

JUST2CE

A Just Transition to Circular Economy



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A DECISION SUPPORT TOOL FOR A JUST TRANSITION TO A CIRCULAR ECONOMY

A Roadmap for Testing and Adoption



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JUST2CE will assess the current state of transition towards the Circular Economy in relevant economic sectors and analyse possible transition scenarios, as well as their outcomes and impacts. It will identify the key factors that can stimulate or hinder this transition. Natural resources are extracted and transformed into products, which are eventually discarded. As many natural resources are finite, it is important to keep materials in circulation for as long as possible. This makes the transition to Circular Economy more vital than ever but is a responsible, inclusive, and socially just transition to a Circular Economy possible or even desirable? What technical, political, and social factors can enable or hamper such transformation? The EU-funded JUST2CE project will answer these questions. It will explore the economic, societal, gender and policy implications of the Circular Economy paradigm. The project's findings will shed light on how to ensure democratic and participatory mechanisms when designing and managing such technology.

History Chart

Version	Date	Implemented by
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Executive Summary

Deliverable 4.3 follows the outline of the Decision Support Tool (DST) presented in Deliverable 4.1 in offering a concrete roadmap for the testing and adoption of the tool. It thus proposes a tentative timeline of activities for Work Package 4 over the final year of the JUST2CE project, taking the DST through its early development to the delivery of a beta version, a comprehensive testing phase, and subsequent dissemination of the tool to ensure its effective impact through the uptake of relevant stakeholders. This roadmap has been developed with input from all WP4 partners, and has been laid out with flexibility and adaptability in mind.

The report is composed of 5 sections. The first section, the Introduction summarises the DST's purpose, intended target audience, and broad structure. It also outlines how the adoption phase was conceived within the initial project proposal. Section 2 presents the roadmap itself, which includes an updated timeline of core deliverables, as well as a workplan for the next year composed of the sequential and overlapping phases of: Development, Testing, Coaching, Training Workshops, and Reporting. Each of these are expanded with description.

Section 3 of the deliverable outlines how we plan to embed the principles of RRI and Decoloniality within the final year of WP4's workplan. We outline here how the dimensions of Anticipation, Inclusion, Reflexivity, and Responsiveness will be engaged with here. Section 4 describes the proposed testing methodology in detail, composed of Functional, Performance, and User Acceptance testing. Finally, Section 5 describes the adoption phase and the proposed plans for running the coaching activities and international workshops.

The core dates and activities for the next year can be summarised as follows:

- 30th November 2023: Beta version of DST released
- December 2023 - June 2024: Testing phase of DST, including 6 stakeholder 'coaching workshops'
- February - July 2024: 3 international workshops showcasing the DST alongside project findings
- June 2024: 'Final' version of DST released

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List of abbreviations

AIRR	<i>Anticipation, Inclusion, Reflexivity, Responsiveness</i>
CE	<i>Circular Economy</i>
D	<i>Deliverable</i>
DST	<i>Decision Support Tool</i>
KPI	<i>Key Performance Indicator</i>
MF	<i>Macro-Functionality</i>
MRIO	<i>Multi-region input-output</i>
RoW	<i>Rest of the World</i>
RRI	<i>Responsible Research and Innovation</i>
WP	<i>Work Package</i>

[1] Introduction

The JUST2CE project aims at understanding, in a critical and thoughtful way, under which conditions a responsible, inclusive and socially just transition to a Circular Economy (CE) is possible and desirable, what technical, geopolitical and social factors can enable or hamper such transformation and how these aspects can contribute to the development of transitional policy measures. The project aims at identifying enablers and barriers to the transition towards a CE in a number of key strategic sectors – selected among those indicated by the EU Action Plan for CE – such as food production and waste, water management, critical raw materials and production in complex global supply chains. The results of this analysis are also being used to develop a decision support tool (DST) and macroeconomics analytical tools to design new or improve existing CE practices.

The Innovation Phase of JUST2CE focuses on the design of tools for a just and responsible CE. The core of Work Package (WP) 4 is the development of an integrated DST. Initially the tool was conceived as being “capable of assessing the current and potential degree of circularity of a given unit of analysis... assess[ing] the ability of production systems to reduce resource consumption while producing a positive socio-economic impact” (Pansera et al., 2020, p42). Since the project specification, the scope and intention of the DST has developed from the framing initially conceived, based upon preliminary work across the project WPs, literature analysis, and the desire for producing a novel research output in line with the values of JUST2CE. The DST is thus intended as a learning tool for stakeholders from a wide audience to better understand global supply chains and issues related to justice which are embedded within them. A description of the tool and the steps which led to its design structure are fully outlined in JUST2CE’s Deliverable 4.1 (Purvis et al., 2023a), and are summarised in Sections 1.1-1.3.

[1.1] DST Purpose

The DST is a learning tool, and thus its primary purpose is to encourage the user to consider and explore a) the global nature of supply chains, and b) how issues relating to justice and circularity are embedded within them. This is achieved by:

- Visually depicting an approximation of the global extent of a chosen supply chain.
- Producing several interactive ways to read and explore about (un)just practices and CE practices, thereby disseminating findings from other JUST2CE WPs.

The tool is not intended to be prescriptive, and its philosophical underpinnings diverge somewhat from traditional decision support systems. Instead, the DST is conceived as a learning tool, to help the user explore a problem, introduce dimensions that perhaps have so far been unexplored, and offer suggestions of broad alternative approaches. Thus outputs to the user include, highlighting case study examples of alternative practices or processes; a series of questions to ask themselves or dimensions to engage with. The process of using/playing with the tool has the intention to impart new knowledge and thinking patterns.

The tool thus provides a key opportunity to incorporate many of the critical orientations of the project under an operative framework that will be engaged with by stakeholders.

[1.2] DST Audience

The General User¹ of the tool is expected to have an interest in supply chains and learning about just transition aspects. This user is conceived very generally, and could be a policymaker, a consumer, a researcher, a company manager, a student, etc. The user is expected to interact with the tool without any assumed prior expertise or technical knowledge.

Given various broad features of the tool, we may be able to conceive of a number of user archetypes who may be interested in particular aspects of the tool over others. This is further elaborated in Section 4.3. It should also be noted that the contractual obligations of the project oblige the Consortium to target and engage a number of specific actors. We discuss this in Section 1.4.

[1.3] DST Structure

The tool will be hosted online, and can be thought of as a website with a number of interactive elements, it consists of 3 related but discreet macro-functionalities (MFs): a **typical supply chain mapper**, a **just transition overlay**, and **just transition directory**. The detailed requirements of each functionality are described in Appendix A, and summarised in the subsequent subsections.

[1.3.1] MF1: Typical Supply Chain Mapper

This MF forms the central visualisation of the tool, and is an organising structure for the latter MFs. It is also the main theoretical contribution from a supply chain research perspective. The user will be prompted to select the supply chain they wish to explore, inputting both a sector and country. Based on user input, the tool will generate on a world map the locations and connectivity of major supply chain nodes. An early mock-up of what this aspect of the tool may look like is displayed in Figure 1.

The foundations of this mapper are based on multi-regional input-output (MRIO) tables which are hosted online and the tool carries out basic calculations upon. Wherever possible, calculations are expected to be performed through a pre-processing mode, in order to reduce computational times and optimise for user experience.

The initial dataset used within the development phase is EXIOBASE 3, which has a European bias featuring data from the EU, 16 major trading partners, and 5 Rest of the World (RoW) regions². It is expected that future development will consider alternative datasets with wider country coverage. The architecture of the DST is flexible enough to accommodate alternative data sources, given that the calculation engine will be independent of the specific database being employed.

¹ Note, we also anticipate a second user type, the Administrative user, who is a member of the JUST2CE team, with some understanding of the structure of the tool, but less technical knowledge about its functioning. This user is expected to utilise backend functionality of the tool to maintain and update data files.

² Aggregating all countries not explicitly detailed into regions of: Europe, Asia, Africa, America, and Middle East.

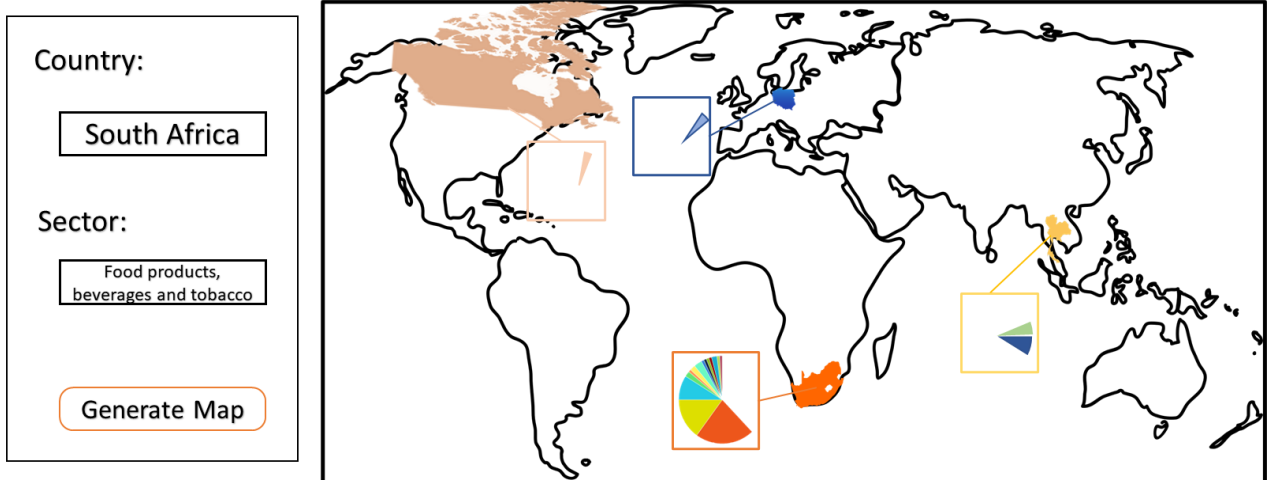


Figure 1: Early Mock-Up of the Supply Chain Mapper MF, displaying the location of major supply chain nodes for the Food sector in South Africa. The major nodes are displayed geographically, with pi chart slices indicating the contribution of specific sectors to the selected sector.

[1.3.2] MF2: Just Transition Overlay

This MF relates to geographically resolved data which is highlighted to the user upon the mapping feature of the tool. Hovering over countries/major supply chain nodes will highlight pop-up justice info that the user can click through to read more, similar to the [Environmental Justice Atlas](#). It is important to note that this functionality is independent of MF1, all data sources for this are separate from the IO matrices, and must be collated by the JUST2CE team.

The overlay is expected to be composed of two datasets (which will be organised in simple spreadsheets), relating to national and sectoral issues of justice. Collaboration between USFD, ACEN, and UPN is currently underway to finalise the structure of these datasets and suitable dimensions to include, however illustrative examples are provided in Tables 1 and 2.

Country	Global Rights Index	GRI Metadata	SDG 5.1.1	GHG Footprint	Global Justice	...
United Kingdom	3	Regular violations of rights	Yes	505mtCO2e	Official Development Assistance has become a contentious issue in the UK since 2010 with subsequent governments making commitments to...	
...						

Table 1: Regional dataset. Note the column titles are arbitrary selections of potential aspects to indicate, and do not represent particular choices that have been made.

Country/ Region	Sector	Item Title	Detailed description	Sources
Cameroon	Aviation	Forced eviction for expansion of Douala Airport, Cameroon	In January 2021 more than 100 families were forcibly evicted for expansion of Douala Airport. Houses were bulldozed and protesters teargassed. Authorities claimed no responsibility for....	EjAtlas Africa News
...				

Table 2: Sectoral dataset. Note this is illustrative only.

[1.3.3] MF3: Just Transition Directory

The Just Transition Directory is a section of the website where qualitative information, links, and images may be hosted and presented in a visually appealing way. Organisation of this will be along the core themes of: **Gender Justice, Global Environmental Justice, Labour Justice, and Supply Chain Visibility**. This is intended as a repository that may be built over time which incorporates findings from the wider project, presenting them in a manner which is accessible to a wider audience.

[1.4] Adoption KPIs

The initial project proposal (Pansera et al, 2020) outlines several expected impacts relating to the adoption of the DST which offer a number of KPIs for realising the adoption of the tool. These are also discussed in Deliverable 6.1 (ARC-MedWaves, 2023), from which Table 3 has been adapted. We will aim to maximise KPIs across all dimensions, and use them to monitor and maximise stakeholder engagement. It may also be necessary to revise specific goals following feedback from the testing phase, and thus an agile approach will be maintained.

Action	KPI (target, total)
<i>Training and capacity building</i>	Number of DSS international trainings
	Number of participants on the DSS international trainings
	Number of policymakers participating on the DSS international trainings
<i>Direct coaching activities on DSS</i>	Number of DSS coaching sessions implemented
	Number of policymakers participating on coaching sessions
<i>Existing digital and open business support services</i>	Number of companies accessing JUST2CE services
	Number of companies accessing JUST2CE outputs

Table 3: Relevant project KPIs, adapted from ARC-MedWaves (2023).

[1.5] Outline of this Document

The remainder of this document will outline the next steps of testing the beta version and its adoption by different users. Section 2 broadly outlines a Roadmap for the next phase of the DST development and delivery up to the end of the JUST2CE project; it provides an updated timeline of deliverables, a workplan, and a brief description of each

subsequent phase. Section 3 demonstrates how this process will incorporate the principles of RRI and decoloniality on which the JUST2CE project is embedded. Section 4 sketches the testing phase, and how sequential rounds of testing and iterative development will transition the beta version of the DST into the 'final' version. Finally, Section 5 outlines the adoption phase, describing in brief the workshops and engagement activities that will be planned to allow for uptake and dissemination of the DST.

[2] A Roadmap

This Section broadly sketches the development and delivery phases of the DST, from the time of writing, during which the DST is under early technical implementation, until the end of the project in August 2024. Several discreet but overlapping phases are conceived which are briefly described and then developed in later Sections of this document.

[2.1] Deliverable timeline

As per the project proposal document (Pansera et al., 2020), the following key deadlines and milestones are required to be delivered. Following discussion with relevant project stakeholders over the feasibility of the initial timeline, several modifications have been proposed. This is primarily due to the initial timeline offering a very limited window for engaging with stakeholders, requiring all reporting activities to be completed by the end of February 2024 despite a working version of the tool not available until the end of November 2023. Given Christmas/Summer holidays, we also expect there to be little work done over December and early January, which is also the summer break of our partners located in the global south.

Deliverable	Description	Initial deadline	Proposed deadline
4.3 - Roadmap	This deliverable: a plan for testing and adoption	31st Aug 2023	30th Sep 2023
4.2 - DST Beta Version	A first working version of the tool which can be used with stakeholders and testing	30th Nov 2023	30th Nov 2023
4.4 - Report on application examples and case studies	A report on testing and how the tool has been engaged with by stakeholders, with examples of implementation/use	29th Feb 2024	30th Jun 2024
4.5 - DST Final Version	A final version of the tool following testing and consideration of stakeholder feedback	29th Feb 2024	30th Jun 2024
6.7 - Public Engagement Report	A report on JUST2CE's engagement activities, including DST workshops	29th Feb 2024	30th Jun 2024
6.8 - Training Report	A report on the 3 international training sessions	31st Aug 2024	31st Aug 2024
~	Project End ~	31st Aug 2024	31st Aug 2024

Table 4: Deliverables within the scope of WP4. Note, Proposed deadlines in red have been modified from the original date..

The extension of the D4.4, D4.5, and D6.7 deadlines by 4 months to 30th June 2024 should allow time for meaningful testing activities and engagement with stakeholders without impacting heavily the timeline for subsequent deliverables from WP6.

[2.2] Workplan

The Gantt chart outlined in Figure 2 illustrates the final year of the project, and the activities that must be covered to successfully deliver the outputs of WP4. This includes, formally, Deliverables 4.3-4.5, and Deliverables 6.7 and 6.8 which relate to reporting on engagement activities. The remaining activities of the WP are delimited into successive and concurrent phases of development, testing, coaching, training workshops, and reporting, these are outlined in Sections 2.2.1 through 2.2.5.

	Deliverables	Development	Testing	Coaching	Training workshops	Reporting
Sep 2023	4.3					
Oct 2023						
Nov 2023	4.2					
Dec 2023						
Jan 2024						
Feb 2024						
Mar 2024						
Apr 2024						
May 2024						
Jun 2024	4.4, 4.5, 6.7					
Jul 2024						
Aug 2024	6.8					

Figure 2: The development and delivery phases of WP4.

[2.2.1] DST Development

Development, meaning the technical design and construction of the DST software, has been ongoing since the delivery of Deliverable 4.1 (Purvis et al., 2023a) in February 2023. The development phase should result in the delivery of a Beta version of the DST in November 2023, and through iterative testing, the final version of the DST in June 2024. At the time of writing, delivery of a working version of the tool by the deadline of 30th November 2023 seems achievable, though uncertainty means it could also be delivered earlier or later than the suggested date. This uncertainty requires some flexibility in the timeplan for subsequent phases of the roadmap. Relevant partners are aware of this uncertainty and clear communication of progress will be key to mitigating any issues related to changing timelines.

It is anticipated that the beta version will provide a minimum working version of the tool that can be used with stakeholders. The basic architecture of the tool will not change between the beta and final version; instead we anticipate testing and stakeholder engagement to result in suggestions for streamlining the tool and implementing additional features that may result from this process.

[2.2.2] Functional and Performance Testing

Testing of the tool is split into three subsequent and iterative processes, namely functional, performance, and user acceptance testing. User acceptance testing overlaps with the 'coaching' phase and is described in the subsequent subsection. The testing phase as a whole is outlined in detail in Section 4.

Functional and performance testing is intended to ensure that the beta version meets a standard of usability sufficient for engaging stakeholders in its use. Functional testing is intended to ensure that the DST accurately performs its intended functions, whilst performance testing aims to optimise the tool for a smooth and responsive user experience. It thus must be completed before users can be formally engaged and targeted. This phase also introduces timeline uncertainty which should be considered in the planning of engagement activities. An important aspect is the load of the tool, and its capacity to handle multiple users accessing it at the same time, as would be the case in an engagement workshop.

[2.2.3] User Acceptance Testing and Coaching

Once the tool has passed preliminary functional and performance testing, we can begin to engage users and relevant stakeholders in the use of the tool. Acceptance testing can begin with easily engageable actors such as students, and immediate colleagues, and work towards engaging identified stakeholders within 'coaching sessions' as prescribed in the project's proposal document.

Coaching workshops are loosely defined in the proposal, but are intended to target specific actors and encourage them to use the tool and consider embedding it within their practice. Six coaching workshops have been budgeted for. These can be combined with the user acceptance testing, intended to ensure that the DST meets the requirements and expectations of its users (see Section 4.3). To ensure maximum outreach, engagement with the case studies, and a widest possible range of perspectives, it is **proposed that a workshop is organised by each JUST2CE partner**. These would leverage each partner's connections and be attended by members of the WP4 team who can present the DST tool.

These workshops should be fairly informal, friendly and primarily face-to-face, but with the option of hybrid formats to maximise participation. They should begin with an overview of the tool and its functionalities and then provide space for participants to play with the tool and ask any questions. Any feedback should be collected and can inform revisions of the beta version of the tool.

[2.2.4] International Training Workshops

Three more formal international workshops are anticipated, to be held in Barcelona, South Africa, and Brussels. Whilst the proposal suggests that these should be 2-days long, this seems excessive for an event focused solely on the DST. Given the budget allocated to these events, we should maximise value by using them to showcase the other findings of the project to stakeholders, including the policy briefs and case study reports. We therefore consider these international workshops as a space to showcase wider lessons learnt, strengthen collaboration among partners, present project outputs and other deliverables related to the DST, including on topics such as gender, labour, and global environmental justice.

Planning for these workshops, as well as the coaching workshops, should consider how they might fit with already existing events such as the European Society for Ecological Economics event in Pontevedra which will run alongside the final project consortium meeting.

[2.2.5] Reporting

Three reports (D4.5, D6.7, D6.8), relevant to WP4, are required to be delivered in the final phase of the project. These all will comment on the dissemination activities and workshops, critically examining the uptake of the tool. It will be expected that each partner responsible for coordinating a coaching workshop will provide a report on their session, and it may be useful to develop a formalised structure for participants to provide feedback.

A key element of the reporting phase is to assess the success of dissemination in relation to the KPIs described in Section 1.4. Many of these, such as successful uptake of the tool may prove difficult to reliably assess within the timeline of the project, given we do not expect engagement activities to include until June/July 2024. For example clear uptake by policy makers of the tool might be difficult if they are not strongly familiar with the CE concept in the first place and might take more than a workshop to achieve uptake of the tool.

[2.3] Futurity

Whilst the JUST2CE project is due to conclude at the end of August 2024, we anticipate that the tool website will remain live for at least three more years after the end of the project. Also, in the final phases of the JUST2CE project, follow-up plans will be devised, also including the possibility of fund-raising for further developments of the DST.

[3] Embedding RRI and Decoloniality

The DST incorporates the AIRR (Anticipation, Inclusion, Reflexivity, and Responsiveness) dimensions of Responsible Research and Innovation (RRI) to support a just transition to a CE. By embracing these dimensions, the DST ensures that its design, development, and usage align with the principles of sustainability, justice, and inclusivity. These dimensions were considered in the design of the tool, as outlined in Section 4.1.1 of D4.1 (Purvis, et al., 2023a), as well as the journal article adapted from D3.2 (Purvis, et al., 2023b; Celebi, et al., 2022). The subsections 3.1-3.4 outline how these dimensions will inform the ongoing activities of WP4. Then, subsection 3.5 illustrates the Decoloniality as a key concept of JUST2CE project, as well as of DST.

[3.1] Anticipation

Anticipation is understood as contemplation of future developments relating to the wide-ranging effects of current research and innovation activities. From the perspective of the DST development, this means anticipating how the tool may be used and analysing both intentional and unintentional impacts that its use may have. We should thus anticipate the possibility of the tool being used in ways that are contrary to our values, and mitigate for this. In the design of the tool, this has been reflected in the targeting towards a general usership. Additionally, the DST has been designed as a learning tool to make the user aware and sensitive towards issues they were not aware of before engaging with the tool in such a way as to promote responsible decision-making.

In its final form, the DST should support the capacity to anticipate and address future challenges and opportunities related to the just transition to a CE. In particular, it should enable users interested in supply chain dynamics to anticipate potential conflicts and areas of injustice within a specific supply network, and alternative choices that could be made. The tool is also expected to integrate and signpost towards other tools or data sources that monitor and analyse emerging trends and developments related to the just transition and CE. This should enable users to stay informed about evolving practices and identify areas for adaptation and innovation. In particular, through presented case studies, within the just transition directory, users should be informed about emerging trends, innovative practices, and insights to support them in anticipating and adapting to future developments. This enhances user's ability to plan early in line with the just transition, to make informed decisions and take proactive actions in driving the just transition to a CE.

Based on the user's selection of sector and geographical inputs, the DST utilises underlying MRIO data to generate a 'typical supply chain' that represents the interconnected network of economic activities involved in the selected sector and location. The tool visualises the generated supply chain on a map, allowing users to gain insights into the geographic distribution and flows of resources, materials, and products across the supply chain. This visualisation aids in understanding the global dynamics of the selected sector and its associated CE practices. Accordingly, users can detect early signs of potential disruptions or emerging opportunities in supply chains and justice considerations by monitoring relevant data sources, such as environmental, social, and economic indicators.

The DST testing and 'coaching' phase is intended to reach a diverse group of stakeholders, such as experts, policymakers, and representatives from marginalised communities, to seek their input on the tool's features, indicators, and functionalities. The tool will also embed outputs generated in the regional co-creation workshops (as a part of WP3) where multiple stakeholders collaborated in generating future scenarios and exploring potential strategies for a just transition. This process allows for collective intelligence and diverse perspectives to inform the anticipation aspect of the DST.

Functionality for user data submission within the DST, as well as feedback from the testing phase, should allow for the gathering of input from users regarding potential future developments, emerging issues, and areas requiring attention or improvement. This feedback will help us to enhance the tool and to refine and improve the DST based on user feedback, emerging needs, and changing contexts.

[3.2] Inclusiveness

Inclusion relates to the expansion of stakeholder dialogue beyond the 'usual suspects' (e.g., C-level company managers and high level policy-makers) and narratives of top-down governance towards the involvement of a broader range of participants including the public (Ravn et al., 2015). This has been reflected in the design of the DST through our decision to develop a more general accessible tool that may be used by a wide range of stakeholder groups (including, for instance, trade unionists, citizen committees, grassroots campaign groups), rather than taking on a more consultative approach which targets typical 'higher power/influence' stakeholders or businesses. The testing and adoption phase of the tool's dissemination should therefore bear in mind the importance of inclusion as it relates to our values.

The DST will be designed to create an inclusive and accessible platform that empowers individuals from diverse backgrounds and abilities to actively participate in the just transition to a CE. It enables a wider range of users to engage with the tool's functionalities, access relevant information, and contribute their perspectives, ultimately fostering a more equitable and inclusive approach to sustainable decision-making. By embracing a user-centric design approach, the DST will ensure inclusivity and accessibility for all users. Understanding the diverse needs, preferences, and challenges of different user groups allows for the development of an intuitive and user-friendly interface. This should enable individuals with varying levels of technical expertise, language proficiency, and accessibility requirements to effectively engage with the tool and make informed decisions related to the just transition.

Clear and intuitive visualisations, accompanied by text alternatives, will enable users with varying visual acuity or cognitive abilities to access and interpret the data. By avoiding overly complex or ambiguous visual representations, the DST will accommodate diverse users and support their understanding and engagement with CE concepts.

Engaging a broad range of stakeholders, including representatives from marginalised communities, in the testing and dissemination phases of the DST fosters inclusivity and reflects the principles of co-creation. By seeking diverse perspectives and actively involving stakeholders throughout the process, the tool can better address the needs and priorities of underrepresented groups. This inclusive approach ensures that the DST supports a just transition that accounts for the specific challenges, aspirations, and justice considerations of marginalised communities.

[3.3] Reflexivity

Reflexivity necessitates the ability to develop a critically reflective approach to our work, being aware and open about limitations, and the political nature of any framing we take. We must be mindful of the implications of our framing of the just transition to a CE and how it situates our tool within the wider discourse and other toolkits.

The DST is intended to encourage users to reflect on the ethical implications of their decisions, critically engage with data and information, adopt systemic thinking, and actively participate in the ongoing improvement of the tool. This reflexive approach fosters a deeper understanding of the just transition concept and supports users in making more informed, context-sensitive, and ethically responsible decisions as they navigate the complexities of the CE. The DST incorporates ethical considerations to encourage users to reflect on the ethical implications of their decisions and actions. By providing information and prompts that foster ethical reflection, the tool will promote responsible decision-making aligned with justice considerations. Users are encouraged to critically assess the social, environmental, and economic impacts of their supply chain practices, ensuring that they contribute to a just and sustainable transition.

The DST prioritises transparency by clearly communicating the sources of data used within the tool, as well as their limitations and caution in their interpretation. Providing information about data collection methods, quality, and limitations promotes reflexive engagement with the data. This transparency enables users to critically evaluate the data's reliability, relevance, and potential biases, enhancing their understanding of the tool's insights and supporting informed decision-making.

The DST's just transition directory will offer learning resources that facilitate reflexivity and critical thinking among users. These resources will include case studies and best practice examples (from WP2) related to the just transition to a CE. By providing access to diverse knowledge, the tool empowers users to engage in continuous learning, reflection, and exploration of alternative approaches, thereby fostering reflexive decision-making and encouraging the adoption of sustainable practices.

The DST will promote systemic thinking by highlighting the interconnectedness and interdependencies within supply chains and justice considerations. By illustrating the complex relationships between social, environmental, and economic factors, the tool will encourage users to consider the broader impacts of their decisions. Reflexive engagement with these interconnected systems helps users understand the potential unintended consequences of their actions and promotes holistic and context-aware decision-making.

[3.4] Responsiveness

Responsiveness relates to the openness to shift direction based upon emerging results and perspectives. D4.1 has documented how our perspective on the tool developed and evolved based upon findings from consortium deliberation. The testing phase, and time between the beta and final version of the tool provides a period for refining the tool based upon feedback and consideration from users.

The tool's ability to allow members of the JUST2CE team to provide real-time updates, foster collaboration, incorporate user feedback, and adapt to evolving needs enhances its effectiveness in supporting users as they navigate the complexities of the just transition to a CE.

The DST adopts an iterative development approach to continuously improve and refine its features and functionalities throughout the testing phase. By incorporating user feedback, emerging needs, and changing contexts, the tool will remain responsive to evolving requirements. Regular updates and enhancements throughout the testing and workshop phases will ensure that the DST aligns with the latest knowledge and best practices, effectively supporting the just transition process.

The DST integrates mechanisms to provide real-time updates, ensuring that users have access to the most up-to-date information related to supply chains, justice considerations, and CE practices, as well as emerging findings from across the JUST2CE project. By engaging with stakeholders through the testing and workshop phases, the tool can tap into their expertise, insights, and innovative approaches. This collaborative approach ensures that the DST remains responsive to the evolving needs of its users and reflects the latest advancements in sustainable practices and justice considerations.

[3.5] Decoloniality

Decolonisation forms a key pillar of the JUST2CE project, and derives from “acknowledging that racial, political, and social hierarchical orders of colonialism are still largely in place, having been absorbed into succeeding social orders in the post-colonial world (Quijano 2000; Bhopal, 2018; Yancy, 2017)” (Girei et al, Working Paper). In the context of the DST, we thus need to be mindful of the implicit logics that are embedded within our choice of framing, as well as core questions relating to the intended purpose of the tool. This necessitates serious consideration of how the needs of potential users may differ globally, and thus the testing phase will need to explicitly target users based within the global south.

It is also necessary to confront issues relating to data coverage disparities between the global north and south, and how this has the potential to bias any tool we develop. The initial MRIO dataset that is being used to develop the tool has a European bias in its coverage, and thus an important update to the tool must consider widening this coverage. It is also important to consider translation of the tool, and its accessibility to users with a variety of language needs.

[4] Testing

This section serves as a tentative guide to the testing methodology to be employed for the DST. To ensure the effectiveness and reliability of the DST, a rigorous testing approach has been adopted. Our testing efforts will be guided by the specific aspects of the DST, such as usability, user experience, accuracy of data, effectiveness in promoting awareness, and adherence to the principles of decoloniality and RRI.

The testing methodology for the DST project comprises three crucial phases: functional testing, performance testing, and user acceptance testing. Through functional testing, we verify that the DST performs its intended functions accurately. Performance testing ensures the tool's stability and responsiveness under different loads and conditions. User acceptance testing involves stakeholders to validate the tool's readiness for deployment. The suggested use cases and test scenarios provided in this document will serve as a foundation for our testing efforts.

[4.1] Functional Testing

Functional testing is essential to ensure that the DST accurately performs its intended functions. Effective functional testing ensures that the tool performs its intended functions correctly, providing users with reliable and accurate information. For thoroughly testing the DST's functionalities, validating its accuracy, and identifying any functional issues or deviations from expected behaviour, we will conduct the functional testing over a comprehensive set of test cases that cover all functional aspects of the DST.

Each test case relates to the functionalities of the tool outlined in Appendix A, and presents a clear objective, inputs, expected outputs, and any preconditions or dependencies. Test cases are designed to cover both positive scenarios (valid inputs, expected behaviour) and negative scenarios (invalid inputs, error handling).

[4.1.1] Test Case #1: User Input and Supply Chain Generation

Objective: Validate the timely generation of a typical supply chain based on sector and geographical inputs.

Test Steps:

1. Select a sector (e.g., Steel) and a geographical location (e.g., Italy).
2. Generate the 'typical supply chain'.

Expected Outcome: A supply chain is generated that accurately represents the selected sector and geographical location. This is performed in adequate computational time.

Data Validation: Ensure that the generated supply chain data corresponds to the selected sector and geographical location.

[4.1.2] Test Case #2: Map Visualisation

Objective: Verify the accuracy and functionality of the map visualization component.

Test Steps:

1. Display a generated supply chain on the map.
2. Zoom in and out on different regions of the map.
3. Click on nodes within the supply chain to view additional information.

Expected Outcome: The supply chain is visually represented on the map, and users can navigate and interact with the map successfully.

Data validation: Verify that the information displayed on the map, dashboard, and just transition directory is consistent and aligns with the underlying data sources.

[4.1.3] Test Case #3: Just Transition Overlay

Objective: Validate the presentation and accuracy of justice-related elements on the map.

Test Steps:

1. Select a supply chain and toggle the associated justice elements.
2. Verify that justice-related elements, such as environmental impact, labour conditions, or socio-economic factors, are displayed correctly.
3. Ensure that the elements detailed align with the selected sector and geographical location and the toggled selection.

Expected Outcome: The dashboard presents accurate justice-related indicators that reflect the selected supply chain and geographical context.

[4.1.4] Test Case #4: Search Functionality

Objective: Test the search functionality within the DST.

Test Steps:

1. Enter keywords related to a specific sector or justice aspect in the search bar.
2. Verify that relevant results, such as case studies or resources, are displayed.

3. Conduct searches with variations in keywords to validate search accuracy.

Expected Outcome: The search functionality returns relevant results related to the specified keywords, facilitating exploration and information retrieval.

[4.1.5] Test Case #5: Just Transition Directory Access

Objective: Validate the functionality of the just transition directory within the DST.

Test Steps:

1. Access the just transition directory from the main menu.
2. Verify that it provides resources, case studies, and best practices related to the just transition to a CE.
3. Navigate through the directory and verify the availability of relevant and diverse information.

Expected Outcome: The just transition directory offers a comprehensive collection of resources and information to support users in their exploration of the just transition concept.

[4.1.6] Test Case #6: Backend Functionality

Objective: Validate administrative access to the backend of the DST to add and update data.

Test Steps:

1. Successfully login to the backend of the website.
2. Perform updates to the just transition overlay data files and the just transition directory files.
3. Verify updates have been successfully pushed through to the front end of the website.

Expected Outcome: The backend allows an administrative user to login and provide basic updates to the just transition data files without compromising the integrity of the front end of the website.

[4.1.7] Testing Process

Test data will represent a variety of scenarios, including different sectors, geographical locations, and justice-related aspects. It will cover both expected and edge cases to validate the tool's behaviour in different situations.

Manual testing will be performed by executing the test cases step by step, following the predefined test procedures and recording the actual results for each test case. Actual results will be compared with the expected results to identify any discrepancies or functional issues.

Testing method	Description
User Interface Testing	We will verify that the user interface elements (the navigation, buttons, links, dropdowns, and other user interface components) and interactions within the DST are functioning as intended. The analysis will also cover usability aspects, such as readability, accessibility, and responsiveness.

Error Handling Testing We will test the DST's ability to handle errors and exceptions gracefully by inputting invalid or unexpected data to trigger error conditions to validate that appropriate error messages are displayed to the user. Test scenarios where network connectivity is lost or other unexpected failures occur to ensure the system handles such situations appropriately.

Compatibility Testing We will validate the DST's compatibility with different browsers, operating systems, and devices. Test the tool on various combinations of browsers (e.g., Chrome, Firefox, Safari), operating systems (e.g., Windows, macOS, Linux), and screen resolutions. Ensure that the tool functions correctly and displays appropriately across different platforms, including on mobile phones/devices.

Regression Testing We will perform regression testing after bug fixes or system updates to ensure that the previously working functionalities have not been adversely affected. That includes re-executing previously passed test cases to validate the stability of the system and to ensure that fixes or changes have not introduced new issues.

Table 5: Functional Testing methods

The test results will be documented, including any defects or issues encountered during testing and a test report will be generated summarising the testing activities, outcomes, and recommendations for improvement.

[4.2] Performance Testing

Performance testing will be conducted to gain insights into the DST's performance characteristics, identifying areas for improvement, and optimising the tool to ensure it can handle the anticipated user loads while delivering a smooth and responsive user experience. To assess the DST's ability to handle different loads and conditions, we will test the performance of the system under various conditions following the procedure as depicted in Figure 3. This involves firstly defining the user performance metrics and defining testing scenarios, before both load and stress testing of this system is carried out. As per the expected attendance at the international training workshops, we will aim to ensure smooth performance for a minimum of 75 parallel users.

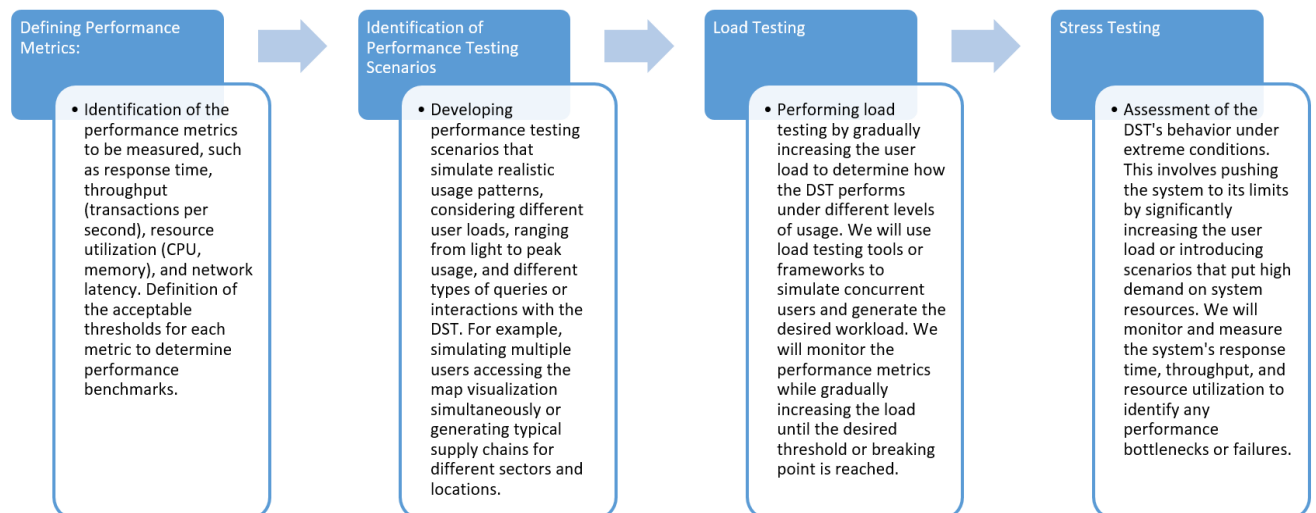


Figure 3: Functional Testing methods

During performance testing, we will use performance monitoring tools to collect data on system performance for identifying performance bottlenecks, pinpointing resource-intensive operations, and analysing response times. We will monitor CPU utilisation, memory usage, network traffic, and other relevant system metrics. The DST's code, database queries, network configurations, or other relevant components will be optimised to improve performance following the analysis of the performance testing results and identification of any performance issues or bottlenecks, as well as specific areas that require optimisation.

[4.3] Acceptance Testing

The acceptance testing will be conducted to ensure that the DST meets the requirements and expectations of its users in collaboration with stakeholders to validate the tool's readiness for deployment over a set of user profiles and corresponding acceptance test plans to reflect the specific context, target audience, and objectives of the DST. The acceptance test plans will ensure that the DST aligns with the stakeholders' needs and facilitate the validation of the tool's functionality, usability, and alignment with the desired outcomes. Acceptance testing will overlap with the coaching workshops described in Section 5.

[4.3.1] User Profiles

Deliverable 4.1 (Purvis et al., 2023a) identified various typologies of user through suggestions from members of the consortium and discussion relating to which actors should be engaged, these are listed as follows:

1. Companies: Startups, Entrepreneurs, SMEs, Co-operatives, Industrial parks
2. Policymakers: Public sector organisations/bodies; Local authorities (e.g. Sheffield City Council)
3. Civic organisations: Chambers of commerce; International Greek Exporters Association, SEVE
4. Non-Governmental Organisations: COP26 Coalition; European Environmental Bureau; PAGE, UN-led Partnership for Action on Green Economy; Chatham House; E3G; SEI
5. Social and Solidarity Economy Organisations / 'Civic bottom-up initiatives'
6. Researchers and Academics
7. Workers: Trade Unions; Informal economy actors
8. Consumers' associations
9. Communities
10. Activists/Activist Groups

Further discussions identified various dichotomies of user experience that must be accounted for and bridged (pp 26-27). As well as discussing users in terms of the amount of prior information they possessed, other ways of categorising users were highlighted, including: north/south; internal vs external to the production process; small vs big companies; and sectoral differences.

Some user profiles and corresponding acceptance test plans for the DST are given in Table 6. These scenarios cover a range of user interactions and tasks to ensure comprehensive testing and a thorough evaluation of the tool's effectiveness, usability, and alignment with the underlying values. Note, this list is not exhaustive, as we expect the workshops to identify further use cases and interactions that have not been anticipated at this stage of the tool's development.

Test user	User Profile	Acceptance Test Plan
Environmental Activist	An individual actively involved in environmental advocacy, with knowledge of CE principles and justice considerations	<ul style="list-style-type: none"> • Verify that the tool provides accurate and comprehensive information on environmental impacts of different supply chains. • Evaluate the effectiveness of the just transition directory in providing relevant resources and case studies related to environmental justice. • Assess the tool's ability to visualise and highlight sustainable practices within supply chains. • Validate the integration of environmental indicators and data in the dashboard, ensuring they align with recognised standards.
Policymaker	A government official or policymaker responsible for shaping policies and strategies which relate to sustainable practices.	<ul style="list-style-type: none"> • Evaluate the tool's ability to generate supply chains based on selected sectors and geographical locations, aligning with policy priorities. • Assess the dashboard's presentation of justice-related indicators and socio-economic data, relevant to policymaking. • Validate the relevance and usefulness of the just transition directory in providing policy guidance and case studies. • Verify that the tool supports policymakers in understanding the interconnectedness of global supply chains and identifying opportunities for intervention.
Social Justice Advocate	An individual advocating for social justice, focusing on labour rights and marginalised communities.	<ul style="list-style-type: none"> • Evaluate the tool's consideration of labour justice within supply chains, including fair working conditions and wages. • Assess the availability of information on supply chains related to sectors with high labour exploitation risks. • Verify that the just transition directory provides case studies and resources addressing labour justice and the empowerment of marginalised communities. • Validate that the tool supports the exploration of supply chains that prioritise social justice and inclusion.

Circular Economy Entrepreneur	An entrepreneur or business owner aiming to transition their business towards CE practices.	<ul style="list-style-type: none"> • Verify that the tool provides insights into CE practices within specific sectors and geographical locations. • Assess the usability of the map visualisation to identify potential suppliers, partners, or opportunities for CE initiatives. • Validate that the just transition directory offers relevant resources and best practices for businesses seeking to transition to circular models. • Evaluate the tool's effectiveness in helping entrepreneurs understand the environmental and social impacts of their supply chains.
Employee in a Multinational Company	An employee working in a multinational company with a role related to sustainability, supply chain management, or corporate social responsibility.	<ul style="list-style-type: none"> • Validate the DST's effectiveness in supporting sustainability initiatives and supply chain management within a multinational company. • Assess the tool's ability to capture and visualise sustainability performance across the supply chain. • Evaluate the tool's effectiveness in identifying areas of strength and improvement in terms of environmental and social impacts. • Identify opportunities for waste reduction, resource efficiency, or sustainable sourcing.
Backend user	A member of the JUST2CE team with administrative access to the tool. This user may have limited understanding of the tool's architecture but wishes to push several updates.	<ul style="list-style-type: none"> • Validate the suitability of the login portal and ease of updating data files. • Assess the comprehensiveness of the read me guides for a user who may have little knowledge of the tool's architecture and may have not participated in the design process. • Evaluate the tools effectiveness in identifying any potential issues with updated data files, e.g. flagging data that has been removed or corrupted.

Table 6: Preliminary user profiles for acceptance testing

[4.3.2] Identification and recruitment of testers

We will engage stakeholders and representatives from the target user groups, corresponding to the above mentioned user profiles, who will participate in the acceptance testing. Following a pilot session with colleagues/students to streamline the process, the 'coaching' workshops identified above, and further described in Section 5.2 will be used as a format for acceptance testing. Each partner will be responsible for recruiting participants, building on connections already established through the activities within WP2 and WP3. Within the session, users will be trained to have a good understanding of the tool's purpose and be able to provide valuable feedback. A mix of individuals with varying levels of knowledge about justice, supply chains, and circularity, and from different geographical locations will be invited to ensure the tool's effectiveness across regions and knowledge levels.

[4.3.3] Conducting user testing

We will organise both individual and group testing sessions with the recruited users, with the latter taking the form of the user coaching sessions. We will provide users with testing scenarios and observe their interactions with the DST. During testing sessions, the users will be encouraged to think aloud and share their feedback, including their impressions, challenges faced, areas of confusion, and suggestions for improvement.

We will collect qualitative and quantitative feedback from the test users. This will be done either through surveys, interviews, or feedback forms. Users will be asked specific questions about their experience with the tool, its usability, the clarity of information, their understanding of justice-related aspects, and their perception of decoloniality and RRI integration.

Individual testing sessions can either be done face to face with key participants, as well as rolling out the beta online and eliciting feedback both through the targeting of individuals, and elicitation of participants through the project's social media channels.

[4.3.4] Test Cases

Acceptance testing will be conducted by executing the following predefined test cases that cover various scenarios and functionalities of the DST, emphasising real-life usage situations.

1. **Exploring a Supply Chain:** Users will be asked to select a specific sector and geographical location of interest. They will be instructed to explore the generated typical supply chain for that sector on the map. We will observe their ability to navigate the supply chain visualisation, understand the connections between different nodes, and identify key components of the supply chain.
2. **Interacting with the just transition overlay:** Users will be provided with a set of justice-related elements displayed as pop-ups on the supply chain visualisation. They will be asked to interpret and analyse the information presented. We will evaluate their understanding of the justice aspects related to the selected supply chain and their ability to make informed judgments based on the data provided.
3. **Accessing the Just Transition Directory:** Users will be instructed to access the just transition directory within the tool. They will be asked to explore the case studies, resources, and additional information available. We will assess the ease of navigation, relevance of the provided resources, and the tool's ability to guide users towards further exploration and learning.
4. **Testing Sensitivity to global south Needs:** We will create scenarios that specifically address the needs and challenges of users in the global south. For example, users will be asked to explore a supply chain in a specific developing country or consider the justice implications for marginalised communities within a particular region. We will evaluate the tool's ability to provide relevant and context-specific information while incorporating decolonial perspectives.
5. **User Feedback and Suggestions:** Users will be provided with opportunities to provide feedback on various aspects of the DST. They will be asked about their overall impressions, usability, clarity of information, and suggestions for improvement. We will collect their feedback through interviews, surveys, or feedback forms and analyse their responses to identify areas for refinement.
6. **Learning and Exploration:** We will assess the tool's ability to promote learning and encourage users to explore new avenues of thinking and evaluate whether users feel inspired to consider justice-related dimensions of the CE and whether the DST facilitates the development of new insights or perspectives.

[5] Adoption

Based on the expertise of MedWaves, the Regional Activity Centre for Sustainable Consumption and Production (ARC) created by the Barcelona Convention Bureau, dissemination of the DST as well as the project's main results will be carried out by combining **capacity building and specific technical assistance activities**. These will target and engage key national stakeholders, representatives from start-ups/SMEs, and other key stakeholders identified from previous activity.

These types of **exploitation and dissemination activities** are key to communicate the project's aim, its main impacts, and results to parties who may then build on these findings as well as adopting suggestions. ARC plans for specific events to facilitate results uptake, aimed at both public and private sector actors, in order to exploit key project

outputs. As stipulated previously, these will consist of **3 International Training Workshops** (two in the EU and one in Africa) which are intended to transfer the final version of the DST and main project outputs, as well as **6 direct coaching activities** using the DST beta version as a means to extend reach and allow for the incorporation of important feedback from target user groups. Both activities aim at targeting both key national stakeholders (public policymakers), final end-users (start-ups and SMEs) and relevant stakeholders and actors with an interest in just CE practices.

[5.1] International Training Workshops

The 3 International Training Workshops will be organised in Brussels, Barcelona and South Africa between February and July 2024. Around 75 participants will be invited representing policymakers both at national and EU level, private stakeholders, and industry representatives. These sessions will be used to disseminate the wider findings of the project, but will also provide dedicated space for training and transfer of the DST.

Within the 3 international workshops, WP4 will focus on presenting the DST to both public and private users, enabling them to interact with it and showcase its main results and potential impacts. Specific capacity building sessions will be held on the DST in order to exploit its use to the full and communicate its benefits for both public policymaking and business planning. In addition, the international workshops will also provide an additional space to present key project outputs, results and lessons learned on different topics, such as gender, labour, climate change, geopolitical issues or social justice, and how these issues interact with the DST and its main exploitation of results.

[5.2] Coaching Activities

The 6 coaching activities will take place over one day and will bring together private actors, public representatives and relevant stakeholders to interact and learn about the DST, its main impacts, benefits and uses, as well as the systematic collection of feedback for the acceptance testing process.

These six sessions will mainly target actors and stakeholders that were identified during the national workshops developed under WP3, together with some other public and private candidates who could be re-identified. Thus, ARC in collaboration with project partners aim at organising one face-to-face and interactive coaching session in each partner country that organised a national workshop, i.e., **Spain, Italy, Greece, South Africa and the United Kingdom**. The remaining coaching session could take place both in a partner country or a non-partner country, especially if it is organised as part of a larger international, regional or national event where the benefits of the DST can be exploited to the fullest extent with a wider audience.

Some of these coaching sessions could take a hybrid or online format if necessary due to specific needs of partners.

Results and key achievement will be partially documented in **D6.7 (Public Engagement activities report)** and mainstreamed through the partners' networks. Moreover, the capacity-building and coaching activities carried out will be also documented in the final version of **D6.8 (International Training Reports)**.

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Appendix A: DST Macro Functionalities

This appendix details and summarises macro functionalities of the DST from a software requirements perspective.

[A1] Overview of Purpose and User Types

There are two intended user types for the platform, described as follows

User 1: General User - Any user of the tool external to the project. Expected to interact with the tool; no expertise or technical knowledge required. Expected to have an interest in supply chains and learning about just transition aspects. This user could be: a policy maker, a consumer, a researcher, a company manager, etc. It is important to note that different sub-categories of General Users might be interested in different perspectives offered by the tool (such as consumption- or production-based views, which are explained in the following).

User 2: Administrative - A user associated with JUST2CE, with some understanding of the structure of the tool, but less technical knowledge about its functioning. This user is expected to utilise backend functionality of the tool to update data files.

Tool Purpose:

- The DST is a learning tool, and thus its primary purpose is to encourage the user to consider and explore a) the global nature of supply chains, and b) how issues relating to justice are embedded within them. This is achieved by:
 - Visually depicting an approximation of the global extent of a chosen supply chain.
 - Producing several interactive ways to read and explore about (un)just practices and CE practices (MF2 & 3), thereby disseminating findings from other JUST2CE WPs.

Tool Structure:

The tool should be hosted online, and consists of 3 related but discreet macro-functionalities.

[A2] MF1: Typical Supply Chain Mapper tool

This MF forms the central visualisation of the tool, and is an organising structure for the latter MFs. It is also the main theoretical contribution from a supply chain research perspective.

MF1.1 User input: The user will be prompted to select the supply chain they wish to explore, inputting both a sector and country.

Requirement 1.1.1: Options for sector and country selection which correspond to database categories.

Requirement 1.1.2: Help text, user guidance, and prompts for sector categories via keywords/autocomplete.

Requirement 1.1.3 (lower priority): Allow user to choose between Consumption Based or Production Based perspective

Requirement 1.1.4 (lower priority / to be explored future): Additional user prompts relating to data source options, including dataset year and the option to use an extended dataset with more regional disaggregation

MF1.2 Typical Supply Chain Map generation: Based on user input, the tool will generate on a world map the locations and connectivity of major supply chain nodes.

Requirement 1.2.1: major supply chain nodes across several tiers identified and plotted on world map

Requirement 1.2.2: relative contribution of each node in terms of output identified to user

Requirement 1.2.3: nodes in successive tiers are connected by arrows

Requirement 1.2.4: The map is interactive and the user is able to zoom, scroll, and hover over countries/coordinates for information pop ups (see MF2). This may include toggles for displaying less/more information for visual clarity.

(System) Requirement 1.3: Hosting of input-output data files in format accessible to the tool

Requirement 1.3.1: Assembling initial matrix files from Exiobase

Requirement 1.3.2: Pre-aggregation of matrices by sector (see below)

Requirement 1.3.3: Calculation of A^n matrices, Leontief Inverse, and Diagonalised \hat{Y} matrix

Requirement 1.4 (lower priority): Capability for the tool to display on the map a limited number of extended impact/satellite indicators for each identified node

[A2] MF2: Just Transition Overlay

It is important to note that this functionality is independent of MF1, and all data sources for this are separate from the IO matrices. So, no need for calculations involving IO matrices and this further layer of data will be required.

MF2.1 Map overlay: Hovering over countries/major nodes will highlight pop-up justice info that the user can click through to read more.

Requirement 2.1.1: The map will include geolocation data relating to elements of justice resolved at a national/regional level

Requirement 2.1.2: The map will include geolocation data relating to elements of justice resolved at a national/regional & sectoral level

Requirement 2.1.3: Hovering over countries/nodes produces a pop-up that can be clicked through to more information within the directory (MF3).

Requirement 2.1.4: Data from WP1's Atlas of Just CE practices to be embedded within the map.

Requirement 2.1.5: (uncertain): Satellite/impact data extracted from the appropriate database may also be displayed here on a country/sector basis (see requirement 1.5).

MF2.2 Backend functionality: this will allow a user from the research team to update, refine, and add to the underlying MF2 data set.

Requirement 2.2.1: A backend with restricted functionality that allows this user type to update MF2 data.

Requirement 2.2.2: Basic readme text to support this user making these updates.

MF2.3 User submission of data: allow the general user to submit data for inclusion in the MF2 datasets in the form determined by their structures.

[A3] MF3: Just Transition Directory

MF3.1 Directory section of website

Requirement 3.1.1: Section of the website where qualitative information, links, and images may be hosted and presented in a visually appealing way.

Requirement 3.1.2: Organisation such that items within the directory may be hyperlinked to from other parts of the site.

Requirement 3.1.3: Basic search functionality.

Requirement 3.1.4: Organisation along the themes of: Gender Justice, Environmental Justice, Labour Justice, and Supply Chain Visibility

MF3.2 Backend functionality to allow for content to be added and updated

Requirement 3.2.1: Backend functionality so that this information can be easily edited and updated by lay members of the JUST2CE team.



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