Strategic study of Total Innovation Management and its Relationship with Marketing Capabilities in Palm Conversion and Complementary Industries

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Research

Keywords: Total innovation management, conversion and complementary industries, Date, Marketing, agri-food system

DOI: https://doi.org/10.21203/rs.3.rs-244719/v1

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Abstract

Given the role and importance of processing and complementary industries in preventing waste from agricultural products, the establishment of such industries can be considered as one of the most appropriate solutions for agricultural development. For this purpose, the data were collected for data processing and complementary industries in the fields of packing, pricing, customer orientation, in south of Iran. Method: According to the goals and assumptions, descriptive-analytical research and its survey method is a survey. According to the Cochran formula, 155 people are involved in marketing, packaging and processing of palm in Kerman province. To answer the research questions. SPSS software and AMOS software were used to analyze the results. Findings "Local culture in packing

Using communication tools in marketing impact of customer-orientation approach are Top Priorities in "marketing Date" The "packaging" factor is the most important factor in the marketing development of date conversion and complementary industries.

Introduction

The agri-food system (also called food system) is “the way in which people organize themselves, in space and in time, to obtain and consume their food”. According to FAO (HLPE, 2014), “a food system gathers all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) Today, all the components of the agrifood systems are concerned by a huge need for innovation to reach sustainability (Tilman and Clark,2015).

Agro-industry is an activity that uses the product of the primary sector (agriculture, plantation and forestry) as raw materials, designing and providing the equipment and services for the primary sector itself (Adriadi Ghiffari, 2015). The activity of the conversion and complementary industries causes value added of the product, job creation, prevention of waste, improvement of export situation, encouragement and encouragement of producers and direct impact on the economy of horticultural production areas of the country, has a special place and importance. Is. Agricultural development is not limited to increasing yields, but also includes diversification and processing, waste reduction and value-added production. Therefore, it is necessary for the agricultural sector to prepare beyond its livelihood functions for new roles (McLeod Riverar, et, al 2002). Complementary industries refer to a set of industries that by performing physical and chemical changes on raw materials of plant and animal origin in terms of processing and processing, grading, packaging, storage and marketing and distribution of the resulting products. Take action. In them, an agricultural product is transformed into another form for better consumption, better supply and increase of economic value. In such a way that the nature of the new product is the same as the nature of the raw material, but the final product of a new material is the same as the raw material. (Fami et al., 2012).

Establishment of conversion and complementary industries has positive and significant effects on strengthening the rural economy, increasing the level and variety of products, as well as preserving
agricultural lands and rural landscape. Given the natural and social characteristics and talents of the region and the positive effects of agricultural-related industries, linking the two sectors of agriculture and industry is mandatory to achieve sustainable rural development. Pourramadzan et al. (2012).

Dates are considered as one of the strategic products among the agricultural products for Iran and one of the most important garden products in this country. Iran has around 17% of the cultivated area and 13% of the world’s date production (Iranian customs statistics, 2015). Nowadays, there is an enormous need among all components of agricultural systems for innovation in order to achieve sustainability (Tilman and Clark, 2015).

Recently, the issue of Food Loss and Waste (FLW) has been the subject of much discussion. When it comes to food security, potential economic benefits and natural resource conservation, scientists, politicians, and general public, agree that FLW needs to be reduced. However, the way the FLW problem is presented and analyzed faces numerous inconsistencies (Chaboud and Daviron, 2017).

The privatization of the public infrastructure for agricultural knowledge was the most important change. Agricultural knowledge and information were regarded as public goods offered by the state through extension services and publicly applied agricultural research institutes (Lacy, 2001).

In practice, for the most part, these were not the exclusive source of knowledge and information for innovations as private service providers were also active. Depending on the local context, for the support of agricultural innovation, privatization has resulted in either the acceleration or development of a market for agricultural R&D and KIBS for the US, (Leeuwis, 2000; Levidow et al., 2002).

The privatization of public knowledge infrastructures in agriculture was the second major change. Agricultural knowledge and information were viewed as public goods provided by the state through advisory services and publicly applied agricultural research institutes (Bennett, 1996; Rivera, 2000; Lacy, 2001). In practice, however, these were often not the exclusive source of knowledge and information for innovations as private service providers were also active. Privatization has resulted in either the acceleration or emergence of a market for agricultural R&D and KIBS for the US, depending on the local context, for the support of agricultural innovation (; Leeuwis, 2000; Levidow et al., 2002).

Information and knowledge become private or chargeable goods. From the perspective of an innovation system with a strong emphasis on effective linkages between actors, the changes discussed above at the interface between producers and users of knowledge and information present a number of limitations and challenges for actors in agricultural knowledge infrastructure. In order to meet these new demands, state farmers are encouraged to be more market-oriented, to look for new opportunities and to act more strategically. This shift from production to business and market orientation has drawn attention to the appropriateness and application of general business skills in the agricultural sector compared to technical skills and knowledge in animal and plant production. (Klerkx & Leeuwis, 2008).
High demand for the high quality of fresh food has pushed farmers' interest in marketing, creating social connections and vibrant shopping experiences, and widespread health issues, and has always pushed farmers toward marketing (Hamilton, 2005). Branding: price, along with "location (or distribution) and promotional activities," is one of the four pillars of marketing. Proper pricing, along with its components in the success or failure of a business, has a significant impact on income through the mix of marketing pricing as a major parameter (Dolgui et al 2010). Marketing relations include various components such as sales promotion, public relations, direct marketing and advertising, which is an important part of marketing. Marketers use advertising to raise brand awareness, build branding between other brands, and ultimately the name of commercial brand by the customer (Abbasi et al. 2007).

Marketing: It is a technical economic practice that minimizes the cost of goods development while increasing sales and thereby maximizing profits (Afrasibi, 2010).

The brand name is an important driver of new product success. However, if consumers perceive inconsistency between the existing name and a new product, they may react unfavorably toward the new product, as well as the brand and its existing product. (Trung et al, 2017).

considered pricing as a kind of behavior, culture, information flow, decision making, strategic planning, and as the least costly way to address customer problems and customer management (Shafei et al. 2013). Since the date industries of Kerman province has not been able to reach the world markets in the field of marketing, packing and processed products, this paper examines the development of date processing and complementary industries with an emphasis on comprehensive innovation management.

Literature Review

Framework and Overview of Modeling Approaches

Conversion industries guarantee food security and play a vital role in improving the accessibility of poor people to food and improving their purchasing power. Cost effective conversion and complementary industries, with proper marketing and transportation, play an important role in rural development. (Olamade, 2014).

Total innovation management

Total Innovation Management (TIM) discusses the components of strategy, culture, organization, and the relationship between them (Xu, 2007). It presents a model for the relationship between technology and non-technology. This new model integrates various characteristics of new innovation and traditional innovation. The main emphasis of traditional innovation management has been the creation of technology or innovation processes, and the role of management includes processing innovations or innovating the product (Zhirong, 2000).
Performance in traditional innovation is related to R & D. A key factor in traditional innovation is competitive advantage. Also, in total innovation management, the function of cultural elements, organizations, innovators, place and time are important. (Xu et al, 2007).

Important components of Total innovation management are Innovation strategy, Innovation culture, the organizational structure, technology management and innovators. the innovation synergy among innovative elements.

The notable difference between total innovation and traditional innovation management is that it breaks through the previous innovation framework, which is only limited in the research and development department. The employment of TIM goes through three transformations ranging from individual innovation to overall innovation, from separate innovation to integrated innovation, and from a focus only on the company's internal resources to an emphasis on the integration of internal and external resources.

Innovation is therefore not only the responsibility of a few people or functions, but also in an integrated strategic process for value creation and creation. TIM demands that all functions and all employees are involved in the overall innovation - the resources for innovation will be much higher and the costs of applying TIM will grow consequently. If TIM is not linked to the innovation strategy to create more value in the market than it costs, TIM is therefore not supported and subsequently not carried out.

In a dynamic and complex market, only continuous innovation can drive a company's sustainable growth and profits. In the innovation process, however, companies often get caught up in the “war of innovative wear and tear” (Braun, 1997) and lead to what is known as the innovator's dilemma (Christensen, 1997). Much research and practice has shown that innovation must be brought into the framework of corporate strategy in order to overcome this dilemma and serve the process of changing business strategy (Janszen, 2000; Roussel, Saad, & Xu, 2000).

The implementation of TIM undergoes three transformations. They range from individual innovation to total innovation, from separate innovation to integrated innovation, and from a focus only on the company's internal resources to a focus on the incorporation of internal and external resources. Innovation is therefore not only the responsibility of a few people or functions, but also in an integrated strategic process for value creation. TIM should be integrated into corporate innovation strategy such as R&D (Roussel et al., 1991).

Strategy implementation should be supported by organizational and institutional innovations (Janszen, 2000). According to institutional economics, the establishment of an institutional innovation entails two prerequisites: on the one hand, the innovation changes the latent profits and, on the other hand, the innovation costs must be lower than the added profits (Davis & North, 1970).

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Organizational innovation

Organizational innovation is essential for companies that want to pursue strategic challenges as they lead to improvements in the management of the organization (Higgins, 1995).

Thus, organizational innovation means the implementation of a new organizational method in a company’s business attitudes, such as the arrangement of the workplace and also external relationships. New methods aid in the organization’s routines and procedures, in addition to driving the work and practices which facilitate learning and knowledge sharing within the company (OECD, 2005).

Innovation dimensions

First, product and/or service innovation, which implies changes in a product or service provided by the organization by using new or existing technologies. It refers to the development and marketing of new products and services, related to customer satisfaction. Second, process innovation, which includes changes in the way in which new or significantly improved products or services are created and delivered. It is the development of different ways of manufacturing and providing services. Third, marketing innovation (competitive position), which refers to changes in the context in which goods or services are introduced to the market by focusing on the consumers’ needs. It is the development of new power and leadership structures. Lastly, organizational innovation (management or mental process), which is comprised by changes in the underlying mental models which shape what the organization does, therefore, it is the result of strategic decisions taken by the company through a newly developed business in order to provide a sustainable competitive advantage. (Oslo Manual (2005, Ganzer et al, 2018).

marketing innovation

marketing innovation addresses the implementation of new methods, with significant changes in product development, packaging, promotion, positioning, and even in pricing. Therefore, marketing innovation seeks to address the consumers’ needs, by the way new markets are opening, the product repositioning of a company within the market, aiming to increase sales (OECD, 2005).

Development Indicators of a local foods supply were positively related to the choice to engage in marketing. Factors affecting farm financial performance varied significantly between a short-term and a
long-term measure. The results emphasize the importance of considering multiple outcome measures, developing local supply chains and provide implications about beginning farms (Clare Ahearn, et al, 2018)

Aliabadi et al., (2009), in a study entitled "Smart Packing in the Food Industry", factors for smart packaging such as temperature and time indicators, gas concentration controller, increased ease in the production and distribution of anti-counterfeiting and theft systems and increase the safety and quality of food products.

Eskandarpour et al (2014) carried out a study entitled "The Uniform Price Law and Integration in Global Date Markets". The results of the study indicated that the convergence of prices in global markets and among major exporters such as Iran, Tunisia, Emirate, Iraq and Saudi Arabia could make it possible to access markets. It should be noted that there is price convergence and the unit price law in the long run between global prices and export prices in Iran's export markets.

Tsai et al (2017), in an article entitled "Experiential value in branding food tourism", achieved the results that branding could significantly increase the return on investment. Illustration in branding, such as local food image has a significant relationship with an increase in tourism.

Rapp et al (2010) postulates that customer-orientation is the collection, sharing, and use of information with customers at the organization level and coordinated actions based on this information. Customer orientation, as a dimension of market orientation, emphasizes the importance of identifying and addressing the needs and preferences of buyers and customers (regardless of other dimensions of market orientation).

Market innovation is orientation. Market innovation means the innovation of marketing channel, the operational ways et al., by which to create new market, new channel and new ways. Innovation synergy is approach. Due to the inherent limitation of isolated innovation, it's necessary to integrate all the innovative elements systemically. Synergy of all the innovation agents has becoming the dominant paradigm of innovation management both native and abroad since 1980s, and it's the basic approach to realize TIM. (Zhirong, 2003)

**Modeling Approaches**

**Materials and methods**

This research is based on descriptive-analytical objectives and descriptive-analytical assumptions and its survey method. The statistical population of this research includes Palm grower in south of Iran with 200 people A questionnaire was designed as the main tool of the research; it comprised eight sections, five of which were included in the integrated management of innovation, which included (organizational culture, technology management, organizational structure, psychological characteristics of individuals), and marketing that consisted of three sections (Pricing, packaging, Customer demands). To assess the
validity of questionnaire, farmers who were previously involved in the project were interviewed. After completing the questionnaire, the necessary corrections were carried out under the supervision of the research group. To determine the reliability of the research, Cronbach's alpha was calculated 0.8 for the categories of questions associated with the conversion and complementary industries and for the questions related to comprehensive innovation management was calculated 0.87. According to these results, the reliability of the questionnaire was confirmed. Descriptive and analytic methods have been used to analyze and complete the data. To analyze the data and investigate the model SPSS and AMOS software were used.

Results

Table 1
Descriptive statistics for marketing in processing industries

| Item                                                                 | Mean (Mean rank) | SD   | Coefficient of variation | rank |
|----------------------------------------------------------------------|------------------|------|--------------------------|------|
| Local culture in packing                                             | 3.70 (1)         | 1.00 | 0.270                    | 1    |
| Using communication tools in marketing                               | 4.14 (2)         | 1.26 | 0.305                    | 2    |
| Impact of customer-orientation approach                              | 3.62 (3)         | 1.11 | 0.306                    | 3    |
| Packing methods according to international standards                  | 3.20 (4)         | 1.00 | 0.312                    | 4    |
| Modern transportation methods                                         | 3.67 (5)         | 1.15 | 0.313                    | 5    |
| Proper Warehousing                                                   | 3.65 (6)         | 1.15 | 0.315                    | 6    |
| Preserving quality by type of packing                                | 3.11 (7)         | 0.99 | 0.318                    | 7    |
| International brand in date packing                                  | 3.77 (8)         | 1.21 | 0.320                    | 8    |
| Appropriate pricing in marketing                                     | 3.53 (9)         | 1.14 | 0.322                    | 9    |
| Internal branding in date marketing development                       | 3.57 (10)        | 1.16 | 0.324                    | 10   |
| Date brand advertisement                                             | 1.32 (11)        | 1.23 | 0.336                    | 11   |
| Using advanced technology of date packing                            | 2.93 (12)        | 1.10 | 0.375                    |      |
| Seller information about the brand for the customer                  | 3.12 (13)        | 1.21 | 0.387                    | 13   |
| Date packing in terms of appearance and adequate information in international markets | 3.28 (13) | 1.27 | 0.387                    |      |
| Using skilled force in packing                                       | 3.94 (14)        | 1.18 | 0.932                    | 14   |

Comments of palm industry owners in table 1. In order to determine their importance, the items in the components of marketing were ranked based on their corresponding factor loadings in the final structural
The results of Table 1 indicate that “Local culture in packing” is ranked highest among the items of packing in processing industries and the item “Using skilled force in packing” has the lowest priority.

Table 2: Overall fit indicators for the conceptual model

| Index                                         | Normal limit       | Observed value |
|-----------------------------------------------|--------------------|----------------|
| DF                                            | Larger than zero   | 261            |
| Ratio of \( \chi^2 \) to df                   | Between 2 and 5    | 3.153          |
| Goodness of Fit (GFI)                         | 0.9 and larger     | 0.941          |
| Normed Fitness Index (NFI)                    | 0.9 and larger     | 0.925          |
| Non-Normed Fitness Index (NNFI)               | 0.9 and larger     | 0.950          |
| Incremental Fit Index (IFI)                   | 0.9 and larger     | 0.963          |
| Root mean square error of approximation (RMSEA) | Below 0.05         | 0.027          |
| P-value                                       | Below 0.05         | 0.124          |
| PNFI                                          | Below 0.05         | 0.580          |

Using general value indicators, the question can be answered that regardless of the specific values reported for the parameters, is the model generally supported by the collected experimental data or not? If the answer is yes, the model is acceptable. Otherwise, efforts should be made to correct it. To interpret the values in Table 2, we must say: The second root index of the average of the remaining squares, or RMSEA, indicates whether the developed model can be considered acceptable. This index, which is known as one of the bad indicators of value, its value varies between zero and one, and the smaller the value obtained, the more acceptable the developed model is considered. For the developed factor model, it indicates that
the model is acceptable. Comparative indicators have also been developed to evaluate the acceptability of the model based on its comparison with the independence model. These indicators take values between zero and one, and values above 0.90 have been interpreted as acceptable values in most sources. In the table (5), the Luke Toker Value Index (TLI), which is the same as (NNFI), is 0.950, and the Comparative Value Index (IFI) is 0.960, and their values are more than 0.90. Therefore, based on these indicators, the developed model is considered acceptable.

Structural equation model was used for testing the research hypotheses (investigating for a significant positive relationship between development of date processing industries and organizational, technological, strategic, cultural, and underlying individual variables).

Factor loadings in Figure 2 indicate positive significant relationship between development of date processing industries variable and each of elements of strategic innovation, technology management, innovation culture, and organizational structure. Factor loadings for strategic innovation, innovation culture, technology management, and organizational structure are 0.65, 0.82, 0.56 and 0.79 respectively. According to the results of this analysis, the research hypotheses are supported. Each of the elements in the components of the model are ranked based on the factor loadings represented in the path diagram (Figure 2). In the culture of innovation, the item "vast database of information and resources related to marketing" is ranked highest with a standardized regression weigh of 0.79. Then "the attempt of date industries for Global trade" with a factor loading of 0.60 is ranked second. In strategic innovation, the element "long-term investment in the transformation and complementary industries" with a factor loading of 0.76 is of highest rank, and "the presence of palm growers and owners of palm industries at the university's dissertations" with a regression weight of 0.69 is ranked second. According to these results, the field of investment in machinery will improve the productivity and safety of workers in palm trees, which is in line with the research results of (Gagliard, Others, 2014).

In technology management, "the use of new technology" with a factor loading of 0.73 is the major component and "management of technology with business strategy" with a factor loading of 0.52 is ranked after that. This finding is consistent with the results of Ali Abadi and colleagues (1394) and Lee (2017) and (2017) Lia, Others and (2017) Trott. In organizational structure, "corporate governance with open and honest communication" with a factor loading of 0.79 is ranked highest and "financial incentives" with a factor loading of 0.72 is ranked second. These findings are consistent with the results of Salimzadeh et al. (1395). In psychological characteristics, "risk" with a factor loading of 0.81, the "internal control" with a factor loading of 0.72, are ranked first and second respectively, which is consistent with the results of (2013) Efrat et al. According to the table 2, of the indices of model fit ($x^2$ to df=3.153, GFI=0.941, RMSEA=0.027, p-value= 0.124), all reasonably well indicate the model fits the research data. These fit indices are in the acceptable criteria and justify the credibility of the structural equation model.

Conclusions
Date processing industries have various potential advantages. In order to be successful in development of processing industries, these industries should take into account the challenges they are commonly approaching. This paper indicated that complexities of development of date processing industries might extensively be influenced by organizational structure, technological management, strategic innovation, innovation culture, and individual grounds. The related challenges, which surround development of date processing industries, should be classified. Current research provides these effective factors through a review of theoretical sources combined with a conceptual model. An appropriate brand is great significance in product introduction and marketing. Advanced packing technology is a must for the world market. Local culture has not been able to have a position in marketing palm processing and complementary industries and needs training. To succeed in each market, according to the type of industry and the capabilities of the enterprise, a mixture of marketing and its specific tactics should be designed and implemented. Regarding the pricing results, it was found that the companies under study consider competitors as a reference point for product pricing, which may lead them to fail to meet other goals of the company, so they are suggested to use other methods such as investment returns. Successful organizations place customer needs at the top

In order to develop date processing and complementary industries and management of workshops and marketing in Kerman province, long-term investment in packaging equipment and branding training is needed. Training in technology is insufficient. Improper storage is a marketing failure. The use of indigenous knowledge in this field has not been observed at all. In the framework of the country's legislation, there are shortcomings in innovation marketing in industries related to reprocessing and there is no support for innovation.

**Abbreviations**

TIM: Total innovation management

**Declarations**

**Availability of data and materials**

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

**Competing interests**

The authors declare that they have no competing interests.

**Funding**
No funding has been received by the authors for this research.

Authors' contributions

All authors have equally contributed to this study from proposal development to manuscript writing stages. The authors read and approved the final manuscript.

Acknowledgements

Not applicable

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