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Why is Communicating the Circular Bioeconomy so Challenging?

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Abstract

The circular bioeconomy concept has been around for years now, yet despite increased efforts to popularize it, the concept has so far gained little public attention. Communicating this concept effectively, therefore, poses an important challenge. This commentary synthesizes what is known, presumed, and still unknown about how to effectively communicate about the circular bioeconomy. It postulates that the circular bioeconomy communication challenge appears due to three main reasons: (i) one rooted in differing conceptualizations and competing discourses; (ii) one rooted in normativity; and (iii) due to several knowledge gaps in the communication process. These postulations are backed by examples from the growing body of social-scientific literature on the topic. Finally, it provides a series of lessons learned and some suggestions for future research on circular bioeconomy communication. The insights provided here are useful for environmental communications, and the society and technology scientific communities, as well as for policymakers, practitioners, and communication experts interested in effectively communicating the circular bioeconomy.

Keywords Circular bioeconomy · Communication · Discourses · Normativity · Communication process

The Communication Challenge

The circular bioeconomy (CBE) has received considerable political and scientific backing over the years [1]. Substantial investments have been mobilized to jumpstart the envisioned transition from a fossil-based economy, to an economy where the building blocks for materials, chemicals, and energy would be derived from renewable, bio-based resources [2]. To date, around 60 countries are pursuing bioeconomy-related policies [3]. Numerous research projects have been initiated, and the number of scientific publications on the topic continues to grow [4]. Since the bioeconomy is not necessarily “circular by nature,” principles of a circular economy have been included by the European Commission in the hopes

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of minimizing the generation of waste and maintaining the value of products, materials, and resources for longer periods [5–7]. Initiating such a transformation of our current economic system includes fundamental changes to policies, technologies, organizations, social behavior, and markets [8]. For this to happen, however, societal awareness and engagement are paramount. Experts and decision-makers consider it of “utmost importance” to be “(...) raising awareness and broadly engaging stakeholders” [9] (p. 58) or to “improve public perception and awareness of industrial biotechnology and bio-based products” [10] (p.142). Effectively communicating this complex concept thus remains an important challenge for academics and policymakers. Yet despite growing political and academic backing, one problem persists: the CBE largely remains an obscure concept for the broader public.

A growing number of perception studies point to a gap in our understanding regarding CBE awareness. For example, farmers in Austria tend to be more critical of the bioeconomy concept than other stakeholder groups [11]. Forestry stakeholders from Sweden or Slovakia appear to be more optimistic and identify opportunities for the sector as they consider it can improve the image of forestry [12, 13]. University students from different European countries perceive the bioeconomy differently depending on their field of study, country of origin, own personal values, and previous knowledge about related topics [14, 15]. International NGOs are among the most critical stakeholder groups and question the concept’s socio-economical beliefs [16]. Citizens in Germany, despite not being very familiar with the concept, support its underlying ideas and have high expectations in terms of environmental and economic benefits [17]. Experts and citizens from Finland, on the other hand, are skeptical about the promised sustainability of the bioeconomy [18].

Citizen perceptions seem to depend on specific CBE technologies and products and on how these are communicated [19]. For example, in Germany, the use of genetic engineering in agriculture and industry is opposed but tends to be more accepted in medicine [17]. Similarly, acceptance of specific bio-based products (i.e., textiles, alternative proteins, wood constructions, bio-based plastics) depends on the product and the willingness of consumers to adopt new practices regarding its purchase, usage, and disposal [20]. Whereas there is still a pushback against, i.e., edible insects [21] and other more drastic lifestyle changes [22], citizens from some countries are more accepting of CBE solutions such as wooden constructions [23] or bio-textiles [24]. Younger generations from Italy, for example, are paying growing attention to sustainability and circular economy when it comes to fashion [25].

Clearly, the literature is far from conclusive on matters of CBE perceptions, acceptance of bio-based products, and lifestyle changes. With few exceptions, the majority of studies focus on Europe and North America [26–28]. Furthermore, studies differ wildly in geographical scope, target groups, methodology, theoretical underpinnings, or even definitions of CBE. Some studies focus on specific bio-based products, others on lifestyle changes, and the broader bioeconomy concept. Moreover, terms such as “awareness” and “acceptance” are sometimes conflated. Nevertheless, despite a lack of a comparable, comprehensive meta-analysis focusing on public perceptions of CBE, the existing literature tells us that perceptions vary depending on how this complex concept is constructed and communicated.

In other words, the difficulty in communicating CBE effectively does not only depend on “how” it is communicated, but also depends on “what” is communicated, “who” communicates it, to “whom” it is communicated, and ultimately “why” it is communicated. To better understand these challenges, we first have to clarify some important conceptual and normative aspects underpinning CBE communication.

Differing Conceptualizations and Discourses

The first obvious step in tackling our communication challenge is to clarify what we refer to when talking about the CBE. During the last decade, the definition of bioeconomy has been the subject of numerous academic contributions [26, 29]. As a result, different classifications have emerged, highlighting the role of political discourses in framing the concept [30–34]. For example, Pülzl et al. [33] argued that the bioeconomy is a “mixed source” neoliberal discourse, mainly focused on the economy and interweaving arguments of limits to growth with ecological modernization. Scholars have also increasingly pointed to the political character of this concept [27, 35, 36]. Far from being a policy field, it is at best a conceptual umbrella for several already existing policies [36]. But the dominant way of framing the CBE is through the lens of existing policies, particularly the OECD’s bioeconomy policy agenda [37] and the European Union’s bioeconomy strategy [2738] .

Yet the bioeconomy was not always the political concept concocted by the OECD and the European Commission. In fact, the term “bio-economics” was originally coined by Russian biologist Baranoff to describe fishery economics [39]. It was later used by Georgescu-Roegen who postulated the prospect of establishing a “minimal bioeconomic program” [40] advocating, among other things, for the fight against waste, and the pursuit of sufficiency by consumers [39]. Only in the last decades did the bioeconomy concept gain traction in the European Union, particularly through biotechnology-related programs [1]. The add-on “circular” was recently added, as some experts saw the risk of locking into linear, business-as-usual *modus operandi* if the principles of a circular economy were not included [5, 41].

This brief historical detour of the origins of the CBE concept is important as it shows how the growing rift between different conceptualizations, expectations, and imaginaries came to be. Allain et al. [42] make a useful distinction between the “bioeconomics” and the “bioeconomy” schools of thought. On the one hand, bioeconomy proponents emphasize economic growth enabled by the use of biotechnology using and processing large amounts of biomass (forests, crops, agricultural residues, etc.) [e.g., 1, 8, 28]. On the other hand, bioeconomics proponents consider that the concept has been “hijacked” from Georgescu-Roegen’s “bioeconomics program” [39] and argue for de-growth, new social organization, and low-tech innovations [e.g., 39, 43], critiquing the supposed circularity as only being related to targets of “reusing and recycling” which are ultimately aimed at economic growth [44]. This important conceptual distinction influences the communication process. It also has normative implications as it involves different expectations from the CBE.

Normativity

If we accept that the CBE is inherently political (at least in its current configuration), then we must also acknowledge that it comes with heavy normative baggage. Normative power means connecting concepts, agents, or activities with a set of shared values [45]. Studies have shown how powerful political and industrial actors produce and reproduce bioeconomy storylines staking out relevant scientific knowledge and expertise that grant them normative authority over how the CBE transformation ought to unfold [27, 45, 46]. This has led critical policy scholars to point out that citizens and civil society have had little say in decisions that impact their lifeworld [16, 47]. Moreover, citizens and stakeholders from the

Global South have yet to co-opt the envisioned European bioeconomy vision [48]. So far, participation in the CBE has been mainly framed from the consumer perspective, expecting citizens to buy (new) bio-based products and adopt significant lifestyle changes to reduce climate and environmental footprints [16].

This is why the specialty literature often points to regulatory and normative policies necessary for eliciting changes in everyday behaviors and new societal values [10, 49]. Envisioned CBE “lifestyle changes” are presented as fundamental pattern changes in consumption behavior which may include new dietary habits (e.g., vegetarian or vegan diets), food waste reduction, consumption, circularity, leisure activities, or mobility [22, 50]. The sustainable consumption literature discusses two main framings of the problem of sustainable consumption: one related to market and technology failure, and the resulting need for economic and technical solutions; and a more “radical” concern with environmental issues rooted in de-growth research [50]. Similar fames have permeated the CBE debate as well. Bioeconomy proponents emphasize technological innovation, new bio-based products on the markets, and substitution. But whereas bioeconomy and biotechnology proponents are normative in the sense of encouraging and nudging citizens to buy into the new bio-based market and opt into a lifestyle enabled by neoliberalist “green growth”, ecological bioeconomics is intrinsically normative by advocating for radical lifestyle changes related to consumption and production patterns, sufficiency, entropy, and ecological sustainability within planetary boundaries [42]. Yet again, two conflicting normative imaginaries are at play here, each envisioning radically different CBE lifestyles and behaviors.

Similar to climate change communication, a series of challenging traits also make the abstract CBE concept a tough issue to engage with, i.e., distant impacts (i.e., the temporal and often geographic distance between cause and effect), detachment of urbanites from the natural environment (e.g., where wood comes from, how food is produced, how waste is recycled), or delayed or absent gratification for taking action (e.g., understanding that action taken today impact future generations) [51].

The Communication Process

After briefly clarifying the conceptual, discursive, and normative assumptions underpinning current bioeconomy debates (the “what” and the “why” questions), we can now turn to the communication process itself. As argued above, calls for better communication are too simplistic. Basic questions related to “who” communicates (i.e., who the messenger is) and “to whom” it is communicated (i.e., what the target group is) need to be answered first. We have seen that the “who” question does not always have a straightforward answer. Recent research points out that CBE knowledge is mainly passed between different experts i.e., policymakers, academics, the private sector, or different specialized networking organizations [45, 52–54]. Policymakers have an inherent normative bias rooted in different political philosophies and backed by advocacy coalitions on issues of interest [45, 52]; researchers communicating about bioeconomy risk to unintentionally legitimize certain political imaginaries [27, 35]; industries may use bioeconomy to improve the image of their sector [12, 55]; and the media is bias or present partial information [56, 57]. To overcome this conundrum, some scholars have proposed responsive governance approaches [47], deliberative democracy [16], or co-creating inclusive innovations tailored to citizens’ immediate needs [58]. But deliberative democracy and participatory approaches remain complicated processes mired in conflict, differing orientations, and political inequalities [59].

The question related to the target group (“to whom”) is equally important. So far, the academic literature refers to stakeholders, experts, laypeople, citizens, and consumers. We have seen that different groups have different levels of knowledge regarding bioeconomy, and interpretations of the concept differ widely depending on who communicates and what is communicated. Bioeconomy proponents pin the responsibility on the individual consumer and lifestyle choices. According to this rationale, the target audience is the average consumer that needs to be nudged and educated. Ecological bioeconomists advocate for systematic changes and socio-technical transformations, questioning the very neoliberalist, growth-oriented logic of political bioeconomy discourses [44]. Consequently, the communication target is not only the average citizen, who is turned from consumer to co-creator, but also decision-makers, and the corporate establishment who need to be informed and reformed in to make the envisioned changes.

As to the channels of communication (the “how” question), messengers have employed different approaches with so far little known effects. Communications and marketing research shows that different modes and channels of communication affect the persuasiveness of communication in different ways [60, 61]. So far, CBE-related information has mainly appeared in the written media (e.g., newspapers, blogs) [56, 62]. Few studies have looked at how the concept has been taken up by the broader hybrid media (i.e., audio, television, and written media) [e.g., 63]. Despite CBE communication campaigns being initiated in different European countries, so far, there is no research on the circulation and framing of the concept on social media. For example, in Germany, the science year 2020/21 was dedicated to the bioeconomy.¹ The Federal Ministry for Research and Education sponsored a series of communication initiatives, such as expositions and fairs (showcasing different bio-based products), public lectures, podcasts, art competitions, and other creative communication initiatives. Similarly, the Swedish forest industries association launched a communication campaign titled “bioeconomy in your everyday life”² intended to inform citizens about the different bio-based solutions and at the same time promote the forest sector. The success of these initiatives is difficult to judge. There is a research gap in terms of the different strategies employed, the role and interests of the different messengers, their strategies, and the effectiveness of these communication approaches in terms of public and/or consumer awareness. Future research on bioeconomy communication could draw on lessons from mass media communication experiments as a means of engaging society concerning the environmental problems and sustainability issues related to consumption [64].

Conclusion and the Way Forward

Effectively building communication bridges between science, policymaking, and society is paramount for a successful CBE transformation. This commentary has put forth three main arguments for why CBE communication is so challenging. It has been argued that in order to overcome this communication challenge, we first have to understand fundamental aspects related to differing conceptualizations and competing discourses, inherent normativity, and knowledge gaps in the communication process. For future communication and research endeavors, the following key aspects are important:

¹ Science year 2020/21: <https://www.wissenschaftsjahr.de/2020-21>

² Bioeconomy in your everyday life: <https://www.forestindustries.se/bioeconomylife/>

- There is no single, generally accepted CBE conceptualization. Two paradigms (bioeconomy vs bioeconomics) that point in opposite directions to solving the sustainability crisis come into conflict. They nevertheless share two commonalities: both focus on a common object of transition (society and its relationship to the environment), and both take a global approach when talking about planetary boundaries, decarbonization, energy efficiency, or economic competitiveness [42]. Communication must consider these differences and commonalities and transparently inform about the trade-offs of each paradigm.
- Both bioeconomy and bioeconomics are inherently normative. In this sense, the ball is in the court of politics. Who the messengers are and what is communicated depends on power, values, and beliefs. To negotiate value judgments at the science-policy interface, normative stances must be transparent [65]. Furthermore, communication endeavors must engage with the demands of the broader society for the bioeconomy to gain societal legitimacy [66]. This needs to go beyond “creating acceptance” and “consumer awareness” and instead focus on informed participation by all citizens as well as communicating the importance of societal wellbeing [66, 67].
- The CBE concept remains highly technical and abstract, detached from the lifeworld of the average citizen. Distant impacts, detachment of different lifestyles from the natural environment, or delayed or absent gratification for taking action make it a tough issue to engage with. This also complicates the communication process, which needs to clearly differentiate target groups (policymakers, experts, academics, farmers, citizens, etc.) and adapt communication strategies and mediums accordingly. So far different approaches have been employed, but their success is unknown. Much research remains to be done in this direction. Important lessons can be drawn from studies on communicating sustainable consumption [e.g., 50, 64, 68].

Lastly, CBE communication has much to learn from climate change communication [e.g., 69–71]. This field has amassed a great amount of highly interesting literature, albeit with mixed results regarding its effectiveness. However, it would be misleading to equate the CBE with climate change. Whereas there are certainly many important lessons to be learned from decades of climate change communication, one concept embodies a scientific reality, the other a (political) solution. Just as the scientific expertise generated by CBE researchers elicits different imaginaries and policies, so too has the scientific expertise around climate change eventually translated into various normative mitigation policies [72]. Scientific expertise with relevance to public policy is always value-laden [73]. Communicators must, wherever possible, make such value judgments clear to allow for deliberative governance and public debate [65]. The CBE is but a tool in what should otherwise be a diverse toolbox of solutions addressing urgent sustainability challenges. And just as Maslow’s “law of the instrument” warns against the overreliance on a preferred tool, so too must policymakers and communicators avoid presenting the CBE as the silver bullet to all our sustainability problems.

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