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WHEN DOES SUSTAINABILITY RESEARCH BECOME NORMATIVE? A THREE-LEVEL FRAMEWORK FOR POSITIVE ANALYSIS, VALUES, AND SMART ECONOMIC GROWTH

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Abstract: *Sustainability research is widely recognized as normatively oriented, yet this characterization is often extended too quickly from the field as a whole to every individual study conducted within it. This conceptual article asks whether a strictly positive study—descriptive, explanatory, causal, or predictive—can constitute a complete contribution to sustainability research without formulating prescriptions about what ought to be done. The article uses a conceptual-analytical review of representative traditions in economics, philosophy of science, sustainability science, and sustainability economics. It develops a three-level framework that distinguishes (i) value relevance in problem selection, (ii) the logical and methodological status of scientific propositions, and (iii) normative inference in the setting of goals and policy recommendations. The framework is examined through common-pool resources, collective action, natural capital, the Hartwick rule, integrated climate-economy models, and environmental policy evaluation. The central conclusion is a pluralist epistemological account: sustainability research legitimately contains positive, normative, and integrated positive–normative inquiries. For smart economic growth, the framework clarifies why multidimensional evidence can be empirically rigorous while rankings of 'smarter' growth paths still require explicit evaluative premises. The contribution is to locate where values enter the inquiry rather than assuming either complete value-freedom or universal normativity.*

JEL classification: B41, Q01, Q56

Key words: sustainability science; positive economics; normativity; values in science; inductive risk; smart economic growth

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1. INTRODUCTION

Sustainability studies occupy an unusual epistemological position at the intersection of economics, the social sciences, environmental research, and philosophy of science. Unlike research objects that can be characterized primarily through observable properties, sustainability simultaneously concerns states of the world, causal relationships, and judgments about which conditions should be maintained over time. The classic definition of sustainable development in Our Common Future links the satisfaction of present needs with the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987). From the outset, therefore, sustainability raises questions of intergenerational justice, human needs, ecological limits, and distribution.

The normative orientation of the concept is not controversial. What is less clear is the inference sometimes drawn from it: that every study contributing to sustainability research must itself contain normative claims. That inference conflates the orientation of a research field with the logical structure of each individual inquiry. A field may exist because a set of problems is socially important while still containing studies whose conclusions are entirely descriptive, explanatory, causal, or predictive.

This distinction matters especially for research on smart economic growth. Unlike a unidimensional output target, smart economic growth combines economic performance with objectives such as quality of life, environmental protection, innovation, resilience, and balanced development. Related work on smart economic development likewise treats sustainability and the adequacy of conventional growth metrics as central issues (Venkatesan, 2017). This multidimensional structure creates a specific epistemological tension: many component relationships can be measured, explained, or causally estimated, yet labeling one growth path 'smarter' than another requires criteria for weighting and comparing heterogeneous outcomes. Empirical work in this area frequently estimates effects, identifies mechanisms, compares institutional arrangements, or predicts outcomes. Whether those findings must be accompanied by prescriptions is therefore an epistemological question with direct consequences for research design, peer review, and policy interpretation.

This article asks: Can a strictly positive study constitute, by itself, a legitimate and complete contribution to sustainability research? The argument developed here is affirmative, but two terms require precision. Throughout the article, 'strictly positive' refers to the logical

status of the research question and its conclusions, not to a claim that the entire research process is value-free. A 'complete contribution' means complete relative to its stated descriptive, explanatory, causal, or predictive objective; it does not mean sufficient by itself to resolve the broader sustainability problem or to select a policy. A study may therefore establish what happens, why it happens, under what conditions, and with what magnitude without asserting which state is morally preferable or which policy ought to be adopted. Values may still shape problem selection, modeling choices, evidential thresholds, and communication. The more modest claim is that value sensitivity in the context and conduct of inquiry does not automatically transform the propositions produced by that inquiry into normative judgments.

The article makes three contributions. First, it reconstructs the positive–normative distinction in a form suitable for sustainability research without relying on an absolute fact/value dichotomy. Second, it proposes a three-level diagnostic framework distinguishing value relevance, proposition status, and normative inference. The novelty is not the positive–normative distinction itself, but the separation of forms of value involvement that are often conflated when sustainability and smart economic growth research are evaluated. Third, it applies this framework to recurring domains in sustainability economics—common-pool resources, natural capital, climate models, and policy evaluation—and shows how it can function as a methodological and editorial criterion for identifying the precise point at which additional evaluative premises become necessary.

2. METHODOLOGICAL APPROACH

This article uses a conceptual-analytical review rather than a systematic literature review or meta-analysis. Its purpose is not to estimate the prevalence of epistemological positions across the literature, but to reconstruct a recurrent problem and assess the discriminating capacity of the proposed framework across representative research traditions. Sources were selected purposively from four bodies of scholarship: (i) positive and normative economics; (ii) philosophy of science on objectivity, values, and inductive risk; (iii) foundational and contemporary sustainability science; and (iv) sustainability economics and smart economic development. Priority was given to canonical contributions that define the relevant distinctions and to recent work that directly contests or refines the value-free ideal.

The analysis proceeded in three steps. First, each contribution was read for the location at which evaluative commitments enter the inquiry: problem selection, proposition formation and assessment, or movement from evidence to preferred ends and policy recommendations. Second, the three-level distinction—value relevance, proposition status, and normative inference—was applied comparatively to recurring domains: common-pool resources and collective action, natural-capital measurement, the Hartwick rule, integrated climate-economy models, and environmental policy evaluation. Third, the framework was examined for its implications for smart economic growth, where multidimensional indicators and policy rankings frequently combine empirical measurements with evaluative choices about weights, thresholds, substitutability, distribution, and intergenerational trade-offs. The cases are therefore illustrative rather than exhaustive; they were chosen because they expose different points at which positive and normative reasoning can be separated or integrated.

This design supports conceptual clarification rather than bibliometric generalization. Accordingly, the article does not claim that the selected literature represents the frequency of epistemological positions in the field. Its validity rests instead on argumentative coherence, faithful reconstruction of the cited positions, and the framework's capacity to classify heterogeneous research claims without either treating all value-sensitive inquiry as prescriptive or assuming that positive claims emerge from an entirely value-free research process.

3. POSITIVE ANALYSIS AND NORMATIVE REASONING

In economics, the positive–normative distinction separates propositions about what is, what occurs, or what may occur from propositions about what ought to be. Positive economics aims to describe, explain, and predict, whereas normative economics introduces evaluative criteria for comparing social states or recommending actions. Friedman (1953) famously characterized positive economics as a system of generalizations capable of yielding predictions about the consequences of changes in circumstances.

Applied to sustainability, positive questions include: What effect do clearly specified use rights have on fish extraction? Which institutional variables predict forest persistence? How do emissions respond to a carbon tax? Which institutional arrangements are associated with long-lived common-pool resource systems? Such questions can be assessed through logical

consistency, data quality, identification strategy, explanatory power, predictive accuracy, and robustness.

Normative questions are different in logical form: How much forest should be preserved? What weight should be assigned to the welfare of future generations? Which distribution of climate costs is fair? What level of ecological risk is acceptable? Evidence can constrain and inform answers to these questions, but it cannot determine them without an evaluative premise. For example, the proposition 'a carbon tax reduces emissions' can be positive. The conclusion 'therefore, the tax should be adopted' additionally requires an objective, a welfare criterion, and a comparison with feasible alternatives.

The distinction should not be treated as an impermeable boundary. Sen (1987) criticized the separation of economics from ethics; Hausman and McPherson (2006) documented the moral assumptions embedded in applied policy analysis; Longino (1990) examined how contextual values influence science; and Putnam (2002) rejected a rigid fact/value dichotomy. These critiques weaken a simplistic conception of neutrality, but they do not make the logical distinction between description and prescription useless. The more productive response is to identify where values enter and what inferential work they perform.

3.1 A three-level framework for locating values

The central analytical proposal of this article is to distinguish three levels that are often collapsed in sustainability debates. The first is value relevance: social concerns help determine which phenomena merit investigation. Climate change, biodiversity loss, resource depletion, or unequal exposure to environmental harms are researched partly because societies consider them important. This motivational role does not determine the truth value of the empirical claims later produced.

The second level is proposition status. A proposition may be descriptive, explanatory, causal, or predictive even when it concerns a value-relevant object. An econometric estimate of the effect of energy prices on consumption does not become a normative proposition merely because energy transition is politically salient. Its validity depends on the data, design, assumptions, and inferential standards appropriate to the method.

The third level is normative inference: the movement from empirical findings to judgments about preferred ends, acceptable trade-offs, or recommended policies. At this stage, evaluative premises are indispensable. The same causal estimate may support different policy

recommendations if decision makers use different distributive weights, risk tolerances, discount rates, or conceptions of ecological responsibility.

This three-level framework avoids two symmetric errors. One is to call a study 'value-free' merely because its final propositions are positive, ignoring value-laden choices elsewhere in the research process. The other is to call every scientific proposition 'normative' merely because the topic is socially valued. Epistemological transparency requires separating these levels rather than forcing all sustainability research into a single category.

Table 1 summarizes the three analytical levels.

Level	Core question	Possible role of values	Epistemic implication
1. Value relevance	Why is this problem investigated?	Selection of socially important topics and outcomes.	Value relevance does not by itself make the resulting propositions normative.
2. Proposition status	What type of claim is established?	Value-sensitive methods do not preclude descriptive, explanatory, causal, or predictive claims.	Claims are assessed by evidence and methodological standards appropriate to their type.
3. Normative inference	What should be preferred or done?	Goals, welfare criteria, rights, equity, risk tolerance, and intergenerational weights.	Prescription requires evaluative premises in addition to empirical evidence.

Table 1. Three levels for locating values in sustainability research.

4. THE NORMATIVE CORE OF SUSTAINABILITY

To describe a trajectory as sustainable, researchers or decision makers must specify what is to be sustained: consumption, aggregate welfare, total capital, natural capital, biodiversity, ecosystem functions, human capabilities, or opportunities available to future generations. Data alone cannot select among these candidate objects. The selection invokes judgments about what is valuable and how resources, risks, and opportunities should be distributed.

The debate between weak and strong sustainability makes the point visible. Weak sustainability permits substantial substitution between natural and produced capital, whereas strong sustainability treats at least some components of natural capital as critical and not fully substitutable. Neumayer (2025) identifies substitutability as a central axis of this controversy. Science can estimate ecological thresholds, substitution possibilities, irreversibilities, and uncertainty. Whether a particular loss is acceptable, however, depends on an evaluative criterion.

Sustainability is therefore normatively oriented as a general category and social objective. Yet this statement concerns the field and its organizing concepts, not necessarily every article, model, or empirical estimate produced within it. The distinction is essential because otherwise a non-prescriptive study could be judged epistemologically incomplete even when it provides rigorous knowledge about a process central to long-run economic and ecological performance.

5. STRICTLY POSITIVE RESEARCH AS AN AUTONOMOUS CONTRIBUTION

A study may constitute a complete contribution to sustainability research while remaining strictly positive in its research question and conclusions, even when methodological choices are value-sensitive. Its contribution consists of reliable knowledge about mechanisms that influence the persistence, degradation, resilience, or transformation of economic, social, and ecological systems. Membership in the field does not depend on the appearance of the word 'should' or on the inclusion of a policy recommendation. It depends on the substantive relevance of the object and on the study's capacity to increase knowledge about sustainability-related processes.

The Weberian distinction between value relevance and value judgment helps clarify the point. Researchers may study biodiversity loss because it is socially regarded as important while testing hypotheses whose acceptance or rejection depends on evidence and methodological criteria. The motivation for studying a phenomenon does not mechanically determine the logical form of the conclusion.

This space for positive inquiry is present in the intellectual history of sustainability science. Kates et al. (2001) described the field as oriented toward understanding fundamental nature–society interactions while helping to advance sustainable trajectories. Clark and Dickson (2003) similarly emphasized dynamic nature–society interactions and decision-relevant knowledge. The task of understanding has autonomous explanatory content even when the broader research program is socially oriented. Boda (2021), reconstructing competing paradigms in sustainability research, notes that foundational discussions distinguished the normative selection of goals from scientific analysis. That separation has been challenged, but it demonstrates that the coexistence of normative goals and positive inquiry is not external to sustainability science; it is part of its own epistemological history.

5.1 Examples of strictly positive questions

Table 2 illustrates the distinction through representative positive research questions.

Research question	Scientific product	Does it require a normative recommendation?
What effect do defined use rights have on fish extraction?	Causal estimate of changes in extraction or biomass.	No.
Which institutional variables are associated with long-lived common-pool resources?	Identification of patterns and institutional conditions.	No.
How does energy consumption respond to higher prices?	Elasticities and heterogeneous responses.	No.
What effect does a carbon tax have on emissions?	Average and distributional effect estimates.	No; recommending adoption is a further step.
Which factors explain forest-cover loss?	Causal or predictive relationships with deforestation.	No.

Table 2. Positive sustainability research can legitimately stop at estimation or explanation.

6. POSITIVE TRADITIONS IN SUSTAINABILITY ECONOMICS

6.1 Common-pool resources and institutional analysis

Ostrom (1990) provides one of the strongest examples of an explanatory contribution with direct sustainability relevance. Comparative research on common-pool resources identified institutional conditions associated with long-lived systems, including defined boundaries, locally adapted rules, participation by users, monitoring, graduated sanctions, and conflict-resolution mechanisms. The central scientific contribution is explanatory: it clarifies conditions under which particular institutional arrangements can persist.

Becker and Ostrom (1995) extended this line by linking institutional diversity to resource sustainability. Their framework supports empirical investigation of which institutional structures are associated with durable resource outcomes. The empirical regularities do not logically compel a claim that community governance is morally superior to private or state management. Such a judgment would require additional criteria.

6.2 Open access, incentives, and collective action

Gordon (1954) and Scott (1955) formalized the economics of open-access fisheries, showing how the absence of exclusivity can create incentives for excessive effort and pressure on the resource. Hardin (1968) later popularized a related logic through the 'tragedy of the commons', although subsequent institutional research demonstrated the need to distinguish common-pool resources from open-access regimes and documented multiple forms of collective governance.

Olson (1965), through the theory of collective action, explained why groups face different incentives to organize and provide collective goods. These contributions can be used to explain environmental outcomes and institutional performance without making their empirical validity depend on a conclusion about which institutional system ought to be adopted.

6.3 Natural capital and measurement

Dasgupta (2001) developed frameworks linking well-being, assets, and the environment, contributing to the incorporation of natural capital into economic analysis. Measuring stocks, depreciation, productivity, or changes in assets can be a positive exercise. Nevertheless, choosing the indicator that is to represent sustainable well-being and deciding which losses are acceptable introduces additional evaluative premises.

The same distinction applies broadly to measurement systems used in smart economic growth. Indicators can be estimated, validated, and compared empirically. Yet the construction of a composite criterion for what counts as 'smart', 'inclusive', or 'sustainable' growth requires choices about dimensions, weights, thresholds, and substitution that should be presented as evaluative rather than disguised as purely technical facts.

7. THE CONTEMPORARY DEBATE ON VALUES AND OBJECTIVITY

7.1 Separation between scientific analysis and normative ends

One tradition, associated historically with Weber (1949) and with the positive–normative distinction in economics, attempts to separate the determination of ends from the establishment of facts and causal relations. Political and social deliberation determine desirable objectives, while science contributes knowledge about means, consequences, and constraints. Boda (2021) identifies this orientation as one of the paradigms present in the history of sustainability research. Its relevance is straightforward: the social orientation of a field does not require every researcher to insert value judgments into the core of empirical conclusions.

7.2 Inherent normativity and transformative sustainability science

A second position argues that sustainability cannot be reduced to an objective defined externally to science and that researchers require the capacity to identify, discuss, and negotiate values. Wiek, Withycombe and Redman (2011) included normative competence among the key competencies for sustainability education. Schneider et al. (2019), in the context of the 2030

Agenda, argued that science must engage analytically with sustainability's normative dimension and the values embedded in social goals.

From this perspective, sustainability research is not only problem-driven but also solutions-oriented and transformative. The case against a strict separation becomes stronger when the selection of indicators, uncertainty thresholds, model boundaries, or risk communication can materially affect socially sensitive conclusions.

7.3 Philosophy of science and the value-free ideal

Nagatsu et al. (2020) identify normativity and the role of values as central philosophical challenges for sustainability science, emphasizing the interaction of physical complexity, social complexity, problem orientation, and morally heterogeneous contexts. In the broader philosophy of science, Longino (1990) and Putnam (2002) provide influential critiques of simple value-free or fact/value accounts. More recent work continues to debate how far extra-scientific values should enter hypothesis acceptance and other core stages of inquiry (Brown, 2024; Stamenkovic, 2024; Sikorski, 2024).

Douglas (2000, 2009) sharpens the challenge through the problem of inductive risk: choices about evidential standards, error thresholds, and hypothesis acceptance can have foreseeable social consequences, so non-epistemic values may legitimately play an indirect role in methodological decisions. Elliott (2017) similarly emphasizes the multiple points at which values can enter scientific practice and argues for transparency about those roles. These arguments matter for the present framework because they show that value-sensitive methodology and normative proposition content are separate questions. An evidential threshold may be chosen partly because false positives and false negatives have asymmetric consequences, while the resulting proposition can still be descriptive or causal in logical form. This does not make the methodological choice value-neutral; it means that the location and function of the value judgment should be identified rather than conflated with a policy recommendation.

The appropriate conclusion is therefore not that the debate is settled in favor of either complete neutrality or universal normativity. Rejecting a strong ideal of totally value-free scientific practice does not entail that every scientific proposition is normative. Values may shape question selection, model boundaries, evidential thresholds, or communication while a resulting proposition remains descriptive, explanatory, causal, or predictive in logical form. The

relevant analytical task is to identify where values enter, what inferential work they perform, and the point at which a claim begins to rely on an evaluative premise about preferred ends or action.

Table 3 contrasts the main positions discussed above.

Position	Representative references	Core thesis	Implication for positive studies
Ends/facts separation	Weber (1949); Friedman (1953); Boda (2021)	Normative ends can be set outside the analytic core; science studies means and consequences.	Directly permits strictly positive studies.
Inherent normativity	Wiek et al. (2011); Schneider et al. (2019)	Sustainability requires normative competence and explicit engagement with values.	Calls for stronger value disclosure, especially in transformative research.
Pluralism / science and values	Longino (1990); Putnam (2002); Douglas (2000, 2009); Elliott (2017); Nagatsu et al. (2020)	Values may enter several stages of practice without erasing the logical difference between fact and prescription.	Allows positive studies while rejecting an overly strong value-free ideal.

Table 3. Competing positions on values in sustainability research.

8. APPLICATIONS: NATURAL CAPITAL, CLIMATE POLICY, AND SMART ECONOMIC GROWTH

8.1 The Hartwick rule: formal result and sustainability criterion

Hartwick (1977) showed, within an aggregate model with exhaustible resources, that under specified conditions reinvesting resource rents can sustain constant per-capita consumption along efficient paths. The formal result has a positive character in the sense that it establishes a conditional relationship: given the assumptions, a property of the trajectory follows.

Treating constant per-capita consumption as the correct criterion of sustainability, however, requires an evaluative premise. The theorem does not establish that intergenerational justice must be defined in those terms or that all natural capital is substitutable by reproducible capital. The Hartwick rule therefore illustrates how a positive analytical core can later be embedded in a normative sustainability argument.

8.2 Integrated climate-economy models and discounting

Integrated assessment models make the combination of positive and normative components particularly visible. The Dynamic Integrated Climate-Economy (DICE) model, associated with Nordhaus (2013), combines economic and climate relationships to compare emissions, damages, mitigation, and welfare trajectories. Some equations represent descriptive or estimated relations; the selection of an optimal trajectory additionally requires a welfare function and parameters with evaluative consequences.

The discount rate is a canonical example. A higher rate reduces the present weight assigned to future damages; a lower rate increases it. The contrast between the approaches associated with Nordhaus (2013) and the Stern Review (Stern, 2007) shows how apparently technical parameters can also reflect different views about obligations to future generations. The lesson is not that such models are invalid. It is that researchers should distinguish results driven by empirical evidence from conclusions driven by evaluative assumptions.

8.3 Positive evaluation of environmental policy

Environmental policy evaluation offers perhaps the clearest setting for strictly positive sustainability research. A quasi-experimental design can estimate whether a regulation reduces emissions, whether a permit system changes investment, or whether a tax has heterogeneous distributional effects. A study may legitimately conclude with a causal estimate without stating that the instrument should be adopted.

The recommendation is a second inferential step. To claim that a policy ought to be implemented, researchers need an objective, a comparison of costs and benefits, a treatment of distribution, a stance toward risk, and a comparison with alternatives. Keeping these steps distinct improves analytical transparency and makes disagreement easier to diagnose: actors may agree on the causal effect yet disagree on the evaluative premises required for a policy choice.

8.4 Implications for smart economic growth research

The distinction has particular relevance for smart economic growth because the concept combines economic performance with objectives such as innovation, environmental quality, resilience, and quality of life. This multidimensionality is not incidental: smart economic development has been explicitly connected to sustainability and to the limits of conventional

output-centered metrics (Venkatesan, 2017). Empirical research can estimate productivity effects of green innovation, energy-price responses, pollution impacts, institutional determinants of resource persistence, or distributional consequences of environmental regulation. These are legitimate contributions even when they stop at explanation or estimation.

At the same time, labeling one growth path 'smarter' than another requires a criterion that orders multidimensional outcomes. If a strategy raises output and innovation but worsens biodiversity or intergenerational distribution, evidence alone cannot supply the weights needed to rank those effects. Smart economic growth research therefore benefits from a transparent epistemic division of labor: positive analysis should make mechanisms and consequences visible; normative analysis should make evaluative criteria explicit; and integrated work should show exactly how the two components are combined.

9. AN EPISTEMOLOGICAL TYPOLOGY OF SUSTAINABILITY STUDIES

The preceding analysis supports an epistemological pluralism rather than a single mandatory architecture for sustainability research. At least three legitimate modalities can be distinguished. Strictly positive studies ask what occurs, why, under what conditions, and with what magnitude. Predominantly normative studies ask what should be sustained or how benefits, costs, and risks should be distributed. Integrated positive–normative studies combine empirical evidence with an explicit evaluative criterion to compare policies or trajectories.

The hybrid character therefore belongs primarily to the field as a whole, not to the compulsory structure of every individual paper. A journal, research program, or scientific community devoted to sustainability may contain positive studies alongside normative and integrated contributions. The standard of rigor should be appropriate to the type of claim being made.

Table 4 synthesizes the resulting epistemological typology.

Modality	Typical question	Scientific product	Example
Strictly positive	What happens, why, and with what magnitude?	Description, explanation, causal estimation, or prediction.	Effect of use rights on fish extraction.
Predominantly normative	What should be preserved, preferred, or distributed?	Ethical argument, justice criterion, normative evaluation.	Intergenerational justice or intrinsic value of biodiversity.
Integrated positive–normative	Which policy is preferable given specified objectives and effects?	Empirical evidence + evaluative criterion + recommendation.	Comparison of climate instruments under an explicit welfare criterion.

Table 4. Three legitimate modalities of sustainability research.

10. IMPLICATIONS FOR RESEARCH DESIGN AND PEER REVIEW

The distinction proposed here has practical consequences for research design and peer review. It does not impose a single method. Instead, it requires authors and evaluators to clarify what kind of claim is being advanced and whether the evidence is sufficient for that claim.

For strictly positive studies, authors should define the phenomenon and classify the claim as descriptive, explanatory, causal, or predictive; distinguish social motivation from the hypotheses under test; justify data, indicators, and methods; examine sensitivity where relevant; and avoid turning an empirical result automatically into a policy prescription. If resilience, degradation, or well-being depends on conventional thresholds, those assumptions should be disclosed even when the final claims remain positive.

For normative or integrated studies, authors should identify the evaluative criterion used—welfare, rights, equity, sufficiency, preservation, precaution, or another principle—and distinguish the part of the conclusion supported by positive evidence from the part that depends on normative premises. Sensitivity analysis is especially important when discount rates, distributional weights, or thresholds alter the recommendation. Stakeholder deliberation may be relevant for legitimacy, but political legitimacy should not be confused with empirical validity.

For editors and referees, four screening questions are sufficient: Is the object relevant to sustainability or smart economic growth? Is the claim descriptive, explanatory, causal, predictive, evaluative, or prescriptive? Does the evidence and method justify it? If a recommendation is made, are its evaluative premises explicit? This screening avoids two recurring errors: rejecting a non-prescriptive paper merely because it does not prescribe, and treating a recommendation as scientifically inevitable when its normative premises remain hidden.

11. DISCUSSION

The proposed framework offers a middle position between two extremes. The first extreme assumes that scientific objectivity requires a research process completely insulated from social and ethical values. The second assumes that because sustainability is value-laden, all scientific claims in the field are intrinsically normative. Both positions obscure important distinctions.

Scientific practice can be value-sensitive without making every proposition prescriptive; conversely, a causal estimate can be positive without implying that the entire inquiry was generated in a value-neutral context.

This middle position also clarifies the role of disciplinary specialization. Sustainability problems are complex enough to require an epistemic division of labor. Some researchers may specialize in causal identification, others in ecological modeling, institutional explanation, ethical analysis, participatory deliberation, or policy design. Requiring every individual study to integrate all these functions can weaken rather than strengthen rigor if it encourages unsupported prescriptions or superficial normative discussion. Integration is valuable when the research question requires it, but it should be explicit and methodologically justified rather than ritualistically appended.

The principal limitation follows from the article's design: it is conceptual-analytical and uses purposive, representative sources rather than systematic sampling of the literature. The framework should therefore be evaluated for conceptual coherence and discriminating usefulness, not as evidence about the prevalence of epistemological positions in sustainability research. Future work could test the framework empirically by coding published sustainability articles according to the three levels proposed here and examining whether explicit separation of positive and normative premises is associated with greater transparency, replicability, or agreement among reviewers.

A second avenue concerns quantitative smart economic growth research. Composite indicators and multi-criteria rankings often combine empirically measured variables with evaluative choices about normalization, weights, substitutability, and aggregation. Applying the three-level framework to such models could separate measurement uncertainty from normative sensitivity and show more precisely why rankings change across specifications.

CONCLUSIONS

Sustainability has an unavoidable normative dimension as a concept and social horizon. Deciding what should be sustained, what risks are acceptable, or what obligations exist between generations cannot be resolved through observation alone. Yet this premise does not imply that every study within the field must itself be normative.

A strictly positive study can be an autonomous and complete contribution relative to a clearly stated descriptive, explanatory, causal, or predictive objective when it increases knowledge about mechanisms, incentives, institutions, relationships, dynamics, or consequences relevant to the persistence of socio-ecological and economic systems. This does not make such a study sufficient for deciding what society ought to sustain or which policy ought to be adopted. Research on common-pool resources, collective action, natural capital, climate-economy relationships, and policy evaluation provides clear examples of this epistemic division of labor.

The epistemologically more defensible position is therefore pluralist. Sustainability research contains positive inquiry, normative inquiry, and integrated positive–normative inquiry. Values may shape the orientation of the field, the selection of problems, and some methodological choices, while particular propositions can retain descriptive, explanatory, causal, or predictive status. Normative requirements arise when researchers move from evidence about what is or what follows under specified assumptions to judgments about what should be preferred or done.

For smart economic growth research, this distinction improves both rigor and usefulness. It protects the autonomy of empirical analysis while preventing evaluative choices from being hidden behind the appearance of technical inevitability. The appropriate requirement is not that every paper be hybrid, but that every paper be transparent about what it claims, what evidence supports the claim, and where—if anywhere—it crosses from analysis of facts to judgments about desirable ends.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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