Global Sustainability

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Toward a responsible exit from the research field: lessons from transdisciplinary regional envisioning in a Japanese municipality

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Research Article

Cite this article: Takahashi M, Nakagawa Y, Saijo T (2024). Toward a responsible exit from the research field: lessons from transdisciplinary regional envisioning in a Japanese municipality. *Global Sustainability* **7**, e41, 1–12. https://doi.org/10.1017/sus.2024.29

Received: 14 September 2023
Revised: 5 July 2024
Accepted: 5 July 2024

Keywords:
planning and design

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Abstract

In transdisciplinary sustainability, scientists take responsibility for the long-term impact they have on practitioners in the research field and beyond. However, the duration of a career and amounts of funding are finite. One way out is to perform a responsible exit from the field. This study extracts lessons to realizing researchers' responsible exit from their field through detailed description of the experiences of two researchers and a practitioner in collaboration in transdisciplinary research, weaving together the perspectives of all parties. The following lessons were extracted: (1) Imagining the extent of mutual understanding, (2) Production of knowledge entrusted to practitioners, and (3) Researchers' acceptance of being unneeded. This study does not claim that these approaches are universally effective. We suggest that the reader transfer this case study and its approaches to his or her own case to seek better relationships. The validity of this qualitative study's suggestions should be tested by readers.

Non-Technical Summary. In the discipline of transdisciplinary sustainability, researchers must responsibly manage their impact on their partner practitioners. Balancing this with limited career durations and limited research funds is challenging. One potential solution involves responsibly exiting from the research field. This study investigates the experience of two researchers and a practitioner in collaborative transdisciplinary research. The lessons include acknowledging researchers' amateurism, anticipating the challenges in achieving mutual understanding, and embracing researchers' acceptance of feeling unneeded. The universality of these principles should be investigated in the future research. This research encourages readers to apply these principles to their own cases to develop better relationship between researchers and practitioners that leave no seeds of misfortune.

Technical Summary. In transdisciplinary sustainability, scientists take responsibility for the long-term impact they have on practitioners in the research field and broader communities. However, the duration of a career as a scientist and amounts of funding are finite. One way out is to responsibly exit from the field. This study extracts lessons to realizing researchers' responsible exit from their field by providing a detailed account of the collaborative experiences of two researchers and a practitioner engaged in transdisciplinary research, weaving together the perspectives of all parties. The following lessons were extracted: acknowledging researchers' amateurism, anticipating the challenges in achieving mutual understanding, and embracing researchers' acceptance of feeling unneeded. This study does not claim that these principles are universally effective. We suggest that the reader transfer this case study and its approaches to his or her own case to seek better relationships.

Social Media Summary. In transdisciplinary sustainability, researchers must responsibly manage their impact on their research partner practitioners. Balancing this with limited career durations and funds is challenging. Researchers' responsible exit from the research field is a possible solution. This research derives insight from researchers' and a practitioner's experiences in collaborative transdisciplinary research. Lessons include acknowledging researchers' amateurism, anticipating the challenges in achieving mutual understanding, and embracing researchers' acceptance of feeling unneeded. However, these approaches might not be universal. Readers are encouraged to apply these lessons to their own case for better relationship building.

1. Introduction

1.1 Whether TD researchers should exit or not

Transdisciplinary (TD) research stands out as a promising approach for addressing sustainability challenges. It distinguishes itself by the focus on intricate, multifaceted real-world issues, bridging academic divides to foster collaboration among researchers and stakeholders and employing continuously evolving methodologies that reflect on the problem and its contexts (Wickson & Carew, 2014). These characteristics, differing from those of traditional

disciplinary studies, have prompted ongoing exploration in previous research on the optimal conduct of TD research. For instance, Carew and Wickson (2010), among the most referenced works in this domain, proposed a set of guidelines applicable across three stages of the research process: shaping (planning and proposing research), supporting (guiding ongoing research), and evaluating (planning for evaluation, periodically documenting progress, and reporting outcomes). Similarly, Steger et al. (2021) suggested activities to undertake throughout a seven-step TD process, spanning from an introductory and exploratory phase (step 1) to project initiation (step 7). Scholz and Steiner (2015) drew attention to the challenges and barriers inherent in the TD process, emphasizing the need for their identification and management from the initial phase to the postprocessing phase (creating, disseminating, and evaluating outcomes).

There is an important distinction among these studies. While Carew and Wickson (2010) and Scholz and Steiner (2015) indicated the presence of a closure phase in TD research and outlines what should be performed in that phase, Steger et al. (2021) recommended considering the possibility of initiating the next project in the final phase of a single TD study. This difference likely reflects a lack of sufficient consensus among TD researchers on the following question:

> Should TD researchers aim for permanent stakeholder relationships or acknowledge their finite nature?

To the best of the authors' knowledge, this question has not received sufficient attention from TD researchers.

1.2 Difficulty in answering the question

It appears ethical to respond positively to this question. Given that TD research endeavors to address sustainability challenges, the influence of TD researchers on nonacademic communities within the research field may extend far into the future, potentially impacting even generations yet unborn. Bearing in mind the general principle that you should 'take responsibility for how your chosen acts and practices affect the lives of your fellow human beings' (Hilsen, 2006), as well as the ethical requirement for TD researchers to reflect on and to accept accountability for the societal impacts of their research (Daedlow et al., 2016; Wickson & Carew, 2014), it becomes evident that the ethical responsibilities of TD researchers must also be enduring. Thus, it is reasonable that some researchers advocate for the necessity of long-term relationships between researchers and local stakeholders for knowledge coproduction and sustainable social transition (e.g. Polk & Knutsson, 2008; Zscheischler et al., 2014).

However, it is undeniable that positively answer this question presents challenges. The reality is that a researcher's research funding and academic career have finite durations. Given these resource constraints, it may not be feasible to sustain the responsibilities of a TD researcher indefinitely. Thus, once a researcher embarks on TD research, they may face the dilemma of being confronted with an endless series of responsibilities. This dilemma underscores the difficulty in establishing a definitive stance toward the question posed in Section 1.1.

1.3 Pitfalls of engaging with helicopter, parachute, or mosquito science

If one continues to withhold taking a stance on this question due to its difficulty, then researchers may ultimately find themselves in a situation where they have to exit the research field unexpectedly, in a way unforeseen by stakeholders in the field and even by themselves. At such times, researchers become engaged with the so-called helicopter, parachute, or mosquito science.

In biology and medicine, practices (usually by researchers from wealthy nations visiting lower-income countries) that do not benefit field partners are described as helicopter or parachute science. This refers to scientists collecting samples and publishing results with little or no involvement from local scientists, providing no benefit for the local community (Adame, 2021; Gewin, 2023; Nordling, 2015). These partnerships can cause problems for the partners, such as dependency on external expertise, neglect of local research needs, and hindrance of local research endeavors (Stefanoudis et al., 2021).

Additionally, researchers may fail to benefit their research partners and negatively affect them. Such researchers are likened to mosquitos, as an ephemeral, pestering, and disruptive presence, whose impacts take time to heal (Guishard et al., 2018). Wilson et al. (2018) provided a recent and comprehensive review that argues against mosquito science, albeit without explicitly using the term. Wilson et al. (2018) also classified issues as (i) protecting participants (including vulnerable ones), (ii) tensions between outsider researchers and insider partners (caused by conflicting beliefs, expectations, and assumptions between researchers and partners), and (iii) partnership, collaboration, and power (e.g. how partnership and collaboration are established and how power differences between researchers and partners can induce adverse effects), among others.

1.4 Responsible exit as a promising strategy to overcome the dilemma

One approach for researchers to navigate this dilemma is to brace themselves for conducting TD research, acknowledging the finite nature of the researcher–stakeholder relationship, and withdrawing responsibly from their research fields in a manner that will not put their partners in a negative position.

Several studies have discussed responsible withdrawal of researchers in conjunction with the empowerment of partners. Magnus and Rai (2023) argued that the researched people (who might also be referred to as partner practitioners) should be empowered to decide early in the research process how they would like the researcher to transition out of the field. Furthermore, Sanchez and Vivier (2019) indicated that transformation is a long-term endeavor that cannot be owned by researchers or by them alone, and they suggested identifying a clear exit plan from the start to allow skills and knowledge to be transferred.

These studies present a scenario where researchers contribute to the empowerment of their partners through increasing their capacity and contextual power (Coy et al., 2021) and conduct a responsible exit by this means. However, few studies have specifically identified the process through which empowerment is achieved. Brandt et al. (2013), in one of the most representative reviews of TD research in sustainability science, concluded 10 years ago that, with few exceptions, empowerment was rarely realized in case studies and that few projects gave practitioners authority to make decisions. In the subsequent decade, there was a significant increase in research papers reporting TD case studies; however, as Coy et al. (2021) cautioned, many of such reports were described by researchers on the empowering side, not the being empowered one. Where studies have described

https://doi.org/10.1017/sus.2024.29 Published online by Cambridge University Press

what empowerment looked like for the researcher, they could not show what it was like from the partner's perspective. This limitation is serious, as the partner, not the researcher, determines whether the exit was responsible.

1.5 Research objective

Based on the above background, the present study sets two objectives to elaborate the responsible exit strategy of TD researchers. First, the authors of this paper, two researchers and a practitioner, describe the TD experience of engaging in long-term visioning for community development through collaboration, weaving together both perspectives. During the collaboration process, the two researchers were committed to the interrelated principles of what we call 'the principle of staying in the shadows' and 'the principle of fading away' (Section 2.1) to complete the responsible exit. The description focused on how the researchers attempted to adhere to these principles and how it was appreciated (or not appreciated) by the practitioner.

Second, on the basis of this description, we derived answers to the following research questions (RQs):

RQ1: Did the two principles lead to successful responsible exits by researchers in the described case?
RQ2: What lessons can be drawn for future research to enhance the likelihood of successful responsible exits through the two principles?

2. Research methods

2.1 Theoretical framework adopted in the TD process

According to Saijo (2015, 2020), Future Design (FD) seeks to foster sustainable societal transitions by cultivating people's sympathy toward future generations. One promising measure for this is to introduce 'the imaginary future generation' (Saijo, 2017, 2019). In this framework, individuals play the role of members of an imaginary future generation and engage in design strategies that can be adopted by the present generation. Moreover, FD aims to incorporate the perspectives of future generations into the development of social systems. These systems are designed to address the limitations of the market and democratic institutions, which can sometimes lead the current generation to deplete the resources available to future generations. One of the systems is a participatory envisioning methodology incorporating the framework of imaginary future generations.

For implementing FD in real settings (e.g. governments, private companies, and nonprofit organizations), Saijo (2020) proposed several principles, including 'staying in the shadows' and 'fading away.' (Note that he did not express the content of the former using exactly the same words.) For the former, he called for actors in the real settings (i.e. policy makers, citizens, and company employees) to be the major players in making decisions regarding how FD is implemented in their contexts and in implementing it in attaining their own goals. Thus, academic researchers with the expertise of FD remain in the shadows and act as supporters of such partner actors. Specifically, it insists that researchers should resist direct intervention with partners and their communities, playing the modest role of offering an FD framework in response to partner requests. The partners are tasked with deciding whether to accept it and, if they do, determining which output to pursue. This principle recognizes that it is improper for the researcher to intervene in the partner's decision-making, insofar as researchers cannot easily take responsibility for the long-term effects of their intervention.

The 'fading away' principle assumes that when a researcher assists a field partner, the researcher will eventually withdraw from the field, leaving the partner able to utilize the knowledge provided by the researcher. This principle is consistent with 'staying in the shadows,' as the commitment to remain in the shadows gives the partner the confidence to continue the same activities as during the collaboration, even if the researcher has left. The expression 'fading away' implies that the researcher gradually reduces the degree of commitment to the practitioner and then eventually exits.

The 'fading away' principle is counterintuitive for TD scientists who may believe that long-term relationships between scientists and local actors are preferable. Nevertheless, Saijo (in prep.) advocated 'fading away' because he considered it the only correct solution to the avoidance of the significant imbalance where the demand for researchers far exceeds the supply. This belief appears convincing when one considers whether it would be feasible to resolve the millions of problems faced by communities or organizations around the world with the small number of TD researchers by allocating one researcher to each problem.

Thus, with these two principles in mind, we (a local government official, the first author, and two researchers – the second and third authors) collaborated.

2.2 Conceptual framework adopted in the case description

This study employed the 'Rashomon-like technique', conceptualized by Lewis (1961) and inspired by Akira Kurosawa's film *Rashomon* (released in 1950). This technique involves delving into the perspectives of each member of a family through their extensive autobiographies to comprehend the culture of poverty. By simultaneously presenting these autobiographies to readers, he effectively depicted the multifaceted nature of the events within the family.

The present study's intention to adopt the Rahomon-like technique is as follows. While we acknowledge the value of fact-checking based on the recollections of the three authors during the collaboration process (e.g. temporal order of key events and the contents of the conversation exchanged among the three individuals), the paramount focus lies in elucidating how the practitioner and researchers perceived the same event from different perspectives and underscoring the inherent subjectivity of these individuals. This clarification is crucial for multifacetedly examining whether the two principles upon which the present study relies were successfully operationalized and for drawing lessons.

The present study adopted this technique after some modifications in two different manners. First, a single story was presented, and each key event embedded within that story was described from the perspectives of the practitioner and the researcher. This is in contrast to Lewis (1961), where independent stories are presented for each family member, revealing how common key events are experienced differently by distinct members. This change was made to shorten the description. Second, while Lewis (1961) juxtaposed the first-person narratives of the family members, the preset research concisely presented them from the third-person's perspective, considering the word limit for a journal article. This modification was adopted by Mutsaers and Meijeren (2023), among others.

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A difference exists between Mutsaers and Meijeren (2023) and the present study. In the former, the subject of the case description and the case describer were distinct entities. However, in the latter, Nakagawa, who was one of the subjects of the case description, also assumed the role of the case describer as a qualitative researcher. There are significant benefits to taking such a unique approach. In fact, when one of the parties involved takes on the role of collecting the narratives of the others and describing the case study, it becomes possible for the describer to sensitively detect unexpected points within those narratives and elicit more detailed accounts about them. Identifying such unexpected narratives can lead to pinpointing moments where discrepancies in understanding occur between researchers and practitioners, providing practical implications for those looking to conduct transdisciplinary studies in the future. On the other hand, this unique approach has at least two limitations. First, while the describer intends to describe the collaborative process of the other parties from an independent view, it is unavoidable that the describer may prioritize his own perspective over those of the rest. Second, when one of the parties serves as an interviewer, the remaining parties may hesitate to mention certain matters out of consideration for the interviewer.

2.3 Data collection

Yahaba Town adopted the FD methodology in the development of its Seventh Late-Stage Comprehensive Plan in 2019. Takahashi and other officers in the Planning and Finance Division of the town were in charge of the development of this plan. External experts of the FD methodology, including Nakagawa and Saijo, among others, collaborate with Takahashi in this process. The present study describes this TD process through the lens of these three authors.

The data to be utilized for describing the case were obtained via (i) interview surveys and (ii) Takahashi's lecture talks. Regarding (i), Nakagawa, the writer of the case, organized group interviews with Takahashi and Saijo on 7th Oct 2022, 4th Nov 2022, 8th Dec 2022, 22nd Aug, and 29th Aug. In these interviews, Nakagawa encouraged Takahashi and Saijo to reflect on the key events during the TD collaboration and to mention about the perspective from which each of them experienced such events. Nakagawa simultaneously fulfilled the role of an interviewer, listening to the stories of two individuals, and the role of a participant in the collaborative process, referring to his own perspective during the collaboration process. Regarding (ii), Takahashi had two opportunities to deliver talks about this collaborative experience in workshops that were held online and organized by Saijo (13th Apr, 2022 and 10th Sep 2023).

All the voices in the interviews and the lectures were recorded and transcribed in Japanese, and the transcription amounted to 136 pages.

3. Description of the comprehensive planning process

3.1 Preliminary history of the comprehensive plan

Yahaba Town adopted the FD methodology in the development of its Seventh Late-Stage Comprehensive Plan in 2019, which was not the first occasion where Yahaba Town utilized FD. In 2015, a citizens' workshop was held to develop the Yahaba Town Comprehensive Strategy for Town, People, and Work Creation using the FD methodology (Hara et al., 2019). Furthermore, in 2017, a citizens' workshop was held to revise the Comprehensive Management Plan for Public Facilities, etc., and the same method was adopted there as well (Hara et al., 2021). Moreover, in 2018, FD methods were utilized at a workshop whose participants included bureaucrats from the central government, Yahaba Town officials, and residents (Hiromitsu et al., 2021). During the workshops conduct, Takahashi (the first author), serving as the section chief of the Planning and Finance Division, assisted in their organization. It was during these workshops that he initially witnessed the potential of the FD methodology.

Many external researchers participated in these workshops, among whom was Saijo (the third author), an advocate of the FD methodology. Saijo related an unforgettable moment at the 2017 workshop. During a break in the workshop, a female staff member whispered to him, 'You guys come here to take data from our town and use it for your paper, right?' and walked away (Saijo, in prep.). As a researcher, it felt very embarrassing to hear this comment from a local official. Conversely, the point made sense to Saijo, who has been working with Yahaba Town since 2015, as he and his colleagues (not municipal officers) took the lead in the preparatory meetings for the workshop and as they (even if unintentionally) made their presence known during workshops by patrolling from group to group to see how citizen discussions were going. When Saijo met that official in 2017, she posed several important questions to him: 'Am I just imposing my own ideas on the people and staff of Yahaba Town?' and 'How should a researcher behave in preparatory meetings for workshop designs and in the workshop practice?' It took approximately two years for Saijo to provide clear answers to them to the town office, as he was unable to respond immediately to her question.

3.2 Concerns that the town hall had

As soon as Takahashi began working at the Planning and Finance Division in 2015, he knew he would oversee creating the Comprehensive Plan in 2019. As 2019 approached, he noticed a growing momentum within the town office, spearheaded by the mayor, toward integrating FD into the plan formulation process. He began to consider whether FD should be used and what results could be expected if it was used. Subsequently, in summer 2018, he decided that preparations should proceed on the basis of the assumption that FD would be employed to create a comprehensive plan.

Nonetheless, Takahashi had concerns regarding the legitimacy of using FD. He believed that as long as the mayor maintained genuine intentions, there should be no issue with implementing FDs within the local government. However, this does not guarantee approval from the citizenry or the representative council. If even a small number of citizens who do not represent the town as a whole become imaginary future persons and develop a vision for the future far beyond the period of the Comprehensive Plan, it would be difficult to hold them accountable to the plan. Takahashi was 'terrified' that the council might reject the Comprehensive Plan, which was the town's top-level plan. Neither Saijo nor Nakagawa (the second author) could envision such a scenario at the time.

Takahashi had another concern related to this: to develop a comprehensive plan using FD, the support of external researchers was essential, as it had been in 2015 and 2017 because he was not expert in FD himself. However, he also considered that the researchers should have the verification of the method's

https://doi.org/10.1017/sus.2024.29 Published online by Cambridge University Press

effectiveness as their main goal, with the acquisition of the results of the social implementation of the method. They would expect the citizens, who serve as imaginary future persons, to form a creative vision and reflect it in the plan. Takahashi believed that the more the town hall tried to meet the researchers' expectations, focusing primarily on generating scientific findings, the more challenging it would be to maintain accountability to the citizens and the town council.

At the time, Takahashi had additional concerns regarding objectivity, rationality, and certainty. These included uncertainties about defining a goal 40 years into the future and potential variations in the vision of the future if workshop participants and their groupings changed. Furthermore, there were questions about where the responsibility would lie if the envisioned future could not be realized.

For Takahashi, there was only one way to address the above concerns. The town would avoid the time-consuming step of having external researchers with no administrative experience learn the entire process of developing a comprehensive plan. With the help of external experts, the town would conduct workshops, but it would be responsible for deciding how the outputs would be reflected in the comprehensive plan. This was the answer that Takahashi arrived at. However, Saijo and Nakagawa had no way of knowing that Takahashi had made this decision.

3.3 Start of activities of the TD team

In January 2019, discussions about how to use FD in developing comprehensive plans began to be held regularly online among Takahashi, other Yahaba Town officials, and external researchers. In April 2019, personnel changes in Yahaba Town identified the administrative personnel who, with Takahashi, would be responsible for the development of the Comprehensive Plan. The composition of the formulation team was almost finalized. The team comprised nine members of the town officials, including Takahashi and his supervisor (Mr. Ritsushi Yoshioka), and nine external experts, including Saijo and Nakagawa. Discussions on the design of the workshop were conducted via online meetings and e-mail. The degree of the involvement of external experts in the plan's development varied widely.

On April 3, 2019, a single e-mail was quickly sent by Takahashi to the team, providing a rough draft of the schedule for all six citizen workshops and a list of desired outputs for each session. The workshops were to take place from June 1, 2019 (first session) to August 17, 2019 (sixth session). E-mail exchanges and online meetings then proceeded, with the external experts commenting on the draft. Takahashi's action to provide the external researchers with the draft on April 3 was due to his determination that the administration, not the researchers, must take the initiative in the project. Until then, however, the irregular online meetings were always initiated by the researchers, and the town office never initiated.

On April 17, 2019, the team met for the first time in the conference room of Yahaba Town Hall (this meeting was also called by Saijo, not Takahashi, via e-mail on April 9). At the beginning of this kickoff meeting, which was moderated by an external researcher, Saijo shared a thought with the meeting participants that had been brewing for two years. He asked the town hall staff and external researchers to follow the principle that the local staff take the lead in the design and operation of the citizen participation workshops and that the external researchers, including himself, remain in the background. Nakagawa, who was present at this meeting, sensed significant tension in the team because this point prompted doubts about the way this meeting, now underway, was being managed.

Takahashi's supervisor, Yoshioka, responded to Saijo's statement. In front of everyone, he instructed Takahashi to take control of the team. Takahashi was ill on the day of the meeting and participated online with the camera off. Hence, the other members could not see his expression, but Saijo remembered hearing surprise and confusion in Takahashi's voice. Takahashi then moderated the meeting, and the kickoff meeting was successfully concluded. This set the tone for the relationship between the town hall staff and the external researchers from then on.

The immediate priority for the planning team was to determine how to prepare by June 1, when the first workshop was to be held. Before this, nevertheless, a major hurdle arose that the team had to overcome.

3.4 Highest hurdle

As of 2019, the Town of Yahaba had a Comprehensive Development Committee (hereafter called the Committee), which would be responsible for advising and reporting to the mayor on the Comprehensive Plan's development. The committee had 60 members, including 30 from various organizations, 20 from the general public, and 10 knowledgeable individuals. Beginning in 1976, when the ordinance establishing the Committee was enacted, Yahaba Town has positioned it as an official forum for gathering citizens' opinions for preparing the Comprehensive Plan. Takahashi, his supervisor, and Saijo knew that obtaining the approval of the Committee to formulate the Comprehensive Plan using FD was the largest hurdle to fulfilling their accountability to the town residents and the council for their understanding. The first meeting of the Committee was set for May 16, where the 60 Committee members were asked to endorse the FD. Aside from design considerations for the first citizens' workshop on June 1, the main focus of discussion in the formulation team was how to get through the May 16 meeting.

Under these circumstances, it was only natural for Takahashi to seek help from Saijo, a proponent of FD. Takahashi was concerned that he did not have a firm understanding of FD. He hoped that having a university expert explain FD to the committee, rather than a local government official, would foster trust in the method.

Surprisingly, however, Saijo did not accept Takahashi's request. He told Takahashi that he wanted Takahashi to proceed with the Committee alone. In the end, the two agreed that Saijo would film a 10-minute video of himself talking and provide it to Takahashi, and Takahashi would use this video on the day of the meeting to explain FD to the committee members. The video only included his voice and Microsoft PowerPoint slides, and his face was not shown. Nakagawa provided another 10-minute video to introduce the concept of the imaginary future people in a picture-story show. For the brief session to follow the screening of these videos, where the Committee members would experience imaginary future persons, Takahashi continued to ask external experts, via e-mail and online meetings, for advice on the plan for the progression of the brief session, on the basis of which Takahashi revised the plans. Although the citizens' workshop had not yet begun, Takahashi was already extremely busy. As if to confirm this, on May 12, Saijo sent an electronic message to Takahashi, expressing concerns for his health during the all-nighters he was pulling.

https://doi.org/10.1017/sus.2024.29 Published online by Cambridge University Press

The day of the Committee meeting finally arrived on May 16. Takahashi watched the faces of the Committee members during the screening of Saijo's lecture video and felt that they were interested. Subsequently, during Nakagawa's video, he felt that they began to understand the FD methodology. He now felt that, perhaps, they could move ahead with the development of a comprehensive plan using FD, and he felt his anxiety begin to disappear.

Nonetheless, the largest hurdle was the brief session, in which the 60 participants were divided into groups of nearly six, who imagined themselves as future persons. One group of relatively elderly members could not grasp the concept of the imaginary future persons, and they began to ask, 'Can we have such discussions?' Their dissatisfaction did not subside even after the meeting ended. They complained to Takahashi, who had been the moderator of the meeting. These members and Takahashi began an exchange. Saijo was watching from a distance, hoping that Takahashi would be able to move through this difficult situation on his own. According to Saijo's recollection, at the beginning of the exchange, the Committee members were outspoken in their frustration and anger. However, as the exchange progressed, one of them said the following, recalling the time soon after World War II:

> Come to think of it, a single huge road was once constructed, tens of meters wide, through a burned-out area of Tokyo. Whoever thought of that must have been doing FD. I see what you mean.

The disgruntled members were eventually satisfied and headed home, and Takahashi overcame this obstacle. Takahashi's supervisor Yoshioka, who had been watching during the Committee meeting, was beyond relieved, and was even excited, after the meeting. Some of the 60 Committee members even expressed their willingness to participate as citizens in the citizens' workshop that would begin on June 1.

3.5 Implementation of citizen workshops

Thus, having overcome this obstacle, the team proceeded to hold six citizens' workshops, beginning June 1 and lasting approximately two months. Eleven Committee members were among them, along with members of the general public. Saijo strongly urged Takahashi to invite the Committee to participate in the workshop, despite Takahashi's reluctance. Takahashi was reluctant because he felt that the Committee, composed mainly of representatives of groups in the town, was a voice for the interests their own groups in the present and, hence, would not feel comfortable in FD discussions. He feared that the FD workshop would not go well if these Committee members were involved. Conversely, Saijo believed that the Committee members' participation was essential if the results of the workshop were to be accepted by the Committee. Takahashi's fears were unfounded, as will be discussed later.

These six workshops had to be held on a busy schedule because of the constraints of starting after the May 16 meeting of the Committee and writing the comprehensive plan by the end of the fiscal year. This schedule was considerably demanding for Takahashi and others in the town office, as the workshops were held one after the other, with only one to three weeks between them. The cycle of preparing a rough draft for one workshop ⇒ discuss with external experts in an online meeting ⇒ revise the rough draft ⇒ conduct the workshop ⇒ prepare a rough draft for the next workshop based on the results ⇒… was repeated every one to three weeks. However, Takahashi's difficulties were not limited to the schedule. After the end of each workshop, it was extremely difficult and even painful to calculate how to design a workshop that would encourage participants to engage in discussions that would contribute most to the development of a comprehensive plan. As the sessions went on, however, Takahashi gradually freed himself from this pressure. He decided not to create complete plans but rather opted to do what was possible and then seek candid opinions from external experts for possible improvement.

Neither Saijo nor Nakagawa had even imagined that Takahashi was finding the process painful. They thought that the policy of staying in the shadows had been properly enforced and that the town officers were proceeding with the management of the workshop, as they had expected. Two factors could be cited as reasons why Takahashi could proceed with his work in spite of these circumstances. The first was Saijo's encouragement. Takahashi recalled Saijo once saying to the staff, 'Let's change the future and the world from Yahaba Town,' to make them understand the value of what Yahaba Town was doing. Takahashi and the rest of the staff were thrilled by his words and felt compelled to do their best.

Second, during each online meeting with external researchers, Takahashi received academic opinions from a completely different standpoint from that of the town. This spurred him to make this attempt to formulate a comprehensive plan using FD, aiming to ensure its utility for the town while also recognizing its potential value as a societal contribution. He believed that the time and effort required to reconcile the opinions of external experts with the administration was not wasted but something he had to accept.

Due in part to Takahashi's hard work, the participants attended all six workshops with a great sense of significance. Saijo has vivid memories backing this up. He was the only external researcher to observe the second Committee meeting (July 31, 2021), held after the completion of five of the six sessions. One Committee member, who also attended the workshop as a citizen, made the following statement at the committee meeting. (This is a reconstructed statement based on Saijo's memory.)

> How can a comprehensive plan be produced in this 120-minute meeting, where each Committee member only has two minutes to speak on average? In the FD workshops, people are seriously thinking about the vision of Yahaba in the future as imaginary future people. Why don't you all visit the FD workshops?

Saijo interpreted this to mean that it is impossible to be creative in a formal committee meeting with 60 people, unlike in a workshop where a group of four or five people work together as imaginary future persons, cooperating with one another to create a vision for the future. Saijo felt that this statement created an atmosphere in the Committee in which the opinions of the citizens' workshop could not be denied.

As the six workshops got underway, Takahashi and the other town officers began to find them more rewarding and enjoyable. On one occasion, when Saijo joked with a staff member, 'With the ongoing reform of work styles, you shouldn't work on weekends,' the staff member replied 'No, I don't feel like I am working, I am doing it because I enjoy it, so please let me do as I please.' Saijo was surprised and pleased by this response.

3.6 Position of external experts in the citizen workshops

The stance of the external researchers varied in terms of their participation in all six citizen workshops held in the conference room

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of the Yahaba Town Hall. Some researchers, including Saijo, went to Yahaba Town to observe each workshop. Their observations formed an important basis for designing the plan for the next sessions. However, Saijo took great care to ensure that the citizens were as little aware of their observation as possible. In fact, he asked that the workshop organizer not mention the names and titles of the external researchers.

Nakagawa did not participate in any of the six workshops, although he actively contributed to their preparation. This was because Nakagawa and Saijo were affiliated with Kochi University of Technology. Thus, Nakagawa could hear details of the workshop from Saijo on the day of the workshop, and Nakagawa could make his contributions to the following workshop from this information. Nakagawa also refrained from going to the workshop site to divide his time and effort among all of his other duties.

Nakagawa understood that not visiting the workshops left him open to criticism. However, Saijo saw Nakagawa's stance differently. For Saijo, it was ideal for external researchers to stay in the background at the workshop site and not to visit the site to begin with, and Nakagawa was practicing this ideal. In fact, beginning in 2022, Saijo and Nakagawa have provided support to the Kijo Town Office in Miyazaki Prefecture without going to the site.

Takahashi recognized that external researchers' site visits are valuable for what they share from their perspective, which the town officers are not aware of. Moreover, those who, like Nakagawa, do not come to the site can just as well point out flaws and ways to improve proposed workshop management from a more general point of view.

3.7 How to make use of the results of the citizens' workshop

The outcome goals showed little leeway up through the fifth of the six citizen workshops. The first two sessions were devoted to preparatory workshops to review the history of Yahaba Town. From this, in the third through fifth sessions, the FD method was utilized, with each group imagining the future of Yahaba Town in 2060 as an imaginary future person and discussing recommendations for the current generation in 2019 from that perspective. For the sixth session, contrarily, there was considerable leeway to define what the outcome goals were. This is because the outcome of the sixth meeting determined how the results of each group up to the fifth meeting were reflected in the comprehensive plan and because the answer to this question was unclear to anyone. After July/August 2019, when the design of the sixth workshop was being discussed, the differences in thinking between Takahashi and the external researchers (in particular, Nakagawa) were recognized.

Nakagawa's main concern in July and August was to clarify the vision of the future of Yahaba created by the participants. Nakagawa was supporting workshops in several local governments in addition to Yahaba Town and recognized the difficulty of composing a vision narrative representing what a group of individuals has discussed. Therefore, Nakagawa sought to establish a methodology to create what Wiek and Iwaniec (2014) called a 'holistic' vision narrative, identifying semantic linkages among the many statements found in the audio transcriptions of the discussions. (The results were published in January 2020 as Nakagawa, 2020.) That said, even if each group's vision of the future was successfully composed, only the coexistence of six different visions would be realized, and Nakagawa did not have any proposal on how to link these workshop outputs to the comprehensive plan.

Takahashi was aware of a completely different problem. The vision of the future formed by each group (or an integrated vision produced in some way), which had, by ordinance, no explicit role in the process of formulating the comprehensive plan unlike the Committee, could not be directly reflected in the comprehensive town plan. Within this institutional constraint, Takahashi's largest question was how to link the citizen workshops' outputs to the comprehensive plan.

Takahashi and his colleagues developed a method that he himself would later call the Yahaba method. During the fifth workshop, each of the six groups developed a set of recommendations for the current generation to realize their vision of the future. In all, 110 recommendations were produced. In the sixth workshop, each group was allocated 20 votes and used them to cast their preferences among the 110 recommendations. These recommendations were assessed on the basis of their potential contribution to the realization of each group's vision for the future. Consequently, each option was assigned a rank on a six-level scale, determined by the number of votes it received. The Committee and its secretariat removed 55 recommendations that were considered less feasible or too specific in addressing certain issues. The remaining 55 recommendations, along with their respective six-level rankings, were included in the corresponding chapter of the Comprehensive Plan.

The six future visions were formed by the arbitrarily selected townspeople who happened to participate in the workshop, and the persuasive power of the future visions they produced was lacking. However, a proposal that contributes to a larger number of such diverse future visions can be highly persuasive because it is more versatile. Takahashi was proud of the cleverness of this method, in that each future image was not used as an object of selection but as the criteria to evaluate the recommendations directed to the current generation. After the fourth workshop, Takahashi spent a considerable amount of time coming up with this idea, taking advice from the external researchers in seven online meetings. He finalized it just before the sixth workshop.

The difficult question of how to connect the output of the FD workshop to the comprehensive plan was finally addressed. Accordingly, Takahashi and other town hall staff continued to work on the comprehensive plan. The resulting plan was successfully approved by the council in February 2020, and its formulation was completed in March. This marked the first time in the world that a local government's top-level plan was formulated using FD.

Although Nakagawa gave his support for the Yahaba method in the online meeting to review the contents of the sixth discussion, he remembered being not entirely free of doubt. Nakagawa thought that the summaries of each group's discussions prepared by the town office after the third through the fifth workshops, while compact and itemized, did not always show a semantic link between bullet points. He feared that participants could have voted without fully understanding their vision of the future. Nakagawa continued with this concern even after the sixth workshop was complete and Nakagawa and Saijo had left the comprehensive planning. Using the methodology presented in Nakagawa (2020), he analyzed the audio transcription of the six groups and created a description of the future vision for each group and a corresponding illustration. This was submitted to Takahashi in March 2020, and the town kindly included it as a reference in the 58-page comprehensive plan. In a journal article, Takahashi (2021) described the results as follows:

> With the kind cooperation of Kochi University of Technology (Nakagawa and Saijo's former affiliation) after the workshop, we had the audio data

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thoroughly analyzed. The groups' visions of the future were compiled, along with heartwarming hand-drawn illustrations. Upon review, we could recognize that distinct ideological axes, not explicitly recognized during the group discussions, had been incorporated into the visions of the future for each group. This helped us reaffirm the creativity and effectiveness for community development achieved by using FD.

Nonetheless, Nakagawa was left feeling that he had not fully executed what he had hoped to contribute to Yahaba Town. During the writing of this paper in 2023, Nakagawa clearly realized that this was due to the incompatibility between his technological seeds (i.e. the technique of grasping the whole picture of what kind of discussion took place and what kind of future has been imagined by the group) and the needs of Yahaba Town.

3.8 Movements after the comprehensive plan was formulated

The Comprehensive Plan was passed by the council, and the implementation period began in April 2020. Since then, Takahashi felt that the number of town projects based on the comprehensive plan formulated using FD has indeed increased. One characteristic of those who envision the future as imaginary future persons is the emphasis on the preservation of the natural environment and rural landscapes. This is a concept that would not normally occur to those living in the town, as the abundance of nature is taken for granted. The recommendations reflected in the Comprehensive Plan were selected as the basis for developing an increasing number of projects leading to the protection of nature and the expansion of opportunities to become familiar with nature, such as tree planting activities by youth baseball teams and maintenance of mountain trails in the western area.

Another characteristic is that the imaginary future people will cherish the cultural heritage of the town. Mt. Nansho in Yahaba Town is known to townspeople as the model for the railroad depot in 'Night on the Galactic Railroad' by Kenji Miyazawa, a well-known children's author. A hot spring resort on this mountain that does not receive many visitors is planned for revitalization in combination with surrounding areas; this project was initiated in April 2020. Takahashi considers this project to also have been a result of the use of FD.

Reviewing the series of events, Takahashi felt that he has undergone a significant change. Beforehand, he had a sense of being a part of the flow of work, doing what he was told by his bosses. However, as he became involved in FD and gained experience in it while needing to make the work his own, he came to believe that he needed to take the initiative. He considered this series of events to have been a major turning point in his professional life as a public servant, without overstating its importance.

Takahashi felt that the development of the FD-based comprehensive plan has also led to changes in the town office staff who were not part of its development. As they develop new projects, they refer to the 58-page Comprehensive Plan. In it, the 69 recommendations of the imaginary future people are listed together with the 'FD' mark. Through the appearance of this mark, in the eyes of the staff, they are working together with the imaginary future people in shaping the town's policies.

In November 2022, work began within the Yahaba Town Hall on the Eighth Comprehensive Plan. This plan is scheduled to be completed by March 2024, with implementation slated to commence in April of the same year. Takahashi informed Saijo, Nakagawa, and others before the start of the planning that FD would again be utilized. However, no external researchers would be on the formulation team. While Takahashi himself was eager to have external researchers participate again, the prevailing sentiment at the town hall was that they could formulate the FD methodology independently. Thus, the 'fading away' principle was successfully adhered to. Saijo and Nakagawa knew, through informal conversations with Takahashi, that Yahaba Town had made the decision to develop a comprehensive plan without relying on external experts. However, it was only during the process of writing this paper that they learned about the discussions that took place behind this decision. At the time, Nakagawa speculated that Takahashi might have been hesitant to thoroughly inform the researchers of Yahaba Town's decision not to use external researchers.

Behind the successful fading away principle was a major inconsistency in perception between the researchers and the practitioners. Takahashi had understood that the researchers were adhering to the 'staying in the shadows' principle. However, Takahashi did not understand that this was not for the ultimate purpose of 'fading away', but because, as scientists, they needed to maintain objectivity by refraining from intervening with the research 'subjects' (in this case, municipal officers including Takahashi himself, local citizens, etc.). It was while he wrote this paper that Takahashi recognized his misunderstanding, and Saijo and Nakagawa also realized that Takahashi had misunderstood their intentions. Takahashi is now even more deeply grateful to the researchers than he was during the collaboration. Saijo and Nakagawa recognized the difficulty researchers had in communicating and collaborating with practitioners.

Institutionally, there have been two significant changes in Yahaba Town after the conclusion of this TD process. First, the Mayor of Yahaba Town submitted a proposal to the council to repeal the ordinance that had established the committee, as it had become increasingly difficult to develop plans relevant to the times using the traditional approach. The idea of repealing the ordinance was proposed by Takahashi, along with his supervisor, Yoshioka, and the mayor supported it. The draft ordinance was passed by the council in December 2022. Second, within the town hall, a future strategy division was newly established. Up until then, the Planning and Finance Division had been responsible for tasks related to FD, but the new section took over those responsibilities. Creating a section with the word 'future' in its name was undoubtedly a courageous decision for the mayor. Takahashi believed that the mayor was able to make that decision because there was a track record of the forward-thinking comprehensive plan being embraced by the townspeople.

4. Discussion

Now we are ready to derive answers to the two questions mentioned earlier in this paper.

4.1 Research question RQ1

Did the two principles lead to successful responsible exits by researchers in the described case? To provide a positive answer to this question, it seems necessary and sufficient that two sub-questions must be positively answered: (RQ1a) did the researchers' attempt to adhere to the two principles lead to the empowerment of practitioners and did the impact of empowerment lasted even after the researchers' exits. Additionally, (RQ1b) was the researchers' withdrawal in accordance with the

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intention of the empowered practitioner. We will positively answer these sub-questions below.

Regarding RQ1a, the description of the case shows that Takahashi had been empowered from the beginning, rather than being empowered by the researchers. According to the description in Section 3.2, prior to the initiation of the creation process, he knew that he would oversee the creation of the Comprehensive Plan. Furthermore, he was contemplating how to effectively utilize external experts, understanding their areas of expertise and what expertise they lacked. This is evidence of his eagerness to lead the experts, rather than being led by them. However, this does not mean that he had no reservations about external experts. It was Saijo's attempt to adhere to the two principles that helped alleviate those reservations. He argued that Takahashi should lead the meetings of the TD team (see Section 3.3) and that Takahashi himself should provide explanations to the Committee members (see Section 3.4). Empowered by such consistent attitude of Saijo, Takahashi finally devised his original method to ensure procedural validity when incorporating the outcomes of workshops attended by residents who do not necessarily represent the entire population into the town's top-level plan, which was unexpected for Saijo and Nakagawa. Throughout such experiences, Takahashi came to believe that he needed to take the initiative in his work in general and considered them as a major turning point in his professional life as a public servant (see Section 3.8). This proves that the TD collaboration served as an opportunity for Takahashi's empowerment, and the impact lasted even after the researchers' exit.

However, as stated in Section 3.8, Takahashi had a significant misunderstanding of why Saijo and Nakagawa were adhering to these principles. Nevertheless, in this particular case, their adherence did not result in the breakdown of trust between practitioners and researchers; rather, it led to the empowerment of practitioners. This can only be described as fortunate in an unfortunate situation.

Concerning RQ1b, as shown in Section 3.8, in the creation of the town's next (i.e. eighth) comprehensive plan, they decided not to utilize external experts because the dominant atmosphere at the town hall was that they could formulate the FD methodology independently. This proves that the withdrawal of researchers was a decision made by the empowered practitioners, not something imposed by researchers against the practitioners' intentions.

4.2 Research question RQ2

What lessons can be drawn to enhance the likelihood of successful responsible exits through the two principles? In association with RQ1a and RQ1b, we can elucidate three different lessons.

Lesson 1: Being aware that researchers are amateurs in a sense

This lesson, valuable for practitioners to remember, was derived from the response to RQ1a. It is a fact that Takahashi respected Saijo and Nakagawa as experts in the FD methodology. However, as researchers affiliated with the university, they lacked the experience and knowledge in formulating comprehensive plans in local municipalities. Takahashi's accurate recognition of this fact enabled him to establish a cooperative relationship between Saijo and Nakagawa, both of whom adhered to the two principles. If Takahashi had not fully acknowledged this understanding, then he might have perceived Saijo and Nakagawa's adherence to the two principles as irresponsible behavior. Consequently, Takahashi might not have been able to establish a cooperative relationship with them.

This lesson is worth remembering not only for practitioners but also for researchers. By doing so, researchers can entrust the creation of knowledge to practitioners, providing them with opportunities to enhance researchers' understanding. This empowerment of practitioners can lead to successful exits.

For researchers to remember this lesson implies having a slightly different perspective from conventional TD researchers. TD research centers the coproduction of knowledge between researchers and practitioners. This is because knowledge that contributes to solving social problems that threaten sustainability can only be obtained and implemented when scientific knowledge and practitioners' knowledge are integrated (e.g. Jacobi et al., 2022; Mauser et al., 2013). In the case of this study, the practitioners received the knowledge in relation to workshop practices that the scientists had beforehand and independently improved it. Thus, rather than a coproduction of knowledge between the scientist and the practitioner, the scientists entrusted the practitioner with the production of knowledge.

Moreover, remembering this lesson implies not only the entrustment of knowledge production but also the entrustment of governance for practitioners. This is analogical to the prioritized interrelationship between knowledge and governance that is co-produced in TD research, where the creation of knowledge is considered as meaningful only if it is utilized in governance to alter social behaviors and societal arrangements (e.g. Miller & Wyborn, 2020). In the present case study, the practitioners not only discovered methods to enhance the FD methodology but also integrated it into their process for developing the comprehensive plan. This culminated in the Mayor of Yahaba Town submitting a proposal to the council to repeal the ordinance that had established the Comprehensive Development Committee (see Section 3.8).

Organizational research has shown a close relationship between organizational members' opportunities to engage in innovation, their sense of autonomy, and their job satisfaction (e.g. Bysted, 2013; Demircioglu and Audretsch, 2020; Nasution et al., 2021). As the production of knowledge and governance represents a form of innovation, when practitioners are entrusted with this production, as demonstrated in this case, they are likely to acquire increased autonomy and satisfaction. This, in turn, should lead to their empowerment and the successful and responsible exit of researchers.

Lesson 2: Imagining the extent of mutual understanding challenges

Lesson 1 taught that researchers adhering to the two principles could increase the likelihood of empowering practitioners. Conversely, Lesson 2 aimed at preventing the worst-case scenario, as indicated in the response to RQ1a, where adherence to these principles might not result in practitioner empowerment but instead lead to discouragement. This lesson should be remembered by researchers.

In the described case, the researchers were thorough in adhering to the principle of staying in the shadows and had explicitly communicated this. However, as shown in Section 3.8, the practitioners were not clearly aware why they intended to adhere to this principle. Specifically, the practitioners thought that the researchers were following scientific ethics, stating that researchers needed to maintain objectivity by refraining from intervening with the research 'subjects' (in this case, municipal officers including Takahashi himself, local citizens, etc.).

Another miscommunication was a result of the researchers' strict adherence to the same principles. The researchers did not even

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imagine that the pressure of these principles (see Section 3.5) was so intense on the practitioner that he became afraid of the pressure.

Such miscommunication may be so difficult for the parties to recognize that it may go unrecognized for several years. Fortunately, in the present case, the collaborative work was successfully completed, but this miscommunication could have led to a dissolution of the relationship between the parties. Recognizing how challenging it is for researchers and practitioners to understand each other is a task falling to the researchers, insofar as researchers intend to adhere to the two principles.

Lesson 3: Researchers' acceptance of being unneeded

As mentioned in the response to RQ1b, Yahaba Town decided not to utilize external researchers in the subsequent comprehensive planning. However, the successful withdrawal of the researchers was not completed at the time: it was completed only by the researchers' respect of that decision. In doing so, researchers must be willing to accept the feeling of being unneeded. Furthermore, researchers must be mindful of creating an atmosphere that signals their willingness to accept anytime that they are no longer needed by practitioners, which is challenging. In nursing, gerontology, and other fields, the sense of being needed and valued is noted as significantly crucial for people in finding meaning in their lives (e.g. Le Penne, 2017; Steeman et al., 2013; van Oorsouw et al., 2022). However, in exchange for accepting this, researchers can achieve a responsible exit and reduce the risk of engaging with helicopter, parachute, or mosquito science.

5. Conclusion and future issues

The current study primarily aimed to provide a multilayered picture of how practitioners and researchers involved in a comprehensive planning process in Yahaba Town interacted with each other. From this, we verified that there was a case where TD researchers, upholding the 'staying in shadow' and 'fading away' principles, successfully achieved a responsible exit, although there existed a significant misunderstanding regarding the researchers' motivation for adhering to these principles between practitioners and researchers, posing a potential threat to the trust relationship between the two parties.

The second objective of this study was to explore how one can collaborate with practitioners and extract practical approaches to support external researchers as they seek a responsible exit while adhering to these two principles. Consequently, we were able to extract three interrelated lessons: (1) being aware that researchers are amateurs in a sense, (2) imagining the extent of mutual understanding challenges, and (3) embracing feelings of being unneeded. Throughout these findings, the present study proposed that TD researchers keep these two principles in mind to achieve responsible exits and consider these three lessons to enhance the likelihood of achieving them.

These principles and lessons go against TD researchers' belief that researchers should build lasting relationships with actors in the field. Nevertheless, there were two reasons why this paper advocated this approach. First, this was because it is difficult for researchers to fulfill the ethical obligations that arise when they enter deeply into actions that have a long-term impact on a region, such as the development of a long-term vision. Second, given the overwhelmingly small proportion of researchers in the world population, it is not always the best strategy for change toward a sustainable society for researchers to remain committed to a particular region.

In summary, this study argues that by researchers' adherence to the two principles ('staying in the shadows' and 'fading away') and the subsequent three lessons, practitioners (more generally, actors of the research field) are endowed with the opportunity of empowerment and capacity building, which in turn will enables responsible exit by the researchers. The reason why three lessons were extracted as mediators to enhance the likelihood of researchers adhering to the two principles leading to responsible exit is as follows. Lesson 1 (being aware that researchers are amateurs in a sense) was extracted because practitioners being conscious of this lesson serves as a driving force for their empowerment, and researchers being aware of this does not hinder practitioners' empowerment. Lesson 2 (Imagining the extent of mutual understanding challenges) was extracted because it is expected to deter researchers who adhere to the two principles from displaying a seemingly passive attitude to practitioners, which could lead to the breakdown of trust between both parties. Lesson 3 (Researchers' acceptance of being unneeded) was extracted to prevent researchers from wasting opportunities when practitioners become empowered, and there is a chance for responsible exit from the research field.

However, there are several situations in which this argument may be difficult to sustain. First, as noted by Magnus and Rai (2023), partners of researchers may desire intimacy and close connections to researchers. When conducting TD research in fields where individuals possess such characteristics, researchers may need to exert significant effort to gain understanding from actors in the research field regarding their adherence to the above two principles. Additionally, adherence to these principles may even pose a considerable risk of undermining the researchers' credibility with the local actors. To mitigate this risk, it may be necessary to seek the appropriate timing for explicitly stating the principles, rather than researchers asserting them initially.

Second, in TD research, there may be cases where researchers become such integral and indispensable pieces that actors in the research field cannot fill the 'holes left by the researcher' (Magnus & Rai, 2023, p. 17). In such cases, it may be challenging to directly apply the principles and lessons advocated by this study. The difficulty may increase when actors in the field expect researchers to possess highly specialized knowledge. However, even in such cases, it is not necessary to abandon these two principles. It suffices to modify the principles while understanding the essence behind them. As observed by earlier studies (e.g. Coady, 2006; Dellsén, 2018; Mumpower & Stewart, 1996; Resnik & Stewart, 2012), no individual expert can represent all opinions within the research field. Thus, practitioners have the discretion to seek out and select the necessary experts or scientific evidence they require. When considering how researchers can engage with practitioners to maximize their agency in situations where they explore and choose the experts and scientific evidence they need, the principles and lessons advocated in this study can serve as a valuable guide. Thus, it is important to further develop them to be applicable in a broader context. This endeavor of extending the approach proposed in this study for broader applicability represents a significant task for the future.

Data availability. Due to the sensitive nature of the interview data, which includes personal information, we are unable to make these data publicly available. A summary of the findings and themes is, however, provided in the manuscript.

Acknowledgments. The three authors are grateful to the other members of the transdisciplinary team that was formed in April 2019, including the five

town officials and the seven external researchers. As evident from the content of this paper, this paper does not claim the content of Yahaba Town's comprehensive plan as its own achievement. The comprehensive plan of Yahaba Town is the collective result of Yahaba Town Hall, the residents of Yahaba Town, the council, and the external researchers who participated in the transdisciplinary team.

Author contributions. Sections 1 and 2 were authored by Nakagawa and Saijo. Sections 3, 4, and 5 were authored by Nakagawa based on the discussions held by all three authors. After the writing process, all the authors reviewed and finalized every section.

Funding statement. This study was supported by JSPS KAKENHI Grand Number 17H00980.

Competing interests. The authors declare that there is no conflict of interest.

Research transparency and reproducibility statement. We are committed to ensuring transparency and reproducibility in our qualitative research. To support these principles, we have implemented the following measures:

Methodological details. Detailed descriptions of the data collection and analysis methods, including interview guides and analysis procedures, are included in the Methods section. This allows for a clear understanding of the research process.

These practices are designed to maintain the credibility and transparency of our research while protecting participant confidentiality.

References

Adame, F. (2021). Meaningful collaborations can end 'helicopter research'. *Nature*, *10*, published online June 29. https://doi.org/10.1038/d41586-021-01795-1.

Brandt, P., Ernst, A., Gralla, F., Luederitz, C., Lang, D. J., Newig, J., Reinert, F., Abson, D. J., & von Wehrden, H. (2013). A review of transdisciplinary research in sustainability science. *Ecological Economics*, *92*, 1–15.

Bysted, R. (2013). Innovative employee behavior: The moderating effects of mental involvement and job satisfaction on contextual variables. *European Journal of Innovation Management*, *16*(3), 268–284.

Carew, A. L., & Wickson, F. (2010). The TD wheel: A heuristic to shape, support and evaluate transdisciplinary research. *Futures*, *42*(10), 1146–1155.

Coady, D. (2006). When experts disagree. *Episteme; Rivista Critica Di Storia Delle Scienze Mediche E Biologiche*, *3*(1–2), 68–79.

Coy, D., Malekpour, S., Saeri, A. K., & Dargaville, R. (2021). Rethinking community empowerment in the energy transformation: A critical review of the definitions, drivers and outcomes. *Energy Research & Social Science*, *72*, 101871.

Daedlow, K., Podhora, A., Winkelmann, M., Kopfmüller, J., Walz, R., & Helming, K. (2016). Socially responsible research processes for sustainability transformation: An integrated assessment framework. *Current Opinion in Environmental Sustainability*, *23*, 1–11.

Dellsén, F. (2018). When expert disagreement supports consensus. *Australasian Journal of Philosophy*, *96*(1), 142–156.

Demircioglu, M. A., & Audretsch, D. B. (2020). Conditions for complex innovations: evidence from public organizations. *The Journal of Technology Transfer*, *45*(3), 820–843.

Gewin, V. (2023). Pack up the parachute: Why global north-south collaborations need to change. *Nature*, *619*(7971), 885–887.

Guishard, M. A., Halkovic, A., Galletta, A., & Li, P. (2018, September). Toward epistemological ethics: Centering communities and social justice in qualitative research. *Forum qualitative Sozialforschung/forum: Qualitative Social Research*, *19*(3). https://doi.org/10.17169/fqs-19.3.3145.

Hara, K., Yoshioka, R., Kuroda, M., Kurimoto, S., & Saijo, T. (2019). Reconciling intergenerational conflicts with imaginary future generations: Evidence from a participatory deliberation practice in a municipality in Japan. *Sustainability Science*, *14*, 1605–1619.

Hara, K., Kitakaji, Y., Sugino, H., Yoshioka, R., Takeda, H., Hizen, Y., & Saijo, T. (2021). Effects of experiencing the role of imaginary future generations in decision-making: A case study of participatory deliberation in a Japanese town. *Sustainability Science*, *16*, 1001–1016.

Hilsen, I. A. (2006). And they shall be known by their deeds: Ethics and politics in action research. *Action Research*, *4*(1), 23–36.

Hiromitsu, T., Kitakaji, Y., Hara, K., & Saijo, T. (2021). What do people say when they become "future people"? -In: Positioning imaginary future generations (IFGs) in general rules for good decision-making. *Sustainability*, *13*(12), 6631.

Jacobi, J., Llanque, A., Mukhovi, S. M., Birachi, E., von Groote, P., Eschen, R., Hilber-Schöb L., Kiba, D. I., Frossard, E., Robledo-Abad, C. (2022). Transdisciplinary co-creation increases the utilization of knowledge from sustainable development research. *Environmental Science & Policy*, *129*, 107–115.

Le Penne, S. (2017). Longing to belong: Needing to be needed in a world in need. *Society*, *54*(6), 535–536.

Lewis, O. (1961). *The children of Sanchez: Autobiography of a Mexican family*. New York, NY: Random House.

Magnus, A. M., & Rai, K. (2023). Doing rural community-based action research (CBAR): Community perceptions and methodological impacts. *Qualitative Research*, *24*(4), 851–871.

Mauser, W., Klepper, G., Rice, M., Schmalzbauer, B. S., Hackmann, H., Leemans, R., & Moore, H. (2013). Transdisciplinary global change research: The co-creation of knowledge for sustainability. *Current Opinion in Environmental Sustainability*, *5*(3–4), 420–431.

Miller, C. A., & Wyborn, C. (2020). Co-production in global sustainability: Histories and theories. *Environmental Science & Policy*, *113*, 88–95.

Mumpower, J. L., & Stewart, T. R. (1996). Expert judgment and expert disagreement. *Thinking & Reasoning*, *2*, 191–211.

Mutsaers, P., & Meijeren, M. (2023). Triangulation and violence in the Caribbean: Crimes retold from a Curaçaoan juvenile detention centre. *Ethnography*, 14661381231159057.

Nakagawa, Y. (2020). Taking a future generation's perspective as a facilitator of insight problem-solving: Sustainable water supply management. *Sustainability*, *12*(3), 1000.

Nasution, N. R., Siregar, Z. M. E., & Pristiyono, P. (2021). The effect of job autonomy on employee innovative behavior: The role of job satisfaction as intervening variable. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal*, *4*(2), 2846–2853.

Nordling, L. (2015). Africa's fight for equality. *Nature*, *521*(7550), 24.

Polk, M., & Knutsson, P. (2008). Participation, value rationality and mutual learning in transdisciplinary knowledge production for sustainable development. *Environmental Education Research*, *14*(6), 643–653.

Resnik, D. B., & Stewart Jr, C. N. (2012). Misconduct versus honest error and scientific disagreement. *Accountability in Research*, *19*(1), 56–63.

Saijo, T. (2015) Future Design: Concept for a Ministry of the Future; Kochi University of Technology, Social Design Engineering Series: Kochi, Japan.

Saijo, T. (2017). Future design. *The Economic Review*, *68*, 33–45, (In Japanese).

Saijo, T. (2019). Future design. In Laslier, M., & Sanver, Z. (Eds.), *Future of economic design: The continuing development of a field as envisioned by its researchers* (pp. 253–260). Springer.

Saijo, T. (2020). Future design: Bequeathing sustainable natural environments and sustainable societies to future generations. *Sustainability*, *12*(16), 6467.

Sanchez-Betancourt, D., & Vivier, E. (2019). Action and community-based research: Improving local governance practices through the community scorecard. *Research Methods in the Social Sciences*, *375*, 375–392.

Scholz, R. W., & Steiner, G. (2015). The real type and the ideal type of transdisciplinary processes Part II-what constraints and obstacles do we meet in practice. *Sustainability Science*, *10*(4), 653–671.

Steeman, E., Tournoy, J., Grypdonck, M., Godderis, J., & De Casterlé, B. D. (2013). Managing identity in early-stage dementia: Maintaining a sense of being valued. *Ageing and Society*, *33*, 216–242.

Stefanoudis, P. V., Licuanan, W. Y., Morrison, T. H., Talma, S., Veitayaki, J., & Woodall, L. C. (2021). Turning the tide of parachute science. *Current Biology*, *31*(4), R184–R185.

Steger, C., Klein, J. A., Reid, R. S., Lavorel, S., Tucker, C., Hopping, K. A., Marchant, R., Teel, T., Cuni-Sanchez, A., Dorji, T. & Greenwood, G. (2021). Science with society: Evidence-based guidance for best practices in environmental transdisciplinary work. *Global Environmental Change*, *68*, 102240.

Takahashi, M. (2021). Developing a comprehensive plan for Yahaba Town using future design. *Trends in the Sciences*, *26*(2), 2_61–2_63.

van Oorsouw, R., Oerlemans, A., Klooster, E., van den Berg, M., Kalf, J., Vermeulen, H., Graff, M., van den Wees, P. & Koenders, N. (2022). A sense of being needed: A phenomenological analysis of hospital-based rehabilitation professionals' experiences during the COVID-19 pandemic. *Physical Therapy*, *102*(6), pzac052.

Wickson, F., & Carew, A. L. (2014). Quality criteria and indicators for responsible research and innovation: Learning from transdisciplinarity. *Journal of Responsible Innovation*, *1*(3), 254–273.

Wiek, A., & Iwaniec, D. (2014). Quality criteria for visions and visioning in sustainability science. *Sustainability Science*, *9*, 497–512.

Wilson, E., Kenny, A., & Dickson-Swift, V. (2018). Ethical challenges in community-based participatory research: A scoping review. *Qualitative Health Research*, *28*(2), 189–199.

Zscheischler, J., Rogga, S., & Weith, T. (2014). Experiences with transdisciplinary research: Sustainable land management third year status conference. *Systems Research and Behavioral Science*, *31*(6), 751–756.

https://doi.org/10.1017/sus.2024.29 Published online by Cambridge University Press