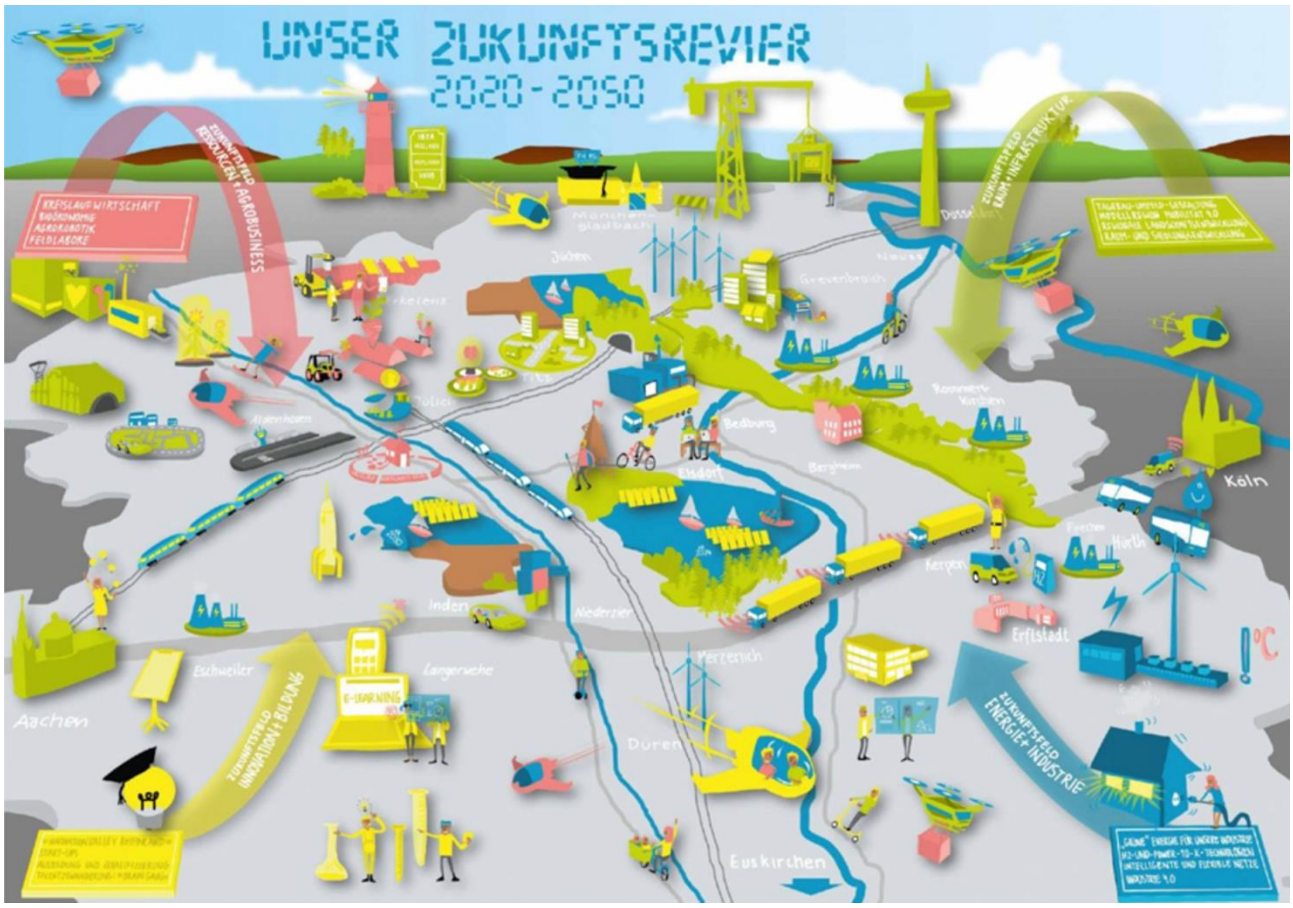

Just (Energy) Transition as an interdisciplinary transformation challenge: Learning from the German experience

Discussion Paper

commissioned by

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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Just (Energy) Transition as an interdisciplinary transformation challenge: Learning from the German experience

This Paper is an expert assessment created by Mesopartner as part of the GIZ´s business development project 18626 "Just (Energy) Transition". The results are based on Mesopartner's own research and interviews.

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Abbreviation List

APR	Action Program Ruhr
BMWK	Federal Ministry for Economic Affairs and Climate Action
CCCL	Coal Commission and Coal Exit Laws
CLIP	Cooperation, Legitimacy, Interest, and Power
CSF	Critical Success Factors
DPR	Development Program Ruhr
EC	European Commission
ECSC	European Coal and Steel Community
EU	European Union
EU ETS	European Emissions Trading Scheme
FICSR	Future Initiative for Coal and Steel Regions
GRW	*Gemeinschaftsaufgabe "Verbesserung der regionalen Wirtschaftsstruktur“* Joint National/Länder Task for the Improvement of Regional Economic Structures
IBA	International Architecture Exhibition
IBAEP	IBA Emscher Park
ILO	International Labour Organisation
JET	Just Energy Transition
JT	Just Transition
LED	Local Economic Development
NRW	North Rhine–Westphalia
R&D	Research and Development
SMEs	Small and medium enterprises
WWF	World Wildlife Fund
ZRR	Zukunftsagentur Rheinisches Revier (Future Agency Rhenish region)

Summary of the Study

The Gesellschaft für Internationale Zusammenarbeit (GIZ) commissioned Mesopartner PartG to summarize Germany's Just Transition experience focusing on economic structural change and coal phase-out in selected regions of Germany. The German Just Transition Process should be analysed in the context of its time and the policy instruments used during specific periods. Germany's coal and steel industry played a crucial role in shaping industrialisation and contributed significantly to the reconstruction and economic development after World War II.

At its beginning in the 1950s, the structural change process of coal and steel production in the Ruhr Valley was not considered a "Just Transition" process. To fully comprehend the various policies promoted in Germany over the decades, it is crucial to understand the country's context, including its social market economy and social security system. This paper highlights the significance of the social market system and the subsidies available that enabled the implementation of cushion policies for coal and steel workers in Germany. Therefore, examining the different decades of policy support that involved distinct learning processes and experimentation with various support instruments is imperative.

The primary policy shift within the last six decades was moving from a centralistic and top-down policy design process towards a more bottom-up-driven approach. During the 1960s and 1970s, the national government and the federal state in North Rhine Westphalia promoted a conserving approach to the sectors based on solid alliances between political government parties, large coal and steel companies and labour unions. This phase in the Ruhr Valley was shaped by specific support measures for coal and steel workers leaving the sector. Reskilling efforts and reemployment support measures in other large and mass employment sectors were accompanied by support measures for the declining sectors and infrastructure improvements of the cities affected by the decline of their industries. The second phase of structural change policies started in the 1980s applying a bottom-up approach, giving municipalities and local sector representatives a more critical role in shaping bottom-up policies and using endogenous decision-making structures. The latter led to the promotion of more participatory approaches for identifying appropriate solutions. Strengthening local governments' role in local economic development and strengthening linkages between local knowledge organisations, universities, and local governments led to more effective promotion activities for SME support.

An initiative called the "International Architecture Exhibition" (Internationale Bauausstellung) was utilised to gather fresh ideas from both local and international sources to enhance the effectiveness of structural change in mining areas. This strategy continued into the early 2000s with the encouragement of clusters, competence fields, technology parks, and local innovation systems.

Based on evaluations of the effectiveness of the respective policies during the decades, it can be stated that the bottom-up policies were crucial in strengthening new competitive advantages within the regions in West and East Germany. On the other hand, the cushioning, re-employment and educational efforts enabled a smooth social transition and reskilling of many workers. At the same time, the incentives during the first decades focused on restructuring declining sectors and technology investment support of these sectors. This slowed down the structural change and prolonged the slow decline process.

The paper describes key instruments used throughout the decades and values the laboratory of development priorities that were promoted in Germany. It provides a rich experience considering the context in which these priorities have been identified, promoted and implemented.

The transferability of such socio-economic concepts from one country to another is a complex process that requires careful planning and execution. The process begins by evaluating whether these concepts are applicable and adaptable across different contexts. To ensure successful transferability, conducting a thorough analysis is essential, as adapting the concepts to suit local contexts and continuously monitoring and adjusting the process as necessary. The transfer process is dynamic and requires collaboration, flexibility, and a deep understanding of the origin and destination environments and contexts.

The paper introduces a transferability framework consisting of four phases that aim to facilitate the identification of suitable instruments and measures applied in Germany (and potentially other countries and regions). The framework also aims to assess the transferability of these measures to the specific context of a target country or region, pilot the adjusted measures in the new environment, monitor the results, and upscale the application.

Based on the transferability deliberations, various inspiring practices from the German experience could inform a service portfolio from GIZ. The paper's final section outlines key measures to consider when transferring knowledge and exchanging information with partner countries. These institutional, policy, and network measures may be considered good practice in Germany but are not present similarly in developing countries. At the end of their paper, the authors present four types of relevant service portfolios. These portfolios are based on the existing service offerings of GIZ and integrate the transferability considerations of German experience discussed throughout the paper.

1 Introduction

1.1 Context of the study

Germany's historic coal phase-out and the 60-year history of the energy transition have been accompanied by various support and mitigation measures. These structural change experiences can also be defined as a historical "Just Transition" process. The Gesellschaft für Internationale Zusammenarbeit (GIZ) commissioned Mesopartner PartG to summarise the valuable regional and national experiences of economic structural change and coal phase-out in selected regions of Germany, in particular learning experiences about political, financial and technical measures as well as implementation instruments, implementation mechanisms and partner constellations in the context of the German Just Energy Transition. It is intended to provide recommendations that support the conceptual and technical development of GIZ's interdisciplinary advisory approaches and services on Just Energy Transition in various partner countries.

The objective of Just Transition is to shift from environmentally damaging industries to sustainable ones in a fair and equitable manner. This involves protecting workers, supporting affected communities, promoting environmental sustainability, ensuring social equity and inclusive planning to prevent economic harm and social disparities during the transition. The ILO (ILO, 2022) explains that a Just Transition "*means greening the economy in a way that is fair and inclusive of everyone concerned, creating decent work opportunities and leaving no one behind*".

Just Transition, as understood by GIZ, "*is a socially just design of medium- and long-term structural changes, with the aim of setting up the economy, society and state in a climate- and environmentally friendly way. Just Transition must respond to the following challenges: (1) drastically reduce the country's greenhouse gas emissions and (2) significantly and equitably improve the living conditions of the population*". Further, Just Transitions has seven principles: climate impact, leave no one behind, inclusiveness and transparency, tailor-made solutions and partner alignment, scale, regional focus, long-term orientation and flexibility (GIZ, 2023a).

The concept of Just Energy Transition is a part of the larger idea of "Just Transition." It focuses on the move away from traditional energy sources that rely on fossil fuels like coal and instead embracing cleaner and sustainable alternatives. Just like the broader framework of Just Transition, the aim of Just Energy Transition is to ensure fairness and equality. This transition is especially important when tackling climate change and the need to decrease greenhouse gas emissions.

The Energiewende, also known as the "energy transition," is a significant shift taking place in Germany. It aims to move away from traditional energy sources like fossil fuels and nuclear power, and instead prioritize renewable energy options while still focusing on sustainability and protecting the environment. Social responsibility is also a key aspect of this transition, including worker support, community involvement, and safety nets. The process of phasing out coal, known as the "coal exit" or "Kohleausstieg," is a major part of this transition. It involves policy decisions and planning activities, starting with the creation of the Coal Commission in 2018 and the enactment of the Coal Exit Law in 2020. The goal of the coal phase-out is to minimize its impact on the environment and society as a whole.

However, Germany has a longer history of converting coal-dominated regions to new industries, dating back to the 20th century. Two typical examples are the Ruhr Valley transformation and the Lusatia region. The Ruhr Valley in western Germany was traditionally a coal and steel production centre. In the mid-20th century, the region faced an economic downturn due to heavy industry

decline. The German government and the European Coal and Steel Community (ECSC) invested in economic diversification to invigorate the region, promoting new sectors such as technology, services, and cultural industries. The Lusatia region in Eastern Germany has historically been tied to lignite (soft coal) mining and power generation. The German government has been working on a long-term plan to phase out coal in the region. To support the transition to a more sustainable economy, investments were made in renewable energy, research, and education.

Many years of experience with structural policy and economic and employment promotion in North-Rhine Westphalia, specifically in the Ruhr Valley, have led to a wealth of experience that can be used for German development cooperation's Just Transition programmes (Meyer-Stamer, Jörg, 2000). In addition to structural policy, economic development and employment promotion, social policy measures were applied.

This study aims to gather information on the regional and national experiences of economic structural change and coal phase-out in specific regions of Germany. The study analyses the political, financial, and technical measures and the implementation instruments, mechanisms, and partners involved in the German Just Energy Transition and structural economic change context. This study's recommendations will guide GIZ's interdisciplinary consulting approaches and service offerings related to Just Transition and economic structural change across various sectors and partner countries.

1.2 Current debate on „Just Transition" in Germany

The ongoing discussions about Just Transition in Germany are mainly focused on the economic transformation taking place in relation to the coal phase-out, including how fast it should happen and how it should be implemented. Other important topics being discussed are how to provide support to coal workers and the regions affected by this change, how to balance environmental goals with social equity, and how to expand renewable energy. The discussions emphasize the need for a smooth and fair transition while addressing climate targets and supporting marginalized communities.

In recent years, Germany has implemented various social cushioning measures to soften the impact of climate change mitigation and adaptation efforts on vulnerable populations. These measures include energy price regulation, subsidies for low-income households, a strong social safety net, worker support programs, investments in affected regions, community engagement, and other Just Transition initiatives.

Germany can learn from its historical experiences with coal and steel structural change processes to guide its ongoing energy transition. These lessons show the importance of diversification, innovation, social support, community engagement, long-term planning, environmental responsibility, international collaboration, and adaptability as key elements of a successful transition to a sustainable future.

1.3 Focus of the paper on „Just Transition" in coal regions

Considering the study's objectives and the relevant German history sketched above, the study focuses on experiences from the past structural change process and current activities to revitalize regions undergoing energy change processes. Among the Just Transition initiatives, it concentrates on socio-political measures and active economic development policies to cushion the negative consequences of shifting from fossil to renewable energy sources. These policies and initiatives will

be described exemplarily for one region in East Germany (Lusatia) and one in West Germany (Ruhr Valley). Hence, the study will not address Just Transition efforts of a broader set of climate change mitigation and adaptation measures. Rather, this literature-based study tries to answer the question: *How did Germany attempt to leave no one behind during the last decades' coal phaseout and energy transition processes?*

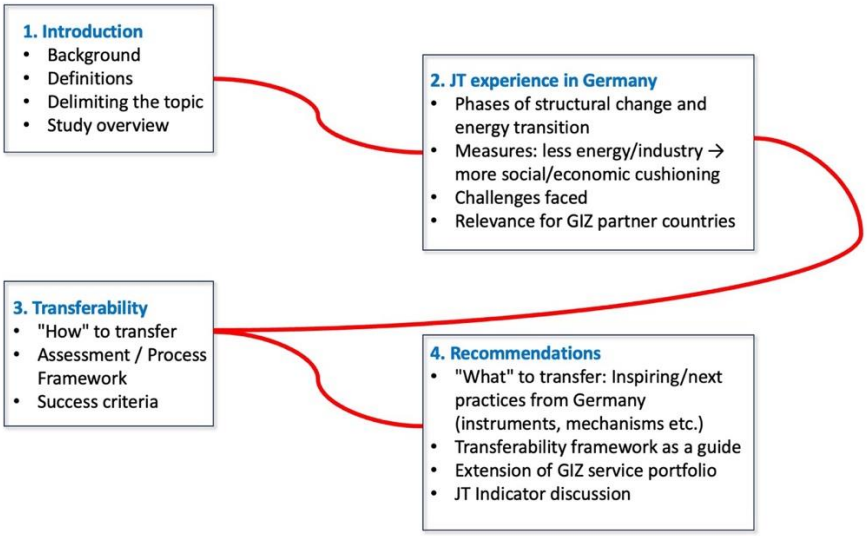

Figure 1: Logical flow of the study

Chapter 2 provides an in-depth analysis of Germany's industrial and energy transition history with its unique context of a social market economy and stakeholder structures. The challenges that arose during these transformational processes and the attempts to overcome them are reflected upon.

Chapter 3 discusses the transferability of the German Just Transition experiences, highlighting that context matters. The critical success factors of transferability can be identified and turned into a framework to navigate the transfer of concepts and measures to GIZ's partner countries. A multi-phased transferability framework is presented to address the question of "how" to transfer socio-economic concepts in a structured manner between countries.

Chapter 4 includes suggestions on which German Just Transition practices could be used as examples for other countries to follow. The focus is on especially inspiring ideas. By looking at both the "what" and the "how" of transferring these practices, conclusions are drawn about what GIZ should offer in the future, and we start thinking about how we can measure success in Just Transition projects.

2 Key "Just transition" experiences from Germany

2.1 The industrial transition during the last 60 years

Short summary of the structural change process

Sectors, economic locations and living spaces are coevolving. When one visits the industrial heritage routes in the hard coal Ruhr Valley, where abandoned collieries and heavy industry buildings are now industrial heritage museums, or Lusatia, where seascape stands as a reminder of former lignite mining fields, it is difficult to imagine that just 60 years ago, the regions were still dominated by a mining and working culture that involved generations of families. Interest coalitions of companies,

politicians, and trade unions shaped political and economic decisions and dominated network relationships. The regions have undergone continuous deindustrialization, but active social and economic development policies have provided support. Today, some literature refers to the past 60 years as a "German Just Transition" period. Until the early 1990s, the process of industrial and societal restructuring was driven by the economic development cycle of sectors in a liberalized world market rather than the ambition to change the energy system due to the risks of climate change. Coal and steel production and its supplier industries experienced a competitiveness crisis. The previous backbone of the German economy started to shrink and decline in the 1950s due to increasing production costs and competition from other countries.[1] Traditional services and physical infrastructure became obsolete or were repurposed as valuable assets for emerging sectors. Still, the reconfiguration and restructuring of the economy went through a “just” transition process during the past 60 years. Active economic policies linked development with employment, skills, and social policies.

At the beginning of the 20th century, Germany was the third-largest producer of hard coal worldwide (Furnaro and et al., 2021), p. 7). In the 1950s, 10% of workers in coal regions worked in the mining sector (WWF, 2019 p. 32), not considering steel production and all interrelated industries (CES, 2023). Within 60 years, the regions have moved from steel and coal production towards knowledge-intensive and service-oriented sectors. Cities in the Ruhr Valley, such as Dortmund, are transitioning from coal, steel, and beer production to focus on logistics, micro/nanotechnology, and IT/software (Schroeter, 2002). In all regions where lignite mining used to take place, the most important manufacturing sectors today are mechanical engineering, fabricated metal production, and food and animal feed production. In many regions, the service sector has already surpassed the manufacturing sector in terms of job opportunities. This implies that new sectors have emerged, which require new knowledge and skills, and have also necessitated the development of infrastructure such as universities, capacity building centres, technology and innovation parks.

[1] The reason for the increasing lack of competitiveness of the German hard coal mining industry was that the coal cannot be mined in opencast or at shallow depths, as is the case in the world's leading hard coal exporting countries, e.g. the USA, South Africa and Australia. German hard coal must be extracted at depths of up to 1 500 metres, which increases costs considerably. The geological situation in Germany can therefore not be compared with the conditions in other countries of the world (Europäische Kommission, 2007). Additionally, after the liberalization of the energy sector, cheap imported oil as well as the diversification of the energy mix toward nuclear, natural gas, and oil gained importance (Scott and et al., 2022). Domestic demand for hard coal began to decline at the end of the 1950s. Imports of cheaper hard coal replaced domestic production, and the demand from the steel industry, one of the main consumers of German hard coal, also declined (Furnaro and et al., 2021). Additionally, it has be mentioned that the increasing unemployment numbers in the Ruhr area as well as in the lignite mining regions came especially from the rising unemployment from supplier companies who were not covered by many of the cushion policies for coal and steel workers.

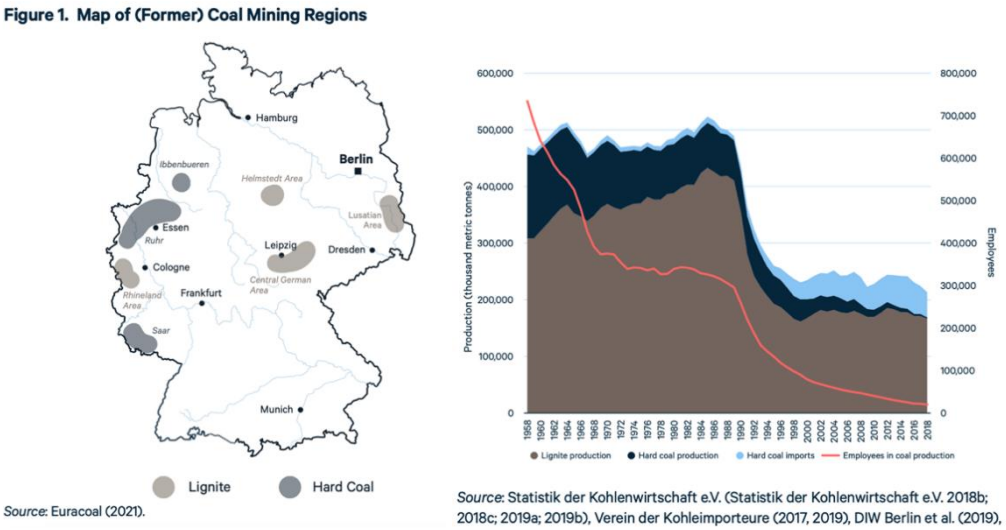

Figure 2: Map and statistics of former coal mining in Germany
Source: (Furnaro and et al., 2021)

Germany's coal, energy, and steel production can be distinguished by three factors, highlighting its structural changes over the past 60 years.

a. East versus West German realities,

b. hard coal versus lignite coal mining,

c. mining in larger cities and agglomeration areas versus rural areas.

Figure 2 shows that hard coal deposits were mainly concentrated in West Germany, especially in the Ruhr Valley, with 123 million tons of mining production annually, and the Saarland, with 16 million tons annually. Over 600,000 people were employed during the peak time in 1957 in hard coal production in Germany, and production was done mainly in highly dense and industrialized city areas. In only ten years, the employment dropped to 280.000 and continued to reduce steadily until 2018, when only around 5,000 people were employed in the mining-related sector activities.[2] Germany's last remaining hard coal mine was closed in 2018 (Furnaro and et al., 2021). In contrast, lignite deposits are distributed in West and East Germany, produced in open pits of the Rhineland, Lusatia and Central Germany. The eastern coal mining regions (Central Germany, Lusatia) are mostly rural. Lignite mining was especially promoted in East Germany. In West Germany, the number of employees in lignite mining peaked in 1958 at 38,700 and went down to 9,900 (WWF, 2019) by 2016. In 1985, 90% of lignite was mined in East Germany, reaching its peak in the same year with a production of 430 million tons and around 160,000 employees. After reunification, the lignite sector declined sharply due to a lack of competitiveness and production efficiency.[3] In contrast to the gradual hard coal decline, lignite production declined radically. Between 1989 and 1994, more than 100,000 employees lost their jobs in East Germany.

[2] Kohlenstatistik, https://kohlenstatistik.de.

[3] "The reason was the lack of productivity: in 1989, 109.9 million tonnes of lignite were produced in West Germany by 17,900 employees (or an average of 6.1 million tonnes per employee). At the same time, 156,700 employees in East Germany produced 300.8 million tonnes (or an average of 1.9 million tonnes per employee)." (WWF, 2019)

Shifting policy trends during the decades

To comprehend Germany's successful just economic transition process, examining the historical backdrop in which Germany has pushed for this change is crucial. The process was not linear and involved various phases of learning, different priorities, and interest coalitions at play.

The last 60 years of the coal and steel transition process were determined by some system-inherent elements shaped by the German political, institutional, and economic set-up and its path dependency.

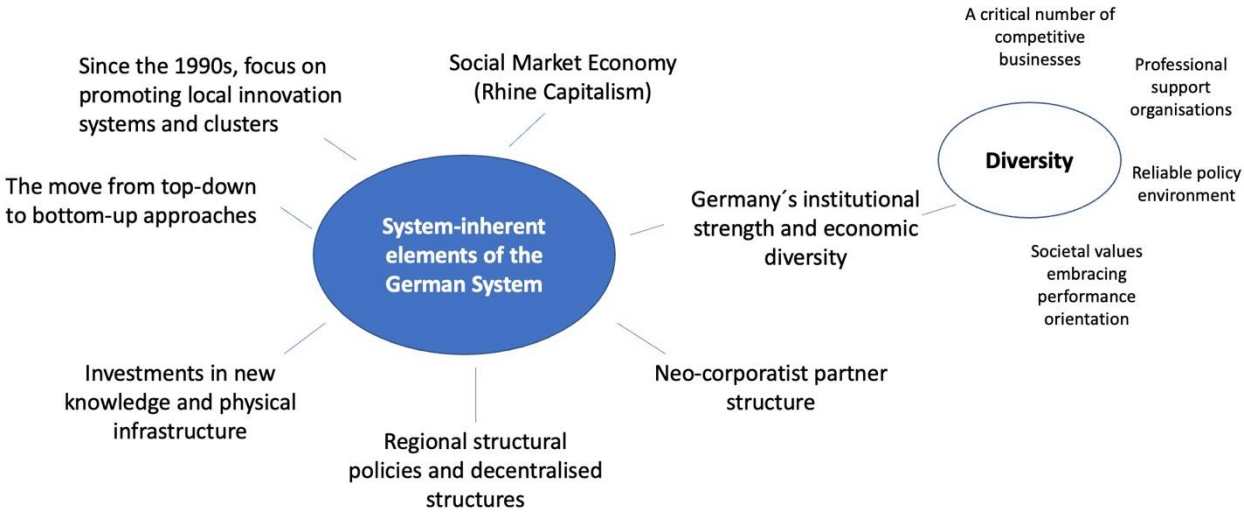

Figure 3: System-inherent elements of the German System

- Following World War II, the social market economy, also known as the Rhine Capitalism System Model, was introduced in Germany. This model consisted of a liberal economic system, social policies, and regulations to establish fair competition within markets, as well as the creation of a welfare state. The basic social policies were implemented to cushion the economic and employment shifts during the coal transition phase. These policies included unemployment insurance, access to good public healthcare, and a long-term care system after retirement.
- **Economic strength and diversity:** During the 1950s, Germany had a diversified economy with a strong demand for labour in sectors such as machine building, automotive, chemical, and other services. As a result, immigration was heavily supported in the 1960s to manage the demand for cheap labour.[4]
- The **German neo-corporatist partner structure**, an **interest coalition**, refers to a tight network of participation and organisation between trade unions, politicians and the corporate sector (Eichhorst and Weishaupt, 2013). The coal and steel sector had the strongest worker unions with high co-determination rights in their companies. As a result, worker rights movements were strong. Their political alliances, especially with the labour-oriented social democratic parties, let to industrial policies promoting especially large-scale investors as well as towards a coalition interest that was interested in holding on to the traditional sectors and slowing down the transition process. This alliance of interests was also strong in fighting and assuring cushion policies like early retirement plans and long-term subsidies for the sector. (Furnaro and et al., 2021). Thus, the coalition was also used to undermine change and mitigate impact.

[4] Historisches Lexikon, Gastarbeiter, https://www.historisches-lexikon-bayerns.de/Lexikon/Gastarbeiter

- **Relevant regional development and structural policies:** Germany's Constitution aims to reduce regional disparities, leading to policies jointly implemented by the federal government and the federal states. Funds like the Joint Task for the Improvement of Regional Economic (*Gemeinschaftsaufgabe "Verbesserung der regionalen Wirtschaftsstruktur*", GRW) and EU Structural Funds form the financial basis of these development policies. Germany's coal and steel regions have benefitted, and continue to benefit today, from these funds to promote the restructuring of their economies.
- **Investments in new knowledge and physical infrastructure**: In West Germany, the 1970s and 1980s were characterised by an investment surge into new universities, flexible employment promotion and diverse vocational training programs. After the reunification of Germany in 1990, these types of investment also began to gain popularity in East Germany, as future competence fields require specialisation and knowledge-based development.
- **The move from top-down to bottom-up approaches**: Since the 1980s, there has been a shift towards more bottom-up, participatory, and network-driven approaches to development. Local governments and business networks have played important roles in driving change. Old industrial infrastructure has been converted into cultural or economic assets for new start-up or cluster promotion activities, while urban development infrastructure has been renewed. Local universities have specialized in various fields and opened technology and innovation centres, providing strong support for new start-ups and small-to-medium enterprises (SMEs).
- Since the 1990s, there has been a strong emphasis on **promoting local innovation systems and clusters**. This often-involved local economic development agencies working together with local knowledge organizations and development agencies to implement concrete development projects. Funds were provided by the EU, federal and state levels with the goal of creating knowledge networks between businesses and support organizations. This has led to the strengthening of local ecosystems through strong interrelation efforts.

2.2 The German context: Social cushion policies and economic institutional setting

The management of structural change and Just Transition processes requires the consideration of the specific context, the capability of designing respective policies, the interest coalitions of stakeholders involved, and the ability to finance new development opportunities. A key contextual element to consider is the social market economy in Germany introduced after the 2nd World War. The German past-war government opted for an economic development model that encourages individual freedom and entrepreneurship and at the same time assures a welfare state and a solidarity-based approach in which the richer groups of society support the less well-off through transfer payments.[5] This economic system differs from those many developing countries apply. The Just Transition process in Germany should be reflected against the social elements and the socio-cultural and competitiveness-related elements.

The German Social Security System factors, also called "baseline policies" provided the basic assurance of a Just Transition process. Table 1 provides an overview of these policies.

[5] The current Federal Ministry for Economic Affairs and Climate Action (BMWK, 2022) emphasises that the most important task for our time will be to turn the social market economy into an ecological and social market economy.

Area	Examples
Unemployment	Unemployment benefits, job placement, vocational training
Retirement	Retirement pension
Health care	Prevention, early detection, treatment, sick leave, maternity leave allowance
Accidents	Work accidents prevention and insurance, rehabilitation, vocational rehabilitation, disability, and injury pensions
Long-term care	Support in case of care, dependency on care

Table 1: German Social Security System
Source: Furnaro and et al., 2021

- **Unemployment insurance** provides a safety net for workers and businesses during crises. It also includes income support to job seekers and employees with insufficient incomes or not entitled to unemployment insurance. This system is funded by employee and employer contributions, which is possible in a competitive economy with relatively high social insurance contributions.
- The **pension system** in Germany makes public retirement insurance mandatory for all employees, supplemented in many cases by occupational and private pensions. A benefit of the pension insurance system that coal workers commonly use is early retirement (Furnaro and et al., 2021).
- Access to a professional **public health care system** is based on a health care insurance system that supports prevention, early detection, accident insurance and long-term care of retirees.
- **A labour market system** that supports the dual system of vocational training, but beyond that, specialised reskilling and job reorientation support, job placement coaching through job centres in cities and specific employability programs for low-skilled and long-term unemployed.
- Labour law aspects including collective bargaining and codetermination aspects (*Mitbestimmung*) that provide workers and unions with a strong role in fighting for their rights and incomes in company and industries. The codetermination through work councils (*Betriebsrat*) and supervisory boards (*Aufsichtsrat*) enable workers to participate in management decisions at the company level. The trade unions negotiate collective agreements at the industry level. This worker power played an important role in the fight for additional compensation in the coal and steel sector during the transition process.

It is important to consider sociocultural and competitive factors when analysing the transition in Germany (Meyer-Stamer, 2000).

- At the business level, a **critical number of competitive,** often export-oriented **SMEs,** especially in West Germany with its "*Mittelstand*" generated 54.4% of Germany's employment in 2020.[6] Unlike many survivalists and less growth-oriented businesses in developing countries, this SME structure operates in a highly competitive environment that demands continuous improvements and learning. Moreover, these businesses offer ample employment and career prospects that are sustainable in the long run.
- The **existence of professional and specialised support organisations** and service providers supporting businesses and workers, e.g., regarding technology investments, quality assurance, demand-oriented vocational training, specialisation services, and knowledge management.

[6] IFM (2023)

- **From a policy perspective, long-lasting experience** in the design of structural reform and industrial policies since the 1980s. This includes local development strategies focused on business promotion.
- **Stable generic and business-friendly framework conditions** and macroeconomic policies that provide planning certainty for businesses.
- From a general sociocultural perspective, values embrace competitiveness and performance orientation.
- A **decentralised political system** with a dominant subsidiarity principle to enhance performance and solution efforts at the local, regional, and national levels.

One must consider these framework conditions to fully comprehend the transition process in Germany's coal and steel sector. The social market system aided the coal and steel sector during the transition period. The collaboration between policy representatives, large company owners, and labor unions led to the implementation of early retirement programs, infrastructure investments, and support for new sectors. This, in turn, helped reorientate employees and ensured a smooth transition process.

2.3 Past policies and stakeholder structures influencing "Just Transition" processes

This paper along with the literature differentiate trends, shifts of mindsets and setting new priorities by decades since the 1950s. Sociological papers, books and novels emphasize dominant narratives throughout different times and decades. Table 2 presents some narratives found in literature and decades of structural change. The list is not exhaustive.

Time	Typical messages	Explanation	Coalitions/actors	Emphasis
1950s and earlier	***"The Black Wonder", "The Black Gold"*** [7]	Resource as a symbol of growth, prosperity and industrialisation	Strong linkage to worker and regional identity; workers' culture	Strong trade unions, close links with social democracy and political workers' cleavages
1960s/1970s	***If we give up mining, then good night, Germany!*** [8]	Change but adherence to energy self-sufficiency and energy security	Large demonstrations, strikes and protests; energy security thinking dominates; social Just Transition efforts for workers	consolidation of corporate structures; belief in efficiency; competition through technological innovation
1970s/1980s	***"We need to think forward. Let's get rid of old myths!"*** [9]	Entrepreneurship and education as new focus	Newly educated middle class; new education and employment patterns emerge	Newly emerging job opportunities; loss of traditional worker cleavages in the party system
1990s/2000s	***"The coal phase-out is an opportunity for new social and economic development in the region!"*** [10]	Identification of endogenous potentials; new sectors and businesses targeted	Strong linkages between cluster promoters, new emerging businesses, local governments	New support programs; bottom-up support structures; local motivated actor.
2010s/2020s	***"Again we are the losers of another transition process!"*** [11]	After radical transformation shifts in East Germany following the reunification	Low educated class with lacking employment opportunities;	Political cleavages with radical right party AFD denying climate change

[7] Die Geschichte des Steinkohlenbergbaus, https://bergmaennischer-traditionsverein.de/geschichtliches/
[8] Seligmann, 2008
[9] Seligmann, 2008
[10] Hermwille, 2023
[11] BBSR (2022)

		manifestation of left-behind regions	worker still engaged in lignite mining or supplier industries	and the need for energy transition
2020s	***"A slow coal phase-out due to lobby interests!"***[12]	Critical voices and groups that demand a quicker energy transition process	Climate movements, environmental groups and local residents' initiatives	Demand for quicker phase-out; saving lignite mining villages and towns, Hambacher Forest, Lützerath.

Table 2: Narratives spread during the JT phases in Germany

The narratives demonstrate the deep roots of societal and political change. They illustrate contemporary values and beliefs specific to certain societal groups and social classes. Certain slogans can often make narratives more tangible and easier to categorize. The narratives expressed through slogans in the above table paint a simplified picture and sound black and white. The reality is more complex, as the following sections will show.

2.3.1 Managing the coal and steel transition: targeted policies during the 1960s/1970s

The following chapters analyse the Just Transition process in Germany with a particular focus on the Ruhr Valley. The region was one of the first to experience significant effects from the structural change process. During that time, lignite mining and production were still on the rise in East Germany. The relevant literature defines the policies in the Ruhr Valley during the 1960s and 1970s as "preserving policies" (Furnaro and et al., 2021) or "centralised policy" phase (WWF, 2019).

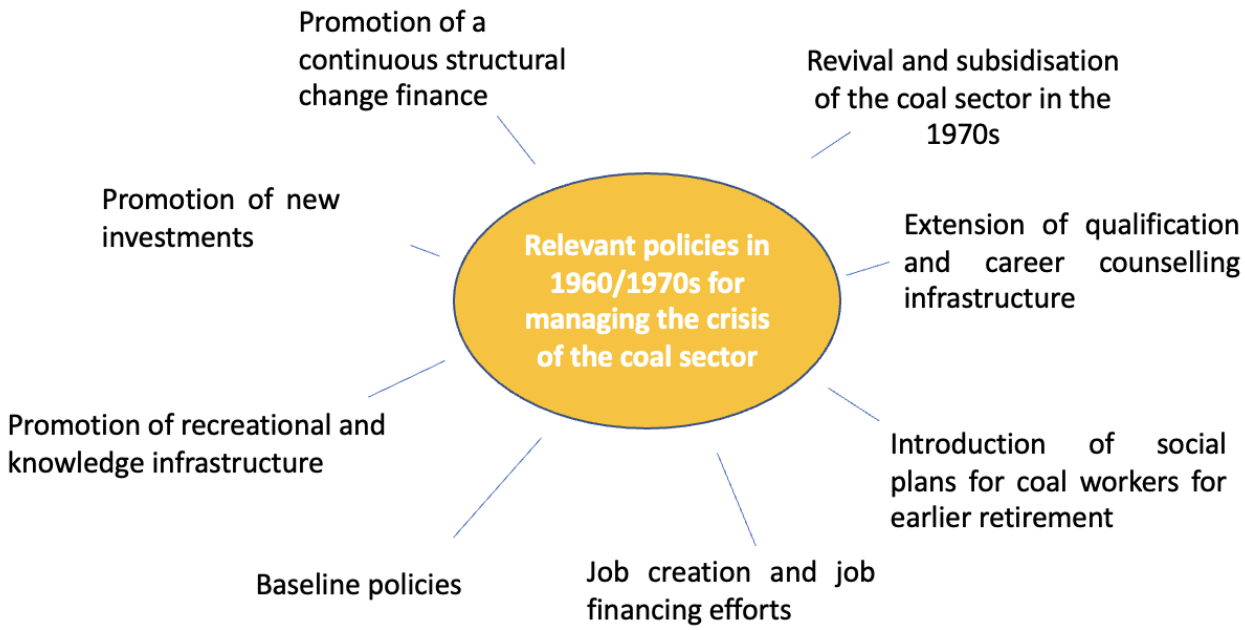

Figure 4: Structural change policies in the 1960s/1970s

Since the 1950s, structural policy (*Strukturpolitik*) has been a key concept in supporting the transition of declining regions in Germany. It involved industrial policies that support sectors facing structural change pressure and regional development policies that promote economic growth in subnational regions affected by economic decline (Furnaro and et al., 2021).

[12] Hermwille, 2023)

Promotion of recreational and knowledge infrastructure

In the late 1950s, Germany implemented policies to aid the coal regions in their transition. These policies were designed to protect the coal industry by encouraging production and improving infrastructure. At the time, regional structural policy was seen as a tool to alleviate the effects of the crisis by opposing structural change. The policies were influenced by the interest coalition mentioned earlier. In their article, Furnaro et al. (2021) outline the significant funding initiatives that supported the modernisation of physical infrastructure and technology to maintain industry competitiveness. These programs, such as the Development Program Ruhr (DPR) (1968-1971) and the Action Program Ruhr (APR) (1980-1984), included expanding road networks and public transportation systems, developing regional recreational facilities like coal mining district parks, and expanding education and research infrastructure. (WWF, 2019). During the 1970s, public infrastructure was the main focus of city development, while in the 1990s, the focus shifted to organisational infrastructure, such as technology centres and parks, with a greater economic orientation. Different evaluations have been made regarding the impact of various programs. The investments made in plants and mining infrastructure have been viewed as conserving the crisis, but not effective in bringing about economic structural change. On the other hand, investments made in city infrastructure have been evaluated differently and are seen as having a positive impact in the long run. (Umweltbundesamt 2022, Prognos 2015). Cities in the Ruhr Valley lagged behind in infrastructure investments, including shopping opportunities, street network renewal, and green spaces. There was a stronger emphasis on car-based infrastructure rather than local public transport in these investments. They increased the attractiveness of the cities, laying the ground for additional service sector opportunities. In Lusatia, investments in city infrastructure have been promoted since the early 2000s. This has demonstrated the importance of developing locational factors to improve living standards and increase the attractiveness of cities.

In the Ruhr Valley, a new university network was promoted to create knowledge capabilities for future competitive sectors. The network of middle schools, vocational training centres and hospitals was promoted to ensure access to knowledge creation and public health care in the coal regions. Looking back, establishing universities and higher education institutions in the Ruhr Area has been a success and a game-changer for the region's future development prospects. The education reform that took place during the 1960s and 1970s played a vital role in creating a scientific landscape in the region. The region's universities and applied sciences institutes are among the most significant institutions in Germany regarding both student enrolment and research specializations. The employment effects created by the science sector have a considerable impact on the regional labour market (Prognos, 2015). It is important to note that significant financial resources were poured into the area to improve both the knowledge and physical infrastructure.[13]

The promotion of new investments into the region and of continuous structural change finance

In the 1960s and 1970s, promoting new employment opportunities focused especially on attracting large external investors engaged in mass production (e.g., Opel in Bochum) to absorb a critical mass of available labor and provide new growth opportunities. In 1969, Germany launched the Joint

[13] The financial volume of the infrastructure activities in the Ruhr area from two first programs (Development Program Ruhr (DPR), 1968–1971 and Action Program Ruhr (APR), 1980– 1984) included around 12 billion Euro. This covered at that time more than 20% of the GDP of the federal state NRW which was most affected by the crisis.

Federal/Laender Task for the Improvement of Regional Economic Structures (GRW), an annual budget co-financed by the federal and state levels. It was considered a long-term joint investment fund for promoting economic transition processes and new business investments. In the 1970s, this fund targeted large-scale and mass-producing investors besides supporting reskilling and other educational measures to open new employment opportunities.

Evaluations show that the attempts to attract large new businesses were not very effective, mainly because most of the industrial land was still owned by mining and energy companies. These companies were not willing to sell or rent their land in the 1970s. However, the investment made by Opel was a successful exception in attracting large new companies and sectors (Umweltbundesamt, 2022).

Revival of the coal and steel sector in the 1970s and its subsidization over two decades

In Germany, the first half of the 1970s was marked by the oil crisis and embargo, which revealed the country's economic vulnerability. Consequently, there was a renewed interest in using coal as a national energy source. The state of North Rhine-Westphalia (NRW), heavily impacted by the coal crisis, promoted technology investments between 1975 and 1985. This promotion focused on the mining, energy, and steel sectors to increase the productivity of local companies, reduce environmental pollution, and improve technology transfer.

As local coal production was no longer globally competitive, a complex subsidy system included almost 60 different, partly conflicting measures. The financial support for this subsidy system increased from €0.6 billion in 1958 to €7.5 billion in 1989. Most of the funding was financed through a special fund based on the “coal penny” (“*Kohlepfennig*”) outside the public budget. The coal penny was a levy paid by every electricity consumer in the Federal Republic between 1974 and 1995 (WWF, 2019, p. 20). The decision to reduce the crisis status of the steel and coal sector with the so-called "coal penny" was evaluated as a social policy, but ultimately hindered a shift towards promoting new business opportunities (Umweltbundesamt, 2022).

Extension of qualification and career counselling infrastructure

In the 1960s and 1970s, it became clear that additional qualifications and employment measures were needed beyond formal education. As a result, career counselling infrastructure was expanded to promote qualifications within new relevant sectors like the automotive industry across different levels of expertise. From the mid-1960s to the mid-1980s, the mining federal states and the national governments co-financed additional allowances for the qualification and training of miners to fight increasing unemployment, especially among the youth in the region.

Introduction of social plans of coal workers for earlier retirement

An additional strategy adopted was to provide incentives for early retirements of coal workers. Until now, this approach is used to facilitate the phasing out of the mining sector across Germany. Germany handled the reduction of hard coal production during the 1960s more socially acceptable compared to other countries like the United Kingdom (Brauers, Oei and Walk, 2020). None of the former coal workers became unemployed directly. Instead, they either entered early retirement or found follow-up employment, which helped protect their socioeconomic status. In the lignite mining sector, the planned phase-out until 2038 will also adopt retirement incentives and normal-age retirement. Also, within the hard coal exit plan of 2007, underground miners above 50 or surface

miners above 57 were entitled for early retirement, which is mainly financed by the national government since the 1960s (Furnaro and et al., 2021).

Job creation and job financing efforts started in the 1970s

The funds allocated in the 1960s and 1970s to restructure the economy and cushion the economic decline were instead used to support employment in other sectors and provide job opportunities for less-qualified workers. While heavy infrastructure investments led to temporary employment in the construction sector, the government provided payment contributions to employers for job creation measures in the automobile, light manufacturing, and electronic sectors. In summary, all the efforts promoted in the 1960s and 1970s were aimed towards:

- Keeping the coal sector competitive through subsidisation efforts (e.g. “Kohlepfennig”)
- Creating new opportunities, primarily through attracting large-scale external investors
- Supporting the reorientation of young and older workers via reskilling and early retirement
- In light of the oil crisis, heavy investments in technology and innovation to ensure the competitiveness of selected sectors.

The national and federal governments mainly enforced the policies and measures during this time, top-down, without much input from local governments and stakeholders. The emphasis was on subsidizing the coal sector, prolonging its decline and cushioning the harsher consequences. However, this delayed the acceptance of change. From the 1980s onwards, this perspective shifted.

2.3.2 Strengthening endogenous potentials: A gradual regional structural policy shift in the 1980s and 1990s

Mindset and orientation shift during the 1980s and 1990s in a nutshell

When looking at the Ruhr Valley, the 1980s and 1990s shifted mindsets regarding the transition process.[14] During these decades, a stronger bottom-up approach was adopted, which involved local actors in decision-making processes. This approach promoted local economic sectors, SMEs, and future economic potentials. The groundwork for this was laid in the 1960s with investments into new universities, training organisations and research institutes that contributed to networking between local knowledge organisations, business networks, and unions. This transition phase was driven by a holistic approach utilising endogenous potentials and synergies, integrating local stakeholders to find innovative, place-based solutions. Emphasis was given to social and cultural aspects, such as local communities' well-being, quality of life and environmental issues.

During the 1990s and early 2000s, there was a focus on identifying new emerging clusters and future fields of competence. This was accompanied by efforts to support new businesses, foster networks between applied research organisations, start-ups and innovative businesses. Universities played a stronger role in promoting new startups through science parks and technology centres. Local

[14] Historian Kwame Anthony Appiah (Appiah, 2011) explains that moral or mindset revolutions generally follow a certain progression. First, there is ignorance of the issue. Then, there is acceptance of the issue without any change in behavior or policy. This is followed by acceptance of the need for change, but with a continued focus on reasons why change is not possible. Finally, there is experimentation and action taken to promote a new and different way of change. (cited from Schneidewind, 2018).

development agencies played a larger role in facilitating and identifying new local economic promotion activities and future economic development strategies. New methodologies were employed to harness endogenous potentials for the transition. Evaluations of structural policies in the 1990s often refer to improving soft locational factors, following a focus on physical infrastructure in the 1960s and 1970s. In some publications, the selection of cluster fields and the cluster focus were criticized during this time frame (Umweltbundesamt, 2022).

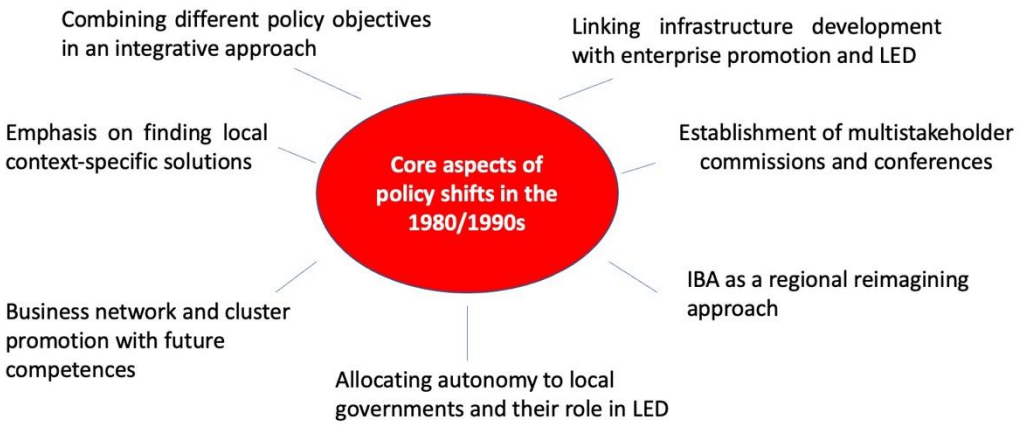

Figure 5: Policy shifts in the 1980s/1990s

Local and national actor coalitions emphasised the importance of local context-specific solutions

During the 1980s and 1990s, stakeholders at the state, federal and local levels realised that identifying new economic potentials in the regions required the participation of local stakeholders and the promotion of smaller companies rather than focusing solely on large mass production investors. Additionally, trade unions recognised the need to have a say in shaping the future of the locations where their workers and members resided. After the oil crisis and attempts to revive the coal and steel sectors with technology-intensive investments, it became evident that these sectors could not remain competitive despite long-term subsidies.

Establishment of multistakeholder commissions and conferences

In the Ruhr Valley in the late 1980s, multistakeholder commissions and regional conferences demonstrated a new approach to communication and problem-solving. One such initiative was the Future Initiative for Coal and Steel Regions (FICSR; *Zukunftsinitiative Montanregionen*) in 1987. This initiative aimed to address the massive layoff of workers in the steel and coal industry. Instead of top-down decision-making, the initiative adopted a more collaborative approach to assess the region's challenges. For example, the Coal and Steel Regions Commission was established, comprising representatives from the private and public sectors, labor unions, local organizations, and research institutions. This commission facilitated a participative process of identifying locally set priorities and funding opportunities for implementing specific projects.

IBA as regional reimagining approach inviting outside perspectives and harnessing endogenous potentials

The instrument “International Architecture Exhibition (*Internationale Bauausstellung*, IBA)” was a large, highly innovative and long-term structural change project initiated by the state government of NRW. Until then, the IBA was a common innovative urban development initiative consisting of architectural installations in specific regions or cities in Germany. The 10-year project IBA Emscher

Park (IBAEP) from 1989 to 1999 was the first IBA project aimed at promoting a regional renewal process. It reconverted coal and steel landscapes through architectural installations and previous coal and mining infrastructure into industrial heritage sites useful for tourism, industrial parks, and startup promotion centres. The IBAEP was initiated to change the image of the Ruhr area from a grimy, old industrial location to an environmental-friendly, tourist-friendly, and heritage-based region, offering new housing, live and work areas, cultural event locations and revitalized landscapes. Inspired by the IBAEP success, the lignite mining region Lusatia in East Germany followed suit to implement the IBA Sea from 2000 to 2010. This project aimed to reconvert the region into an attractive lake area.

A few noteworthy aspects about the IBA Sea and IBA Emscher Park make them stand out as innovative models. Both IBAs had a public-private entity to manage the process, providing a relatively high level of autonomy in decision-making. The entities consisted of a creative group of architects, landscape planners, artists, and economic development promoters, tasked with bringing new ideas to the region. They promoted the reimagination of the region from an inside and outside perspective through architectural and landscape idea contests and local participatory workshops and conferences. Large- and small-scale projects were designed and implemented with funding support from regional government bodies. These projects had to comply with participatory, cultural, economic, and environmental criteria. Large-scale regional lighthouse projects[15] served, and still serve today, as symbols of heritage, business promotion and landscape renewal. Also, small-scale projects, business and training infrastructure projects and neighbourhood projects were supported to tap into the region's endogenous potential.

The IBAEP and IBA Sea projects did not receive additional funds. Instead, the management units made use of existing funds for the entire region, which were then funnelled through the IBAs. The management units had the authority to select projects based on specific criteria. As a result, they were able to choose more than 30 projects in the region and bundle funds from various sources such as the EU, Germany, and federal states NRW or Brandenburg to finance them.

Strengthening the role of local governments in Local Economic Development (LED)

Since the mid-1980s it became evident that local actors had to be strengthened to find local solutions and create synergies. Local governments received access to financial resources to implement activities and reduce coordination failures between the political levels. Regional structural funds became accessible to municipalities for specific projects e.g. in start-up promotion, innovation, and spin-offs from universities. By providing access to regional funds, they were enabled to design, implement, and finance projects needed for the transition. This included the set-up of local development agencies outsourced from municipal governments and independent management structures. It strengthened the facilitation role of local governments that started to provide platforms of communication with local and regional research organisations, unions, and private sector representatives to reflect on local economic development potentials. Furthermore, local governments received funding through programs such as IBA and the Future Initiative for Coal and Steel Regions to support local and regional projects. As their expertise grew, local governments

[15] In the Ruhr area and the IBAEP some examples of these large-scale projects are the Colliery Zollverein as a museum, the Gasometer Oberhausen as an exhibition centre, the Colliery Nordstern as a business centre, or the Tetraeder as landscape art project. In Lusatia and its IBA See results are the newly established lakes, the F60 museum, the industry park and Garden city Marga etc. (see http://www.iba-see2010.de).

took on a more significant role and are now seen as important players in promoting new sectors and innovation. They also accessed fundings coming from regional structural promotion programs.

Business network and cluster promotion to identify future sectors and promote businesses

Since the 1990s, the cluster approach started to become relevant as an SME and innovation promotion framework. Clusters focus on businesses and sectors with employment and innovation potentials. Cities started to network with universities, business associations and businesses to identify new start-ups, and future business and sector opportunities, accompanied by making investments in technology centres in core clusters. For instance, in the city of Dortmund in NRW future fields of competence were identified in IT, biotechnology and micro- and nanotechnology. Research fields and start-up promotion in these clusters were supported. The identified clusters were promoted at universities and through specialised skills training. Since the 1990s, regional and national structural funds were increasingly disbursed to network groups of actors, who needed to cooperate to apply for funds successfully.

Linking infrastructure development with enterprise promotion and LED

In the 1970s, the structural and GRW funds were mainly used for investing in physical and social infrastructure. This included projects such as urban renewal, the creation of new parks, and providing technology support to larger companies in mass production sectors like electronics, automobile, and metal processing. However, in the 1980s and 1990s, the GRW and regional structural funds shifted towards business infrastructure development, such as start-up and technology centre support. The funds were used to reconvert old industrial heritage buildings into business parks and new housing opportunities nearby. This was combined with promoting infrastructure for clusters and creating future industries.

Combining different policy objectives in an integrative approach

From the late 1980s onwards, a more integrative approach began to emerge, in which different local and regional incentive policies and promotion approaches were interlinked. Different combinations of policy approaches were implemented:

- Combining new sector or cluster promotion with supporting knowledge-intensive infrastructure such as competence centres, science parks, incubators, applied research organizations or university programs
- Combining economic development efforts with flexible employment promotion activities, e.g. building business infrastructure, or reconverting industrial buildings with specialised employment promotion, subsidised job payments and skilling of less qualified workers
- Linking the reconversion of coal mines and steel mills to an image change of the region, enabled through innovative architectural-, landscape, and business promotion ideas (see IBAs) leading to industrial heritage, cycling paths, cultural events, and other innovative tourism activities.

2.3.3 Phasing-out regulations and innovation promotion in former coal and steel regions: the 2000s and onwards

The 1980s and 1990s initiated a transition policy trend that continued into the 2000s. The Ruhr Valley still suffers from the highest unemployment in West Germany. The lignite mining region in East Germany is still a backward region regarding promoting new emerging sectors with employment opportunities. Nonetheless, the transition model of the Ruhr Valley of the 1980s/1990s was replicated by the lignite mining region in East Germany after the reunification. The promotion of regional growth poles in Brandenburg and the region of Lusatia (Wältring, 2019) started in the 1990s with the consolidation and privatisation of large industries, the attraction of external investments and the promotion of SMEs. In the late 1990s and 2000s, the promotion of start-ups, technology centres, clusters and linkages between R&D and SMEs followed. Based on the experience made in West Germany, particularly in the Ruhr Valley, future local development strategies were developed, vertical and horizontal communication channels between business, knowledge and skills development organisations promoted, and local capabilities strengthened (Wältring, 2019). The difference between the Ruhr Valley and the Lusatia region was that the first structural change in Lusatia was rather radical. After reunification in 1990, lignite mining was not competitive any longer and shrank very fast. By contrast to the Ruhr Valley in the 1960s and 1970s, where conserving policies were promoted, in Lusatia no efforts were made to continue lignite mining at a large scale. The strategy to promote large company investments primarily was tried temporarily. However, efforts started very quickly to promote new SME structures, clusters, and innovative business networks.

2.3.3.1 Regulative decisions that shaped the phase-out process of coal mining in Germany

In the first two decades of the 21st century, Germany made the decision to phase out nuclear power and coal as energy sources.[16] Previously, the transition processes were initiated due to economic decline and the desire to reduce environmental impact of industries and diversify the economy. However, since the early 2000s, climate change and sustainability concerns have become more important in the energy transition. This was accelerated by the Paris Agreement in 2015 and the CO^2 targets set by the EU and Germany.

A clear direction towards phasing out coal production in Germany was set by various steering measures.

- **Renewable energy incentives**: Since the beginning of 2000s, feed-in tariffs promoted private and public investments in renewable energies.
- **Societal pressure and political shifts**: Civil society pushed for further policy efforts to reduce the coal-based emissions in Germany. The growing influence of the Green Party, the shift in traditional working-class divisions within the social democratic party, and the overall political necessity to initiate an "*Energiewende*" (energy transition) indicate a change in societal attitudes.
- **Ending hard coal mining by 2018**: In 2007, the national government, industry and unions reached a deal to phase-out hard coal mining by 2018, including early retirement deals for

[16] At the end of 2011 Germany decided to phase out of nuclear power. The last nuclear power plants to be finally taken off the grid by 2023 at the latest. https://tinyurl.com/5n94f2eu

miners. The sector was supported by up to 337 billion euros between 1970 and 2016 in subsidies.[17] The last mine in Germany closed in December 2018, even though hard coal is continuously imported.[18]

- **In 2005, the European Emissions Trading Scheme (EU ETS)** was introduced to implement the Kyoto international climate change agreement. It became the central European climate protection instrument and since then urged the main polluting industries to increase CO^2 reduction measures.
- **2015 Paris Agreement**: With the signing of the 2015 UN-Paris Agreement as a legally binding international treaty on climate change, Germany was pressured to increase its climate reduction efforts. In 2018, coal-fired generation still accounted for almost 80% of electricity generation emissions (Scott et al, 2022).
- **EU and German Climate targets**: The EU announced its CO^2 emission targets in 2020 to reduce emissions by 55% by 2030 and become emission neutral in 2050. In 2021, Germany published its Climate Protection Law with higher targets: reducing greenhouse gas emissions by at least 65% by 2030 compared to 1990; 88% by 2040, and greenhouse gas neutrality by 2045.

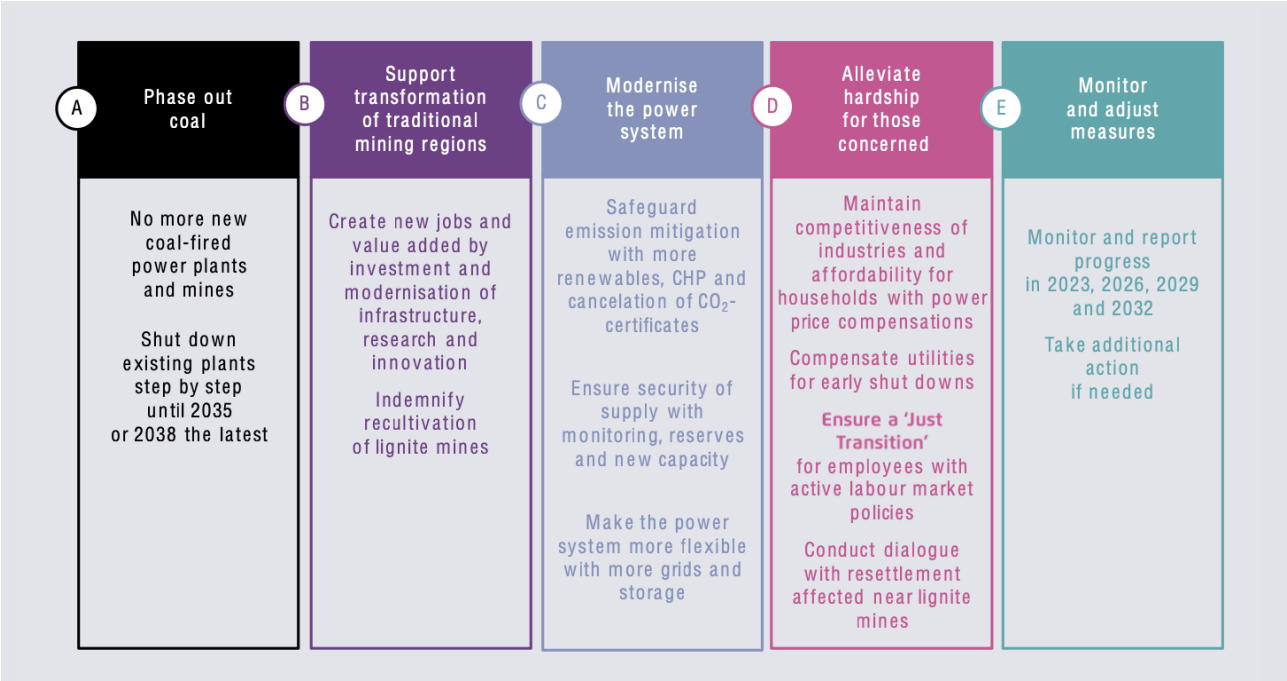

Figure 6: Overview of recommendations of the Coal Commission
Source: AGORA, 2019

- **Coal Commission to define phaseout of coal power reduction latest in 2038**: The Commission on **Growth, Structural Change and Employment** (Coal Commission) is part of the German Climate Action Plan 2050. In June 2018, the German government set up a multistakeholder

[17] Appun (2018)

[18] The Russian invasion of Ukraine demonstrated the dependence of Germany on hard coal and gas imports, especially from Russia. 50% of the hard coal in 2021 was imported from Russia. The hard coal in Germany in 2021 still had an 8.5% share of primary energy production. See Tagesschau (2022) at https://www.tagesschau.de/wirtschaft/konjunktur/eu-kommission-schraenkt-russische-kohleimporte-ein-101.html

commission with the participation of governmental representatives from different local, regional, and national level, and private sector and civil society representatives, tasked with policy recommendations for a complete coal phaseout. Based on their recommendations, all coal-fired stations and lignite mines will be phased out by 2038 at the latest, ideally by 2030 (Furnaro et al., 2021). The program also recommended promoting economic innovation, social cushion, and price compensation policies. It emphasizes “Just Transition” with active labour market activities (see overview of recommendations, Figure 6)

Over the last two decades, Germany has shifted towards more climate-friendly values, driven by changes in society, political shifts, international agreements, and the regulatory role of the EU.

2.3.3.2 Innovative efforts to support the phaseout-process

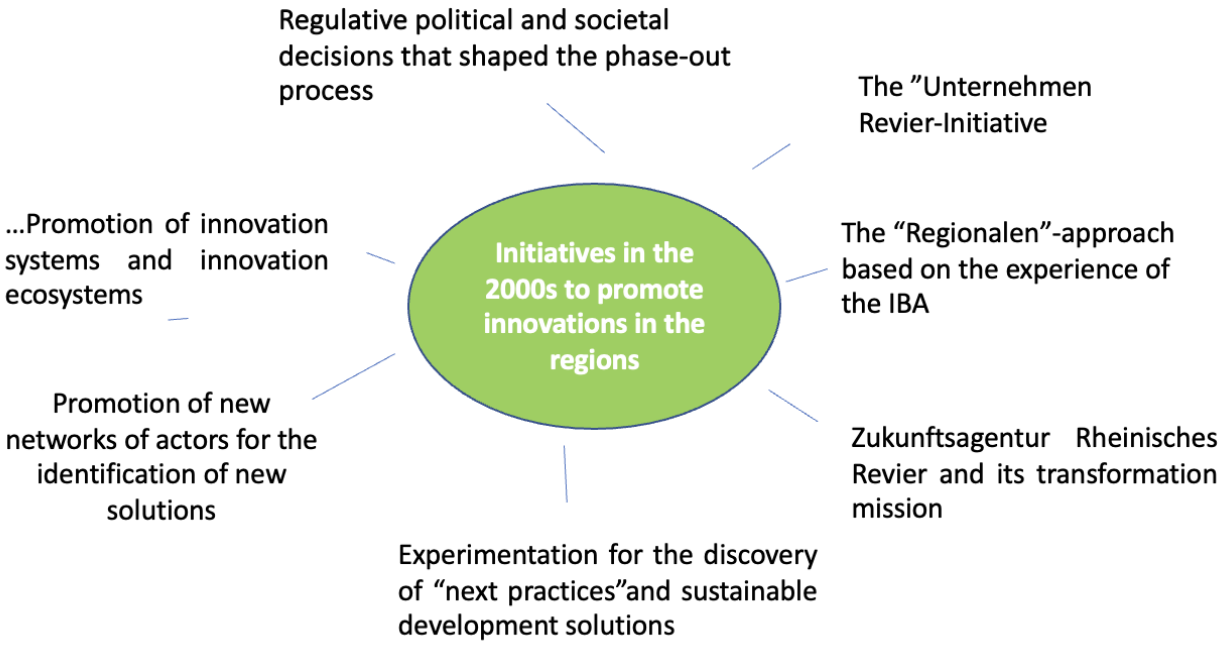

Figure 7: Innovation promotion initiatives in the 2000s

The above-described steering measures were accompanied by funding schemes to support the shift at the local level. Therefore, the last two decades also saw innovative bottom-up approaches to reshape and reorientate former coal and steel regions. NRW became an experimentation field for testing different support measures and network initiatives. In East Germany and especially the Lusatia region, new local and regional efforts and networks emerged that strongly fought for future-oriented and mission-driven trajectories.

Promotion of innovation systems and innovation ecosystems

The support of clusters and SME networks gained further importance in the 2000s, promoting smart specialization efforts. At the beginning of the 2000s, this was the trend in the Ruhr Valley and other East and West German mining regions. The terms "local innovation systems" and "local entrepreneurial ecosystems" also gained importance. Both emphasize the endogenous potential and the need for a local enabling environment, shaped by creative industries, new service delivery and sustainable production. In the 1990s, East Germany started to establish an SME-based

economic structure. Still, the German government promoted large labour-intensive investments, attempting to attract West German companies and suppliers.[19] At the same time, SME support, startup promotion at universities and spin-off promotion from older industries were targeted. “Applied technology and scientific research” gained importance and considered a strategic approach to continuously renew the economy (WWF, 2019, p. 22).

In parallel, local governments and the growing expertise of local and regional economic development agencies created new network efforts (see below in the case of Lusatia, Harmes-Liedtke and Wältring, 2018)

”Unternehmen Revier”-Initiative

Since 2017, the "Unternehmen Revier" model project has been actively shaping structural change in the lignite regions in the East and West of Germany with the objective of increasing the endogenous self-help and network governance competencies among the regional stakeholders. It is an important component of the federal government's structural policy. To this end, the coalfield regions receive eight million euros annually (BMWK, 2017). The initiative also aims to initiate competition of ideas and projects that could become models for other regions. The priority areas cover a broad range of traditional and new structural policy instruments (WWF, 2019, p. 51), including

- **Boosting competitiveness** and enhancing the region as a business location via applied research, regional marketing, innovation promotion at company and business network level, and optimising business infrastructure development
- **Employee qualification** through encouraging inter-company initiatives and specialised vocational training activities
- **Cluster and innovation management** through optimizing networking between regional players, companies, and research bodies

The approach is based on the participatory design of **regional innovation concepts** that create the basis for project investments and the selection of activities. These regional organizational structures are crucial for establishing regional dialogue and improving subsidy absorption capacity and effectiveness (WWF, 2019).

The REGIONALEN-approach based on the IBA experience

The REGIONALEN are structural support measures for selected regions based on the regional experience of the IBAEP. Since 1997, the state government of NRW offers districts and municipalities the opportunity to carry out joint ground-breaking projects every three years. The region must apply on a competition base, demonstrating a joint visioning process for the region and initial project ideas for promoting change. Like the IBA, funding schemes are bundled to finance the selected change projects, which entail small and lighthouse projects. Also, like the IBA, each Regionale's management unit is responsible for defining projects and consolidating them with regional stakeholders. The strong emphasis on bottom-up change has generated many innovative landscape

[19] One of the most recent large-scale investments in eastern Germany is the Giga battery factory of Elon Musk and Tesla in Brandenburg and the city Grünheide. It produces battery cell components.

and economic development projects.[20] In that respect, regional transformation is the core focus of each Regionale. 12 regions were supported since 1997. The currently ongoing 2025 “Bergisches Land”-Regionale is located next to the lignite mining area Rhineland.

Zukunftsagentur Rheinisches Revier and its transformation mission

To promote the transformation process in the rural Rhenish lignite mining region in Western Germany, municipalities, regional business associations and trade unions joined forces in 2014 to become shareholders in the newly funded regional development agency ‘*Innovationsregion Rheinisches Revier’*, later renamed in ‘*Zukunftsagentur Rheinisches* Revier’ (Future Agency Rhenish region, ZRR). Until 2030, the agency serves as the main coordinating body of the state of NRW and manages the structural change process in the former coal-mining region. Its main task is to guide the development of an extensive economic and structural program to smoothen the coal phase-out and economic transition of the region (EC, 2020). Interesting features of this initiative are:

- Establishing an intermediary that can help (coal) regions in transition to set up a long-term oriented platform for the design of a structural change process through creating a vision, developing strategies, mediating between stakeholders, and planning and executing projects. This is comparable to the REGIONALE and IBA experience, although established in a more top-down manner.
- Creating an agency originating in a regional stakeholder network can lower biases towards sustainable transition efforts. It provides a direct communication link with the federal government for shortening decision-making and facilitating bureaucratic procedures.[21]
- The existence of reliable institutional medium- to long-term funding to establish structures and scope for deep structural transitions (EC, 2020). Together with the coal phase-out, the German government passed the Coal Regions Investment Act, which provides structural aid of up to 14.8 billion euros for the Rhenish coalfields until 2038. Investments of this budget through projects will be highly influenced by the ZRR.[22]

Experimentation to identify “next practices” for sustainable development solutions

The coal regions have been receiving support for a long time, going through different learning cycles, and facing pressure to promote new economic development activities. Numerous support programs over the decades have resulted in rich experiences that were not always successful but were intensive learning opportunities. The initiatives mentioned above, such as Regionale, ZRR, IBA, and *Unternehmen Revier*, follow the logic of "next practices". Unlike best practices that focus on how to navigate the Just Transition, the "next practice" perspective is future-focused, with many unknowns and ambiguities. The importance of experimentation is emphasized, and new innovation efforts are co-created through trial and error. The CEO of the “*Regionale Bergisches Land*”, Reimar Molitor, pointed out: “*For the transition of regions, there are no role models anymore. We have to try ourselves, learn and fail, get inspirations from other regions in the world and at the same time figure out ourselves what works and doesn’t. It means we can contribute our next practices and learn from*

[20] MHKBDF NRW (2023)

[21] Nonetheless, these bottlenecks still exist, according to interviews with employees and CEO of the ZRR in 2022.

[22] RP (2023)

other next practices. The time of best practices in this complex world does not exist anymore. Especially in the presently required green transition, we are all still greenhorns."[23]

The creation of new networks of actors for the identification of new solutions

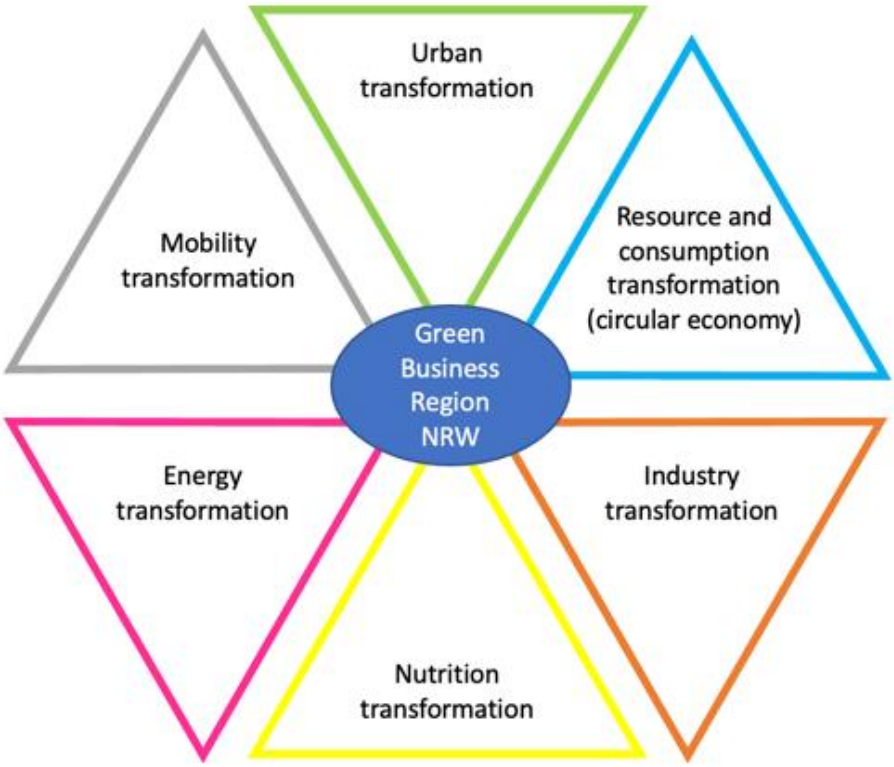

Figure 8: Transition challenges in NRW beyond the Energy Transition

Source: Transformation and change areas (Schneidewind, 2018), Mesopartner, 2022)

The extensive experiences of structural change in the German coal and steel regions have contributed to a wide network of stakeholders and strengthened network structures. NRW is still the most industrialised region in Germany. After the economic structural change in the coal and steel industry, it faces the green industrial transition challenge, affecting dominant industrial sectors and cities. Figure 8 depicts the transformation challenges NRW and its industrial regions (including the coal and steel areas) as highly agglomerated city regions (in the Ruhr area) and rural areas (in the Rhenish mining region) will face in the future.

At the same time, Figure 9 shows the large number of regional actors active in shaping the different transition processes in NRW.

[23] Mesopartner-Interview with Raimar Molitor, CEO of Regionale Bergisches Land, April 2022 (Mesopartner Archive).

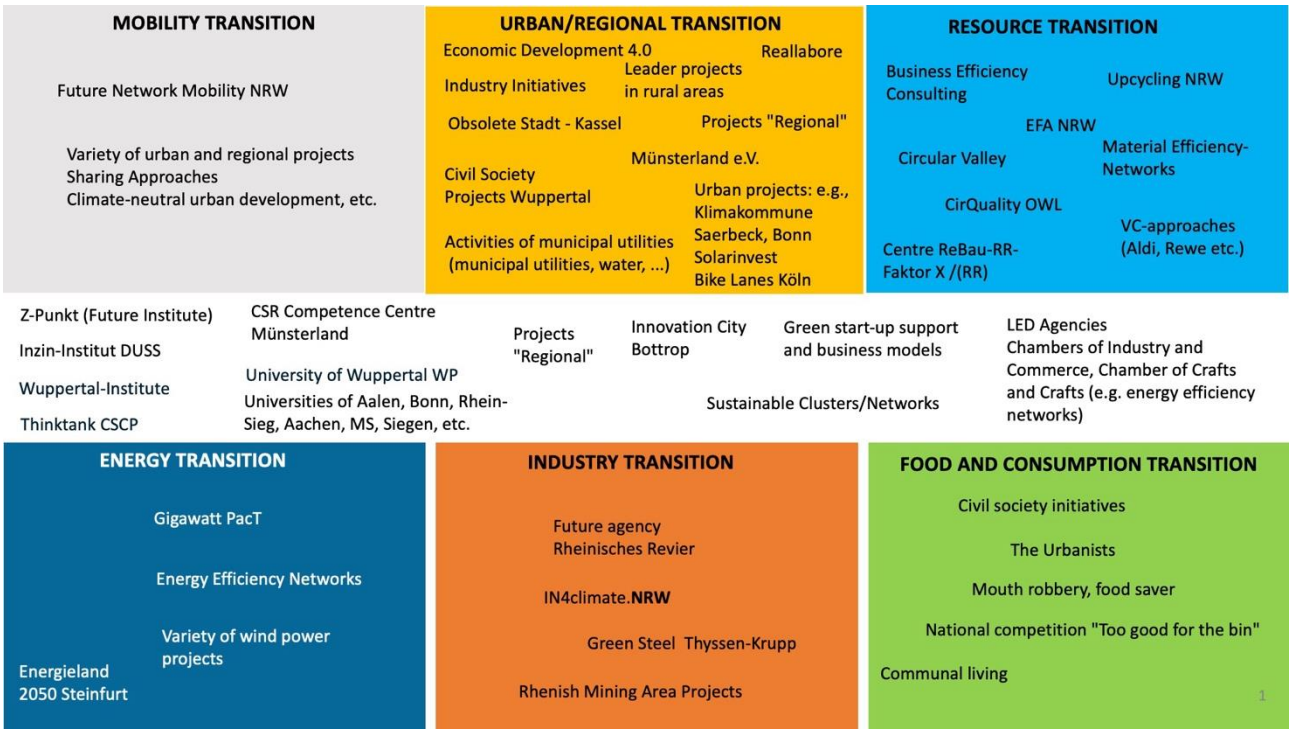

Figure 9: Mapping of the wide network of actors involved in shaping the green transition in NRW

Source: Mesopartner, 2022

The NRW network emerged from the region's experience with structural changes in coal, steel, and other sectors, making it a valuable resource for innovative solutions. Also in the Lusatia region, networks have been institutionalised to design future strategies for managing transition oriented towards harnessing endogenous potentials. Typical actor networks are, for example:

- The Lusatia Round (*Lausitzrunde*) is a union of 23 mayors and municipal representatives in the region. They aim to support a bottom-up transition process where the cities play an important shaping role.
- The Innovation-Region Lausitz GmbH (iRL) is a foundation created under the leadership of the Lusatia Chamber of Commerce and Industry, regional businesses, and the regional Technical University Cottbus-Senftenberg. It develops ideas and promotes business growth projects in renewable energies, transformation of the urban energy system, XXL robotics and electromobility.
- The *Wirtschaftsregion Lausitz GmbH* is the regional development agency in Lusatia. It strengthens the image and economic power of the region. It was founded by the district governments in and around Lusatia as a supra-regional agency for regional development to overcome the fragmentation of interests of local authorities and the private sector. It initiated a participatory visioning process in the region Lusatia involving all interested actors (Harmes-Liedtke and Wältring, 2018).

3 Transferability of the German experiences in “Just Transition” processes

3.1 Context considerations and requirements of transferability

In Chapter 2, it was demonstrated that energy transition and structural change measures in Germany were supported by socio-economic cushioning. These measures went through different stages in response to changes in political and societal circumstances. Certain cushioning measures were more effective than others during the time of their deployment, with their success influenced by the context and stakeholders involved. Some of these successful measures can be considered exemplary or even the best practices at a particular time and place in Germany. They may serve as inspiration or models for other countries and at different times.

Looking at the social policies for workers in the mining and steel sectors, it can be concluded that they played a successful role in providing a peaceful transition. However, the investments and support provided for the upgrading of technologies and for attracting large company investments were evaluated as not having a strong impact in the longer run, and instead, they held back the structural change process in the Ruhr Valley. In Lusatia, the promotion of bottom-up policies and SME structure-building activities were also rated as quite successful. These approaches were partly based on the experiences gained from the Ruhr Valley in the 1990s.

Different papers suggest various critical success factors (CSF) for the transferability of social and economic concepts between countries. Among the CSF, cultural sensitivity and adaptability (de Jong and Bao, 2007), effective stakeholder communication and engagement (Hu and Xue, 2010), legal and regulatory alignment, long-term sustainability and continuous monitoring, evaluation and learning are paramount. These generic success factors could be broken down into more specific factors. Tailoring the approach to the specific needs and context of the target country or region is crucial for positive outcomes.

Defining the transferability of socio-economic concepts from one country to another must be a carefully designed, well-structured and multi-phased process. The transfer process starts by assessing the applicability and adaptability of these concepts across different contexts. The transferability depends on careful analysis, adaptation to local contexts, and ongoing monitoring and adjustment. It should be considered a dynamic process that requires collaboration, flexibility, and a deep understanding of the origin and destination environments and contexts.

Key elements for assessing transferability and executing the transfer should include:

1. *Analyze the contexts*: Understand both countries' contexts.
2. *Identify core principles*: Find the key principles in the concepts designated for transfer.
3. *Assess compatibility*: Ensure alignment with the target country's context.
4. *Adapt, test and experiment*: Modify and pilot concepts for feasibility; consider safe-to-fail experiments.
5. *Engage stakeholders*: Involve relevant parties in the process.
6. *Create and communicate a narrative*: make policies accessible, relevant, and engaging.
7. *Align policies*: Ensure regulatory and institutional alignment.
8. *Monitor and adjust*: Continuously evaluate and adapt as needed.

As this study does not allow assessing the transferability of all past Just Transition measures conducted in Germany to various country contexts, the authors designed a transferability framework. This framework is expected to facilitate the cross-country transferability assessment of selected policy measures and guide the transfer process. It also supports the identification of future service offers of GIZ to developing and transformation countries to accompany their just energy transition processes.

3.2 Designing a transferability framework

Table 3 outlines a transferability framework divided into four phases and including multiple activities. The framework indicates where each activity should be focused, the principles that should be followed, and some suggested tools to complete each task. However, the tools are just exemplary. Additional tools can be used to carry out the specified actions.

Likely, not all socio-economic measures that have proven successful in Germany and intended for transfer to another country will pass the pre-transfer assessment of phase 1. This could be due to context or stakeholder structure differences or if the pre-assessment indicates that a particular measure differs from what the intended beneficiaries require.

In Phase 2, it is important to tailor the activity and implementation structures to ensure successful implementation, provided that the type of measure, context, and stakeholder setting are appropriate. In Phase 3, it is recommended to conduct pilots or a portfolio of small-scale experiments to determine which type of selected measures may be most effective in the given context. During Phase 3, monitoring begins, and in Phase 4, regular reviews are conducted to continually adjust and improve the chosen measure. Once this is done, replication and upscaling to other regions will become viable options.

Phases	Activities	Location	Principles	Tools/Services
Phase 1: Pre-transfer assessment	Context Analysis	Germany / target country	Context matters	- Systemic Competitiveness analysis - Policy Transfer Frameworks
	JT measure(s) identification	Target country / Germany	Leave no one behind / needs-orientation / feasibility / climate impact	- Scanning JT measures (stock-taking / database) - Cynefin workshop (Cynefin is complexity-sensitive conceptual framework aiding decision making)
	Stakeholder mapping and engagement	Germany / Target country	Inclusiveness / transparency	- Stakeholder mapping - CLIP Analysis
Phase 2: Adaptation and planning	Cultural adaptation	Target country	Adaptability / tailor-made solutions	- Culture, norm, value analysis: Iceberg Model Workshop - Inglehart-Welzel World Cultural Map Analysis - Project design workshop
	Policy / legal alignment	Target country	Adaptability / tailor-made solutions	- Policy & legal review - Regulatory impact assessment
	Capacity development	Target country	Ownership / sustainability	- Training sessions - Study tours (e.g. to Germany)
	Pilots & Safe-to-fail experiments	Target country	Tailor-made solutions / Experimentation	- Project design workshop - Portfolio of experiments

Phase 3: Implementation and monitoring	Stakeholder collaboration	Target country	Inclusiveness / transparency	- Dialogue fora - Collaboration platforms and software
	Communication	Target country	Transparency / sustainability	- Awareness campaigns (social media, videos, websites etc.) - Narratives tools (e.g. story telling)
	Monitoring Evaluation Learning	Target country	Goal orientation	- Results based monitoring (RBM) - Outcome harvesting
Phase 4: Review, adaptation, and scaling	Regular review	Target country	Goal orientation	- RBM - Outcome harvesting
	Adaptation	Target country	Adaptability / tailor-made solutions	- Project re-design workshop - Expert consultations
	Scaling-up	More regions in target country	Scale	- Dialogue fora - Knowledge Sharing Events - Policy toolkits

Table 3: Transferability framework

3.3 Applying the transferability framework

The transferability framework is designed to be flexible and generic, making it suitable for use by development policy practitioners to assess the transferability of a specific policy measure or development practice. While it is important to consider the four phases of the framework, not every activity in each phase needs to be followed strictly. Depending on the context, the measure being assessed, and previous work, some activities might be skipped or added. Additionally, the tools mentioned as examples in the framework can be replaced by others that are more familiar to the development practitioners involved, affordable in each project setting, or culturally more sensitive. Admittedly, we prefer the tools mentioned in the framework, but other colleagues may have different preferences.

Creating a toolbox that collects relevant and tested tools for every phase and type of activity would be beneficial. This toolbox would provide a plethora of resources and tools to enhance the capacity of development professionals in effectively planning, implementing, and evaluating the transferability and the transfer of just (energy) transition initiatives.

It is also not necessary to complete the four phases of a transfer process in a strict linear sequence. Activities from different phases can overlap and be executed in parallel. For example, stakeholder engagement is a permanent process that starts from the initial assessment and continues throughout the transfer process until upscaling and evaluation. Without stakeholder buy-in and collaboration, there can be no ownership or sustainability. It's important to shape a convincing narrative that can help gain support, build trust, and ultimately implement a policy measure successfully. Therefore, narratives are not only the outcome of the communication strategy in Phase 3 but also start taking shape during the pre-transfer process through stakeholder engagement and local expert consultations.

It is important to regularly review and adjust the transferability framework as it is generic and flexible by nature. During the review process, questions such as the following should be discussed: Do the four phases make sense? Do they need to be merged or extended? Are there too many activities, or are activities missing? Which activities are always conducted, and which are rarely or

never conducted? What are the most frequently used tools? Which tools need better documentation, codification, and training?

4 Recommendations

4.1 Focus on transferring German experience

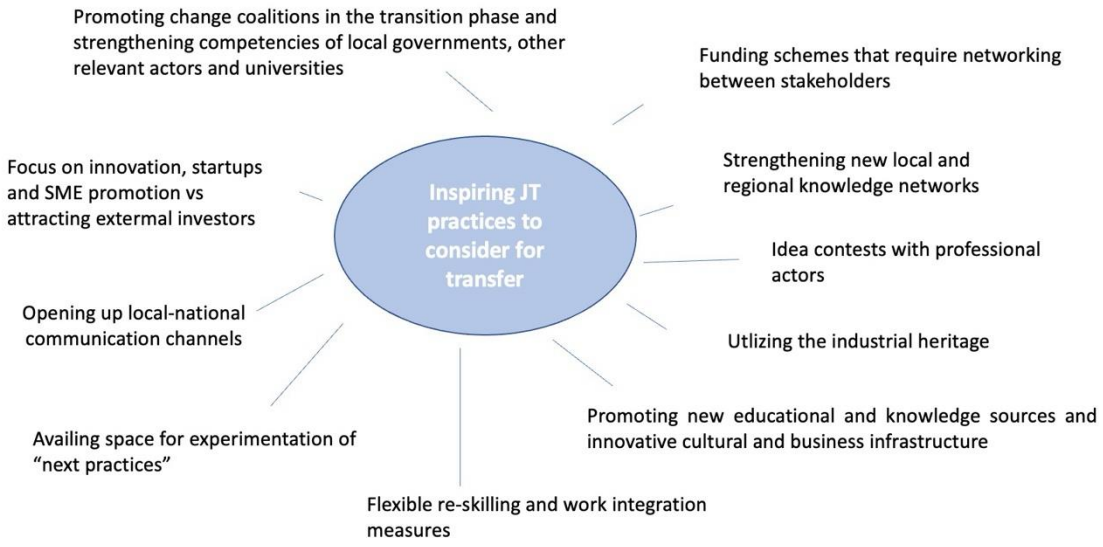

Figure 10: Inspiring JT practices from Germany

Despite context-specific considerations and transferability deliberations, various inspiring practices from the German experience could inform a service portfolio from GIZ. This section will outline key measures to consider when transferring knowledge and exchanging information with partner countries. These institutional, policy, and network measures may be considered normal in Germany but are not present similarly in developing countries (Figure 10). Additionally, certain principles are universally relevant and must be considered as well.

- **Facilitate a political process and establish a narrative** that justifies the process of structural change. It is essential to develop change networks and offer national and local governments an opportunity to collaborate and communicate with civil society and the private sector. This helps in driving the transition process forward.
- **Promoting new change coalitions in the transition phase:** Germany shows that interest coalitions could prolong the transition process. Therefore, it is important also to promote new actor groups that are forward-looking and harness new economic opportunities.
- **Promoting funding schemes that require networking between stakeholders** (businesses, universities, local actors). This contributes to creating synergies and common solutions.
- **Earmark sufficient funds** for the transition process at national, regional, and local levels. If a supra-national level, such as the European Union, is available, utilize its funds for structural changes.

- **Strengthening endogenous potentials** through bottom-up and participatory approaches. Since the early 1990s, promoting local development efforts contributing to the transition process has become successful in Germany.
- **Strengthening LED competencies** and **promoting innovation in start-ups and existing businesses** as a traditional yet effective way for Just Transition processes and new emerging sectors.
- **Promoting new educational and knowledge sources and infrastructure**. Promoting new education institutes and demand-oriented vocational training ensured that Germany's youth could improve their skills and transition to new employment opportunities.
- **Utilizing old industrial infrastructure** for start-ups, including creative office space.
- **Opening up local-national communication channels**: The German examples show that specific successful initiatives were mainly set up to increase the involvement of knowledgeable local actors and enable communication between the local and federal actors to find the best solutions and overcome bureaucratic procedures.
- **Focusing on start-up and SME promotion and its enabling institutional and policy environment**. By contrast, a heavy focus on investment promotion – as observed in many developing countries – bears the risk that a support system needed by SMEs to grow is not being set up.
- Strengthening competencies of local governments, other relevant actors, and universities in becoming **local pioneers of change** through increased autonomy and access to funding
- **Promote flexible re-skilling** and work integration measures, such as job services and counselling, employment subsidies or career services.
- **Promoting communication and decision platforms**. Publicly initiated projects and multistakeholder commissions integrating regional stakeholders received a voice and gained decision-making power. Partly, they could be financially backed up by funding.
- **Promoting idea contests** with professional external actors (see IBA), involving a diverse expert group, e.g., architects, artists, and other experts with different perspectives.
- The **IBA/Regionale models** include a management unit with strong autonomy to develop ideas and experiments with local and international stakeholders. The decision-making processes were not politicized.
- The **IBA/Regionale models** promoted image-shifting campaigns through the implementation of small and large-scale projects
- **Availing space for experimentation of "next practices**". The solutions under the complex considerations of a transition process should provide space for experimentation with safe-to-fail activities.
- The **IBA model utilized the industrial heritage** of abandoned industry facilities and repurposed them for reimagining the space

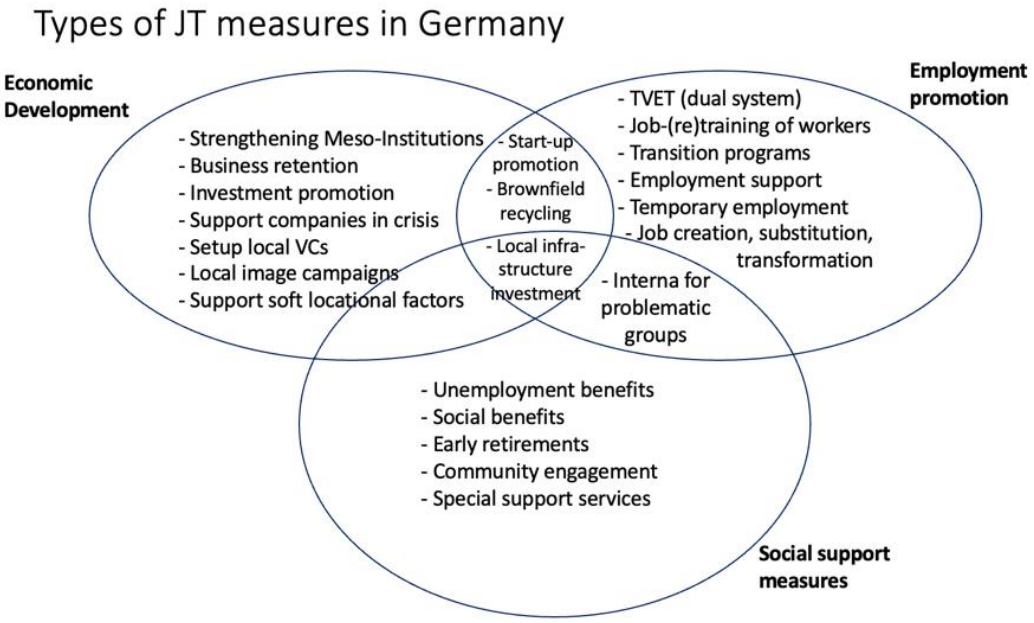

Figure 11: Selected types of JT measures in Germany

- **Linking economic, social and employment promotion.** There are many possible ways to combine economic development, employment promotion and social support measures in a Just Transition process. Figure 11 shows some of the most popular measures in Germany that belong to one of the three fields, connecting two or even all three. In most cases, however, many of the measures mentioned in the graphic were implemented in parallel to support enterprises, create jobs, reskill people, convert industrial heritage, construct infrastructure, and provide social support in parallel.

Germany can leverage its lessons from historical transitions to navigate its knowledge transfer to countries currently undergoing an energy transition and other structural changes. The successful principles of Germany's Just Transition experience can be summarised as follows:

1. Diversify the economy;
2. Think long-term, but don't start with a grand strategy;
3. Apply perspective incrementalism (Meyer-Stamer, 2000);
4. Stay flexible and adaptive;
5. More bottom-up, less top-down;
6. Harness competition;
7. Prioritize sustainability;
8. Support workers;
9. Collaborate internationally;
10. Establish multi-level governance, involve stakeholders early on and engage communities;
11. Invest in infrastructure;
12. Foster innovation.

4.2 Designing a service portfolio around “Just Transition” for partner countries

In the following, we will present four relevant service portfolios after analysing the German experience. In the second service portfolio approach, we will also look at the existing service offerings of the GIZ. Integrating these service offerings into existing ones would be a further step. However, we see this as another step that can be taken forward with GIZ.
In the following, we will elaborate on the four portfolio approaches (see Figure 12).

1. **Service portfolio 1:** Transferability analysis and implementing selected JT practices/measures
2. **Service portfolio 2:** Repackaging existing GIZ service offers related to JT as cross-cutting and interdisciplinary approaches
3. **Service portfolio 3:** Considering the GIZ portfolio approach and recombining approaches
4. **Service portfolio 4:** Developing service packages of good “next practice” models

Service Portfolio 1: Transferability analysis and implementing selected JT practices/measures
Chapter 3.2 provides a framework for assessing and planning transferability opportunities, evaluating their status, and implementing activities. In this context, GIZ could

- offer transferability assessment of JT measures as a service
- take stock of existing tools and services of GIZ and other agencies, e.g. Wuppertal Institute, suitable for a possible transfer and introducing additional tools/services as deemed necessary
- provide capacity development for the transferability analysis (in-house and to consultants)
- select German (and other EU) practices fitting the purpose (based on the assessment results)
- adapt German JT practices to the context of the target region/country
- facilitate the implementation of selected JT models/practices
- offer support packages/coaching for the implementation of JT practices to local counterparts

The transferability framework provides a guide that can be supplemented with additional tools and process descriptions, such as South-South and South-North learning exchanges. The existing service offers include the perspectives (i) Just Energy Transition, (ii) Financing a Transition, and (iii) Socioeconomic transformation (see Figure 12). The latter distinguishes between enablers, mitigators, and specific technical cooperation opportunities along certain areas of economic policy, decarbonisation of key industries, labour market policy, social protection, local economic development etc. It does not offer an overall transferability assessment across competence fields and an overview of what is specifically needed from each of them and how they could be combined/recombined.

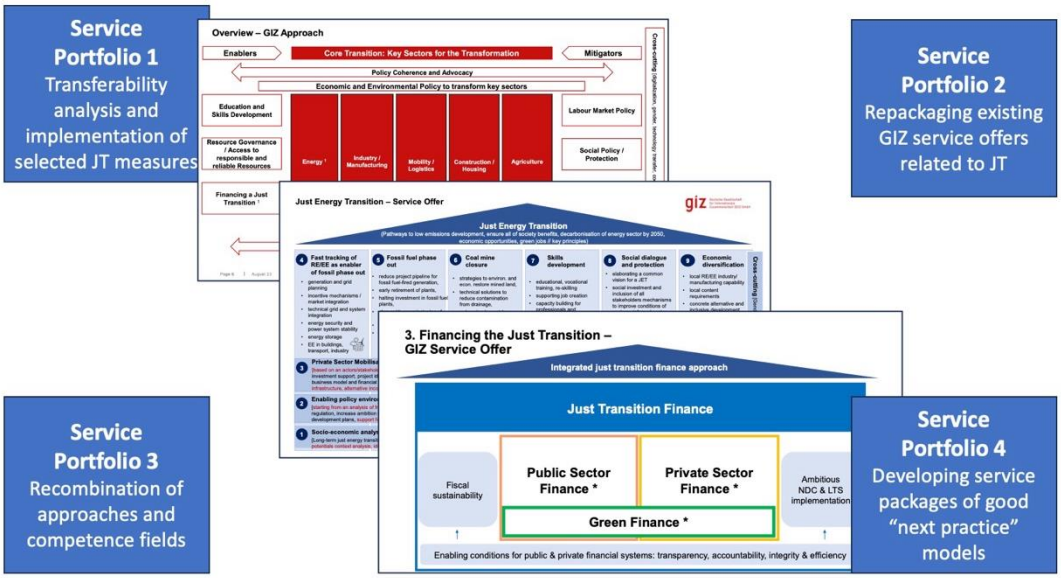

Figure 12: Recommended services portfolio approaches for GIZ

Sources: Based on (GIZ, 2023)

Service Portfolio 2: Repackaging existing GIZ service offers related to JT to strengthen cross-cutting and interdisciplinary approaches

GIZ offers a wide range of knowledge, skills, and expertise across its different thematic areas, e.g. in private sector development and economic policy, social and labour market policy, Technical and Vocational Education and Training (TVET), energy, climate change, sustainable finance etc. (see Figure 12 above). The integrated Just Transition service offer combining (i) just energy transition, (ii) financing a Just Transition and (iii) socio economic transformation already started to bring together and integrate different thematic areas and approaches. This can be strengthened and even further used for an innovative recombination of approaches from the energy, climate, economic and financing area. This might also involve identifying missing approaches that need to be developed within GIZ. Also, upgrading/supplementing relevant JT knowledge and skills within the existing thematic areas could become relevant.

The GIZ portfolio presentations on Just Socio-economic Transition, Just Energy Transition and Just Transition Finance mention the main areas of technical cooperation. However, there are some areas where a deep dive and further elaboration of the approaches could be more specifically offered to meet JT requirements or where knowledge sources could be upgraded. Below are **some examples** for clarity:

- "Long-term Just Transition Scenarios"
    - Develop alternative Just Transition scenarios in partner countries or regions, which entail the socio-economic, energy-related, and financial perspectives concerning all four justice dimensions. Use these alternative stories of the future for a dialogue on the preferred future trajectory and design the context-specific service offer around the most plausible scenario.
- "Active Labor Market Policy":

- Instead of only creating a skilled workforce through TVET, identify flexible forms of employment creation for different target groups (low-skilled, the elderly, the youth). Use reconversion requirements in transition sectors for learning and skilling, promoting life skills required in basic social and public employment fields etc.
- Compare workers' physical and intellectual requirements in phasing-out sectors with those in newly emerging sectors. Re-training and re-skilling workers from phased-out industries could focus on these common requirements between sectors to facilitate the socio-economic and energy transition. For instance, the coal mining closure could be combined with re-skilling measures and economic diversification towards the healthcare industry or tourism, to give two examples.

- "Policy Coherence and Advocacy":
  - Instead of traditional **public-private dialogue (**PPD), facilitate dialogue around a common vision on the energy transition and the new economic and social development opportunities differently. The various commissions created in Germany during the restructuring process could provide valuable examples. These commissions could be linked to financing concrete initiatives. By this, PPD does not get lost in round table discussions but is oriented towards promoting a laboratory of creative safe-to-fail experiments and actions.
  - Beyond **inter-ministerial dialogue**, also target local-national dialogues, support structures based on the subsidiarity principle and intelligent top-down and bottom-up decision-making structures. Take on a system perspective and encourage shared responsibilities between the local, regional, and national policy actors.
  - The German experience, with a focus on strengthening endogenous potentials, created an understanding of **policy design** and implementation that strengthened network governance. The policies are not created by a single public group. Rather, they are the outcome of promotional policies and activities in which both the private and public sectors at the sectoral, local, regional, and national level play a role by contributing, providing feedback, and creating learning loops.
- Policies to transform key sectors:
  - Since the 1980s, the focus has shifted towards defining more horizontal industrial and innovation policy instruments that promote **bottom-up network solutions**. This approach is more accessible to sectors that look for common solutions and innovation synergies rather than promoting sector-specific solutions. The experience in the transition regions highlights the effectiveness of this approach. Therefore, policy instruments and approaches should integrate these experiences to design effective solutions.

- Redesign technical support in local and regional economic development (LRED):
  - LRED and the **reconversion of old industrial estates** for new business infrastructure
  - The industrial heritage can be leveraged to **promote new sectors** and increase locational attractiveness, such as for tourism.
  - **Innovation promotion** in certain areas requires strengthening the **knowledge base**, universities, and research institutes.

- **Climate-smart governance** at the local or regional level considers adaptation and mitigation measures of a locality or region and its economic actors to address climate change, fast-track the energy transition and attract climate funds to the local level.

Service Portfolio 3: Considering the GIZ service portfolio approach and recombining of approaches

This service portfolio focuses on recombining GIZ thematic areas into a new service offer („innovation as recombination"). In the German transition context, certain competencies were combined to create a "meso laboratory" (Meyer-Stamer, 2000). The meso laboratory in the federal state of NRW is an ongoing initiative. This is because the region is the leading industrial federal state in Germany and is facing the challenge of finding sustainable solutions for the green industrial transition after the economic structural change process in the 1990s. Examples of recombining competencies to create new innovative approaches in the transition process are the following (see also Chapter 2.3.2 paragraph "Combining different policy objectives in an integrative approach"):

- employment promotion with brownfield recycling
- employment promotion and subsidised job creation with addressing social needs, infrastructure renewal, and strengthening of economic diversity
- landscape development with private-sector development
- industrial heritage promotion with business infrastructure development and new sector promotion (e.g., event tourism)
- urban planning with environmental regeneration and economic asset development
- early retirement with subsidised job creation
- JT finance with knowledge network promotion

The GIZ's Just Transition service offers currently are in a modular way presented. The opportunities for recombination could be more clearly described in terms of specific fields of expertise and combination. Achieving this would also require enhancing competencies and encouraging interdisciplinary collaboration between the various thematic areas within GIZ.

Service Portfolio 4: Developing service packages of good "next practice" models

Several experiences in Germany have led to innovative transition approaches. Examples are the IBA model, the Regionale, the Future Agency establishment, specific stakeholder fora, the *Unternehmen Revier* model, etc. The organization of delegation trips and learning events by GIZ with a focus on "JT next practices" and the promotion of sustainable structural change solutions could be offered. GIZ staff and service portfolio managers may need to upgrade their knowledge through learning trips to offer these packages.

4.3 Developing indicators for "Just Transition" (early considerations)

GIZ has identified ten characteristics of a successful Just Transition in its orientation framework. These characteristics are:

- Dismantled subsidies and incentives harmful to climate
- Increased investments in renewable energy/energy efficiency increase

- Significantly improved clean energy access
- Eased transition for workers through skills development
- Generated alternative employment opportunities
- Expanded social systems protecting vulnerable workers
- Introduced sustainable business models and production methods
- Available private and public financial instruments for JT
- Resolved social conflicts without violence
- Developed solutions for contaminated sites

Although all ten characteristics are useful in assessing progress in various aspects of JT, there is no consensus yet on how to measure, how many indicators must be met and in what combination for the JT process to be deemed successful. It is unlikely that all characteristics will be achieved simultaneously, and meeting only a few may not suffice. Thus, it is advisable to establish a monitoring framework that outlines the minimum requirements for success. This framework should turn the characteristics into measurable indicators, consider the relevance and significance of each indicator, select essential indicators that must be met, and suggest optimal combinations of indicators that demonstrate success, such as at least one from each of the six areas: industrial/technological, environmental, social, economic, financial and energy related.
Moreover, some relevant dimensions might still be missing among the characteristics, such as stakeholder engagement, cultural sensitivity, or scalability. A discussion based on the success criteria and process elements reflected in the transferability framework would help to supplement the set of indicators and construct a monitoring framework.

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