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Impact of Innovative Multidisciplinary Research Enhancing Global Transparency in Scientific Policy Discourses Leading Holistic Sustainability

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Real-world breakthrough discoveries depend on enhancing potential multidisciplinary research. Boundaries among academic disciplines are getting porous as traditional knowledge silos are demotivated behind emerging era of cross disciplinary research. Focusing future confronts in learning and exploration, polygonal interdisciplinary approach might cross insight threshold. To meet global SDGs, interdisciplinary research holds significant importance in bridging traditional speculative gaps. Policies and practices in all educational domains need to project and implement real-world interdisciplinary impactful research. Present study aimed to explore constructive analyses of individuals from diverse research background viz, natural sciences, management sciences, social sciences and basic sciences. Research findings revealed that scientific collaborations in form of multidisciplinary research is of utmost significance meeting challenges in today's era. Merging intellects of various minds in transparency of innovations is the key aspect in congregating defies of developing nations as multi-skilled research holds tremendous potential for addressing the multifaceted challenges of our world. Scientific policy discourses encourage multidisciplinary learning to enhance breakthrough discoveries, solving intricate concerns and their solutions to real-world.

1. Introduction

Research collaborations in emerging era are prominently aspiring fundamental ontology of diverse academic disciplines (Dalton et al., 2021). Bridging complex gaps of dynamic consensus, a robust policy must be designed for integrated multidisciplinary research. Jumping academic and research steps from monodisciplinary to cross-disciplinary is observed globally, perhaps due to complexities in research tackled by mutual understanding (Hara et al., 2003). No doubt cooperation and collaboration in research sounds more reliable and valid innovations development (Salvato et al., 2014). Multi-disciplinary sciences are ontologically challenging as prior studies elaborate various fundamental views that are still ambiguous (Martensson et al., 2016). Quality research evaluation in real scientific domain needs attention across global boundaries. Academic and research diverse disciplines profoundly address complex concerns fostering creative competencies focusing global perspectives and transparency (Morgan et al., 2022).

It is pertinent to mention that female individuals tend to be in a relatively destitute view in academia and research periodicals in the workplace, comparatively to their male peers, therefore it is urged to prioritize females with multidisciplinary background to maintain balance in scientific policy discourses (Lyu et al., 2024; Chubb & Derrick, 2020; Huang et al., 2020). Global transparency in implementing policies is enhanced positively. World digitization and multidisciplinary approach interlinked progressive connections among policy makers and people profoundly (Brunswicker et al., 2019). Transparency openness, secured through greater availability of information is increasingly seen as integral measure of the solution to a complex array of social, economic, political, scientific and ethical problems in an interconnected world (Gupta & Mason, 2014).

Our study addressed prior and post-hoc hypothesis with respect to response analysis of academicians, researchers and policy makers emphasizing the circumstances applicable in global multidisciplinary policymaking and evaluating impact of multidisciplinary research in scientific policy discourses enhancing global transparency and sustainability meeting universal SDGs.

2. Literature Review

2.1 Role of Policymakers Framing Multidisciplinary Research

Various policy concerns viz; impact analysis of multi-dimensional policy issues based on their foregrounded significance, are all framed by policy makers, implementers and analytics, followed by responsive solutions (Steedman et al., 2020). To promote scientific transparency and accessibility globally, the need of time is to develop science more conversant and imparting wisdom focusing civic ‘ownership’, perhaps by publishing multidisciplinary research, outreach workshops and seminars (Smith and Jensen, 2016). Nevertheless, emphasizing knowledge frames, scientific interests could be raised symbolically (Boswell, 2009). Scientific knowledge recognition across multidisciplinary global research is quite a complex process. Only access and availability are not addressed, rather concern of complexity management in a limitless domain is another serious matter. In-depth analysis of global multidisciplinary research is riotous task. Global incisive multi-

disciplinary research overview for positive credible constructivism from a vast array of knowledge, needs attention and credibility (Rahman & Mahmud, 2016).

2.2 Holistic Multidisciplinary Transparent Approach

Holistic and multidisciplinary approach emphasizes the need for a global sustainability line towards higher education acknowledging learners to choose courses from different disciplines based on their interests, aptitudes, future needs and professional career development. The HMTA must promote universal education focusing cognitive, social, emotional, moral and physical development followed by enhancing a culture of curiosity, critical thinking, and problem-solving (Dhamodharan, 2023).

2.3 Discourse Analysis in Mono & Cross Disciplinary Research

One of the major aspects of qualitative research approach is discourse analysis across multi science disciplines against meeting challenges and analyzing reality construction in a variety of developmental arenas among institutes. A growing body of research across sciences discipline revealed remarkable contributions of discourse analysis toward knowledge generation in various social, organizational, and institutional settings. Previous literature fusion, hints major multidisciplinary systematic challenges according to theoretical and epistemological underpinnings, maintaining transparency of methodological processes, providing evidence that warrants knowledge claims (Greckhamer & Cilesiz, 2014). To demonstrate the transparency of multi-sciences, research a systematic and rigorous analysis is vital to enhance trustworthiness, and researchers must explicitly document and communicate their analysis procedures (Gee, 2011).

2.4 Multidisciplinary Research and AI: Complexity, Uncertainty and Materiality Challenges

The world has changed rapidly focusing emerging technologies, where AI (artificial intelligence) holds fundamental importance, reshaping and substituting humanistic work with various deep and machine learning algorithms, emphasizing; industrial, scientific, intellectual and social applications. AI facilitated in multi-fields with technical innovation and has transformed abundant manual errands (Dwivedi et al., 2021). The ability for AI to overcome some of the computationally intensive, intellectual and perhaps even creative limitations of humans, opens new application domains with subsequent impacts on global sustainability, productivity and performance (Daugherty & Wilson, 2018; Mitchell, 2019; Janssen et al., 2017).

Collaboration between experts in various fields is essential for the implementation of AI and robotics in manufacturing, such as computer science, life sciences, medical sciences, natural sciences, earth sciences, engineering, psychology, and management sciences to address technological, ethical, and social challenges and ensure that robotics and AI are developed in a way that is morally and legally correct as well as secure for society. Multidisciplinary scientists develop various algorithms and software to create intelligent systems assessing data, learn from experience, and make decisions, whereas psychologists postulate controls and interfaces to enable simple and safe human interaction with robots.

Mycologists help identifying threatening fungal diseases by machine and deep learning models and image analysis. Management sciences help identifying potential moral and social problems that may arise from the use of robots and AI, such as the effect on human labor and bias in algorithms creating rules for constructive and secure handling. Beside all this, nobody could deny the fact that the future of AI is still not clear, as a million risks exist that wraps societal alienation regarding technology misuse. It is pertinent to mention that a couple years would surely decide the upcoming AI path, impacting existing and future generation lives.

3. Material & Methodology

Current study focuses major objective elaborating opinion of 81 academicians, researchers and policy makers from Pakistan on various aspects of multidisciplinary research transparency (Table 1). Prior hypothesis of present study was intensive on dependency relationship between variables viz; global transparency is enhanced by multidisciplinary research in scientific policy discourses; monodisciplinary to cross-disciplinary remarkable contributions of discourse analysis are recorded towards knowledge generation in various institutional settings.

Table No 1: Multidisciplinary Research Transparency Criteria Standards Description

Standards	Criterion Description	Sequels
Theoretical Framework	Post-hoc analysis Strategic multi-research planning and designing	Abductive, deductive and inductive multi-disciplinary research strategies specified? Whether research identified post-hoc hypothesis separately from a prior hypothesis? The level of awareness and appropriateness of dissemination and transparency measures.
Research Design	Methods, techniques, procedures, models, AI tools.	Premise acceptable. Validity of Items and Scales used. Research questions addressed.
Analysis	Software and statistical analysis tools	Is interpretation justifiable in means of (Softwares, NVIVO, EFA versus CFA, ANOVA, PAT, Conventional univariate tests of significance, Phylogenetic analysis, Transcriptomics, structural equation modeling, deletion, Fissurization, transformation, etc.
Evidence Reporting	Research sensitivity	Validity, reliability and authenticity of reported data in terms of responses, understanding, identify coefficients unstandardized or standardized. Most suitable social networks to disseminate the results. Human capital dedicated to communication and professional external collaborations.

Questionnaire was compiled and validated in accordance with expert judgement method analysis (Pérez & Martínez, 2008). Broadly stroking pen, four major dimensions influence public perspectives regarding global transparency and multidisciplinary research in scientific policy discourses, viz; wider policy features; scientific disciplines argument; scientific

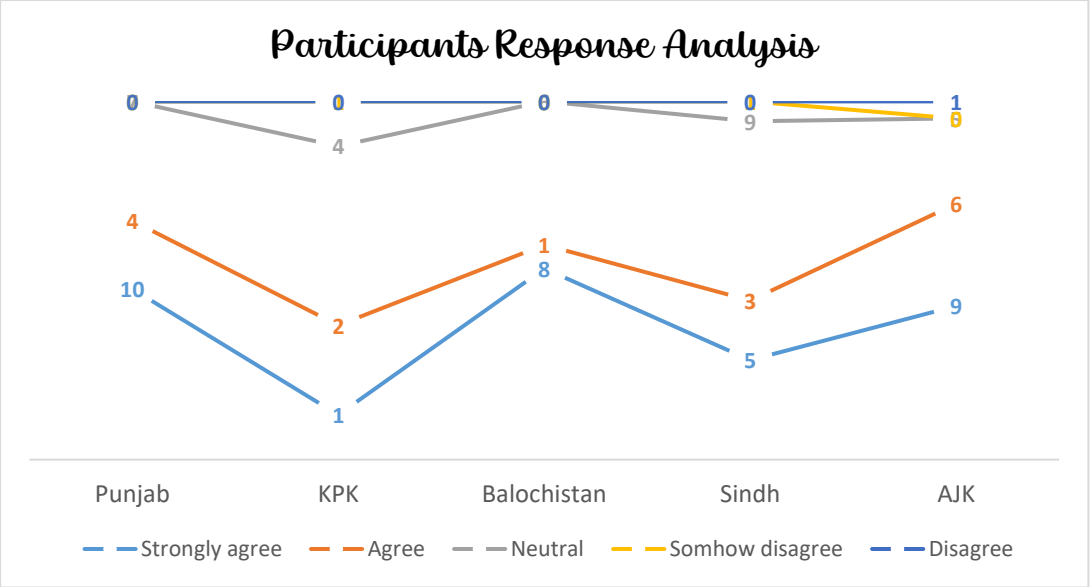
perspective of policymakers; and underlying attitudes amongst different emerging societies. Further, six experts across Pakistan from multidisciplinary sciences (natural, life, social, medical, management and earth) were selected for opinion generation based on prior information delivered and the degree of understanding and appropriateness of the questions asked.

A total of 63 participants out of 81, responded questionnaires that collectively make up study population (77.7%). Remaining participants declined to reply, claiming to reject the assumption. A total of 27 participants were from Punjab, 18 from AJK, 11 from Balochistan, 13 from KPK and 12 from Sindh, Pakistan, respectively. Data analysis was conducted using SPSS 28 version.

4. Results & Discussion

The opinions generated that respondents have about the questions provided were positive with an average of 3.7 points out of 5 (*SD* = 0.9). Specifically, 45.03% (*N* = 44) strongly agree, 16.03% (*N* = 22) agree, 32.1% (*N* = 31) neutral, 5.4% (*N* = 2) somehow disagree, and 1.17% (*N* = 1) disagree (Figure 1). The criterion outcome of major dimensions influencing public perspectives by majority of participants 32% focus on value based appropriate solutions, followed by 20% agreeing that scientists must address issue coalitions on controversial policy matters and act as intermediaries between groups; 27% said implications for global development of capacity in legislative science advice are more important while (21%) focused on evidence-based decision making, respectively (Table 2).

Figure No 1: Participants Response Analysis from Various Areas of Pakistan



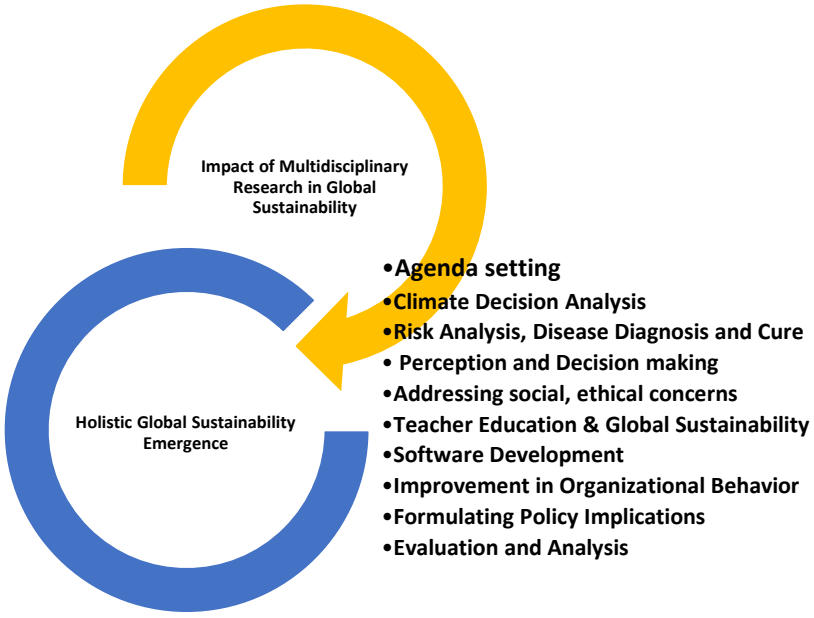
Multidisciplinary research enhances global transparency and sustainability by addressing climatic instability and emerging concerns, various threatening disease detection and management, risk analysis, teacher education & global sustainability, improvement in

organizational behavior, decision making, agenda setting, AI usage, social ethical, moral, organizational issues tackling, constructive software development (Figure 2).

Table No 2: Major Dimensions Influencing Public Perspectives Regarding Global Transparency and Multidisciplinary Research in Scientific Policy Discourses

Dimensions	Participants Response	Criterion Outcomes
Wider Policy Features	32%	Value based appropriate solutions
Scientific Disciplines Arguments	20%	Scientists must address issue coalitions on controversial policy matters and act as intermediaries between groups.
Scientific Perspective of Policymakers	27%	Implications for global development of capacity in legislative science advice
Underlying attitudes amongst different emerging societies	21%	Evidence based decision making

Figure No 2: Impact of Multidisciplinary Research in Global Sustainability



Science, technology, arts and humanities play an important role in solving global sustainability problems. The global systems encapsulate sustainability sciences followed by innovative changes regarding targeted developmental goals for transformation. Throughout the world, scientists must focus the scientific evolution from the existing research compared with preferences of science in targeting SDG's transformations. Despite million years effort of holistic sustainability, still scientific policies and implementation is far behind humanistic approaches. No individual discipline solely contributes towards global sustainability transition.

Another study by Barge and Lopez (2012) supports our findings as multidisciplinary research ensures the reproducibility of outcomes, the transparency of science, sharing and publishing data and databases, rigorous description of research methods, and the verifiability of research findings as a leading solution towards the fundamental comprehensive crisis. This Perspective argues for transforming sustainability science into a transdisciplinary enterprise that can generate positive social and environmental change globally. In such revolution, the natural sciences, life sciences, medical sciences, social sciences, humanities, and the arts can play an important role to address the complex problems of culture, institutions, and human behavior (Shrivastava et al., 2020; Bozeman & Boardman, 2014).

Current study concludes an utmost need of transforming our approach to research itself. Several known attributes of universal change currently create challenges to multi-disciplinary research systems and their ability to analyze and contribute towards transparency leading innovative global revolution and sustainability meeting SDGs.

5. Conclusion

This study focused on consolidated multiple perspectives of various multidisciplinary research aspects and captures the wind of change, so professionals must adopt and implement transparent scientific policy discourses aligned with multidisciplinary domains within legislatures. Our findings argue with traditional fundamental theory where research is not only effective in policy apprising and decision-making processes when it is credible, relevant and legitimate, instead the pertinence, inclusiveness, effectiveness and availability better recap the significant aspects of multidisciplinary research influencing global transparency and scientific policy discourses. No doubt innovative cross disciplinary research is a way forward towards holistic global sustainability, value-neutrality and technocracy.

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