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# **The Innovation Breakthrough in Digital and Disruptive Era**

# A Conceptual Framework for e-Commerce Personalization in Small Medium Enterprise's

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**Abstract.** Information overload on e-commerce sites or applications makes users spend more resources than they should. Buyers should be able to use it according to their own habits, needs, wants and beliefs. Personalization of e-commerce is a solution that can be used to overcome this problem. In this paper, the researcher creates a framework for personalizing e-commerce, especially for small and medium enterprises. This framework consists of the customer behavior assumption, technology requirement and business assumption. The customer behavior assumption contains an approach to the habits/nature of the buyers themselves. By understanding this, e-commerce can offer something suitable and different for each person. Meanwhile, with technology requirements, e-commerce is able to adapt to the development of content and scalability of e-commerce itself. To make users feel comfortable and willing to go back to shopping at the same e-commerce, the business assumption is another component in this framework. We conclude that the use of this personalization framework can have a major impact on increasing user retention in e-commerce.

## 1. Introduction

In contrast to traditional or offline selling, online selling provides a wide variety of options. Buyers in traditional markets or offline, have to spend a lot of time and energy to move from one seller to another. Likewise, to choose one particular item from a wide variety of offers. This is increasingly felt when buyers want to compare an item with other items. Or want to compare the features of an item from one seller to another. The online marketplace has grown from focusing solely on selling one type of product to being multi-product. With various types of buyers available, the online market must be able to

accommodate the needs of every buyer who comes. The decision to buy something is usually aided by the various features provided. By using this feature, buyers will decide to buy according to their habits, needs, desires, and beliefs [1].

Every line of business and social media uses the website as part of the way they sell and interact with customers, product or service promotion, marketing, after-sales, and customer support. This makes information on an e-commerce web overload for visiting buyers [2]. The solution offered by the online market is to make it personal for each buyer. Buyers' habits and styles will be analyzed and product offerings and appearances made

accordingly. With the development of Artificial Intelligence (AI) and Big Data technology, this has become a feature that can be implemented by every online market. Personalization makes e-commerce according to the needs and preferences of users. An approach that displays flexibility for users in displaying appropriate product information [3]. Even grocery products that are usually purchased repeatedly, can be personalized with baskets that can be offered to customers. Personalization of this basket can be done by paying attention to features in the form of large orders, repeated purchases and the frequency of purchases made [4]. Amazon as one of the largest e-commerce platforms even uses Persuasive System Design (PSD) as part of its personalization and persuasive approach to customers [5]. In the world of e-commerce, personalization has become a concern in improving the shopping experience [6]. Information overload makes personalization a solution to provide customer convenience. Personalization makes products and services according to customer needs and desires [3]. The difficulty of the customer to choose a product that suits his personal personalization is a problem that must be found a solution to overcome. This problem has become a classic problem because online shopping behavior in developed countries is different from that in developing countries. In addition, there are also cultural factors, habits, and readiness to use technology to be the determining factor in formulating a solution.

However, from the research that has been done, there are still areas that have not been sufficiently researched or are not yet well-developed in the existing scientific literature. Therefore, to explore this research gap. Some areas that need further research such as personalization in e-commerce and its application in the context of SMEs need to be comprehensively prepared. This will help identify whether any concepts or models have been developed previously and highlight areas that have not been well-researched. Literature research should cover product personalization, user experience, recommendations, personal marketing, and factors influencing the acceptance and adoption of personalization by

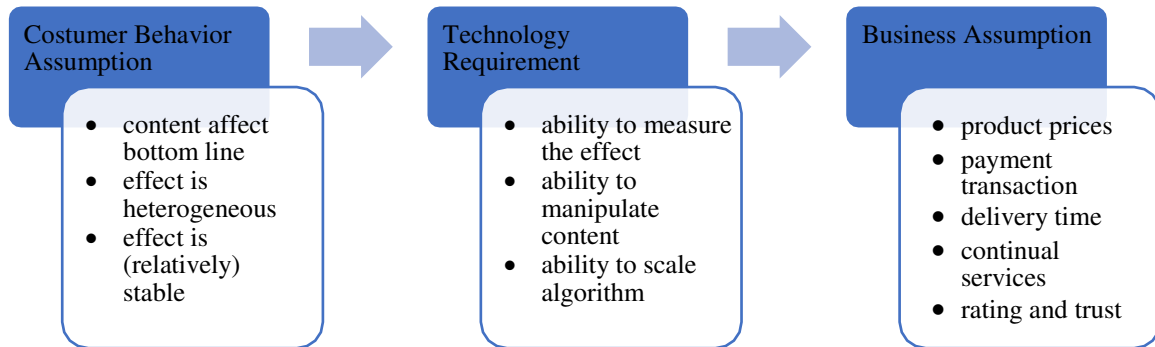
SMEs. In addition, it is crucial to identify the needs and challenges faced by SMEs in adopting personalization in their e-commerce strategy. Case studies, surveys, or interviews with business owners, managers, or workers of SMEs can provide insight into their difficulties and hopes for personalization in e-commerce. The next thing is that it is necessary to conduct a review of the personalization technologies that are already available for SMEs. This includes tools and services that can help them implement personalization in their e-commerce platform. Through evaluating existing technologies, research can identify weaknesses and potential for new solutions to meet the specific needs of SMEs. The important thing to note is to focus on user experience models and preferences that fit the SMEs business context. How user experiences and preferences are collected, analyzed, and used to present recommendations and personalization in e-commerce is at the heart of this research. Next is an examination of the security and privacy issues that may arise in collecting and processing user data for personalization purposes. How to address user concerns regarding privacy and gain consumer trust needs to be the main focus. In addition, an analysis of business performance and impact is required, namely an application of the conceptual framework must include an analysis of business performance after personalization is applied in the context of SMEs. How personalization contributes to increased conversions, customer retention, and revenue growth needs to be evaluated in detail. In addition, research should also consider how personalization is integrated with the wider business strategy of SMEs. In some cases, personalization may be one aspect of a larger digital business strategy, and it needs to be considered within a conceptual framework. Therefore, this research will make a valuable contribution to business owners and SMEs, helping them understand the benefits of personalization and overcome obstacles that may occur in adopting it. In this way, small and medium enterprises can optimize the potential of their e-commerce strategy and compete effectively in an increasingly competitive digital market.

Solutions have been created by building a framework that can be used to develop personalization for online businesses. The use of the assumption of the nature of the customer and the technological approach can be used to build a novel personalization [7]. This paper tries to modify the personalization framework by looking at the assumption business component as one of the main components in e-commerce personalization. This is important because business assumptions are a determining factor in the use of e-commerce in developing countries. In developing countries, business assumptions become important because the needs and behavior of customers are very dependent on the assumptions that are built such as the price, the method of payment, the time of delivery, and the level of trust. These things are still very dominant and need to be studied to build e-commerce personalization. This can also be seen in the Covid-19 pandemic which began in 2020, many small and medium businesses are looking for ways to still be able to market their products. One of the innovations made is by switching from traditional markets (onsite) to online market players (e-commerce). E-commerce and personalization can indeed help businesses survive during the pandemic. Personalization has the potential to increase sales and interaction with customers [8]. From the business side itself, both as a seller and as a buyer need to be considered in building a framework for personalization. This business side can increase the successful buying rate and customer retention. In this paper, we try to include business assumptions to complement the framework. And also given an example of a small and medium business case where this framework can be used.

This paper aims to build an e-commerce personalization framework that comprehensively formulates a specific e-commerce personalization model according to the context of developing countries. The framework that is built is expected to become a model framework that can be implemented easily and provide direction in the development of the e-commerce personalization framework in the future.

## 2. e-Commerce Personalization

Personalization of e-commerce can be interpreted as a business that specifically sorts and chooses what content is displayed for each customer according to their own habits and preferences. Information overload with too many features can confuse or even make customers uncomfortable. Content is anything that can be displayed on a web/e-commerce application. Personalization of this content can be achieved by utilizing a combination of understanding the nature of the customer and the capabilities of the technology used [7]. Covid-19 hit the world in early 2020, brought significant changes in the buying and selling process. The social distancing implemented by the government in an effort to reduce the number of outbreaks has made business people turn to online sales. E-commerce is suddenly a trend. Businesses turning to e-commerce are trying to stand out from other competitors and attract more customers. Simply understanding the nature of the customer and technological capabilities is no longer enough to personalize. The third component, namely business assumptions, needs to be added. The business assumption complements the previous two components, which can increase the customer retention ratio in e-commerce. The business assumption factor is the basis for business actors to earn income and increase turnover. As for the customer, the business assumption can help increase confidence in e-commerce that is used as a place to shop.



**Figure 1.** Conceptual Framework for Personalization

Each customer has different characteristics and habits. We have to make some assumptions to make personalization. The results of this personalization should vary for each customer. From Figure 1 above, in the first component, three assumptions are made to understand this customer's habits. The three assumptions are content that can affect customers, the influence given is heterogeneous or diverse and the influence received by the customer is stable. The first assumption can be exemplified by adding more detailed categories to the displayed products. Products displayed in the category only "Men's Clothing" will have abundant information. The products will be displayed for all men's clothing from toddlers to adults. From formal wear to beachwear. If the category "Men – Adult Clothing" is added to the displayed content then the buyer will be sure that when he is looking for a formal shirt for work, there will be no toddler sleep pants display in the e-commerce. With the addition of these categories, not only will the information displayed be more concise and straightforward, but it will shorten the time for customers to search for the desired product. Influential content is not enough if it is homogeneous. The heterogeneous influence will make two people who enter simultaneously in the same category will not

get the same product offerings. This will have an impact on customers who feel that e-commerce is specifically designed according to their own personality. The last assumption is that the influence received must be stable. Reaction to content will be influenced by emotional factors. Customers who previously would be happy with the appearance or dynamics of the content, maybe today will feel bored or bored. A stable effect can be achieved by applying the heterogeneity of the display at a certain time which is usually related to customer behavior. In the second component of Figure 1, three assumptions are made to describe the technology requirements of this e-commerce personalization. The first assumption is the ability to assess the effect of personalization made must be dynamic. Dynamic learning is needed to accommodate the uncertain factors that exist [7]. Content modification, which is part of the personalization itself, should not interfere with the customer's enjoyment of the experience. Content must be fast and consistent. Displays in the "Men-Adult Clothing" sub-category should not mix children's clothing. Computing capabilities and AI technology must be able to accommodate the growing number of customers and visits. The growing and a large amount of data should not hinder the ability of e-commerce platforms to provide a pleasant experience for customers.

The Covid-19 outbreak that has hit the world since the beginning of 2020 has forced

businesses to find ways to survive. Business actors who previously only sold directly (on-site), now rely a lot on the internet as a place of sale (online) through e-commerce platforms. The third component in Figure 1, incorporates the business aspects into the previous framework. The business assumption has 5 (five) assumptions that need to be considered in e-commerce personalization. Product price is a price within a range that can be compared with competitors. Giving a cheaper price is the first choice, but a higher price is not impossible if it has added value for customers. Product prices can be bundled with similar products or additional accessories. Prices that are more expensive and have no added value compared to competitors are clearly not the customer's choice. The diversity of payment methods is a determining factor in many transactions. Customers don't want to be bothered with having to take a few additional steps just because their payment method is not provided by e-commerce. Cooperation with many banking institutions and e-wallet makes customers have many choices according to their wishes. The assumption of delivery time is closely related to the diversity of expeditions that work with e-commerce. Some expeditions do not even accept certain products to be shipped overseas. Others can even ship products in as little as 1-2 hours on the same day. The free shipping promo also has a significant impact on the number of transactions that occur compared to when there was no promo. Mass-produced goods have the possibility to malfunction. Guarantees from e-commerce will provide a sense of security for customers. Even the additional time and warranty coverage will be in demand by customers for certain products. Although of course, they have to pay extra for the extended warranty service. A pleasant experience on an e-commerce platform will provide a sense of satisfaction for customers. In a certain period of time, this satisfaction will turn into trust. Customers who have trust tend to be loyal. This will be reflected in the rating of e-commerce. The rating, which is a form of previous customer testimonials, can be a reference for new customers. This continuous process will eventually increase the number of successful

transactions. Increased successful transactions, pleasant experiences during transactions will increase customer retention in the e-commerce.

### 3. Result and Discussion

The Institute for Development of Economics and Finance (INDEF) reports that the number of online shoppers has increased significantly from 22.2 million buyers in 2015 to 38.34 million buyers in 2021. The implementation of the framework for personalization begins by looking at the three components and their assumptions. assumptions made for small and medium enterprises with food-beverage products. Analysis of each component and implementation in SME can be seen in Table 1.

**Table 1.** e-commerce personalization

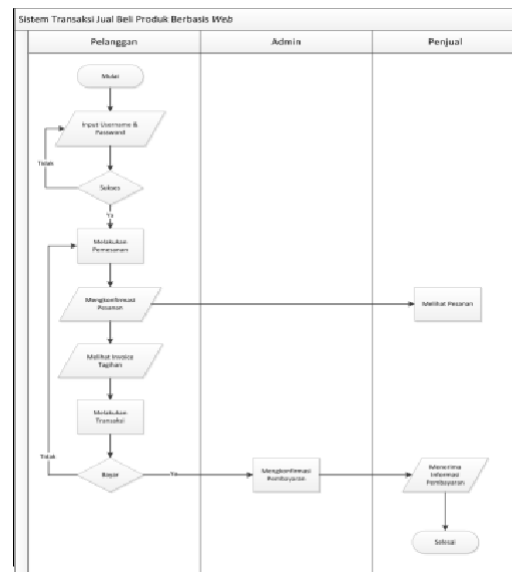
No	Customer Behavior Assumption	Technologi Requirement	Business Assumption
1	Main food categories, appetizers, and desserts were made. The main food is made into subcategories: rice and noodles. Appetizers made sub-category: soup. Desserts are made into subcategories: fruit and ice.	The number of successful transactions and the duration of customer visits can be used as a measure of the success of personalization. An increase in these two things can be an indication that customers are comfortable and match the products offered	Prices will be set at least the same as competitors. If the price is more expensive than there will be added value. For example, drinks with a larger size, food has extra toppings.
2	So that the effect is heterogeneous for each customer, then personalize the content displayed based on the product category, last seen during a	The use of content management will make it easier for e-commerce platform content processing. Up-to-date products, both information, and stock will	Payment systems can be made through banks (eg BRI, BCA, BNI) and e-wallet (eg OVO, Dana). Payment methods can also be made

	visit + related sub-categories.	have a positive effect on customers.	through ATM transfers, through internet banking, and even through payment outlets at minimarkets. The payment on the spot (COD) method is also available with certain conditions.
3	The appearance of the content is in accordance with the habits of the customer's visiting time, plus personal information such as the month of the anniversary or related to work/hobby.	The use of a computational system that can be developed will ensure that the system will remain responsive when processing more and more data. Minimizing downtime will make customers not disappointed when visiting.	There are many expeditions to choose from. Delivery time can be selected from the regular, same day, and even express (1-2 hours depending on distance). Co-operating expeditions must have a sufficient number of fleets to anticipate a large demand.
4	-	-	The warranty given must be clear in scope and duration. There is a change that can be given <u>if it meets</u>

	-	-	the existing conditions.
5	-	-	Provide a testimonial container, as a place for customers to provide ratings and comments about services and products.

From table 1, the e-commerce built with this framework has a business perspective to facilitate e-commerce personalization for customers. With this business assumption, customers will get not only a pleasant shopping experience but also the right economy.

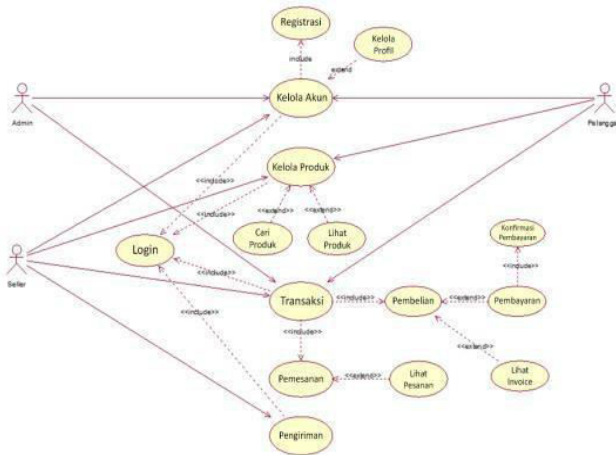
The business processes that occur on the e-commerce platform can be seen in Figure 2.



**Figure 2.** Business processes in SME's e-commerce

The business process flow starts with the admin logging in to enter all the information about categories and costs into the system. Sellers who want to sell must register first and enter product information. Meanwhile, the customer must register by entering personal information and the appropriate address.

Orders made must be completed within 1x24 hours before being automatically canceled by the system. Making use case diagrams only has three actors, namely: admin, seller, and customer.



**Figure 3.** Use case diagram for e-commerce transaction processing

Developing e-commerce applications/webs is done using the Codeigniter framework. This development framework uses the Model-View-Controller (MVC) system. The Model is responsible for the data from the application, the View is responsible for displaying the data, while the Controller is responsible for processing the data obtained by the Model and giving it to the View to be displayed. After being made, the last step before being released to the public is testing. Testing is done by using black-box testing and usability test methods. The black-box testing stage is passed with the results of the function running accordingly, both input and output functions. No errors were found in the data structure or database access. The usability test in table 2, is a test carried out to assess whether this application is suitable for use or not. The test results obtained a score of 89.81%, which states that it is feasible to use.

**Table 2.** Usability test

No	Usability Test	(%)
1	Usefulness	87,85%
2	(Ease Of Use	88,70%
3	Ease Of Learning	92,50%
4	Satisfaction	90,20%
Total		89,81%

An important part of this research is the implementation of the framework for personalization that can be applied to small-medium enterprises. E-commerce applications that feel personal will make you feel comfortable and willing to reuse for a long period of time. In the long run, this will increase the number of successful transactions. In line with this is research from Desai which states that personalization can increase satisfaction and desire to use e-commerce websites for the long term [2]. Personalized e-commerce applications not only information but also the appearance and navigation will make customers feel at home visiting. Using the right technology requirements can improve personalization without disrupting the user experience. Good personalization must be achieved within a certain period of time [9].

Personalization of e-commerce does not only focus on personal e-commerce itself but what needs to be considered is how to increase customer satisfaction and various stakeholders involved in e-commerce [10]. This is important considering the profitability results must be felt by all stakeholders involved [11]. This will have an impact on increasing the income of business actors who use e-commerce as a medium for conducting trade. This of course will have an impact on economic growth which ultimately improves the economy in a country [12]. Therefore, it is very necessary to build a classification to categorize e-commerce based on the scale, congestion, and efficiency that is built on e-commerce [6]. Technologically personalization of e-commerce can be provided in various forms, namely mobile applications and websites. Website technology really needs an analytical model to get the right personalization model [13]. We need an algorithm to technically classify users to make

it easier for us to classify e-commerce users. One algorithm that has proven to be very good for classifying is the fuzzy approach algorithm which can be implemented on the website [14]. The classification made needs to consider the level of trust in e-commerce personalization because the trust factor becomes very important in e-commerce development. The trust factor needs to be modeled so that the right model is obtained in developing the e-commerce personalization model [15]. In e-commerce personalization, logistical factors are also seen to ensure the delivery process and management of traded goods. It is necessary to have a transportation management model to ensure that the logistics of goods can be guaranteed properly [16]. This is also closely related to the costs incurred due to the flow of these goods and services.

#### 4. Conclusion

We conclude that e-commerce personalization is not enough to just take into account the customer and technology aspects. The business aspect needs to be included to ensure that there are three aspects, namely Customer Behavior Assumption, Technology Requirement, and Business Assumption. This is considered because customers not only get a pleasant shopping experience but there are other factors that are more dominant. Thus, the right framework in building personalized e-commerce customers will get the desired product, with economic value and a sense of satisfaction that can increase the possibility of return visits. This framework is very easy to implement and has been proven to be easy to adopt.

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