

The Efficiency of Elderly Community Product Using Digital Marketing through Unfolding of Practice during COVID19 Pandemic

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Abstract. The development of the trade sector of elderly community enterprise in Thailand during the COVID-19 pandemic triggers the need to study the processes of formation and evaluation of digital marketing through the unfolding of local practice. This research has developed the Digital Marketing for Elderly Community Enterprises (DMeCE) model to increase online trade capability and customer relationship management for elderly entrepreneurs who do not have sufficient digital skills in Thailand community enterprises. DMeCE model includes social media CRM, storytelling for branding, gamification CRM, augmented reality for branding using the hybrid marker QR code, and Thai ontology Thai chatbot services for both customers and elderly entrepreneurs via the voice command function. The evaluation results based on the classification of the model performance measurement indicated that the developed model could help the elderly entrepreneurs reach the infrastructure, process, customers, and organizational performance. Furthermore, it was found that both the effectiveness and satisfaction of the developed DMeCE model were rated at the highest level. Moreover, it provided an accuracy rate of more than 98%, giving the elderly community enterprises more income-making opportunities.

Keywords: Augmented reality, chatbot, community enterprise, digital marketing, customer relationship management, elderly, gamification, social media, storytelling

1. Introduction

Every country has stepped into a society of the elderly, including Thailand, one country with an aging society. Experts estimated that there would be 14.4 million older people living in Thailand by 2025 (Office, 2017). This elderly population is believed to have considerable value in terms of wisdom and past experiences. Since this group of people may continue to contribute the society, it is necessary to encourage them to generate revenues towards activities that can benefit them mentally and physically. To clarify, elderly people should be equipped with the ability to do business or earn incomes by themselves rather than depending on a pension or provident fund to maintain their self-esteem and mitigate the risks of loneliness and depression. The majority of professions available for older people in Thailand are related to agriculture. Apart from using their knowledge and skills in plantations, many of them generally sell their agricultural products in their communities or sell them as local products to generate the community's revenues. During the Coronavirus disease-19 (COVID-19) crisis, it can be seen that the lifestyle of people has changed due to the social distancing policy of the Thai government. Thai people are not allowed to commute and buy products at shops frequently. Instead, they buy products for personal use and relatives and donate to the poor or medical personnel. Therefore, ordering goods via online channels has become a popular alternative. Further, digital technologies have facilitated humanity to cope with the current situation in a favorable manner by selling and delivering products directly to the consumers. (Elavarasan and Pugazhendhi, 2020). Regarding the customer behavior of Thai people, in 2020, the value of the internet economy in this region reached over 100 billion USD for the first time (Google et al., 2020).

There were 47 million internet users in Thailand in 2019, showing an increase of 11 million. The majority of the users employed the internet for communication, shopping, entertainment, ordering food online, traveling, learning, and training new skills. Thailand was ranked first in terms of internet usage on mobile since Thai people spent five hours and thirteen minutes per day, whereas the worldwide average was three hours and thirteen minutes per day. Subsequently, online shopping is all-time happening, and the government has encouraged public spending to go to community products that can be tax-deductible. Nonetheless, a significant concern is that local entrepreneurs may not have adequate internet technology knowledge to promote their marketing and sell their items. Today, the fast growth in internet technology as well as smartphone technology has brought about the transition of community trading approaches from traditional methods to online trading. This offers opportunities for older people to sell their local products. The government has supported online trading. Thailand Post Company and other logistics companies also provide direct delivery services to elderly entrepreneurs in many communities. This signifies a promising future in Thailand's delivery system. However, the local products of many elderly community enterprises have not been well-known yet due

to the lack of appropriate guidelines for digital marketing in this era.

2. Literature Review

Many works or studies involve using digital technology to promote value creation, brand concept presentation, and increase the target market. In addition, the new technologies were considered to customer identity and engagement in information about the market production process and branding (Bilton, 2014). Social networking sites mainly play a role as a medium and part in keeping customers experienced and engaged (Dissanayake et al., 2019). In particular, social media activities involving customers engagement can help businesses gain many benefits and advantages (Siriwardana, 2020). It could be said that customer engagement on social media has a positive effect on overall business related to satisfaction, trust, and brand loyalty (Schwarz & Newman 2017). Therefore, business sectors should develop digital strategies to increase customer engagement (Rassool & Dissanayake, 2019).

Storytelling is a connection of branding to customers both consciously and unconsciously thinking. (Woodside et al., 2008). It affects the engagement, intent, and behavior of customers (Pera & Viglia, 2016). People are involved in modernizing storytelling that is unique and personalized (DeCou, 2017). So it is good to know that people need brand interaction more humanly and realistically (Newman, 2015). When customers think about a brand, they memorize the story (Lundqvist et al., 2012; Pace, 2008). Thus, storytelling is a more robust and content-rich tool of communication (Chiu et al., 2012; Mattila, 2000). It helps create communication, better perception, and decision-making regarding psychologies, social, and marketing (Chiu et al., 2012; Pera, 2017). Storytelling is therefore essential to brand building. It also helps communicate information about the business to consumers (Herskovitz & Crystal, 2010).

Augmented Reality (AR) is a technology that helps create new experiences for consumers. It empowers consumer creativity and helps consumers become more engaged (Alexander et al., 2020) and interact with brands (Kyung et al., 2020). AR can also encourage customer awareness and help improve the brand identity (Daria et al., 2021). Further, AR helps to induce customers to experience positively before deciding to purchase products and services. It could be said that AR is another technology that influences consumer confidence in purchasing products.

Incorporating gaming technology into business is a great strategy to increase customer engagement. As a result, it is becoming more and more popular day by day. Gamification is a game technology-based approach that attracts customers to online community activities and increases brand value (Mohamad et al., 2021). More studies indicate that gamification is important to motivation-related customer engagement, behavioral manifestations of success, and collecting rewards from participating in-game activities (Harwood and Garry, 2015; Robson et al., 2015; Seixas et al., 2016). In addition, gamification helps improve consumer sentiment and intent by increasing

engagement in the social interaction from using the application (Rodrigues, Oliveira and Costa, 2016), which is good for the organization and business (Mamoona & Mudiarasan, 2017). Furthermore, some studies found that gamification can change customer behavior while enlarging customer engagement if appropriately implemented (Dexter and Yazdanifard, 2015; Robson et al., 2015).

The adoption of Artificial Intelligence (AI) technology in the market will increase the number of target customers for the digital era (Campbell et al. 2020). As a result, it also increases the number of orders (Campbell et al. 2020; Bag et al. 2021) and helps find real customers on the correct occasion (Ransbotham, et al. 2017). Thus, the chatbot is an AI-based software technology used to help respond and answer customer inquiries easily with real-time conversations or live chat as natural language (Chopra, 2020), including simple interaction for customer engagement. It makes customers in the digital marketing era hope to gain new experiences using chatbot services or applications (Keiningham et al. 2017). The chatbot reinforces customer belief in using AI in digital marketing with human-generated data. It helps enhance in-depth customer experience positively (Rabby et al., 2021) and help create greater customer satisfaction with digital technology in marketing (Ransbotham et al. 2017).

According to research studies, there is no integration of digital technology to help market to local community enterprises of elderly. Thus, this goal of this study is to apply the new digital strategy for marketing as a new channel for marketing, selling products, and building relationships with Thai customers to elderly entrepreneurs in local communities both. in typical situations and under social distancing circumstances in Thailand during the new normal era of COVID-19. The developed model uses for the application to Thai local community enterprises where the elderly's business exists. Thus, this study applies diverse kinds of technologies such as social media, Augmented Reality (AR), storytelling, ontology chatbot, and gamification to present the model as a new way to promoting marketing and trading of local products. The model is formulated in Thai language for the domestic market. This digital technology will support older people to profit from community products and prove that local products of the elderly can enter the digital marketing through the new digital strategy.

3. Methodology

3.1. Data Collection

This research collects data related to problems and requirements in applying digital technology in promoting the marketing and branding of local products made by elderly entrepreneurs. There are three groups of samples, including 1) Ten experts in the field of business information technology and digital business, 2) Thirty-three elderly entrepreneurs in local community enterprises, and 3) One hundred and fifty-seven typical customers who had purchased products via online channels over ninety days. The sample customers registered the project on Facebook (with a link to Google

Forms). Then, there were 3-hours focus group discussions organized via the Google Meet application. In this study, all research participants were given documents explaining the protocols and research ethics and requesting their consent to participate. Therefore, this research can be summary of the five problems related to selling of local products made by elderly community enterprises are list P1 (Place): the lack of local product introduction to social media which are the leading platforms where customers look for information, share opinions, and establish the community, P2 (Product): the lack of digital content which represents the value of local products made by elderly entrepreneurs which can attract typical customers, P3 (Branding): the lack of communication which can raise brand awareness, P4 (People): the lack of digital skills required for marketing among elderly entrepreneurs and P5 (Time): the inconsistency between the sellers and buyers' trading time.

3.2. Design of Model

In this Section, the Digital Marketing for Elderly Community Enterprises (DMeCE) model is designed based on the consistency of the contents assessed by ten experts in business information technology and digital business. The result was used for determining the content validity index (CVI) and the item content validity index (I-CVI) in order to analyze the content validity of each feature in the model and to find the content validity for scale (S-CVI) in order to evaluate then the appropriateness of the features (Lynn, 1986). S-CVI/Ave esteem is the average extent determined by taking the entirety of the I-CVI of the highlights and afterward dividing it by all of the questions. For the CVI, just the things evaluated 3 or 4 by the specialists were considered content validity. Therefore, the genuine estimation was dichotomous by which 1 or 2 demonstrated inconsistency, and 3 or 4 showed consistency (Polit and Beck, 2006) as defined underneath.

$$I-CVI = \frac{N_c}{N} \quad (1)$$

Where:

I-CVI indicates the content validity index by features;

N_c indicates the number of experts who rated at 3 and 4 level;

N indicates the total number of experts.

$$S-CVI/Ave = \frac{\sum I-CVI}{P} \quad (2)$$

Where:

S-CVI/Ave indicates the average content validity index of the entire application;

I-CVI indicates the total value of the content validity index by features;

P indicates the total number of features.

This research applies CVI to evaluate the prototype with a 4-level rating scale. Score 3 or 4 refers to accepted, and score 1 or 2 refers to rejected. This means there are two types of results that are accepted and rejected in order to reduce the bias of

the evaluation results as well as the influence of unrelated- to-decision making value such as the index of Item-Objective Congruence (IOC) (Rovinelli and Hambleton, 1977; Lynn, 1986) when there are three levels of a rating scale as -1, 0, and 1 (by which 0 and -1 refer to rejection).

The features of the DMeCE model were evaluated by ten experts in the area of business information technology or digital business. The I-CVI was employed in the evaluation to determine scores. The evaluation results of the I-CVI and S-CVI/Ave were 0.92 and 0.83, respectively. An I-CVI of 0.8 refers to a good level of content validity (Shi et al., 2012). Therefore, an excellent level of content validity should be defined by S-CVI/Ave of 0.8 or higher when there are six or more experts (Grant and Davis, 1997; Polit and Beck, 2004; Waltz et al., 2017). It represents that the number of experts answering the questionnaire under the objective shall take up higher than 80% of the total population (Rovinelli and Hambleton, 1977), which indicates that the features of the prototype conform to the objectives and possess the contents appropriate for the application; ultimately, it means the components function effectively.

All features on the DMeCE model are displayed in Figure 1. It shows the feature diagram also illustrates the data inputs and outputs, showing the whole process of the DMeCE model. The system framework of the DMeCE model is shown in Figure 2.

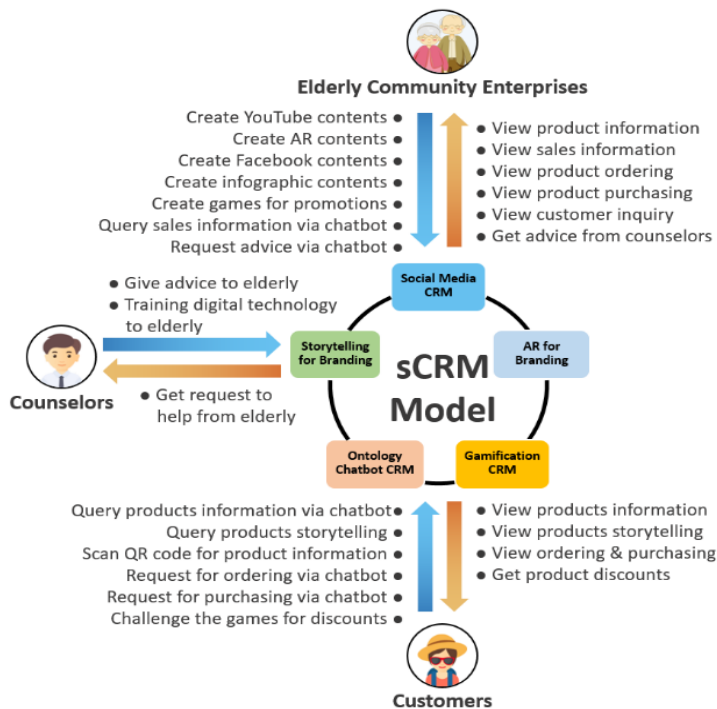


Fig. 1: The diagram of all features of the DMeCE model for elderly community

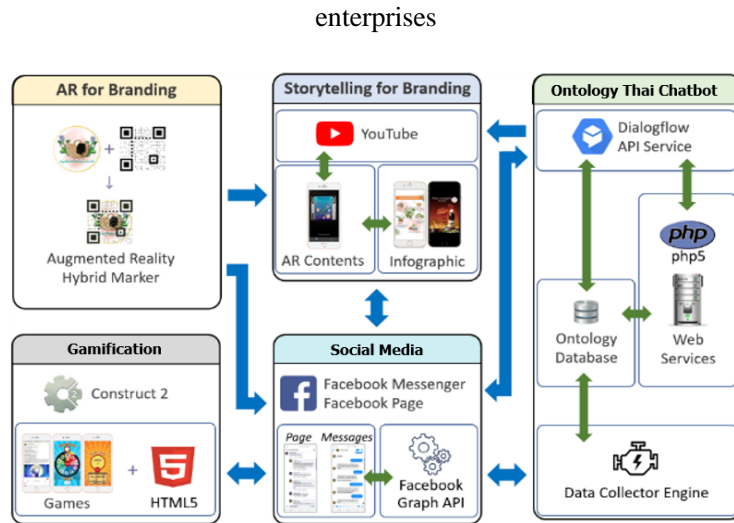


Fig. 2: The system framework of the DMeCE model for elderly community enterprises

3.3. Development of DMeCE through the unfolding of local practice

3.3.1. Creating partnerships and creating consultants to build confidence for the elderly towards digital marketing

In this study, counseling with experts was offered to support the practice of digital technology application for trading and marketing. The excellent connection with peers from the younger generations who are skillful in digital technology can boost elderly entrepreneurs' confidence, reduce the age gap and loneliness, and create bonds between the two groups. Moreover, university students could also use to chance to do an internship in an actual situation. Therefore, this research offers two hundred and thirty-one volunteers who are students in the field of information technology at Suan Sunandha Rajabhat University to participate in this program. The program was conducted offline and online for ninety days. These students had passed the Digital Marketing course. They were asked to work as team supporters of thirty-three elderly entrepreneurs in the local community enterprises throughout this work. The communication between the elders and the students was made towards social networks on smartphones, such as video calling on Facebook, online meetings, and onsite support or training. The elderly entrepreneurs would be helped to create one. This presents their product information, images, entrepreneur's information, videos, and contact information such as maps and address pins. The contents were updated daily. They were created by a free-of-charge photo editor program available in all smartphones, saving money and reducing complexity. The product presentation process on a Facebook Page is typical, as illustrated in Figure 3.

3.3.2. Development of Storytelling for Branding

Most elderly entrepreneurs did not have sufficient skills to develop product content to attract their target market. Nonetheless, the local products made by elderly entrepreneurs tended to have exciting stories and unique identities embedded (for instance, ancient recipes inherited from their ancestors, medicinal food, local materials, and ingredients, or environmental-friendly qualities). They could become a competitive advantage for elderly entrepreneurs because of the price that matters and the quality and story of the products.

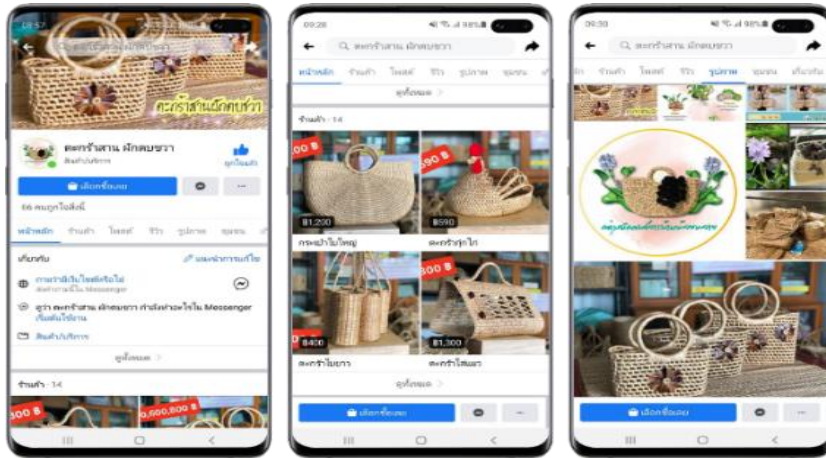


Fig. 3: The Facebook Page of the local products made by elderly entrepreneurs

This study, therefore, applied the three-act structure storytelling technique which consists of three stages. First, Act I: Setup, this stage introduces characters, their story world, and some kinds of stimulating incidents or a conflict that leads to the second act. Second, Act II: Confrontation or building, this stage refers to the middle part of the story which excites the audience to keep watching. It is the main part of the story that usually brings about the possible scenario to the characters. Finally, Act III: Resolution or payoff, the end usually leads to some kind of catharsis or resolution, whether it is a happy or sad ending (Trottier, 2019). The whole process was operated to tell the local folktales by using infographics. The application of storytelling towards one single colorful image could be noticed, apprehended, and used for impressing the audience at a glance. It is easier than interpreting texts and more suitable for today's people who are not interested in reading. Additionally, a short video presentation could animate the story of the local products from scene to scene with extra sounds, subtitles, and effects to create impacts and add value to the products shown in Figure 4. The main components in the video were the products themselves and brand logos. This kind of video was published on both Facebook and YouTube. In 2020, YouTube had become another popular online platform with top

user engagement in Thailand (Google et al., 2020).

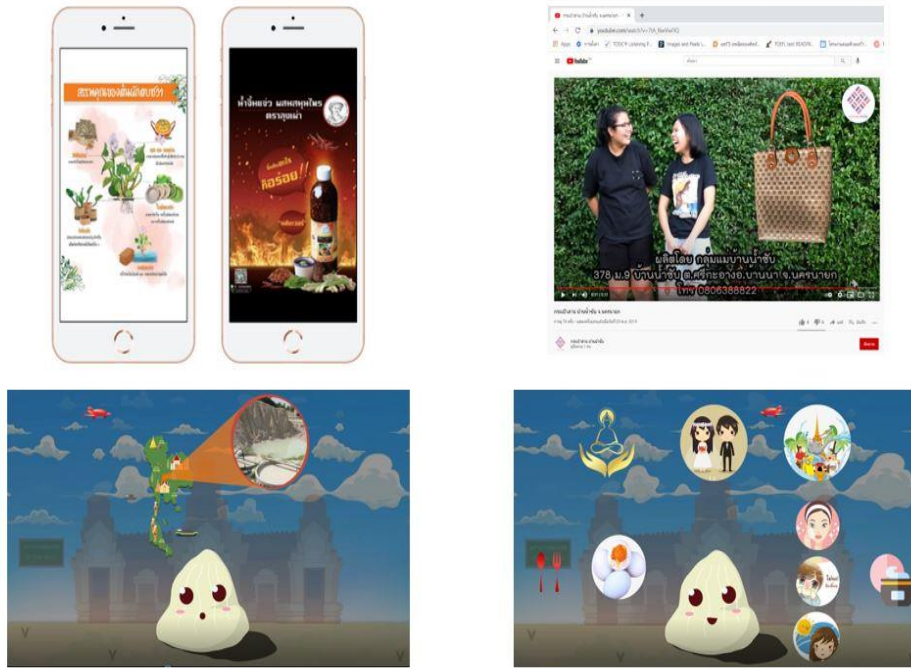


Fig. 4: Infographics and YouTube videos of the local products made by elderly entrepreneurs

3.3.3. Development of Augmented Reality for Branding Using Hybrid Marker with Pictorial Quick Response Code

This research focuses on applying QR codes overlaying on existing local brand logos for quick scanning. This method is the overlapping mode; this mode was employed to invert both pixel colors overlapping between QR codes and pictorial brand logos. The creation of these hybrid markers consisted of three stages. In the first stage, both images were overlapped in two layers, the same as the initial step in opacity layer mode. Then, in the second stage, the pixels were identified, crossing over a pixel color and another pixel color that were similar or close to each other; this process is called pixel overlapping. Finally, at the last stage, all of the overlapped pixels were inverted into different colors, such as white color, the primary color in a pictorial brand logo, and a darker color. Second, the opacity layer mode was employed to drop the opacity value on both QR codes and pictorial brand logos. This function was a meaningful way to display both layouts of QR codes and pictorial local brand logos. The researcher set the opacity value range between 45% and 75% for the experiment, while the suitable opacity values ranged between 50% and 60%. Hence, the default opacity value was set at 55%, but the users could still adjust it by themselves. For pictorial brand logos in grayscale or black and white pictures, users could select the

primary color and combine or overlay the QR codes on the pictorial brand logos directly in this work called AR hybrid marker. An example of the combination of a QR code and a local brand logo is demonstrated in Figure 5.

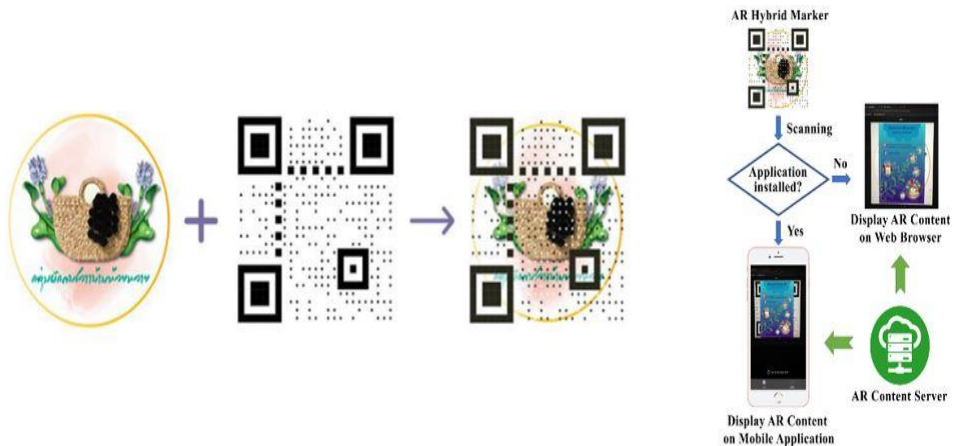


Fig. 5: AR hybrid marker of the local products in the elderly community enterprises.

3.3.4. Development of the Ontology Thai Chatbot

Most local entrepreneurs were older people who lacked knowledge and skills in digital technology for marketing and trading, struggled with health problems such as poor eyesight, slow speech, and had different time management patterns when compared to the consumers. To clarify, older people in the countryside tended to work during midday while most consumers were working people who were usually free to make inquiries in the evening. Therefore, the slow response problem often occurred.

This research thus applied the ontology technique combined with the chatbot services on Facebook to create an automatic response system in Thai language for the elderly entrepreneurs. This means the consumers can immediately order a product towards the services linked with the chatbot services without suppliers' presence. The study also presented fundamental knowledge to formulate Thai vocabulary patterns for product inquiry, ordering, and purchasing based on the ontology approach. It helps the customers find information by using Thai words in questions and answers. The forms of automatic answers included texts, pictures, videos, stickers, and links to websites or other kinds of social networks.

This study employed data and information related to frequent conversations between Thai customers and entrepreneurs on Facebook Pages and Facebook Messenger to formulate 5,700 sentence patterns. The data were collected by a data collector engine created in this study as a service on a PHP-based web services platform that could connect with Facebook Graph API and messaging permissions. Furthermore, the system architecture diagram of this process is demonstrated in Figure 6 (A). The texts were classified into nouns, pronouns, verbs, prepositions,

conjunctions, adjectives, numbers, currencies, and multimedia objects (images or stickers). The chatbot service was available for both consumers and suppliers 24/7. This process consists of five steps, as follows: 1) data collection and preprocess: Thai conversations were collected in the form of documents towards a data collector engine which developed on a web services platform to collect, cleanse, transform, and improve data to be suitable for further analysis, 2) word segmentation process: each word or number at this stage was classified by the longest matching method, 3) keyword extraction process: both keywords from users' inquiries and suppliers' response messages were extracted from the documents, 4) keyword grouping process: all keywords were classified. And 5) named entity recognition process: entity extraction categorized named entities that were present as keywords into meaningful classes to match questions and answers in various forms, including texts, images, hyperlinks, and multimedia, as illustrated in Figure 6.

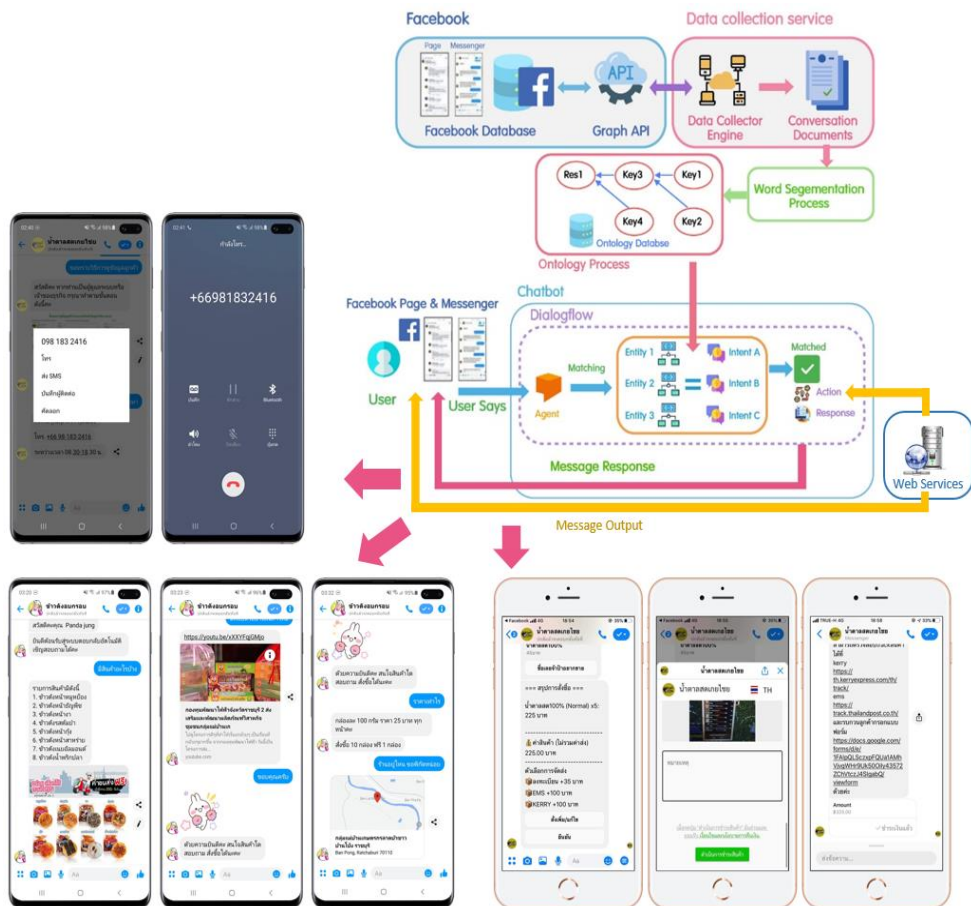


Fig. 6: Ontology Thai chatbot framework and message response to the customers.

Term Frequency-Inverse Document Frequency (TF-IDF) was utilized to calculate the weight of a word in each set of documents (W_{ij}) regarding the frequency of term appearance in documents. The TF-IDF formulas are illustrated in (3) and (4) (Wu et al., 2008).

$$W_{ij} = TF_{ij} \times IDF_i \quad (3)$$

$$IDF_i = \log \frac{|N|}{DF_i} \quad (4)$$

Where:

TF_{ij} refers to the frequency of i in j

DF_i refers to the number of documents containing i ;

N refers to the total number of documents.

Additionally, this research developed the back-end services for local businesses towards utilizing a Thai ontology chatbot on Facebook. There were three significant steps of the development process: ontology structure creation, back-end web services, and chatbot output mapping. In terms of sales and revenue inspection, the users who were elderly entrepreneurs could use the voice command function or type a message to check the information and details about their customers. The data was stored in files on the cloud system, easily checked with a voice command or text message. Passcodes were available for protecting the data from other users. Moreover, the files could be conveniently delivered to the customers or double-checked with the suppliers' bank accounts.

Regarding the first phase, ontology structure creation, the researcher collected eight hundred and fifty Thai entrepreneur's conversations for further application to back-end services in the following areas: quantity of product sales, shipping status, and the number of daily sales. These sets of data were processed for Thai word segmentation towards the use of the longest matching technique. Next, the keywords and technical terms were extracted from user inquiries for back-end services. All keywords and technical terms were stored in the ontology database. Second, back-end web services, this stage provided the information that responded back to users or entrepreneurs who asked for the data in back-end services towards the chatbot. All information about the back-end processing was formulated into a formal query or a uniform resource locator (URL) of web services. These web services were operated in Hypertext Preprocessor (PHP) language version 7.3.10 and run on Apache web server version 2.4.41. The outcomes of the back-end services could be displayed in various forms, for example, the number of product sales, graphics or images, excel files, hyperlinks, or even web pages. The final stage of this process is chatbot output mapping for the communication between users and web services results. Dialogflow was operated to administer the ontology of dialogue from the suppliers and the action responses from back-end web services. Dialogflow mapped the ontology structure as an entity for delivering the action message responded back to the users. The outcomes

were later displayed on the screen when the suppliers typed their inquiries on Facebook Messenger. This system framework diagram is shown in Figure 6 (B). If the elderly users had any queries or forgot how to use the program, they could use the voice commands or text messages to contact the volunteer students who were their counselors.

3.3.5. Development of the Gamification

This research thus applied gamification to promoting the buyers were to be familiar with the products in a short period and received discount vouchers or giveaways in exchange. This encouraged the customers to memorize the products they encountered in the activities, resulting in increased brand awareness. Each game was developed by employing Construct 2 (Scirra, 2019), a software developed by Scirra Limited for game creators based on Hypertext Markup Language version 5 (HTML5). The game style was designed mainly for two-dimensional games. The key features of Construct 2 are its coding flexibility and the ability to be played on all devices which support HTML5. The game style are illustrated in Figure 7.

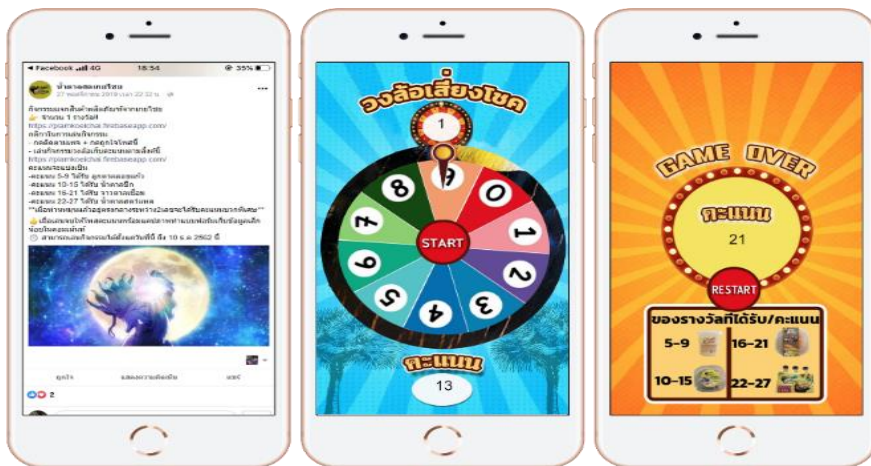


Fig. 7: Games for local products made by elderly entrepreneurs

4. Results

In terms of the accuracy of the developed DMeCE model, the following components, including social media, storytelling for branding, AR for branding, ontology chatbot, and gamification, had an accuracy rate of more than 98%. The developed DMeCE model, then, could solve the five problems mentioned in the previous. First, social media could solve the P1 problem. Second, storytelling for branding could solve the P2 and P3 problems. Third, AR for branding could solve the P3 problem. Fourth, an ontology chatbot could solve the P4 and P5 problems. Finally, gamification could solve the P3 problem. These results are illustrated in Table 1.

Table 1: The effectiveness evaluation result of DMeCE model against five problems

DMeCE model	DMeCE model	Accuracy (%)	Sensitivity (%)	Specificity (%)	Resolve the Problem
SMC	38,940	98.79	98.82	91.23	P1
STB	12,990	98.46	98.55	94.55	P2, P3
ARB	6,270	96.81	96.84	96.39	P3
OCC	47,952	98.34	98.37	93.24	P4, P5
GMC	12,140	98.19	98.27	94.46	P3

The evaluation results of the effectiveness of the developed DMeCE model for elderly community enterprises were given by ten experts in business information technology and digital business, as described below.

Infrastructure: the development of social media and the ontology chatbot could help the local products made by elderly entrepreneurs to reach the business performance measure criteria in all aspects. Storytelling for branding could help them reach the business performance measure criteria in terms of online brand communities. AR for branding could help them reach the business performance measure criteria in terms of social media monitoring. Gamification could help them reach the business performance measure criteria in terms of online brand communities.

Process: the development of social media and ontology chatbot could help the local products made by elderly entrepreneurs to reach the business performance measure criteria in all aspects. Storytelling for branding and gamification could help them reach the business performance measure criteria in customer interaction and market and customer segmentation. AR for branding could help them reach the business performance measure criteria in the field of customer interaction.

Customer: the development of an ontology chatbot could help the local products made by elderly entrepreneurs to reach the business performance measure criteria in all aspects. Social media could help them reach the business performance measure criteria in the area of customer-based relationship performance and customer loyalty, while storytelling for branding, AR for branding, and gamification could help them reach the business performance measure criteria in the field of customer loyalty.

Organizational performance: the development of social media and ontology chatbot could help the local products made by elderly entrepreneurs to reach the business performance measure criteria in all aspects. Storytelling for branding could help them reach the business performance measure criteria in customer lifetime value, financial benefits, brand awareness, organizational process optimization, and competitive advantage. Next, AR for branding and gamification could help them reach the business performance measure criteria in brand awareness, organizational process optimization, and competitive advantage.

Let SMC refers to social media, STB refers to storytelling for branding, ARB refers to augmented reality for branding, OCC refers to ontology chatbot, and GMC refers to gamification. The effectiveness evaluation results of the developed DMeCE model by classifying the DMeCE performance measurement are illustrated in Table 2.

Table 2: The evaluation result by classifying the DMeCE performance measurement

Performance measurement	SMC	STB	ARB	OCC	GMC
Infrastructure					
- Social media monitoring	✓	✗	✓	✓	✗
- Online brand communities	✓	✓	✗	✓	✓
Process					
- Customer insight	✓	✗	✗	✓	✗
- Customer orientation	✓	✗	✗	✓	✗
- Customer interaction	✓	✓	✓	✓	✓
- Market and customer segmentation	✓	✓	✗	✓	✓
Customer					
- Customer-based relationship performance	✓	✗	✗	✓	✗
- Customer loyalty	✓	✓	✓	✓	✓
- Peer-to-peer communication	✗	✗	✗	✓	✗
Organization performance					
- Customer lifetime value	✓	✓	✗	✓	✗
- Financial benefits	✓	✓	✗	✓	✗
- Brand awareness	✓	✓	✓	✓	✓
- Organizational process optimization	✓	✓	✓	✓	✓
- Competitive advantage	✓	✓	✓	✓	✓
- New product performance	✓	✗	✗	✓	✗

With regards to the DMeCE model, the elderly entrepreneurs were satisfied with the developed DMeCE model with a mean value of 4.63 and a standard deviation value of 0.48. Concerning the effectiveness of customers were satisfied with a mean value of 4.65 and a standard deviation value of 0.48. Considering median (MED), first quartile (Q1), and third quartile (Q3), all of the values reached the interquartile range (IQR) no more than 1, and the quartile deviation (QD) no more than 0.5. Thus, both elderly entrepreneurs and customers were satisfied with the developed DMeCE model at the highest level. There was a high consensus among elderly entrepreneurs and customers in terms of the acceptance of the DMeCE model. The results also showed that the elderly entrepreneurs rated the model with 98.13% of accuracy (ACC) and 96.61% of income-making opportunities (OPP), and the customers rated the model with 98.71% of accuracy and 98.11% of repeating purchases-making opportunities, as in Table 3.

Table 3: The effectiveness evaluation of DMeCE model in black box testing

Technique	Mean	SD	Q1	ME	Q3	IQR	QD	ACC	OPP
Elderly entrepreneurs									
SMC	4.64	0.49	4	5	5	1	0.5	98.57	97.03
STB	4.61	0.50	4	5	5	1	0.5	98.03	97.06
ARB	4.64	0.49	4	5	5	1	0.5	98.52	96.58
OCC	4.67	0.48	4	5	5	1	0.5	98.36	97.24
GMC	4.61	0.50	4	5	5	1	0.5	98.06	96.15
Total	4.63	0.48	4	5	5	1	0.5	98.13	96.61
Customers									
SMC	4.67	0.47	4	5	5	1	0.5	98.97	98.04
STB	4.63	0.48	4	5	5	1	0.5	98.83	98.22
ARC	4.63	0.48	4	5	5	1	0.5	98.61	98.13
OCC	4.68	0.47	4	5	5	1	0.5	98.65	98.17
GMC	4.64	0.48	4	5	5	1	0.5	98.50	98.01
Total	4.65	0.48	4	5	5	1	0.5	98.71	98.11

The effectiveness evaluation result was gained from pre-test and post-test by thirty-three samples) in the training process. The learning results showed that the samples received more correct answers after the training. Afterward, the comparative test results were used for the statistical test of the following hypotheses:

H0: The learning results before and after using the applications are not different;

H1: The learning results before and after using the applications are different.

Statistically tested by t-Test, the null hypothesis H0 was rejected because the probability value (p-value) was lower than the significant level (α); it was considered statistically significant. Therefore, in this study, the H0 was rejected, while the alternative hypothesis H1 was accepted where $\alpha = 0.05$. According to the paired sample t-Test results, it was found that the significance value was lower than the predetermined significance level. Therefore, the mean values of the two groups were different. According to the learning outcomes before and after the application usage training, there was a statistically significant difference between the learning outcomes (p-value < 0.001). There is the mean value at 15.22, with the SD at 5.69 for the pre-test. For post-test, the mean value at 25.78 with the SD value was 2.44.

Moreover, the effectiveness evaluation result was gained from pre-test and post-test by thirty-three samples (N) in average income over 3 months. The income results showed that the samples received more income after the use the DMeCE. Model. Afterward, the comparative test results collected before and after income were used for the statistical test of the following hypotheses:

H0: The income results before and after using the DMeCE Model are not different;

H1: The income results before and after using the DMeCE Model are different.

Statistically tested by t-Test, the null hypothesis H₀ was rejected because the probability value (p-value) was lower than the significant level (α); it was considered statistically significant. Therefore, in this study, the H₀ was rejected, while the alternative hypothesis H₁ was accepted where $\alpha = 0.05$. According to the paired sample t-Test results, it was found that the significance value was lower than the predetermined significance level. Therefore, the mean values of the two groups were different. According to the income results before and after using the DMeCE model, there was a statistically significant difference between the income results (p-value < 0.001).

5. Conclusion and Discussion

This study aims to apply a new digital strategy for marketing through the unfolding of local practices of Thai elderly community enterprise. This study has solving problem sell for elderly community enterprises in Thailand deriving during Covid-19 which directly impacts elderly entrepreneurs who do not have adequate digital skills and tend to lose business opportunities because of the lack of access to customers, difficulty in trading, and inability to engage customers in the online platforms. This research, thus, developed a DMeCE model through the five following stages: 1) the development of the social media as a tool to marketize, distribute information and communicate with customers, 2) the creation of storytelling for branding to share stories about the products and the producers to add value to the products toward the use of infographics and videos on social media and the social media, 3) the development of AR for branding by using hybrid marker of QR code to raise brand awareness and share information on the developed DMeCE model, 4) the establishment of ontology Thai chatbot to automatically answering about products and sales on social media such as Facebook more conveniently (the chatbot will answer the questions automatically and provide information about daily sales to elderly entrepreneurs toward voice demands; this includes the request for infographics, instructions and calls to counselors), and 5) the application of gamification by developing online games which can increase the interactions between brand of and customers, this ultimately allows the customers to have more brand awareness since products are represented as the main components of the games. The effectiveness evaluation was found out that the developed DMeCE model provided satisfaction at the highest level with the agreement from both elderly entrepreneurs and customers, and the developed DMeCE model provided an accuracy rate of more than 98%, meaning it could give more incomes-making opportunities and to help elderly communities to generate more revenues

This development of the DMeCE model helps elderly entrepreneurs to enhance their marketing in the Era digital technology, trading, communication with customers. In order to reduce the digital gaps between generations and help elderly communities to generate more revenues, digital technology was applied to expand their market to

online platforms where a large number of users exist and connect in a well-established social web. This increased the chance for them to encounter more customers with high buying power who mostly are younger generations in the digital age. This group of customers was equipped with a considerable amount of influence by a single touch. In addition, the local products were full of exciting stories such as the use of local materials or ingredients, inherited recipes and procedures, and ideologies for local development. By developing product presentations towards storytelling, customers gained more understanding about and absorbed in the local products made by elderly entrepreneurs and their myths. These stories were represented towards rich media such as infographics and videos, which raised brand awareness via augmented reality and gamification. Once attracted by the products, potential customers could inquire about product information from the questions and answers services 24/7 towards ontology chatbot which answers the questions in various forms, including texts, images, stickers, links, and videos. This feature could link the customers with the ordering, purchasing, and payment services automatically. Moreover, it could assist elderly entrepreneurs to use voice commands to retrieve daily sales information or contact with their digital technology counsellors. This technology increased self-confidence and digital usage among older people, which supports the elders to earn more income, have a better quality of life, and reduce the exposure to depression. Therefore, this study is a guide to the application of digital technology for promoting the competitive advantages of local products made by elderly entrepreneurs in the era of digital disruption. The technology can help them to develop marketing, trading, business communication, and processes for Thai local elderly entrepreneurs by reducing the digital gaps and supporting them towards counseling. Last but not least, the DMeCE model can increase brand engagement and customer loyalty through different stories as well as attract tourists to the origins of the products. Ultimately, Thai local wisdom embedded in the local products will be sustained.

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