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FOCUSING ON THE FUNDAMENTALS: SCAFFOLDING QUANTITATIVE RESEARCH STRUCTURE AND RESEARCH PARADIGMS IN SOCIAL SCIENCES RESEARCH

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Introduction

Planning scientific research can be likened to building a house. Procedures must be duly followed to avoid fruitless efforts. This article addresses some of the issues encountered by younger researchers. Writing a quantitative study takes various steps. However, there are three main types of research design- quantitative, qualitative, and mixed method. The differences in these approaches depend largely on data collection procedures, philosophy, the nature of research problems, theoretical perspectives, research structure, and study objectives. The quantitative study deals with numbered data that can be analyzed using statistical means. It is an approach for testing objective theories, via the examination of relationships among measurable variables on instruments. It uses a large number of respondents. Again, the quantitative method allows scholars to test the relationships among the study variables identified in the study model to provide evidence to support or refute the hypotheses. Quantitative could be experimental, cross-sectional, or longitudinal (West, Turner, & Zhao, 2010).

Experimental studies are ones where researchers introduce an intervention and study its effects. Experimental studies are usually randomized, meaning the subjects are grouped by chance. A cross-sectional study is a type of research design in which you collect data from many different individuals at a single point in time. The study takes place at a single point in time. It does not involve manipulating variables. It allows researchers to look at numerous characteristics at once (age, income, gender, etc.). It's often used to look at the prevailing characteristics in a given population. A longitudinal study is conducted with the same sample over the years. The longitudinal study can justify a cause-and-effect relationship (Bryman, Bell, 2011).

The qualitative study is not the opposite of the quantitative study as people usually assumed. Qualitative study starts from where quantitative study ends with a distinct approach. Qualitative research tends to explore and understand the meaning individuals, groups or respondents ascribed social or human problems using few participants. It is mainly on words with a flexible structure. It uses an inductive style in reporting the complexity of a situation. A mixed methods approach involves the integration of both forms. However the mixed method is philosophically distinct. The main focus of this article is on the quantitative approach (Kahlke, 2014).

Additionally, regardless of your academic major, as you pursue a particular degree, much of what we are learning in research is a result of theoretical thinking. In conducting scientific research, the primary purpose is either to generate a theory (qualitative method) or verify a theory (quantitative method). When this important component (Communication theory) is missing in scientific research, the whole frame and structure of the entire research or study are incomplete (Richey, Klein, & Tracey, 2019). This theoretical aspect is further examined in a different segment of this article. This is because a quantitative study is built and guided around a relevant theory to a study (Craig, 1999).

Table 1: Distinctive differences in research approaches

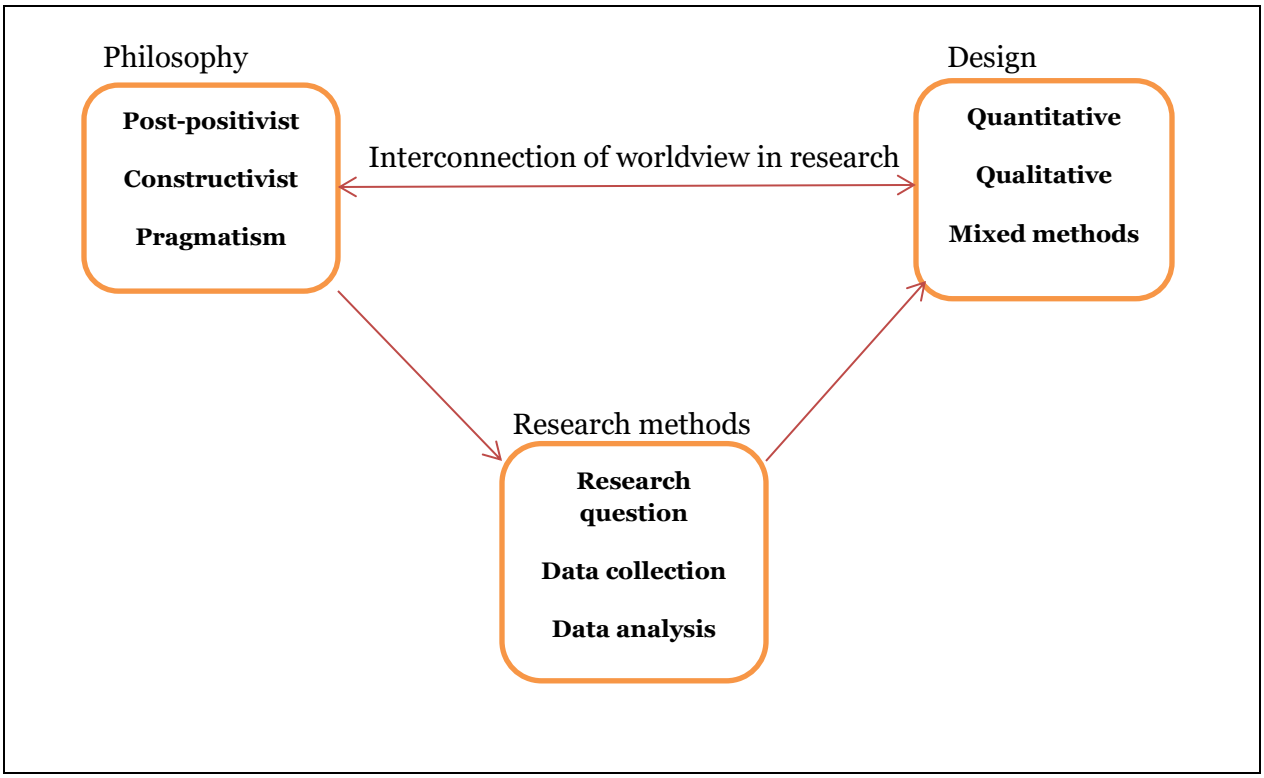
Quantitative study	Qualitative study	Mixed methods study
Pre-determined	Emerging approach	Both Pre-determined and Emerging approach
Statistical interpretation, numbers based	Themes, patterns interpretation, words based	Both Statistical interpretation and Themes, patterns interpretation
Closed-ended instrument based questions	Open-ended based interview questions	Both Closed-ended instrument based questions and Open-ended based interview questions
Statistical analysis	Test and image analysis	Both Statistical analysis and Test and image analysis
Large population/ performance data, attitude data, observational data, and census data	Small population/ interview data, observation data, document data, and audiovisual data	Multiple forms of data, drawing from both quantitative and qualitative data possibilities

Adapted from West, Turner, & Zhao, (2010)

1. Quantitative ingredients

Research is a product of philosophical assumptions, otherwise known as worldviews. These worldviews shape the research method. Each of the three research approaches has its distinctive philosophical assumption. It is important to understand the application of worldviews to scientific research. This plays a major role in the accurate selection of research design or method.

Diagram 1: Interconnection of worldviews, research design and research methods framework



Adopted from Creswell, & Creswell, (2017)

Arguably, philosophical assumptions remain hidden in scientific research, especially at the Ph.D. level. However, these philosophical ideas still predominantly influence the practices of scientific research. It is important to recognize these paradigms as they connect to different research approaches (Creswell, & Creswell, 2017).

In the approaches to knowing, three approaches characterized distinctive approaches to research. This set of beliefs or approaches is known as a paradigm- ontology, epistemology, and axiology. Ontology is the nature of existence, Epistemology is the nature of valid knowledge acquisition and, Axiology is the nature of value judgment. These are linked to methodology in scientific research. Methodology, simply put, is the overall research strategy and rationale. It is in a general sense. Methods are simply the specific tools, behaviors, and procedures researchers use to collect and analyze data or select a research technique (Raadschelders, 2011).

Thus, the methodology is the analysis of all the methods and procedures of the scientific investigation. Research methods are the techniques that apply the methodology. Epistemology discovers knowledge, Ontology talks about the existence of knowledge, and Axiology creates a picture and discourse about the moral judgments and values of the knowledge acquired. Ontology helps researchers recognize how certain they can be about the nature and existence of objects they are researching. Epistemology is important because it influences how researchers frame their research in their attempts to discover knowledge. The table below further explains the linkages among ontology, epistemology, methodology, and method in research (Killam, (2013)

Table 2: Interconnection of approaches to knowing, research philosophy, and research design

ONTOLOGICAL STANCE	EPISTEMOLOGICAL STANCE	RESEARCH PHILOSOPHY	RESEARCH DESIGN
Singular Reality – one truth	Examine using established designed and tools	Positivism	Quantitative
Multiple realities	Examine using interpretive approach	Constructivism	Qualitative
Singular and Multiple realities	Examine using best tool	Pragmatism	Mixed method

Adapted from West, Turner, & Zhao, (2010)

A researcher's ontological position can be objective or constructive. An objective ontological position evaluates social phenomena independent of social actions (usually associated with the quantitative approach). A constructive ontological position recognizes that social phenomena are dynamic and realized through social interaction, usually linked to a qualitative approach (Grix, (2001)

Thus, ontological realism (one truth) is a quantitative research, positivism, deductive, objective, and theory verification. While ontological relativism (truth based on cultural or social background/interpretation) is a qualitative research, constructivism, inductive, subjective, and theory generation. Epistemology is concerned with assumptions about human knowledge,

particularly the acceptable knowledge in a discipline. These assumptions shape how we understand our research questions and the methods that we will use to investigate the research question, collect data, analyze and interpret data. In other words, the specification of the ontological stance is a prerequisite for the choice of the epistemological standpoint which, in turn, shapes the research methodology that is going to be adopted (Krauss, (2005).

Positivists believe that there is a single reality, which can be measured and known, and therefore they are more likely to use quantitative methods to measure this truth. Constructivists believe that there is no single reality or truth, and therefore reality needs to be interpreted, they are more likely to use qualitative methods to get those multiple realities (Craig, 1999).

Pragmatists believe that reality is constantly renegotiated, debated, interpreted, and the best method to use is the one that solves the problem- mixed methods. As argued by Knight and Turnbull, a researcher needs to have a clear ontological and epistemological stance for their research, and understand fully the knowledge in their field of study and how it is acquired (Tuli, 2010).

1.1. The Postpositivist paradigm

This worldview is a traditional form of research that is dominant in quantitative studies. It holds a deterministic philosophy (determines effects or outcomes) in research. It identifies the causes that influence outcomes. It is reductionist (it reduces the big ideas into a smaller set – the variable that comprises the research hypotheses or research questions) in structure. It is based on careful observations and measurements that study relationships among variables that exist in a quantitative study, which signifies objective realities in the human world. This paradigm studies human behaviors via numeric measures of observation (Creswell, & Creswell, 2017).

One important point to note about postpositivism is the fact that it recognizes the laws that govern human existence (the theories) and the need to verify or refined these (laws) theories so that we can understand the world and nature of our existence (epistemology). Owing to this worldview, the researcher begins with a relevant theory, collects data that either support or refutes the selected

theory, and makes a refinement to the theory. There is an absolute truth in this paradigm using closed-ended structured questionnaires and statistical data analyses – a quantitative study. This was demonstrated in the figure above. Postpositivist Epistemology is deductive, objective, realism, and theory verification based. An empirical researcher tends and strives to be objective and scientifically works to control the relevant concepts in the theory (West, Turner, & Zhao, 2010).

1.2. The constructivist worldview

Social constructivism is the Interpretivism perspective. It holds more in qualitative studies. This paradigm believes that people seek an understanding of the world in which they live and work. It is more of words than numbers thus; the subjective meaning of individual experience applies. In this paradigm, there is no absolute truth. Individuals develop subjective meaning via open-ended (broad and general) questions, which leads to the complexity of views and opinions (qualitative) rather than narrowing meanings (quantitative study) into a set of ideas (Creswell, & Creswell, 2017).

1.3. The Pragmatic worldview

The researcher in constructivism relies heavily on the participant's view of the phenomenon being studied. The main intent of this worldview is to make sense of the meanings others have about the world and human existence. Constructivist Epistemology emphasizes the: inductive, subjective, and theory generation perspective. Here, rather than starting with a relevant theory (postpositivism-quantitative), researchers inductively generate a theory or a significant pattern of meaning (Morgan, 2014).

This paradigm arises out of action, situations, and consequences rather than antecedents. This is also known as the critical approach. It holds more on the mixed methods because pragmatist believes more in the best possible means to solve human problems. For the mixed method researchers, this paradigm opens the door to multiple methods, a different worldview, different assumptions, different forms of data collection, and analyses with the view to opting for the best approach to solving societal problems (Creswell, & Creswell, 2017).

For a pragmatic researcher, it is important to change the status quo to resolve power imbalance and give voice to the voiceless by the power structure. There is freedom of choice from multiple truths, and an external world independent of the mind. The authors graphically present the differences in the worldview as they relate to research approaches.

Table 3: Worldviews classifications into distinctive research approaches

POST-POSITIVISM	SOCIAL CONSTRUCTIVISM	PRAGMATIVISM (CRITICAL THINKING)
1. Determinism 2. Reductionism/Deductive 3. Empirical observation and measurement 4. Realism 5. Theory verification 6. Construct relationships based. 7. Large population 8. Survey/experimental 9. Objective 10. Closed-ended question 11. Ontologically single truth 12. Epistemologically using established designed and tools.	1. Understanding 2. Exploring 3. Relativism 4. Multiple participant meaning 5. Researcher's involvement 6. Social and historical construction 7. Inductive 8. Subjective 9. Interpretivism 10. Ethnography/grounded 11. Open-ended questions 12. Theory generation 13. Ontologically more than one truth 14. Epistemologically using interpretive approach	1. Power and justice based 2. Collaborative 3. Pluralistic approach 4. Social change oriented 5. Critical thinking/problem centered 6. Consequences of action 7. Real-world practical oriented 8. Political 9. Epistemologically using the best tools-collaborationism
Quantitative	**Qualitative**	**Mixed methods**

Adapted from Tuli, (2010)

2.0. The concepts of theory/variables in research

Theory can be used in qualitative, quantitative, and mixed-methods research. Research is a systematic process by which data are gathered and analyzed (methods) through carefully designed procedures (methodology) to generate new knowledge (epistemology) and solve an identified existing problem (ontology). Research is rooted in philosophical beliefs about values, concepts, and the nature of knowledge. The set of beliefs or worldview is known as a paradigm- ontology, epistemology, and methodology. Interestingly, all these are embedded in the theories which are

verifiable/testable in quantitative research or buildable in qualitative research (West, Turner, & Zhao, (2010).

The centrality of every scientific research is built on the questions being asked, the hypotheses being tested, the constructs/variables being examined, the population being considered, and the type of inquiry or systematic investigation being applied. All these listed important segments in every scientific research are predominantly derived from a theory or theories.

Therefore, taking away theories from scientific research will become meaningless and worthless. If we must study and understand human behavior, and issues in life such as consumer trust, divorce, decision-making, etc., theory should be a top priority. Scientific research (quantitative study) is best understood both in topic and structure through the application of theory (Lee, 1961; Boyle, & Schmierbach, 2019).What is theory in research?

According to Richard & Lynn, a theory is a system of concepts and their relationships that helps us to understand a phenomenon. In quantitative research, a theory is like a building plan that formulates and organizes ideas that a researcher wants to study. Research constructs are mostly if not predominantly products of theories (West, Turner, & Zhao, 2010). Furthermore, according to kerlinger, theory in a quantitative study is a set of interrelated constructs formed into propositions that presents a systematic view of phenomena that specifies relationships among variables (Kerlinger, 1979). One important question to be answered by a quantitative researcher before and after a topic election is; what topic is relevant to answer my research questions?

This is important because your research variables depend on it. Theories are developed when researchers test a prediction over and over in different settings and with different populations. Simply put, theory develops as an explanation to advance knowledge in particular fields (Creswell, & Creswell, 2017). When a researcher wants to create a theory, he is guided by his knowledge of knowing things (empirical, Interpretive or critical) and the answers to questions about truth and reality (ontology, epistemology, and axiology).

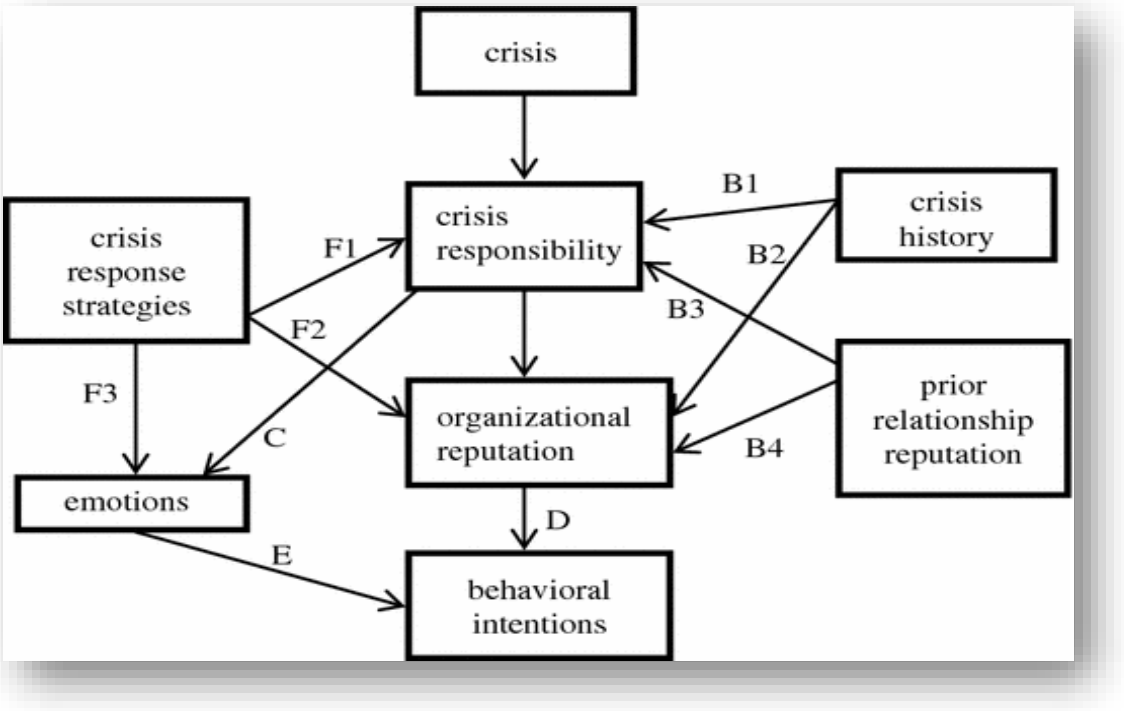
In research, a theory has different levels: Micro level (micro level theories explain predictions that are limited to a small number of people or time such as face to face interactions engagement), Meso level (this level of theory links the micro and macro levels. These are theories not too small, not too broad. They are theories of organizations, communities, or social movement), and the Macro level (these are theories that explain larger sum or numbers, such as cultural systems, a whole societies, social institutions).

From the theoretical framework, a conceptual framework is derived. This is where the study's variables are derived from and shaped in quantitative research. However, researchers are not expected to use the entire proposition from the theoretical framework but only a few, relevant to the current study. When a researcher uses only the construct from a theoretical framework without incorporating another source, it is a confirmatory study (Osanloo, & Grant, 2016). When a researcher incorporates a variable called the intervening variable, it is an exploratory study. Let us take an example from the SCCT theory by Coombs. The author uses Situational Crisis Communication Theory to illustrate confirmatory and exploratory studies in quantitative research, as explained above.

Diagram 2: Theoretical framework (SCCT)

The blueprint for the entire research inquiry that serves as the guide and also provides the structure which defines how the researcher will philosophically, epistemologically, methodologically, and analytically approach the research as a whole is the theoretical framework. A poor or missing theoretical framework is a critical problem for quantitative research. It is like building a beautiful house without a foundation which can result in a devastating collapse. The theoretical framework justifies the conceptual framework. One major problem with most young researchers is that the constructs in their conceptual framework/ research topic are distinct from their theoretical framework. When there is no theory to support your research, it simply means that your result or research outcome has no evidenced-based results.

The framework is always a theory in theory-driven research (quantitative research) where the researcher attempts to test the validity of an existing theory. But not so in qualitative research, where the researcher attempts to develop a theory. A theoretical framework is extrapolated from existing theories (or theory) in the literature that has already been tested and validated by others and considered a generally accepted theory in the scholarly literature (Lederman, & Lederman, 2015).



Note: There is a strong bond between crisis communication (strategies of communication) and corporate reputation management. SCCT provides crisis communication strategies to shield corporate reputation in a crisis. This is an established theory, used in crisis communication research to protect organizational reputation during a crisis. The Situational Crisis Communication Theory (SCCT, 2007), mainly focused on a symbolic approach to crisis communication was posited by Timothy Coombs and originally presented by W. Coombs in 1995. The theory was inspirited by or an extension of the 'Attribution theory', supporting the view that people make a sound judgment about the cause of any sudden negative occurrences (crisis) with negative outcomes. In quantitative research, a theory is selected and operationalized to create and shape the framework that sustains the research questions and guides the analytical technique.

3.1. Conceptual framework

The skeleton for every research paper is the research framework. It is a systematic model of the researcher's link to the several variables that have been identified as important to the problem of the study. It helps in the justification of the variables as regards data collection.

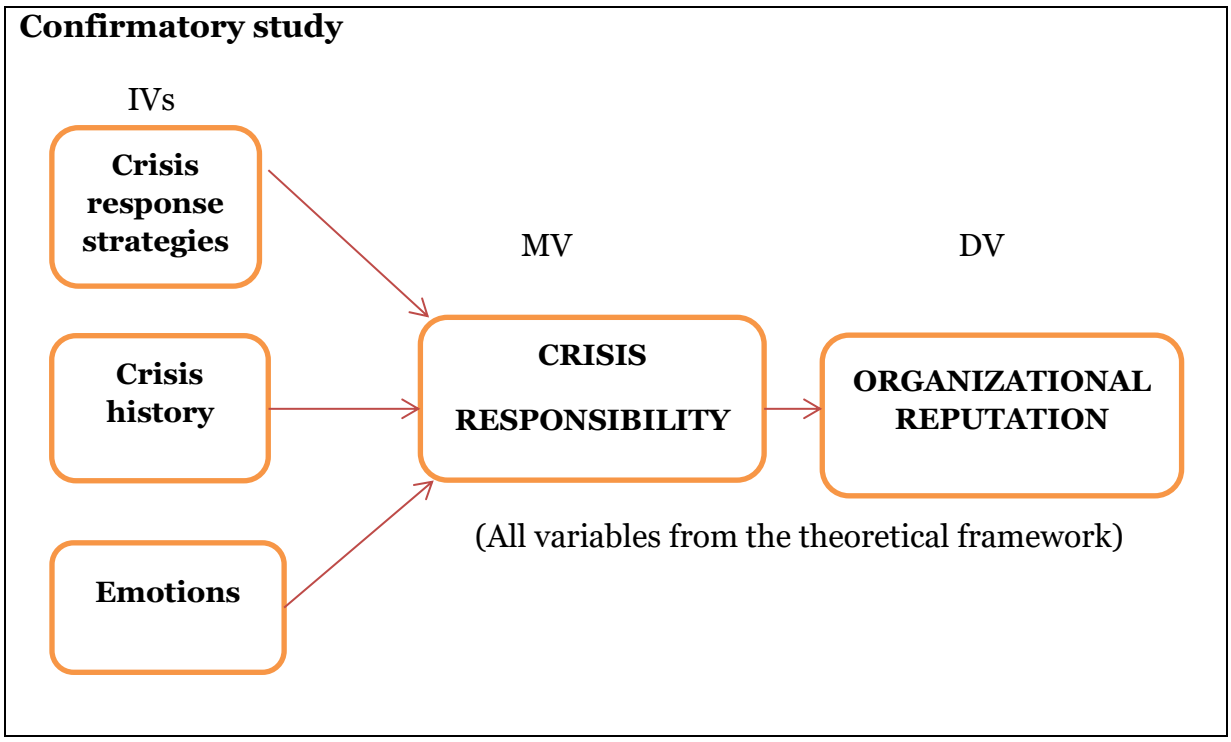
A conceptual framework is derived from the propositions in the theoretical framework and it is logically applied. There must be an agreement between the research topic, the variables in the conceptual framework, and the theoretical perspective. Show me your research topic, and the proposed theory, and I will show you the looks (variables) of your conceptual framework. From the theory above, we are going to see how confirmatory and exploratory work (Osanloo, & Grant, 2016).

Consequently, a theoretical framework describes the theoretical underpinnings of your work based on existing research. On the other hand, the conceptual framework allows you to draw your conclusions, mapping out the variables you wish to use in your study and the interplay between them.

In practice, the conceptual framework constitutes the researcher's intellection on the identification of the construct relationships, the research topic, the question to be asked, the problem/gaps to be investigated, the concepts to be applied, the methodology to be used, the methods, procedures and the instruments, the data analysis, and findings interpretation embedded in the research.

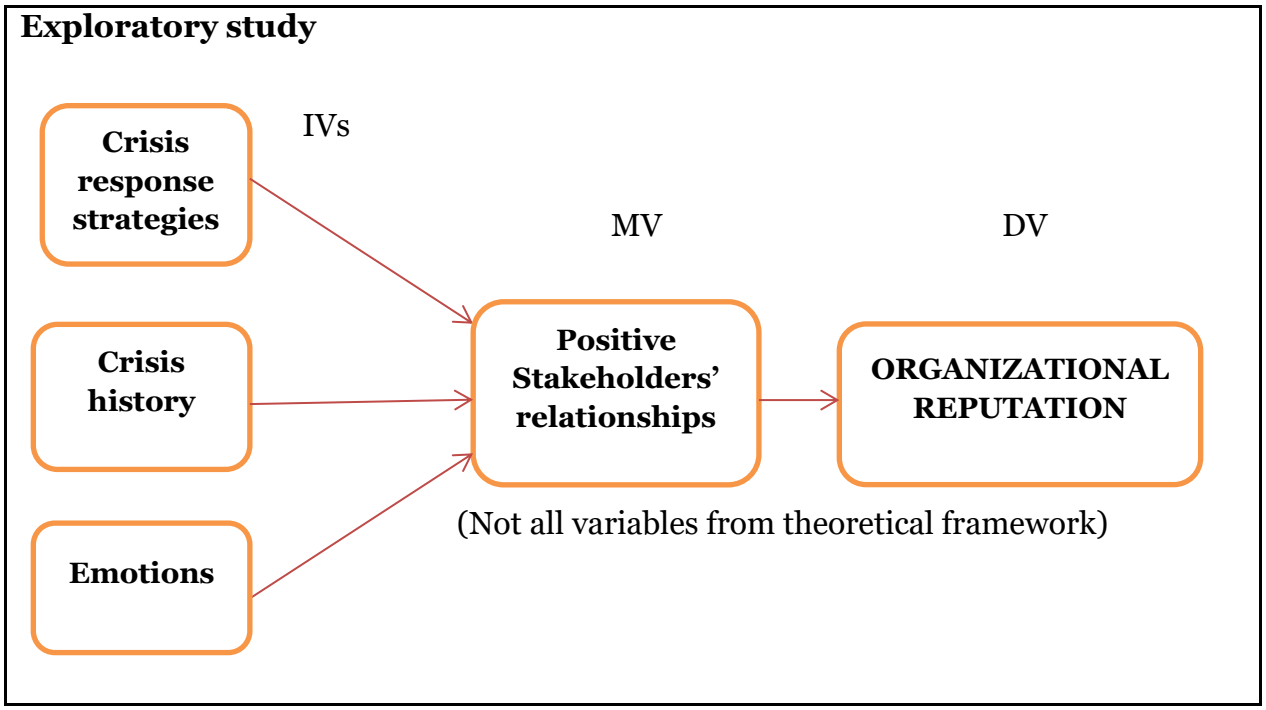
Therefore, it is regarded as the researcher's logical metacognitive conceptualization of your entire research work (Mensah, Agyemang, et al., 2020).

Diagram 3: Confirmatory study Conceptual framework



Here, the researcher aims to confirm if this theory still holds in a particular context as other contexts appeared to be valid with the theory. In data analysis, this is where Covariance-based structural equation modeling is applicable (Hair Jr, Hult, Ringle & Sarstedt 2021). The relationship between variables in a conceptual framework is logically and systematically finalized before data collection. It involves hypothesis generation, prediction, and testing resulting in theory development, refinement, or rejection.

Diagram 4: Exploratory study Conceptual framework



The purpose is to advance or develop the theory. In data analysis, this is where partial least squares structural equation modeling is applicable. This leads us to the concept of variables in research.

3.2. Variables in Quantitative research

A variable is an attribute of an individual, an organization, or a society that can be statistically measured or observed which varies among the individual, organization, or society that is being studied. In quantitative studies, measurable variables could be gender, age, socio-economic status (SES), especially looking at MODERATORS, and attitudes, and behaviors, especially looking at MEDIATORS. The sequence of variables in quantitative study is based on theory, logic, and researchers' experience (Hair Jr, Hult, Ringle & Sarstedt 2021).

However, these variables could be latent constructs (variables that are not directly measurable. They are hidden or unobserved. Their value can be inferred by taking other statistical or mathematical measurements, for example- reputation) or observed variables (variables that can be measured directly, example- gender).

3.3. Types of variables in quantitative study

3.3.1 Independent variable (exogenous latent constructs): These are variables that influence the outcome. They are called independent because they are the variables that can be manipulated in an experiment. They are also called treatment variables. In a conceptual framework, variables on the left side predict the variables on the right. Variables that perform as independent variables are empirically known as exogenous latent constructs. They are positioned on the left side of the conceptual framework. Again, they have arrows that point out of them and never have arrows pointing into them.

3.3.2. Dependent variable (endogenous latent constructs): These are variables that depend on the independent variables. They are the outcomes of the influence of the independent variables. In a conceptual framework, variables on the right side are considered dependent and are empirically known as endogenous latent constructs. Furthermore, they have an arrow pointing into them and never out of them.

3.3.3 Intervening variable (mediating variables): These are variables that stand between the exogenous and endogenous latent constructs. They transmit the effect of an exogenous variable on an endogenous variable. Again, arrows from independent variables are pointed into them and an arrow from them, pointed into the dependent variable.

Systematically, statistical procedures like Analysis of covariance (ANCOVA), is usually applied by quantitative researchers to control these types of variable. Furthermore, the concept of ANCOVA is explained in the article below.

3.3.4. Moderating variable (predictor variables): They affect the direction and strength of the relationship between exogenous and endogenous latent constructs or between predictor and outcome. They intersect with the independent variables and influence the dependent variable. The

moderating effect often takes the form of observed variables like: participant gender, age, levels of education, SES, and levels of income (Creswell, & Creswell, 2017). In the conceptual framework, an arrow or arrows pined in the middle as seen in the example below.

Diagram 5: Conceptual framework indicating independent, mediating and dependent variables

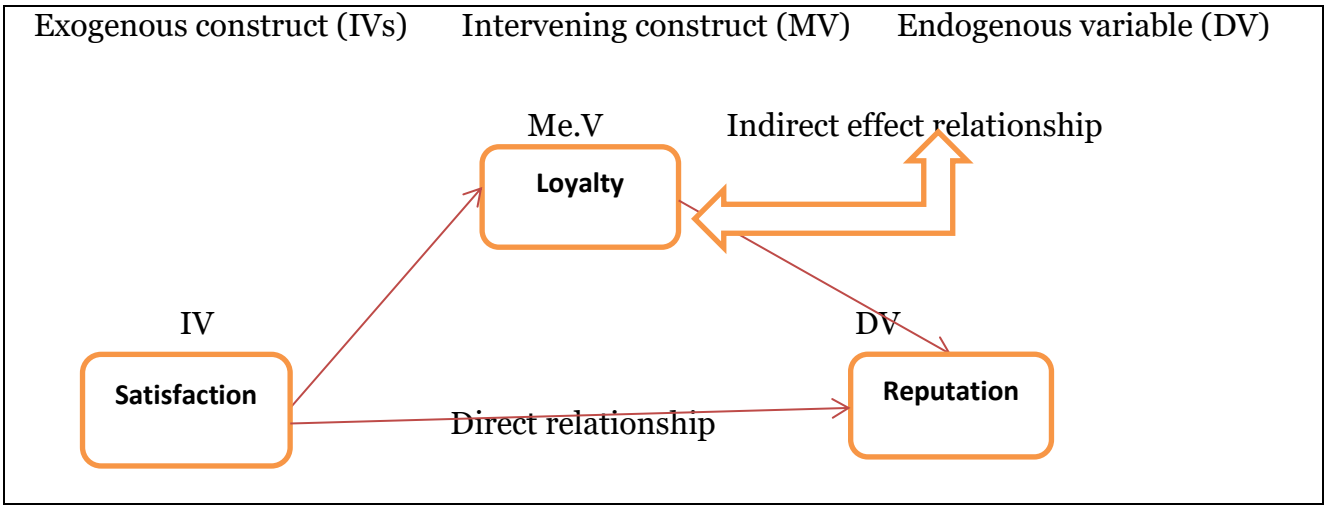
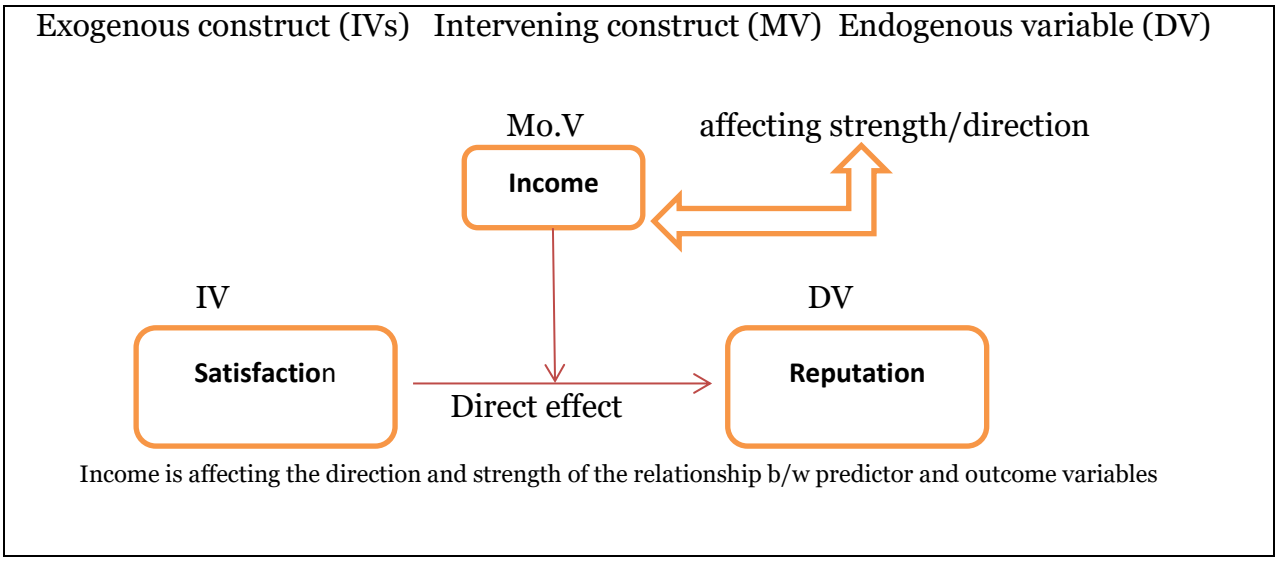


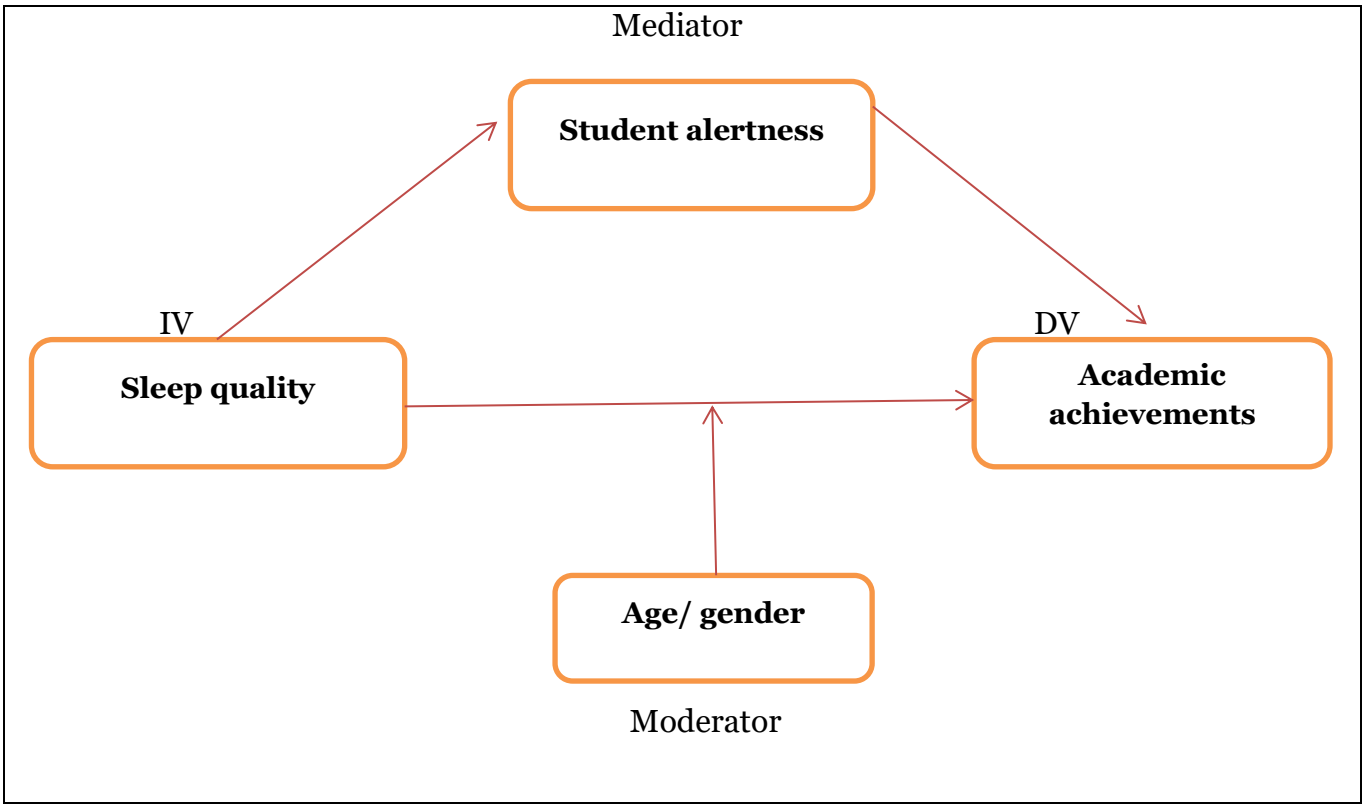
Diagram 6: Conceptual framework indicating independent, moderating and dependent variables



Furthermore, there are two types of moderating relationships (continuous and categorical). The difference is that a continuous moderating effect exists when the moderating variable is metrically measured, e.g., income. A categorical moderating effect happens when the moderating variable is

categorical, e.g., gender (1. male 2. female). Most often, the concept of a theoretical/conceptual framework, are usually built on existing research knowledge from the literature (Hair Jr, Hult, Ringle, & Sarstedt, 2021).

A mediator explains (cause and effect) the process through which two variables (the exogenous construct and endogenous construct), are related. It goes between two variables. A moderator acts upon the relationship between two variables and changes its direction or strength. It can be represented using one model or framework (Hair Jr, Hult, Ringle, & Sarstedt, 2021).Diagram 7: Conceptual framework indicating the combination of independent, mediating, moderating, and dependent variables

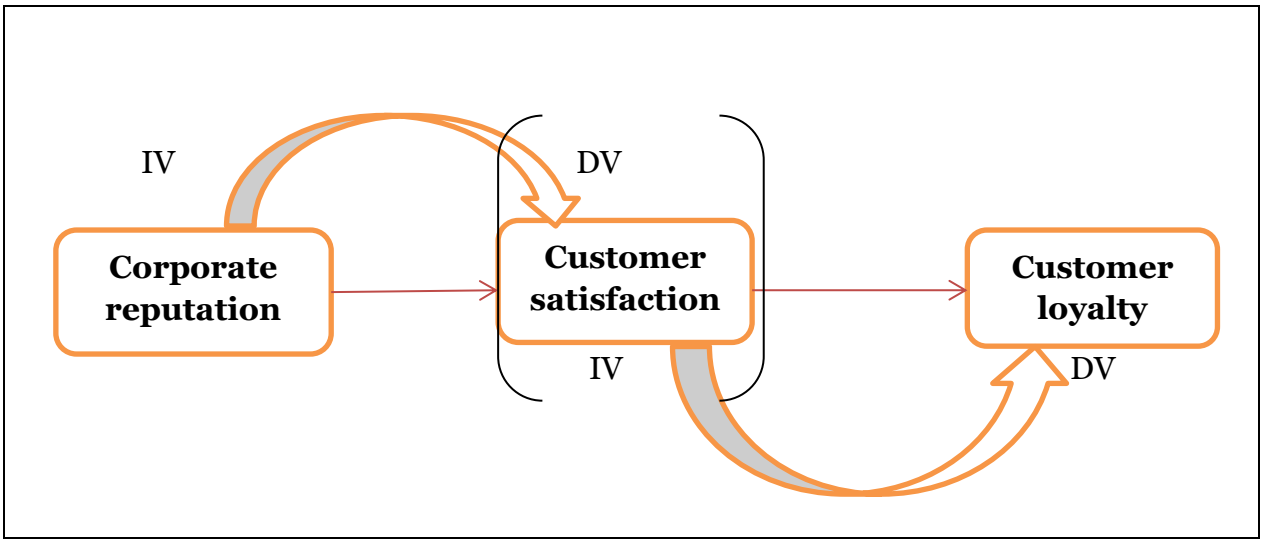


(Baron, & Kenny,1986).

Here, "sleep quality" affects "academic achievements" through the mediator of "student alertness": the hypothesis is that when a student sleeps very well, it will increase his academic alertness thus, affect his academic achievements or performance. Again, age or gender affects the direction or strength of the relationship between "sleep quality" IV and "academic achievement" DV (Creswell, & Creswell, 2017).

In quantitative research, constructs are related to answering a research question while we use theory and specification of variables to formulate research hypotheses. The research hypothesis is a prediction about a specific event or relationship between the variables of interest in the study. However, a variable can play the role of an dependent variable and independent variable at the same time in different studies (Hair Jr, Hult, Ringle, & Sarstedt, 2021).

Diagram 8: Satisfaction construct as independent variable and dependent variable



Adapted from Hair, Hult, Ringle, & Sarstedt, (2021)

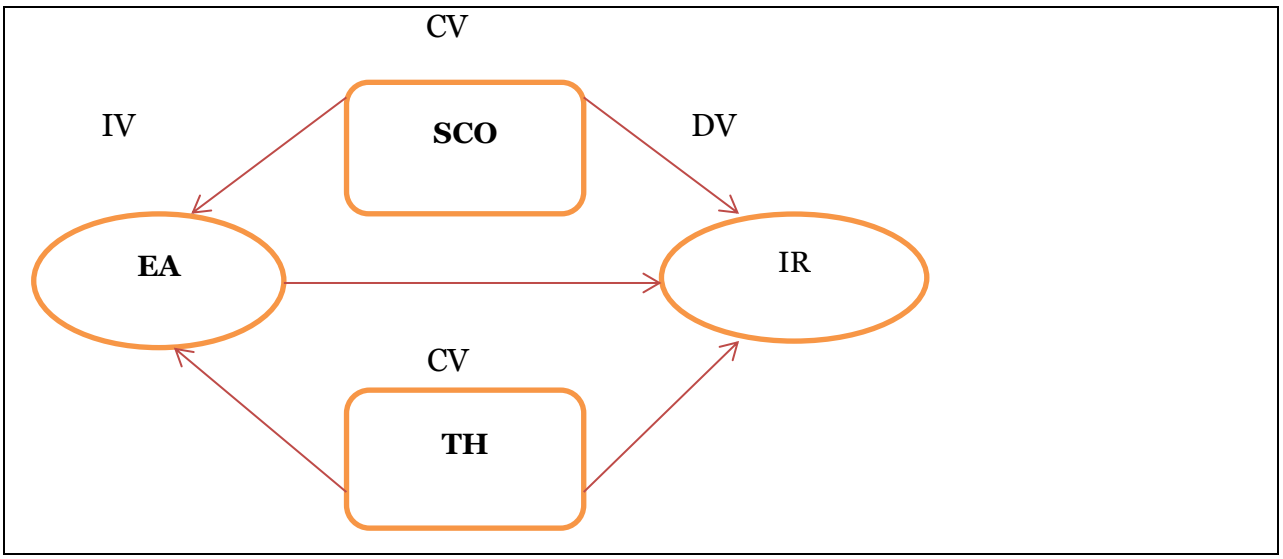
The satisfaction construct is an endogenous latent construct having a dual relationship with IV and DV. It is a DV because it is predicted by reputation. However, it is also an IV because it predicts loyalty. The loyalty on the right end is only a dependent construct because it is predicted by satisfaction and does not predict another variable. Secondly, an arrow points to it without it pointing to another.

4.0. Statistical models for mediating and moderating variables

This refers to systematic and statistical drawing in terms of its content and scope, concepts and definitions, classifications, relationships between elements, and links to other statistical frameworks. One of the vital elements that researchers should pay attention to is the direction of arrows in each framework, as this makes a significant difference in quantitative research.

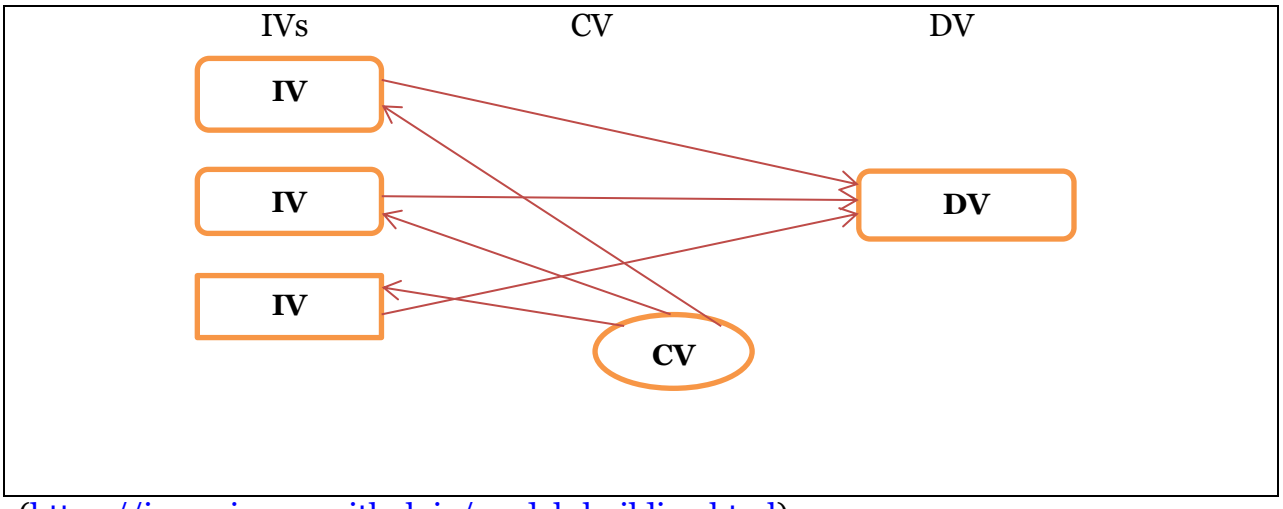
4.1. Partial Correlation: Partial correlation is a measurement in a quantitative study. it measures the strength and direction of a linear relationship between two continuous constructs while controlling for the effect of one or more continuous variables (https://jamovi-amm.github.io/model_building.html).

Diagram: 9 Partial Correlation



(https://jamovi-amm.github.io/model_building.html)

Its objective is to identifying the relationship between (IR) with (EA) by controlling (SCO) and (TH). This is one IV and one VD, by controlling a variable from the study. Let us look at partial correlation considering three IVs and one DV and the controlling one variable.

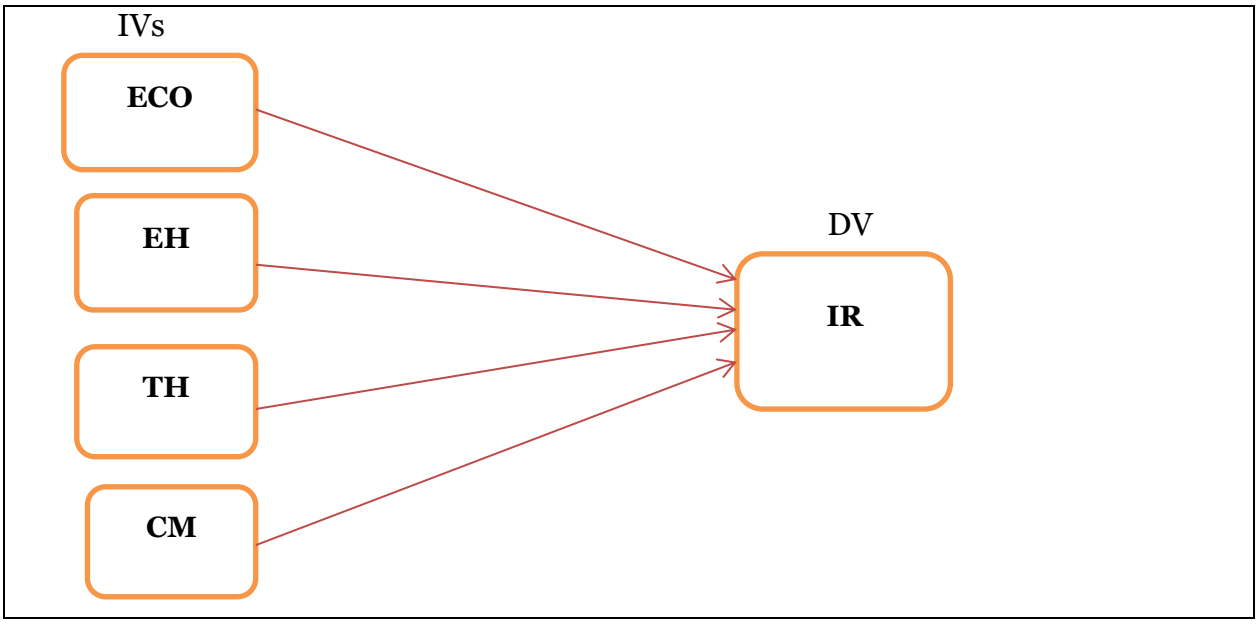


(https://jamovi-amm.github.io/model_building.html)

4.2. Multiple Regressions: A Multiple Regression is a statistical technique that analyzes the relationship between a single dependent construct and multiple independent variables. A Multiple regression is an extension of simple linear regression. It is applied when we want to predict the value of a variable based on the value of two or more other variables. The variable we want to predict is called the dependent variable (or sometimes, the outcome, target, or criterion variable).

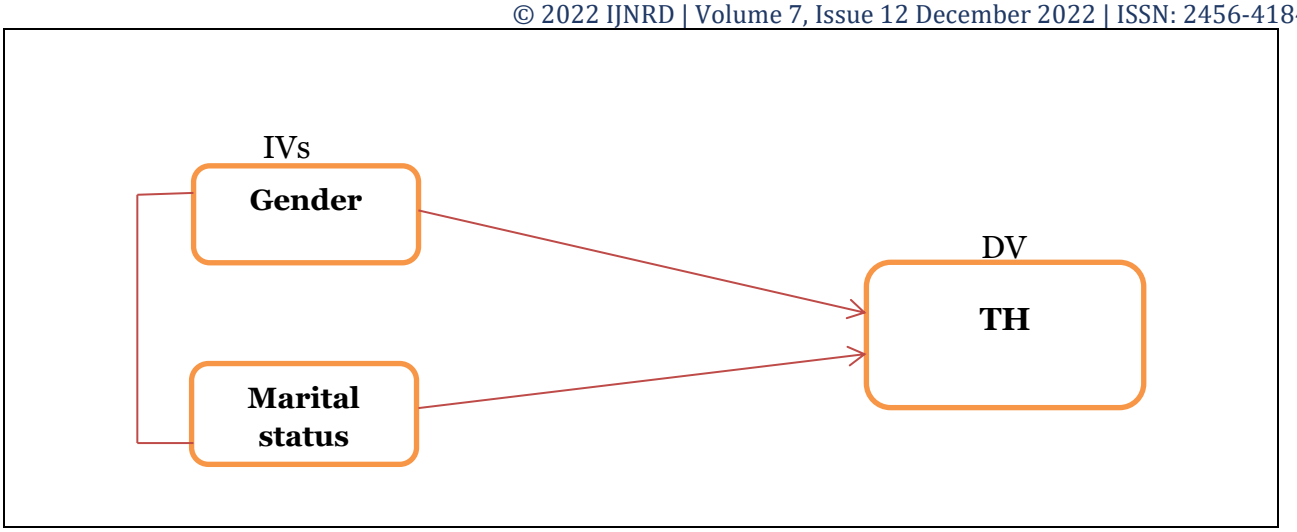
Its objective is to use the independent constructs whose values are known to predict the value of the single dependent value.

Diagram10: Multiple Regressions



https://jamovi-amm.github.io/model_building.html

4.3. Two-way ANOVA: This is used in SPSS to compare the mean differences between groups that have been divided into two independent variables called factors. As exemplified below, its objective is to identify the interaction effects of Gender and Marital Status on (TH).Diagram11: Two-way ANOVA



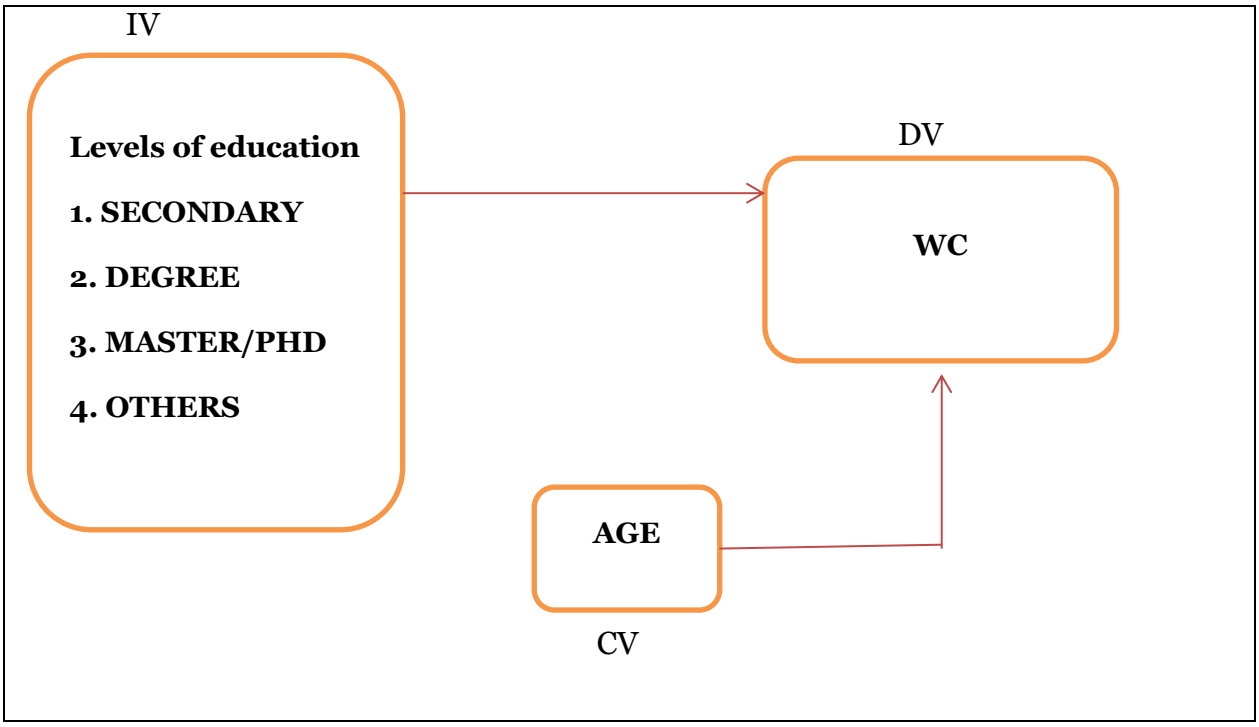
https://jamovi-amm.github.io/model_building.html

4.4. ANCOVA Analysis: Analysis of covariance (ANCOVA) is a method for comparing sets of data that consist of two variables (treatment and effect, with the effect variable being called the (variate). when a third variable (called the covariate) exists that can be measured but not controlled and that has a definite effect on the variable of interest.

ANCOVA is commonly used for the analysis of quasi-experimental studies when the treatment groups are not randomly assigned and the researcher wishes to statistically "equate" groups on one or more variables that may differ across groups.

The ANCOVA method is suitable when there are covariates that denote the continuous independent variable, and ANOVA is appropriate when there are no covariates. In the example below, its objective is to identify the relationship between Levels of Education and WC by controlling the age factor.

Diagram12: ANCOVA Analysis

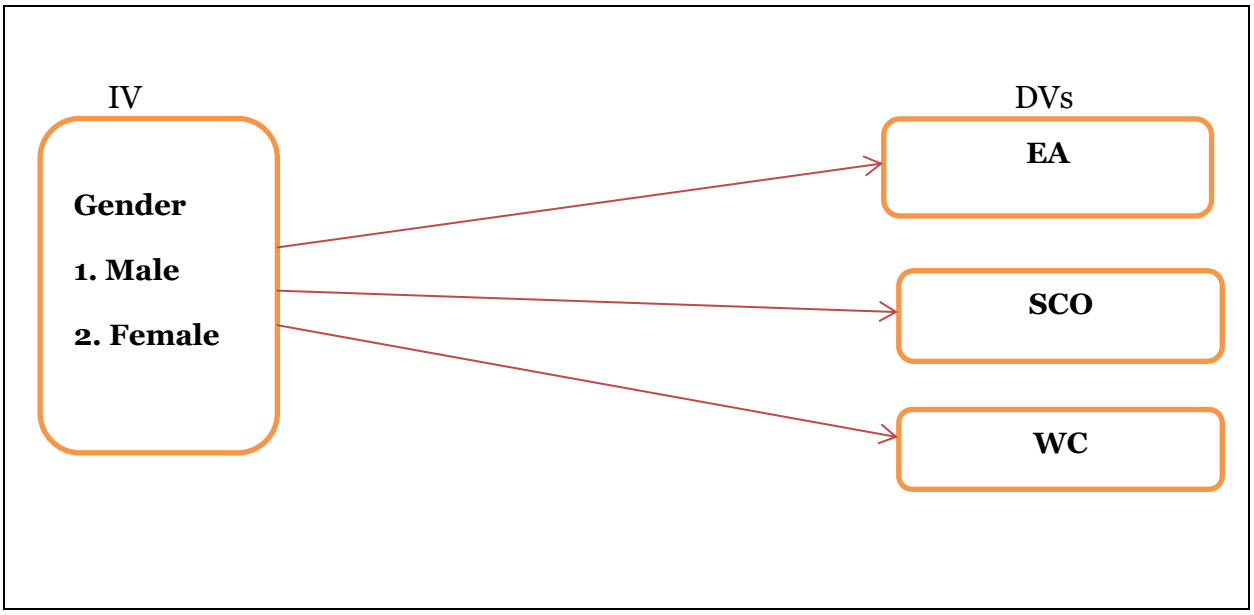


(https://jamovi-amm.github.io/model_building.html)

4.5. One-way MANOVA Analysis: This is the one-way multivariate analysis of variance. Statistically, it is used to determine whether there are any differences between independent groups on more than one continuous dependent construct. It is different from one-way ANOVA which measures only one dependent construct. As used in the example below, its research objective is to identify whether gender is a factor towards EA, SCO, and WC amongst Masters of Corporate Communication students in Dominion school.

The only difference between one-way and two-way ANOVA is the number of independent variables. A one-way ANOVA has one independent variable or one factor, while a two-way ANOVA has two independent variables.

Diagram13: One-way MANOVA Analysis

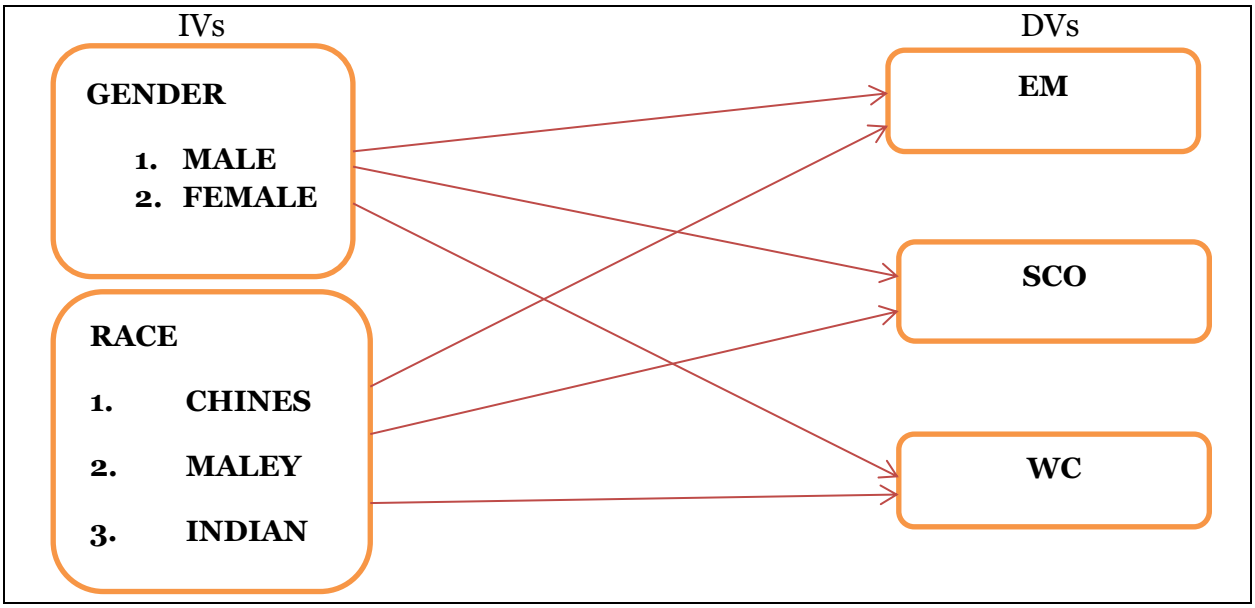


https://jamovi-amm.github.io/model_building.html

4.6. Two-way MANOVA Analysis: This compares two or multiple IVs and multiple DVs. this statistical technique is used to determine whether multiple levels of independent constructs on their own or in combination have an effect on the dependent constructs. The application of MANOVA demands that the DVs meet parametric requirements.

As exemplified below, its objective is to identify whether Gender and Race are factors towards (EA), (SCO), and (WC) amongst Masters of Corporate Communication students in Dominion school.

Diagram14: Two-way MANOVA Analysis



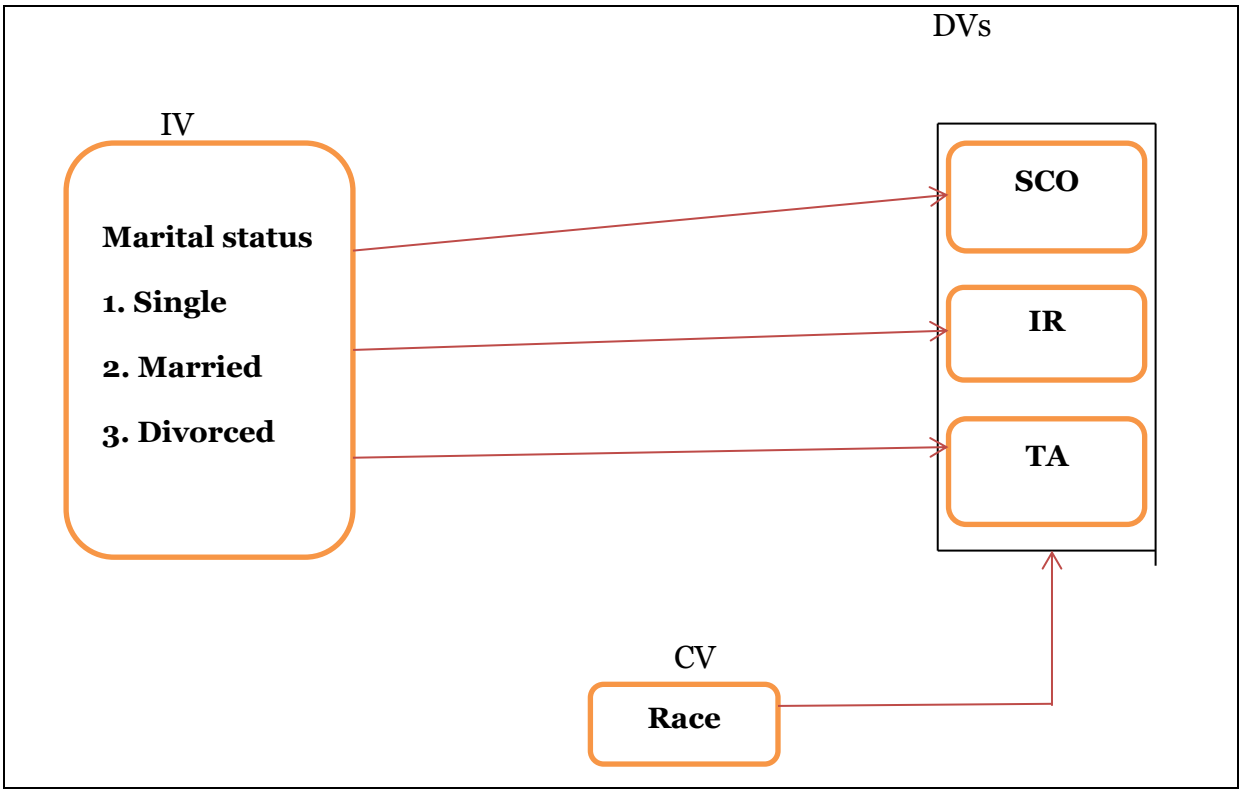
https://jamovi-amm.github.io/model_building.html

4.7. One way MANCOVA Analysis: A one=way MANCOVA is a statistical technique used to determine whether there are any statistically significant differences between the adjusted means of three or more unrelated IVs groups, having controlled for a continuous covariate.

Simply put, whether IVs groups have an effect on DVs by controlling a specific covariate. A one-way MANCOVA needs at least four variables: One IV with two or more groups (levels or factors), plus two or more DVs and one or more covariates (Verma, 2012).

However, Multivariate analysis of covariance (MANCOVA) is a statistical technique that functions as an extension of the analysis of covariance (ANCOVA). As exemplified below, its objective is to identify whether Marital Status is the factor towards (SCO), (IR), and (TA) among the Masters of Corporate Communication students in Dominion schools by controlling the Race (covariate) factor.

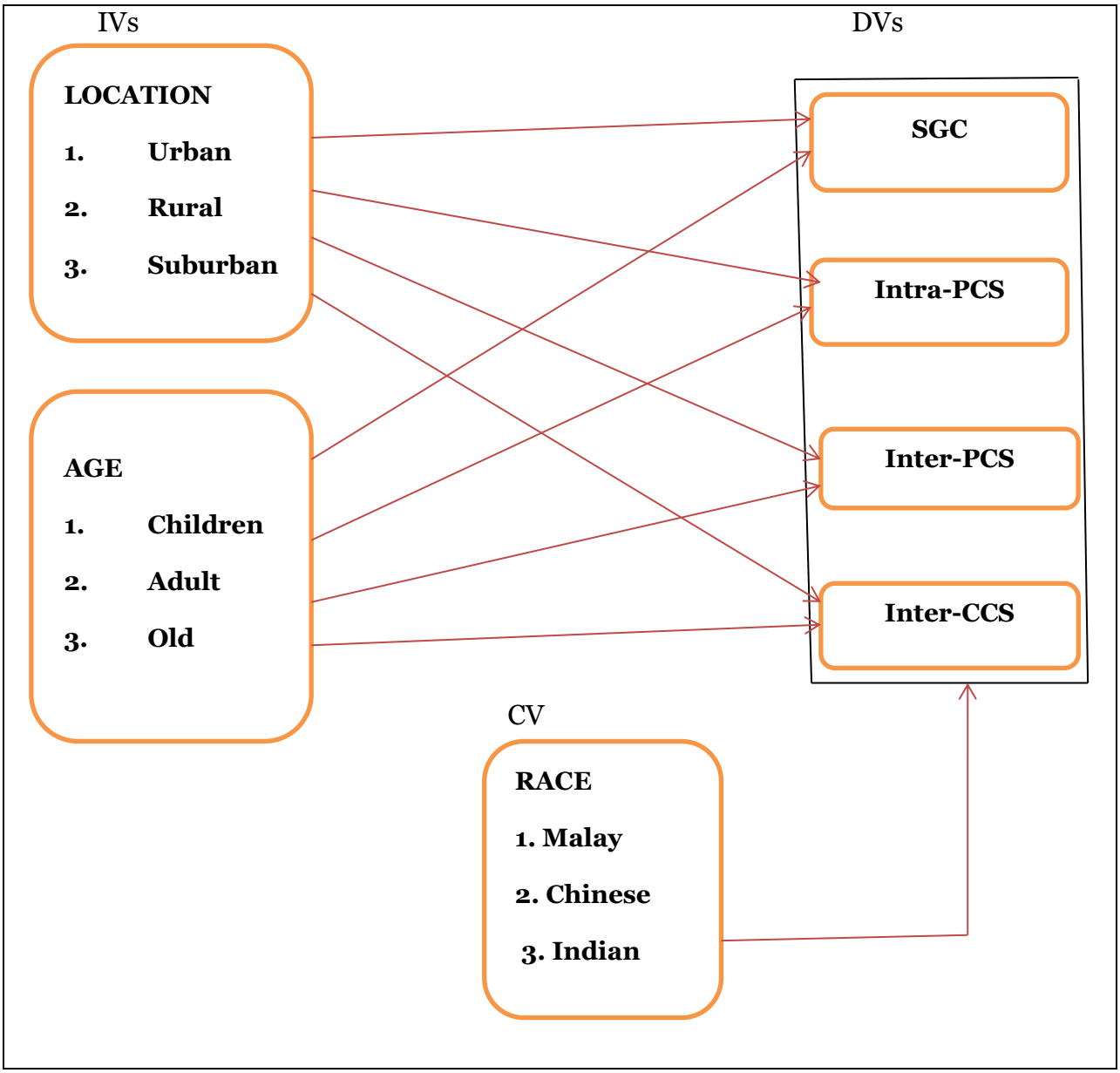
Diagram 15: One way MANCOVA Analysis



https://jamovi-amm.github.io/model_building.html

4.8. Two-Way MANCOVA Analysis: A two-way MANCOVA is almost the same as a one-way MANCOVA. The objective of a two-way MANCOVA is to determine whether two or more IV groups have a significant effect on DVs by controlling a specific covariate. As exemplified below, its objective is to identify whether the location and the student's age are the factors (that have a significant effect) on (SGC), (IntraPCS), (InterPCS), and (InterCCS) amongst Masters of Corporate Communication students by controlling the race (COVARIATE) factor.

Diagram 16: Two-Way MANCOVA Analysis



https://jamovi-amm.github.io/model_building.html

Keywords:

IR- Intimacy relationships

EA- Empathy Ability

SCO- Socio Communicative Orientation

TH- Talkaholic

WC- Willingness to communicate

TA- Tolerate Ambiguity

SGC- Small group communication skill,

Intra-PCS- Intrapersonal communication skill,

Inter-PCS- Interpersonal communication skill

Inter-CCS- Intercultural communication skill

5.0 The flows between a research topic, research question, research objective, research theory, and research framework

From the lens of systematic or academic research, reviewing the literature is the most reliable and tedious way of formulating a research topic and generating research gaps. However, the topic or title should be descriptive, direct, accurate, appropriate, not too long, interesting, concise, precise, unique, and not misleading. It should contain keywords that will make it easier to locate during a keyword search (Creswell, & Creswell, 2017).

A good research title should demonstrate the study's variables (concepts/constructs), the location (context) of the study, something that happens or is regarded as happening or has happened that a researcher wants to examine, and the population-the organization/institution or a specific group that is being affected (by something that happens). These keywords or constructs should be consistent from the topic to the research objective, research question, related to the study's theory propositions (theoretical framework), conceptual framework (study skeleton), and conceptualization of variables. Whatever happens, in Chapter 4&5 is shaped by these elements explained above. In quantitative research, it is important to point out that your research question should have descriptive and inferential statistics. This segment is exemplified below:

5.1. Title

The relationship between **crisis response strategies**, **crisis history** and **crisis type** on the **reputation** of **Nigerian** multinational mobile telecommunications **(ABC) organization**

5.2. Research Questions

1. What is the level of **crisis response strategies**, **crisis history**, **crisis type**, and **Nigerian ABC organizational reputation**? = (**Descriptive statistics**)

Descriptive statistics

2. What is the relationship between **crisis response strategies** and **Nigerian ABC organizational reputation** during crisis management?

3. What is the correlation between **crisis history** and **Nigerian ABC organizational reputation** during crisis management?

4. What is the relationship between **crisis type** and **Nigerian ABC organizational reputation** during crisis management?

Questions 2 to 4 inferential statistics

5.3. Specific Objective

RO1: To examine the levels of **crisis response strategies**, **crisis history**, **crisis type**, and **Nigerian ABC organizational reputation**.

Descriptive statistics

RO2: To ascertain the relationship between **crisis response strategies** and **Nigerian ABC organizational reputation** during crisis management.

RO3: To evaluate the relationships between **crisis history** reference and **Nigerian ABC organizational reputation** during crisis management.

RO4: To determine the relationship between **crisis types** and **Nigerian ABC the organizational reputation** during crisis management.

Objective 2 to 4 inferential statistics

5.3.1 Keywords

Crisis response strategies,

Crisis history,

These keywords are easily noticeable from the research topic, theoretical framework, and conceptual framework, which are the subject of studies.

Crisis type,

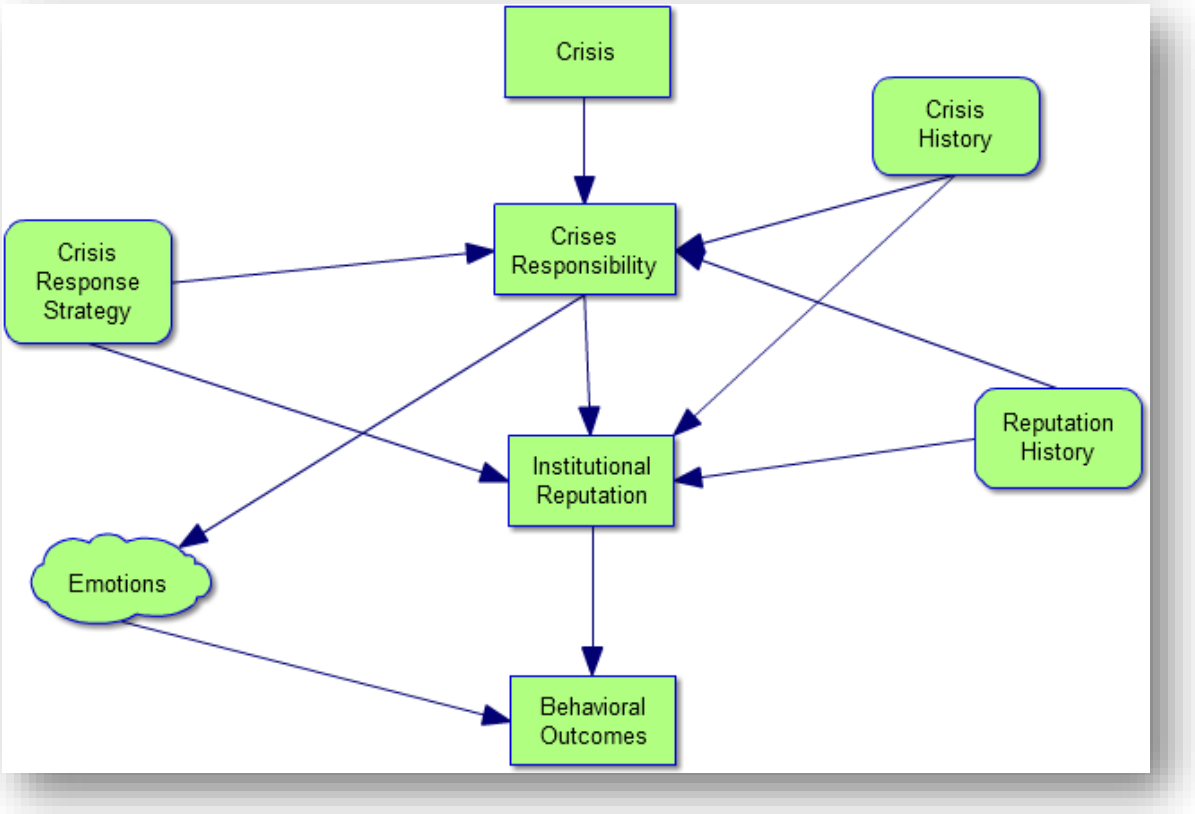
Nigerian ABC organizational reputation

Keywords are commonly called search terms which represent the main concepts of your research topic to describe the topic.

5.4a Theoretical framework

A foundational review of existing theories that serve as a roadmap for developing the research arguments you will use in your work is referred to as the theoretical framework.

Diagram 17: Theoretical framework



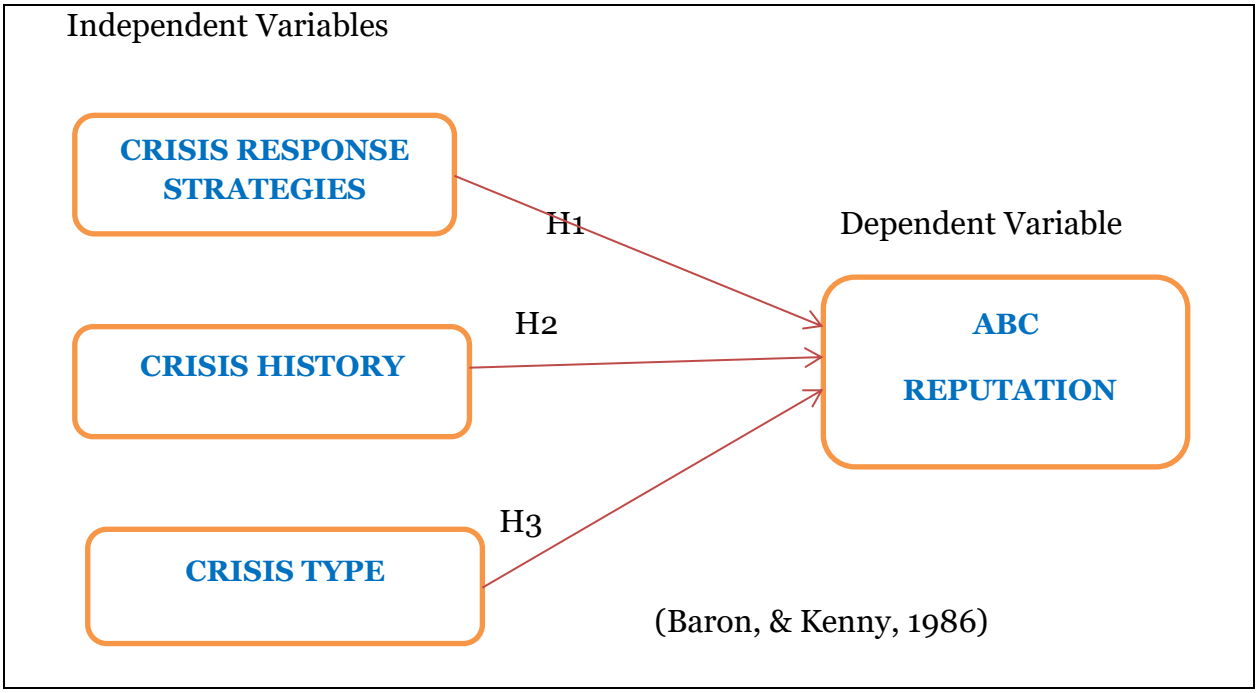
5.4b. Conceptual framework

This is a systematic model of the researcher's link to the several variables that have been identified (from theory or theories) as important to the problem of the study. It helps in the justification of the variables as regards data collection.

In the quantitative study, a conceptual framework represents the relationship a researcher expects to see between his variables. It is an analytical tool with several variations and contexts. A conceptual framework is developed based on a literature review of existing studies about your topic, theoretical framework, and the researcher's knowledge about the topic (Samsudeen, & Mohamed, 2019).

The theory is an abstract description of the relationships between ideas and concepts that help researchers understand the world. However, from the theory, the researcher constructs a structure that logically develops an argument and explains the concepts and premises that scaffold the study. The need for a study and how the study contributes new knowledge is made clear through a conceptual framework.

Diagram 18: Conceptual framework



This study could be confirmatory as it intends to accept or reject hypotheses. Confirmatory research (hypothesis testing) is where researchers have a pretty good idea of what's going on. The researcher has a theory or several theories, and the objective is to find out if the theory is supported by the hypothesis. It starts with a clear hypothesis and then collects data that may or may not support that hypothesis.

Again, it examines if the theory will still hold the same results from one context to another. For example, in Asia, America, and Europe, the theory yielded the same result from the literature. However, this current study is in an African context Nigeria to be precise. Will the theory still maintain the same results as Asia, Europe, and America? This is the objective of Confirmatory research. In contrast, exploratory research tends to develop a theory.

5.5. Hypothesis

Quantitative hypotheses are the scientific predictions the researcher makes about the expected results of relationships among constructs.

H1: There is a positive relationship between **crisis response strategies and Nigerian ABC's reputation.**

H2: There is a positive relationship between **crisis history** and **Nigerian ABC's reputation**.

H3: There is a positive relationship between **crisis types** and **Nigerian ABC's reputation**.

There is no mediation or moderation in the framework/hypothesis

6.0. Important elements in a Survey Design

Why writing a survey method plan, it is important that researchers take note of the following vital information, which is regarded as the basic rationale for survey design.

6.1. Title: Writing a good title

* The title summarizes the main idea or ideas of your study. It should not be too long and represents the study variables clearly, context and concept.

6.2. Chapter 1: Background/instruction of the study

* Properly introduce a research study with good English, detailing what has been done on the topic and what is left undone. Identifying and framing the research problem within the existing literature. The researcher points out the deficiencies in the literature, provides the target audience of the study and introduces the theory and systematic method for the study.

* Research Problem Statement (theoretical, contextual, methodological, practical, and respondents' issues)

*Research Question (pointing descriptive and inferential research questions)

*Research Objective (pointing to the general and specific objectives respectively)

*Significance of Study (pointing out the theoretical, methodological, practical, and policy-making significance of the study)

*Scope of the Study (geographical, theoretical, contextual scope of the study)

*Limitation of the Study (concept & context, population and respondent, and time and money limitation). This depends on the nature of the study.

* Definition of the Keywords (defining the keywords that make up the constructs of the study). This definition should be clear and relevant to the study (Boyle, & Schmierbach, 2019).

In summary a good research introduction should have an overview of the topic, start with a general overview of your topic, a complex review of literature, a rationale for your research, describe the methodology, research problem statements/gapes statement, and provide an understanding of your research.

6.3. Chapter 2: Literature Review

- It is important to stand on the shoulder of giants in social science research. This is to extensively review the literature regarding your topic, constructs, and the study theory or theories. The literature review is regarded as the bedrock of knowledge on any intended research topic. It should be synthesized based on past researchers' agreements and disagreements on the study constructs, concepts, and contexts.
- The concept of theory used in the study is elaborated in this chapter.
- Theoretical framework
- Conceptual framework
- Research hypotheses

6.4. Chapter 3: Methodology (quantitative research)

A good quantitative researcher begins this chapter with the study philosophy, approaches, design strategies, research method, instrument, and population/sample size (as my supervisor will always say "always justify your reason" to make your work valid).

1. Design strategies (always identify the purpose of the study- to empirically examine or predict the mediating role of a construct on the relationship between variables)

- Indicate if the study is experimental, longitudinal, or cross-sectional (state the why and justify the why).

- Identify the nature of data collection (face to face, online, telephone, email, or the procedure you want to apply (state the rationale, justify your reason).

1. The population/sample of the study (specify the population and study sample size)

- State the location of the study and the population

- State the type of sampling (probability sampling and non-probability sampling) you employed in the study and justify why. Note that sampling is the systematic selection of a subset of the

population of interest in a research study. State if the sampling design for the study is a single-stage sampling design or a multistage (clustering) procedure. For example (Cluster sampling is a probability sampling method and random sampling procedure. The clusters should ideally have a mini-representation of the population as a whole. The cluster sampling could be single-stage or multi-stage such as districts or schools).

- If you employed probability sampling (random sampling, Stratified sampling, Systematic sampling, and Cluster sampling), be specific on the type or types used and justify the why.
- Identify a certified sample size determination and clearly state how you arrive at your sample size (possibly with your calculation presented) in your study.
- Provide a clear operationalization of variables (stating the demography of your study, the independent variables, mediating and or moderating variables, dependent variable, number of items, measurement (5,6,7,8… point Likert scale), types of data(ordinal and nominal), and justify with reference sources.
- Specify the survey instrument used to collect data. Most importantly, report the validity and reliability of the instrument (pre-test, validity test, pilot test, and reliability test.
- Specify steps for administering the survey instrument and following up to guarantee a high response rate.
- Chapter 4: data analysis (quantitative study)
- Identify the descriptive statistics (objective1- mean, standard deviation, and range of scores) for the variables. This step comes after the discussion of the method by which response bias was determined.
- Identify the inferential question or hypotheses (from objective 2…4- regression, correlation, and mediation/moderation).

- If the study is exploratory, Partial Least Squares SEM (PLS-SEM0; also called PLS path modeling is more suitable for data analysis.
- If the study is confirmatory, Covariance-Based SEM (CB-SEM) is suitable for data analysis. According to Hair, Hult, Ringle, & Sarstedt, (2021), quote "CB-SEM is primarily used to confirm (or reject) theories (i.e., a set of systematic relationships between multiple variables that can be tested empirically) while PLS-SEM is primarily used to develop theories in exploratory research" in quantitative research (Hair Jr, Hult, Ringle, & Sarstedt, 2021).

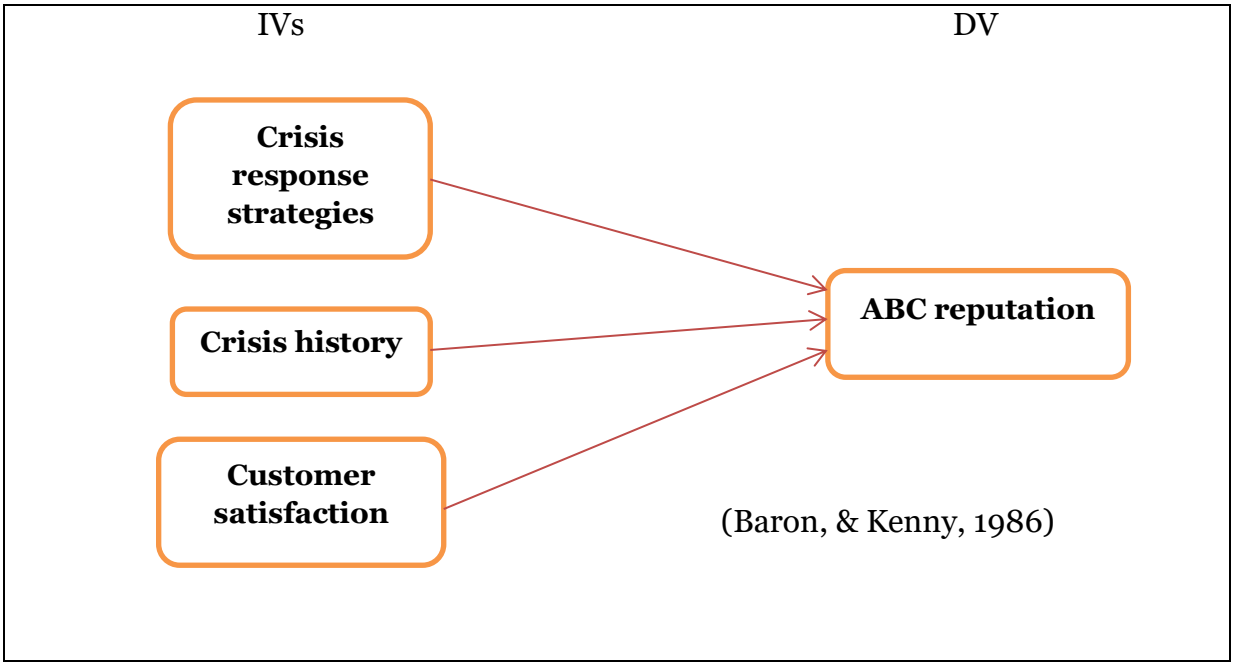
6.5. Chapter 5: Interpreting results/Discussion session

This is where the researcher draws conclusions from the results of the research questions. The researcher concludes the results of the research questions in steps;

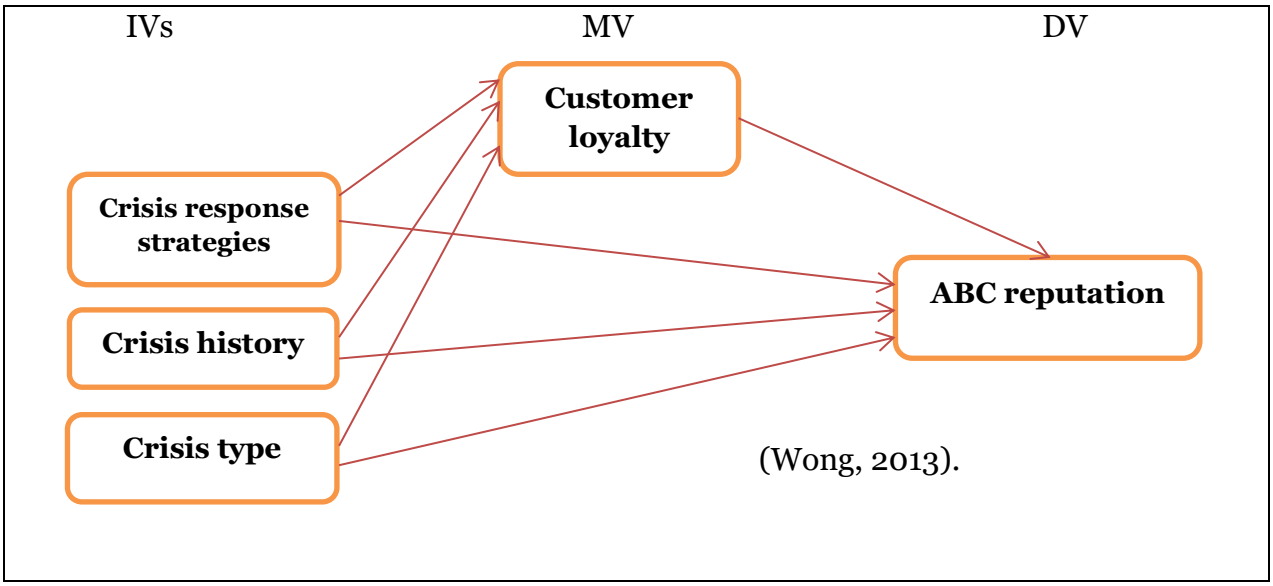
- The researcher reports how the results addressed the research question (starting from the descriptive statistics reports, statistical significance testing, confidence intervals, and the effect size) of the study.
- The researcher drafts a comprehensive discussion section where he discusses the implication of the research results (stating if the results are consistent, reject, or extend the body of related literature) of the study.
- The practical implication, theoretical implication, and policy-making are discussed. The researcher at this point also addresses the issues of limitations/delimitation of the study. Finally, future research areas are emphasized.

One vital question at this point is based on your research topic, how do your research findings (results) address the issues (gaps) in the body of literature? Scientific research begins with a research topic and ends with references Creswell, & Creswell, 2017). The constructs/relationships in your research topic should reflect and be explained in the conceptual framework (based on theoretical perspective/literature) as exemplified below:

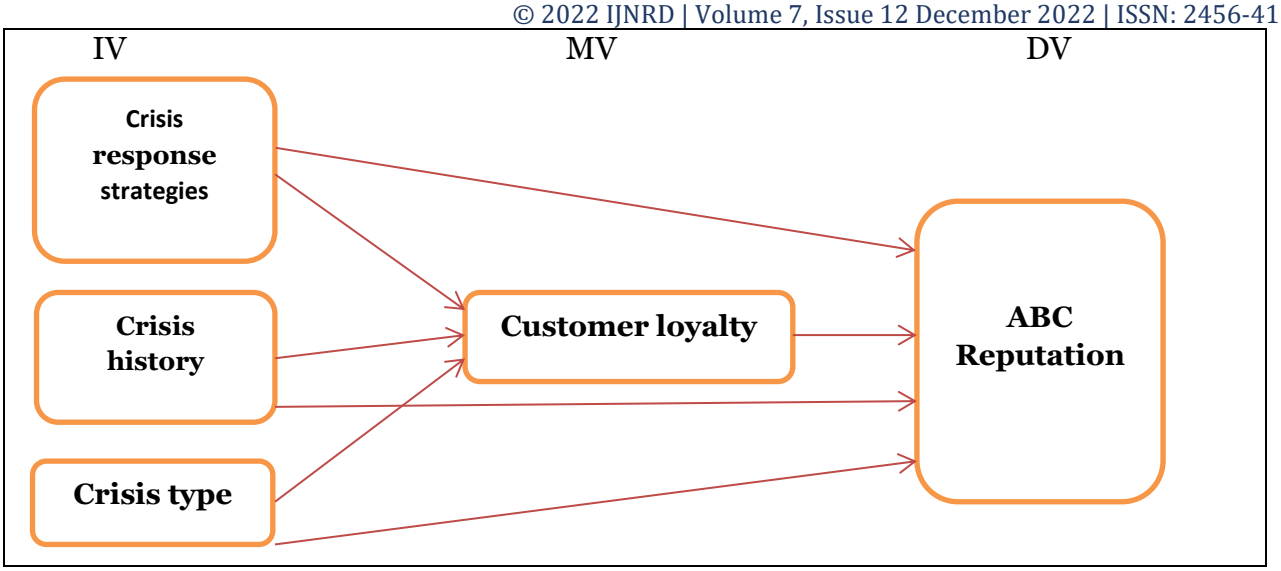
- Topic: The relationship between Crisis response strategies, Crisis history and Customer satisfaction on the Reputation of Nigerian multinational mobile telecommunications (ABC) organization



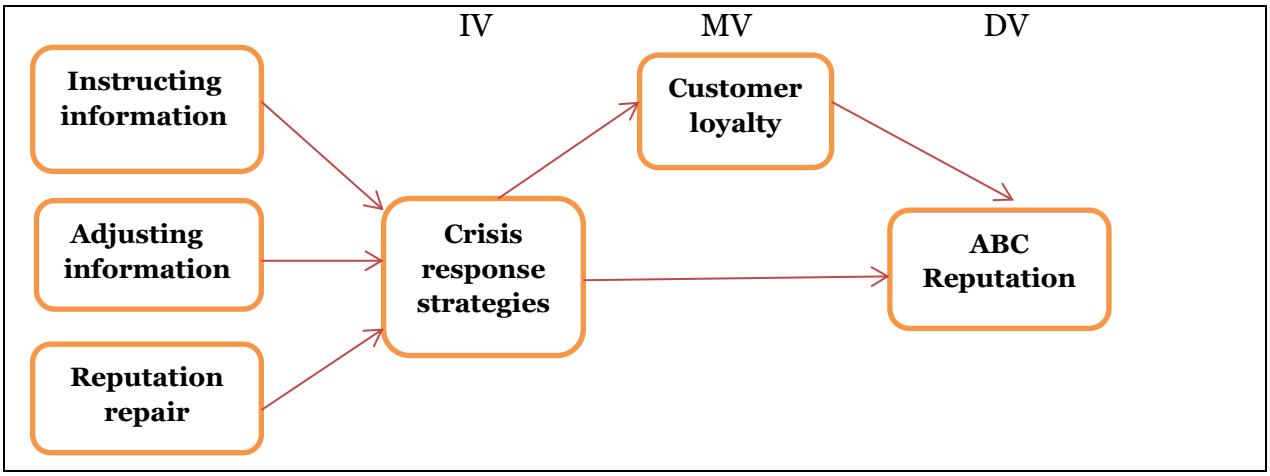
- Topic: The mediating role of Customer loyalty on the relationship between Crisis response strategies, Crisis history and Crisis type on the Reputation of Nigerian multinational mobile telecommunications (ABC) organization



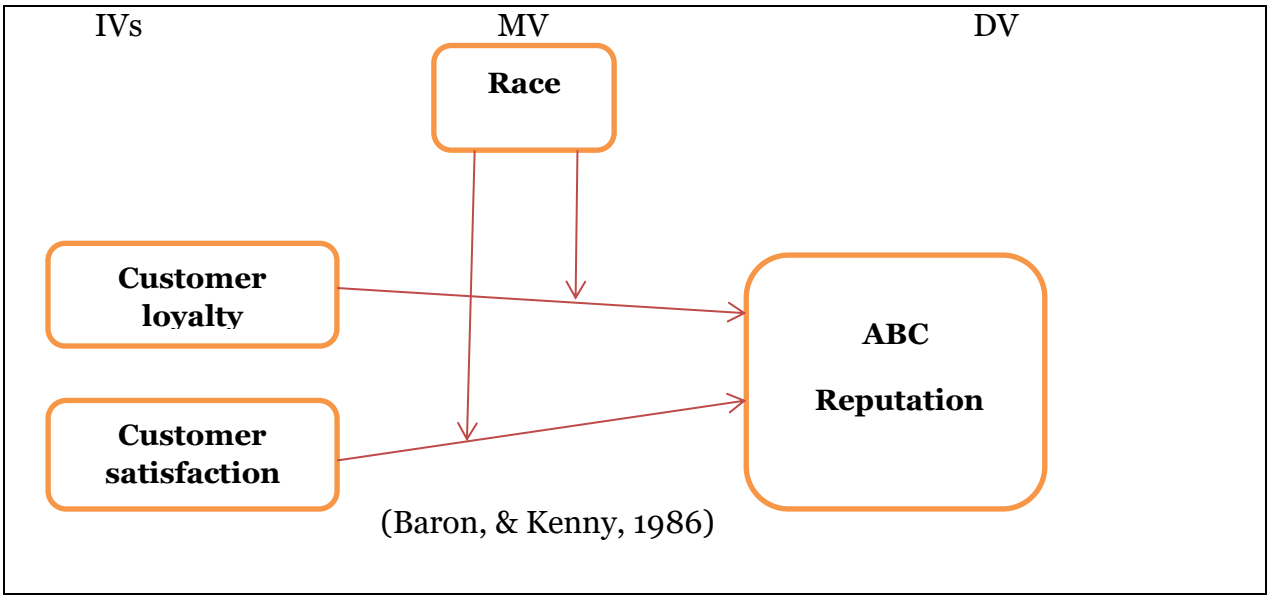
Or



Another option below could be if the IV has multiple dimensions

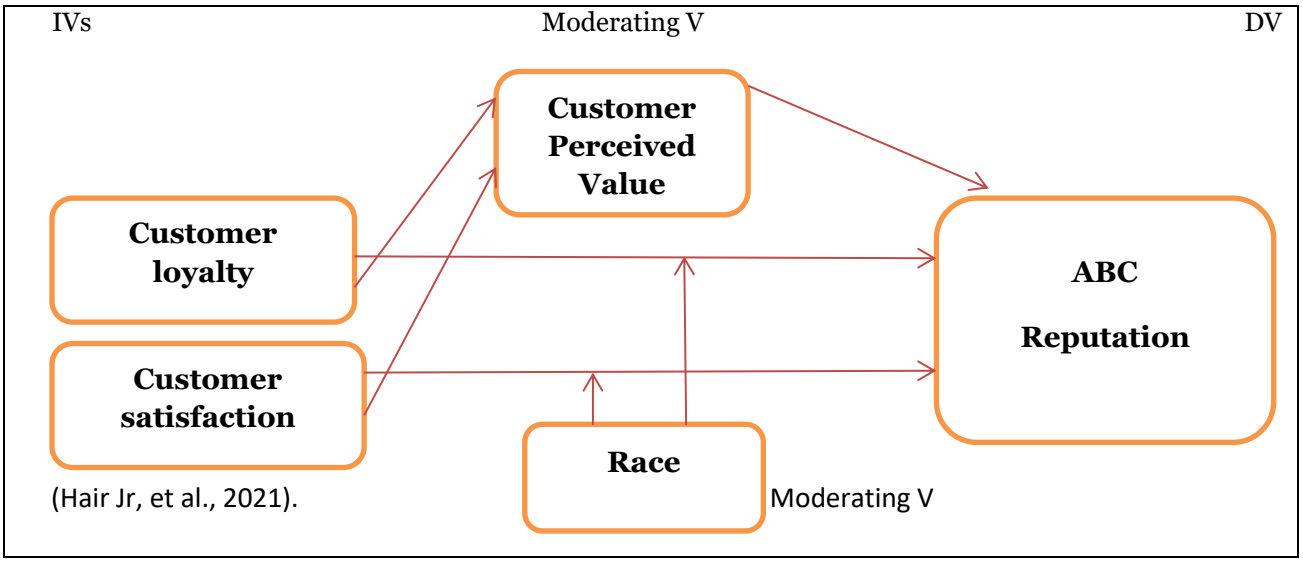


- Topic: The moderating effect of Race on the relationship between Customer loyalty, and Customer satisfaction on the Reputation of Nigerian multinational mobile telecommunications (ABC) organization



(Baron, & Kenny, 1986)

- Topic: The role of Customer Perceived Value and Race on the relationship between Customer loyalty, and Customer satisfaction on the Reputation of Nigerian multinational mobile telecommunications (ABC) organization



(Hair Jr, et al., 2021).

7.0 Conclusion

This short textbook addresses some of the challenges faced by young researchers, as it discusses in bullet form some vital information regarding the quantitative study. However, it is limited to only the quantitative method; prospective authors stand the chance of addressing some of the issues faced in writing qualitative or mixed methods. This short book will help in research proposal writing, understanding the structure of quantitative, as well as dealing with the issues of conceptual frameworks in social science quantitative research.

I. We hope that our efforts to solve students' confusions while attempting a quantitative research for beginner have been made simple with the assistance of this textbook. In summary, this book has been able to scaffold its primary objectives, which include to: Familiarize students with research approaches, worldviews, and concepts of theory/variables in research.

II. Demystify statistical (SPSS) frameworks, and the concept of mediating and moderating variables.

III. Provide students with an understanding of the vital components of quantitative research.

IV. Acquaint young undergraduates, and masters, degree students with the structure of social sciences research.

We hope the discussed concepts are helpful and clear enough to advance your studies.

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