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# The use of Quantitative Research approaches in enhancing Mixed-Methods Research in Public Administration

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## ABSTRACT

Researchers often employ qualitative, quantitative, or mixed-methods approaches, with mixed-methods research (MMR) combining qualitative and quantitative techniques to address complex social phenomena. This study addresses research gaps by examining how quantitative methods can enhance the quality and relevance of MMR in public administration. The goal was to assess postgraduate researchers' understanding of quantitative methods in MMR. Data was collected through closed-ended questionnaires administered to postgraduate students in Public Management and Administration, using random sampling, and analysed with descriptive statistics to summarise the dataset, including means, standard deviations, and frequencies. Findings indicate that most respondents have a clear understanding of mixed methods and the basics of quantitative research, recognising its theoretical principles, methodological advantages, and practical applications. Respondents also emphasised the importance of quantitative methods for collecting extensive data from large samples. The study concludes that quantitative research provides tools for evaluating the impact of governance frameworks on economic performance and service-delivery efficiency. This research examines the underuse of quantitative methods and the challenges of integrating quantitative and qualitative methods in MMR in public administration. By evaluating how quantitative approaches improve MMR's depth and validity, this study addresses key methodological gaps. A more systematic integration is recommended to enhance research quality, and this can be done by incorporating quantitative methods that provide generalizable data to complement qualitative insights. The article contributes to the use of quantitative research methods to enhance mixed-methods research in public administration.

**Keywords:** Qualitative, quantitative, public administration, mixed methods, research

## INTRODUCTION

Various researchers have shown how researchers typically adopt a qualitative, quantitative, or mixed methods/multimethod approach to inquiry.[1] Mixed methods research (MMR) is an approach that combines qualitative and quantitative methodologies to offer a comprehensive view of complex social

[1] Patricia Bazeley and Susanne Vogl, *Integrating Analyses in Mixed Methods Research*, vol. 20182012 (SAGE publications Thousand Oaks, CA, USA, 2018); Warren S Eller, Brian J Gerber, and Scott E Robinson, *Public Administration Research Methods: Tools for Evaluation and Evidence-Based Practice* (Routledge, 2018); R Burke Johnson and Larry B Christensen, *Educational Research: Quantitative, Qualitative, and Mixed Approaches* (Sage publications, 2024).

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phenomena.[2] MMR involves collecting, analysing, and interpreting both types of data and integrating these findings into a unified whole.[3] This approach is critical in public administration due to the field's inherent multidisciplinary nature, characterised by the interaction of elements from sociology, political science, economics, and management.[4]

In recent years, public administration research has advanced through improvements in research engagement and inquiry methodologies.[5] Research methodologies are essential in influencing policy decisions in this domain. In public administration, triangulation can enhance validity and reliability, thereby strengthening the validity of findings across diverse methodological approaches. Despite its increasing popularity, research suggests that the quantitative component is frequently underutilised or poorly integrated, resulting in a deficient understanding of government issues.[6]

Quantitative research methodology employs numerical data obtained from observations to elucidate and characterise phenomena represented by those observations. This methodology utilises empirical and descriptive statements about the importance of real-world cases rather than focusing on the ideal characteristics of those cases and methods.[7] The integration of quantitative and qualitative methodologies enables researchers to address questions that neither method could address independently.[8] Quantitative methods enhance the measurement and analysis of variables within large datasets, facilitating statistical generalisation and the identification of patterns and relationships that support evidence-based decision-making.[9]

MMR combines qualitative and quantitative research methods to tackle complex research questions. This approach presents unique challenges, requiring careful methodological planning,[10] attention to sampling issues,[11] data collection techniques,[12] and integration of data analysis.[13] Different paradigms, epistemological bases, and analytical methods add to these challenges. Despite the growing use of mixed methods, the quantitative component is often underutilised or poorly integrated, thereby limiting the rigor and practical applicability of studies.

MMR has gained significance in public administration due to its ability to combine quantitative data with contextual insights, providing a more holistic approach to complex governance challenges.[14] Gilad states that combining methodologies can yield more comprehensive solutions to real-world inquiries, especially in complex policy contexts.[15] In this context, quantitative methods augment research by facilitating statistical analysis, hypothesis testing, and the validation of qualitative findings, thus enhancing rigour and generalizability.[16]

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[2] Kathryn Hendren et al., "How Qualitative Research Methods Can Be Leveraged to Strengthen Mixed Methods Research in Public Policy and Public Administration?," *Public Administration Review* 83, no. 3 (2023): 468–85.

[3] P.D Leedy and J.E Ormrod, *Practical Research: Planning and Design* (New Jersey: Prentice Hall, 2021).

[4] Chelsea Richwine et al., "Defining and Assessing the Value of Canonical Mixed Methods Research Designs in Public Policy and Public Administration," *Journal of Policy Analysis and Management* 41, no. 3 (2022): 891–920.

[5] Bruce D McDonald III et al., "The Future of Public Administration Research: An Editor's Perspective," *Public Administration* 100, no. 1 (2022): 59–71.

[6] John W Creswell and Vickil Plano Clark, "Mixed Methods Research," *Thousand Oaks, CA*, 2007.

[7] Hamed Taherdoost, "Different Types of Data Analysis; Data Analysis Methods and Techniques in Research Projects," *International Journal of Academic Research in Management* 9, no. 1 (2022): 1–9.

[8] Danielle Berkovic, "Ethical Principles and Consent," *Qualitative Research–A Practical Guide for Health and Social Care Researchers and Practitioners*, 2023.

[9] Hendren et al., "How Qualitative Research Methods Can Be Leveraged to Strengthen Mixed Methods Research in Public Policy and Public Administration?"

[10] John W Creswell and Vickil Plano Clark, "Mixed Methods Research," *Thousand Oaks, CA* 143 (2007).

[11] Michael D Fetters, Leslie A Curry, and John W Creswell, "Achieving Integration in Mixed Methods Designs—Principles and Practices," *Health Services Research* 48, no. 6pt2 (2013): 2134–56.

[12] A Tashakkori and C Teddlie, *Sage Handbook of Mixed Methods in Social and Behavioural Research* ( SAGE., 2010).

[13] Martyn Denscombe, *EBOOK: The Good Research Guide: For Small-Scale Social Research Projects* (McGraw-Hill Education (UK), 2017).

[14] Richwine et al., "Defining and Assessing the Value of Canonical Mixed Methods Research Designs in Public Policy and Public Administration."

[15] Sharon Gilad, "Mixing Qualitative and Quantitative Methods in Pursuit of Richer Answers to Real-World Questions," *Public Performance & Management Review* 44, no. 5 (2021): 1075–99.

[16] Nataša Matović and Kristinka Ovesni, "Interaction of Quantitative and Qualitative Methodology in Mixed Methods Research: Integration and/or Combination," *International Journal of Social Research Methodology* 26, no. 1 (2023): 51–65.

Many MMR studies in public administration fail to fully leverage the strengths of quantitative research, such as statistical generalisability, hypothesis testing, and predictive modeling, which limits the policy relevance and broader applicability of their findings. The literature reveals various research gaps. The researcher has observed a lack of studies exploring the application of quantitative research methods in public administration. Despite their potential, quantitative approaches are often insufficiently integrated into public administration's MMR. A comprehensive understanding of quantitative research methods in this field underscores the need to investigate how these approaches can be effectively used, a gap this study aims to address. This research aims to address the underutilisation of quantitative methods and the challenges associated with integrating qualitative and quantitative data. Ultimately, this study strives to bridge the gap by exploring how quantitative research can enhance the depth, validity, and applicability of MMR in public administration.

Despite these advantages, challenges persist in effectively incorporating quantitative methods into MMR. Hewlett and Werbeloff observe that historical educational disparities in regions such as South Africa result in public administration postgraduate students often exhibiting reluctance or inadequacy in quantitative approaches.[17] Aramide et al. argue for a more specific conceptualisation of the systematic integration of methodologies within MMR to enhance public administration research.[18] This study investigated how quantitative methods can improve the quality and relevance of MMR in public administration to rectify these flaws. This approach provides researchers and practitioners with a clearer methodological foundation for conducting significant, evidence-based studies. Moreover, incorporating quantitative research methodologies into mixed-methods frameworks enriches public administration research by providing precise, generalisable data that augments the depth and context offered by qualitative approaches. The study emphasises the importance of objectivity and empirical research in addressing public-sector challenges, adopting a positivist paradigm.[19] This is essential for academics and professionals aiming to utilise rigorous research to improve service delivery, accountability, and strategic planning. Consequently, the research objective of this study is to evaluate the degree of comprehension among postgraduate researchers in public administration of the application of quantitative methods in mixed-methods research.

## LITERATURE REVIEW

### Mixed methods research

The definition of MMR is a "work in progress".[20] Denscombe notes that numerous labels have been used to describe the evolving field of mixed-methods research.[21] This text references various terminologies related to mixed methods research (MMR), including mixed methods, mixed research, mixed methodology, integrated methods, methodological pluralism, multi-method research, qualitative and quantitative methods, multiple research approaches, combined methods, multi-strategy research, multiplism, the third methodological movement, mixed-mode, and multimethod, triangulated, or integrated design.[22]

It is noted that discussions about the precise meaning of MMR are ongoing. There are numerous methods and approaches used in combination, so to clearly define and establish boundaries for MMR as a research approach, many scholars have contributed descriptions of MMR.[23] Karambakuwa states that a mixed-methods approach to research involves the use of both quantitative and qualitative

[17] Lynn Hewlett and Merle Werbeloff, "Preparing Public Management Students for Mixed Methods Research," *Teaching Public Administration* 41, no. 3 (2023): 367–88.

[18] Kolawole Akinjide Aramide, Udeme Samuel Jacob, and Jace Pillay, "Conceptualisation and Contextualisation of Mixed-Methods Research: A Review.," *Research in Social Sciences and Technology* 8, no. 4 (2023): 14–36.

[19] Yoon Soo Park, Lars Konge, and Anthony R. Artino, "The Positivism Paradigm of Research," *Academic Medicine* 95, no. 5 (May 2020): 690–94, https://doi.org/10.1097/ACM.0000000000003093.

[20] D.C Watkins and D Giona, *Mixed Methods Research: A Pocket Guide to Social Work Research Methods* (Oxford: Oxford University Press, 2015).

[21] Denscombe, *EBOOK: The Good Research Guide: For Small-Scale Social Research Projects*.

[22] Denscombe, *EBOOK: The Good Research Guide: For Small-Scale Social Research Projects*; Johnson and Christensen, *Educational Research: Quantitative, Qualitative, and Mixed Approaches*; J.M. Morse, "Principles of Mixed Methods and Multimethod Research Design," in *Handbook for Mixed Methods in Social and Behavioural Research*, ed. A Tashakori and C Teddlie (California: Sage, 2004).

[23] Watkins and Giona, *Mixed Methods Research: A Pocket Guide to Social Work Research Methods*.

methods within a single study.[24] The researcher combined quantitative numerical data with qualitative narrative data to address the research questions. According to Cohen et al., there are 19 definitions of MMR, each varying by context.[25] Johnson et al. provide a consensus definition of mixed methods, based on the views of 21 researchers, and then present their own definition.

*Mixed methods research is the type of research in which a researcher combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection and analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration*.[26]

Mixed-methods researchers often use notational conventions to describe how the timing, weighting, and mixing decisions contribute to the overall design.[27] A system developed by Morse uses plus (+) symbols and arrows (—►) as well as uppercase and lowercase letters to describe the weighting given to a research approach.[28] Thus:

- A plus sign (+) indicates that quantitative and qualitative data are collected concurrently (at the same time).
- An arrow (—►) indicates that they are collected sequentially (one followed by the other).

The use of uppercase letters indicates a higher priority or weighting for a particular method (i.e., QUAN or QUAL).

Lowercase letters indicate a lower weighting or priority (i.e., quan or qual).

- QUAN + QUAN = Equal status – for quan and quan
- QUAL + QUAL = Equal status – for qual and qual
- QUAL + QUAN = Equal status – for qual and quan
- QUAN ➡ qual = = Explanatory sequential - Quant dominance
- qual ➡ QUAN = Exploratory sequential - Quant dominance
- QUAL ➡ quan = Exploratory sequential – Qual dominance
- quan ➡ QUAL = Explanatory sequential - Qual dominance

**Advantages of mixed methods**

An MMR offers several advantages, as noted by multiple authors.[29] MMR can present multiple benefits over using a single research method.[30] It is recognised that relying on a single type of data, methodology, or perspective may not fully capture the issue under investigation.[31] Mohajan further states that several sub-objectives, not all of which are suited to thorough examination by a single paradigm's methods, are better explored through different approaches.[32] Some sub-objectives are more effectively investigated using quantitative methods, while others are better suited to qualitative methods.[33] Mixed methods design combines quantitative and qualitative research methods and techniques for data collection and analysis. Using both approaches enables researchers to develop a more comprehensive and in-depth understanding of the research problem by considering multiple

[24] R Karambakuwa, "Writing a Research Proposal," *Research Methods for Economics*, 2024, 45–60.

[25] Louis Cohen, Lawrence Manion, and Keith Morrison, *Research Methods in Education*, vol. 6 (routledge London, 2009).

[26] R. Burke Johnson and Anthony J. Onwuegbuzie, "Mixed Methods Research: A Research Paradigm Whose Time Has Come," *Educational Researcher* 33, no. 7 (October 1, 2004): 14–26, https://doi.org/10.3102/0013189X033007014.

[27] M. M Sefotho, "Research and Professional Practice," in *Research at Grassroots for the Social Sciences and Human Services Professions*, ed. C.B Fouché, H Strydom, and W. J. H Roesterburg (Pretoria: Van Schaik, 2024).

[28] J. M Morse, "Principles of Mixed Methods and Multimethod Research Design," in *Handbook of Mixed Methods in Social and Behavioural Research* (California: SAGE, 2003), 189–208; Morse, "Principles of Mixed Methods and Multimethod Research Design," 2004.

[29] Bazeley and Vogl, *Integrating Analyses in Mixed Methods Research*; Claire Bless and Craig Higson-Smith, *Fundamentals of Social Research Methods: An African Perspective* (Juta and Company Ltd, 2000).

[30] Eller, Gerber, and Robinson, *Public Administration Research Methods: Tools for Evaluation and Evidence-Based Practice*.

[31] Cohen, Manion, and Morrison, *Research Methods in Education*; Johnson and Christensen, *Educational Research: Quantitative, Qualitative, and Mixed Approaches*; W Li, P Liping, and Q Khan, *Research Methods in Education* (London: SAGE, 2018).

[32] Mohajan, "Quantitative Research: A Successful Investigation in Natural and Social Sciences."

[33] Mohajan, "Quantitative Research: A Successful Investigation in Natural and Social Sciences."

perspectives.[34] This idea is reinforced by Tashakkori and Teddlie, who assert that MMR truly integrates diverse quantitative and qualitative views to enhance understanding.[35] In this way, an MMR approach delivers depth, comprehension and breadth,[36] as well as comprehensiveness and triangulation,[37] thus addressing the limitations and biases of a single method.

The following are the other advantages of mixed methods research:

- The researcher draws on the strengths of the quantitative and qualitative research while minimising the weaknesses found in each of the approaches.
- Suppose a researcher decides to conduct an in-depth exploration of a phenomenon. In that case, they can use qualitative research with a small but informative sample and employ quantitative research through inferential statistics to quantify the results.
- By combining data from both quantitative and qualitative approaches, a mixed methods research approach can help researchers develop theories and apply deductive and inductive analysis within the same study.
- Researchers may design a single study that addresses questions about both the complex nature of phenomena and the relationship between variables from the participant's perspective
- The researcher can use the approach that works best for the research to investigate, predict, explore, describe, and understand a phenomenon.[38]

Fundamentally, MMR combines quantitative and qualitative research within a single study.[39] It can serve multiple purposes and offers several advantages over using only a single research or evaluation approach.[40] On the one hand, a study can adopt an MMR approach by following the five primary purposes or rationales outlined by Greene, Caracelli, and Graham.[41] These are triangulation, complementarity, initiation, development, and expansion. They are presented as reasons for obtaining a deeper, more reliable understanding of the topic, phenomenon, or problem, insights that neither qualitative nor quantitative methods alone can provide.[42] This approach allows for converging, corroborating, and confirming findings, as well as addressing the limitations and biases of a single method (benefiting from 'complementarity' and 'completeness').[43] Therefore, MMR provides depth and understanding, breadth, comprehensiveness, and triangulation.[44] Table 1 below summarises how Greene et al.'s rationales for the MMR approach can be applied in a study.

**Table 1: Greene et al.'s five rationales for the MMR approach in a study**

| | Reason For MMR | Meaning |
|---|---|---|
| **1** | Triangulation | Simply put, this involves confirming results using different methods. It seeks convergence and corroboration of results from different methods and designs that study the same phenomenon. |

[34] C Boswell, "Data Collection," in *Introduction to Nursing Research: Incorporating Evidence-Based Practice*, ed. C Boswell and S. (Eds) Cannon (Barlington: Jones and Bartlett Learning, 2023).

[35] C Teddlie and A Tashakkori, *Foundations of Mixed Methods Research: Foundations of Mixed Methods Research*, Knight et al. (United States of America: SAGE Publications, Inc., 2009).

[36] Johnson and Onwuegbuzie, "Mixed Methods Research: A Research Paradigm Whose Time Has Come."

[37] D.E Gray, *Doing Research in the World*, 4th Ed. ( London: SAGE, 2018).

[38] Karambakuwa, "Writing a Research Proposal."

[39] J.C Perry, "Conducting Mixed Methods Research," in *Complete Your Thesis or Dissertation Successfully: Practical Guidelines.*, ed. J.G Maree (Cape Town: Juta, 2018); Joseph Seabi, "Research Designs and Data Collection Techniques," *Complete Your Thesis or Dissertation Successfully: Practical Guidelines* 1 (2012): 81–95.

[40] Eller, Gerber, and Robinson, *Public Administration Research Methods: Tools for Evaluation and Evidence-Based Practice*.

[41] Jennifer C Greene, Valerie J Caracelli, and Wendy F Graham, "Toward a Conceptual Framework for Mixed-Method Evaluation Designs," *Educational Evaluation and Policy Analysis* 11, no. 3 (1989): 255–74.

[42] Creswell and Clark, "Mixed Methods Research," 2007; B.M Sharan and S.G Robin, *Qualitative Research in Practice: Examples for Discussion and Analysis* (Francisco: John Wiley & Sons, 2019).

[43] Cohen, Manion, and Morrison, *Research Methods in Education*; Sharan and Robin, *Qualitative Research in Practice: Examples for Discussion and Analysis*; Nicholas Walliman, *Research Methods: The Basics* (Routledge, 2021).

[44] Johnson and Onwuegbuzie, "Mixed Methods Research: A Research Paradigm Whose Time Has Come" .

| | | |
|---|---|---|
| **2** | Complementarity | Simply put, this is where results from one method are used to enhance, elaborate, or clarify results from another method. It seeks to elaborate, enhance, illustrate, and clarify results from both the quantitative and qualitative methods. |
| **3** | Initiation | Simply put, this is where new insights are obtained, which will stimulate new research questions. It is the discovery of potential paradoxes and contradictions that leads to a reframing of the research question. |
| **4** | Development | Simply put, results from one method shape another method. It utilises findings from one method to inform the other method. |
| **5** | Expansion | Simply put, this involves expanding the breadth and range of research by employing different methods for various lines of enquiry. It seeks to expand the length and range of research by employing different methods for various enquiry components. See also Johnson and Onwuegbuzie (2004). |

**Source:** Greene et al.[45]

**Quantitative research approach**

Methodology pertains to the research design, research instruments, data collection procedures, data presentation and analysis procedures, and sample size. There are three types of research design.

1. A quantitative design measures objective facts and focuses on variables and statistical analysis. It includes surveys, content analysis, and experiments.
2. A qualitative design focuses on social reality, cultural meaning, interactive processes, and events. It includes interviews, focus groups, and observations.
3. A mixed methods approach is a combination of qualitative and quantitative research approaches.[46]

There are many debates about whether qualitative research is superior to quantitative research or vice versa. However, the truth is that both approaches are equally valuable when the appropriate method is matched to the appropriate research context.[47] Although MMR has the broad purpose of providing both breadth and depth of understanding and corroboration, methodological purists argue that one should continuously operate within either a qualitative or a quantitative paradigm.[48]

Research in public administration has primarily relied on qualitative methods such as interviews, case studies, and focus groups, which offer valuable insights by capturing lived experiences, motivations, and contextual factors.[49] This reliance has resulted in limited use of quantitative methods, a situation attributed to several factors, including a lack of expertise in statistical analysis, epistemological tensions between qualitative and quantitative paradigms, and an institutional culture that prefers narrative-based approaches over data-driven methods.[50] Many mixed-methods studies in public administration fail to fully leverage the strengths of quantitative methods, such as statistical generalisability, hypothesis testing, and predictive modeling, thereby limiting the policy relevance and broader applicability of research findings.

To provide research contributions and recommendations for policymakers, practitioners, and academic researchers, researchers are committed to conducting rigorous studies to establish confidence

[45] Greene, Caracelli, and Graham, "Toward a Conceptual Framework for Mixed-Method Evaluation Designs."
[46] Karambakuwa, "Writing a Research Proposal."
[47] B Quinlan et al., "Business Methods," 1st Edition (Hampshire: Cengage Learning, 2015).
[48] Johnson and Christensen, *Educational Research: Quantitative, Qualitative, and Mixed Approaches*.
[49] Dirk Ifenthaler and Jane Yin-Kim Yau, "Utilising Learning Analytics to Support Study Success in Higher Education: A Systematic Review," *Educational Technology Research and Development* 68, no. 4 (August 12, 2020): 1961–90, https://doi.org/10.1007/s11423-020-09788-z.
[50] Teddlie and Tashakkori, *Foundations of Mixed Methods Research: Foundations of Mixed Methods Research*.

in their findings.[51] To do this, a quantitative research approach becomes pertinent. A quantitative research approach is one of the three research strategies available to authors.[52] Researchers in public administration may choose to conduct their studies using a quantitative methodology for several reasons.

Researchers may ascertain the correlation between independent and dependent variables using quantitative research.[53] This is accomplished by assessing the validity of a suggested relational assertion. According to Kapengura, quantitative research involves developing concepts or hypotheses about the relationships among the variables under study.[54] Some scholars suggest that the study may employ either a descriptive or correlational design.[55] The importance of reliability and validity in establishing the correlational research coefficient is emphasised. Statistical analysis is often used in quantitative research to evaluate hypotheses or predictions on the relationship between independent and dependent variables.[56] A non-experimental design utilises a quantitative research technique often linked to a deductive approach grounded in logic.[57] This approach aims to ascertain the links between independent and dependent variables to validate these associations.[58]

Researchers may use a quantitative research approach to gather data in a standardised manner with an objective, systematically planned, and established study design. This approach is methodical and relies on strong, reliable quantitative data, rendering it appropriate for hypothesis testing and for the analysis of the study's numerical data through statistical methods.[59]

The efficacy of quantitative research stems from its reliance on numerical data, which provides a robust foundation for empirical inquiry across disciplines, including the social sciences.[60] A quantitative research methodology allows the investigator to collect data objectively in an organised, systematic, standardised, controlled, and impartial manner through the application of a predetermined and fixed research design.[61] The established answer categories and standardised data-collection techniques enhance the validity and reliability of replication studies.[62]

Furthermore, as highlighted by Vijayendra and Fantone, this study emphasises objective metrics and employs methods such as surveys and experiments to gather measurable data efficiently. These techniques are crucial because they provide researchers with a systematic framework for analysing and assessing events using numerical data.[63]

Quantitative studies prioritise empirical data that researchers often examine in public, which is thought to be more objective. The potential for researcher bias in data collection or analysis is significantly

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[51] Pattanapong Tiwasing et al., "The International Journal of Entrepreneurship and Innovation Editors' Series: Advancing Quantitative Research in Entrepreneurship," *The International Journal of Entrepreneurship and Innovation* (SAGE Publications Sage UK: London, England, 2023).

[52] Sefotho, "Ethical Approval for Human Research."

[53] Allen Bartley and Ladan Hashemi, "Quantitative Data Analysis and Interpretation," 2021; Sefotho, "Research and Professional Practice".

[54] F. Kapengura, "Cross-Sectional Data Analysis. In ," in *Research Methods for Economics*, ed. Mishi and A. (Eds.) Maredza ( Pretoria: Van Schaik, 2024).

[55] Kapengura, "Cross-Sectional Data Analysis. In "; W Thomas Means and Rasul A Mowatt, "Philosophy of Science and Leisure Research: An Exploratory Analysis of Research Paradigms," *Leisure/Loisir* 48, no. 1 (2024): 123–47; Schurink, Schurink, and Fouché, "Qualitative Data Analysis and Interpretation."

[56] Karambakuwa, "Writing a Research Proposal."

[57] G Anakpo and A Mishi, "Research Types, Design, and Methodology," *Mishi, S and Maredza, A. Research Methods for Economics. Pretoria: Van Schaik*, 2024.

[58] Bartley and Hashemi, "Quantitative Data Analysis and Interpretation."

[59] P.M Nardi, *Doing Survey Research: A Guide to Quantitative Methods* ( London: Routledge, 2018); N. J. Salkind, *Exploring Research* (London: Pearson, 2019).

[60] N Banjari, M Agby, and R Khan, "Strengths of the Quantitative Method in Social Science Research," *Social Science Research Review* 45, no. 1 (2023): 33–47; R Bayron, "Quantitative Approaches in Applied Social Research," *Journal of Quantitative Inquiry* 19, no. 4 (2023): 88-100.

[61] Bless and Higson-Smith, *Fundamentals of Social Research Methods: An African Perspective*; P. Leedy and J. Ormrod, "Practical Research: Planning and Design" (UK: Pearson, 2020); I Van Aardt and P Hirschsohn, *The Nature of Quantitative and Qualitative Research. Approaches to Business Research: Key Philosophies and Differences. Research Methodology: Business and Management Contexts*, 2nd ed. (Cape Town: Oxford University Press, 2021).

[62] Anakpo and Mishi, "Research Types, Design, and Methodology."

[63] Kumar Vijayendra and An Fantone, "Recent Trends of Quantitative Approaches in Different Sectors: A Concise Review," *Asian Journal of Education and Social Studies* 41, no. 2 (2023): 22–34.

reduced when the researcher has no direct interaction with the participants.[64] Carmines and Zeller contend that researchers can enhance the reliability and accuracy of their results by reducing subjectivity and bias through standardised processes and quantitative measures. As a result, research results exhibit enhanced trustworthiness owing to the precision that enables study replication and independent verification by researchers.[65]

Multiple writers assert that quantitative research enables large sample sizes, thereby facilitating the generalisation of results to other contexts.[66] Researchers can draw inferences about larger populations from a data subset by using representative samples and statistical techniques. The generalisability of results allows researchers to infer and conclude beyond the unique characteristics of their study, thereby enhancing our understanding of the issue.[67]

The quantitative data collection approach broadens the study's scope by enabling researchers to gather information on various facets of a phenomenon from diverse respondents.[68] Xiong asserts that data collection and analysis are more efficient and less time-intensive in quantitative research.[69] The integration of quantitative approaches into mixed-methods research facilitates robust statistical analysis and hypothesis testing, thereby enhancing the credibility of the research.

In public administration, quantitative tools provide a systematic assessment of governmental efficacy and efficiency. Quantitative methodologies have been employed in research to evaluate the efficacy of various government initiatives, particularly those aimed at governance optimisation.[70]

Quantitative research employs statistical methods and data from various regions or populations to identify significant patterns and trends. This information helps policymakers understand practical implementations and identify areas for improvement in their operational frameworks. This method enhances reliability and validity by utilising extensive datasets, thereby increasing the ability to make well-informed decisions based on empirical evidence.[71]

Moreover, quantitative research methods strengthen accountability in public management. They offer tools for assessing the impact of governance frameworks on outcomes such as economic performance and service delivery effectiveness.[72]

## METHODOLOGY

The research approach selected for this study is the quantitative method because it is a structured and objective methodology in which concepts are translated into operational definitions, yielding numerical data presented as figures. Additionally, this study employed a quantitative data analysis method that enabled the researcher to measure, score, or count the variables of interest. These procedures facilitated the collection of numerical data through questionnaires, using a randomly selected sample to ensure the generalisability of the findings. The study focused on Public Management and Governance students at Walter Sisulu University, and the results are expected to extend to the broader student population.

The study population included all postgraduate students in Public Management and Administration. A random sampling technique was used because it helped reduce bias when estimating population parameters and included elements that reflected the variations within the entire population.

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[64] Xueting Xiong, "Critical Review of Quantitative and Qualitative Research," in *2022 3rd International Conference on Mental Health, Education and Human Development (MHEHD 2022)* (Atlantis Press, 2022), 956–59.

[65] Edward G Carmines and Richard A Zeller, *Reliability and Validity Assessment* (Sage publications, 1979).

[66] Anakpo and Mishi, "Research Types, Design, and Methodology"; Hendren et al., "How Qualitative Research Methods Can Be Leveraged to Strengthen Mixed Methods Research in Public Policy and Public Administration?"

[67] M M Zyoud, T R K Bsharat, and K A Dweikat, "Quantitative Research Methods: Maximizing Benefits, Addressing Limitations, and Advancing Methodological Frontiers," *ISRG Journal of Multidisciplinary Studies* 2, no. 4 (2024): 11–14.

[68] Saraswati Dawadi, "Thematic Analysis Approach: A Step by Step Guide for ELT Research Practitioners," *Journal of NELTA* 25, no. 1–2 (2020): 62–71.

[69] Xiong, "Critical Review of Quantitative and Qualitative Research."

[70] Timur T. Gantamirov, Magomed S. Tepsuev, and Dinara M. Agirbova, "Quantitative Research On Public Administration," *Ekonomika I Upravlenie: Problemy, Resheniya* 1/12, no. 154 (2025): 91–96, https://doi.org/10.36871/ek.up.p.r.2025.01.12.012.

[71] Jyotshna Sahoo, Basudev Mohanty, and Satya Prakash Dash, "Methodological Developments and Innovations in E-Government Research," *Electronic Government, an International Journal* 20, no. 4 (2024): 361–74.

[72] Sue Chern Ooi and Sarah Thangadurai, "A Bibliometric Analysis of Governance for Food Security: Global Trends and Future Research Directions," *Journal of Public Affairs* 25, no. 2 (May 14, 2025), https://doi.org/10.1002/pa.70032.

Additionally, this method ensured that every member of the population had an equal and independent chance of being selected as a respondent.

The data collection tool used in this study was a questionnaire. Data were collected using structured electronic questionnaires, enabling efficient administration to 84 postgraduate public administration students and resulting in a strong response rate. This approach facilitated the collection of substantial, precise quantitative data and captured both factual and opinion-based information from informed respondents.

The data was analysed using descriptive statistics that characterised and summarised the study's sample or dataset, including variables' means, standard deviations, and frequencies. Thus, alongside assessing demographic and biographical data, descriptive statistics helped summarise the sample size and response rate from the collected data.

The study was guided by content and face validity. The former ensured that the instrument's items accurately represented the entire scope of the concept being studied. The latter assessed how well an approach appears to provide an accurate evaluation of a specific attribute. To ensure reliability, the researchers ensured that the questionnaire used in this study was sound. The researchers achieved this by seeking advice from methodologists and experienced colleagues before determining the best approach.

Ethical considerations, such as informed consent as well as the principles of anonymity and confidentiality, were observed. The researchers also obtained an ethical clearance certificate from Walter Sisulu University (Ref: FMPAS/DPMG/2025/0006).

## PRESENTATION OF FINDINGS

The objective of this article was to assess the extent to which postgraduate researchers in public administration understand how to use a quantitative approach in mixed methods research. Findings are shown in Figures 1 and 2 below.

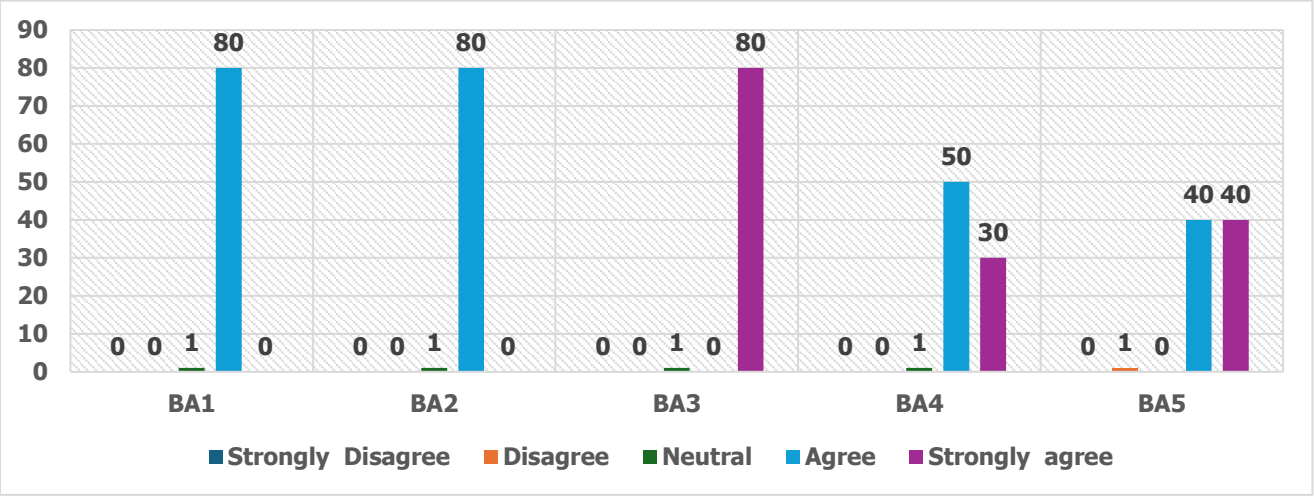


*Figure 1: Mixed methods research*

This study's objective addressed the issue of mixed-methods research. This was to assess whether postgraduate researchers understand the dynamics of mixed-methods research. According to the findings, most respondents (80%) agree that mixed methods design combines quantitative and qualitative techniques for data collection and analysis. Additionally, 80% agree that using both approaches enables researchers to gain a broader and more profound understanding of the research problem by considering multiple perspectives. Furthermore, 80% strongly agree that the MMR approach offers depth, breadth, and triangulation, thereby addressing the limitations and biases associated with using a single method. Meanwhile, 50% agreed, and 30% strongly agreed that MMR enables researchers to design a single study that explores the complex nature of phenomena and the relationships between variables from the participants' perspective. Lastly, 40% agreed, and another

40% strongly agreed that incorporating quantitative methods into mixed-methods designs enables rigorous statistical analysis and hypothesis testing, thereby enhancing the credibility of the research.

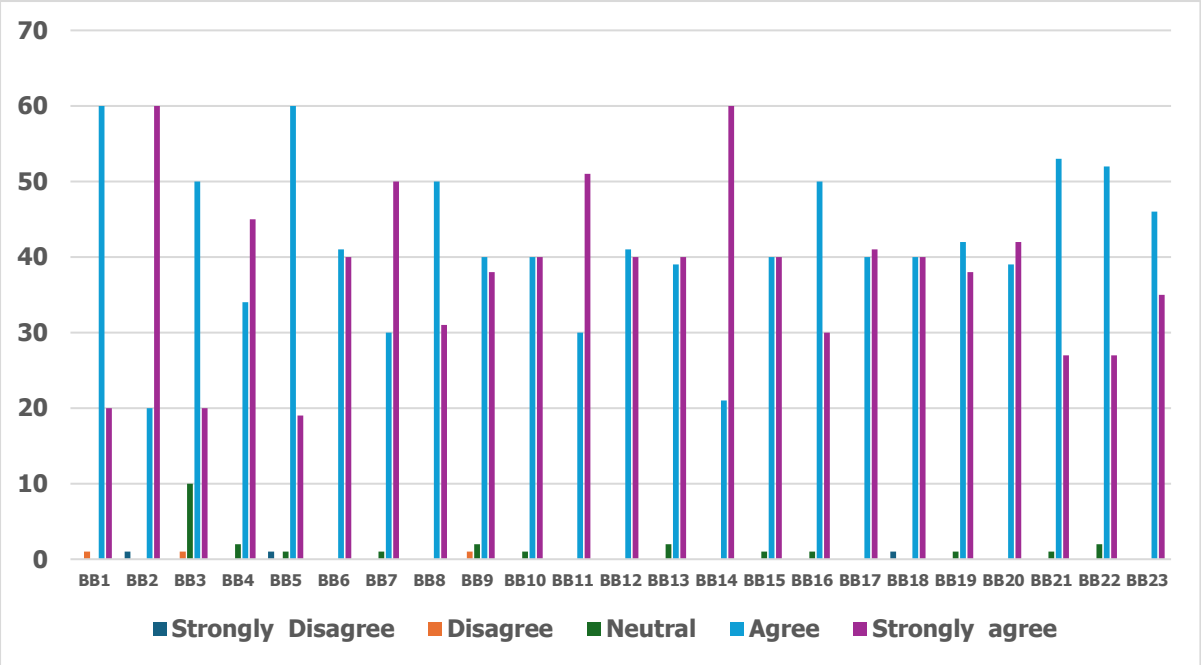


*Figure 2: Quantitative research approach*

This section examined the quantitative research approach. It aimed to assess the extent to which postgraduate students understood this methodology and their capacity to engage with related statements. The findings revealed that 60% of the respondents agree, while 20% strongly agree, that quantitative research involves formulating ideas or hypotheses between variables, 60% agree that quantitative data collection enhances a study's scope by allowing researchers to gather information on various aspects of a phenomenon from different respondents, 50% agree with 20% strongly agreeing that this methodology is crucial quantitative research is crucial for evidence-based decision-making in public administration, the overall trend (BB1-BB23) reveals that most students leaned toward agreement, with relatively high proportions of responses falling under agree and strongly agree across the majority of statements.

## DISCUSSION OF FINDINGS

### Discussion of mixed methods research

The findings clearly show that most respondents understand what mixed methods involve. A mixed-methods design combines quantitative and qualitative research methods for collecting and analysing data. The high levels of agreement across all statements suggest that respondents recognise the unique benefits of combining these approaches. The results indicated that the respondents agreed that using both methods offers a broader and deeper understanding of research problems. This finding supports Boswell's argument that using both quantitative and qualitative approaches enables researchers to gain a more comprehensive understanding of the research problem by considering multiple perspectives.[73] The high level of agreement demonstrates that students value MMR's theoretical flexibility when tackling complex research problems.

There was strong support (80% strongly agree) for the idea that MMR provides depth, breadth, and triangulation, which help overcome the limitations of using a single approach. This shows recognition of MMR's core strengths, including depth, understanding, and breadth, as well as comprehensiveness and triangulation.[74] These qualities address the biases and limitations of relying on

[73] Boswell, "Data Collection."

[74] R Burke Johnson, Anthony J Onwuegbuzie, and Lisa A Turner, "Toward a Definition of Mixed Methods Research," *Journal of Mixed Methods Research* 1, no. 2 (2007): 112–33.

just one method. Adding quantitative methods to mixed-methods research enables rigorous statistical analysis and hypothesis testing, thereby increasing the Research's credibility.

The findings demonstrate that postgraduate students grasp the core concepts of MMR and recognise its practical and methodological benefits. The results confirm that MMR is considered an essential method in public administration research, as it addresses both the need for empirical generalisability and the requirement for contextual analysis.

**Discussion of the quantitative research approach**

The findings indicate that most respondents demonstrated a clear understanding of the basics of the quantitative research approach. The results revealed strong agreement across most questionnaire items (B1–B23), indicating that postgraduate students recognise the theoretical principles, methodological advantages, and practical applications of quantitative research.

Respondents also highlighted the importance of quantitative methods in expanding a study by allowing extensive data collection from large samples. This aligns with Mishi and Anakpo's argument that quantitative research supports large sample sizes, enabling generalisation and the application of findings to other contexts.[75] The results showed that students appreciate the efficiency, time-saving features, and generalisability of quantitative methods, emphasising their recognition of their importance for extensive research.

Furthermore, the results demonstrate a clear understanding of the importance of quantitative methods in evidence-based decision-making for public administration. More than half of the respondents (42%) agreed, and 20% strongly agreed, that this methodology is crucial for guiding policy decisions. This aligns with Gantamirov et al., who note that quantitative methods have been employed in research to assess the effectiveness of various government initiatives, particularly those aimed at enhancing governance.[76] Quantitative research offers tools to evaluate the impact of governance frameworks on outcomes, including economic performance and service delivery efficiency.[77]

Another key aspect highlighted by the findings is the importance of reliability, validity, and credibility. Students agreed that quantitative research eliminates researcher bias, employs standardised methodologies, and facilitates replication, thereby strengthening the reliability of results. This supports the argument of Carmines and Zeller that researchers can enhance the reliability and accuracy of their results by minimising subjectivity and bias through standardised procedures and quantitative measures.[78] As a result, research outcomes demonstrate greater trustworthiness, owing to the precision that enables replication and independent verification by researchers.

## RECOMMENDATIONS

The article contributes to the use of quantitative research methods to enhance mixed-methods research in public administration. The research examined the underuse of quantitative methods and integration challenges in MMR for public administration. By evaluating how quantitative approaches improve MMR's depth and validity, this study addresses key methodological gaps. A more systematic integration is recommended to enhance research quality, and this can be done by incorporating quantitative methods that provide generalizable data to complement qualitative insights.

## CONCLUSION

Researchers typically employ qualitative, quantitative, or mixed-methods approaches to inquiry. MMR combines qualitative and quantitative methods to provide a comprehensive view of complex social phenomena. Recently, public administration research has advanced through improvements in our research engagement and inquiry methods. However, many MMR studies in public administration do not fully leverage the strengths of quantitative research, such as statistical generalizability, hypothesis testing, and predictive modeling, thereby limiting the policy relevance and broader applicability of their

[75] Anakpo and Mishi, "Research Types, Design, and Methodology."
[76] Gantamirov, Tepsuev, and Agirbova, "Quantitative Research On Public Administration."
[77] Ooi and Thangadurai, "A Bibliometric Analysis of Governance for Food Security: Global Trends and Future Research Directions."
[78] Carmines and Zeller, *Reliability and Validity Assessment*.

findings. The literature identifies various research gaps. Despite these benefits, challenges remain in effectively integrating quantitative methods into MMR. This study explored how quantitative methods can improve the quality and relevance of MMR in public administration. Therefore, the research goal is to assess the extent to which postgraduate researchers in public administration understand the use of quantitative methods in mixed-methods research. Using a quantitative method, closed-ended questionnaires were administered to postgraduate students in Public Management and Administration, employing random sampling. Data were analyzed using descriptive statistics to characterize and summarize the study's sample or dataset, including means, standard deviations, and frequencies for the variables. The findings clearly show that most respondents understand what mixed methods involve. Most respondents demonstrated a clear understanding of the fundamentals of quantitative research, and postgraduate students recognize its theoretical principles, methodological advantages, and practical applications.

Furthermore, respondents highlighted the importance of quantitative methods in expanding a study by allowing extensive data collection from large samples. The study concluded that quantitative research provides tools to evaluate the impact of governance frameworks on outcomes, including economic performance and service-delivery efficiency.

## BIBLIOGRAPHY


Aardt, I. van, and P. Hirschsohn. *The Nature of Quantitative and Qualitative Research. Approaches to Business Research: Key Philosophies and Differences. Research Methodology: Business and Management Contexts*. 2nd ed. Cape Town: Oxford University Press, 2021.

Anakpo, G., and A Mishi. "Research Types, Design, and Methodology." *Mishi, S and Maredza, A. Research Methods for Economics. Pretoria: Van Schaik*, 2024.

Aramide, Kolawole Akinjide, Udeme Samuel Jacob, and Jace Pillay. "Conceptualisation and Contextualisation of Mixed-Methods Research: A Review." *Research in Social Sciences and Technology* 8, no. 4 (2023): 14–36.

Banjari, N, M Agby, and R Khan. "Strengths of the Quantitative Method in Social Science Research." *Social Science Research Review* 45, no. 1 (2023): 33–47.

Bartley, Allen, and Ladan Hashemi. "Quantitative Data Analysis and Interpretation," 2021.

Bayron, R. "Quantitative Approaches in Applied Social Research." *Journal of Quantitative Inquiry* 19, no. 4 (2023): 88-100.

Bazeley, Patricia, and Susanne Vogl. *Integrating Analyses in Mixed Methods Research*. Vol. 20182012. SAGE Publications, Thousand Oaks, CA, USA, 2018.

Berkovic, Danielle. "Ethical Principles and Consent." *Qualitative Research–A Practical Guide for Health and Social Care Researchers and Practitioners*, 2023.

Bless, Claire, and Craig Higson-Smith. *Fundamentals of Social Research Methods: An African Perspective*. Juta and Company Ltd, 2000.

Boswell, C. "Data Collection." In *Introduction to Nursing Research: Incorporating Evidence-Based Practice*, edited by C. Boswell and S. (Eds.) Cannon. Barrington: Jones and Bartlett Learning, 2023.

Carmines, Edward G., and Richard A. Zeller. *Reliability and Validity Assessment*. Sage Publications, 1979.

Chinoda, Tough, and Forget Mingiri Kapingura. "Digital Financial Inclusion and Economic Growth in Sub-Saharan Africa: The Role of Institutions and Governance." *African Journal of Economic and Management Studies* 15, no. 1 (2024): 15–30.

Cohen, Louis, Lawrence Manion, and Keith Morrison. *Research Methods in Education*. Vol. 6. Routledge, London, 2009.

Contemporary PNG Studies. *The Commonalities and Differences between Research Paradigms*. Kekeya, J., 2019.

Creswell, John W., and Vicki L. Plano Clark. "Mixed Methods Research." *Thousand Oaks, CA*, 2007.

———. "Mixed Methods Research." *Thousand Oaks, CA* 143 (2007).

Dawadi, Saraswati. "Thematic Analysis Approach: A Step-by-Step Guide for ELT Research

Practitioners." *Journal of NELTA* 25, no. 1–2 (2020): 62–71.
Denscombe, Martyn. *EBOOK: The Good Research Guide: For Small-Scale Social Research Projects*. McGraw-Hill Education (UK), 2017.
Devlin, A. *The Research Experience*. Sage, 2018.
Dube, B., and T. G. J. Shawe. "Data Analysis and Interpretation Procedures." *Fundamentals of Research in Humanities, Social Sciences and Science Education: A Practical Step-by-Step Approach to Successful Research Journey*, 2022, 151–67.
Eller, Warren S., Brian J. Gerber, and Scott E. Robinson. *Public Administration Research Methods: Tools for Evaluation and Evidence-Based Practice*. Routledge, 2018.
Fetters, Michael D., Leslie A. Curry, and John W. Creswell. "Achieving Integration in Mixed Methods Designs—Principles and Practices." *Health Services Research* 48, no. 6pt2 (2013): 2134–56.
Gantamirov, Timur T., Magomed S. Tepsuev, and Dinara M. Agirbova. "Quantitative Research On Public Administration." *Ekonomika I Upravlenie: Problemy, Resheniya* 1/12, no. 154 (2025): 91–96. https://doi.org/10.36871/ek.up.p.r.2025.01.12.012.
Gilad, Sharon. "Mixing Qualitative and Quantitative Methods in Pursuit of Richer Answers to Real-World Questions." *Public Performance & Management Review* 44, no. 5 (2021): 1075–99.
Gray, D.E. *Doing Research in the World*. 4th Ed. London: SAGE, 2018.
Greene, Jennifer C., Valerie J. Caracelli, and Wendy F. Graham. "Toward a Conceptual Framework for Mixed-Method Evaluation Designs." *Educational Evaluation and Policy Analysis* 11, no. 3 (1989): 255–74.
Halperin, Sandra, and Oliver Heath. *Political Research*. 3rd ed. Oxford University Press, 2020. https://doi.org/10.1093/hepl/9780198820628.001.0001.
Hendren, Kathryn, Qian Eric Luo, and Sanjay K Pandey. "The State of Mixed Methods Research in Public Administration and Public Policy." *Public Administration Review* 78, no.6(2018): 904–16.
Hendren, Kathryn, Kathryn Newcomer, Sanjay K Pandey, Margaret Smith, and Nicole Sumner. "How Qualitative Research Methods Can Be Leveraged to Strengthen Mixed Methods Research in Public Policy and Public Administration?" *Public Administration Review* 83, no.3(2023): 468–85.
Hewlett, Lynn, and Merle Werbeloff. "Preparing Public Management Students for Mixed Methods Research." *Teaching Public Administration* 41, no. 3 (2023): 367–88.
Ifenthaler, Dirk, and Jane Yin-Kim Yau. "Utilising Learning Analytics to Support Study Success in Higher Education: A Systematic Review." *Educational Technology Research and Development* 68, no. 4 (August 12, 2020): 1961–90. https://doi.org/10.1007/s11423-020-09788-z.
Ivankova, N. V., John W. Creswell, and V. L. Plano Clark. "Foundations and Approaches to Mixed Methods Research." *First Steps in Research. Pretoria: Van Schaik* 3, no. 3 (2007): 253–82.
Johnson, R. Burke, and Anthony J. Onwuegbuzie. "Mixed Methods Research: A Research Paradigm Whose Time Has Come." *Educational Researcher* 33, no. 7 (October 1, 2004): 14–26. https://doi.org/10.3102/0013189X033007014.
Johnson, R. Burke, and Larry B. Christensen. *Educational Research: Quantitative, Qualitative, and Mixed Approaches*. Sage Publications, 2024.
Johnson, R., Burke, Anthony J. Onwuegbuzie, and Lisa A. Turner. "Toward a Definition of Mixed Methods Research." *Journal of Mixed Methods Research* 1, no.2 (2007): 112–33.
Kapengura, F. "Cross-Sectional Data Analysis. In ." In *Research Methods for Economics*, edited by Mishi and A. (Eds.) Maredza. Pretoria: Van Schaik, 2024.
Karambakuwa, R. "Writing a Research Proposal." *Research Methods for Economics*, 2024, 45–60.
Leedy, P., and J. Ormrod. "Practical Research: Planning and Design." UK: Pearson, 2020.
Leedy, P. D., and J. E. Ormrod. *Practical Research: Planning and Design*. New Jersey: Prentice Hall, 2021.
Leeuw, Edith de, and Joop Hox. "Mixing Data Collection Methods: Lessons from Social Survey Research1, 2." *Advances in Mixed Methods Research: Theories and Applications*, 2008, 138.

Li, W., P. Liping, and Q. Khan. *Research Methods in Education*. London: SAGE, 2018.

Linake, M., C. Maphosa, and K. E. Mthethwa-Kunene. "The Synergy between Paradigms and Research Approaches," 2022.

Manzini, M., and M. Mhakure. "Research Hypothesis and Relationships with Statistical Tools." In *Fundamentals of Research in Humanities, Social Sciences, and Science Education: A Practical Step-by-Step Approach to a Successful Research Journey*, edited by E. Adu and C. I Okeke. Pretoria: Van Schaik, 2022.

Maree, K. "Planning a Research Proposal." In *First Steps to Research*, edited by K. Maree, 3rd ed. Pretoria: Van Schaik, 2025.

Masha, A. K., and E. Eze. "Selecting Your Instruments for Data Collection." In *Fundamentals of Research in Humanities, Social Sciences, and Science Education: A Practical Step-by-Step Approach to a Successful Research Journey*, edited by E. Adu and C. I Okeke. Pretoria: Van Schaik., 2022.

Matović, Nataša, and Kristinka Ovesni. "Interaction of Quantitative and Qualitative Methodology in Mixed Methods Research: Integration and/or Combination." *International Journal of Social Research Methodology* 26, no. 1 (2023): 51–65.

McDonald III, Bruce D., Jeremy L. Hall, Janine O'Flynn, and Sandra Van Thiel. "The Future of Public Administration Research: An Editor's Perspective." *Public Administration* 100, no. 1 (2022): 59–71.

Means, W. Thomas, and Rasul A. Mowatt. "Philosophy of Science and Leisure Research: An Exploratory Analysis of Research Paradigms." *Leisure/Loisir* 48, no. 1 (2024): 123–47.

Mele, V., and P. Belardinelli. "Mixed Methods in Public Administration Research: Selecting, Sequencing, and Connecting." *Journal of Public Administration Research and Theory* 29 (2019): 334–47.

Mohajan, Haradhan Kumar. "Quantitative Research: A Successful Investigation in Natural and Social Sciences." *Journal of Economic Development, Environment and People* 9, no. 4 (December 31, 2020). https://doi.org/10.26458/jedep.v9i4.679.

Morse, J. M. "Principles of Mixed Methods and Multimethod Research Design." In *Handbook of Mixed Methods in Social and Behavioural Research*, 189–208. California: SAGE, 2003.

Morse, J.M. "Principles of Mixed Methods and Multimethod Research Design." In *Handbook for Mixed Methods in Social and Behavioural Research*, edited by A. Tashakkori and C. Teddlie. California: Sage, 2004.

Nardi, P.M. *Doing Survey Research: A Guide to Quantitative Methods*. London: Routledge, 2018.

Ooi, Sue Chern, and Sarah Thangadurai. "A Bibliometric Analysis of Governance for Food Security: Global Trends and Future Research Directions." *Journal of Public Affairs* 25, no. 2 (May 14, 2025). https://doi.org/10.1002/pa.70032.

Park, Yoon Soo, Lars Konge, and Anthony R. Artino. "The Positivism Paradigm of Research." *Academic Medicine* 95, no. 5 (May 2020): 690–94. https://doi.org/10.1097/ACM.0000000000003093.

Patino, Cecilia Maria, and Juliana Carvalho Ferreira. "Inclusion and Exclusion Criteria in Research Studies: Definitions and Why They Matter." *Jornal Brasileiro de Pneumologia* 44 (2018): 84.

Perry, J.C. "Conducting Mixed Methods Research." In *Complete Your Thesis or Dissertation Successfully: Practical Guidelines*, edited by J.G. Maree. Cape Town: Juta, 2018.

Quinlan, B, B Babin, J Carr, M Griffin, and W Zikmund. "Business Methods," 1st Edition. Hampshire: Cengage Learning, 2015.

Richwine, Chelsea, Qian Eric Luo, Zoë Thorkildsen, Nicholas J Chong, Rebecca Morris, Burt S Barnow, and Sanjay K Pandey. "Defining and Assessing the Value of Canonical Mixed Methods Research Designs in Public Policy and Public Administration." *Journal of Policy Analysis and Management* 41, no. 3 (2022): 891–920.

Sahoo, Jyotshna, Basudev Mohanty, and Satya Prakash Dash. "Methodological Developments and Innovations in E-Government Research." *Electronic Government, an International Journal* 20, no. 4 (2024): 361–74.

Salkind, N. J. *Exploring Research*. London: Pearson, 2019.
Saunders, Mark N. K., Philip Lewis, and Adrian Thornhill. "Research Methods for Business Students (Eighth)." *Harlow: Pearson Education Limited*, 2019.
Schurink, W. J., E. M. Schurink, and C. B. Fouché. "Qualitative Data Analysis and Interpretation." In *Research at Grassroots for the Social Sciences and Human Services Professions*, edited by C. B. Fouché, H. Strydom, and W. J. H. Roesterburg, 5th Edition. Pretoria: Van Schaik, 2024.
Seabi, Joseph. "Research Designs and Data Collection Techniques." *Complete Your Thesis or Dissertation Successfully: Practical Guidelines* 1 (2012): 81–95.
Sefotho, M. M. "Research and Professional Practice." In *Research at Grassroots for the Social Sciences and Human Services Professions*, edited by C.B. Fouché, H. Strydom, and W. J. H. Roesterburg. Pretoria: Van Schaik, 2024.
Sefotho, M. "Ethical Approval for Human Research." *South African Journal of Bioethics and Law* 17, no. 1 (2024): 34–52.
Sharan, B.M., and S.G. Robin. *Qualitative Research in Practice: Examples for Discussion and Analysis*. Francisco: John Wiley & Sons, 2019.
Svensson Harari, Natalia, and Anders Fundin. "An Early-Phase Design Process to Enable Long-Term Flexibility in Assembly Systems." *Research in Engineering Design* 34, no. 2 (April 18, 2023): 257–83. https://doi.org/10.1007/s00163-022-00404-0.
Taherdoost, Hamed. "Different Types of Data Analysis; Data Analysis Methods and Techniques in Research Projects."*International Journal of Academic Research in Management* 9, no.1(2022): 1–9.
Tashakkori, A., and C. Teddlie. *Sage Handbook of Mixed Methods in Social and Behavioural Research*. SAGE, 2010.
Teddlie, C., and A. Tashakkori. *Foundations of Mixed Methods Research: Foundations of Mixed Methods Research*. Knight et al. United States of America: SAGE Publications, Inc., 2009.
Tiwasing, Pattanapong, Laura Galloway, Deema Refai, Alex Kevill, Endrit Kromidha, and Steven Pattinson. "The International Journal of Entrepreneurship and Innovation Editors' Series: Advancing Quantitative Research in Entrepreneurship." *The International Journal of Entrepreneurship and Innovation*. SAGE Publications, SAGE UK: London, England, 2023.
Ugwuanyi, C. S. "Hypothesis Testing and Reporting of Quantitative Research Results." *Fundamentals of Research in Humanities, Social Sciences and Science Education: A Practical Step-by-Step Approach to a Successful Research Journey. Pretoria: Van Schaik. Available at:[Link]*, 2022.
Vijayendra, Kumar, and An Fantone. "Recent Trends of Quantitative Approaches in Different Sectors: A Concise Review." *Asian Journal of Education and Social Studies* 41, no. 2 (2023): 22–34.
Walliman, Nicholas. *Research Methods: The Basics*. Routledge, 2021.
Watkins, D. C., and D. Giona. *Mixed Methods Research: A Pocket Guide to Social Work Research Methods*. Oxford: Oxford University Press, 2015.
Xiong, Xueting. "Critical Review of Quantitative and Qualitative Research." In *2022 3rd International Conference on Mental Health, Education and Human Development (MHEHD 2022)*, 956–59. Atlantis Press, 2022.
Yin, Robert K. *Case Study Research and Applications*. Vol. 6. Sage, Thousand Oaks, CA, 2018.
Zyoud, M. M., T. R. K. Bsharat, and K. A. Dweikat. "Quantitative Research Methods: Maximizing Benefits, Addressing Limitations, and Advancing Methodological Frontiers." *ISRG Journal of Multidisciplinary Studies* 2, no. 4 (2024): 11–14.

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