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RESEARCH ARTICLE

Policies for Green Transition of the Turkish Industry: An Evaluation through Istanbul's Organized Industrial Zones

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ABSTRACT

The goal of this study is to make policy implications for the Turkish industry's green transition by taking the opinions of stakeholders active in the field on the supporting drivers, hindering barriers and the policies that should be implemented accordingly. There is a significant gap in the academic literature regarding the studies focusing on the evaluations through stakeholder opinions on the green transition of the Turkish industry, the related drivers and barriers, and the policy needs. To fill this gap, a qualitative study based on content analysis was conducted through semi-structured, in-depth interviews with mid-level managers of organized industrial zones (OIZs) in Istanbul. Istanbul is the largest city in Turkey in terms of economic activity, population, industrial production, trade and employment. Since OIZs are crucial actors in Turkey's industrialization experience, current industrial production, trade and employment, they also have been identified as stakeholders in the green transition by Turkish officials. According to the findings, the prominent drivers supporting the green transition of the Turkish industry consist of the awareness and willingness of the public and large exporters on the significance of the green transition. The prominent barriers consist of the firms' inability to understand the importance of the green transition, economic and financial concerns regarding the transition. The most significant policy recommendations are the government's strong political will regarding green transition, active participation of stakeholders in relevant policies, a legal framework for transition establishing legislation and providing transparent and comprehensive incentives based on reciprocity.

INTRODUCTION

Anthropogenic climate change, biodiversity loss, ocean, water, air and soil pollution, desertification, deforestation, solid waste and plastic pollution threaten the future of humanity (Rockström et al., 2009; Sachs, 2015; UN, 2015; UNEP, 2015; IPCC, 2021). In addition to increasing environmental problems, social and economic problems such as economic crises, unemployment, income and wealth inequality, poverty, problems related to employment quality and insecurity, and food insecurity are also increasing (Banerjee et al., 2011; Milanovic, 2012; Saez and Zucman, 2020; ILO, 2022; FAO et al., 2021). These environmental, economic and social problems caused by the current production and consumption system are strongly interrelated (UNWCED, 1987; UN, 1992). Sustainable development is an important global policy agenda that considers the complex drivers behind these problems. Despite the unsustainability of existing socio-economic structures, the green transition has emerged as a sustainable development strategy as a result of the potential provided by new technologies and

new forms of organizations (Wu et al., 2022). Many countries are declaring their green transition strategies and trying to put into practice (Vela-Almeida et al., 2023). For instance, the European Union (EU) aims to become a leading global actor with its policies and regulations within the framework of the European Green Deal (EGD) (European Commission, 2019). The EU's efforts to encourage its neighbors and trading partners to switch their economic policies and activities, particularly through the instruments regarding foreign trade, such as the Carbon Border Adjustment Mechanism (European Commission, 2019) cause a challenge for Turkish economy which is struggling with structural problem like trade deficit (Ministry of Development, 2019; Taymaz andVoyvoda, 2023). Adapting to the green transition for Turkey is crucial for preserving the export-led growth strategy and integration with the global economy (Ministry of Trade, 2021). Therefore, Turkey declared its 2053 Net Zero Emission Target in 2021, became a party to the Paris Agreement in the same year, and started to announce various green transition policies and action plans towards the net zero target.

Environmental problems such as climate change are classic common goods problem, and it is the biggest market failure the world has ever seen (Hochstetler and Viola, 2012; Stern, 2006). Therefore, the direction of markets will not spontaneously shift towards a green transition (Mazzucato and McPherson, 2018). Moreover, the scope of the transition requires the creation and shaping of new markets beyond market failures (Mazzucato, 2019). Hence, there is a need for a new regulatory framework that will provide incentives to mobilize markets towards green transition (Giddens, 2008), setting long-term and comprehensive goals, developing policies and implementing them effectively to guide transition (Altenburg and Rodrik, 2017). However, in today's democratic societies based on complex power balances, top-down decision-making processes, where the central actor is the state is not sufficient for a dynamic structural change such as green transition (Rotmans and Loorbach, 2010; Sachs et al., 2019; Muench et al., 2022). Transition brings critical roles for the government, private sector and civil society (Kattel et al, 2018), but also requires the active participation of all stakeholders in the process (Niesten et al., 2017) and solving problems through social learning (Loorbach, 2010; Kua, 2016). This makes governance a critical instrument for achieving green transition at global, regional, national and sub-national levels, in different social spheres (political, social, economic) and economic sectors (Smith et al., 2005; Van Zeijl-Rozema et al., 2008; Leach, 2015; Patterson et al., 2017; Bowen et al, 2017; Scoones et al, 2015; Weiland et al., 2021).

Istanbul province and OIZs are extremely crucial not only for the Turkish industry but also for the Turkish economy. Istanbul has the largest share in Turkish economy with 24% of the total active registered employees, 30.4% of the GDP, 21.9% of the total industrial production, 22.6% of the manufacturing industry production, 48.2% of the total exports and 50.9% of the total imports (Ministry of Industry and Technology, 2021; TurkStat, 2022). The total amount of industrial employment in Istanbul is approximately 806 thousand and 40% of the employees works in companies located in İstanbul OIZs (Ministry of Industry and Technology, 2021; Istanbul Governorship, 2021). OIZs are extremely important industrial institutions in terms of industrial production, employment and cooperation between firms, are among the most significant economic actors and stakeholders in Turkey. OIZs have been at heart of industrialization during the planned development period that started in the 1960s and have become one of the most significant elements of Turkish industry (Ministry of Industry and Technology, 2021). As of 2024, the number of OIZs in Turkey exceeded 400 (OSBÜK, 2024). OIZs will be directly affected by green transition policies and as an example of industrial clusters, they will be very effective in green transition practices with their industrial knowledge, experience, technological and spatial infrastructure. Industrial clusters can play an important role in the sustainable development process in various direct or indirect ways (Derlukiewicz et al., 2020). Therefore, OIZs have been defined as stakeholders in the green transition by the Ministry of Trade (2021). The concept of stakeholders refers to all parties from the public, private sector, civil society, academia and media, citizens who have rights and/or interests and/or

are affected by other's doings in a system (Martínez-Peláez et al., 2023; Addison et al., 2024).

In this study, the focus is on the opinions of OIZ managers regarding the green transition of Turkish industry. As official institutions, the managers in charge of OIZs are not only very familiar with the strategies, policies and regulations of central and local governments but also work with many companies and institutions related to industrial activities such as non-governmental organizations and financial institutions. The managers of Istanbul OIZs can closely monitor the development, potential and problems of the Turkish manufacturing industry due to the size of the activities within the OIZs in Istanbul. Therefore, semi-structured, in-depth interviews based on open-ended questions were conducted with the mid-level managers of 6 of the 8 OIZs active in Istanbul. The literature section of this study includes recent studies focused on stakeholder views on transitions to make policy implications. The reviewed studies reveal the essentialness of political will to encourage transitions, the necessity of legislation and regulations, and the need for policies to be shaped in a more participatory policy setting.

There is a gap in the Turkish and international literature which focuses on taking the views of the managers of industrial clusters as an important stakeholder regarding the supporting drivers, the hindering barriers and the policy recommendations for the Turkish manufacturing industry's green transition. This study aims to fill this gap by answering the following research questions:

1) What are the drivers supporting green transition in Turkish industry?

2) What are the barriers hindering the green transition in Turkish industry?

3) What kind of policies should be implemented for sustainable development and green transition?

The qualitative data obtained from the answers given to these three research questions were subjected to content analysis and a descriptive and exploratory study was carried out. According to the findings of the study, the most significant drivers in the green transition of the Turkish industry were listed as the awareness and willingness of the government, large exporting companies and OIZ administrations regarding green transition, green finance opportunities, possible wave of innovations towards clean technologies, increasing consumer welfare, existing industrial and logistical advantages. The most significant barriers were listed as the lack of understanding of the green transition by the business, economic and financial concerns, disadvantages of SMEs, problems in the current incentive system, the risk of weakness in the political will of the government on green transition and the existing structural problems of OIZs. Political determination of the government for the green transition, imposition of sanctions on companies and going without exceptions and exemptions, an effectively reorganized, innovative and country-specific legislation and regulatory framework and a comprehensive public incentive system were mentioned as the main policy recommendations.

LITERATURE REVIEW

The studies reviewed here in this section are mostly qualitative studies trying to obtain first-hand information (from stakeholders) about the drivers, challenges, perceptions, and expectations in the context of green transition and/or transition policies and strategies within the scope of green transition. Data is collected through semi-structured in-depth interviews and analyzed through content analysis and text mining.

Bakker et al. (2014) conducted a study based on 38 semi-structured interviews with 38 representatives of stakeholders to identify stakeholders' interests, expectations and strategies for the development and commercialization of electric vehicles (EV) and charging infrastructures in the

Netherlands. According to the study, most of the stakeholders perceive the EV system as an opportunity, while others see it as a potential threat. Regarding (potential) conflicts of interest between stakeholders, it was found that specific policy intervention is required; public support is needed for the realization of public charging infrastructure. Government policies that have triggered and supported the transition should be continued and those policies should accommodate the pace of the transition.

Graff et al. (2018) analyzed data collected from interviews and surveys with stakeholders in three locations- Detroit, Michigan; St. Louis, Missouri; and the Appalachian coal region- to identify the impacts in different regions of the energy transition in the United States and examine how various communities are progressing through the current transition towards low-carbon energy sources. A total of 51 semi-structured interviews were conducted, the majority face-to-face and the remainder by telephone. Many of the stakeholders were found to be concerned about the loss of local jobs, increasing energy costs and the impacts on low-income residents. Participants identified relevant policies and political will as both a challenge and an opportunity.

Brunetti et al. (2020) conducted face-to-face, semi-structured in-depth interviews with 60 stakeholders from the Tyrol-Veneto macro-region of Italy regarding the challenges of digital transformation in the regional innovation system of companies in the education sector, public administrators and organizations, and analyzed the data obtained through both text mining analysis and content analysis. The participants were asked to identify challenges that require further intervention to promote the digital transformation of the region and suggest specific actions. According to the study, the challenges of digitalization require unique and multidimensional interventions built on the knowledge, entrepreneurship and social and cultural resource characteristics of each regional innovative system. Accordingly, a macro-regional policy for digital transformation should work in these directions without focusing only on technologies or only one technology at a time, and various strategic actions should be coordinated with each other.

Saviolidis et al. (2020) conducted 38 in-depth, semi-structured interviews in four European countries (France, Iceland, Italy and the United Kingdom) to analyze the involvement of key stakeholders in the policy-making process of sustainable food consumption system. Solutions proposed by interviewees report on the need to integrate food policy for long-term goals and the consensus among stakeholders on the need to transform agri-food systems for sustainability. Voluntary and collaborative governance solutions were emphasized, reflecting the increasing involvement of private actors in the management of food supply chains.

Falcone et al. (2021) analyzed two transition initiatives involving the conversion of Porto Marghera and Gela refineries into biorefineries, aiming to assess the extent to which the discourses of key local actors' influence on stakeholders' perspectives. For this purpose, semi-structured interviews were conducted with key local actors to assess the impact of discourses on the reconversion processes. According to key local actors, Porto Marghera's regeneration is a success story despite several disadvantages, whereas the Gela case is considered a complex and challenging process. A notable finding is that policies aimed at strengthening stakeholder networks and cooperation are considered to have been implemented in Porto Marghera but not in Gela. According to the study, policymakers should keep stakeholders' opinions in mind when trying to formulate effective and balanced policy interventions.

Giorgi et al. (2022) conducted semi-structured interviews with stakeholders in the construction sector to analyze the current practices of circularity strategies in the construction sector in five European Union member countries -Belgium (Flanders), the Netherlands, the United Kingdom, Denmark and Italy- which have adopted the circular economy as an significant sustainable development strategy. The study revealed the inadequacy of existing legislation and policies, the

need for a more participatory decision-making process, the need to overcome barriers by directly involving stakeholders in the policymaking process, and the need for more effective and coordinated action and policies.

Moritz et al. (2022) conducted a qualitative study based on 13 interviews with stakeholder representatives in Germany to understand how relevant political stakeholders perceive the supporting drivers, hindering barriers and the potential for transformation of the current food system within the framework of cellular agriculture. The study reveals that stakeholders recognize the changes needed, but mostly have an idea that such large-scale transformation of the agriculture system may not be a feasible solution. According to the participants, markets will play an important role in deciding whether cellular agriculture products will be successful or not.

Kekkonen et al. (2023) conducted a study to identify Estonian entrepreneurs' perceptions of challenges and opportunities related to the green transition by conducting online surveys, focus groups and individual semi-structured interviews with 42 experts from 532 Estonian companies. According to the study, the opportunities perceived by the respondents are increasing production efficiency and taxation practices for green products and services, while the main challenges are the loss of competitive advantage, economic crises, the need for long-term planning and large investments. A significant number of Estonian companies see the green transition as a challenge rather than an opportunity. The main concerns of companies include increasing costs, limited access to finance, limited policy support, lack of consumer demand and regulatory uncertainty.

Suphasomboon and Vassanadumrongdee (2023) conducted a qualitative study using a deductive content analysis approach and 12 semi-structured interviews with industry and policy stakeholders to identify business and policy perspectives on sustainability transitions in the Thai cosmetics industry. According to the study, multinational cosmetics companies are taking initiatives to develop sustainability dimensions holistically as part of their corporate strategies, but local cosmetics companies do not have the initiative to fully integrate sustainability into their core business. Policy recommendations in the study include mandatory sustainability reporting, extended producer responsibility regulations for packaging and financial incentives for the cosmetics industry.

Ho et al. (2023) conducted 23 semi-structured interviews with key stakeholders to understand their ideas regarding circular economy awareness/perceptions, drivers, challenges, enablers and barriers in the state of Victoria in Australia. The purpose of the study was to make contributions to the development of strategic plans. According to the study, lack of awareness/understanding on circular economy is the number one challenge. The number one enabler is the regulatory environment, which is vital for driving a systemic movement toward circularity, while the number one barrier is the lack of specific guidelines and standards. The study revealed that the regulatory environment needs to be developed for highlighting circular economic understanding. The main policy recommendation is the need to increase circular economy understanding of stakeholders and disseminate the circular economy policies that support circular economy transition.

Mackiewicz and Kuberska (2024) conducted in-depth interviews with cluster organization managers and researchers and a comprehensive analysis of documents on organizations' strategies to identify how cluster organizations are promoting green transformation in Poland. According to the study, cluster organizations manage and participate in actions that create favorable conditions for pursuing low-carbon and circular economy initiatives and help overcome barriers related to green transition. Cluster organizations create awareness among their members for circular business models, enable networks and industrial symbiosis for the use of waste materials in new products and act as a bridge between research institutions and companies and disseminate the latest know-how.

Schultz et al. (2024) conducted a qualitative-empirical study based on semi-structured interviews

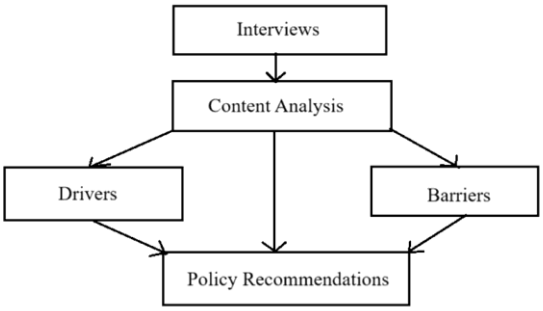
with key stakeholders from the European chemical and plastics industry focusing on stakeholder collaboration in the practice of circular economy. According to the study, successful cooperation often takes place between various stakeholders in close interaction. A systematic circular economic transition requires a collective rather than a company-centered approach and governance strategies. Rather than business models, innovative governance is presented as a possible solution, arguing that innovative governance has a greater potential for radical change.

Ekdahl et al. (2024) conducted exploratory qualitative research by conducting semi-structured interviews with 18 senior experts to develop an understanding of how industrial policy can be designed to address the lack of industrial policy toward climate change. The research revealed that a Swedish industrial policy focused on the circular economy transition requires public investments in circular economy technologies. It is concluded that a policy mix focusing on correcting market failures, market creation and capacity building can support a circular industrial transition.

METHODOLOGY

Method and Sample

In this study, qualitative data analysis was used for the the classification and interpretation of linguistic material to make statements about what is represented in the data (Flick, 2014). The qualitative research process has an inductive character and the research data is descriptive (Merriam, 2009). The most important methodological step in analyzing qualitative data to reduce large data sets or complexity in data (statements or observations) is to group the data under a certain concept, find patterns and reach themes (Patton, 2002; Flick, 2014). The data are analyzed through a process called constant comparison. In this process, the data are divided into manageable parts and the parts compared in terms of similarities and differences are grouped to form categories and then themes are reached (Corbin and Strauss, 2015).



The most obvious way to follow all analytical practices is qualitative content analysis (Flick, 2014). The content analysis technique is implicitly used in the inductive analysis of all qualitative data because what is being analyzed is the content of the interview notes and/or documents (Merriam, 2009). The steps of qualitative content analysis are a formulation of the research question, identification of the sample, conducting structured or semi-structured observations and interviews, use of documents and visual materials and fulfillment of recording protocols, development of a coding framework, classification of the data, coding trial, evaluation and modification of the coding framework, performing the basic analysis and finally presentation and interpretation of the findings (Creswell, 2009; Flick, 2014; Schreiber, 2014;). In this study, in which content analysis was used, purposeful sampling was used. Purposive sampling, which is based on the principle of consciously selecting participants that will best help the researcher understand the problem, is the most appropriate sampling method for qualitative research, used in many qualitative studies (Merriam, 2009; Creswell, 2009).

Data Collection

Data collection tools used in qualitative research are in-depth interviews, direct observation and written document analysis (Patton, 2002; Merriam, 2009). Interviews are a qualitative data collection tool that is extremely useful when direct observation of the sample is not possible and provides direct data on the views of the participants (Patton, 2002; Creswell, 2009). In interviews, it is also possible to emphasize the elements that are meaningful to the participant, especially through open-ended questions -unlike, for example, a questionnaire study (Patton, 2002).

In this study, semi-structured interviews based on open-ended questions were used to collect data. 8 OIZs that are still active in Istanbul were contacted via e-mail and telephone; 6 OIZs responded positively, and 2 OIZs refused the interview request. Face-to-face interviews were conducted with 12 different relevant mid-level managers from six OIZs in 6 sessions between 25 March 2023 and 7 May 2023 in the OIZs where the managers were in charge. The interviews lasted between 70 and 120 minutes on average and were recorded with a voice recorder with the permission of the participants. Before the analysis, the interviewed OIZ managers and OIZs were anonymized. The recorded interviews were manually transcribed by the author.

Data Analysis

The data obtained from the interviews were reviewed repeatedly to reach themes based on the research questions, to determine the prominent evaluations and the frequency of repetition of these evaluations. The data was first coded, and the coded data was divided into categories and themes were tried to be reached from the categories. The resulting categories and themes are listed in the tables. Table 1 lists the findings for the first research questions. Themes are expressed in boldface style and categories are given under the themes. The frequency column gives the number of expressions of the drivers in the interviews. It does not indicate the number of people expressing the relevant theme, but the number of interviews in which it was prominent.

Table 1. Drivers Supporting the Green Transition of Turkish Industry

Drivers	**Frequency**
Awareness and willingness of the importance of green transition. *The government has recognized the importance of green transformation.* *Large domestic exporters are following and trying to adapt to green transition developments abroad.* *The willingness of OIZs' top management to be a pioneer in the green transition.*	6
New financial opportunities. *Financial resources to be provided by the EU.* *Potential interest from international investors.*	6
Existing industrial and logistic advantages. *The existence of an established and relatively well-organized industrial structure.* *The potential to organize quickly (flexibility).* *Logistic advantages and geographical proximity to ports.*	6
Possibility of a new wave of innovation. *Creation of new products and technologies.* *Creation of new markets.* *Emergence of new sectors.*	4
The creative outcomes of a mandatory, comprehensive and inevitable transformation. *Those who succeed in transformation will be the winners.*	

The necessity brought by multi-national companies dominating global value chains and foreign market expectations is an opportunity for the local companies. *Mandatory regulations will level the playing field for the best performers.*	4
Changes in consumer expectations. *The fact that consumer welfare will increase with the green transformation will change the expectations of consumers.*	4

Table 2 shows the categories, themes and frequencies resulting from the participants' answers to the second research question.

Barriers	**Frequency**
Most companies lack the understanding of green transition. *Firms think of EU sanctions only as an additional tax cost.*	6
Economic, social, financial and organizational concerns. *The risk of companies having to withdraw from the market due to cost increases and inability to catch up with change.* *Risk of job losses and employment decline.* *Economic, financial, technological and organizational disadvantages of SMEs.*	6
The risk of infirmity in the government's commitment to the green transition. *Regulation of legislation at the desk, failure to develop country-specific policies.* *Market fundamentalist policies and the inability of countries to produce original ones.* *Insufficient number of personnel in the relevant ministries.*	6
Problems with the current incentive system. *Unclear and insufficient incentives.* *Incentives favoring large companies.*	5
Difficulty in ensuring and implementing new standards. *Too many bureaucratic burdens and procedures.* *Organizational inefficiencies in industry to adopt those new standards.*	4
Problems related to the current situation of OIZs. *Spatial constraints in existing OIZs.* *Difficulties in transformation in the old OIZs.* *OIZs' inability to carry out independent efforts for sustainability.* *The ineffectiveness of OIZs in the decision-making processes.*	4

Table 3 lists the answers of the participants to the third research question. policy recommendations of the participant managers.

Policy Recommendations	Frequency
There must be political determination and will and this must be demonstrated to all parties. *Policies must be mandatory; sanctions must be put.* *Volunteerism is not enough for transformation.* *There should be no exceptions and exemptions in the relevant policies.*	6

Legislation and regulations must be transformed according to the need for the green transition immediately. *Legislation must be clarified and settled.* *Legislation must be enforceable.* *Legislation and regulations should be transformed together with scientists.* *Experts from different disciplines and fields should work together in the regulation of legislation.* *Legislators should be innovative and organize country-specific legislation.* *Legislators should know the field and the working conditions.*	6
Informative activities should be carried out and training should be provided for the industry on sustainable development and green transformation. *New concepts should be clearly explained to the industry.* *The reasons for the new regulations should be comprehensively explained.*	6
There should be comprehensive public incentives for the green transition. *There should be transparency in incentives and clear information on incentives.* *The results obtained from incentives should be publicly evaluated and unsuccessful ones should be abandoned (flexibility).*	5
The transition must be planned. *Transition should be planned specifically for local conditions.* *There should be a gradual transition.* *Site selections for new investments should be considered.*	4
The education system should be organized according to the requirements of the green transition. *Particularly in secondary and higher education, the green transition should be taught.* *Qualified intermediate staff should be trained.* *Qualified young people should be encouraged to work in industry.*	4
Wide societal awareness should be created. *Innovation culture should be popularized in society.* *Green transition should be adopted as a culture by the public.* *The green transition must be constantly covered in the media.*	3
An effective and accessible data system should be established. *Data on sustainability and green transition practices in industry and OIZs should be collected on a secure digital platform and be shared with relevant and selected stakeholders.* *Networks should be created to pave the way for green transition.*	2

FINDINGS AND DISCUSSION

In the literature section of this study, policy recommendations such as implementing strong, flexible, adaptable public policies for transitions and ensuring the continuity of these policies, clear and effective public incentives, encouraging stakeholder engagement, serving as a bridge for cooperation between stakeholders, creating platforms that will ensure the dissemination of technical information and support the development of innovative practices for transitions, eliminating market failures and creating new markets are the prominent policy recommendations. The policy recommendations revealed by the managers for the green transition of the Turkish manufacturing industry largely overlap with the policy expectations in the literature examined in this study. First, the leadership and support of the government in the green transition was considered a strategic element by all participants. It was stated that stakeholders and experts from different fields should be encouraged

to participate in long-term planning efforts and discussions for the new legislation and regulations. All participants agree that the framework to enable stakeholders to be effective should be determined and regulated by the public sector. Stakeholder engagement should be at the heart of the transition strategies and policies.

Providing effective incentives for stakeholder participation and cooperation and establishing bridge mechanisms between stakeholders are the most important expectations to be addressed within the framework of clarified rules and regulations. On the other hand, participants do not only focus on public sector leadership in the green transition policy recommendations but also consider the influences of Turkey's major exporters and global value chains in which Turkish industry is involved.

To prevent on-desk decisions that may result in the policies copied from other countries' policy documents, decision-makers should be right at the heart of the field and should work together with stakeholders, scientists and experts from different fields to support social learning and co-evolution in the transition. The suggestion to establish an effective and accessible central digital data system is a recommendation that can be considered both tactical (building networks) and operational activities.

The most prominent recommendation is that the uncertainties regarding the transition should be addressed by building strong political determination that will cause both a challenge and an opportunity for different stakeholders. Another significant suggestion is adopting green transition as a culture, particularly by the public sector, yet by society. It is noteworthy that all participants are at a consensus that encouraging volunteerism is not enough for the green transition of the manufacturing industry. Country and local industry-specific policies developed within the framework of a planned action are all in line with the approach of social learning and empiricism.

CONCLUSION

The study aims to make policy implications regarding the green transition of the Turkish manufacturing industry by obtaining policy recommendations and evaluations about the drivers and barriers from mid-level managers of OIZs located in Istanbul which is the heart of Turkey in economic, social and industrial terms. OIZs have been operating as prominent industrial organizations and stakeholders at the meso-scale for more than 60 years in Turkey, have the knowledge and experience for evaluating the drivers and barriers and the needed policies that will lead the way for the Turkish industry in the green transition. There is no other academic study in literature that fully meets the purpose of this study. There is a gap in the Turkish and international academic literature for the studies that aim to provide policy implications regarding the green transition of the Turkish manufacturing industry by obtaining the opinions of the managers of industrial clusters regarding the supporting drivers, the hindering barriers and the policy recommendations. In-depth interviews with open-ended questions were used to collect data and content analysis was carried out to reach conclusions for the research questions.

Participants made holistic, comprehensive policy proposals that embrace social transformation with different aspects and comprehensive findings of this study are largely in line with the literature covered in this study. However, in this study, the participants reveal that green transitions should be socialized like an emergency within a more holistic approach; strong, inclusive, flexible, innovative networking, social learning, and trial-and-error processes need to be carried out transparently. Green transition as a sustainable development strategy is also a governance strategy.

While the participants express the awareness of the government, large exporters and OIZs as the most important dynamic, they consider the failure of companies, especially SMEs, to understand the importance of the green transition as the most important barriers. There are many policy

recommendations they made in this context. Committed, agile, transparent and democratic leadership of the government is the most prominent policy recommendation which is yet a consensus among all participants. Insufficiency of voluntariness for green transition is another consensus among all participants because they argue that the green transition is not fully understood by all parties in the industry and society as well. Long-term planning is also determined as a significant policy need. Therefore, the participants did not support a traditional top-down governance model; they also highlighted the significance of engaging stakeholders and creating country-specific policies by working with the scientists and experts. Bottom-up interventions are an important input in the decision-making processes according to the participants. They also emphasized the influences of global value chains, big exporter strategies and the changes in consumer preferences in the trade partners. In addition, it was emphasized that regulations consisting of the translation of other countries' policies would not be sufficient and effective and that country-specific strategies and policies should be developed. It is understood that to both demonstrate political determination and involve all stakeholders in the process by making them effective, specific policies focused on local conditions should be put forward with strong institutional mechanisms and revised according to the results obtained.

Conducting similar studies for different stakeholder groups in Turkey or similar/different stakeholder groups in different countries will make a significant contribution to the literature. In addition, such academic studies should be considered as a product of the participation of academia as a stakeholder group in the process, as a part of social learning and co-evolution.

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