

Mediation-Moderation Modeling for Marketing in Supply Chain Management

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Abstract- This paper aimed to explore and remap the functions and roles of mediating and moderating variables from various research papers and their use in supply chain management marketing research. The interface areas investigated between marketing and logistics/supply chain management in marketing research. The literature review method used refers to using the thematic content analysis approach and qualitative analysis. The research findings were a single mediation model with full mediation classification, partial mediation, complementary mediation, and competitive mediation. Both single moderation models with classification homologizer moderation, quasi moderation, and pure moderation. Finally, a combination of mediation and moderation models with separated mediation-moderation classification and complementary mediation-moderation. With the increasingly complex modeling that is proposed and tested, the clarity of the statistical tools used is very important to disclose as one component of the assessment of qualitative supply chain management marketing research.

Keywords- *Mediation; Moderation; Mediation-moderation modeling; supply chain management, Marketing research.*

1. Introduction

Part of the supply chain process that plans, implements and controls the efficient and effective flow and storage of goods, services and related information from the point of consumption in order to meet customer requirements. Publication of scientific papers in national and international journals, as well as theses and dissertations, we are often confused with various derivative terminologies of what are called variables. Variables in a simple way can be said as a concept that has a variety of values [1]. What exactly is the understanding of the concept itself? then the reference written by Ihalauw becomes interesting that the concept has two levels, namely the abstract and the empirical level [2]. And actually, a concept itself cannot be separated from the paradigm as stated [3].

Derivatives of variables are very numerous and often exchanged with each other, thus confusing beginner researchers. An example in strategic management is research from [4] which proves the existence of the role of corporate social responsibility as a moderator variable but is more appropriate with mediation terminology, namely between strategic orientation and dynamic capability with the performance banking industry in Indonesia.

Likewise with the research from [6] which interacts between independent variables and mediation in testing the mediation function which is more conceptually and mathematically more precisely categorized as a moderating variable. Not only that, for mathematical modeling that is not very different between variables called independent, exogenous, predictor, antecedent, intervening, suppressor and control. Similarly for non-independent or dependent variables with mathematical modeling for endogenous variables, criterion or outcome variables [7-12].

The use of mathematical notation is often exchanged between exogenous variables and endogenous variables as in the writings of [13] who are popularly referred to as determining the criteria for mediating variables. In the writing, the visual model uses the LISREL standard notation which is not quite right, that is, the gamma coefficient is visualized to affect fellow endogenous variables. Similarly, beta coefficient notation is inappropriate. So to eliminate this confusion in this paper use the LISREL notation standard developed by Joreskog and Sorbom [13]. The aim is as stated by [14] "A need exists to consider the art and practice of specification, evaluation, and interpretation without sacrificing too many technical considerations."

In its development, the terminology of mediation, moderator, intervening and control variables that appear visually or diagrammatically raises confusion and debate regarding the actual roles and functions of the four variables mentioned. However, when looking at the derivatives of mathematical equations in multivariate analysis, they are actually based on multiple correlation analysis (MCA) and multiple regression analysis (MRA) and path analysis [14-20] to explain or predict effects or the influence of one dependent variable on the other dependent variable. Of course mathematical modeling changes compared to the mathematical model developed at first, as for MRA using path analysis with decomposition techniques and MRA with mathematical models of reduced form as stated by [21], "From the structural equations one can solve for the endogenous variables and the reduced form equations and the associated reduced form coefficients. A reduced-form equation is one that expresses an endogenous variable solely in terms of the predetermined variables and the stochastic disturbances."

Logistics/supply chain management related issues or concepts contained in the previous researches were

identified, analyzed, and classified. Thus, our research will identify the specific supply chain issues focused on by marketing. This paper itself aims to explore and remap the functions and roles of mediating and moderating variables from various experts and their use in various studies, which are more specialized in the field of marketing management. In [22] themselves have asserted that the most important role of the two variables is to be the third variable used in testing the model. The first variable is, of course, the independent variable and the second variable is the dependent variable.

2 Mediating, Moderating and Mediating-Moderating Modeling in Supply Chain Management Marketing Research

2.1 Function and Role of Mediation Variables

Supply Chain Management encompasses the planning and management of all activities involved in sourcing, procurement, conversion, and almost all Logistics Management activities involved in the entire chain. Importantly, it also involves coordination and collaboration with channel partners, which can be suppliers, integrators, third party service providers, & customers. The discussion of mediation variables, including moderation, of course, is inseparable from the [10] which reviews conceptual and strategic mediation and moderation variables, including statistical considerations. Both explain that a third variable has a mediating function of the relationship between independent variables and non-independent variables. In essence, being treated as a mediating variable can provide predictions and explanations of how and why the (indirect) effect occurs. An example in the field of marketing that can be referred to is research conducted [20] who wants to prove the mediating function of trust, involvement variables, perceived value and commitment between customer satisfaction and customer loyalty. Which findings enrich the theory of relationship marketing, namely "the study suggests that perceived value proves to be complete mediators of satisfaction and loyalty, while commitment, trust, and involvement can prove to be partial mediators of satisfaction and loyalty. These findings indicate another role of commitment, trust, involvement, and perceived value in the formation of customer loyalty [20].

Perhaps an example or illustration that is more general and easy to digest if we look at the explanation put forward by [22] which describes the path diagram for the causal relationship of the three variables namely preventive program (X), social norm (Z), and number of smokers (Y). In this example, all variables that are influenced by other variables - social norms and number of smoking - are endogenous variables, whereas variables that only affect other variables without being influenced by other variables - prevention programs - are exogenous variables. Logically simple what, [23] that no matter how good a cigarette prevention program is carried out by the

government, for example, it will be something in vain if it is not linked (mediation) by planting or changing values at the norm of society. The more permissive the community is towards smokers, the more certain the program will certainly be ineffective. Another example referred to by [24], "For example, a researcher might posit that condom availability (X) has a positive risk of sex with multiple partners (Y). M), that marketing products as remedies create "get-out-of-jail-free cards."

2.2. Mediation Variable Criteria

Finally, a market orientation facilitates relationship marketing could promote the implementation of Supply Chain Management indirectly as compared to relationship marketing. A variable that functions as a mediator when fulfilling the following conditions: (a) exogenous variable (ξ_1) significantly influences the variable (η_1) which is assumed to have a mediating function (path γ_{11}), (b) Mediation variable (η_1) has a significant effect on the variable dependent (η_2) denoted by line b, and (c) when the path coefficients γ_{11} and β_{12} are controlled, the previous significant relationship between the independent and dependent variables is no longer significant, with a strong mediating function. This occurs when the path coefficient γ_{21} is zero (Figure 1). Concerning the last condition, we might imagine a continuum. When Path γ_{21} is reduced to zero, [25] state to be strong evidence for the dominant single mediator. If the line residue γ_{21} is not zero, this indicates a mediation function.

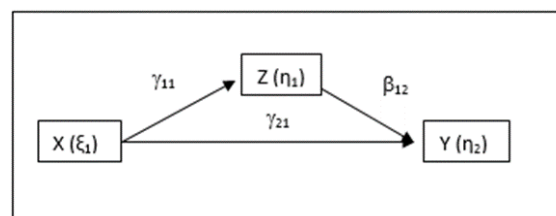


Figure 1. Mediation Variable Model with LISREL Notation

The mediating effect occurs when a third variable intervenes in the relationship between two variables. One of the basic requirements of a functioning variable as a mediating variable is the existence of a significant correlation between the three variables. But a researcher can test mediating variables in several ways.

Because the relationship or function of mediation is not easily determined, in addition to the theoretical basis statistically several ways that have been commonly used other than SEM or the GLM (General Linear Model) approach, including multiple regression analysis of course [26]. Using illustration 1, the steps that can be taken:

a. Significant correlation relationship:

a) Is the relationship/correlation of X (ξ_1) with Z (η_1) significant?

b) Is the correlation/correlation $X (\xi_1)$ with $Y (\eta_2)$ significant?

c) Is the relationship/correlation of $Z (\eta_1)$ with $Y (\eta_2)$ significant?

b. If the correlation coefficient c between X and $Y (\eta_2)$ is significant, it does not experience changes, including the addition of $Z (\eta_1)$ as a predictor variable in the model, then the mediating function variable $Z (\eta_1)$ is not supported.

c. If the path coefficient γ_{21} is omitted, while the results of predictor variables $X (\xi_1)$ and $Z (\eta_1)$ to $Y (\eta_2)$ are significant, the mediating function variable $Z (\eta_1)$ is supported.

d. If the coefficient c is omitted because it is not significant, but variable Z remains as the construct of mediation, then full mediation is supported.

In [26] explains the following about the mediation function of a variable $Z (\eta_1)$ hypothesized to have a mediating function between variables $X (\xi_1)$ and Y . Similarly, the variable $Z (\eta_1)$ is hypothesized to have a mediating function between $X (\xi_1)$ and $Z (\eta_1)$. If the fit model is accepted, then C as the mediating variable is accepted. Indeed, we can test the direct effect of $X (\xi_1)$ on $Y (\eta_2)$. Each direct relationship between $X (\xi_1)$ to Y , is an indication of the function $Z (\eta_1)$ as a mediating variable not supported. However, when the estimation of the path coefficient $X (\xi_1)$ to $Y (\eta_2)$ is not significant, while the estimation of other path coefficients is significant, the mediation function variable $Z (\eta_1)$ is supported.

2.3. Mediation Variable Mathematical Model

Building the best theoretical model is a mathematical equation because diagrammatic visual models make it easier for readers to digest but at the operational level, it must be explained in mathematical modeling whether a test of mediation functions is stated as full mediation or partial mediation.

The equation for linear regression analysis in LISREL notation is as follows:

$$y = \alpha + \gamma_1 X_1 + \gamma_2 X_2 + \dots + \gamma_q X_q + \varepsilon, \quad (1)$$

where $\alpha, \gamma_1, \gamma_2, \dots, \gamma_q$ are parameter estimates, ε is the term error or residual with an average of 0 and the variant σ^2 . Errors are assumed not to be related to independent variables X_1, X_2, \dots, X_q .

In [10] suggest that to test whether or not a variable has a mediation function requires several testing steps. Suppose we refer to Figure 1, then four equations are needed to be tested, namely the direct effect of path coefficient c . The path coefficients a, b and c are tested and estimated by the following equations 2, 3, 4 and 5.

$$\eta_1 = \alpha + \gamma_{11}\xi_1 + \varepsilon \quad (2)$$

$$\eta_2 = \alpha_2 + \gamma_{21}\xi_1 + \varepsilon \quad (3)$$

$$\eta_2 = \alpha_3 + \gamma_{21}\xi_1 + \beta_{12}\eta_1 + \varepsilon \quad (4)$$

$$\gamma'_{21} = \gamma_{11}\alpha \beta_{12} + \gamma_{21} \quad (5)$$

So the first step is to test first whether the mediating variable has a direct effect on the dependent variable (η_2). The second step regresses the independent variable (ξ_1) on the dependent variable (η_2) whether it has a direct effect. Only the third, simultaneously testing independent variables (ξ_1) and mediation (η_1) to η_2 . Until on this side, we do not understand the thoughts set forth by Berry and Kenny (1986) regarding the indirect effects of the similarities. As a solution to find out whether the mediating variable (η_1) has a significant mediation function or not, both of them borrow the testing done by the famous Sobel with Sobel Z-Test by multiplying the indirect effect of the path coefficient a with b as follows:

$$z = \frac{\gamma_{11}\alpha\beta_{12}}{\sqrt{\beta_{12}^2\sigma_{\eta_1}^2 + \gamma_{11}^2\sigma_{\beta_{12}}^2}} \quad (5)$$

Thus, [27] actually ignore the contribution of testing the direct effects, indirect effects and total effects developed by [28], whose testing of significance can be done by t-test (*test of joint significance*) not only on the coefficient direct paths but also indirect coefficients can be done, taking into account the correlation between the independent variable (ξ_1) and the mediating variable (η_1) to calculate the indirect path coefficient and whether the t-test is significant or not.

In [29] provide a critical note on [30]'s thinking about the function of mediating variables that fail to understand when associated with building theory. They give three critical notes. First, the mediation function is strongest when there is an indirect effect but there is no direct effect in equation 3. Second, there is no need for a significant "mediation effect" in equation 2. It is enough to specify the mediation function, that the indirect effect $a \cdot b$ becomes significant. Third, the Sobel test has low power compared to the bootstrap test popularized by [31].

In [29] who conducted empirical testing of the mediating variables of corporate brand credibility (CBC) and corporate reputation (CR) between corporate social responsibility (CB) and corporate brand equality (CBE) provided interesting results using Preacher procedures and Hayes. The results of a comparison between two indirect effects, namely (CSR \rightarrow CBC \rightarrow CBE vs. CSR \rightarrow CBC \rightarrow CR) show that indirect effect 1, namely CSR to CBE via CBC is much greater than indirect effect 2, CSR to CR via CBC.

Even though the coefficient for the contrast between indirect effect 1 and direct effect 1 is not significant. Meanwhile, the contrast coefficient between indirect effect 1 and direct effect 1 also did not have a significant difference from the value of 0 (95% CI -.20 to .32). Thus, the direct effect of CSR on CR is greater than the direct effect of CSR on CBE. For the record, in previous tests, Hur et al. (2014) [49], successfully proved that corporate brand credibility and corporate brand reputation have a significant mediating function between CSR and corporate brand reputation.

In [16] also expanded the mediation classification of [10] over three typologies, namely full mediation variables, partial mediation, and no mediation into five typologies namely complementary mediation, competitive mediation, indirect-only mediation: direct-only non-mediation, and no -effect non-mediation. In [16] recommend testing significant mediating variables using the bootstrap test for indirect effects $\gamma_{11} \times \beta_{12}$. Based on the classification of mediation types from the coefficient parameters γ_{11} , β_{12} , and γ_{21} . These coefficients can be obtained simultaneously by Structural Equation Modeling (SEM) or by using regression equations 2 and 4. The first step that must be considered is whether the direct effect is significant. This becomes the basis for knowing whether the tested variable has a function of mediation or not (non-mediation), namely:

1. If $\gamma_{11} \times \beta_{12}$ is significant but c is not significant, it means that the tested model has indirect mediation.
2. If $\gamma_{11} \times \beta_{12}$ is not significant but c is significant, it means that the model tested does not have a mediating function, but a direct effect on the dependent variable (Y).
3. If $\gamma_{11} \times \beta_{12}$ and γ_{21} are not significant, it means that the tested model has no mediation function at all, only the normal multiple regression equation models.
4. If $\gamma_{11} \times \beta_{12}$ and γ_{21} are significant, then specify $\gamma_{11} \times \beta_{12} \times \gamma_{21}$ by multiplying the three coefficients, or multiplying the coefficient γ_{21} with an average value of $\gamma_{11} \times \beta_{12}$ from the bootstrap output (eg using SPSS or LISREL). If $\gamma_{11} \times \beta_{12} \times \gamma_{21}$ is positive, the tested model produces complementary mediation variables, but if $\gamma_{11} \times \beta_{12} \times \gamma_{21}$ is negative, the tested model produces competitive mediation.

Thus, from the description described, we can draw a red thread that in testing mediating variables in structural equation models has two sects or schools of thought, namely the first *data behavior*, MRA (Multiple Regression Analysis) which was popularized by [3], which was then refined using a sampling technique with the Monte Carlo approach. Second, *human behavior*, based on path analysis, was later developed by [10] and Joreskog [5]. The mediation classification produced is full mediation and partial

mediation with two variants namely complementary mediation and competitive mediation.

2.4. Functions and Roles of Moderating Variables

In [10] explain that in general a moderating variable can be qualitative data such as sex, race or social class and quantitative data such as the level of difference in reward that directly affects or has a strong relationship between variables independent of or with variables dependent, more specifically in the framework of correlation analysis, moderation is a variable whose influence or relationship is a zero-order correlation between the other two variables. But the opinion of [10] has been broken by [9] which suggested the existence of three typologies of moderating variables namely homologizer, quasi and pure moderation which will be explained in a separate section. Back to the view that moderation is a variable whose influence or relationship is a zero-order correlation between two other variables. For example, in marketing, research conducted by [27] that variety seeking, age, and income is an important moderation between customer satisfaction relationships with customer loyalty. The moderating function of the three variables is done by multiple-group analysis.

In more popular variance analysis (ANOVA), the moderating effect is represented as the interaction between the independent variable and the independent variable which is a factor in determining the occurrence of moderation. For example, research conducted by [16] which tests the perceived function of moderation risk, which has always been an independent variable in marketing. The background of this test is inseparable from various previous studies on product category schemes that have congruent moderation functions. One of them is the perceived risk variable as a situational factor that moderates consumer product choices by moderating the preferences for the norm variable. The point is that if a consumer buys a product, it is certain that he will buy a product that is consistent with his perception (for example, milk that is not dented or defective). If the product purchased is not (incongruent products), then if he will continue to buy, whether the reason there is no choice or hurry, then consumers need what is called preferences for the norm. However, if the product is suitable, the moderating preferences for the norm function will not appear. The point is the seller or manufacturer must take this aspect into account.

2.5. Moderate Variable Criteria

Sharma et al. (1981) argue that the moderating variable can be formulated as a modification or systematic form of the strength of the relationship between independent variables and non-independent variables. Even though the conception of moderating variables has been widely accepted, but the validation of the model that has independent variables classified as moderating variables still has not yet had a complete understanding. The categorization of moderation

variables in general in various studies refers to the views of [10]. First, the moderating variable is the interaction between one independent variable and the other independent variables tested having a moderating function. Second, the independent variables are fully tested as moderation variables (full moderation). And the third most popular is the moderating variable that does not interact with other independent variables, by testing its significance employing differences between groups (multigroup) on the relationship between independent variables and the dependent variable.

In [22] state that the initial classification of moderation variables is only two, namely moderation which tests the strength of the influence of relations between independent variables on non-independent variables, and second, only modification of the first type. Which was then clarified by [4] in the form of a matrix that facilitates the understanding of researchers who are interested in testing the role of moderating variables, as shown in Figure 2.

	Related to Criterion and/or Predictor	Not Related to Criterion and Predictor
No Inter- action With Predictor	1 Intervening, Exogenous, Antecedent, Suppressor, Predictor	2 Moderator (Homologizer)
Interaction With Predictor Variable	3 Moderator ("Quasi" Moderator)	4 Moderator ("Pure" Moderator)

Figure 2. Typology of Moderation Variable Specifications

Figure 2 is a two-dimensional matrix. The first dimension is the classification of independent variables that interact with those that do not interact. The second dimension is interaction or not with independent variables and non-independent variables, which ultimately form four quadrants, where three quadrants fall into the classification of the moderating variable. As seen in quadrant 1, both the independent and non-free variables do not interact at all, so they are called various names which have been widely known as intervening, exogenous, antecedent, suppressor, or additional independent variables that depend on the characteristics of the variable. Moderation in quadrant 2 is a modification of the strength of the relationship called homologizer moderation, while moderation in variables 3 and 4 is a form of influencing the relationship between independent variables and non-independent variables, each of which is called apparent moderation and pure moderation.

2.6. Mathematical Model of Moderating Variables

To determine which model has a moderating function, [4] suggest doing four stages. The first is to determine the significant interactions between hypothesized variables that have a moderating function (η_1), by treating them as independent variables (predictors with MRA procedures as in equations 6, 7 and 8. If the interaction results are significant, proceed to the second step. If not significant, go straight to step three.

$$\eta_2 = \alpha + \gamma_{21}\xi_1 + \varepsilon \quad (6)$$

$$\eta_2 = \alpha + \gamma_{21}\xi_1 + \beta_{12}\eta_1 + \varepsilon \quad (7)$$

$$\eta_2 = \alpha + \gamma_{21}\xi_1 + \beta_{12}\eta_1 + \beta_{22}(\xi_1 \times \eta_1) + \varepsilon \quad (8)$$

The second step, determines whether the η_1 variable is related to the criterion variable. If it is related, then η_1 is a quasi moderation variable (quadrant 3, in Figure 2). If not related, then η_1 is a pure moderating variable, two forms of this moderator by [4] is called the classic moderation validation model. The equations for pseudo moderation functions are as follows:

$$\eta_2 = \alpha + \gamma_{21}\xi_1 + (\beta_{21} \times \eta_1) + \beta_{21}\xi_1\eta_1 + \varepsilon \quad (9)$$

For pure moderation equations are as follows:

$$\eta_2 = \alpha + \gamma_{21}\xi_1 + \beta_{21}\xi_1\eta_1 + \varepsilon \quad (10)$$

The third step determines whether the moderating variable (Z) is related to other independent variables or non-independent variables. If related, then the moderating variable (η_1) is not a moderating variable, but it is more accurately called exogenous, predictor, intervening antecedent, or suppressor variable. If the variable that is assumed to have a

moderating function (η_1) is not related, both with the independent variable and the non-independent variable, then proceed to the fourth stage.

The fourth step, for samples in the sample sub-group as a basis for hypothesizing the moderating variable. Group division can be done by median, quartile or other division methods. After the sample is divided into two or more, do a significance test based on valid predictive values between sub-groups. If there are significant differences between groups, η_1 is the type of homologizer variable that is determined based on the sample error rate. If there is no significant difference, it means that η_1 can be concluded not to have a moderating function. For mathematical equations homologizer moderation is as follows:

$$\eta_2 = \alpha + \gamma_{21} \xi_1 + \eta_1 \varepsilon \quad (11)$$

One weakness in the analysis of Sharma et al. (1981) is the illustration given is not consistent with the statement that to determine whether a moderating variable is based on differences in group sample errors. But the explanation emphasizes the value of the coefficient of determination and the value of F. So that should be given additional illustrations to better understand the operational level. Research conducted by [17] might help our understanding of homologizer moderation variables.

2.7 Combination of Mediation and Moderation in Testing Structural Models

We often find marketing research that tests empirical models that combine mediation and moderation variables simultaneously. As an example of research conducted by [13] who tried to prove empirically the overall satisfaction variable whether it has a mediation function or moderation between transaction-specific satisfaction and attitudinal loyalty (Figure 3). A result, for the function of mediation, overall satisfaction plays a significant role in the service industry it studies. To strengthen the previous theory that overall satisfaction has a mediation function. While for the function of moderation, overall satisfaction does not prove to be a significant role. However, some critical notes can be given to the tests carried out by [13], first in terms of measurement theory that supports the three tested variables which are not representative. Second, it is unclear which mathematical model is used, because it uses the MRA requirements with normality tests and classic assumptions and more stringent measurement scale requirements. Actually, the model developed is more a behavioral approach by using a more appropriate application, SEM. So [4], that the significance of the mediation role of overall satisfaction is not significant because of the differences in the industries studied.

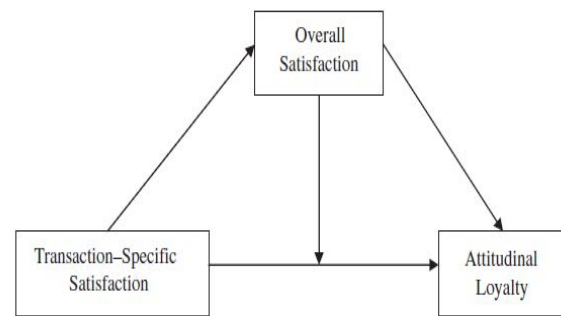


Figure 3. Partial Mediation Model and Moderation Overall Satisfaction

Source: Bodet (2008) [13]

Research from [15] is a better reference because the mathematical model and scale of measurement variables used are not debatable. They tested the mediation and moderation model of food-choice based on consumer trust on the logo of the product purchased. Consumers see the logo as a source of trust (willingness to pay). While for a significant moderating role is the type of store compared to the location of the store in the relationship between price, logo, and willingness to pay.

Research by [15] strengthens the proposition of a combination of mediation-moderation models that can be done simultaneously as proposed by [16]. Testing this model has the first stage, the manipulation effect of the independent variable and moderation on the final variable (outcome), second is the effect of the mediating variable on the final variable (outcome) and the three mediating-moderating effects on the final variable (outcome). Thus there are three hypotheses tested, especially the first and second hypotheses the results are significant so that the third hypothesis with the role of mediation-moderation can also be tested. Thus, the combination model of mediation and moderation has two variations, namely separated mediation-moderation [15] and complementary mediation-moderation [13].

3 Methodology for Classification Mediation and Moderation Models in Marketing Research

In line with the purpose of this study, the method used is the literature review. The literature review method used refers to [11] and [66]. Data sources are based on scientific papers in the form of journals published from data sources such as Emerald, Springer, Proquest, Elsevier, Gale, and others. Journals taken in the category of research papers or original papers from 2009 to 2018 are full text and speak English. Information taken is limited to marketing management studies and marketing research. The keywords used in the search are marketing, marketing research, mediation, moderation, and mediation-moderation modeling.

From the search obtained 233 journals, which were then scanned for titles, abstracts, and keys to sort out relevant articles. The results were obtained 157 articles which were considered relevant to the purpose of this study for further study with the following

details: Emerald, 50 (31.85%); Springer, 32 (20.38%); Proquest, 30 (19.11%); Elsevier, 30 (19.11%); Gale, 8 (5.10%) and others, 7 (4.46%) as seen in Table 1.

Table 1. Data Source Search Results (2009 -2018)

No.	Source	Searching Result		Review Result	
		Total	%	Total	%
1.	Emerald	61	26,18	50	31,85
2.	Springer	43	18,45	32	20,38
3.	Proquest	65	27,90	30	19,11
4.	Elsevier	41	17,60	30	19,11
5.	Gale	12	5,15	8	5,10
6.	Others	11	4,72	7	4,46
	Total	233	100	157	100

After the sorting process is done, it is continued by using a thematic content analysis approach that refers to the research procedure used by [24], [11] and [6]. The thematic content analysis

approach produces 3 classifications with 6 sub-classifications for mediating variables (Table 2), 3 sub-classifications for moderating variables (Table 3) and 3 sub-classifications for mediation-moderation modeling (Table 4) in marketing research.

Table 2. Mediation Classification in Marketing Research: 2009 – 2018

No	Author	Mediation					
		Multi	Full	Partial	Competitive	Complementer	Complex
1	[1]			V			
2	[9]			V			
3.	[2]			V			
4.	[1]			V			
5.	[14]		V				
6.	[8]						V
7	[3]		V				
8	[5]		V				
9	[6]	V					
10	[7].	V					
11	[24]	V					
12	[30]	V					
13	[29]				V		
14	[6]				V		
15	[3]				V		
16	[29]					V	
17	[3]					V	

Table 2 presents that there are quite a number of mediating variables used, but the most multi mediation. This means that these six types of variables are considered to provide benefits in building theory and solving marketing problems over the past ten

years. Even if it only appears once, mediation testing using control variables is also carried out, especially studies that look at the relationship with financial performance [3].

Table 3. Moderation Classification in Marketing Research: 2009 – 2018

No	Author	Moderation		
		Homologizer	Quasi	Pure
1	[6]	V		
2	[3]	V		
3	[8].			
4	[17]	V		
5	[77]	V		
6	[7];	V		
7	[9]	V		
8	[3]	V		
9	[2].		V	
10	[3]		V	
11	[2].		V	
12	[6].		V	
13	[7]; [19].		V	
14	[27].			V

Table 3. For the classification of moderation variables in three types, namely homologizer, quasi and pure, the dominant type is the homologizer moderation. This is easy to understand because for the quasi type demands more stringent measurement

requirements, because it is an interaction between the independent variable and the variable that is thought to have a moderating function. And of course not separated from the side of the moderation proposition that was built.

Table 4. Mediation-Moderation Classification in Marketing Research: 2009 – 2018

No	Author	Mediation-Moderation		
		Separated	Complementer	Complex
1	[6]	V		
2	[19]	V		
3	Pekovic & Rolland;	V		
4	[15] .	V		
5	[6]	V		
6	[18];			
7	[19]	V		
8	[3]	V		
9.	[30]	V		
9	[17]	V	V	
11	[4]	V	V	
12	[4]		V	
13	[21]		V	
14	[26];		V	
15	[17];		V	
16	[15];		V	
17	[13] [12]		V	
18	[15]; [22];		V	
19	[19]; [28]; [15]		V	
20	[1]; [11]		V	V
20	[12].		V	V
21	[30].	V		V
22	[20]; [18]	V		V
23	[14]	V	V	V
24	[27]	V		V
25	[16]	V		V
26	[17]; [23]			V
27	[7]; [13]		V	V
28	[9]		V	V
29	[5]	V		V
30	[22].			V

The mediation-moderation classification produces three types, namely separated, complementer and complex. The type of separated mediation-

moderation tests the function of mediating variables with simultaneous homologizer moderation. Similar to complementary mediation is testing the mediation

model with quasi moderation simultaneously. Complex mediation-moderation in question is in addition to using separated or complementer forms also adding other variables such as control variables, so that mathematical modeling and hypothesis testing are no longer linear.

4. Discussion and Managerial Implication

4.1 Marketing benefits to Supply Chain Management:

Relationship marketing can be built on the foundation of trust as a willingness to rely on an exchange partner in whom one has confidence. Moreover, effective service marketing depends on trust because customers typically must buy a service before experiencing it. And, mutual benefit to participating parties is essential for strong relationships. Both parties must perceive greater benefit from the relationship than could be achieved without it. Another financial benefits and competitive advantage are earned by a firm only if

customers are willing and able to engage in relationship patronage. For mediation, the choice of multi, full and partial mediation is more widely used in various marketing research. There is an additional classification proposed by Zhao et al. (2010) [106] about complementary mediation and competitive mediation, apparently limited use. For moderation, the results show that for the marketing sector that remains widely accepted are homologizer and quasi types (Table 3). The results of the literature review with TCA (Thematic Content Analysis) are dominant testing, especially separated, a combination of partial mediation and homologizer moderation. While for mediation-moderation complementary is a combination of partial mediation with quasy or pure moderation. In both of these modeling combinations, it turns out that many marketing researchers are interested in adding control variables, even with content analysis combinations. So that diagrammatically the reclassification of modeling mediations in marketing research is presented in Figure 3.

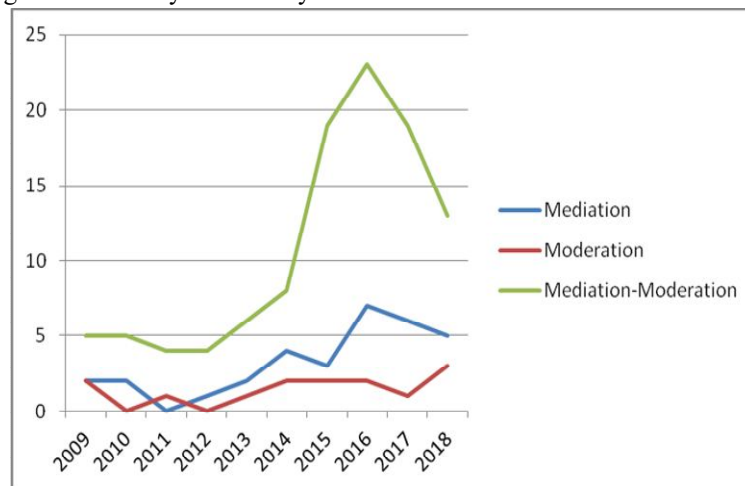


Fig. 3. Trends in Structural Models in Market Research: 2009-2018

In Graph 1 we can state that the interest of marketing researchers is to do combination testing mediation = moderation. A popular second choice is mediation testing. Even though the moderation test is singularly outnumbered, the research design used is more impressive. Because in general, the moderation test uses more data collection techniques in the form of experiments.

For data analysis, marketing research is more dominant in behavioral studies, especially about

perceptions that on a measurement scale including ordinal scales that use statistics that rely mostly on non-parametric statistics. While in Table 5, we see a lot of analysis of the data used are numerical scales such as MRA, OLS, Anova / Ancova, and Manova/Mancova. While data analysis accommodates more non-metric scales in SEM and PLS. Indeed MRA can be used in medical studies but requires that it be done using decomposition techniques [30].

Table 5. Mediation and Moderation Classification in Marketing Research: 2009 – 2018

Classification	Sub-classification	Total Mention
Data Analysis	MRA/OLS/ANOVA	53
	SEM/CFA	68
	ANCOVA/MANCOVA/MANOVA	22
	Bootstrapping	7
	PLS	24
Application	LISREL	15
	SPSS/PROCESS Macro	33
	SmartPLS/Other	6
	EQS	2
	Amos	19
	Not mention	82
Scope of Marketing	Consumer/Durable Goods	64
	Service	50
	Industrial	24
	Digital	17
Research Design	Experiment	42
	Survey	111
	Data <i>sekunder</i>	2

This "carelessness" can be tracked by identifying the assisted programs used, such as LISREL providing the transformation process for ordinal data into intervals, or Smart PLS which does not require strict assumptions regarding some basic assumptions such as in the MRA or Anova / Manova. The carelessness was seen by not mentioning the analysis tools used with the number reaching 82 articles. This should be taken into consideration with the increasingly complex modeling that is built and tested, of course, the clarity of the tools used is very important to be one component of the quality assessment of marketing research.

5. Conclusion

The concept of marketing, relationship marketing, market orientation and Supply chain management are not distinct. Instead they are inseparably associated with each other. The marketing concept promotes individual firm's coordinated activities inside and outside the firms to accomplish customer satisfaction with a profit earning. With conceptual exposure about functions and the role of mediation and moderation variables can be said to have three patterns. First, a single mediation model with the classification of multi-mediation, full mediation, partial mediation, complementary mediation, competitive mediation, comp; ex mediation. Both single moderation models with classification homologizer moderation, quasi moderation, and pure moderation. Third, the combination model of mediation and moderation with separated mediation-moderation classification,

complementary mediation-moderation, and complex mediation-moderation modeling.

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