



## Development of a multi-tiered business model for value chain analysis for mobile nutrition counseling online system

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### ABSTRACT

**Introduction:** Internet searches suggest people need to check the appropriate and correct information in the field of health. Meanwhile, due to the rapid growth of new technologies such as mobile technology, which today is universally accessible to all members of society, has been created a new and appropriate channel to offer health services that use this technology to propose best value tailored to customer requirements in a short time.

**Method:** In this paper, several approaches and models has been exploited in order to study and design a new business model for mobile health nutritional counseling. First, the business value chain has been introduced and several parts of the Canvas model, VRISA index, Growth-Share Matrix and Familiarity Matrix and Porter's Five Competitive Forces has been analyzed and finally, a cost and revenue model and food menu provision have been provided.

**Results:** The results show that the application of Information Technology especially mobile technology is advantageous for nutritional counseling domain. With respect to a portion of the costs and revenues that are roughly predictable. The way to determine the price your service provider offers be considered floating price is higher than first and then reduce prices to attract more customers. The total number of customers leading to a break-even point is 5373. Once this amount is reached, the number of customers we will achieve profitability.

**Conclusion:** The proposed business model relatively provides a sustainable competitive advantage with low cost, but since resources are available in this area, the threat of new entrants is low and we need to maintain continuous improvement and innovation to keep our market position. With the increasing number of customers, revenues are growing exponentially, while the cost of the project is fixed. So attracting the customers and meeting their demand is very important.

**Keywords:** Canvas business model, Electronic health, Mobile phone, VRISA analysis, Familiarity matrix

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### Introduction

Health is considered as one of the most important aspects of human life and as a development fundamental in societies. Today, increasing development of information and communication technologies provides a broader application of these technologies in the healthcare context. One of the aspects of the information technology is mobile technologies whose main function is provision of ubiquitous services. Use of mobile tools provides ubiquitous access to information and services. Application of wireless technologies also expands and develops service delivery and provides an equal exploitation of these information and services for the users throughout the society (1). Extensive application of mobile and wireless networks, tools (phones and PDAs, etc), and middleware (a software that connects application programming modules and other software components or enterprise

applications) provides interesting and new possibilities. This technology provides real-time access to information and tools which have been accessible only through the Desktop Computers in the past (2). Electronic business can be considered as a subset of electronic health. Mobile commerce is one of the newest electronic business models and one of the aspects of the information technology from which different technologies have taken advantage (3). Application of electronic initiatives at healthcare section in various countries have provided benefits such as enhancement of health service quality, efficiency, cost reduction, and revenue increase (4).

More specifically, a framework based on the field data has been proposed in order to support the well-established category implementation of PSS business model including product-oriented, use-oriented and result-oriented business models. There is a relationship between every business model and five tactics at operating levels of 1)

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Contracts, 2) Marketing, 3) Networks, 4) Product and Service Design, and 5) Sustained Operating practices that ensure the successful implementation of the model and value creation (5).

According to Goossens, facing a growing health issue as a result of inappropriate dietary patterns, people seem unable to convince individuals to adjust nutrition and lifestyle in an appropriate manner to reduce health costs. Although the earliest attempts failed to commercialize this approach, personalized nutrition, where dietary intake data and other general life-style information can be combined, hold still great promises to make nutritional and dietary advice more personalized and thus more effective (6).

One of the most common hospital information systems evaluation models that have been used in the studies is ISO 9241 -10. The main purpose of this model is to ensure the applicability of software systems. Isometric is a reliable tool for evaluating usability of hospital information systems with the goal of assessing the user satisfaction (7). Rogers' diffusion of innovation model is one of the models for understanding the relationship between people and technology which has also been used in the studies of hospital information system. Using this model can help to determine the willingness of users to use the hospital information system. This model discusses the implementation of new technologies and innovations in an organization (8).

The studies indicate that lack of access to real-time patients' information and inconsistency among healthcare service provider team members are considered as the most significant causes of medical malpractices (9). In the present era, exploitation of Health Information Systems with fixed terminals do not seem sufficient since they are not capable of providing the necessary information at the right time to the service providers, leading to an interruption (disrupt) in the agile and continuous process of service provision to patients. According to this report, sports, diet and weight are among the most popular health applications downloaded by users (10). One of the barriers to the expansion of a new technology is when a new technology has been developed in a direct competition with an existing technology; this new technology is accepted in a large scale only when it provides the user with more value and more effective performance (11). Mobile technologies possess numerous features and characteristics that distinguish them from other information and communications technologies in medical care and public health domain. These features include mobile wireless telephone communication, continuous and interactive communication from every place like phone calls, text and multimedia messages, and access to the internet via wireless application protocols or wide bandwidth mobile internet. Second, because of their small size, light weight and recharge ability, they are portable and, ultimately, they possess good computing power in order to support a variety of multimedia applications (12). In this regard, in this paper a business model was proposed for the mobile nutrition counseling system and revenue making and profitability trends were investigated.

Then, Canvas model, Porter Competitive Forces, VERISA index, growth-share matrix, cost-revenue model and food menu provision were studied.

The aim of this paper was to create greater added value compared to other available options in nutritional counseling services using a more effective and practical business model. The proposed business model in this study aimed to transform plans and ideas into economic values including entrepreneurship, strategies, economic issues, investment, performance and marketing. Here using Canvas analysis, Porter's Five and Six Porter, Boston Counseling Group matrix and finally through a cost-benefit model analysis, it was shown that mobile nutritional counseling services proves utile in responding the needs and demands of all stakeholders including nutritionists in providing medical and nutritional advice. This may lead to a value chain regarding revenue and profit making which is considered as a business principle.

### **Problem**

Business model is a way of delivering value to customers and encourage them to pay for the value and converts these payments to profit (13). This study aimed to propose a business model for nutritional counseling. The trend of this model, as you can see, begins with the installation of the related application (software) on the mobile phone or Personal Digital Assistant with access to the Internet or affiliated health centers and then, if the user receives the application from the affiliated health centers, then related personal and health information are entered into the system by the related center. This system includes different food menus and recipes which are accessible offline for the user.

The proposed model is based on the business activities and key partners (14), as illustrated in Fig 2 as follows:

A) Customers: Since this model is proposed for healthcare setting (environment), clinics and private hospitals, special care patients association and those interested in using this system are considered as customers.

B) Communication channel: These include Internet connection, SMS system, email, SMS advertising and doctor, clinic and Kettering recommendations and advices.

C) Customer Relationship: Attention to customer taste and characteristics, lower costs, application (software) user-friendliness, and time saving leads to effective customer relationship.

D) Key activities: These include system support and maintenance, selection of nutrition and diet specialists and advisors, preparation of system content, maintenance of user profile and customization of service offerings.

E) Key resources: Key resources of this model include doctors, sports and nutrition advisors, HR specialists, service offering innovation and the related system.

F) Revenues: Revenue sources in this model are realized through the contracts established with clinics and hospitals, Special Care Patients Association and Subscription fee for the enthusiasts.

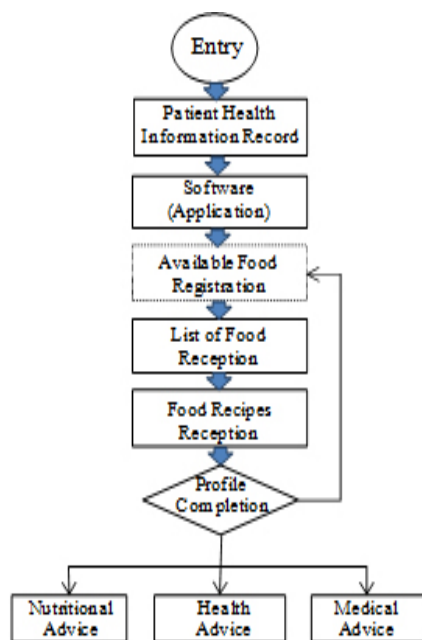
G) Costs: Related costs include system start-up costs, system advertisement costs and SMS and administrative and personnel costs.

H) Partners: Since this model deals with several areas such as health and nutrition, partners are pharmaceutical companies, Ketterings, doctors, health and nutrition advisors to whom the users are referred for services.

I) Value provided: These values include diets, online access, user convenience, time saving, economic, and brand making.

As the user begins to choose from diet menu, his/her user profile progressively gets completed and personalized based on his/her taste and health characteristics. Indeed, upon the completion of his/her profile, the user will be allowed to get medical, dietary and health advice. In Fig. 1, as shown with dotted line, it is possible to incorporate an additional option such as "Entry of user defined nutrition" and provision of a nutrition menu that fits the user's needs and requirements which have not been addressed in this paper.

**Figure 1.** Mobile Health Nutrition Counseling Business Model



## Method

In this study, an effective method was designed for a change in business model in nutritional counseling service, using new information and communications technologies such as mobile technology. In this respect, after the study and investigation of the relevant business model literature review, change of information technology and its impact on organizations and other related studies regarding the change in business models and application of mobile technology in nutrition domain, a theoretical framework was developed using business Canvas. Then, every element of this model has been compared with the following platform. In Figure2, the proposed business model for nutritional counseling services was defined and multiple scenarios were examined. In the examination and study of the measures of a business model, it is possible to consider the elements of Value Chain, VRISA index, and Boston Counseling Group (BCG) matrix. It should be

noted that the following cases are constitutive elements of a single model and not a multitude of models and the following framework was used (15). These elements include the factors related to industry, customer position, resources, activities and cost forecast which creates a puzzle and along each other they create a business model for nutritional counseling.

## Results

As shown in Table 1, 70% of health centers had desktop PC useable as platform in university telemedicine system, 100% of centers had laptop useable as platform in university telemedicine system, and no center used PDA and tablet pc platforms. Cellphone platforms were used in Hafez hospital for medical tele-consultations. Except Shahid-Rajaei hospital, which had no platform accessories for medical tele-consultations, all the studied health centers had cameras connected to platforms and their platform accessories were connectable to clinical devices. Results of the present study showed that 70% of the studied health centers had monitors with full HD resolution images and the rest had monitors with other resolutions.

As Table 1 shows, of all 15 advice-receiver health centers only Kharam health center had Gluco-meter and the rest had no clinical equipment or devices. Our results also showed that 85% of the studied centers had video conference equipment. It was shocking to find that none of advice-giver health centers (health centers in Shiraz) had required videoconference equipment for telemedicine. Table 1 indicates that none of the studied health centers, in their communicational infrastructures, used VSET protocols, old simple telephone services, network public telephone, and integrated digital network services; they mostly used leased line protocols. The findings of present study showed that bandwidth average of health centers was 644.67 mb/s. Of all the studied centers, 12 (63%) had optical fiber infrastructure with bandwidth of 1000 mb/s, four centers (21%) had wireless infrastructure with bandwidth of 54 mb/s, and three (16%) had wireless infrastructure with bandwidth of 11 mb/s. Based on Table 2, telemedicine software used by Shiraz University of Medical Sciences had 19 abilities of all 24 studied abilities (79.16 percent).

### 1- Canvas Business Model - Case Study

Osterwalder and Pingneur proposed a basic Canvas model in order to define and create a business model that represented all the performance related information. They divided the model into Value and Productivity sections comprising nine elements: Customer Segmentation, Channels, Value Proposition, Customer Relationships, Revenue Streams, Key Resources, Key Activities, Cost Structure, and Key Partners (Table 1).

### 2- Value Chain

Since the proposed value to customers in this business model is based on service and not on product, upon content creation or update in the system or upon overall system implementation, marketing process is proceeded through various methods such as advertisement SMS and the Internet.

Figure 2. Components of the Business Model

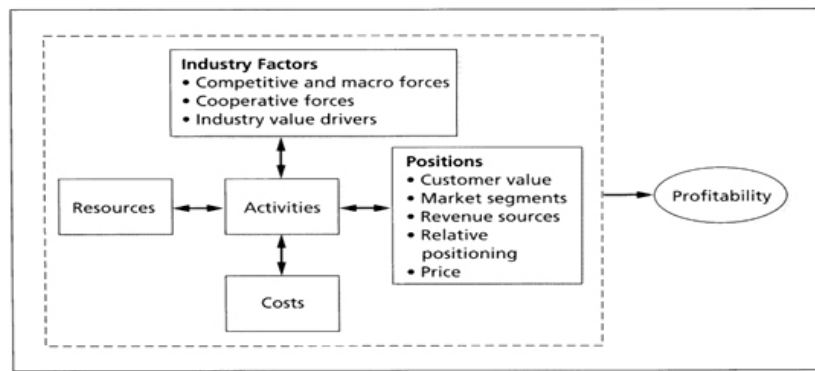


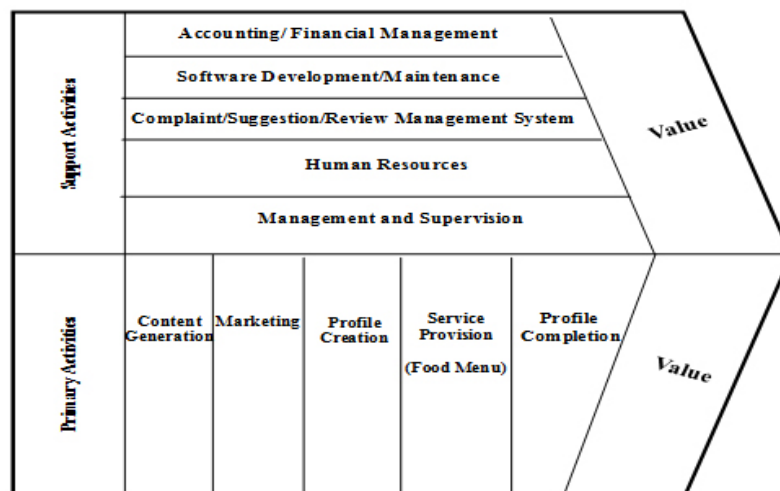
Table 1. Canvas Business Model

Key Partners	Key Activities	Value Propositions	Customer Relationships	Customer Segments
<ul style="list-style-type: none"> <li>•Pharmaceutical</li> <li>•Restaurants</li> <li>•Intermediate</li> <li>•Specialist (physician)</li> <li>•Nutrition advisor</li> <li>•Sports advisor</li> </ul>	<ul style="list-style-type: none"> <li>•Sports &amp; Nutritional Advice</li> <li>•Doctor selection</li> <li>•System maintenance</li> <li>•Information selling</li> <li>•Content creation</li> <li>•Service personalization</li> </ul>	<ul style="list-style-type: none"> <li>•Dietary approaches</li> <li>•Being online</li> <li>•User convenience</li> <li>•Time saving</li> <li>•Affordability</li> <li>•Exercises</li> <li>•Localization</li> </ul>	<ul style="list-style-type: none"> <li>•Attention to customer taste</li> <li>•Being online</li> <li>•low cost</li> <li>•user-friendliness</li> <li>•Time saving</li> <li>•Service offering with minimum required facilities</li> </ul>	<ul style="list-style-type: none"> <li>•System enthusiasts</li> <li>•Clinics</li> <li>•Special Care Patients Associations</li> </ul>
	<b>Key Resources</b> <ul style="list-style-type: none"> <li>•Doctors</li> <li>•System</li> <li>•Sports &amp; Nutritional advisors</li> <li>•Human Resources</li> <li>•Service innovation (Patents)</li> </ul>		<b>Channels</b> <ul style="list-style-type: none"> <li>•Mobile SMS</li> <li>•Internet</li> <li>•Email</li> <li>•Physician and Hospital advertisements</li> <li>•Advertising SMS</li> <li>•Restaurants</li> </ul>	
		<b>Cost Structure</b> <ul style="list-style-type: none"> <li>•System start-up cost</li> <li>•Advertisement</li> <li>•Variables costs including SMS, ...</li> <li>•Nutritional advisor costs (Food menu, ...)</li> </ul>	<b>Revenue Streams</b> <ul style="list-style-type: none"> <li>•Contracts with clinics and private hospitals</li> <li>•Contract with Special Care Patients Associations</li> <li>•User subscription fee</li> </ul>	

This business model is based on service and not on product, upon content creation or update in the system or upon overall advertising (Online advertisement), clinics and hospitals and special care patients associations. After user registration, a profile is created and related health and personal information are entered in their profile and in case there is no access to this information, a food menu

is offered offline to the user via the application installed on the mobile phone or Personal Digital Assistant. Over time and as interactions between the user and application increases, his/her nutrition preference profile is completed and in addition to the personalized services, the user will be able to get advisory, health and dietary services defined at the end of the value chain. A schematic view of the value chain is illustrated in Fig 3.

Figure 3. Mobile Nutritional Health Counseling Value Chain



### 3- Porter Five Forces

Economist and sociologist, Michael Porter in 1979 in his book, introduced Porter’s five forces model: “ How Competitive Forces Shape Strategy”.

Business strategy is defined based on competition and although, nowadays, competition has been intensified, competition is shaped based on four competitive forces: Threat of new entrants, bargaining power of customers, bargaining power of suppliers, threat of substitute products or services, and also complementary products which has been added recently (3).

Authors have analyzed Porter’s five forces in order to determine the profitability and competitive position of the mobile nutrition counseling business:

A. Bargaining power of customers: Since customers in this model consist of clinics and private hospitals, special care patients associations and enthusiastic users, and since such a system does not exist in Iran and is considered an innovation in service industry, customer bargaining power is at minimum and poses no threat to our business.

B. Bargaining power of suppliers: Suppliers of this system include doctors, nutrition and health advisors, infrastructure and implementation service providers such as hardware, communications and infrastructure and mobile operator companies. Due to the increasing number of these suppliers, bargaining power of suppliers poses no threat to our business.

C. Threat of new entrants: According to VRISA analysis results, the only and most important factor leading to value creation is innovation and initiative that ultimately guarantees business profitability and threat of new entrants is likely to have impact on our business. Thus, new entrants pose a relatively high threat and since service provision requires a great deal of time, through strategies such as brand making, image promotion and greater service offerings, there would be hope to attenuate the new entrants’ threat.

D. Complementary services: This force has been introduced as the sixth competitive force and refers to products/services that are compatible with what a particular industry sells or offers. Typical complementary services in the studied business include medical advisors, health and nutrition advisors and Ketterings that are recommended to common system users to use the offered services.

Market position in industry: Analysis of similar or convergent businesses shows that provision of a service including the food recipes, various nutrition advice and

customization is a novel service and has no background in the country or has been provided individually or in a static form. For example, people with simple and similar diets are grouped in a limited number of categories (Table 2).

According to the items mentioned above and the analysis of the porter’s five competitive forces, results have been summarized in Fig 4. According to the results, the related business possesses a good competitive position and a sustainable profitability.

Figure 4. Porter’s Competitive Forces



### 4- VRISA Index

Services provided by this system have a significant value due to accordance with end user taste and health characteristics; accessibility anytime and anywhere; provision of health and diet related consultations; being user-friendly and able to be installed on various mobile devices; being cost- and time-effective; having food menu customization; and reducing the customer’s commuting to the computer. This is a new service throughout the country which has been introduced in domains other than mobile, or has been introduced individually and statistically. This service is imitable but time consuming and since it is not electronically accessible throughout the society, it’s possible to replace the service and receive it through traditional means. The most important advantage of this service is the innovativeness that makes it a pioneer. Thus, in case of competitor’s entry or introduction of a similar system, this threat could be eliminated (Table 3).

### 5- Growth – Share Matrix

Henderson introduced Growth-Share Matrix in 1970 for the analysis of the business units, helping to allocate the resources to these business units (16).

As illustrated in Figure5, the relative market share represents the money making potential and market growth represents the amount of the expended money. The current business position in Growth-Share Matrix at the market entry phase is located at Question Marks due to the absence of competitors but require an investment in order to set-up a business.

Table 2. Mobile Health Nutritional Counseling

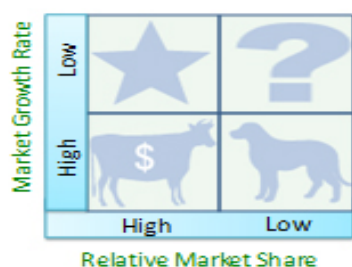
Service	Description
<b>Mobio Network</b>	Provides food and cooking recipes and instructions anywhere and anytime via mobile internet
<b>Healthy Diet Website</b>	Delivery of health diet for members via email, a limited number of health diets for patients including Hyperlipidemia, renal patients and pregnancy periods
<b>Peymooneh</b>	Provides Iranian and International food and cooking recipes and instructions for iPhone free of charge
<b>Tebyan Website</b>	A weekly dieting calculator based on weight and height information
<b>Medical Consultation</b>	Online doctor, online consultation
<b>Health Consultation</b>	Online fitness, Online exercising

**Table 3.** VRISA Index

Index	
<b>Value</b>	To provide food and diet menus considering every taste and preference, accessible anywhere and any-time, medical consultation, user-friendliness, lower costs for several services, personalization
<b>Scarcity</b>	There are other similar services but they are more static and incomplete and are provided in non-mobile contexts.
<b>Inimitability</b>	This system can be copied.
<b>Non substitutability</b>	There are substitutes but they are not dynamic, based on user taste and preference, they do not provide medical consultation and are not delivered via internet and mobile phones.
<b>Appropriateness</b>	Since we are the first one to provide such services in the country, branding leads to profitability.

After presentation to the market and customer acquisition, business enters the Cash Cows and maintains this position as long as there is no competitor present at the market. However, with the emergence of competitors, the positions shift toward Stars so that it would regain the previous position through investment in marketing and customer loyalty enhancement programs.

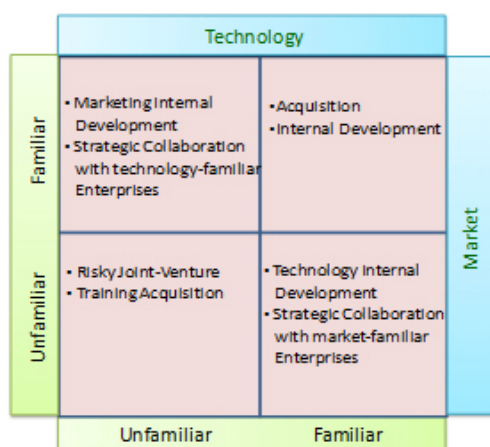
**Figure 5.** Growth - Share Matrix



**6- Familiarity Matrix**

Familiarity matrix is used to develop intangible assets. In case there is a need to develop intangible resources which pose the required know-how, i.e. processes and procedures, marketing knowledge include distribution channels consisting of clinics, associations, internet, etc. Then, in pricing based on the market segmentation and subscription fee or transaction-based pricing being familiar with customer expectations and service application, the acquisition and internal development strategies are preferred, as shown in Fig 6 (17).

**Figure 6.** Familiarity Matrix



**7- Pricing approach**

Since users of this system are divided into three groups of public, private and enthusiasts, it is necessary to develop appropriate pricing strategies for each group described as follows:

- Public sector includes Ministry of Health and with regard to the law enforcement and regulation in health sector, this system will be used extensively by this organization; on the other hand, since user profile information is partly accessible, a dual pricing strategy is possible, meaning that pricing is done in a periodical manner. For example, services are provided with a fixed fee for maximum 10,000 users and above that, price is calculated based on the number of additional users.
- Private sector: The most suitable strategy for this sector is the segment pricing because users (customers) in this sector can be divided into two groups: customers who operate in one area and those who operate in several areas. Basically, customers who operate in just one area do not require a diverse food menu and their profile making process takes a little time and effort. Thus, the best pricing strategy for this segment is the interactive pricing and the most effective strategy for customers in several areas is considered to be the bundling pricing in order to gain the customers' satisfaction with service price and differentiation on one hand and to achieve reasonable revenue making with respect to the expenditures, on the other hand.
- Other Users: Other customers or enthusiasts, who would like to use this system, require a reasonable and worthy price for the offered services because the price plays an important role in customer's decision. Since these users in contrast to the two previous groups are not obliged to take advantage of this system for health purposes, it's possible to determine the appropriate pricing strategy through expert survey or a sample of customers. Due to the absence of competitors in nutrition counseling service in Islamic Republic of Iran, price increase is of no concern, but it must be taken into consideration that this price increase should not be done before customer loyalty is gained and this price increase should not surpass the perceived customer value. In case of encounter with a new market entrant (competitor), since some market and customer information has been gained and their profile has been created, and basic costs such as system set-up, marketing etc are unrepeatable, it's possible to consider single or mixed strategies.
- Bundling and two-part-tariff pricing: to provide a food menu with a fixed fee and a variable fee in case they need

a profile based and customized menu.

Pricing to avoid confrontation: The existing gap has been identified using the market research feedback and in case of competitor emergence, this gap is filled by providing the appropriate services. For example, health is a national concern and in the public sector, there is a need to provide these kinds of services, free of charge or at minimum cost and there's not much need to provide a food menu based on customer interests and it's possible to fill the gap by providing some advice or counseling.

8-Diet

In this part, food recipes are provided according to the user's preference and interest, health status, special diets and diseases, and with minimum cost. Chefs have already prepared each recipe and our focus in this section is on determining the optimum amount of the raw material.

cost minimization

The objective function here is a loss of function or negative but in the model itself, the objective function has been considered as a cost minimization and the following steps

$$\begin{aligned} \text{Max } Z &= \sum v_i x_i \\ \sum w_i x_i &\leq W \\ x_i &\geq 0, i = 1, 2, \dots, n \end{aligned}$$

should be followed in order to solve this problem:

- 1- According to food preference of the user (Iranian and International cuisine, fast foods, Chinese foods, Italian foods ...) and his/her recent days' diet, a recommendation is provided for the customer.
- 2- Raw material and ingredients was chosen from the table that had already been prepared by the chefs.
- 3- The maximum and minimum constraints for raw material consumption are determined. In this step, every nutritional value constraint is defined according to the **Table 4**.Raw materials' nutritional value

Nutritional Value							
Raw Material	Price	Calorie	Protein	Sugar	Salt	Pepper	...
Rice							
Meat							
Potato							
Vegetables							
...							

four following characteristics:

- Food recipe constraints already prepared by the chefs.
  - Constraints defined based on person's preferences and interests, for example, customer's interest in fatty, salty, spicy foods asked at the time of the membership.
  - Constraints defined based on the health condition of the person. For example, for a person with Hyperlipidemia, an upper limit of fat consumption is determined.
  - Constraints defined based on person's daily activities. For example, for a person with heavy daily physical activities and high calorie consumption, the recommendation must provide the required amount of energy.
- 4- Variable coefficients in the constraints and the objective

function are chosen from a table including the unit price and nutritional value of the ingredients (Table 4).

Finally, the mathematical model is defined as follows:

$$\begin{aligned} \text{Min } Z &= \sum c_i x_i \\ \sum W_{\min} &\leq w_i x_i \leq W_{\max} \\ x_i &\geq 0, i = 1, 2, \dots, n \end{aligned}$$

Where  $c_j$  is defined as the variable unit price from the second column of the table above;  $W_{\min}$  and  $W_{\max}$  are obtained from step 3 and  $w_j$  from table above.

Of course, the chosen food may not possess all of the required nutritional valuable ingredients where a dessert or an appetizer might compensate this deficiency.

In addition, one of the most important features of this system is the interactivity between the user and the system. For example, if a person gets a meal more than the determined amount, or gets a meal out of the determined ordinary food menu, then he/she can announce it to the system to prevent the further overeating.

9-Cost structure

Health care costs are determined in three steps. First, resources identified based on different categories to be included in the analysis are determined including staff, equipment, set-up and installation, readmission, emergencies and overhead costs. Then, the units for these resources are determined, for instance, type of staff, time spent for various activities, number of readmissions, etc. Finally, the value of the resources is calculated based on staff salary, market price or price weights (18).

Costs are divided into three groups:

Set-up costs: including menu preparation costs, system and data maintenance costs, site set-up costs.

Fixed costs: including medical consultancy fees, system maintenance costs, salaries, nutritional consultancy fees.

Variable costs: SMS, e-mail

Revenues

Membership fee (Annual, monthly, ...)

Revenue per SMS (Food menu)

Revenue per SMS (Exercise instructions)

Advertising or promotion (Restaurants, Drug Stores, Gyms, etc.)

Sales of information to customers Pricing

In this section, according to the costs and revenues which are partially predictable, authors have proposed a method to determine the service provision prices and improve the outcomes or equivalent outcomes at lower cost (19).

Profit = Revenue

Revenue = Membership fee + Revenue per SMS + advertisement + Information sales

Costs = Fixed costs + variable costs = Delivery cost per SMS + medical consultancy fee + nutritional consultancy fee+ Salary

Result

As we earlier explained, regarding the proposed economic business model for nutritional counseling service, it can be concluded that:

- The application of information technology in health domain may lead to service quality improvement and counseling error reduction.
- The application of standards in general health domain may lead to service quality improvement.
- Various standards are applied in general health domain, each of which views the problem from a specific point of view and has its own benefits and deficits.
- The application of new technologies and information technologies for recording the historical counseling services could be considered as emerging fields.
- The proper use of the individuals' nutritional counseling profile data and, of course, regarding the personal privacy and request for their permission, can be considered as an emerging business domain and innovation of information technology in business.

According to the proposed model applied as a case study in one of the hospitals in Tehran and regarding the finished cost and determining the breakeven point using real world data, the obtained results are provided in (Table 5).

**Table 5.** Partial estimation of the related costs

Profession	Number	Per Capita Salary (Million Rials)	Total Salary (Million Rials)
Consultant Doctor	1	60	60
Chef	1	40	40
Programmer	2	30	60
Sport Professional	1	20	20
<b>Total</b>			180

90 SMSs every month for every person (3 meals a day and 30 days), SMS delivery cost (a two-page text at each step) is 100 Rials and in case of monthly membership, SMS delivery cost for 80 SMSs is received in advance.

- Q1: Number of customers with monthly membership.  
 Q2: Number of customers who pay per SMS

We assume that half of the customers belong to the first group and the other half belong to the second group of customers. (Q1 = Q2 = 0.5Q)

Now, price can be determined for different values: Here it's possible to consider a floating price which starts with a relatively high price and as the number of customers increase, price is reduced. Assuming the price of 500 Rials for a SMS which is a typical cost of advertising and service

$$\text{Revenue} - (\text{Variable Cost} + \text{Fixed Cost})$$

$$[80PQ1 + 90PQ2] - [10 \times 90Q + 18 \times 10^6] = 0$$

$$P = \frac{18 \times 10^6 + 900Q}{85Q}$$

- Q=1000     =>     P=222  
 Q=10,000   =>     P=31  
 Q=100,000   =>     P=12

SMSs, we reach the break-event point of 5,373. Thus, with this number of customers, profitability is guaranteed.

One of the applications of this business model includes nutritional counseling, using software that can be installed on the user's mobile phone or personal digital assistant. The system records the user's health through contact covered by the medical centers. This health and personal information is entered intelligently through the related center into the system. The application includes a menu of various dishes and the way that users are able to receive instruction on various dishes on the menu database which will be personalized and tailored to the taste and health properties. After completing the user's profile, they will be able to receive health, and medical and dietary service. Sustainable competitive advantage in this research parallel with lower costs requires the newcomers in this field to exert continuous improvement and innovation due to the availability of resources in order to maintain their business position. Although the number of customers grows exponentially, the costs of the project remain constant. Thus, customer attraction and identification are of the greatest importance and every stakeholder including users, physicians and counselors are put on the same page.

### Discussion

The results of comparison of the models explained earlier in this paper with the proposed model are summarized in Table 6.

With respect to the development of mobile infrastructures and nutrition counseling systems, in order to monitor the public health, easy and online access to these specialized services and economic model for all stakeholders including individuals and nutrition specialists seems necessary. In this study, the application of electronic business models with the aim of simplifying and facilitating their usage at counseling domain and easy application, low cost and high speed and precision for counselors everywhere has been studied. Study of similar cases revealed (3) that no economic analysis was available for the models mentioned in this research.

Study and analysis of electronic business models in the field of e-Health using mobile technology based in the studies of (13) leads to the increase of efficiency and effectiveness of the health and nutrition counseling and accelerating the responsiveness to the public.

Colene and Byrne in their studies have examined the feasibility and advantages of using e-learning activities in the field of health care in different countries that leads to efficiency improvement, cost reduction and revenue increase (13).

Free examined the application of information and communication technologies such as mobile phone and phone calls and text messages in the field of medical and health care and highlighted the significance of the subject. Based on the findings of their research, small size, light weight, chargeability, portability and computing capabilities are the main reasons for the people's have tendency to use this technology in health subject (8).



**Table 6.** Table comparing the model with other models

Comparison	Model [3]	Model [10] Free, C. et al	Model [9] Christensen, C.M. et al	The Proposed model
Strengths	Colene M, Byrne - System acceptance among the stakeholders	- High precision counsels and advice - Use of mobile	-Use of large data volume - Application of Canvas model	-Attention to cost structure in the model - Economic analysis of the nutritional counseling service - Comprising the strengths of all three models - Use of bilateral communication with customer
Weakness	- Costly		- Lack of communication with customer	- Non-familiarity among customers - Lack of access to distribution networks

Christensen discussed the barriers to the development and failure of these new technologies and proposed corresponding solutions and initiatives (7).

In this paper, authors made an attempt to propose a new business model able to accommodate market conditions through the integration of economic analysis of multi-layered business model such as canvas framework, VRISA analysis, Trading matrix market, Porter's five competitive forces, value chain analysis and revenue model. Cost and revenue analysis related to the establishment of an electronic health care center was carried out.

### Conclusion

In this study, a new business model for mobile health nutritional counseling has been proposed. First, the business and its value chain was introduced and several parts of the Canvas model, VRISA index, Growth-Share Matrix and Familiarity Matrix and Porter's Five Competitive Forces were analyzed, and finally cost and revenue model and food menu provision were provided.

The growing development of these systems can play a significant role of this business model in the promotion of the public health and its competitiveness through mobile penetration rate in households and expansion of bandwidth in new generations (3G, 4G). E-health value chain, which was referred to in this study as an example, health and diet counseling services, as applicable in each case.

It should be noted that this application is able to store question and answer data retrieved from respondents or nutrition experts using software learning algorithms that constitute a valuable and robust database for decision-making in sports and nutritional diet fields (10). The strength of this research is the aggregation of relevant models with economic analysis.

### Conflict of Interest

None declared.

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