Article **Journal-Economic Systems**
December, 2019 Vol.3 No.5 1-8

Formalism of E-Commerce for SME of Pottery

Formalismo de Comercio Electrónico para PyMES de Alfarería

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DOI: 10.35429/JES.2019.5.3.1.8 Received July 11, 2019; Accepted December 03, 2019

Abstract

This work presents the essential elements that must be contained in marketing strategy oriented to virtual commerce, which is colloquially known as e-commerce. The presentation of the mentioned elements is done from a reflexing of some concepts that are formally showed. It is to say that the dissertation on the validity of the proposal is supported by mathematical approaches. Although the exhibition of this research is acceptable for all types of Small and Medium Enterprises (SME), it is focused on the characteristics and needs of the pottery industry. The elements of the proposed marketing strategy are aimed at maximizing the customers shopping experience. The essential questions addressed are 1) How to keep customers to contact with products? 2) How to make customers feel that they are served? 3) How to get buyers to remain as customers and attract more? 4) How can buyers help to improve e-commerce? 5) What is the trend of the marketing strategy for e-commerce?

E-commerce, ICT, SME

Resumen

Este trabajo presenta los elementos esenciales que deben estar contenidos en la estrategia de mercadotecnia orientada al comercio virtual, que se conoce coloquialmente como comercio electrónico. La presentación de los elementos mencionados se hace a partir de una reflexión de algunos conceptos que se muestran formales. Es decir que la tesis sobre la validez de la propuesta está respaldada por enfoques matemáticos. Aunque la exposición de esta investigación es válida para todos los tipos de Pequeñas y Medianas Empresas (PyMES), se centra en las características y necesidades de la industria de la cerámica. Los elementos de la estrategia de marketing propuesta tienen como objetivo maximizar la experiencia de compra del consumidor. Las preguntas esenciales que se abordan son: 1) ¿Cómo mantener a los clientes en contacto con los productos?, 2) ¿Cómo hacer que los clientes se sientan atendidos?, 3) ¿Cómo lograr que los compradores permanezcan como clientes y atraigan a más clientes? 4) ¿Cómo pueden ayudar los compradores a mejorar el comercio electrónico? 5) ¿Cuál es la tendencia de la estrategia de marketing para el comercio electrónico?

Comercio electrónico, TIC, PyMES

Citation: GONZÁLEZ-CASTOLO, Juan Carlos, RAMOS-CABRAL, Silvia and ZATARAIN-DURÁN, Omar Alí. Formalism of E-Commerce for SME of Pottery. Journal-Economic Systems. 2019. 3-5: 1-8

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Introduction

A company with a small number of employees is classified as *SMEs* (Saavedra García & Tapia Sánchez, 2013), (INEGI, 2009). The pottery industries of Jalisco state are *SME*s. It is known that the basic aspiration of all *SME*s is to expand their market area. To achieve this, the marketing strategy needs to consider the use of *information and communication technologies (ICT)*. Currently, the use *ICT* is massive (Calvo Marín & Ospina Ospina, 2014). With the use of *ICT* there are vertiginous changes in the way of doing business (Barrientos Felipa, 2017) that it is known as e-bussines, and changes in social networks (González Castolo, Ramos Cabral, & Hernández Gallardo, 2018) that introduce the social-commerce, (Lia & Kub, 2018). The e-commerce and social-commerce are application areas of e-bussines (Grandón, Ramírez-Correa, & Luna Orrego, 2019). The discussion of social-commerce is not included here.

There are studies that try to enhance e-commerce with various strategies such as to give compensation in automated models, (Shojaiemehr & Rafsanjani, 2018). In the same context, there are studies such as transaction security verification (Yu, Ding, Liu, Wang, & Crossley, 2018); logistics analysis and supply chain management (Yu, Wang, Zhong, & Huang, 2017), (Pei & Yan, 2019); study of activities to balance supply and demand (Gölgecia, Karakasb, & Tatogluc, 2018); price prediction (Tseng, Lin, Zhou, Kurniajaya, & Li, 2018); sales prediction (Yuan, Xu, Li, & Lau, 2018); purchasing prediction (Dong & Jiang, 2019); analysis of purchase intention (Dachyar & Banjarnahor, 2017), (Ramírez-Correa, Grandón, & Arenas-Gaitán, 2019), (Li, Feng, & Zhai, 2019); customer loss prediction (Berger & Kompan, 2019); analysis of elements to attract and retain customers (Choshin & Ghaffari, 2017), (Deng & Gao, 2018), (Jannach, Ludewig, & Lerche, 2017), (Wu, Zhang, Tian, & Wu, 2019), (Chen, 2019); trust analysis (Kim & Peterson, 2017), (Sánchez-Alzate & Montoya Restrepo, 2017), (Masseya, Wanga, & Kyngdon, 2019); etc. This work takes the e-commerce strategy as a marketing strategy because the arguments showed are more general

This paper is organized as follow: In the next section, fundamental consideration theoretical is presented about satisfaction grade and some related concepts are also included.

Then, characteristics that the marketing strategy required is shown. Next, discussions that have implicit answers to research questions are presented. Finally, the conclusions are given.

Satisfaction Grade

The *satisfaction grade (SG)* of the *customer (Cmer)* is directly related to the grade to which the *expectation (E)* is met regarding an object and/or service. Hereafter, the object and/or service will be called *product (P)*. The *P* has *characteristics (Ch)* to attend *E* that are referred to as *product benefit (Pb)*. The *SG* is a function of *E* and *Pb*, (1)

$$SG = f(E, Pb) \qquad (1)$$
$$Pb = \{Ch\}$$

The *E* is a variable that is a function of *marketing (Mk)*, *utilitarian constant (K)* and the *valuation of who sells and/or where it is sold (Kp)*, (2). Then *Mk* is the variable that modifies *E*. The utilitarian constant is inherently associated with the solution of a task and/or service attention. For example, the tool is useful for doing things and pottery is useful for decorating a place.

$$E(t) = f(Mk(t), K, Kp) \qquad (2)$$

The *SG* is variant in time with greater importance from the acquisition of *P* to the event of first use. The present work presents arguments from this point.

The *Mk* encourages the desire of *P* through its *Pb* promotion. The *P* has *physical Pb (PPb)* and/or *ethereal Pb (EPb)*. For example, *PPb* refers to material type, design, texture, etc. The *EPb* refers to comfort, status, investment, etc. Each *Ch* could be has *PPb* or *EPb* or both, (3).

$$PPb \cup EPb \cup PPb \cap EPb \in Pb \qquad (3)$$
$$\{Pb\} \in Ch, \{Ch\} \in P \Longrightarrow \{\{Pb\}\} \in P$$
$$\Longrightarrow \{\{PPb \cup EPb \cup PPb \cap EPb\}\} \in P$$

The *Mk* always has a presence in the market, although in some cases it is not obvious. For example, people must expose *P* to the view of *Cmer* and even approach to make the offers in case of they sell pots on the public road. This practice has an implicit *Mk*.

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Balance of *E* and *Pb* is the main propose of *Mk* in order to maximize the number of *greed state (Gs)* and therefore maximize the *accumulated gain (TP)* in a given time. The *Gs* is denoted when the excitement of desire causes that the *Cmer* acquires *P*. The *TP* is the sum of *simple profit (SP)*, (4). The *SP* is the difference between the *sale price (Sp)* and the *production cost (PC)* where *SP* can be positive, negative or zero, (5). The variable $n_s(t)$ represents sold units. It should be noted that *Sp* is part of *PPb* ($Sp \in PPb$).

$$TP(t) = \sum SP(t) \quad (4)$$

$$SP(t) = n_s(t)Sp(t) - PC(t) \quad (5)$$

The *PC* is integrated by *manufacturing cost (MC)*, *marketing cost (MkC)* and *research cost (RC)*. The above concepts are represented as variables in function of time, (6).

$$SP(t) = n_s(t)Sp(t) - n_p(t)MC(t) - MkC(t) - RC(t) \quad (6)$$

The variable $n_p(t)$ represents made units such that $\sum_0^t n_s(t) \leq \sum_0^t n_p(t)$. The sum of sold products tends to be equal to sum of produced products when the company has production on demand policy.

Let it assumes that all variables of equation 6 in t_0 are zero. After of t_0, *RC(t)* value starts increment because *P* project requires the research of the market, *P* characteristic, material supplies, *P* design, etc. The *RC(t)* tends to zero after an increase, according to solve advance of *P* proposal.

The *Mk* campaign begins shortly before this proposal is resolved. The *MkC(t)* overlaps in time with the *MC(t)*. At first, *MC(t)* has a higher value attributable to inexperience in *P* elaboration, but this will tend to decrease and stabilize. The t_a is the moment in which the *TP(t)* has maximum negative, where receipts due to the number of sold products is equal to the *PC(t)*, Fig. 1(a). The *SP(0, ta)*, *SP(ta, tc)*, *SP(tc, td)* as well as *SP(td, t)* curves are not necessarily monotonic because variables are susceptible to the market, (6). The return of investment is at t_c instant.

The maximum gain in the shortest time is in t_d that it can be given by a high volume of purchase-sale transactions ($n_s \gg 1$) or high profit for each *P* sold ($n_s(t)Sp(t) \gg PC(t)$).

Due to market saturation or past the *P* novelty period, *SP* has a drop that it will tend to stabilize after t_d. The curve of *TP(t)* is described in Fig. 1(b). If *TP(t)* is negative after t_d it means that *Cmer* loses interest in *P*.

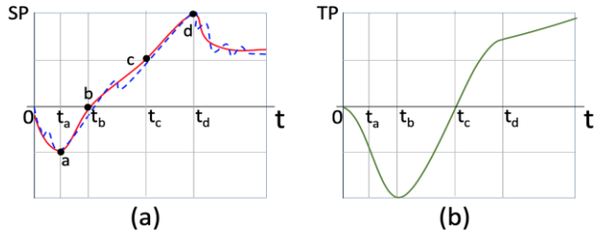

Figure 1 Illustrative curve of SP and TP

Let's define, *sales success* as the fact of obtaining a profit of twice the investment in half of the time that product takes to appear on the market from *P* project start.

Valuation and Opinion

The *SG* is displayed internally as *valuation (Val)* and externally through *opinion (Op)*. The *Op* is the *Val* manifestation, and they are directly proportional with variations over time. The *Val* can be seen as a variable that is due to *Cmer* interaction with *P* (continuous qualitative variable) and *Op* as the manifestation of said *Val* at a given moment (discrete qualitative variable). After *P* introduction in the market, *Op* in the short-term pushes operations purchase-sale due *Cmer* focused attention over this *P*. The *Op* on the medium and long term is more related to stability and/or *P* life in the market. The *Val* can be seen as the difference between *Pb* and *E*, (7). If *Pb* is greater than *E* then it has a *supra Val* (V^+) and otherwise, it has an *infra Val* (V^-). With V^+ a *positive opinion* (Op^+) is expressed and with V^- a *negative opinion* (Op^-) is said, (7). An atypical case occurs when *Pb* is equal to *E* because *Cmer* always takes a position with his *Op* in a positive or negative way, (8).

$$Val = (Pb - E)\Big|_{V^+ \Rightarrow Op^+}^{V^- \Rightarrow Op^-} \quad (7)$$

$$(Pb = E) \in \emptyset \quad (8)$$

The unbalance between *Pb* and *E* is revealed through *Op*. The *Op* is positive (Op^+) when *Pb* satisfy *E* otherwise it is negative (Op^-). For all practical purposes it has that $Op^+ = 1$ and $Op^- = -1$. The Op^- has more influence in the market than Op^+ then *weight of* Op^- (w_{Op^-}) is greater than *weight of* Op^+ (w_{Op^+}), (9). The K_u is an adjustment constant. The *product qualification (PQ)* is defined as the difference of w_{Op^+} sum and w_{Op^-} sum, (10).

The *product qualification perception (PQP)* is obtained with *PQ* that results as *positive (pos)* or *negative (neg)*, (11). If *P* is associated with a brand and/or commercial space then *PQ* contributes to the company perception and/or place. This will be referred as *company qualification perception (CQP)*, (12).

$$\begin{matrix} w_{Op^+} \equiv Op^+ \\ w_{Op^-} = K_u w_{Op^+} \end{matrix} \Big| K_u \in \mathbb{N} \quad (9)$$

$$PQ = \sum w_{Op^+} - \sum w_{Op^-} \Big| PQ \in \mathbb{Z} \quad (10)$$

$$PQ < 0 \Longrightarrow PQP = neg \quad (11)$$

$$PQ > 0 \Longrightarrow PQP = pos$$

$$CQP = \sum_P PQ_P \quad (12)$$

Since *Mk* adjusts *E* with *Pb* then optimization of the *marketing cost index (Mc)* is obtained with more balance between them. The *Mc* is a function of *PQ* and n_s, (13). The *Op* quantity is not necessarily equal to n_s. The *Mc* describes the acceptance of *P* in the market whose sign is equals to *PQ*.

$$Mc = \frac{PQ}{n_s} \Big| n_s \in \mathbb{N}; Mc \in \mathbb{R} \quad (13)$$

If $Mc \cong 1$ means that *PQ* is equal or approximate to n_s and it is a maturity position of *Mk* since *Pb* is balanced with *E*. If *Mc* moves away from 1 in the negative sense ($Mc \prec 1$) then *E* is higher than *Pb*.

This means that *Mk* must be corrected because the consumer is not properly informed and this has felt as cheating. Correct *Mk* does not mean increase *MkC*. Finally, if *Mc* moves away from *1* in a positive direction ($Mc \succ 1$) then *Pb* is higher than *E*. The above reveals that there is a potential market to offer *P*. The strategy of *Mk* can be extended to publicize *P* and promote *Gs* in order to increase *SP* through increasing n_s. As in the previous case, extend the strategy of *Mk* it does not mean increase *MkC*.

Strategy of Mk approach

The *strategy of Mk* must ensure that *Pb* satisfies *E* and achieve *Gs* at the same time. The *introduction of P in the market* can be from the next *strategies of Mk approach* and/or a combination of them.

– Nice feeling,
– Service promise *and/or*
– Social status promise.

The *Sp* is part of *PPb* in any *strategy of Mk approach*, and they are inversely proportional. This is that a *Sp* high decrement *PPb* and vice-versa. A *nice feeling* can be an evocation of affection, pleasure, adventure, etc. The *service promise* can be the type of material, ergonomics, etc. The *social status promise* tries to put *Cmer* within a privileged group. The *P* elaboration must be careful to justify a high *Sp* in this case. A high *Sp* of the *P* guarantees that only a select group of people has it. Moreover, the slope of *Pb* is small because $Sp \ll PbE|Sp \in PbP$ and therefore *Val* is affected little. Only in the *service promise*, *Sp* is adjusted carefully because *Pb* is reduced with any change to rise of *Sp*.

Purchase-sale Transactions Valuation

The *Val* can be seen in three moments associated with the purchase-sale transactions, 1) *Val before*, 2) *Val during* and 3) *Val after*.

The *Val before* is motivated with *PQP* and/or *Mk*. The *PQP* is due to *Op* of *Cmer* that acquired P previously. The *Mk* affects *Val* because it promotes desire until *Gs* is obtained. The *Val during* is present at first approach of *Cmer* with *P* and it is related to *Pb* and *E*, (7). The *Val after* is due to *P* integration into *Cmer* environment that is denoted as *product use (Puse)*. The *Val during* and *Val after* propitiate *Op*. The *Op* and *Mk* affect *PQP* and therefore *Val before* of new *Cmer*, (14).

$$\begin{matrix} Val\_before = f(PQP, Mk) \\ Val\_during = f(Pb, E) \\ Val\_after = f(P, Val\_during, Puse) \end{matrix} \quad (14)$$

$$\Longrightarrow Op \Longrightarrow PQ \Longrightarrow PQP$$

If *PQP* is negative then it is illogical that *Cmer* buy *P* and a reflection is not considered in this case, Table 1.

Val before	Val during	Val after	Efect
Pos	Neg	Neg	New P in the market with a high initial sales push due to Mk where Val during and Val after does not influence Val before, $Val\_before = f(Mk)$. The P does not penetrate the market.
Pos	Neg	Pos	The *Mk* causes that $E > Pb$ and it gets *Gs*. Although *Val during* is a factor that influences *Val after* the condition gets $Pb \geq E$ after some time. This is interpreted as an erroneous strategy of *Mk*.
Pos	Pos	Neg	The P will sell well at the beginning but after it will sales decrease because the competition is better.
Pos	Pos	Pos	The P that penetrates the market with a stable presence.

Table 1 Effect of Val of the P in marked

ISSN 2523-6350

According to (10), Op^- number must be lower than Op^+ number or zero. The $w_{Op^+} < w_{Op^-}$ because Op^- is out of normality.

As has been argued before, the *Mk* has two clear objectives, 1) to look the balance between *E* and *Pb*, and 2) to induce *Cmer* to buy *P*. The first objective is obtained by an adequate *P* description. The second objective is procured by stimulating *Cmer* senses. This last objective tries to find a pleasant and/or satisfactory image that is empathetic whit *Cmer*.

Discussion of *Strategy of Mk*

The question of interest is, how to stimulate the desire of the *Cmer*? People have needs and their desire is stimulated by *P* promoting. Then, *P* tries to satisfy a group of specific needs whit high percent. The first contact of *Cmer* with *P* is fundamental because, from that, *Cmer* will try to recreate his positive experience or avoid his negative experience.

The *strategy of Mk* must guide *Cmer* also about the *environment of P* and/or *use of P*. The *environment of P* corresponds to the place where *Ch* of *P* are relevant such as workshop, office, house, etc. The *use of P* has to do with *P* handling as ignition, maintenance, storage, etc. The *strategy of Mk* must also attend the *P support* and *P life* can be seen as part of *EPb*. The *P support* has to do with the attention that company is offered post-sale. The *P life* refers to time sure that *P* will be in the market. The *P* must *Cmer* attention attract as an element that wants to integrate into his environment and/or experience. The senses are the channel through the desire of *Cmer* is stimulated. Currently, the desire in e-commerce is stimulated through sense of sight and exceptionally sense of ear.

The number of senses to stimulate is reduced in e-commerce, so more attention must be paid to the *strategy of Mk*. In successive will be discussed points that are within e-commerce context.

a) Consumption is the scheme of interpersonal relationships. The *Cmer* satisfies accompaniment wish, mitigates loneliness, and/or reduce fears through purchase-sale transactions. According to this, the communication and propagation of *P* experience and/or *Ch* of *P* must be facilitated.

The forums are sites that support the idea of communication and discussion.

b) Since consumption is usually emotional and not rational, then *Cmer* must perceive in a sideboard an empathy with his desired world. The *P* must help to recreate and/or to modify a space where *Cmer* moves away from mundane everyday life.

An images catalog must try to identify a pleasant scenario where *P* is used and/or places where it is.

c) The contribution of *Cmer* to images catalog helps to indicate Pb. In addition, it exhibits the message that good choice of *P* is distinguished.

The *Cmer* must have the facility to public *P* images. The publication of images where *Cmer* use *P* helps to meet *Cmer* recognition. The validation of material before its publication attend image catalog.

d) The idiomatic messages associated with P contribute to *Mk* purpose because they accentuate the good *Cmer* decision with an acquisition. The paragraphs project knowledge and authority on *P*.

The *strategy of Mk* must have a slogan and good advice for life. In addition, it must give description, originality, temporality, and recommendations of *P*.

e) It is important to give a personalized shopping experience. The effort to attend *Cmer* needs should be shown.

The *strategy of Mk* must be assisted by algorithms that according to the *Cmer* search history and/or purchases make suggestions of new *P*. The artificial intelligence could assist here.

f) The innovation of *strategy of Mk* must be constant to find *Cmer* satisfaction in purchase immersion. It is desirable to stay in the mind of *Cmer*.

The analyst of the *strategy of Mk* is necessary to appreciate the market trend and anticipate changes.

ISSN 2523-6350

g) The shopping experience should try to recreate the feeling of the ride that the *Cmer* would do in a physical process.

The *strategy of Mk* can be included the virtual reality of displacement through shop windows where *P* image is amplified when the mouse cursor passes over it. With clicking on virtual *P* is shown a box with specific information about *P* and opinions and/or photographs. Recommendation and opinion are very important to stimulate desire.

h) The strategy of *Mk* proposition must be the idea of easy to buy, fast delivery, availability, and assistance after sales.

The *strategy of Mk* must avoid physical move inconveniences of *Cmer*. Also guarantee existence, diversity of payment forms, search tools, serious transaction (Sánchez-Alzate & Montoya Restrepo, 2017), and assistance.

i) In order to have differentiators from the competition, strategies must be devised that make it difficult for competitors to enter the market.

The *strategy of Mk* should be based on the offer of some exclusive *P*.

j) Even if the *strategy of Mk* has a specific marketing portal, it should not underestimate the use social networks portals.

The *P* offer should be made in different digital showcases such as YouTube, Reddit, Instagram, Pinterest, Facebook, Twitter, etc.

Conclusions

In synthesis, the proposed is give the *Cmer* what it is looking for and offer proposals that meet their needs. Pleasure to buy, feel loved, feel appreciated, feel part of an exclusive world. It convenient gives the promise to transform her environment through *P*.

The e-commerce must get the trust of *Cmer*. This could be obtained with clear rules, something contributed to the community, tips given without expecting something in return, authority demonstrated, business transparency show, questions attention, and commitments fulfill.

This paper presented a formal description elementary aspect of e-commerce. The reflection shows that *SG* is a function of *E* and *PB*; that *Mk* modulates *E*; that *P* has *Pb*; that *Sp* is a *Pb*; that *Val* and *Op* are effects of *SG*; that stimulating desire gets *Gs*. The implicit questions had been answered in the discussion of the *strategy of Mk* section.

E-Commerce must evolve with *TIC* advance with the aim of offering the best shopping experience. The evolution trend of e-commerce is with the use of virtual reality, artificial intelligence, and it needs to get involved in the dynamics of virtual social networks. The future work is the *strategy of Mk* atomization in order to develop the *WEB* portal for *SME* pottery.

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ISSN 2523-6350