Marketing innovation: A new informative communication case for the skull and palate-craniofacial implants

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ABSTRACT
Marketing innovation is an important information communication. This study design medical 3D image technology. The information platform directly with the physician communication links, a substantial increase in traditional communication between the medical practitioners. That can be fast and accurate completion of the skull and palate-craniofacial implants customization, response Product feasibility and modification, reduce the operation time and customization of medical error rate, but also reduce the delay in treatment of patients with time-course risk.

Keywords
Marketing innovation; 3D annotation; interactive marketing; skull implants; palate-craniofacial implants.

1. Introduction
Customer satisfaction is one of the key success factors of medical management. How to persuade the customer medical service is to meet their need, is to reduce the service gap, improve service quality as PZB [1]. Technology gives customers important medical information and use, such as the customer through RFID to understand the content of hospital services and outstanding physicians, or hospitals using LCD TV laparoscopic surgery for advertising. We can see that the media tools used in science and technology are rich through the media. Then the firm can earn the stability in service [2].

Marketing innovation can be solved the customer need or technology. In euro, promotion of the company through advertisements and conferences increase marketing value. Market research is also identified the type of clients and competitors. The firm changes in distribution channels or on the aesthetics of a good or service [3]. They point the other side on US, the firm searches for new customers and new business opportunities. Promoting business can be helpful any strategy. The rate of customer adoption should be increased from something. In medical, the quality relationship usually focuses on information communication for doctors and patients. Both clinicians and patients engage in open and informed exchanges about the appropriateness of medical apps in the particular case of insulin calculators, and future work will likely generate further insights [4]. But it is fare about the information communication relationship in patients, doctors, designers, and manufacturers. The comprehensive view is more important to medical ethics and information safety.

To resolve the import of medical equipment specifications and size does not match the situation of domestic patients, and thus the establishment of human orthopedic medical device real-time interactive design platform to provide communication channel between manufacturers and doctors to achieve collaborative design and production. Then the orthopedic medical equipment could be customized in line with the needs of each patient. Through the integration of the platform mechanism, the use of medical 3D image transmission, and manufacturers and doctors real-time two-way communication, adjustment and manufacture of patients with customized orthopedic medical products. In each product comes with the audit report and QR code, so that patients can check their products detail information on the platform, so that patients feel more comforted, but also improve the loyalty of doctors. According to the latest statistics of 2012, there are about 705 Taiwan medical equipment manufacturers and about 30,250 employees. According to the financial analysis of listed companies, the average gross profit margin is about 31.5%, the R & D share is about 3.2%. Domestic medical equipment manufacturers in the manufacturing capacity has been improved, mostly to export-oriented, the production of medical equipment products over 60% of exports to overseas. At present, China's medical products exports continued to grow from NT $ 29 billion in 2007 to NT $ 41.2 billion in 2011. According to the 100-year statistics of the Ministry of Health and Welfare, the market has important demand trends and output value, such as reconstruction of craniofacial: 350 million (3084 cases), upper and lower jaw reconstruction: 370 million (3771 cases) ) And face: 500 million (7,200 cases).

This study marketing innovation goal was platform mechanism to provide two-way communication for manufacturers and doctors, to create customized products. Through the platform mechanism, manufacturers and doctors improve the cognitive gap between each other, and immediately modify and tailor the product, so that manufacturers can also be in a professional point of view for patients tailored to medical equipment. Secondly, manufacturers and doctors are through real-time communication, shorten the product process, and improve the efficiency of time. Because the manufacturers and doctors to communicate with each other back and forth, to shorten the time to complete orthopedic equipment, about 3 to 7 days can be served, grab the operation of patients with prime time to time advantage and efficiency. Finally, the information communication between manufacturers and
doctors with the customization of the process, the quality of medical treatment also will increase. Compared with the traditional standard medical equipment, customized orthopedic products could be tailored by each patient's bones. It creates a higher value of the service and, the relative medical quality can also be improved.

2. Literature
The major theory is marketing innovation and information system in design science as follows.

2.1 Marketing Innovation
OECD [5] is divided into four categories, including product (service) innovation, process innovation, marketing innovation and organizational innovation. A marketing innovation is the implementation of a new marketing method involving signification changes in product design or packaging, product placement, product promotion or pricing. It is aimed at better addressing customer needs, opening up new markets, or newly positioning a firm’s product on the market, with the objective of increasing the firm’s sales. It must be a new marketing concept or strategy that represents a significant departure from the firm’s existing marketing methods. In euro, the firm enters a new market or a new segment. Or using a new way gets to the market, via distributors, or directly. Marketing innovation is related to commercialisation channels, such as Business to Business or Business to Customer [3]. They viewed other side of US. How to package and how to advertise the product are more useful business. Or the firm rework of the packaging to present products in a new way. Especially, we also foster brand recognition. Therefore, we reference two rules ([5] and [6]) to induct the elements of marketing innovation, such as product design or packaging [5], product placement or channel of communication ([5], [7], [8]), product promotion or pricing [5]. Approach to market [9], Channel of communication ([7], [8], [10]), Product delivery ([10], [11]) and Service delivery ([12], [13]).

2.2 Information system
System is more than two elements to form overall. It has three elements, input, process, and output [14]. The outside environment is accepted with resources, which input data in surgery condition. The data implement in an information system, APPS. Output is produced with useful information, the prototype design of skull implants.

Regulators take burden the balancing risk, and impact on innovation in the sheer volume of apps available [15]. Manufacturers do not understand the needs of the patient, can only make the general standard. By collaborative design of customized products, manufacturers used the platform to communicate with doctors, through the doctor’s professional to provide the needs of patients, to make customized medicine. Medical equipment industry is higher threshold to enter, market development is not easy, not only because the product is the only customer for the surgeon. In addition, the doctor of new product acceptance is often very low, must be through long-term communication, to convince doctors to change other medical equipment and product. This study designed two-way communication mechanism. Through the platform, not only allows doctors to see manufacturers of products, but also for product design specifications to make detailed adjustments in such a two-way communication, the doctor for the medical system to do more at ease, and then increase the physician's favorability of the product.

Consumers (patients) are less comfortable with new products and are less likely to choose new products. No evidence of developers act other apps than in good faith [4]. Therefore, the sensitivity of consumers is also easy to improve a lot. This study designed the open and transparent platform. In the product check-up book, each customization of medical materials consumers have their own QR code, as long as the scan, the platform can see their customized medical materials and data, so that platform Transparency, to give consumers the right to know, more at ease to use.

3. Methods
We used design technology to build the marketing innovation and analyzed the reference. And the risk was considerable in information system.

3.1 Design technology

3.1.1 System design
It integrated with database and application systems, support multi-lingual capabilities, was multiplayer support, and was security and vulnerability fixes.

3.1.2 Application server
That was able to provide configuration settings for easy subordinate application servers, customize security features to reduce network attacks, user-oriented management interface, easy to manage the server, and elasticize expansion modules.

3.1.3 Database
The database can handle tens of millions of information, optimize SQL query syntax to improve query speed Multi-language compiler to provide APU for system integration, support multi-threaded, and full use of CPU Support multiple execution capabilities.

3.1.4 Development tools
It were built in diverse development components, object-oriented development, support dynamic cache mechanism to improve web page execution speed, built in diversified function library, improve development ability, and MVC architecture, easy to multiple simultaneous development.

3.2 Analytics
Marketing innovation had some functions, such as product design or packaging, product placement or channel of communication, product promotion or pricing, approach to market, product delivery, and service delivery. We referenced scholars and gave examples in table 1.

<table>
<thead>
<tr>
<th>Function</th>
<th>examples</th>
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<tr>
<td>product design or packaging</td>
<td>Skull implant in surgery</td>
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<tr>
<td>product placement or channel of communication</td>
<td>Traditional retailers or wholesalers, APPS</td>
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<tr>
<td>product promotion or pricing</td>
<td>Social media in community</td>
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<td>Approach to market</td>
<td>Customized purchasing</td>
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<td>--------------------</td>
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<td>Product delivery</td>
<td>Clearly stated implants</td>
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<td>Service delivery</td>
<td>Open visual processes</td>
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3.3 Risk analysis

For designing medical marketing innovation, we controlled the risk ([15], [16]) and referenced with [17]. There are three risks as follows:

3.3.1 Technical risk

Technology should be control three risks. The complete test mechanism would be firstly established. The software code was scrutinized the thick. The software version should be more controlled and modified.

3.3.2 Cloud risk

Cloud is the most useful technology tool. The user need auditing log function design. All user should be defined the role of personnel responsibilities. In accordance with ISO 27001 requirements, it designed to meet the cloud application management mechanism. We also regularly implemented to scan and penetrate testing system vulnerability.

3.3.3 User risk

The user account should have managed mechanism, and the password set must be more than 8 English numerals. : Personal data process in system, according to the personnel data law designing. Those data access and Log data would be managed.

4. Results

In addition to the continuous training of R & D personnel, and the integration of existing mold, machining and other core technologies, investment in medical products, all kinds of raw materials development, increase product line, and cooperation with the existing medical institutions to develop models to improve patient well-being. With increased medical quality. At present, Taiwan's doctors are imported foreign orthopedic equipment, because of its size and specifications do not meet people's bones, to be modified when the surgery cut. In order to solve the problem of information asymmetry and communication between orthopedic equipment manufacturers and physicians, we want to create a unique design platform that provides instant communication between manufacturers and physicians to achieve collaborative design and development, shorten processing time and increase patient gold Time of medical treatment. The study referenced table 1 to illustrate marketing innovation.

4.1 Product design and packaging

The product packaging in Euro, getting firms' name and products more visual had resigned new delivery bags to "stick out" at the post office [3]. Especially, Added value was packaged it to be considered and innovation. Products through the platform to help doctors and manufacturers to frequent exchanges, to create a custom implant products. The product can be delivered in three to seven business days, and the product's audit report is included with each product, and the patient can also scan the QR code provided on the box. After connecting the platform, their purchase of the product and the product audit information were viewed. Through the coordination of the platform to create not only custom products, we were also more valuable services.

To carry out the product design and packaging, there are three examples of system development in this study.

- Download medical image in new design: Designers can click on the "download Dicom file" to obtain medical images.
- Designation of the designer: After the new case is established by business, the case needs to be assigned to the designer.
- Advanced modified condition: The designer clicks "Completed" to modify the status of the case.

4.2 Product placement and channel of communication

This pathway is the real-time interactive design platform built after the implementation of the plan. The medical side can make intensive contact with the factory through the platform. Because the platform is the customized design image of the medical side, the medical side can accurately Master the information and process progress of the products to ensure that the customized medical materials are delivered to the hospital and can be used when the patients are treated.

To build the product placement and channel of communication, there are two examples of system development in this study.

- Member management: Using member management was input data. The communication controlled important customers or doctors in channel.
- Doctor legally share with the patient: Doctors can share cases with others, patients or family member in legitimate. After setting the expiration date and password, the doctor clicks "Generate link" to generate a QR code image. Then, the case can be posted to share with the person. If the person received the case, also input passwords and view the content.

4.3 Product promotion and pricing

Galindo-Rueda and Cruysen [3] thought that providing a clearer and more unified message and target both existing and potential clients had redesigned firms' website and brochures. And the firms stopped using print for ads and catalogues, but sending pdf versions by email to their target audience. This study used web such as Home rotation slide and Home rotation new product list. In the building platform, you can find a well-known hospitals or doctors of higher prestige to try this interactive platform. We gave account password so that they can always use, and then ask about this platform for the impression. Moreover, from time to time to the major hospitals held product briefings, so that the medical side is not only the use of the platform. We also directly received their own product information, or for the customization of medical issues related topics to make thematic sharing. Mining penetration strategy, with 25-30% of the price discounts compete with existing products. The use of market prices prior to the program to compete with existing market products is not competitive. After the completion of the project in accordance with the different...
circumstances of the price discount adopted in three ways, such as physician price discount is 35%, the price discount for the hospital is 30%, or the dealer's price discount is 25%.

To reach the product promotion and pricing, there are three examples of system development in this study.

- Home rotation slide: The slide changed with new promoting strategy. The 9 new promoting messages rotated by slides.
- Home rotation new product list: The new product list showed with new promoting or pricing strategy. The 8 maps and illustrations would be viewed.
- Renew pricing: Using table audited the pricing condition. The medical firm could see the renew pricing or maintain pricing.

4.4 Approach to market
To create a profit-sharing mechanism to encourage doctors to put forward ideas and concepts of products, thereby enhancing the doctor's loyalty to the manufacturers, but also because of customization, a small number of manufacturing, the average cost is higher. In order to overcome the geographical and spatial impact, resulting in delay in the treatment of patients in the golden age and the gap between doctors and manufacturers in the communication, the establishment of real-time interactive design platform, not only can significantly enhance the communication between the medical side and the factory fluency. The medical side can also use this platform for the design of medical equipment, a professional process to create customized medical equipment, to provide more valuable services.

To achieve the approach to market, there are two examples of system development in this study.

- Role play strategy: The user should set its role to play in case. Using role play strategy can realize and know who the important role in the case.
- Smartphone in web and IOS APP: IOS version of the main service case, the designer and doctor will be managed by the web version of the case, so mobile version (hereinafter referred to as m version) features are based on the client (and the main case).

4.5 Product delivery
The aging of society and the frequent occurrence of accidents, artificial bone and craniofacial reconstruction needs still is non-underestimated, but most of the medical equipment on the market is standardized manufacturing, the doctor must modify the medical equipment for patients or even excision of patients with excess bone. In order to create more orthopedic equipment fit the craniofacial, consumers no longer need to cut feet, we will customize the product to enhance the quality of medical equipment, but also to fill the gaps in the quality of medical equipment.

To get the product delivery, there are five examples of system development in this study.

- Product management: Show all products, managers can click the top right "Add product" to add products. Customer can use the left marquee to modify the product specifications in batches, or use the blue area above the product list to quickly search for products. The Product Edit page enables you to edit product-related information.
  - Case schedule list by role: According the role, it be viewed case assignment and detail in the schedule.
  - View 3D map: The doctor views the case design (new case). Because it is a new case, so there is no designer and design draft. Secondly the doctor also views Case Design (Design) and sees the designer's 3D graph. The three steps as follows: design, agree with design, and Completed.
  - Add comments (doctors): The doctor of case can add comments to record the detail information in design and surgery.
  - Cancel comments (Doctor): You can then click "Cancel Changes" to cancel or re-enter your message and click “Save Changes” to complete the addition.

4.6 Service delivery
In the current medical industry, the time difference is a big gap in demand. Patients have to wait for imported medical equipment, and even doctors have to repair the material on the surgery. In order to solve and compensate for the urgency of time and the prime time of operation, we provide a platform to fill the gaps in time, shorten the time and reach Patient needs.

To finish the service delivery, there are four examples of system development in this study.

- Inquiry form: Using inquire form can realize and confirm the order.
- Case handling process: We created new case handling process as follow.
  - New Case: The status of the order has not been assigned to the designer.
  - Design: the business assigned to the designer, the owner has not yet agreed to the design of the state.
  - Agreed design: The owner agrees that the design has not yet entered the state of production To enter into a state of production.
  - Completed: Completed production to the state before the owner closed. Closed: The owner determines the status of the closed case.
- Add comments to modify data: It increases the modification opinion by doctor. That can be discussed material in production.
- Add discuss: Below the changes you've added, you can revisit this change. After entering the content, click "Add Discussion" to add.

5. CONCLUSION
Marketing innovation is different from the development of enterprise products and services, business processes and organizational innovation. To development the craniofacial implants in the information system process, this study to marketing innovation to establish important guidelines. In
order to expand the development of marketing innovation theory, this study provides an information system model. In the approach to market development optimization platform mechanism, can provide service delivery and manufacturers and doctors to achieve the two-way communication customized products. Manufacturers and doctors using product placement and channel of communication real-time communication, product delivery to shorten the product process, improve time efficiency. Product design or packaging promotes manufacturers and doctors better communication and coordination, but also to complete the product promotion or pricing, and quickly improve the quality of medical care.

Another important contribution of this research is the emphasis on marketing innovation. When the marketing innovation gap exists, but also on behalf of the development of customized information system is very important. More assessing the quality of smartphone health-related apps, more proposing a set of criteria to enable future studies to consistently review health-related app quality in a standardized manner [18]. Especially, International Standard ISO/IEC/IEEE 15288 [17] should be more considered risk analytics in cloud.

In the current orthopedic equipment market, manufacturers and doctors of the gap between the larger, through the platform integration, manufacturers and doctors to achieve the collaborative design and manufacturing, and solve the fitting problem of medical equipment, customized products more in line with Disease needs. Compared to imported medical equipment, the two-way communication of customized medical equipment, achieve the advantages of time, the shortest modification time. In addition, medical quality will be well-being, the value of services is also higher than the generic design medical equipment.

Finally, marketing innovation is very important for visual marketing development. The patient's major customization needs can immediately understand the physician's medical procedures and can significantly shorten the time of suffering. At present, Taiwan's craniofacial and orthopedic equipment market, the imported equipment area still dominated. Although there are several listed domestic manufacturers are continuing research and development of related equipment, but Taiwan's manufacturers are still in the development stage. There are few companies that have sufficient resources to carry out product development. Only by the Government to provide cooperation programs, such as with the ITRI technology combined, etc. And the domestic craniofacial equipment design talent limited, it is major cause for industry resources gap. In addition, abroad market has adequate resources, and marketing innovation capability and market size are large. It can easily achieve the economies of scale, it can meet the custom Aggregate market demand. However, the use of orthopedic equipment in Taiwan usually use standard size, there is no domestic manufacturers do custom orthopedic equipment, if the patient is more special, need to order from abroad, so waiting time will be a big problem.

For the future management practice research proposal, this study proposed three strategies. First, the construction of collaborative manufacturing and design, improve medical quality and time efficiency. In the past and existing medical equipment, doctors handle medical equipment manufacturers are often standardized products, through the platform to help integrate manufacturers and doctors of the cognitive gap, to collaborative manufacturing and design, so that products can have higher medical quality. Collaborative design platform has been used in other fields for many years, at present the world has not yet use the "medical image + 3D surgical simulation" of the network platform combined with "reconstruction plastic implants" market, all for this research is different from the existing application. In particular, the customized product can shorten the operation time of 30 to 60 minutes, which is conducive to reduce the surgical implant modification, bending repair time. The implementation of craniofacial plastic surgery can reduce the risk of excessive blood loss surgery.

Second, creating the service integration mechanisms increased consumer loyalty. In this study, medical 3D images were used as a communication media to enable physicians to respond to product feasibility and modification. The product may be part of the size of the 3D image to be amended, the doctor responded to the system in the product to be modified. For example, the system will be submitted online doctor orders, annotation module and 3D VIEWER module, so that doctors can complete online comments on the 3D part, doctors do not need to learn 3D CAD, professional 3D modification by the GMP factory is responsible for uploading. Through the platform, we sell not only the product itself, but the integration of services. Through the platform mechanism, to create customized products, improve the efficiency of time and more obedient medical equipment, but also because of the platform transparent, so that every patient can see their purchase of products, more at ease.

Finally, a profit-sharing mechanism is created to create the derivative benefits of the program. In addition to co-designing and manufacturing with doctors, the need simple 3D images to be trained in education, such as through a simple instruction manual. In addition, there are sub-run mechanism to encourage doctors to put forward professional ideas and concepts to work together. It benefits more patients, but also improves the loyalty of doctors and enhances firms’ market share.

6. ACKNOWLEDGMENTS
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7. REFERENCES


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Authors’ background

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