, and the display unit. The data receiving unit is aimed to compare the data received from the first part with those in the database, and the compared results would be displayed on the display unit. Hence, the clients could know their physical condition intuitively.

For clients who have suffered from a serious disease and still be cared for by the doctors, the data also would be sent to the hospitals and display on the hospitals' screens at the same time. The doctors could do research according to those data and take actions if there is something wrong with the clients.

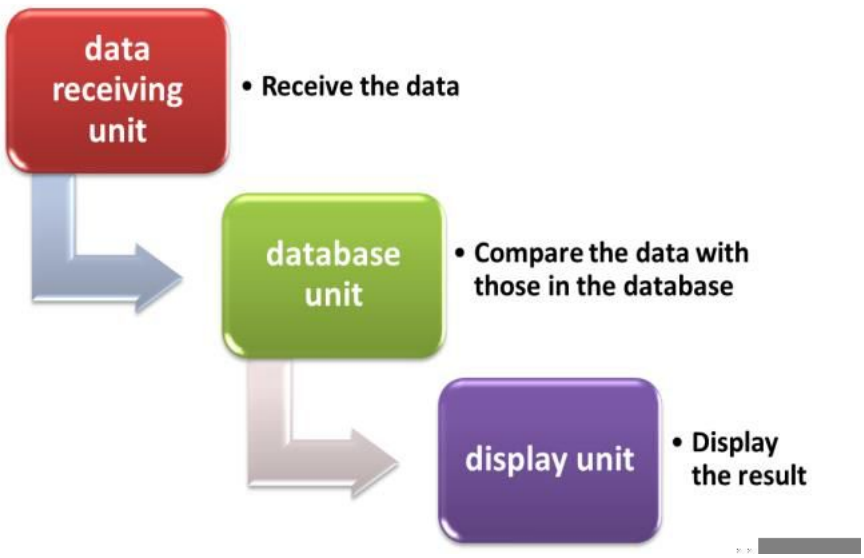


Fig.3 Information processing platform

4.3 Health detection system

The third part of the Dr. Band is a simple unit that combines the first and second parts together by the wireless connection.

4.4 Alarm system

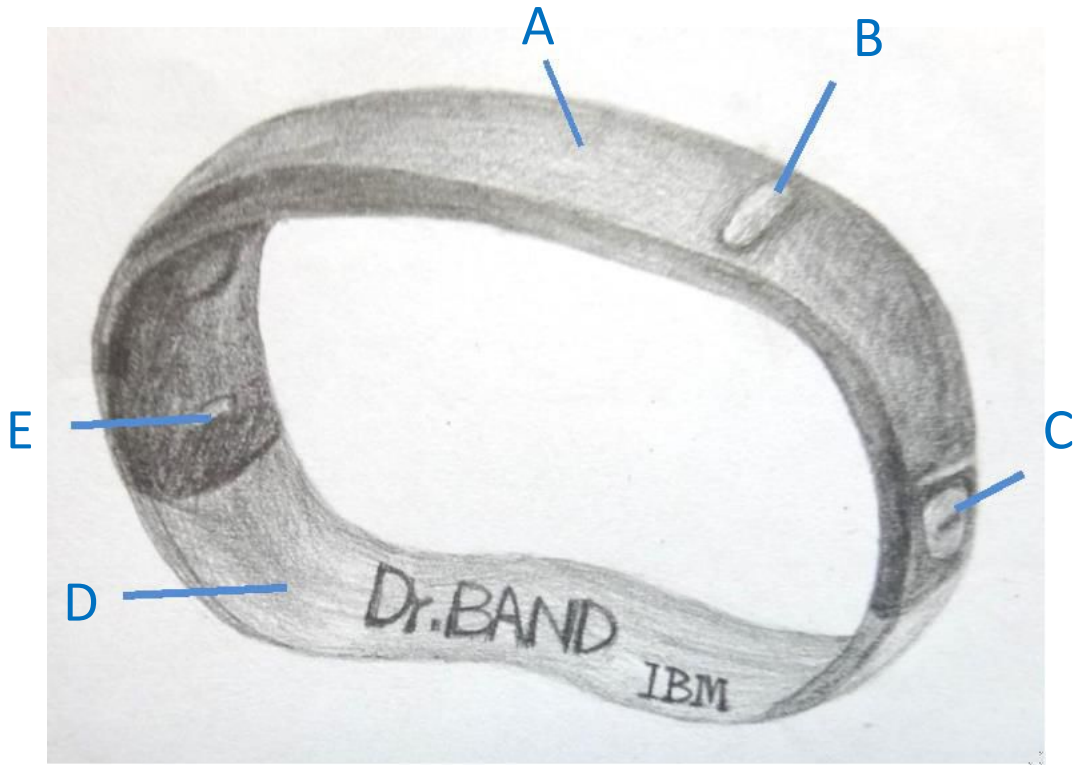
The alarm system is only used by the clients who are in an emergency with no one around. If the clients start this system, the signal would be sent to the nearest hospital via the wireless communication and the hospitals could find their locations through the GPS technology so the clients can be saved in a short time. When the clients start this system, the first three parts also start to work.

5. Project Plan for the Next 12 months

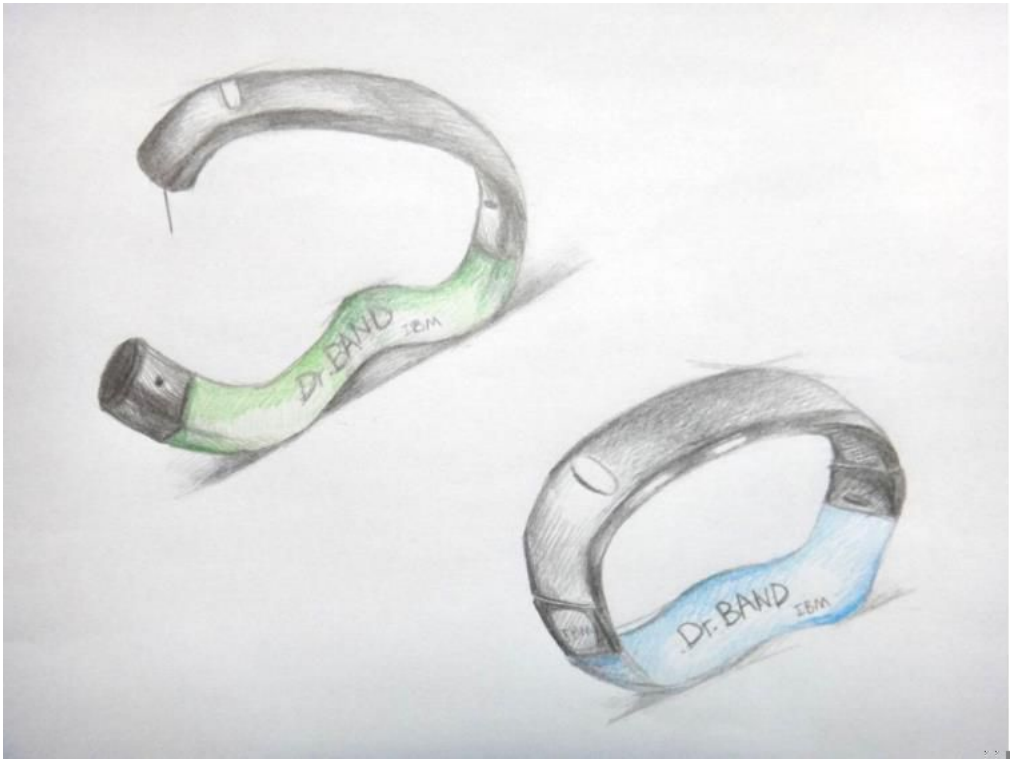
5.1 Handsome Slinky Appearance

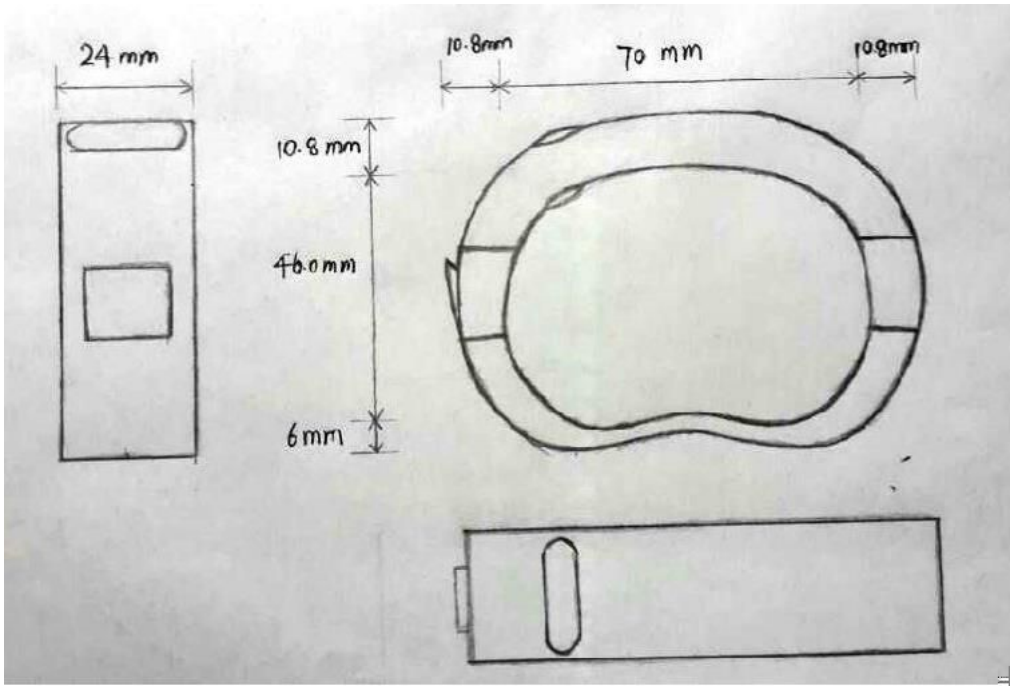
As we all know, a product's appearance sometimes could decides whether a product can be a success or not in a certain degree. So the Dr. Band must have a handsome slinky appearance. According the functions and usages of our product, we design it as follows:

It is just a preliminary idea, and it will take us about four months to complete our Dr. Band and make real ones.



A: Main control board： to display customers' health conditions and relative suggestions
B: Button: to start using Dr. BAND
C: Buckle： to buckle up the wristband
D: Replaceable wristband
E: Sensors： to collect frequency and energy of weak magnetic field in the body

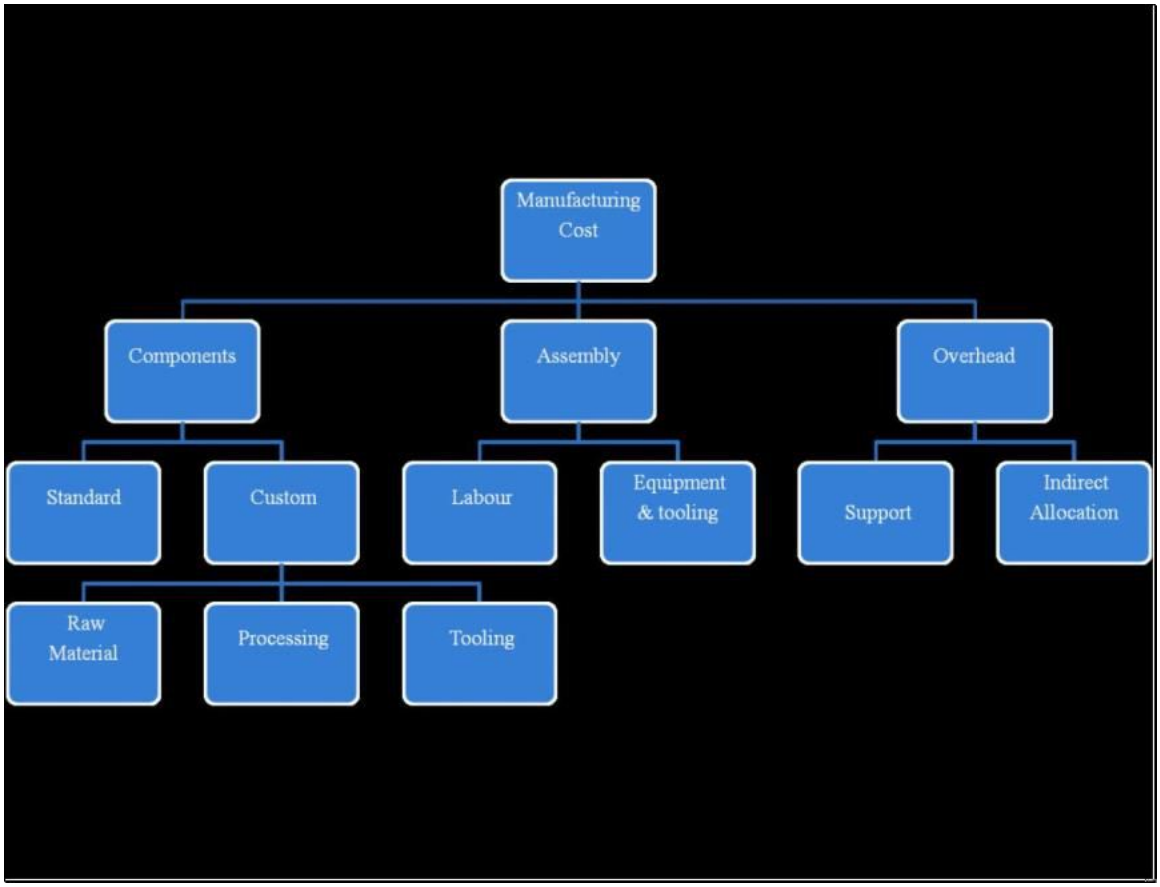




5.2 DFM Strategy for Reducing the Cost

As we take the DFM strategy, we will utilize the scientific production strategy to reduce the manufacturing costs during the whole developing process. As most of the precise calculations are being done at detail design stage, we'll generate a comprehensive analysis here in 5 steps.

First, we estimate the manufacturing costs. By analyzing the whole process, we conclude the detail category of the manufacturing costs as the figure shows:



Project Planning

Second, we reduce the costs of components. For some components, we redesign them to eliminate the processing steps. Then we choose the appropriate economic scale for the part process. Finally, we standardize components and processes when necessary.

Third, we reduce the costs of assembly following the rules: minimize parts count, encourage modular assembly etc.

The last two steps, we will reduce the costs of supporting production and consider the impact of DFM decisions on other factors respectively.

5.3 Plan of Testing and Refinement

After the detail design stage, we will begin testing and refining of our product.

At first will use the alpha prototypes to get access to whether it can work as intended and satisfy the key customer needs. That is to say, we would build models that look similar to and perform the basic functions of the product. However, the models are not necessarily fabricated with the actual processes to be used in production.

Second, we will use the beta prototype to find out the bugs in our products. The first step is to make sure that our product's hardware is in good condition. Consequently, we must make sure our product make no mistakes to guarantee the safety. Also, the necessary software is also intended to be refined. This process is pretty crucial for our product, since our Dr. Band is used as a monitor by people and concerned about peoples' health. Take the sensors that have been introduced before for example, they are used to collect the clients' vital signs. If anything wrong with this part, the next steps that the product is supposed to do totally can't be done. The product would be out of use.

What is more, we would ask about 100 staffs in our company to test in their own use environment and answer questions about performance and reliability in order to identify necessary engineering changes for the final product.

Development Schedule

Phases	Time Required	Tasks	Milestones
Concept Development	Finished	Identifying Opportunities and Selecting the Best Planning	Acquiring a Specific Concept Model
System- level Design	Finished	Decomposition into Functional and Physical Elements	Identifying the Components and Physical Sketches
		Product architecture	Establishing a System- level Architecture of the Product
Detail Design	4 Months	Completing the Real Product's Appearance	Getting the Real Product's Main Body
	2 Months	Reducing Cost by Utilizing DFM Strategy	Minimize the Product's Cost
Testing and Refinement	1 Months	Testing and Refining Hardware by Using Alpha Prototype	Working as Intended
	3 Months	Testing and Refining Hardware by using Beta Prototype	Accessing Reliability Debugging
	2 Months	Testing and Refining Software	Realizing Every Raised Concept

Development Responsibility

1. Define the piece-part production and quality assurance processes. 2. Design the tooling.	1. Define the detail geometry of each part of the product. 2. Choose the material. 3. Complete the industrial control documentation.	Develop the initial marketing plan.
1. Refine Assembly and Quality Assurance Processes. 2. Train the Work Force.	1. Test the Reliability and Performance. 2.Obtain Regulatory Approvals and Make Changes	Develop the Promotion Plan

Market Research

Recent years, the term Smarter Planet has become more and more popular as a long-term goal for IBM to realize, including smarter traffic, smarter grids, and smarter healthcare, smarter money, smarter telecommunications, smarter oil etc.

After enough data collection and rational analysis, we find that people are much likely to be concerned with smarter healthcare which is much closer to their daily demand, rather than smarter money, oil and so on. Below is a brief SWOT analysis [7] of this new product----Dr. Band.

1. Strengths

With the improvement of living standards, an increasing number of people care health problems. Those who have serious illness such as heart attack that has no specific time of attack can become lead customers of Dr. Band. It will supervise automatically to avoid the emergency situation when no one is around the clients. In this way, lots of ictal diseases can be treated and cured at once instead of helpless waiting to death despairingly.

Besides, it can be used for doctors and scientists on healthcare research with its function of recording physical data of patients. Naturally it can do some contributes to academic studies.

2. Weaknesses

Considering the accomplishment of advanced functions of this new product needing considering high-level technologies, technical problems can be possible faults. We are required to devote to looking for and whistling up plenty of qualified personnel to support manufacture.

3. Opportunities

Dr. Band is designed mainly for people needed emergent treatment. Actually, there exist other target customers including people caring about their physical conditions by using the regular examining function of this device and also organizations such as hospitals that can help patients to cure. So, after the help of those lead customers to develop and try out our idea, we can release this device as a final product to numerous target customers as long as they need.

4. Threats

Due to integration of a series of high tech, the price of Dr. Band may not be very low. It will add uncertainty for clients to choose whether purchase or not. And the sales will also be influenced. Furthermore, if there appears some pirate version during the early period of releasing, we may be faced with a huge market threat as a result.

As we know, in addition, products do not mainly fail because of technical shortcomings, but due to absence of market demand. Timely and reliable knowledge about customer preferences is also most important. Thus, it is also of large significance to trace alterations about Dr. Band and make reasonable responses during manufacturing.

Description of the Department

Our department has a complete structure: core team and extend team.

The core team is made up of team leader, marketing customer liaison, installation lead, software and hardware testing lead, verification prime, software and hardware development prime. The division of work is presented by a chart below. The branches of these groups are called extend team. Our extend team has abundant qualified personnel.

The team leader Jiao has a wisdom mind. She can identify market segments, customer needs and thinking out possible products that are valuable to be developed. And she can make up a thorough plan with her partners to convince the upper management to ratify our new product. Jiao also plays the lead role in defining the physical form of the products and how these can best meet customer needs, and then convey these demands to the teams.

Marketing customer liaison and installation lead popularize our new product to the hospitals all around the world. It mediates the interactions between our firm and our customers. They would keep in touch with our customers such as get the after-sale quality feedback, equipment maintenance and so on.

As for the rest parts of the department, we have plenty of technical personnel so that can satisfy the demands. It includes excellent programmers, industrial designers and manufacture engineers to make the ideas come true.

Conclusion

After analyzing and surveying technical details, markets and other aspects of the product, we believe the developing of Dr. Band will bring IBM a new chance to capture bigger market.

Having introduced characters and functions of Dr. Band, we can find out that Dr. Band meets IBM's enterprise strategy made in recent years. Meanwhile, the concept of Dr. Band accords to the popular idea of healthy living. We hope the successful development of Dr. Band could help some specific groups in the society and decrease medical accidents happening. Besides, Dr. Band could also make a contribution to spreading smarter healthcare into daily life.

In developing technology-push products, it is a creative idea for IBM to develop products like Dr. Band. In the first place, smarter planet is infiltrating deeper and deeper in people's life. Secondly, IBM keeps research and development in smart healthcare these recent years. The idea of Dr. Band came up in this favourable situation. The mean technology used by Dr. Band is short-range wireless communication which helps to combine life science with information processing and transmission technologies. Furthermore, we will keep meliorating correlated technologies to meet customers' needs in the following product upgrades.

After the market research, we choose target customer groups for Dr. Band. Like patients with diseases which are easy to happen suddenly, doctors and scientists studying in healthcare areas need to record physical data of patients and other people who care about their physical conditions. The main sales area we choose is large and medium-sized city. Because of Dr. Band has Strong pertinence, its strengths and weakness are obvious. Thus, Dr. Band may have a lot of opportunities in the future if we use its advantages effectively. In addition, we should make public relations strategy to enlarge the market. For example, we expect to develop a series of cooperation strategy and advertisement strategy.

The cost of Dr. Band's development will not be too much as a result of relevant technology is already very mature. We plan to put more funds and forces in Dr. Band's industrial design. [8]

Strengths Dr. Band in each aspect is summarized in the following table:

Respects	Strengths
Strategy fit	Fit current market Advanced technology and management Brand effect Innovative idea
Technical details	Robust design Standardise processes and components Superior testing and refinement Pioneering in smart computing
Market research	Appropriate economic scale Low manufacturing cost Identify customer's needs Potential market

Discussion

A successful industry design of Dr. Band could give us a great business chance. But it is also a big investment risk due to the difficulty of figuring out the next trend customer would prefer.

First of all, nowadays customer pays great attention to product design. Besides, Dr. Band is designed to be a smart wristband that the customer will wear it every day and everywhere. Dr. Band has not only functions of healthcare and biology, but also has a decorative effect. Therefore, a strong sense of industrial designing will attract more customers in the target consumer group, meanwhile, other customers will also be attracted by It special outlook.

So the budget of industrial design will take a larger proportion in this whole plan. However, after analyzing a few cases, we think it is worth to try. Take our competitor APPLE for example; we can see their successful business related closely to their wonderful industrial design. We are sure that a successful industrial design brings the profit will be far greater than similar ordinary products' profit. [9]

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