

AN ANALYSIS OF THE USE OF QUANTITATIVE METHODS IN POLITICAL SCIENCE RESEARCH

¹Mercy Ehidiamen Ikponmwosa, ²Prof. Stephen. M. Omodia & ³Harriet Omokiniovo Efanodor-Obeten, Ph.D.

^{1, 2 & 3} **Department of Political Science and Public Administration, Edo State University Uzairue Edo State, Nigeria.**

Corresponding Author's email: ikponmwosa.mercy@edouniversity.edu.ng

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ABSTRACT

The study examines the use of quantitative method in political science research and probes into the extent to which researchers apply quantitative methods in political science research. It also identifies the possible factors limiting the use of quantitative method in political science research. The study adopts descriptive quantitative research design using primary and secondary sources of data. It applies content analysis technique, using a self-constructed checklist containing different aspects and attributes of quantitative research was adopted for data collection. Analysis of the data was carried out using percentage analysis, graphs and charts from articles on SCOPUS database, with the aid of the Statistical Package for Social Sciences (SPSS) 27.0 software. The study finds that the usage of quantitative method in political science research is low across the articles examined. The study recommends collaboration and a multidisciplinary focused research, so as to incorporate varieties of methodologies in political science research.

INTRODUCTION

Quantitative research is the systematic investigation of social phenomena using statistical models and mathematical theories in order to construct, collect, and enhance the scientific knowledge base (Arel-Bundock et al. 2022). Marlow (1998) asserts that quantitative research produces generalizable findings and is distinguished by the use of large samples, uniform measures, a deductive methodology, and rigidly structured data collection instruments.

The quantitative approach is "shaped by loosely defined sets of philosophical ideas of positivism" (Hammersley, 2014a, p. 17). Positivism broadly aims to expand the application of the scientific method to new fields, such as the study of social structures, human behavior, and history (Hammersley, 2007). It largely views the world as it is. The reality and 'truths' that exist in the world may be seen by everybody, according to positivist ontology (Guba & Lincoln, 1994). This suggests that the truth is already known and that it is the researcher's job to use unbiased research methods to determine it (Muijs, 2004). When it comes to epistemology, positivist scholars ostensibly employ scientific procedures to find information that is highly objective and empirically verifiable. In other words, positivism is the belief that truth can exist without

being influenced by specific people, researchers, or their surroundings, and that it is possible to create fresh, bias-free knowledge. As a result, quantitative researchers adopt methods of inquiry like surveys and experiments because the knowledge that matters to them is precise, objective, verifiable, and reproducible.

Research in political science has assumed various forms and methodologies in recent years. These methods are either quantitative, qualitative or a combination of both (mixed method), depending on the nature of events being investigated, form of data collected and the approach adopted. Most studies in political research adopt qualitative method because the focus is mainly on the why and how of political behavior, the subjective and multifaceted nature of political phenomena, as well as the non-numeric nature of most political events and objects being measured (Gerring, 2017). Formal theory, mathematics, and statistics are the main components of the quantitative research technique and are utilized as effective research tools in political science. It requires statistical analysis and mathematical modeling to assess the key variables because it involves a large amount of numerical data. It is a data-driven strategy in which conclusions and insights into crucial political issues are provided through the collection, analysis, interpretation, and presentation of numerical data. (Gabrielian *et al.*, 2008; Steinmetz, nd.).

Quantitative research is not new in the field of political science as researchers like Young and Soroka (2012); Cassese et al. (2014) have applied quantitative method in investigating various political inquiries. Some have resorted to combining the quantitative and qualitative methods (Wesley, *et al.*, 2020). Although researchers like Creswell and Plano Clark (2007); and Tzagkaraki and Kritas (2023), a suitable blend of quantitative and qualitative methodologies contributes to a deeper comprehension of study issues. Despite the usage of the quantitative research approach, it is unclear to what extent it is used in political science research because there is a dearth of empirical data to support this claim. The study therefore investigates the depth of usage of quantitative method in political science research among academics and researchers.

Specifically, it:

probes into the extent to which researchers apply quantitative methods in political science research; and

identifies the possible factors limiting the use of quantitative method in political science research.

The scope of the study covers articles in political science published in Journals indexed in the Scopus data base during the period 2018 to 2023, to capture the recency and the state of research in political science discipline. One of the biggest databases of top-notch research publications is Scopus. Compared to other multidisciplinary databases, Scopus contains twice as many titles and over 50% more publishers listed, in addition to a large number of peer-reviewed journals. Scopus is regarded as one of the biggest multidisciplinary databases of specialized scientific publications as a result.

Review of Literature

The quantitative approach to study gathers numerical data; data analysis is generally statistical in nature in order to explain, forecast, and/or regulate phenomena of interest. Quantitative research is conducted "by numbers," as has been rightly stated (Sodaro, 2008). The term "quantitative" refers to the generation of quantitative data that may be subjected to rigorous quantitative analysis in a formal and structured manner. (Peter, 2018). The quantitative research method primarily examines social phenomena that may fluctuate in quantifiable levels or amounts. (Sodaro, 2008).

The field of information sought, the researcher's orientation, interest, background, and other factors, among others, determine the choice of an approach to political and social inquiry, claims Peter (2018). Many political scientists feel uncomfortable using the quantitative technique to conduct research despite its accuracy and empirical emphasis. They believe it to be riskier because of the political scientist's worries about these concerns. Many more people are uncomfortable with numbers, which accounts for their preference for the qualitative approach to conducting political science research.

Apart from the use of financial data, statistical data and numeric demographic data, the web scrapping and survey techniques are also useful quantitative approaches. Setting up a computer script to download a collection of documents from the internet is known as

web scrapping. The qualitative papers are frequently so big that they can no longer be termed qualitative data and need advanced quantitative analysis methods like topic modeling or machine learning. In a similar vein, surveys are frequently seen as a quantitative research methodology. Interviews and surveys are comparable, but surveys are typically more structured and used on a bigger sample (Wesley *et al.*, 2020). Qualitative data from surveys are usually converted to quantitative data through coding, which involves assigning numerical values to qualitative responses. Data obtained from web scrapping and surveys are usually expressed in charts and graphs and/or analysed statistically to produce a summary (descriptive statistics), deduce relationships (correlation) or make inferences (regression).

Johnson and Christensen (2012) list the following characteristics of quantitative research: "the confirmatory stage of the study cycle is stressed; Behavior is seen to be consistent and predictable; Instead of focusing on particular groups in particular settings, the researcher is interested in discovering general laws that apply to entire populations; To isolate the effects of individual variables, behavior is being studied under controlled circumstances; It is use an objective strategy, which calls for a range of observers to be able to agree on what is being seen; Data are based on precise measurement using organized and approved data collection equipment. Data analysis attempts to look at statistical linkages.

Empirical Studies

In their 2018 paper, Pellicer and Wegner argued in favor of using quantitative methods to investigate the Middle East and North Africa. They acknowledge the challenges in gathering high-quality and trustworthy data, but they use instances of recent methodological advancements to explain how these challenges might be lessened. They also emphasize the need for in-depth qualitative expertise to interpret raw data because quantitative methods by themselves cannot adequately capture the political and social complexity of the area.

Using information from 67,000 papers that were published in 100 high-impact journals between 2000 and 2019 and other sources, Carammia (2022) conducted a bibliometric analysis of the academic output of European political science communities in relation to other scholarly communities around the world. The bulk of scientists who contribute to the global scientific output, according to studies, are concentrated in just a few countries, with the US and UK alone contributing more than half of the articles that are published in high-impact journals. However, there is a trend toward more regional variety in the base of the global scientific production, with European nations playing a key role in this transition. The enhanced scientific output of academics based in Europe has been significantly boosted by their contributions to worldwide joint publications. This was a widespread global trend that was particularly stunning for several national intellectual communities. Three clusters have consolidated within an expanding and denser network, according to the network analysis of international cooperation. The US is at the center of a global cluster of collaborations, followed by the UK. A larger, increasing cluster and a smaller, even more integrated, highly productive, and connected cluster of academics based on seven northern European states make up the bulk of the countries in

Europe. All bibliometric indexes consistently point to a broad growth in output and a globalization of the scholarly contribution offered by the European political science community.

Arel-Bundock et al (2022) assessed the influence of political science research by gathering more than 16,000 hypothesis tests from around 2,000 papers. According to their generous assumptions, the median analysis has about 10% power, and only about 1 in 10 tests have at least 80% power to identify the consensus effects asserted in the literature. The study also shows that there is a big difference in the power of tests across research domains, with some having high power but others having relatively low power. To analyze the results, the study polled political methodologists about how they view power systems. The bulk of methodologists, they conclude, vastly overstate the statistical significance of political science research.

From the above, there are limited studies in recent times that carried out a bibliometric or content analysis of political science research using a globally recognized and renowned data base like Scopus.

Theoretical Framework

This study is based on the positivism theory. The paradigm that gave rise to positivism was physical science. It carries out research methodically and scientifically. Hughes (2010) asserts that the positivist paradigm claims that through understanding these constant, universal laws, everything that occurs in our world can be understood. It is vital to systematically watch and record the events and phenomena that take place around us in order to understand these universal laws. The next step is to identify the fundamental idea that "caused" the event to occur. The tale of Sir Isaac Newton and the apple serves as an illustration of this procedure in action. Isaac Newton allegedly witnessed an apple fall directly to the ground when he was strolling through an apple orchard. He began to formulate his theory of gravity as he began to ponder how high above the Earth the force of gravity was effective. In this illustration, the observable event was an apple falling, and gravity represented the underlying universal law (Keesing, 2008).

Some famous scholar of positivism includes the likes of Ernest Nagel along with Rudolf Carnap, Carl Hempel and Hans Reichenbach. Nagel (1961) using positivism analyses the nature and logic of scientific inquiry paying keen attention to both natural and social sciences positivism also refers to the application of scientific technique in addition to scientific discovery. According to Mukerji and Albon (2014), positive thinking encourages a rigorous, scientific approach to research that is favourable to the use of quantitative approaches. Researchers that employ a quantitative methodological approach frequently start by formulating a hypothesis and then collect numerical data to test the hypothesis. This can be seen in the Farrant and Zubrick study from 2013 as an example. Quantitative methodology tries to measure, quantify, or ascertain the amount of a phenomenon, in contrast to qualitative

technique, which is often more concerned with articulating experiences, stressing significance, and investigating the substance of an issue (Coolican, 2013). According to Kumar (2014), the quantitative methodological approach is a structured method in which all components of the research process are decided before data collection begins.

METHOD

The study adopts descriptive quantitative research design using primary and secondary sources of data. The population of the study consist of open access Journals and conference proceedings (2018-2023) for subject area political science, as obtained in scopus data base as at 20th March, 2023. The total population is 6,421 articles from 90 Journals in political science and International relations as found in SCOPUS database.

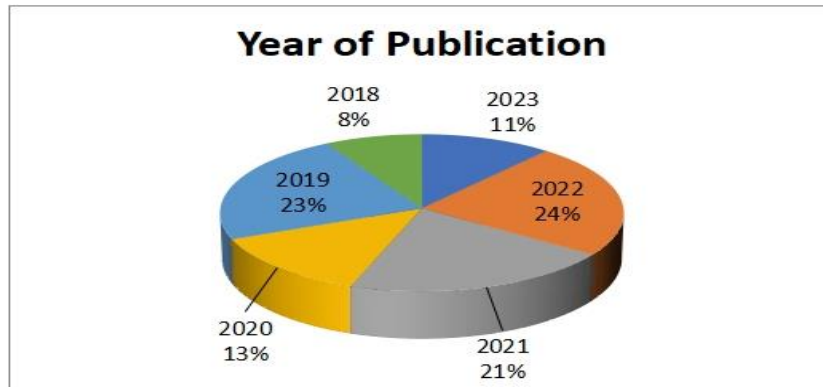
Using the Taro Yamani formulae for sample size determination, a sample size of 377 was derived using 0.05 degree of error expected (Yamani, 1967). The articles were selected using stratified random sampling techniques from the Scopus data base, ensuring that a maximum of 5 and a minimum of 4 articles were randomly picked from each of the 90 journals, to arrive at the sample of 377 while ensuring that all of the 90 journals are adequately captured and equitably represented. Using content analysis, a self-constructed checklist containing different aspects and attributes of quantitative research formed the basis for appraising the sampled articles.

Analyses of the data obtained via content analysis was carried out using percentage analysis, graphs and charts, using the Statistical Package for Social Sciences (SPSS) 27.0 software.

DATA PRESENTATION AND ANALYSIS

This section involves the presentation of data using pie chart and histogram as well as percentage analysis presented in tables. This is followed by an analysis of data extracted via content analysis.

Figure 1: Distribution of Articles by Year of Publication

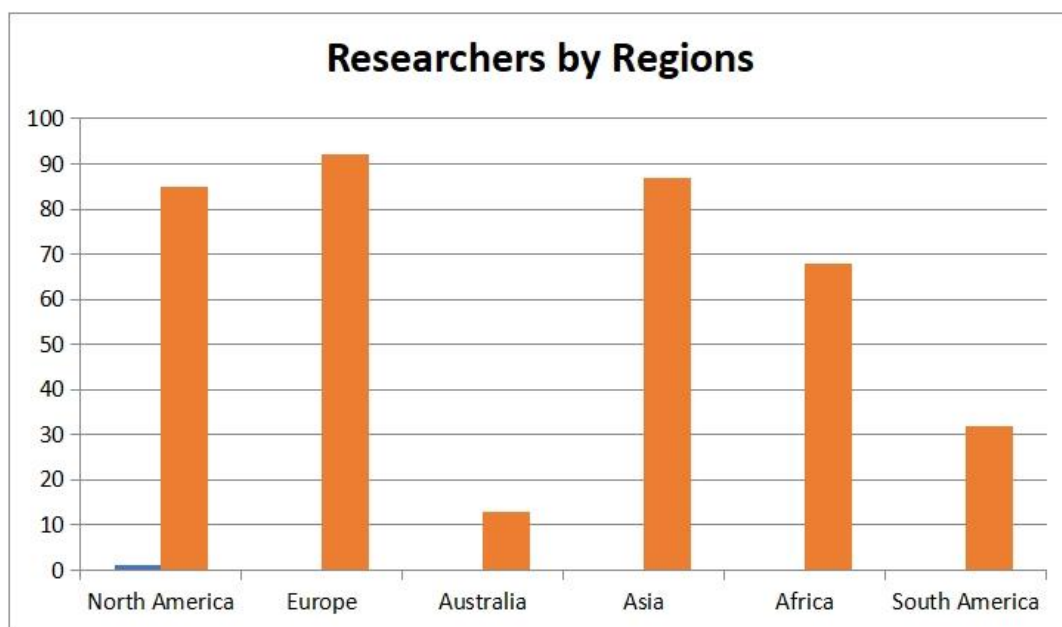


Source: Researcher's computation using SPSS 27.0 output (2024)

Figure 1 above depicts the distribution of sampled articles by their year of publication. 8 percent, 23 percent, 13 percent and 21 percent of sampled articles were published in 2018, 2019, 2020, and 2021 respectively. 24 percent were drawn from 2022 and 11 percent were

drawn from 2023 publication year, indicating a good spread of sampled articles during the study period.

Figure 2: Distribution of researchers by region



Source: Researcher's computation using SPSS 27.0 output (2024)

Figure 2 depicts the distribution of sampled articles by the region of researchers (corresponding authors). It reveals an even distribution of articles across various regions of the world, with Europe, North America and Asia having the highest number of articles in the sample. Article of Africa extraction was also well represented, ahead of South America and Asia.

In carrying out content analysis of sampled articles, we investigated the presence or otherwise of selected elements of quantitative methods. These elements are descriptive statistics, analysis using interview, graphs and charts, applied coding for questionnaires, inferential statistics, analyses of secondary data and hypotheses testing. The results are presented in tables as follows.

Table 1: *Use of Descriptive Statistics*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	360	95.5	95.5	95.5
	Yes	17	4.5	4.5	100.0
	Total	377	100.0	100.0	

Source: Researcher's computation using SPSS 27.0 output (2024)

The result in table 1 above revealed that 95.5 percent of sampled articles failed to use any descriptive statistics like mean, median, standard deviation, skewness, kurtosis e,t,c. only 4.5 percent of

sampled articles used descriptive statistics. An indication that the use of descriptive statistics in data analysis is very low in political science research.

Table 2: *Analysis Using Interviews*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	264	70.2	70.2	70.2
	Yes	113	29.8	29.8	100.0
	Total	377	100.0	100.0	

Source: Researcher's computation using SPSS 27.0 output (2024)

Table 2 shows the use of interview technique in data analysis among sampled political science articles. 70.2 percent of sampled articles applied interview technique in obtaining data and themes for analysis. An indication that a relatively good number of political

science researchers adopt the interview technique in gathering data and drawing themes for analyses.

Table 3: *Graphs and Charts*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	256	67.9	67.9	67.9
	Yes	121	32.1	32.1	100.0
	Total	377	100.0	100.0	

Source: Researcher's computation using SPSS 27.0 output (2024)

Table 3 depicts that 67.9 percent of sampled articles did not utilize graphs and/or charts analyzing research propositions, questions or hypotheses. 32.1 percent on the other hand utilized graphs/ or charts in analyzing data. The result therefore reveals low usage of graphs and/ or charts in political science research.

Table 4: *Coding Questionnaire*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	365	96.8	96.8	96.8
	Yes	12	3.2	3.2	100.0
	Total	377	100.0	100.0	

Source: Researcher's computation using SPSS 27.0 output (2024)

As shown in table 4, only less than 4 percent of sampled articles converted qualitative attributes to quantitative properties through

coding. By implication, analyzing questionnaires quantitatively is still poorly practiced in political science research.

Table 5: Use of Inferential Statistics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	365	97.1	97.1	97.1
	Yes	12	2.9	2.9	100.0
	Total	377	100.0	100.0	

Source: Researcher's computation using SPSS 27.0 output (2024)

As seen in table 5, the use of inferential statistics to aid generalization in sampled political science research articles is still very poor. This is indicated by the 967.1 percent of articles sampled

lagging in the use of inferential statistics like ANOVA, correlation, regression, chi square amongst others.

Table 6: Analysing Secondary Data

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	323	85.70	85.70	85.70
	Yes	54	14.30	14.30	100.0
	Total	3000	100.0	100.0	

Source: Researcher's computation using SPSS 27.0 output (2024)

As revealed in table 6 above, 14.3 percent of sampled articles used secondary data sources for analysis. Data sources include

government databases, research institutions as well as data base of multilateral organisations and NGOs, amongst others.

Table 7: Test of Hypotheses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	340	90.19	90.19	90.19
	Yes	37	9.81	9.81	100.0
	Total	3000	100.0	100.0	

Source: Researcher's computation using SPSS 27.0 output (2024)

The result in table 7 revealed that 90.19 percent of sampled articles did not carry out hypothesis testing. While 9.81 percent tested hypotheses in their study, it can be submitted that the testing of hypotheses in political science research is still very low.

questionnaires quantitatively is still poorly practiced in political science research this might be due to several challenges pose by respondents.

Discussion of result

To what extent do researchers apply quantitative methods in political science?

The techniques and methods in the quantitative method of research were examined and it was discovered that from the analysis, only 4.5 percent of sampled articles used descriptive statistics signifying the low usage of this element of quantitative method in political science research. A good number of political science researchers from the sampled articles, adopted the interview technique in gathering data and drawing themes for analyses which may be because the interview technique gives room for researchers to gain rich and detailed data from respondents. From the sampled articles above, there is low usage of graphs and/ or charts in political science research this might be because of the stringent process of selecting the most appropriate graphical and tabular representation of data and greater design complexity. In the sampled articles, the use of

The use of inferential statistics to aid generalization in sampled political science research articles is still very poor as indicated in the analysis above, this may be due to severe limitations on the type of questions a researcher can ask because inferential statistics rely heavily on frequencies and probability. From the analysis, the use of secondary source of data among political science researchers is very popular which may be due to easy access of the needed materials for the research. From the sampled articles, the testing of hypotheses in political science research is still very low this may be because rather than exploring alternative explanation or perspectives, hypothesis makes a researcher look for evidence that confirms predictions due to bias in the research process and interpretation.

From the analysis carried out, the study observed that the use of quantitative research in political science is still very low, as the sampled studies were significantly focused on qualitative method and techniques. Some of the factors limiting the usage of the quantitative method are identify below

What are the possible factors limiting the use of quantitative method in political science research?

Conducting quantitative research is a challenging topic in political science due to a number of difficulties. Some of these problems include:

Many political scientists lack rudimentary understanding of quantitative research. This represents a significant obstacle to its potential use in conducting political science research. Modern political scientists, who are more accustomed to qualitative research methods, won't be able to teach quantitative knowledge to pupils. The conclusion of this is that the qualitative method will continue to dominate political science research forever (Peter, 2018).

The research's conclusions could also be invalidated by potential data fabrication and/or omission. This is related to how honest and ethical the individuals managing the data were. The people who collect, analyze, and interpret data are extremely capable of falsifying the truth occasionally, despite the widespread belief that numbers do not lie (Osorio, 2014). The natural conclusion is that if these individuals are required to employ quantitative techniques, they may need to enlist the assistance of statisticians and computer scientists. Interpretation and generalization will undoubtedly be dubious since the outside aid providers are not familiar with political reality. There are numerous opportunities for human error to influence a quantitative method from conception to execution.

The challenges of selecting the right quantitative or statistical tool(s) to use are another challenge. Only instances of mono-causality, which are uncommon in the social sciences, can be handled using quantitative methods. In the field of political science, it is frequently challenging to attribute a given action or behavior to a single source. When dealing with multi-causality problems, this research methodology frequently falls short (Babbie, 2010). The use of instruments by researchers to gather and analyze numerical data, such as surveys, computer software, or statistical packages, presents a barrier to many political scientists who likely have little to no experience with those techniques.

The process of operationalization involves turning variables into quantifiable components. It is necessary for the execution of all scientific research. The data source is directed by an operationalized idea. It has to deal with the ideas in the empirical indicators of the phenomenon under examination. The underlying thesis is that quantitative research techniques have limited ability to probe solutions. It becomes difficult to define concepts effectively because everything is reduced to statistics and numbers (Peter, 2018)

Findings

The investigation of Scopus indexed Open Access papers shows a diversity of approaches, however, a significant portion of sampled articles were based on qualitative method and techniques.

The usage of quantitative method in political science research is low, across the quantitative properties examined.

Although articles come from many nations, they all share the same worries about heavily relying on qualitative methods and methodologies, implying that no unique variation based on location was found by the study.

Recommendations

From the findings made, the study makes the following recommendations.

1. The study recommends better collaboration and multidisciplinary focused researches, so as to incorporate non-traditional methodologies in political science research.
2. Researchers should be dynamic, to vary research choices so as to bring new methodologies to bear.
3. Institutionally, journal editors, peer reviewers, and promotion committees should do more to incentivize researchers to conduct quantitative based research and subject theories, hypotheses or assertions to testing.
4. Future studies could expand the sample size of this study to improve on generalization. Similarly, other databases outside Scopus could be explored.

Conclusion

The investigation of Scopus indexed Open Access papers shows a diversity of approaches, however, a significant portion of sampled articles were based on qualitative method and techniques. Despite coming from different nations, the articles' themes are the same. However, the study found no particular geographic variance, which brings us to the conclusion that political science approaches should be examined from a global viewpoint rather than a country-based one.

Searching for institutional, methodological, and theoretical solutions should be motivated by the issue of the limited use of quantitative research methods in political science. The institution should do more to encourage scholars to do quantitative based research and put ideas, hypotheses, or statements to the test. This includes encouraging journal editors, peer reviewers, and promotion committees. By utilizing cutting-edge methodologies, study designs, and measurement approaches, researchers should aim to boost their quantitateness. The study should be interpreted with caution as some aspects of quantitative method may have been omitted from the content analysis conducted. Also, Scopus indexed articles that are not open accessed were excluded from the study. Similarly, the study did not capture published articles outside the Scopus database.

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