

Maximizing Research Impact in Higher Education: An Approach to Identify Essential Stakeholders and Ensure Use-Inspired Outcomes

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Abstract

A growing consensus suggests that scientific research should be use-inspired, thereby addressing the contemporary needs of society. Various studies and perspectives from different disciplines and industries underscore stakeholder engagement as essential to facilitate that objective. A structured process is presented that includes defining goals, identifying key stakeholders, brainstorming, consulting experts, stakeholder mapping, engaging with stakeholders, and adjusting plans to reflect stakeholder feedback. Involving stakeholders early in an initiative facilitates numerous benefits, including improved decision-making, greater stakeholder buy-in, improved problem identification, tailored solutions, risk mitigation, transparency, credibility, faster implementation, and potential for innovative ideas. An example of a stakeholder identification process is provided to strengthen research proposal development. This article is for researchers, practitioners, or businesses seeking guidance to better integrate stakeholders in their work or organization. The article is also intended for professionals entering the workforce who wish to include stakeholders to ensure tangible outcomes. Effective stakeholder prioritization requires a balanced and adaptive strategy that considers environmental resource, economic, and societal factors, ensuring solutions meet critical concerns within each industry's unique ecosystem and human needs. This article provides a decision-making framework to enhance research credibility by identifying essential stakeholder perspectives, making research outcomes more effective and impactful.

Keywords— organizations, research, society, stakeholders, tangible outcomes, use-inspired design.

I. INTRODUCTION

Scientific inquiry and its impact on society have long been debated and studied. The traditional model of scientific research, which often prioritizes autonomy and esoteric exploration, has been challenged by a growing consensus that it must align with the needs of society and, thus, the aspirations of stakeholders [1-3]. In this discourse, various authors have weighed the importance of scientific autonomy against the need for tangible, problem-focused outcomes [4-7]. The objectives of this article are to a) briefly discuss the significance of including stakeholders in research initiatives (or other change initiatives) to ensure tangible results and b) present a method to identify key stakeholders strategically. Few sources provide an expediently navigable overview of why and how to

identify the right stakeholders for the right initiative at the right time. Hence, the impetus for the current article. The goal is not to review all possible literature or methods of identifying stakeholders but rather present an approach that will yield the desired results. This article also serves as a helpful in-road to further inquiry for practitioners to identify the right stakeholders to support various organizational initiatives.

One of the fundamental issues with scientific research outcomes is the periodic disconnect between scientific inquiry and tangible societal impact [8,9]. Many conventional research outcomes are lacking when it comes to capturing the needs of stakeholders and delivering tangible, problem-focused results [10]. Despite this observation, there is a relevant argument for preserving

scientific autonomy, advocating that it should be shielded from political and social influence to ensure the accurate dissemination of information [5]. Warner [7] highlighted the unpredictable nature of basic research and its potential for producing unanticipated future benefits. Fuqua and Walgren [6] added to this discourse, noting that breakthroughs in esoteric and fundamental research areas can often prove more effective in producing societal benefits than incremental progress in highly developed near-application technology. Indeed, the potential for scientific outcomes to be intangible at completion but tangible, perhaps years after completion, highlights the issue's complexity. Regardless, while basic research is undoubtedly essential for advancing knowledge, it should not preclude a concession towards practical solutions to pressing problems to remain cutting edge [11]. While there is merit in protecting scientific inquiry from undue influence, a growing body of evidence suggests that research outcomes must align with societal needs and priorities to remain fiscally, politically, and socially justifiable [4,8-10].

Stakeholder engagement can be an effective mechanism to bridge gaps between research and tangible outcomes. Sung and Kim [12] highlighted the positive influence of research methods integrating stakeholder participation and communication to achieve tangible results. Carrad, *et al.* [13] identified leadership, organizational culture, and government support as facilitators and potential barriers to tangible research success. Rieg, *et al.* [14] emphasized the importance of organizational change processes that include stakeholder input for achieving success, serving as a valuable impetus for future research and practice. The work of Rieg, Gatersleben and Christie [14] has been corroborated by multiple additional recent works advocating organizational change [15,16], use-inspired design [9], and tangible research outcomes [8]. All of which lean heavily on an imperative of stakeholder involvement, buy-in, and engagement in decision-making and progress. Use-inspired design is crucial in harnessing scientific knowledge, resulting in practical solutions that society wants and needs [17]. Use-inspired design, therefore, acts as a bridge, facilitating the translation of scientific knowledge into actionable solutions for industry, policymakers, and other stakeholders [18-20]. Indeed, research shows that scientists and managers who apply a use-inspired design approach more aptly promote sustainability and provide actionable solutions for society. Strasser [21] emphasized the need for research that directly informs actionable strategies for global challenges such as climate change, infectious diseases, and resource scarcity. The ongoing debate surrounding the purpose of scientific inquiry is long-standing and multifaceted. Regardless,

there is growing anxiety in the research landscape, particularly within academia, where the pursuit of esoteric topics that lack immediate applications can lead to a detachment from the practical needs of society [8,22-24]. This detachment may, consequently, contribute to decreasing public sentiment and approval of the academic enterprise [25,26], including reduced appreciation of the value of scientific inquiry and its potential contributions to addressing urgent societal needs [25-28]. Ultimately, there is little argument that while invaluable for advancing knowledge, traditional models of scientific inquiry must be more greatly complemented with practical, problem-focused outcomes.

Identifying critical (key) stakeholders for any initiative can be highly useful for several reasons. First, it facilitates the alignment of the goals and objectives of an initiative with the expectations and needs of those with a vested interest in its success [3,8]. Alignment of goals ensures that resources are allocated efficiently, making the best use of available assets. Second, stakeholder identification aids in risk mitigation by allowing a proactive approach to addressing potential challenges or objections raised during an initiative [29]. Moreover, stakeholders can offer valuable support, whether it is financial, political, or moral, thereby influencing the initiative's outcome. In addition, engaging them early in an initiative can transform stakeholders into advocates, thereby serving as a powerful force for promoting success [4]. Additionally, stakeholder engagement bolsters an initiative's credibility and legitimacy by demonstrating a commitment to considering the interests of those affected by the outcomes.

Stakeholders may sometimes encompass regulatory bodies or authorities whose requirements must be identified and adhered to. These requirements can sometimes hinder but may also protect project limitations. Ultimately, sustaining positive relationships with stakeholders is crucial for initiatives with long-term objectives to ensure ongoing support and partnership, guaranteeing the initiative's long-term success and impact [4,8,9,15,29]. Recognizing and engaging with stakeholders can significantly impact an initiative's success, credibility, and sustainability, ultimately positioning it for tangible, positive outcomes. However, finding the right stakeholders at the right time for the right initiative(s) can be challenging.

II. A GENERAL PROCESS TO IDENTIFY AND ENGAGE KEY STAKEHOLDERS

There are many ways to identify stakeholders. However, identifying the right key stakeholders to best support and advocate for a given initiative at the right time often benefits from a structured process that ensures engagement

with all relevant parties. Engaging with relevant stakeholders should be an inclusive and equitable process. This process should be similar to highly vetted strategies utilized in organizational change initiatives [15,30-32]. Thus, identifying stakeholders for a given initiative should start with clearly defining the initiative's goals and objectives (Figure 1). Clarifying goals and objectives will facilitate identifying primary stakeholders directly affected by or significantly interested in the initiative. These key stakeholders may include customers, employees, suppliers, investors, or local communities. Secondary stakeholders, who may not be as directly affected but still hold vested interests, such as government agencies, industry associations, or advocacy groups, may also become involved. To further expand the stakeholder list, brainstorming sessions could be facilitated, consultation with experts, review of pertinent documents, and conducting surveys and interviews to gain insights from the leadership team, subject matter experts, and key personnel.

Creating a stakeholder map or matrix may help project planners visually represent the relationships and assess each stakeholder's influence and impact. The mapping exercise is particularly impactful at the beginning of a project or organizational design process [33]. Stakeholder mapping can be used in various contexts, such as urban planning [34], holistic interventions [35], and higher education institutions [36]. Mapping can facilitate a better understanding of stakeholders' goals, interests, and influence, which can impact decision-making and project outcomes. Once identified, stakeholders should be engaged by program leadership, lines of communication must remain open, and input sought to address any stakeholder concerns and needs. As the initiative progresses, the stakeholder landscape should be surveyed regularly, engagement strategies should be adapted as needed, and feedback used to drive improvements. This process synthesizes and advances those identified by previous authors. For example, Bousquet, *et al.* [37] proposed an iterative and longitudinal approach to stakeholder analysis, considering the evolving nature of stakeholders over a project's lifetime. Sherman and Ford [38] discussed stakeholder engagement planning with integrated feedback and adaptation processes. Franklin [39] emphasized the importance of engaging stakeholders to understand their preferences and enhance value through interactions. Overall, previous authors highlight the significance of stakeholder identification, engagement, and feedback iteratively to achieve project goals and objectives. Previous authors further note that it is essential to maintain detailed records of stakeholder engagement efforts and be prepared to manage conflicts between

different stakeholder groups. Ultimately, this structured, iterative, and adaptive process guarantees that an initiative will remain closely aligned with the needs and expectations of stakeholders with interests in success (Figure 1).

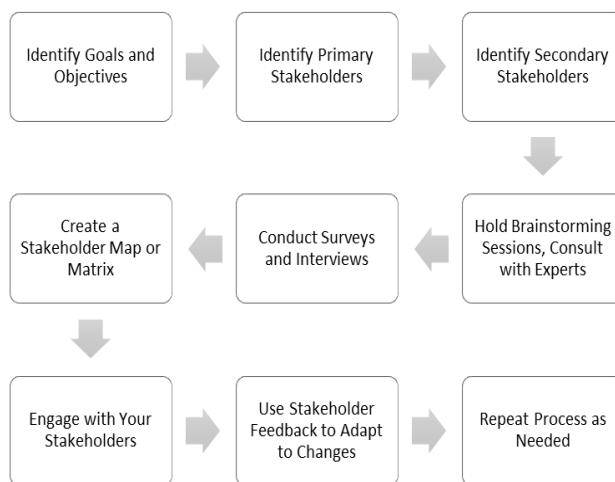


Fig.1. A structured process to identify and engage stakeholders.

III. IDENTIFYING AND ENGAGING STAKEHOLDERS: AN EXAMPLE APPLICATION

Using the process described above and shown in Figure 1, an example is provided in the following text to illustrate how a practitioner might use the method to identify and engage stakeholders for a specific initiative (Figure 2). It is worth noting that while a focused example is provided, the process described above could be applied to any initiative in which there is a desire for stakeholder engagement.

In the following scenario, a researcher wishes to use biochar to amend best management practices (BMP) to improve water quality. Biochar is a porous, carbon-rich material produced from organic matter, such as agricultural waste or wood, through pyrolysis. It improves water and soil quality and sequesters carbon, promoting enhanced crop growth and environmental sustainability [40-42]. The researcher wishes to engage stakeholders early in deciding what research needs to be carried out to ensure the biochar amendment's implementation results in outcomes that serve stakeholders' (tangible) needs [8,9,15]. In this case, the researcher wishes to strengthen the grant proposal by including stakeholder engagement and insights in a decision-making process to justify the proposal's purposefulness, thereby increasing the likelihood of funding approval. Identifying and engaging stakeholders with this goal in mind may be perceived as a critical step in writing a grant proposal for research funding to some funding agencies, as it demonstrates a

commitment to addressing real-world needs and ensuring the relevance and impactful outcomes of the work. For a case where a researcher may wish to use biochar to improve water quality, the following steps could be used to identify and engage stakeholders (Figure 2).

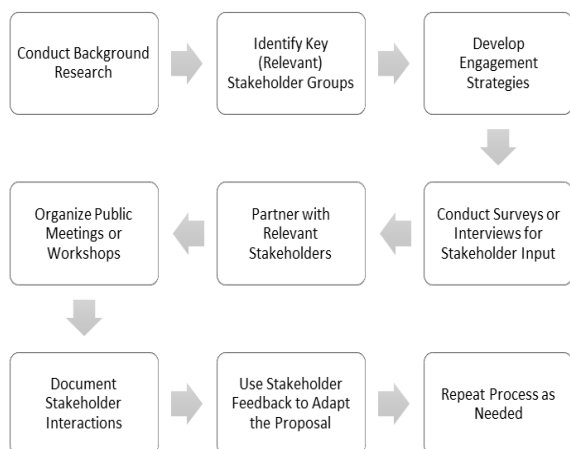


Fig. 2. Example of a structured process to identify and engage stakeholders to develop a biochar-focused research proposal.

Early career readers or other interested parties may be interested in learning more about the nuances of grant writing. For example, Licklider and Network [43] offered strategies and tools for identifying potential sponsors, utilizing campus support, and preparing a targeted grant proposal. Dable-Tupas, *et al.* [44] emphasized the importance of introducing research grant proposal writing to students during their undergraduate training. Shuman [45] highlighted the need for formal grant proposal education and discussed the influence of discipline on the type of education received. Kivunja [46] provided a detailed structure for writing an effective research proposal for higher-degree research programs. There are, ultimately, many sources for grant writing. In most cases, authors emphasize the significance of a well-written and conceived grant proposal and the need for formal training and support in the development and submission process. Conducting comprehensive background research for a proposal is also a standard process element. It serves as a foundation for any research endeavor, ensuring the researcher is well-informed about the chosen area of study, its practical applications, and its potential impact on society. While this is a reasonable criterion and often an imperative for most grant proposal writing, this initial step can facilitate the identification of the diverse sectors and stakeholder groups that are either invested in or affected by the proposed endeavor (Figure 2).

Upon conducting background research, it is essential to identify and engage with key stakeholder groups. The key

stakeholder groups for the current scenario (biochar and water quality) may include government agencies, such as Federal agencies (e.g., the United States Department of Agriculture, Environmental Protection Agency, and others), state environmental agencies, and local water management authorities, who may be directly interested in improving water quality. Likewise, the agricultural community, including farmers, landowners, and agricultural associations, may play important roles as biochar may have applications within agricultural practices [47-49]. In addition, environmental organizations at local and national levels are often at the forefront of water quality initiatives and can offer invaluable insights. Academic partners may facilitate collaborations that enhance scientific rigor and the breadth of information gleaned from the project. Industry representatives involved in biochar production (e.g., the forest industry, biochar manufacturing organizations) and water treatment technologies may also form an integral part of this project's stakeholder landscape. Finally, the input and concerns of local communities, land, homeowners, and stakeholders navigating water quality issues may also be important to engage.

Engagement strategies should be formulated once the relevant stakeholder groups have been identified. Engagement strategies may include attending pertinent meetings, conferences, and workshops and initiating direct outreach through phone calls or email [50,51]. When engaging with stakeholders, it is essential to be well-prepared to articulate the project's objectives, potential benefits, and how their input is indispensable to its success. Stakeholder feedback is pivotal in shaping the research approach. Conducting surveys and interviews to gain insights into stakeholders' concerns, needs, and vision for how biochar can effectively ameliorate water quality may be helpful. These insights will inform the development of the research objectives. Seeking partnerships and collaboration opportunities with stakeholders and relevant organizations is another critical dimension of this example project. Collaboration can significantly enhance the credibility and practicality of the research and foster a sense of shared purpose among stakeholders [8,9,52]. To ensure transparency and inclusivity, public meetings and workshops may be valuable venues to discuss the proposed project with stakeholders, providing a platform to voice their opinions and concerns. This process can foster a sense of community, engagement, and investment in the research process [53].

IV. SUMMARY AND IMPLICATIONS

Involving stakeholders in the early stages of an initiative, such as a management practice, changes in organizational structure, or even a research proposal, can yield many positive outcomes. Early engagement of stakeholders facilitates better decision-making by ensuring that relevant parties' insights, concerns, and expertise are integrated into the decision-making process, resulting in more informed and balanced choices. Early engagement enhances stakeholder buy-in, fostering a sense of ownership and commitment to the initiative as stakeholders feel their influence is valued [8]. A sense of stakeholder value often leads to a deeper understanding of the challenges and issues associated with the initiative, thereby improving problem identification and early mitigation. Additionally, stakeholder input can lead to tailored solutions that align with specific needs and preferences, enhancing the relevance and effectiveness of an initiative [39,54]. Proactively addressing concerns at an early stage minimizes risks and prevents potential conflicts, which can save time and resources. Early involvement fosters transparency and credibility, demonstrating a commitment to a fair and open process. As a result, this approach can expedite decision-making, facilitate faster implementation, and contribute to long-term acceptance. Furthermore, an initiative can benefit from the fresh perspectives and innovative ideas that stakeholders can bring, potentially gaining a competitive edge [55-58]. Importantly, stakeholder engagement can lead to collaborative partnerships that enhance an initiative's success and develop the foundation for future collaborative progress.

It is essential to consider that in any industry, identifying and prioritizing stakeholders' concerns is a nuanced exercise, heavily reliant on a given issue's specific geographical, environmental, and social context. Taking the water industry as an example, in arid or drought-prone regions, such as the Western United States, the predominant stakeholder concern lies in the quantity of water available. In that region, water companies, agricultural businesses, and environmental groups focus on addressing water scarcity through initiatives like large-scale water storage, conservation projects, and efficient usage strategies. Conversely, in regions where water is abundant, such as much of the Appalachian region of the United States, stakeholders' primary focus shifts dramatically to the quality of water. In these areas, the abundance of water leads stakeholders like local governments, environmental agencies, and health organizations to prioritize issues of water purity, pollution control, and sustainable water quality management practices. This dichotomy underscores a broader principle in stakeholder management: the primary interests and

priorities are profoundly influenced by the availability and state of the critical resource in question. Where scarcity is the main challenge, availability, and conservation become the focus, while in situations of abundance, the quality and sustainable management of the resource take precedence. Thus, effective stakeholder prioritization for a water-related initiative requires a deep understanding of local environmental conditions, resource availability, economic imperatives, and the societal impact of these factors. It is a delicate balance that demands continuous adjustment and sensitivity to the changing dynamics of both the natural environment and human needs, ensuring that strategies and solutions are tailored to address the most pressing concerns of stakeholders in each unique context. Achieving a balanced approach requires constant adaptation to the unique dynamics between an industry's ecosystem and human needs. This strategy ensures solutions are tailored to address the most critical stakeholder concerns within each industry context.

V. CONCLUSIONS

The relationship between scientific inquiry and tangible societal impact is complex and evolving. While there is merit in protecting scientific inquiry from undue influence, evidence suggests that research outcomes should often align with societal needs. This approach is important because the detachment of basic or esoteric research from the practical needs of society can lead to a growing gap that diminishes the value of scientific inquiry to the public. A way to bridge that gap is to identify and engage with stakeholders. Identifying the right stakeholders for any initiative can be critically important. Engaging with stakeholders early in an initiative can transform them into advocates, enhancing the credibility and legitimacy of any initiative. Doing so also ensures that the initiative remains closely aligned with the needs and expectations of those with a stake in its success.

A structured process to identify and engage stakeholders that can serve as a practical guide is presented. It starts with clearly defining an initiative's goals and objectives and identifying primary and secondary stakeholders. Brainstorming, consultation, and analysis help expand the list, and a stakeholder map or matrix can aid in prioritizing objectives. Maintaining open communication, seeking input, and adapting engagement strategies are vital components of this iterative process. An example illustrates how this process can be applied to a specific initiative, emphasizing the importance of background research, stakeholder identification, engagement strategies, and documentation. Such an approach not only enhances a project's relevance but is a critical step towards ensuring

that research outcomes serve the needs of society, thereby fostering a more productive and meaningful connection between science and the world it seeks to improve.

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