Innovation Typology in Food Industry Sector: A Literature Review

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ABSTRACT :*Innovation carried out by the organization or company aims to increase the added value to the products or services owned. Food industry-based companies have a different trend of innovation from other industrial sectors, and quantitatively the number of research publications in the field of agro food industry is less compared to the research on non-agro food industry. This study aims to determine the type and characteristics of innovation in food companies. Innovation typologies consisting of product, process, market, and organizational innovations, have different role and level in its implementation to food industry. Market innovation leads to marketing through new marketing methods. Organizational innovation includes the organization' strategic steps in making new breakthroughs related to the products or services produced. The food industry sector generally carries out the four types of innovation, yet product and processinnovations are more widely used, both of which have a higher potential to be applied compared to market and organizational innovations. Incremental level of innovation is more applicable than radical innovation.*

KEYWORDS-*food industry, innovationtypology, market, organizational,process, product*

I. INTRODUCTION

A business environment is characterized by rapid change, diverse customer needs and international competition, thus organizations or companies are required to have new technology and the capability to explore new business to remain profitable in the long run [1]. Schumpeter in Theory of Economic Development (1934) defines innovation as a new combination of production factors of new products and services by introducing new production processes, marketing and new business organizations [2]. Innovation can be formed from a combination of two processes: invention and implementation into new products, services, or new methods of doing things where changes in products, services, and ideas can be perceived by someone as new [3][4]. Practically, novelty that occurs as a result of innovation is sometimes not always felt real by the consumer, particularly when the novelty occurs in the process, material changes, or other resources. There are technical innovations that do not directly create visible value for the consumer, yet it can change the process, function or utility [5].

Innovation can not be separated from the aspect of business success and all aspects that follow. Innovation has become one of the driving forces for the company and the whole economy [6]. Businesses see innovation as the key to survival because long-term success requires customers to be happy with the innovations provided by the company's products and services, thus for survival, the company will continue to require continuous innovation [7]. A study conducted by Rogers[8]reported four inherent aspects of an innovation, that is (i) relative advantage: this innovation is considered better than what exist before, (ii) simplicity: this innovation is considered simple for those who want to understand and use it,iii) compatibility: the innovation is considered consistent with existing values, past experiences and the needs of potential adopters, (iv) ease to conduct experiments: innovation can experiment well in a limited way; (v) observability: innovation seen by other people. Generally, if an organization is not ready to keep upgrading its products and processes, hence chances for the organization to grow or even just to survive will be significantly threatened [9]. Organizational innovation becomes fundamental for the sustainability of its business aspect in order to survive in the middle of market competition. The ability to innovate is the main key for companies to preserve and improve their competitive position in the marketplace [10].

Innovation is an implementation of a new product or significant improvement in the functionality of a product, new marketing method,practice of a new organizational method within a company, organization, or external relations [11]. Innovation is a complex phenomenon involving the production, diffusion and translation of knowledge in converted new products or services, or the development of new production or processing techniques [12]. There are four types of innovations involved in the changes in corporate activities, i) product innovation, (ii) process innovation, (iii) organizational innovation, and (iv) market innovation[11].Many scientific researchesfocused in exploring product and process innovations, while the research on aspects of marketing and organizational

innovations is relatively rare, whereas these two aspects are very strategic for improving competitiveness. The organizationalcapability to manage and survive is important in an environment along withintensive market competition and globalization [13].

Consumers are very important, not only as users and buyers of products, but also as a source of new product development ideas that act as replacement products or future product development. Product user can be a valuable source for new business development [14]. For decades, companies are searching consumer behavior and using it a source of innovation, where companies can take advantage of innovative ideas from users for new product and business model developments[15][16][17]. Innovation is often associated with novelty, success, and change [5].

Innovations capable of meeting customer needs and introducing new products or processes have become one of the most important issues for companies [18]. The company will seek to create a sustainable market through the introduction of superior new products or processes [19]. The company will has competitiveness by innovating [20][21][22]. The innovation process does not show the same characteristics related to financial resources and the results obtained, yet there are differences at the company level according to the type of innovation, firm size, strategy and experience in the field of innovation [23].

II. LITERATURE REVIEW

The demand for new products is encouraged by the "Five Dominant Forces"[24], namely: (i) all products have a life cycle, once a product is lost from the market thus itshould be replaced, (ii) new products that promote growth, (iii) new markets can be created such as organic and functional food, etc., (iv) knowledge and technology may offer new opportunities such as nanotechnology, microwaves,internet, etc., and (v) changes in legislation, health regulations, agricultural policies, and others. The implementation of innovation in food industry and agroindustry is very strategic. Innovation is one of the strengths in the middle of the tight competition of food and beverage industry in developed countries [25].

Changes in the nature of food demand and supply and increased levels of competition make innovation not only an unavoidable corporate activity, but also one of the most important activities for the achievement of the overall agribusiness profit gains [26]. Along with the increasing global competition, technological developments and rapid changes in customer demand, the performance of food and beverages industry companies is increasingly dependent on continuous improvement and introduction of new products and processes [26].Currently, value-based thinking becomes dominant as a concept that has been able to change the needs of subjective consumers such as health, diet, comfort, ethics, objective and sustainable products, value-added products based on the impact of sustainability for consumers[27].

Several studies have shown that companies in the food sector rely on external information sources to innovate. Therefore, the company should open the network to become part of their own innovation process [28][29].A study on the implementation of the concept of innovation in food sector in Italy [31] through empirical analysis shows that, in the food sector, innovation adopted to follow a different pattern when considering product or process innovations. In particular, the introduction of product innovation is influenced by the quality of human resources, the geographic context, and the age of the company.

Innovation typology is also defined by the Organization for Economic Cooperation and Development (OECD), which is relatively widely used as an international research reference. There is a difference in the definitions of typology [30][11], yet if investigated more deeply both definitions reside on the same framework. A company can make different kinds of changes in its working methods and use production factors and output that increases the productivity and commercial performance of the company. There are four types of innovations involved in the changes in the company activities, namely: (i) product innovation, (ii) process innovation, (iii) organizational innovation, and (iv) market innovation [11].

Many scientific researches focused to explore product and process innovations, while research on marketing and organizational aspects is relatively low, while these two aspects are very strategic for increasing competitiveness. Innovations relate to products, while processes relate to technical matters, whereas innovations related to market and organization are considered more as non technical aspects, yet the implementation of innovation in both aspects is very strategic for increasing the competitiveness of the company. The organizational capability to manage and survive is becoming increasingly important in the environment along with market competition and globalization that are increasingly competitive and rapidly changing [13]. The general definition of innovation can be divided into four subcomponents as defined in Bogota and Oslo manual-OECD, namely: (i) product innovation: introducing new or substantially improved goods or services; (ii) process innovation: new or improved production methods or delivery, (iii) market innovation: the adoption of new marketing methods that involve significant changes in product or packaging design, product promotion or pricing, and (iv) organizational innovation: the creation or changing of business practices, workplace organization, or external relations [36].

Table 1
Innovation Typology

OECD Version			Bessant&Tidd (2007)	
Type of Innovation	Scope of Implementation	Distinct Characteristic	Type of Innovation	Essence of Innovation
Product innovation	Innovations related to goods and services.	There are significant improvements in technical specifications, components and materials.	Product innovation	Introduction of new products and services or changes in new products and services that have added benefits to customers.
Process innovation	Implementation of new processes or improvements to the significant production system.	There are significant technological changes, production equipment and/or software.	Process innovation	Introduction of new devices, methods, tools or knowledge to produce goods or services.
Marketinnovation	Implementation of new marketing methods including significant changes in the design or packaging of products during its storage, market promotion and market-based pricing.	There is an increasing level of consumer satisfaction, creating new markets or market positions that are more profitable for companies to increase sales.	Position innovation	The position of a particular product in an industry or specific business segment.
Oganizationalinnovation	Implementation of new forms and methods in organizing companies, work and external relationships.	Implementation of business practices in the organization of the workplace or external relationships as the implementation of strategic decisions.	Paradigminnovation	Shifts or changes in old assumptions related to the Adressing mode in some industries or businesses.

(Source: OEDC, 2005; Bessant&Tidd, 2007)

Hauser [71]studied the scope and impact of an innovation and identifiedit intothree types: (i) operational efficiency/operation/process innovations whereby the innovation of operation consists o improving the effectiveness and efficiency of core functional areas such as data processing, manufacturing, accounting, human resources etc., (ii) new product/service innovations referring to innovation in product or service levels, and (iii) business model innovation including considerations such as changes in organizational structure, strategic partnership, franchising, licensing, shared services, divestment, or a a new method of serving customers.

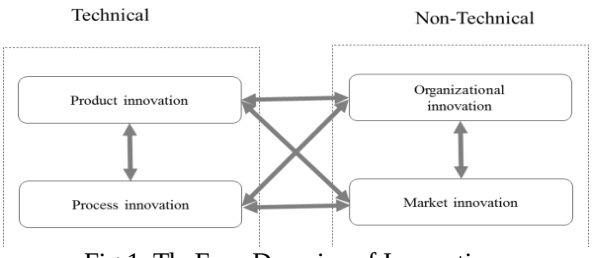

Fig.1. TheFour Domains of Innovation
(Source: Bigliardi&Dormio, 2009)

The food industry sector has a strategic position in the global economy because it includes many different actors who need to continually contact withthe demand of customers, end users and policy makers. On the other hand, food products have the shorter life cycle, high quality standards, food safety and competitiveness [29]. A research conducted by Alfrancaet al.[25] reported that the innovation of the food and beverage industry consists of two parts: (i) innovations related to food and beverage and agricultural expertise, and (ii) new techniques in biotechnology, packaging, chemical coumpounds, and other called non-food innovation. The share of non-food innovation in the food and beverage industry is quite large amounting to 45%-50% [72][73]. The results of innovation provide a temporary competitive advantage that allows the company to earn return on innovation such as higher sales and growth of the company [12].

The food and beverages industry in Europe invests in a very small field of research and development compared to other industrial sectors

where radical new products are extremely rareto find[74]. Manufacturers recognize the importance of more unique and different products, yet they are also well aware that at present, any poduct will be very easy to imitate [35]. The food agriculture system is an industry sector with an intensive level of research and development (R&D) classified as low category[25][31].

Innovation in food companies is usually seen as a balance between technology-push and market demand-pull approach, which is often implemented as incremental innovationrather than radical innovation[12]. This type of innovation in addition tobe included in the OECD definition (product, process, market and organizational innovations), innovation in the agro-food sector also includes new types of animal feed, new feeding systems, new types of packaging, new types of conservation, new additives, new flavor, new consumer products which are introduced continuously in the market, as well as new types of logistics. Agro-food is complex in which innovations in the food industry are not always easily categorized traditionally as in manufacturing industries whose innovations are conceptually and empirically oriented, thus when we define innovations in different agro-food domain, different dimensions must be addressed [75][76].

Process innovationdepends essentially on external conditions, such us designing new technology results from interactions with customers, suppliers, competitors and various public organizations and other parties [23]. Innovation is a recurring process initiated by the perception of new market opportunities or services for discovery-based technologies that lead to the development of production, and marketing tasks that strive for the commercial success of an invention [77]. Companies or organizations that succeed in implementing innovations do not occur suddenly, yet directly seek the creation of new things that provide added value of a product. World-class company that is successful asGoogle, for example, devote most of their time to innovate [78].

Distinct characteristicsof agricultural and food products including nutritional benefit and perishability have consequences for a particular focus on product and organizational innovations. The quality of inputs from agriculture is critical to food products which makes vertical integration with farmers and sometimes also with firms, thus it is essential for innovation process[79]. The innovation process itself differs greatly from sector to sector in terms of development, level of technological changes, relationships and access to knowledges, organizational and institutional structures including in agro-food industries, differences between sectors in revealing the heterogeneity of innovation methods adopted and used [76].

III. METHODOLOGY

Literaturesreviewis done to find out the characteristics of companies in the food industry sector. We reviewed publications from several reliable sources i.e. Google scholar, Sciencedirect, Researchgate, Springer, Prorequest, EBSCO, etc. The publication types were discussed in this review including journal, proceeding conference and book section.Keywords employed for searching online publications are “innovation food industry”, “innovation agroindustry”, “innovation food sector”, etc. from year 1990 to 2017. A total of 40 selected papers that specifically address the innovation typology in the food industry sector.

Table 2.
Recapitulation of Journals Reviewed from Aspect of Research Sites and Innovation Typologies

Paper No	Country&research site	Innovation typology				Level	Paper No	Country&research site	Innovation typology				Level
		Prd.	Pro.	Mkt.	Org.				Prd.	Pro.	Mkt.	Org.	
[31]	Italy /Europe	√	√	x	x	Incre.	[51]	Malaysia/ Asia	√	√	√	√	x
[32]	Italy /Europe	√	√	x	x	Incre.	[52]	Europe	√	√	√	√	x
[33]	Italy /Europe	√	√	x	x	x	[53]	Europe	√	√	√	√	x
[34]	UK/Europe	√	√	x	x	Incre.	[54]	China/ Asia	√	√	x	x	x
[35]	Sweden/ Europe	√	√	x	x	Incre.	[55]	Europe	√	x	x	x	x
[36]	Iran/Asia	x	x	x	√	Rad.	[56]	Denmark/ Eropa	√	√	x	x	x
[37]	New Zealand/ Europe	√	√	√	√	x	[57]	Europe	√	√	x	x	x
[38]	Europe	√	√	√	√	x	[58]	Canada/ America	√	√	x	x	x
[39]	Europe	√	√	√	√	x	[59]	Spain/ Europe	√	√	x	x	x

[40]	Kenya/ Europe	x	x	x	√	x	[60]	Hungary, Italy, Belgium / Europe	√	√	√	√	x
[41]	Singapore/ Asia	√	x	x	x	x	[61]	Ghana/ Africa	√	x	x	x	x
[42]	Malaysia/ Asia	√	√	√	x	x	[62]	India/ Asia	√	x	x	x	x
[43]	Vietnam/ Asia	x	√	x	√	x	[63]	Norway/ Europe	x	x	x	√	x
[44]	China/ Asia	√	x	x	x	x	[64]	Europe	√	x	√	x	x
[45]	Europe	√	√	√	√	x	[65]	Europe	√	√	√	√	x
[46]	Thailand/ Asia	√	x	x	x	x	[66]	Europe	√	√	x	x	x
[47]	Netherlands / Europe	√	√	√	√	x	[67]	Netherlands and France/ Europe	√	x	√	x	x
[48]	Netherlands/ Europe	√	√	√	√	x	[68]	Poland/ Europe	√	x	√	x	x
[49]	Sweden/ Europe	x	x	x	√	x	[69]	Spain/ Europe	√	x	√	x	x
[50]	Europe	√	√	√	√	x	[70]	Cyprus/ Europe	√	√	x	√	x

Remarks: √:yes, x:no; Prd: Product;Prc: Process; Mkt: Market; Org; Organization; Incre: Incremental; Rad: Radical

IV. RESULTS AND DISCUSSION

Innovation research in the food industry sector is presented in Table 2. It is shown that the majority of innovation researches are performed in Europe (70%), Asia (22.5%), and the remaining of 7.5% inAfrica and America. This indicates that food industry in the world implement innovation in improving its competitiveness. Knowledge of innovation in food industry sector is very important due tothe demand and market opportunity play an important role in stimulating product innovation with the increasingly competitive level of food industry business in domestic and international markets. The diversity and quality of innovation are increasingly important where the relationship between market dynamics and innovative behavior may provide information about the potential competitiveness of food systems [80]. In the food industry sector, competitiveness is considered one of the most important factors for companies to survive against competition in national and international markets [31].

Innovation typology conducted by food industries based on 40 research journalsispresented in Table 2, which indicates that product innovation of 87.5%, process innovation of 65%, market innovation of 42.5% and organizational innovation of 45%. These figures indicate that innovation typologywhich becomes the priority for food industry is product and process innovations. Lefebvre et al. [38], managed to group and comparedinnovation typology, product and process innovations with market and organizational innovations, and the results showed that all variables contribute at different levels.

Table 3.
Research Journal Mapping based on Innovation Typology

Product innovation: [31], [32], [33], [34], [35], [37], [38], [39], [41], [42], [44], [45], [46], [47], [48], [50], [51], [52], [53], [54], [55], [56], [57], [58], [59], [60], [61], [62], [64], [65], [66], [67], [68], [69], [70]	**Market innovation:** [37], [38], [39], [42], [45], [47], [48], [50], [51], [52], [53], [60], [64], [65], [67], [68], [69]
Process innovation: [31], [32], [33], [34], [35], [37], [38], [39], [42], [43], [45], [47], [48], [50], [51], [52], [53], [54], [56], [57], [58], [59], [60], [65], [66], [70]	**Organizational innovation:** [36], [37], [38], [39], [40], [43], [45], [47], [48], [49], [50], [51], [52], [53], [60], [63], [65], [70]

Research findings ofArchibugiet al. [32],revealed as much as 57% have introduced better products, and 49% for new products.In addition, as much as 72% introduces better processes than before, and 46% for new processes. Specifically, product innovation is influenced by the quality of human resources, the geographic context, and the age of the company. In contrast, process innovation tends to be related to

financial structure, capital intensity and firm size [31].

Product Innovation

Product innovation can be defined as the creation of new products from new materials or changes in existing products to fulfill customer satisfaction [81]. Products in this sense are defined as goods and services. Introduction of new products or services aims to create new markets or new customers, or to meet the needs of existing markets or customers [82][83] .Table 3 shows that the majority of food industries are applying product innovations. Product and services have a growing trend, yet it is anticipated by producing new products to fulfill consumer desires. Product innovation offers potential protection on the companies against market and competitor threats [84].

There are three important factors for product innovation in the food industry, namely: (i) market research, (ii) technology, and (iii) strategy [44]. In the food industry currently, product innovation has played an important role in fulfilling the changes in demand patterns, which oriented towards product quality attributes including healthy food, sensory characteristic, convenience feature, and new format attributes for traditional and specialized products and simultaneously, process and organizational innovations allow companies to improve the efficiency and reduce production costs so as to improve the organizational competitive performance [64]. Product innovation has a positive and significant relationship with organizational performance [85][86].

A very important part of a product is packaging. Product innovation involves the changes in product characteristics, packaging, and combinations of newly packaged products [60]. Packaging is what fulfills consumers' vision and strongly influencestheirdecision to purchase the product. In food products, packaging is very strategic and as if it can describe the real content of the product. Packaging can be considered as an integral part of the product and is the first point of contact between brand products and consumers [87]. The packaging function in the food retailing sector can be summarized into three points, namely (i) logistics: protecting, distributing and providing information,(ii) marketing: graphic design and format, legislative and marketing demands, consumers/convenience needs, and (iii) environment: recovery/recycling, dematerialization, one direction vsreusable, toxicity [88].

A research conducted by Avermaeteet al.[33], revealed that about 80% of companies introduce at least one type of product or process innovations over the past five years. The results illustrated the frequency of products and process innovations in small and medium-scale food companies. Out of 148 innovative companies, 100 companies introduce product and process innovations, while 10 companies only introduce process innovation and 38 companies only introduce product innovation. Process and product innovations work together, and are seen as critical success factors in the food processing industry [89].

There are three important factors for product innovation in the food industry namely market research, technology, and strategy and interconnected with each other, while critical factors that determine the success of product innovation in the food industry are: market research, technology, and strategy [44]. The level of technological autonomy is at a high level, thus the greater the opportunity for the food & drink industry to innovate products [59].

The current trend is that consumers see packaging as part of a larger integrated system that involves multiple actors in the supply chain, in which one of the major factors hampering manufacturing and productivity efficiency is the strategic task and function [90]. The food industry is the end user of the global packaging industry, thus packaging serves as an integral part of the product, where people in the region are enabled to enjoy good and healthy food due to the packaging excellence [87].

Packaging can affect majority of the variables in the marketing mix and increase customer value or lower costs, due to: packaging design, ensuring security, offering the possibility of price differentiation, reducing transportation and storage costs, contributing to innovation with new solutions, increasing convenience, and supporting the promotion of other products [87]. In accordance with packaging strategic role, it can be concludes that products and packaging need to be developed simultaneously, where packaging researchers suggest that in order to create higher value for consumers, process innovations for products and packaging must be integrated and not only focus on product functionality [10].

Khan et al. [37],found that food manufacturing industry in Singapore needs to implement a new product development (NPD) process that mayfulfill the need for unsustainable product innovation which furtherensures higher returns on investment while providing excellence in the global food market. SMEs' food and beverage industry in Malaysia focuses more on product, process, and marketing innovations compared to organizational innovation [42].

Process Innovation

The introduction of new devices, methods, tools or knowledge is necessary to produce a product or service [30]. Process innovation is not only related to technical matters such as production processes in factories, but also includes business operational processes. Innovation is the process of reengineering and improving the internal operations of business processes, where this process involves many aspects

of corporate functions, including technical design, engineering improvement and development of processes or systems, research and development, manufacturing, management and commercial activities [91][92]. In the manufacturing industry, production process has the distinctivecharacteristics compared to non-manufacturing industry.In the manufacturing industry, process innovation should be emphasized by the company as its distinctive competence for competitive advantage, where process innovation includes new techniques, tools, devices and knowledge in products manufacturing [81][83][93].

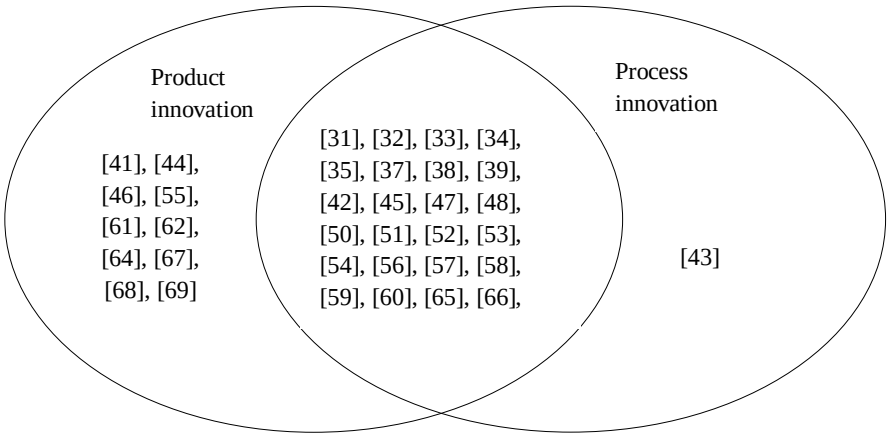

Fig. 2.Illustration of Product and Process Innovations

Figure 2 shows that there is a similarity in the implementation of product and process innovations in the food industry, in which almost all industries that perform the process innovation also tend to perform the product innovation simultaneously. This tendency is caused by its influence on the improvement of company performance. There is a positive and significant influence of product and process innovation on company performance [18][94]. The company that carries outproduct and process innovationssimultaneously obtains better profit compared to the company which only carries out process innovation or product innovation alone [95].

Process innovation may facilitate product innovation leading to successful product differentiation and enhance leadership positions [45]. An innovation in performance matrix may show the balance between the selected innovation strategy and the expected performance, in which the matrix of relationships with the process model allows managers to focus on a particular corporate process where improvements should be made [48]. As example, cocoaprocessing into cocoa butter, cocoa paste, and confectionery is an important component of the value chain by performing 50% of the cocoa processing before it is exported, in this sense there are technological developments that allow research & development, as well as sustainable innovation in Ghana and cocoa producers in the world [61].

Market Innovation

Market innovation is the implementation of new marketing methods that involve significant changes in product or packaging design, product promotion or pricing [36]. Marketing activity is strongly related to the expansion of market share through the creation of new market segments aimed at increasing sales, and alsorelated to the performance of the company. Market innovation has distinctcharacteristics such us increasing levels of customer satisfaction, creating more profitable new markets for companies to increase sales [11]. Market innovation will increase sales through increased demand for products in turn generates additional profits for the company and has a very positive effect on business performance [96][97][98]. Market innovation plays an important role in fulfilling market needs and responding to market opportunities, in which market innovation should be directed to fulfill consumer demand and satisfaction [99][100].

A research conducted by Khan et al. [37],revealed that of the 90 food industries studied in New Zealand, 31% performed market orientedinnovation, 29% performed product oriented innovation, 23% performed process oriented innovation, and 17% performed organizational oriented innovation. This indicates that,regardless of the type of innovation performed, the food industry generally operates on the basis of the resources and capabilities contained. There are significant positive effects as a result of innovation, especially for new products, new operational processes, new managerial processes, new markets, and new resource supplies [51]. The Europeandairy industry has identified overall innovations including: 44% product innovation, 9% process innonation, 26% market innovation, 19% organizational innovation and 2% new source of materials [53]. Food retailers have a specific role in determining the success of innovation in food industry [55]. Research findings of Grunert

and Baadsgaard[56], showed the interaction between consumer and producer criteria in product development and an assessment of long-term developments in the market environment, as well as the role of distribution systems in product innovation.There is a positive correlation between marketing capability and corporate innovation, where good marketing skills will result in high rates of adoption of innovative behaviors, such as product improvement and new market searches [64]. Interdependent conditions among partners throughout the supply chainwill occur, thus it is important to understand innovation in agricultural industry sector [65].Fortuinet al. [67], identified product excellences and cooperation with supply chain partners as the most important success factors for innovation.

Organizational Innovation

Organizations have an important and strategic role in managing all their resources for enhancing competitiveness that allows companies to survive and develop in the midst of intense business competition. Organizational innovations involve creating or changing business practices, workplace, or external relationships [36]. The successful implementation of other types of innovations such as product innovation, process innovation and market innovation is also determined by the organizationalcapability to analyze and manage. Innovation needs to be widespread and includes all the components that exist within an organization. Innovation should also cover the entire organization and not onlybe submitted to research and development experts [3]. The competitiveness of an organization depends on its ability to continuously adapt to new environments, developing new products, and creating innovative ideas [101].

The organizational capability of small and medium-scale enterprises(SMEs) determines its success in applying innovation. Organizational structures are essential to support innovation in small and medium-scaleenterprises [102]. Small and medium-scale enterprises are theoretically easier in applying innovation. Small and medium-scale enterprises are considered to have greater flexibility, lack of bureaucracy, less rigidity in decision making, and can respond more quickly to new opportunities and threats [103]. In terms of innovation characteristics, SMEs agrees that they are usually committed to influenceinnovation orientation factors, yet the very important is the commitment to encourage new ideas and empower employees to be more innovative [34].

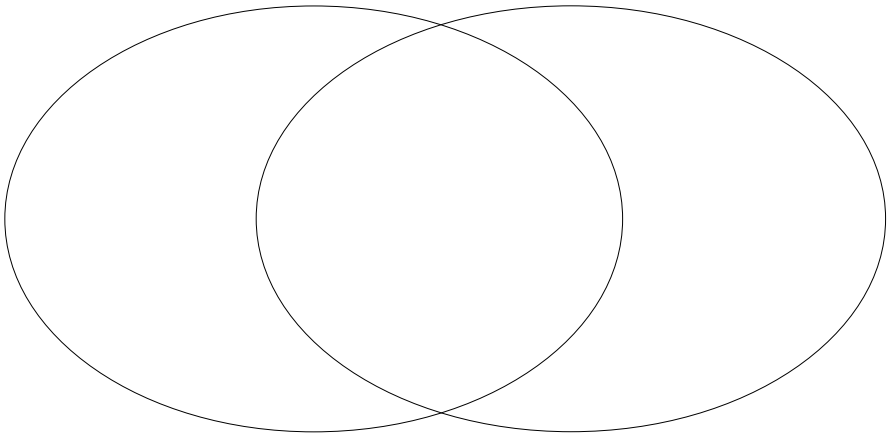

Fig.3. Illustration of market and organizational innovations

Organizational innovation is identified as a business model due to inherent technological factors in the food industry, there is a strong link between products, processes and market innovations, also there is a collaboration between competitors encouraging SMEs to be involved in marketing, process and business model innovations, on the contrary synergy with suppliers and customers support product innovation [39]. The innovation system approach emphasizes the collective dimension of innovation that leads to the need to influence the interaction and interaction between many actors, and successful innovation resulted from the alignment of technical, social, institutional and organizational dimensions [40]. Subsequently, Oliveira &Natárioresearch [50] identified a substantial set of deficits that hamper institutional innovation and the formulation of proposals for better governance of territories that highlight the need to strengthen knowledge transfer to micro and small enterprises involved in agricultural activities.

Soltani&Hosseini [36] found that organizational innovation for SMEs food industry in Iran is still weak, where product and process innovation will only work if organizational innovation is good and more likely to radical innovattion. Government as regulator also has a role in exploring the new value of an organization.

Increased corporate innovation activities are influenced by collaboration between companies and governments [43]. The novelty of innovation projects to companies, communication capabilities and market potential, has a negative impact on the performance of innovation project in the food & beverage industries rather than technology-based industries where upstream functional capabilities are particularly important to increase the likelihood of food & beverage success, with innovation projects in technology-based industries [47].

In order to achieve success in innovation, organizational change is needed, where strong industry conventions and inappropriate organizational conditions can be a barrier to organizational change, thusorganizational capability to change routines has a significant effect on the outcomes of innovation processes [63]. In addition,Efstathiadeset al.[70],demonstrated the impact of innovative activities on organizational performance. The innovative typology of food industry is still polemic, especially regarding which type should take priority whether innovation in products, processes, market, or organization. Moreover, research findings of [36] onSMEsfood industry concluded that emphasis should be done in organizational innovation. The competitiveness of an organization depends primarily on its ability to adapt with new changes in its environment, where process and product innovation for productivity improvement can only be achieved if accompanied by organizational innovation [36].

Ulvenbladet al. [49],studied business model more comprehensively by integrating lean concepts and innovations where self-leadership and lean innovation are proposed to be two important parts of the framework for improving business model innovation. Product innovation includes (a) good, (b) service, (c) idea; process innovation includes (a) technology, (b) infrastructure; market innovation includes aspects of (a) exploitation of territorial areas, (b) penetration of market segments; and organizational innovation consist of (a) marketing, (b) purchasing and sales, (c) administration, (d) management, (e) staff policy[52]. Meanwhile,Gellynck&Kühne[60] studied traditional food industry sector, where product and marketing innovations are implemented in the three countries studied, that are Hungary, Italy & Belgium, in which process innovation is applied in Italy and Belgium, while organizational innovation is applied in Hungary and Belgium.

Innovations in the food industry sector, particularlysmall and medium-sized enterprises (SMEs), tend to implement incremental innovation. Most innovations in the food industry are incremental rather than radical[66][79]. The prevalence of incremental innovations is related to the constraints of consumer demand and conservative behavior [31]. Furthermore, aresearch conducted by Lin & Chen[104], through an empirical study on SMEs in Taiwan found that about 80% of the surveyed firms made innovations, of which 53.5% had applied both incremental and radical levels of innovation, while 21.2 % only made a gradual innovation, and 5.1% only made radical innovation. Manufacturers recognize the importance of producing more unique and different product from existing products in the market, yet they are also very aware that any product can be imitated easily. In general, innovation goes incrementally, while radical innovation is usually rare[35].In addition, a study conducted by Siriwongwilaichat& Winger [46],confirmed that food industry innovations are generally incremental in which Thai food companies focus on imitating existing products in the market, while multinational companies focus on introducing innovative products.Sources and innovative drivers generally come from: suppliers, competitors, employees, governments, research institutes and customers [62].

V. CONCLUSION

Innovation typology can be seen from two aspects, namely technical aspects (product and process innovation) and non-technical aspects (market and organizational innovation). The implementation of innovation based on typology and level aspects has different characteristics compared to manufacturing or service industry in general. Innovation in the food sector is usually incremental rather than radical, which largely consists of improving or producing new product variations from existing products [27][74]. Manufacturers recognize the importance of producing more unique and different products, yet they are also well aware that at present, any product will be very easy to imitate [35]. The very high complexity of the food industry is one of the causes of the low level of research and development implementation. This reinforces the research findings Alfrancaet al. [25],Capitanioet al. [31],which stated that the food agriculture system is an industrial sector with research and development classified to the low category.The challenge of prospective innovation for the food industry is that company employs fewer workers with higher education compared to other industries [57]. Elements of differentiation for young consumers are more concerned with the image and packaging of products, brands and prices, in which all elementsare considered as a symbol of quality and social status. These factors are worth considered when designing marketing strategies in order to increase millennial consumer consumption [69]. Consumers of millennial generation associate new products, particularlyfor foods without preservatives and pasteurization, also reduction of unfavorable ingredients for health [68].

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