

Searching for a sustainable economy: Work, cooperation, and territorial solutions

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Abstract.

BACKGROUND: This article discusses expanded governance of territorial issues as the basis for a sustainable way of producing and commercializing, as well as the relevance of work analysis within this governance. This discussion is developed from the Functionality and Cooperation Economy approach and from Brazilian experiences of organic food production and community-based solid waste management.

OBJECTIVE: To identify and analyze the relationship between territorial issues and work activities in initiatives that seek territorial solutions for food and waste management in order to reflect on a sustainable economic transition and its challenges.

METHODS: This article presents a reflection, *a posteriori*, concerning the follow-up of two initiatives that seek a sustainable economy and that, facing territorial issues, adopted different economic strategies. The field of research, by which the intended reflections are guided, originated from two intervention projects conducted by two different research/intervention groups.

RESULTS: Our study highlights how the central focus on the effects of work in a territory can support the development of reflexivity and, consequently, the production of transversal cooperation and the sharing of material and immaterial resources, thereby leading to multifunctional territorial solutions.

CONCLUSION: This study presents how the co-construction of multifunctional territorial solutions, involving cooperation among different actors, can be developed by an analysis of the respective activities involved. This analysis confers centrality to real work in order to feed the governance devices and enable the development of relationships of trust, necessary for living and producing in harmony, along with the construction of conventions and dynamic cooperation.

Keywords: Functional and cooperative economy, work activities, territorial issues, territorial solutions

1. Introduction: Problem statement

In different modes of production, the satisfaction of human needs takes place within a specific combination of social relations that organize, on the one hand,

the reproduction of the social totality in itself and, on the other hand, the relations between society and the natural conditions of production and reproduction of human life. As a whole, social relations of production and the relations that define the metabolism between society and nature constitute the conditions for the “sociometabolic reproduction” of a given social formation, which can be more or less integrated and sustainable [1].

The most recent sanitarium crisis highlighted how the present stage of rupture of the “sociometabolic reproduction” threatens the environmental balance

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and society's well-living [2]. Two problems have appeared with particular relevance: food and waste management.

Food is an important concern of our daily lives and represents one of the consumption areas of great environmental concern [3]. According to the EAT-Lancet Commission, the global food system (which entails the production, processing, distribution, preparation, and consumption of food) requires radical changes for humanity to feed the world's global population while staying within the biophysical limits of the planet [4]. Over-consumption leads to unhealthy diets in some parts of the world, whereas hunger and malnutrition are prevalent in others [5].

Another significant example is the generation of waste. It is estimated that 17% of total global food may be wasted [6]. In Brazil, 56% of household waste can be found in food residues and garden pruning [7, 8]. The overproduction and underuse of inorganic waste, on the other hand, compromises the capabilities of restoring the planet's resources, as well as promotes complex issues, such as water pollution by microplastics, which leads to serious food problems [9].

This imbalance of local ecosystems, and the combination of these problems, was revealed in the health and economic crisis, reinforcing the current distance between the relations of production and consumption and local needs [2, 10–13]. Nevertheless, these asymmetries and limits had already existed even before the COVID-19 pandemic, as a reflection of a financial and economic performance model. Centered on the mass production of material goods and in the growing global interdependence [14], this model is also known for the distance created between production management and territorial dynamics [15].

In the search for new economic models and new forms of consumption and production that could handle this imbalance, it thus becomes necessary to reflect on the limits of the current economic dynamics [16, 17].

Therefore, this study is focused on the work of those who search to produce and eat from a sustainable perspective, handling with territorial issues that affect production management, as well as their production effects on these territories, i.e., its externalities. Guided by these practical challenges, the Functional and Cooperative Economy (FCE) perspective claims to promote institutional innovations for actor's engagement and expanded governance in territorial issues, considering the centrality of work. This could also represent a way to search for these

necessary alternatives, implemented by a wide range of actors, including companies, civil society, NGOs, collectives, associations, governments, etc., who can join their efforts and share a common horizon, thus forming a cooperative territorialized ecosystem [16].

The present study's objective is to identify and analyze the relationship between the territorial dimension and work activities in initiatives that seek territorial solutions for food and waste management, based on the characterization of their economic models (focusing on co-production, functionality, work, and territory), in order to reflect on a sustainable economic transition and its challenges. This study served to reflect on the relation between work and territories, comprehending the issues of sustainability within an approach that leads to multifunctionality and cooperation, through solutions that bring the service relation to the center of value creation (integrated or not with a product/material good).

2. Background theory

The FCE approach stems from the adverse effects of the dominant industrial economic model, focused on the logic of the mass production of material goods and financial performance [14], whose governance is separated from territorial issues and unable to put the economy at the service of the great functionalities of life, such as food and health [18–20]. In other words, the industrial economic model does not manage externalities of production, that is, indirect and unwanted effects, positive or negative, of a certain production in a territory.

It is important to understand the differences between the expression "economic model" and "business model", the latter being more widely used. Economic models cover a broader field of issues and articulate five dimensions that link the dynamics of the company to its economic environment [16], presented in Table 1.

A fundamental characteristic of the FCE approach is to rethink the relation of "use value" and exchange value, which enable a lesser degree of the consumption of natural resources, greater well-living for people, and better economic development [21], by recovering the work's centrality in the governance of production and territorial issues. The work itself is considered to be the activity of producing value by the transformation to provide goods and services to society and the territory. Therefore, this new economic configuration aims to provide integrated solutions for

Table 1
Five dimensions of the economic model [16]

Dimension of the economic model	Description
1. Value proposition	The first dimension refers to the “value proposition” that aligns the expectations of consumers and their mode of consumption with the expectations of companies and their mode of production, with sustainability requirements as an object of debate.
2. Productive configuration	The second dimension refers to a “productive configuration” of the company, which can be internal (the organization of work to produce the value proposition) and external (inter-company relations to obtain the material and immaterial resources necessary for this production), and related to a linear or circular value chain or even cooperative ecosystems.
3. Contractualization modes	The third dimension refers to “contractualization modes”, transforming the different dimensions of the value produced into monetary value (with customers, suppliers, others), with power balance relationships in value chains and/or cooperation in cooperative ecosystems.
4. Mode of distribution and accumulation of monetary value	The fourth dimension refers to the “mode of distribution and accumulation of monetary value”, and deals with the relationships between the income of the company’s workers and investors, and the methods of distributing monetary value among the different types of stakeholders, especially in cooperative ecosystems.
5. Governance	The fifth dimension refers to “governance”, related to the conditions under which decisions are made between the internal and external actors of the organization, as well as to integrate the beneficiaries or even the territories.

goods and services that no longer depend on simple sales and mercantile exchange values, but rather focus on use value and service relationships, based on cooperation between producers and customers.

In a service economy, cooperation is a central element of work activity, since the beneficiary participates in the production of a service that he/she not only buys and consumes, but also coproduces or even co-designs. There are no longer merely vertical (between management and operation) and horizontal (between operators) possibilities of cooperation, but there are also transversal forms (i.e., with the expectations of customers) [19]. In some cases, beneficiaries even assume a “collaborative involvement” [22], that is, an involvement that goes beyond the co-production of the service in a solely operational fashion, also contributing to its governance. The concrete production of value depends on the ability of workers to cooperate with the beneficiaries and consider their constraints in real-time arbitration between multiple prescriptions [23], when the instituting praxis goes beyond the instituted praxis [24].

Therefore, cooperation is based on the ability of actors to combine their own field of competence and immaterial resources, like health and trust, with the challenges, constraints, and competences of others. It refers to the quality of work as an activity that creates value on an economic, social, or personal level, and the quality of relationships between actors [16]. In this interactionist approach that aims to allow for the recognition of others and their work, sustainability is recognized as the intertwining of social, environmental, and economic pillars anchored in a familiar territory [20, 25]. Thus, among the fundamental bases

of FCE, the territory becomes the space for the materialization of transactions and the recognition of work through the service. The perception of the territory emerges, not as a mere geographic space, but also as a political space for transformation and cooperation, the basis for a social resignification of work and for a new way of producing and commercializing [19, 25].

Studying the mobility, for example, Cunha and Lacomblez [26] adopt a similar perspective: “mobility cannot be thought about as ‘disadherence’, or at a distance from the territorial specificities, even if the notion of territory is polysemous, simultaneously defining a space which is not neutral or appropriate, a governance delimited space, but at the same time a collective space to provide a ‘common interest’ and the sharing of values” (p. 4889). Therefore, territorial issues, such as mobility, as related to common interests and sharing values of territorial actors, becomes a key element in the creation of economic value, taking the form of a “territorialized value” that includes financial, market, territorial, and work dimensions.

The territory’s role is changing from a constraint to a real center of value creation through its “multifunctional dimension” [13], i.e., the integration of different issues in a collective space. In this dynamic, FCE considers the territory as an endogenous actor, enabling the exploration of immaterial territorial resources, but also helping to strengthen them, by the development of reflexivity dynamics and devices. Going in this direction, it conditions the reintegration of both the negative and positive externalities of companies in the territories to the adoption of governance principles that aim to coordinate different local actors. An expanded economic dimension requires

crossing territories, since it is at the territorial scale that environmental and social problems emerge, as do the solutions to overcome them [11].

Understanding the development of a new value proposition by territory requires a detour, comprising the elements of “co-production” and “functionality” as central, as already proposed in other conceptual approaches, such as Service Economy [27], Functional Economy [28], and Servitization [29]. It is also important to understand the differences of these concepts in the more traditional approaches from those proposed by FCE, as an approach that aims to enhance sustainable economic transformations. Therefore, these two concepts will be presented in a conceptual comparison, as shown in Table 2.

From the comparative synthesis between the approaches, we understand that the dynamics of innovation on which these models are based is mainly of a service nature: the transition from selling a product to selling the use of that product. However, the scales of analysis considered by the approaches are different (FCE on a territorial scale), as well as the number and variety of actors involved.

The subsequent effects will depend on the applied scale of analysis. In particular, the reduction of negative externalities, or the recognition and valorization of positive ones, will depend on the systemic partnership and the company’s spatial leap [37]. The more traditional service and functional economy approaches, although interested in mercantile

Table 2
Differentials of the FCE approach

	Traditional approaches	FCE approach
Coproduction	Coproduction is a central element of service dynamics, resulting from the logic of temporal synchronization between service provider and service beneficiary, which operates in “real time” based on opening hours or meeting devices. Unlike the industrial economy, in which consumer action does not intervene in the production process, in a service economy, the customer then intervenes in the production processes and their performance [30]. Value can only be determined by the user in the consumption process, through the interaction between provider and customer (whether through direct interaction or between a good and other partners). In particular, the service customer is always a value coproducer [31].	Coproduction at FCE involves the emergence of stable horizontal and cross-cutting cooperation between multiple actors, who will engage in a service dynamic based on the recognition of their work [16]. Cooperation reinforces the dimension of coproduction by making the work the center of the discussion. It is through work that value is produced and, based on a reciprocal exchange, it is possible to obtain recognition and assistance in a collective development project [32]. This dynamic is fostered by the reflexivity and analysis of the activities involved in the coproduction of the service, which allows one to highlight aspects of real work [19]. Given that service solutions are dependent on the quality of cooperation, corporate governance can be open to the different partners of the cooperative ecosystem, to the employees of the companies, as well as to the territories. All these economic dynamics result in the constitution of territorialized cooperative ecosystems based on a shared governance system whose relevance and legitimacy are built in prolonged action [16].
Functionality	Functionality is focused on the function or performance of goods and services. The dynamic centered on functionality refers to the coproduction of integrated solutions for products and services that meet the expectations of families and industry, between providers and beneficiaries, consolidating new environmental and social requirements [28]. This transition to service (and functional) dynamics makes it possible to look at the life cycle of equipment, as well as the conditions of accessibility to services, in a new way [27]. The economic dynamics that are organized around functionality favor the durability of goods and/or the reduction of consumption of material resources [28, 33–36].	Functionality is addressed in FCE in a systemic way, through the integration of several territorial issues (energy, mobility, food), considering multisectoral criteria, given the recursive causal relationship between the trajectories and impacts of different sectors of the economy. Different from traditional approaches, it considers the association of the sector with the territory and, therefore, with other sectors [13, 16]. Effective performance (focusing on performance of use and territorial performance) does not depend on a single action, but also on the involvement of the beneficiary and cooperation between different types of actors with complementary skills, as well as forms of social regulation implemented at the territorial level [19]. This dynamic makes it possible to integrate new functionalities into services/solutions designed to respond to the challenges identified within a territorial scope. It is the dynamic extension of the (multi)functionality integration area that structures the sustainable dynamics of territories [16, 37].

exchanges, tend to open the field of analysis to non-mercantile cooperation, based, in particular, on mechanisms of reciprocity and redistribution. The FCE, in turn, is interested, among other things, in non-market cooperation mechanisms between actors with the aim of achieving sustainable territorial solutions [38].

From an extension of the area of the integration of goods and services into multifunctional solutions, the performance of use at FCE contributes to the dynamics of the territory. This economic dynamic changes the relationship between companies and territories, on the one hand, and with the human dimension of work, on the other hand, by renewing the cooperation approach.

In the next sections, these concepts and their specificities in the FCE approach will be highlighted through the discussion of two empirical cases, in which FCE was used as a follow-up approach. The methodological procedure can be viewed in the following topic.

3. Methodology

This article conducted an *a posteriori* reflection on interventions, inspired by Schon's approach [39], which proposes to analyze the action of specialists from the situations they face in their daily lives, instead of concentrating on models of technical rationality [40]. Therefore, the field research originated from two interventions, each one with its own methods, since it was conducted by two different research/intervention groups: Club EFC Rio from the Federal University of Rio de Janeiro (UFRJ) and

NAP from the Federal University of Minas Gerais (UFMG).

The objective of the interpretative reflection is not to highlight specificities of the cases, but rather to seek the generalization of certain aspects that can dialogue with theories about work, specifically in this article, in its relationship with the territory. The groups work with a common action referential, but with differences in methodological strategies. The research conducted by Club EFC Rio constitutes an exploratory work, following three main stages, as shown in Table 3: (i) construction of a conceptual-theoretical framework; (ii) research and study of public information of companies; and (iii) monitoring of company directors, following an approach inspired by the work of the ATEMIS laboratory and the FCE European Institute. More than 300 companies have already followed this approach, applicable to any industrial or service company, whatever their field of activity and status. The intervention occurred at the Junta Local, an enterprise in Rio de Janeiro that seeks to shorten the chain and provide access to healthy, local, and fair food. Table 3 briefly describes each of the stages of the methodology.

In the Belo Horizonte experience, the research was developed from an action research perspective [41, 42] and from activity-oriented approaches to ergonomic action [43]. The data collection instruments used in this study are based on Activity Ergonomics and Work Ergonomic Analysis [44–48]. Three types of moments and data collection sources can be highlighted: Type A) collective efforts and face-to-face meetings (especially before the pandemic), with different formats and purposes; Type B) follow-up of work activities; and Type C) pre-

Table 3
Methodology stages – Case 1

Methodology stage	Description
1: Collective dynamics based on FCE principles	Space for group reflexivity encouraged by researchers of the FCE approach. Six meetings were held, one per month, by nine company directors from different sectors. The basis of these meetings was a device in stages where we attempted to identify and debate for each company: (i) the limits of the current economic model; (ii) the positive and negative externalities, as well as the actors involved; (iii) strategic immaterial resources; (iv) the performance of the use of material resources; (v) integrated solutions for goods and services; (vi) the construction of cooperative ecosystems; (vii) the diversification of the flow of income and investment; and (viii) governance, engagement, and cooperation [16].
2: Individual interactions with each manager	Interviews were conducted to learn about the economic model of each company, consisting of: (i) exchange model (value proposition and main customers); (ii) production model (division and working conditions, strategic resources, management challenges, and productivity levers); (iii) business model (profitability and revenue bases, value sharing); and (iv) governance model (strategic decision actors, the perimeter of responsibility, and effects induced by the company's activity).
3: Interactions in pairs of managers	Meetings 1 or 2 times a month, which allowed for the creation of bonds and trust relationships, the basis for collective reflexivity.

Table 4
Methodological procedures – Case 2

Moments/Data collection sources	Methodologies, techniques and tools
A: Collective efforts and face-to-face meetings	“Future activity approach” [49] – approach used by ergonomists when the work to be analyzed does not yet exist – “organic design” [50, 51] and “incubation in reverse” [52] – propose a displacement of the project activity and incorporate it into the daily production.
B: Follow-up of work activities	Ergonomic work analysis [47] and complementary tools, such as participant observation, chronoanalysis and gravimetric analysis of residues.
C: Pre-scheduled interviews with specific actors	Semi-structured interviews (with the support of a semi-structured questionnaire), unstructured interviews, fact-oriented interviews, and self-confrontation interviews.
Data coding and analysis	Grounded theory methodology, initial coding, focal coding, and theoretical coding [53].

scheduled interviews with specific actors. Grounded Theory techniques were used for data coding and analysis. The intervention occurred at Lixo Zero Santa Tereza, an experiment in community-based management of urban solid waste. Table 4 presents the methodological procedures.

For the purpose of this paper, the cases were described, focused on their main elements and events that occurred in the period between 2017 and 2021. Each experience was then analyzed using coproduction/cooperation and multifunctionality as key analytical drivers. In the end, a final discussion was carried out, using territory and expanded governance as central categories, derived from the FCE approach.

4. Case descriptions

4.1. Case 1: Junta Local

Junta Local is an initiative that brings together local producers, from small agroecological farmers, to collectives and cooperatives, with the aim of shortening the food supply chain and bringing access to healthy, local, and fair food. The model is based on articulating producers’ networks through street fairs in neighborhoods in Rio de Janeiro and the sale of products through the “virtual bag” platform. To achieve this, an associative model and a curatorship were created in an attempt to align the premises, vision, and values of the Junta that carries out various activities to support associated producers.

The initiative charges a fixed monthly fee and an 18.5% rate on the producers’ billing statements, which are jointly defined in an assembly. Producers are encouraged to engage in assemblies, spaces in which to discuss operational issues and deliberate on decisions. Part of the producers is actively involved in this process, participating in decision-making processes and contributing ideas and efforts.

Some key partners are local ventures, usually producers who began their businesses at the Junta Local and later expanded them, working today at the Junta as advanced units to promote and sell products. Other public actors, such as the Secretariat of Culture and Creative Economy, help to issue temporary permits for fairs and events. Even with a certain rotation of partner producers, a fraternal affective bond is maintained, together with a political alignment. The Junta Local also has supporters who share a common vision of healthy eating (such as professionals in the field of gastronomy), and act as influencers and content producers, disseminating information in the Junta’s networks and portals.

With the emergence of the pandemic crisis in 2020 and the suspension of street fairs, the Junta’s solution was to invest in an online sales platform, representing a significant sales increase. This enabled the selling of the products on a larger scale, with even greater financial returns and an average ticket increase of 70%. This increase in scale led to a rise in the logistics chain and the operational demands assumed by its internal team (made up of 9 people), which centralized all distribution. The lack of space to receive products; storing and assembling orders (because they do not have a warehouse); and the absence of more cooperative partners in outsourced services, such as the cold chain, emerged as the main challenges.

Moreover, with street fairs suspended, the relationship between producers and consumers has been damaged. Likewise, interactions among the producers have been weakened, since the assemblies have been changed to a virtual approach. To respond to these challenges, in 2021, the Junta Local began its operations in a physical space to centralize the logistic processes and, above all, re-signify the interactions with producers, customers, partners and the community.

The space, called Moinho Fluminense, is located in the port region of Rio de Janeiro and is a real estate

landmark in the city of Rio de Janeiro. The 1887 construction installed the first wheat mill in the country, with structures listed by the National Historical and Artistic Heritage (IPHAN). This historic property, acquired by a real estate investment company, has a requalification project to become a huge multi-purpose space with commercial offices, restaurants, and venues for events.

Given its strong presence in Rio de Janeiro and its relevance in food events in the city, the Junta Local was invited to occupy the warehouse at Moinho Fluminense, based on a low-cost lease, in return for supporting the revitalization of the port region of Rio de Janeiro. Since then, the Junta Local has worked not only with street fairs around the city, but also with its own operations within the space, including a series of events focused on the food project and others of a cultural and artistic nature. The events called 'Open Moinho' are aimed at publicizing the food project, receiving more than 700 people, including producers, consumers and partners, for a food and beverage fair, enabling interaction between visitors and producers in the community, in addition to allowing the public to get to know and occupy the region. The fairs at Moinho allow the public to see how the order distribution system works, since the event takes place in the same place as the operations. The return of street fairs around the city has also gained strength, with the expansion of fairs into new regions, as well as new forms of accessibility to services, including activities for children and families. This new shared configuration allows for interaction between producers and partners, as well as visits and collection by consumers themselves, in addition to interactive events on weekends.

The physical space also allowed for reflection and led to improvements in ways of organizing work, bringing professionalization to the operation and possibilities for new value offerings. In addition to virtual sales, the Junta Local began to offer a subscription of fruit/veggie boxes, with recurring delivery. The signature has some types of standardized boxes, where the consumer has the possibility of some choices and some alternative options. Customers choose the type of box they would like to receive (these can include vegetables, grains, bread), the periodicity (weekly, every two weeks, or monthly), and the size (number of items). The consumers know the number of types of products that the box includes, but they do not know in advance which product they will receive on the given date (they know that they will receive 2 fruits, but they do not know which fruits).

The periodicity of subscriptions allows the Junta Local and its producers to calculate a greater predictability of consumer demand in order to understand what and how much will need to be planted and/or removed from the land, as well as greater financial stability. Predictability also allows the producer to offer more affordable prices to the consumer, as it reduces production costs with better planning. Consumers know that they will receive a box of organic products according to the stipulated recurring dates, and producers know that they will have a fixed income and production for a longer period. Another highlight is the configuration of the boxes by product type, and not by specific items. This gives the producer greater flexibility, considering the seasonality of the weather, local agriculture and possible eventualities in production. On the other hand, consumers get to know new products and, above all, acquire territorial and cultural knowledge, respecting and adapting to the reality of nature and their location.

The subscription service allows the Junta Local to establish longer-term relationships with its consumers, as well as gain a better understanding of their dietary needs and consumption habits. Some forms of reports on experience can be found, but these are still traditional and in online format. Many of the consumers do not respond to the satisfaction survey, but they feel committed to contributing with suggestions, although there are no spaces that welcome them to do so. Despite the courteous service on digital platforms, there is no structure that registers comments and feedback in order to evolve this into discussions and new strategies, nor return answers to the consumers. Some consumers are quite engaged in the fairs and events, while other subscribers feel they do not belong and do not create a concrete relationship with the exchange of experience and co-construction, although they are still interested.

The Junta Local is attempting to develop its relations with producers and consumers, based on deeper research into their ways of life, resources, needs, and knowledge. The knowledge that the Junta has about most of its producers and consumers is generally intuitive, making relations with more distant consumers quite superficial.

4.2. Case 2: *Lixo Zero Santa Tereza*

The Lixo Zero Santa Tereza Project (Santa Tereza Zero Waste Project) – or simply Lixo Zero – is an ecosystemic experiment that seeks to build integrated

territorial solutions for the recovery of domestic solid waste, the promotion of food well-living, and experiments with environmental education services. First conceived and started in Belo Horizonte, in mid-2017, the initiative is led by two operating groups: the Rastafarian culture collective 'Roots Ativa' and the waste picker cooperative 'Coopesol Leste'. A research and technical advisory group in ergonomics at the UFMG (NAP) – which some of the authors of this work took part in – plays a role of direct assistance in and follow-up of the initiative. The project was built in partnership with a network set up in 2017 through an interaction between waste pickers and their organizations, NGOs, universities, and territorial actors, such as a local school, neighborhood associations, and other grassroots movements. This network seeks to promote a pilot project for the complete recovery of solid waste in Santa Tereza, the neighborhood that gives the network its name (Lixo Zero Santa Tereza Network). This neighborhood is well-known for the strong engagement of their residents, institutions and grassroots movements in struggles involving territorial issues.

As a first project, it was decided to create a curbside selective collection service in the surroundings of the referred school; for that, the engaged actors cooperated in mobilizing the neighboring families. The value proposition would be a more sustainable destination of recyclable waste, based on the domestic separation of materials by the mobilized families, and its subsequent destination to Coopesol, which would collect the waste once a week. With the beginning of this service, the network began to support its development and contribute to the emergence of new initiatives.

This was the case of the Vida Composta Santa Tereza project, created in 2018 by the Roots Ativa collective, in the Feira Terra Viva, a neighborhood's associative fair built from the articulation of agroecological and organic producers – among them, Roots Ativa itself, selling products for domestic waste treatment and artisanal food. Before that, the Roots Ativa collective had already been collecting and treating organic waste in the community where its members live, one of the largest groups of favelas in Brazil. This service sought to achieve a better practice in the treatment of organic waste in the community, since the precarious access to the garbage collection service contributed to inappropriate disposal practices. The operation within this project was voluntary and was, at first, supported by access to temporary funds obtained through public notices for projects aimed

at civil society organizations and collectives. It was later suspended due to the lack of funding capacity.

With the creation of the new service, in another territory and socioeconomic context, the idea would be to charge for the treatment of organic waste from the beneficiaries in order to achieve economic feasibility for the initiative.

The existence of two waste treatment projects, one for recyclables and another for organic waste, which were complementary but not integrated, led NAP and the network to promote some integrated service experiments. The proposal to carry out waste management at "zero waste events" was supported by another local grassroots movement, like "Mercado Vivo+Verde", which aims to occupy the abandoned public market located in the neighborhood. In these events, Coopesol and Roots gather resources, competences, and efforts to produce a service with two main scopes: 1) to advise the organizers in order to minimize the production of waste at the events and 2) to manage and treat the recyclable and the organic waste generated at the events. From these experiments, a proposal emerged that sought to structure a continuous alternative in the neighborhood for the complete treatment of domestic waste, based on the cooperation between the waste picker cooperative and the Rastafarian collective.

To enable the development of this integrated service, the first Zero Waste Nucleus was built between 2019 and 2020 as an 'intentional place' [22], whose multiple functionalities revolve around the major categories analyzed in this paper: food and waste management. The construction of this first Nucleus was made possible from the voluntary assignment of the use of an idle land by a former resident of the neighborhood, who had an old, but still unfulfilled wish to implement an urban garden in her terrain.

The Zero Waste Nucleus concentrates, in the same space, a place for the temporary storage of recyclables and a composting system for the local treatment of organic waste – elements related to the waste management service. It also has an agroecological garden and a space for the sale of food produced by small associated local producers – elements related to food services. With the pandemic, a Virtual Fair project was developed to allow remote access to food services. The services related to waste management were suspended in the beginning of this sanitary crisis, as a precautionary measure.

Within the Lixo Zero project, at least four dialogic devices of listening and reflexivity can be identified [54]: 1) the spaces for 'organic design' [51],

co-management and experience feedback with operators; 2) the project's expanded governance meeting, held bimonthly, where all those involved in the cooperative ecosystem are invited to participate; 3) the Zero Waste Nucleus itself, as a space for daily listening and reflexivity; and 4) the virtual group of beneficiaries of the Lixo Zero project, based on an instantaneous messaging platform, where some demands and expectations are also placed, and experiences are exchanged. As will be discussed later in this article, each of these different devices play a specific role in the co-construction and continuous improvement of territorial solutions. For these dialogic devices to work, it is necessary to feed them with subsidies produced through the analysis of the activities involved in the coproduction of services, in the sense of highlighting the real work.

It was this practice of analyzing the activity that made it possible to place work at the center of the debate in critical situations, as, for example, in the discussions that took place within the cooperative ecosystem, at the beginning of the pandemic.

First, the socialization of waste sorting work details and of the risks associated with handling these materials, especially in the pandemic context, contributed to the production of a shared sense of the need to temporarily suspend work. At the same time, the collective reflexivity on the need to maintain the monthly contribution, by the beneficiaries, as a condition for the survival of the project and for the involvement of operators in cooperation during the period, led most of them not to suspend payment.

Later, for the return of activities, a series of meetings were held within the ecosystem, with rich debates focused on the work and health of both the operators and the beneficiaries, seeking to build a safe and reliable coproduction of the service. Based on these debates, some decisions were made, such as that regarding the adoption of compostable bags in the operation of organic waste, which we will briefly present next.

Organic waste used to be deposited in buckets and delivered in the Zero Waste Nucleus. At that moment, the operators used to collect the full bucket and deliver another empty bucket. With this procedure, there was a circulation of the buckets and, with that, risks of cross-contamination due to the persistence of the virus on inanimate surfaces, a phenomenon that was one of the objects of epidemiological studies produced at the time [55]. In addition, there were other restrictions and spatial and temporal constraints associated with the work conducted

using the organic waste buckets. These underwent an in-depth investigation through the Ergonomics Work Analysis (EWA). Among the elements identified and characterized, what stood out were the intense and repetitive work of lifting the buckets, the relatively high demand of work and time to clean them, quality problems related to cleaning, damage to the buckets due to excessive handling and exposure to the weather, for drying, etc. [54].

The results of these analyses were taken as a subsidy for the expanded governance meetings. In these spaces of debate, problems were also reported by the beneficiaries in the domestic operation with the bucket: difficulties in cleaning the buckets and their lids, damage caused to the buckets and their consequences, among others, as well as operational strategies adopted to face these restrictions. Other issues, such as the high consumption of water to clean the buckets, were also discussed, and common values were built from this debate (such as avoiding the waste of water in the operation). The co-decision on the adoption of the compostable bag in the operation, which would eliminate or at least minimize most of the problems discussed, thus appears as the culmination of a long process of listening and dialogic reflexivity within the cooperative ecosystem, based on work analysis.

Results and effects of the co-construction of the project include: the improvement of the effectiveness, efficiency, and quality in the work with waste management; the diversification and horizontal expansion of the services offered; the fostering of convivial relationships in the neighborhood; and the development of immaterial resources (competence, trust, relevance, and health) in cooperation among the actors in the ecosystem strategy.

5. Cases analysis

From that presented above, it is possible to make some considerations about how the experiences presented in our study progressed regarding the main concepts – cooperation and functionality – along with their relation with work and territorial solutions.

5.1. Analysis 1: Junta Local

The company Junta Local has a strong socio-economic and territorial impact, due to the relevance of its value proposition, focused on strengthening local and associative production and health through

healthy foods. As an independent platform, its economic model is based on decision-making autonomy, with higher monetary returns in relation to the market. Based on an associative model, a horizontal cooperation among producers can be seen, through assemblies and collegiate decision-making. Before the pandemic, fairs were the center of their value creation, with (uni)functionalities associated with a value proposition focused on the sale of foodstuffs and services to improve food accessibility conditions, especially locally produced food and organic products. The territory of the fairs emerges as a spatialization of the encounter and co-production in the materialization of transactions.

With the pandemic, Junta Local's production model has faced several challenges, with productivity levers that were focused on the technological progress of the virtual platform and economies of scale by online sales. Direct contact with consumers is lost, as is the territory as a meeting and living space. Accessibility is thought of in terms of product delivery, and the territory is considered as a spatialized demand, that is, as a restriction in the enterprise's logistics system. This new context also highlighted the weaknesses of current modes of work organization, which cannot reconcile decision-making with horizontal and transversal reflexivity spaces. The absence of structured reflexive devices, intended to debate the real work and the customer experience, reflects on weak ties, which fails to establish cooperation as a vector of the economic model, in order to allow the co-constructions of more integrated solutions. With the focus on structuring the value chain, there is reinforcement of a vertical organization mode, among delivery system producers, managers, and consumers.

With the decrease in the pandemic's effects, the Junta Local structured a space to support logistics, Moinho Fluminense, with services associated with food packaging and transport, as well as to the dissemination of the food project. The territory emerges from the Moinho as a spatialization of the production of an industrial service and a productive location to meet the demand of an associative value chain.

With the return of the fair and with the physical space of the Moinho, there is a return to the territory as a living space: artistic and training events, mobilization of beneficiaries and partners, and promotion of the Moinho. However, such actions are more associated with publicizing the Moinho space and the Junta's project, and less associated with new functionalities integrated into the value proposition.

With the subscription service of the Junta's products, a transversal cooperation began, based on the coproduction of producers and consumers based on long-term relationships (predictability of supply/demand and financial stability). The (uni)functionality focused on the accessibility of foodstuffs began to be expanded into an integrated (multi)functional solution that encompassed food, producer and consumer experience, and knowledge. Territorial issues arise from meetings with and between customers, promoted at Open Moinho events, from the beginning of a return of experience (still using traditional methods of evaluating satisfaction) and from the appropriation of local knowledge by consumers, a reflection of the subscription service.

The physical space has mobilized producers and different engaged partners, who were previously competitors, but it is necessary to further develop these relationships, understanding their real work, their resources (material and immaterial), spaces and productive processes, needs and expectations, as well as networking methods. This understanding could enable better routes and mutualization of resources, potentially reducing costs and promoting the democratization of products for new customer segments. This interactionist approach would help recognize the real work of associates and reinforce resilience in their economic relations, reducing the dependence on scalability [20, 25]. As proposed by the FCE, the territory becomes the space for the materialization of transactions and the recognition of work through service. To expand cooperation in the service relationship, not only do Junta's customers need to become service participants, but other local actors need to as well, which was perceived during the elaboration of integrated solutions through collective engagement itself. The perception of the territory thus emerged not as a geographic space, but rather as an essence of relational proximity for this collective work [19, 25].

For this to happen, it is necessary to have a deeper understanding of the operators' real work and its constraints, as well as the beneficiaries' ways of life and consumption, in order to join all this knowledge as the basis of a new cooperative and territorial governance. Strengthening transversal cooperation between beneficiaries and operators would reflect a better use performance linked to the scope of "food well-living", resulting from an implication of those who are fed by the evolution of food uses: the diversity of products consumed, the ways of preparing food, the knowledge of the nutritional dimensions, the health of those who eat, among others [16].

Table 5
Analytical framework – Junta Local

Junta Local – Context	Cooperation	(Multi)functionality
Initial: Fair as a value creation center	Horizontal – assembly between producers	i) Services associated with improving accessibility conditions ii) Value proposition focused on the sale of foodstuffs
Pandemic: Focus on delivery system	Vertical – between producers and delivery system managers	i) Centralization in the food service ii) Betting on gains of scale
Reduction of pandemic effects: Inauguration of Moinho Fluminense Return from the fair Fruit/veggie subscription box	Moinho: Vertical – between producers and delivery system managers Fair: Horizontal – assembly between producers Fruit/veggie subscription box: Beginning of transversal cooperation – coproduction of products and consumers, based on long-term relationships (predictability and stability)	Moinho: Food packaging and transportation services; and services associated with publicizing the food project Fair: Services associated with improving accessibility conditions and profitability focused on the volume of products sold Fruit/veggie subscription box: Subscribers have access to other services, such as events and product discounts

The institution of collective listening and reflexive devices, anchored in the debate surrounding the real work, could help to develop this new service-based dynamic. Table 5 summarizes the elements analyzed for Junta's case, employing cooperation and multi-functionality as key analytical drivers.

5.2. Analysis 2: Lixo Zero

In the Lixo Zero case, there was first an intention shared by multiple actors to reflect collectively on the waste problem within Santa Tereza's neighborhood, and to find a solution for the issue. A common view began to be formulated into what would become the embryo of a territorialized cooperative ecosystem [16]. Two individual projects were created, yet there was still no horizontal cooperation at the operational level between Coopesol and Roots Ativa. An active involvement [22] of neighborhood actors served to mobilize residents' families to adhere to individual projects, characterizing transversal cooperation, but not at the coproduction level. There was still no multi-functionality, since this was restricted to those single functionalities made possible by each of the individual projects. However, it was possible to perceive some horizontal diversification in the Vida Composta case, since the beneficiaries could access composting services and gardening products in the same space.

In a second moment, the "zero waste events" worked as spaces to experiment with the integration between the two operating groups, based on the shar-

ing of a common task: to recover as much of the waste generated in the events as possible. In these spaces, horizontal cooperation between the groups began to be developed at the operation level through the sharing of their resources and competences in order to deliver the expected use performance. With this integration, it subsequently became possible to eventually produce a multifunctional service, which manages to minimize the events' waste production and treat almost all of the waste generated therein (recyclable and organic). Transversal cooperation [19] also took place, between operators and the grass-roots movements that organized the events, who facilitated the infrastructure and mediated the communication between the operators and the events' actors (fair traders, musicians, participants, etc.), who participated in the co-production of the service.

After these first experiments, a common project was developed, based on the search for an ecosystem solution that could contribute, simultaneously, to solving the difficulties the individual projects were facing, and to structuring the relevance of an integrated service. On the one hand, Coopesol, with its own truck and a sorting shed, and an extensive network that recognized it, was able to increase operational capacity and the adherence of new beneficiaries. On the other hand, the Roots Ativa collective contributed with its experience in the implementation and operation of a place for assisted voluntary delivery of recoverable waste, as well as in the proposition of a more service-based value, associated with

the environmental and social gains of waste treatment and education in domestic separation to the beneficiaries.

The construction of the Zero Waste Nucleus as an intentional place led to the shared intentions of distinct actors: (1) the project operators and the land owner, around the common desire to implement an agroecological garden and (2) the two operating groups who engage in continued cooperation, with the common ambition of producing an integrated solution that takes advantage of their complementary material and immaterial resources. The work debate spaces [56] contributed to the development of horizontal cooperation, making it possible for the most important restrictions on the work of each actor to be made explicit, and, thus, pragmatic agreements and work conventions to be produced from the consideration of these restrictions.

The Zero Waste Nucleus was built to support the multifunctionality made possible by the integration between operation groups. This multifunctionality favors the horizontal diversification of activities and of the project's economic model, which benefits itself from integration effects. For example, the beneficiaries of waste management services, having to go to the space to destine their waste, can also access food services; at the same time, the beneficiaries of food services, by visiting the space to access them, can come to know the waste management service more closely and, eventually, also adhere to it. Furthermore, as an intermediary space between the operating groups, and between them and the beneficiaries, the Zero Waste Nucleus allows for shared daily living, in the development of intangible resources and relationships of trust and conviviality, which enhance the transversal cooperation and the emergence of a relational service [57].

The work debate spaces, the extended governance meetings, and even the Zero Waste Nucleus itself work like dialogic devices of listening and reflexivity [54] within the territorialized cooperative ecosystem, which fulfill at least two functions, as shown by the compostable bags case. First, it allows operators to socialize work restrictions around the integrated solution that is being co-built. The issues of work in the operation are communalized, that is, they are seen as not only for the operators, but for the ecosystem as a whole, whose multiple actors are engaged, to a certain extent, in the search for solutions, based on the recognition of the work. Thus, work appears as a fundamental dimension of sustainable development and a key element in the construction of these solutions

[58]. The second function is to allow beneficiaries to socialize their ways of life and the restrictions they face in order to enable the coproduction of the service. These restrictions may be linked to the conditions of accessibility and synchronicity, as well as to the development of immaterial resources necessary for this coproduction, such as competence.

By fulfilling this dual function, these devices became core elements in improving the performance of the territorial solution, since the continuous socialization of the different actors' restrictions enables, on the one hand, the development of immaterial resources and transversal cooperation [19], and, on the other hand, a continuous adjustment, more adherent to the concrete reality from which this solution emerges, even in adverse situations. For example, contrary to the negative consequences of the loss of direct contact in Junta Local, in the Lixo Zero's compostable bags case, this improvement was able to take place despite the pandemic's demands for spatial isolation, thanks to the existence and effectiveness of reflexivity devices. In short, by sharing the critical determinants of the coproduction work, the service becomes a Common [24] between operators and beneficiaries, who engage mutually not only in its immediate co-production, but also in the development of the broader territorial solution. Table 6 summarizes the elements analyzed for Lixo Zero's case, employing cooperation and multifunctionality as key analytical drivers.

6. Discussion

6.1. Territorial projects and expanded governance

Both cases emerged from territorial projects. In Junta Local, in connection with public authorities and local traders, producers sought to provide access to public streets for fairs and cultural activities. At Lixo Zero, the project emerged to carry out curbside selective collection in a neighborhood, co-built in the relationship between a school and a waste pickers' cooperative, which gradually interacted with other waste operators and actors in the territory, in a wide range of initiatives.

Within the scope of new valuation strategies, the approaches were different. The bet on the digital platform for Junta Local was to expand the means of access of the members' products, based on a hierarchy of work in the management of a logis-

Table 6
Analytical framework – Lixo Zero Santa Tereza

Junta Local – Context	Cooperation	(Multi) functionality
Lixo Zero Santa Tereza Network: Common vision construction, individual operation (2017–2019)	Transversal – engagement of territory actors on mobilization of residents.	i) Curbside selective collection: unifunctional, value proposition limited to the sale of recyclables. ii) Vida composta: unifunctional, although betting on horizontal diversification.
Zero Waste Events: Common task, eventual co-operation (2018–2019)	Horizontal – experimentation of co-operation between the two operating groups based on a common task. Transversal – between operators and the grassroots movements that organize the events.	Eventual production of a multifunctional service (treatment of recyclables and organics, advisory for minimization of the events' waste producing, etc.).
Zero Waste Nucleus and Integrated Solution: Common project, permanent cooperation (2019 – current)	Horizontal – permanent cooperation between the operating groups, supported by reflexivity devices (return of experience - REX). Transversal – coproduction and cooperation between operators and beneficiaries, supported by expanded governance geared toward the recognition of real work.	Multifunctional: service is no longer limited to waste management, but extends to food. Value proposition guided by horizontal diversification of activities and of the project's economic mode. Effects of integration and mutual development as a consequence.

tics chain, investment in material technologies and the favoring of short commercialization circuits, in an economy of scale rationale. In Lixo Zero, the supplementary project emerged from the horizontal cooperation between different services provided in the same neighborhood, promoting functional complementarities, the diversification of food services, and the saving of resources by integrating processes involved in waste management services.

These different actions, betting on an economy of scale or on the integration of territorial issues, as a lever for the process of valuing work, proved to be even clearer in the decision-making process during the COVID-19 pandemic. In both cases, the spatialization of relationships in a health crisis forced the requalification of accessibility conditions. While at Junta Local, the bet on the digital platform was something decided by the company's management, at Lixo Zero, the quality of the return to activities and the modalities of its access were adjusted from the co-construction of service terms with beneficiaries.

These differences also appeared in the access to urban spaces to carry out the projects. Access to the Zero Waste Nucleus' land demonstrates how the cultivation of a territorial project contributed to a better cooperation between the actors involved in the process. A former resident of the neighborhood, by connecting with waste operators and communicating her intention to have an urban garden on her land, presented possibilities to integrate resources and operators. For this, the access negotiation internalized

the owner's command in the project, motivating the investment in a multifunctional solution. This emergence of a cooperative and territorialized ecosystem in turn improved the accessibility conditions for beneficiaries, promoting better terms of co-production of services, together with the construction of common values, which reinforce the territorial dimension of the project.

The Moinho space, by contrast, was structured in another neighborhood of Rio de Janeiro, other than the fair, due to the financial conditions of access to a warehouse that would allow the spatialization of the digital platform's logistical structure. In this sense, it was not built in terms of a shared territorial project, but rather as the materialization in space of an economy of scale which the beneficiaries were invited to co-finance. The access is co-produced between the real estate agency and Junta Local, so that the owner's maintenance costs are reduced, while access is guaranteed at a lower price for the producers. However, the different values – on the side of the real estate agency, to increase land value, and on the side of Junta Local, to promote the sale of healthy foods – have not necessarily been integrated.

Despite its relevance for the value proposition and positive socioeconomic and territorial impact, the case studied in Rio de Janeiro illustrates the limits of the dominant economic model, which worsened during the pandemic, due to the centrality of the productivity levers focused on technological progress and economies of scale. With no devices intended

to provide a return of experience involving producers and users, or to focus on work activities, the strategic decisions were made much more in a management production form of thinking, in spite of being based on expanded governance of the relations among producers, consumers, and territorial actors, as a means through which to improve transversal cooperation.

The engagement of the school, the neighborhood association, consumers of a local fair, and the community in the Lixo Zero experimentation, however, demonstrates how the strengthening of relationships with territorial actors has favored the emergence of an economic model anchored in cooperation and multifunctionality, as a territorial project. Moreover, this project contributed to a model economy that is less dependent on the volume of the material sold (in the case of food services) and of recovered material (in the case of selective collection and waste treatment services).

The possibilities envisioned by FCE's approach are shown by the Lixo Zero initiative, which seeks to develop territorial solutions, integrating organic waste composting, the collection of recyclable materials, as well as food production and distribution. For residents of the neighborhood, beneficiaries of the program, going to the fair and being able to give an environmentally adequate destination to their waste, or vice-versa, reduces the need for displacement. Furthermore, treating waste near a community garden also produces a decrease in the circulation of material, given its local use.

6.2. *Reflexivity and work recognition*

After presenting how expanded governance and the sharing of a territorial project can help cooperation dynamics, it is important to highlight how the development of territorial solutions is enriched when governance gives centrality to work activity. Work itself, as the activity of transformation to provide goods, services, and integrated solutions, is a source of value production. The territory itself, with specific issues and diverse engagements, is where the work is materialized and, depending on the governance relationships, where it can be recognized and developed. The co-construction of the conditions for providing the service thus contributes to a better dynamic of cooperation, based on knowledge sharing of the constraints of work activities and the affirmation of common values in dealing with territorial issues.

The co-decision for the implementation of the compostable bag, in the Lixo Zero project stemmed

from a process in which the many actors of the ecosystem contributed, each from their own realities. The dialogic conversation surrounding the issue allows the decision, which could be purely technical and heteronomous, to be, instead, shared and impregnated with meaning. This construction of meaning takes place parallel to the development of important immaterial resources, which feed the integrated solution itself, such as: competences (beneficiaries come to understand more about composting and its restrictions); trust (mutual sharing of restrictions favors empathy); pertinence (solution adjusts from the multiple restrictions and expectations shared in the co-production practice); and health (improving working and hygiene conditions, health of operators, beneficiaries, and the neighborhood as a resource and a result).

In this sense, the co-decision on the interruption of activities at the beginning of the pandemic, in the Lixo Zero case, as well as the co-construction of the terms for returning the service, reveals how value can be agreed upon by producers and local consumers. When beneficiaries decide to continue to pay, without having access to services, the guarantee of producers' reproduction until operations return has emerged as a common value. The work analysis contributed to the effectiveness of the expanded governance devices and the reclassification of the solution to be co-produced, and led to both access and work better conditions, and consequently, to a higher quality service (in this case, defined as greater security in the provision of environmental services, as well as in the use performance of the buckets).

6.3. *Cases limits and some recommendations*

With the subscription service of the Junta Local's products, a transversal cooperation had begun, materialized by the coproduction of producers and consumers, based on long-term relationships and the development of immaterial resources. This represents an evolution in the cooperation within the ecosystem and can be seen as an embryo of a more extended governance. The use of Moinho Fluminense could follow this same path and be developed in a cooperative sense, through a governance model established in a greater amplitude, including the beneficiaries, associates, and even other territorial actors, through the integration of residents of the surroundings and the aggregation of value to the already existing activities and local dynamics. This new organization of work and management model, with a greater space for

the integration of reflexive devices, would enable the recognition of the real work of the engaged actors, the evaluation of cooperation and engagements, as well as innovations of services based on the construction of and return of experience [16]. The development of these new evaluation systems could make it possible to improve the measurement of the intangible resources of the entire Junta Local, as well as the immediate effects of the externalities produced. The perception of this space of proximity, reflexivity, and cooperation highlight the value of (collective) work as an essential part of the recognition of people as a society [11, 19, 20].

For the Lixo Zero project, two perceived challenges could be mentioned, linked to two difficulties. The first is related to fostering and keeping a “collaborative involvement” [22] of the ecosystem actors. More specifically, the difficulties associated with the need to maintain the cooperation of these different actors, in order to sustain the liveliness and dynamism of the project and their dialogic devices of listening and reflexivity. In other words, the development of an “instituting praxis” [24] related to these devices and to the project itself as a Common, so that the instituting process does not stop at the instituted level. The second concerns the difficulty of attributing and defining responsibilities, and the difficulty to distribute monetary value. This is due to the fact that the different subprojects (waste treatment, agroecological garden, emporium, virtual fair) have positive and negative impacts on each other, which requires a specific evaluation process, and, for that, the organization of evaluation devices [19]. These devices would contribute to the common recognition of these impacts and subsequent collective conventions concerning the value of each project and its advancements.

7. Conclusion

This article discusses expanded governance of territorial issues as the basis for a sustainable way of producing and commercializing, as well as the relevance of work analysis in this governance. This discussion is developed from the FCE approach and from Brazilian experiences of organic food production and community-based urban solid waste management.

This study presents how the co-construction of multifunctional territorial solutions involving cooperation among different actors can be developed by an analysis of the respective activities involved in

the process. The analysis of activity can drive centrality to real work in order to feed the governance devices and enable the development of relationships of trust, which are necessary to live and produce in harmony, as well as the construction of conventions and dynamic cooperation.

This study was limited to only two Brazilian cases, which were developed from the same conceptual approach, but with two different research methods. For future studies, a new return on the cases studied is suggested, using the same methodological approach and the same temporality, in order to evaluate new results from the reflection presented here. Another suggestion may be to analyze the cases focusing on other aspects of the FCE approach. An analysis of other cases of short chains of healthy food and waste treatment, in other territories, would be relevant to produce a broader reflection on the results.

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Conflict of interest

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