



POST-WAR RECOVERY AND GROWTH ECO-SYSTEM FOR SMALL AND MEDIUM SCALE MANUFACTURING ENTERPRISES IN TIGRAY, NORTHERN ETHIOPIA

Tsegay Tesfay MEZGEBE^{*1}, Goitom TESFAY¹, Zemichael AMARE¹, Redae ALEMAYEHU¹

¹Manufacturing Engineering Chair, Ethiopian Institute of Technology-Mekelle, Mekelle University,
Mekelle, Ethiopia. P.O.Box 231

*Corresponding author (email: tsegay.tesfay@mu.edu.et; ORCID: 0000-0002-2002-6692)

Abstract

This paper systematically discusses collaborative post-conflict Recovery and Growth eco-system for small and medium scale manufacturing enterprises (SMMEs) in the case of war-torn Tigray, Northern Ethiopia. While discussing the eco-system, theoretical generalization on enabling pathways and policies, scientific methods of comparative analysis, and correlative data triangulation are employed. Examining pre economic contributions of the SMMEs followed by analysis and characterization of the enterprises being under the Tigray war was the prior eco-system agenda. The aim was to map out qualitative and quantitative baseline data covering a time period between December 2020 and June 2021. The finding consequently reveals though the trivial number of SMMEs have been created promising jobs and were fairly generating income, they are devastated being under the civil war and contributed financial and socio-economic losses in the war-torn Tigray in particular and in Ethiopia by large. The policy nursed Recovery and Growth Eco-system is therefore expected to give intelligence for policy makers and for regional and Federal governorships of the country to spontaneously recover the impacted SMMEs within the intended case study.

Keywords: Enabling Policies, Impact analysis, Recovery and Growth eco-system, Small and Medium Enterprises, Tigray war.

Introduction

Small and medium scale enterprises (SMEs), that could have different sizes, Table 1, varying from country to country, refer to non-subsidiary and independent firms characterized by their financial assets and number of employees [1]. SMEs play key roles for industrial growth of emerging economies. Their contribution is notable in job creation and they play pivotal roles in poverty reduction and in equitable income distribution by absorbing productive resources at all levels of national economy. Without being exhaustive, some published materials that witness the industrial and economic contributions of SMEs could be cited. [2], [3], [4], [5], [6], [7] to list among many others.

Table 1. International Finance Corporation’s working definition for SMEs (source: [8])

Defining criteria	Micro Enterprises	Small Enterprises	Medium scale Enterprises
Employees	Between 1 and 9	Between 10 and 49	Between 49 and 499
Asset variables	<\$100,000	<\$3,000,000	<\$15,000,000
Revenue generated	<\$100,000	<\$3,000,000	<\$15,000,000

As part of such contributions, the small and medium scale manufacturing enterprises (SMMEs) in Tigray, Northern Ethiopia had been constituting key pillars of economic development. Since 2005, the development of SMMEs under the Small and Medium Manufacturing Industry Development Agency of Tigray (SMMIDA) had been highly agenda of the Tigray Regional State in Ethiopia. It had been playing a fundamental role in the socio-economic dynamics mainly in job creation, income generation, and hence poverty reduction. They were also key players in regional and national value chains, making them essential actors in the efforts towards achieving sustainable development of the Tigray region and the country by large.

Nevertheless, the Tigray war¹ erupted between the Federal Government of Ethiopia and the Regional Government of Tigray² in November 04, 2020 [9] has baulked its path to socio-economic

¹The Federal Government of Ethiopia named it as “law enforcement military operation”; the Regional Government of Tigray and its followers named it as “[Genocidal Tigray war](#)”; whilst most of the global States and researchers have been named it as “The armed conflict in Northern Ethiopia”, “Northern Ethiopian civil war [10]”, etc. What so ever the name given by different organizations and States, the designation used throughout this paper is “Tigray war” and when it is necessary “Ethiopian civil war in Tigray”.

²The Regional Government of Tigray has been led by the Tigray People’s Liberation Front (TPLF) and the Federal Government of Ethiopia has been led by Prosperity Party.

contribution within the Tigray region and within the nation. Though the battle field was mostly in Tigray, the war continued to affect not only Tigray but also Afar, Amhara, Western Oromia, and Benishangul-Gumuz with involvement of non-state armed groups. The war has largely affected economically important businesses of the country by sending shockwaves across the country's business landscape and eroded social fabrics. However, the situation in Tigray was different. Its economy is significantly devastated [11]. Almost all businesses are negatively affected and the SMMEs is among the negatively affected businesses. Slowly surfaced Governmental reports and eye witnesses (sourced from owners of the enterprise(s) and their employees) assure that machineries, spare parts, products, raw materials, and other related materials of most of the SMMEs are either consciously damaged, intentionally looted, or missed.

The situation is however meaningfully minimized at this time because of the cessation of hostilities signed between the Federal Government of Ethiopia and the Regional Government of Tigray (designated as "TPLF" in the agreement). The agreement was signed in South Africa, Pretoria, on November 02, 2022 after 24 months of intensive war in Tigray and neighboring regions. Consequently, Tigray in particular and Northern Ethiopia by large are now comparatively breathing a respite from the civil war.

Cognizant to this respite, funding agencies, governmental bodies (such as SMMIDA in Tigray), business associations, scholars are either on the way or ready to track the impacts of the civil war on businesses and of course to economically recover damaged businesses. Acknowledging such motivational move, this paper is organized to propose post-conflict recovery and growth ecosystem by discussing contributions of four collaborative actors and enabling recovery pathways and policy environment.

1. Methodology

The purpose of this study was achieved through theoretical generalization and scientific methods of comparative and statistical analysis. Google Scholar, Science Direct, Scopus Index, Research Gate were among the databases used to extract mostly recent publications and scholarly discussions about the theoretical generalization. Exploring the contribution of small and medium scale enterprises for economic development of countries took the premier part of the theoretical generalization. The status of small and medium scale manufacturing enterprises in Tigray region

prior to the Ethiopian civil war is then discussed and followed by analysis and characterization of the civil war's impact on enterprises in the region. Qualitative and quantitative data were used to map out the baseline information before and after the civil war. Global post-war recovery and growth experiences considering the case of SMEs was then shortly reviewed with an aim to serve as spring board for a proposition. A collaborative post-conflict recovery and growth eco-system incorporating the contribution of four actors is thus proposed in the next section taking into account enabling pathways and policy environment. Synthesis and discussion were then finally addressed mainly to present correlation matrix between the contributing actors and the enabling pathways and policies and of course to outline the novelty of the study via triangulating baseline data.

2. Impact analysis of the Tigray war on small and medium scale manufacturing enterprises

2.1 Small and medium scale manufacturing enterprises prior to the war

Referring to situation(s) before the beginning of the war in Tigray, the Tigray region was known for its significant economic growth with relatively high levels of investment [12]. Between 1992 and 2017, for example, Tigray received a large share of Ethiopia's total domestic investment and specific investment across agricultural, manufacturing, and construction sectors. Likewise, between 2012 and 2019, Tigray consistently ranked in the top three out of nine regions in Ethiopia for number of micro and small-scale enterprises [12]. This has directly contributed to the reduction of poverty and unemployment as the Regional Government had been responsible to promote the enterprises by providing entrepreneurial trainings, technology development, and technology business incubations. Some policy advantages of the Regional Government including 100% tariff exemption of duties for imports of materials, 15% tariff reduction of duties for imports on capital goods used, income tax exemption granted from 1-9 years, etc. has also helped to boost the enterprises. Consequently, a number of small and medium scale enterprises has bubbled in the region.

The number and type of small and medium scale manufacturing enterprises, who were on the go until the 2020 Tigray war eruption, and their economic prominence are illustrated as follow. Though the authors are not confident if it could be accessible online or not, the datasets generated the numbers are available in a SMMIDA repository census reported on July 2020 [13].

3.1.1 Location and number of small and medium scale manufacturing enterprises

Currently, the Regional State of Tigray has seven administrative zones namely Western Tigray, North-western Tigray, Central Tigray, Eastern Tigray, Mekelle (capital of the Tigray region), South-eastern Tigray, and Southern Tigray. A total of 5506 small manufacturing enterprises and a total of 877 medium scale manufacturing enterprises had been therefore operating throughout these zones until the eruption of the Ethiopian civil war in 2020, Fig. 1.

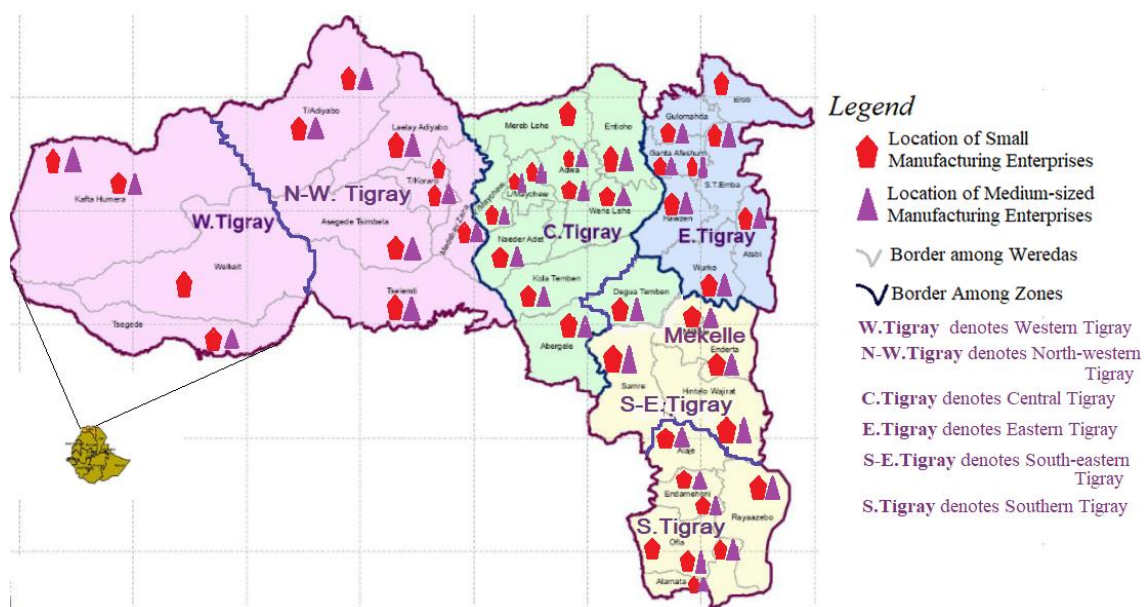


Fig. 1 Pre-war location of SMMEs in the War-torn Tigray (source: [13])

While we observe the location weight of each enterprise, 59.75% of the small manufacturing enterprises were located in North-western, Central, Eastern, and South-eastern zones, Fig. 2(a). Taking the majority weight at Mekelle zone, the remaining 40.25% were located in Western and Southern zones of the region. Similarly, as shown in Fig. 2(b), 57.34% of the medium scale manufacturing enterprises were located in the four zones mentioned for small manufacturing enterprises and the lingering percentage in the remaining zones. Metal and wood works manufacturing sector on the other hand took premier rank carrying 1,990 enterprises both in the small and medium scale enterprises and construction inputs manufacturing follows carrying 1,466 enterprises, Fig. 2(c, d).

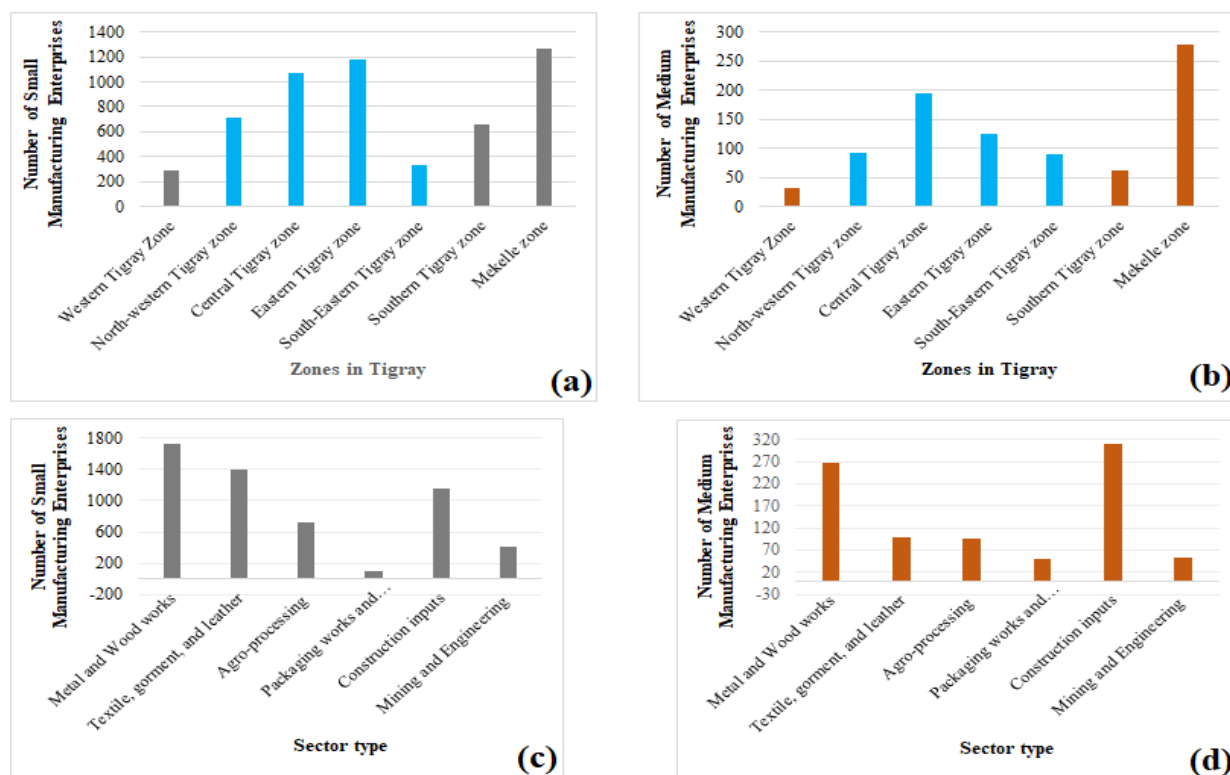


Fig. 2 Pre-war number of SMMEs by zones and by sectors (source: [13])

- (a) Number of small manufacturing enterprises by zones
- (b) Number of medium scale manufacturing enterprises by zones
- (c) Number of small manufacturing enterprises by sectors
- (d) Number of medium scale manufacturing enterprises by sectors

From these two pre-war data, one can simply determine that locational coverages and numbers of the SMMEs in Tigray had directly and positively been contributing to poverty alleviation via job creation and income generation. What about their economic contribution? Generally speaking, their contribution for economic growth of the nation could be noticed positively. Next sub-section details their economic contribution.

3.1.2 Economic benefits of the small and medium scale manufacturing enterprises

Previous studies such as [14], [15], [1], [16] validate that job creation and income generation are among the variables that measure economic benefits of SMEs. Acknowledging this circumstance, between January 2011 and July 2020, 73.64% of the 5506 small manufacturing enterprises and 59.63% of the 877 medium scale manufacturing enterprises in Tigray had been created promising

jobs for tens of thousands and were fairly generating income [13]. Repository data in [13] further tells, a total of 19,505 jobs with 10,421 permanent jobs and 9,084 temporary jobs had been created by the small-scale manufacturing enterprises. 59.74% of these jobs were accumulated in North-western, Central, Eastern, and South-eastern zones of the Tigray Region and the remaining in Western, Southern, and Mekelle zones enchanting the highest number in Mekelle, Fig. 3(a).

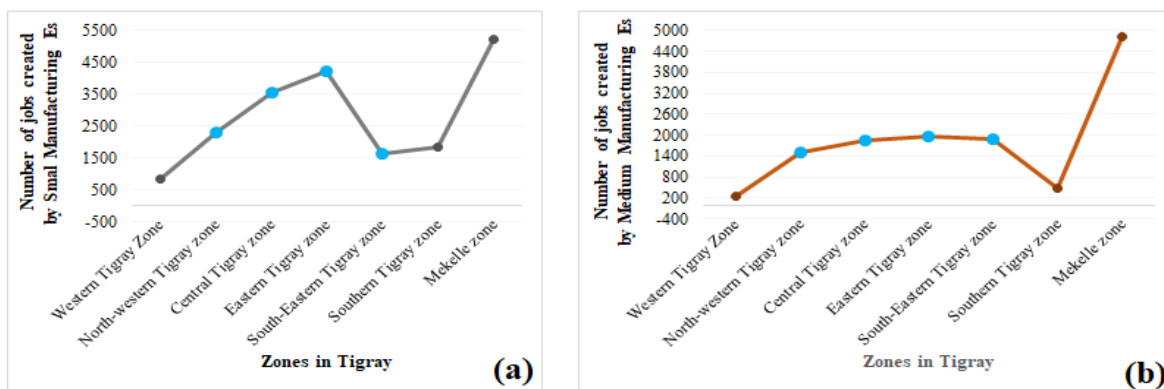


Fig. 3 Number of jobs created by SMMEs in Tigray (source: [13])

(a) Number of jobs created by small manufacturing enterprises (Es) in each zone

(b) Number of jobs created by medium scale manufacturing enterprises (Es) in each zone

Likewise, a total of 12,813 jobs with 7,047 permanent jobs and 5,766 temporary jobs had been created by the medium scale manufacturing enterprises. Corresponding to the small manufacturing enterprises, 56.67% of the total jobs created by the medium scale enterprises had been accumulated in the four zones of the Regional State and the remaining jobs in the three zones, Fig. 3(b). These figures therefore validate, from both enterprises, a total of 18,915 (or 58.53%) beneficiaries have been found in the four zones of the region until the reporting date of the [13] repository time which is July 2020.

Let us now see how these enterprises generated income until the reporting date of the SMMIDA. ‘Per capita annual income’ and ‘average household size’ prior to the war are used as parameters to measure the income generated. According to the [17], in 2020, the annual per capita gross national income in Ethiopia was \$860. This stretches \$71.7 per month. Taking only the 18,915 beneficiaries found in the four zones of Tigray in July 2020, the economic advantage obtained by SMMEs in one month had been 18,915 beneficiaries * \$71.7 per month = \$1,356,205.5. Correspondingly, considering a 2020 average household size in Tigray, which was 4.2 [12], a total

of $4.2 * 18,915 = 79,443$ citizens had been economically benefited only in the four zones of the Tigray region during same reporting month.

The jobs created and income generated therefore confirm that the development of small and medium scale manufacturing enterprises under the supervision of SMMIDA has been highly agenda of the Tigray Regional State by playing a fundamental role in socio-economic dynamics of the Tigray region.

2.2 Small and medium scale manufacturing enterprises being under the war

War-torn global experiences confirm that significant economic destructions have been happening. Congruent to this, as mentioned earlier and because of the Tigray war lasted from November 2020 to November 2022, Tigray's economy is significantly devastated. In line to this, SMMEs are among the devastated business sectors. Though consistent destruction data series are lacking for us because communication lines and damage assessment platforms have largely been non-operational until the compilation time of this paper, this section discerns the impacts of the civil war on SMMEs in Tigray. But one has to know that the full-scale destruction report and study is yet to come as of now.

'Incidents of conflict' of the Tigray war in North-western, Central, Eastern, and South-eastern zones of Tigray region is considered as comparable variable to show the impact on the SMMEs. Minor number of conflict incidents recorded in Map4. of a study by [18] is then used as specific data source to compare with the zonal quantitative data presented in sub-section 3.1.

Map4. in [18] presents occurrence of massacres and conflict incidents of the war in Tigray and Amhara regions in Ethiopia. The battles, ambushes, air strikes, drone attacks, and shelling tracked conflict incidents are legend with 'Sky blue' colored triangular shape in the map. Field information from confidential sources and Map Ethiopia 2021 are acknowledged as source of data by the study. The study therefore found that because of the armed conflict ranged from November 2020 up to June 2021, the number of conflict incidents recorded in North-western, Central, Eastern, and South-eastern zones of Tigray are at least 188. On the other hand, as it is demonstrated in sub-section 3.1, a total of 18,915 economic beneficiaries have been found in the four zones of the region during the SMMEs census reporting date of SMMIDA. Taking these figures, the socio-

economic impact of the war, elapsed only for eight months and enumerated only in the four zones, are delineated as follow.

Three variables namely ‘per capita gross annual income’, ‘average household size’, and ‘causal relationship between conflict incidents and economic decay’ are considered to measure the social, human, and economic loss of the war’s impact on SMMEs in Tigray. According to [17], in 2021 or during the intensive conflict incidents time, the per capita gross annual income in Ethiopia was \$960. This gives \$80 per month. Taking the 18,915 beneficiaries affected by the conflict incidents only in the four zones and in eight months, Tigray has lost an economic advantage of 18,915 beneficiaries * \$80 per month * 8 months = \$12,105,600. Congruently, the impact of the conflict incidents on household livelihood in the same zones were severe. According to [12], in 2020, the average household size in Tigray was 4.2. Hence, taking the 18,915 beneficiaries determined earlier and the minor conflict incidents recorded, 4.2 *18,915 = 79,443 social dis-integrity is documented only in the four zones of Tigray region.

Let us proceed to the third variable: ‘causal relationship between conflict incidents and economic decay’. Studies such as [19], [20], [21], [22], [23] show that conflict incidents and/or conflict intensity has direct relationship with country’s economic decay. That is, the impact of conflict incidents on economic growth could directly be estimated using standard growth regressions, presented in equation below, to depict the direct impact on per capita GDP, investment rate, trade openness, and export-partner growth.

$$y_{i,t} - y_{i,t-1} = \beta_1 y_{i,t-1} + \beta_2 C_{i,t-1} + \gamma X_{i,t} + \alpha_i + \alpha_t + \varepsilon_{it} \dots\dots\dots (1)$$

Where, $y_{i,t}$ is real per capita GDP in country i at time t , $C_{i,t}$ is conflict variable of interest, $X_{i,t}$ is a vector of other control variables (such as investment rate, trade openness, and export-partner growth), α_i is country-specific, α_t is time effect, $\varepsilon_{i,t}$ standard errors clustered at country level.

To encapsulate, because of conflict incidents emanated by a civil war, productivity decreases [22], trade decreases [23], and annual average growth in countries become about 2.5 percentage points lower [19]. This validates the Tigray’s SMMEs being under the Tigray war has been conveyed significant financial and socio-economic losses both at regional and national levels. Hence, how

such losses could be recovered? What lessons could be taken from global experiences on similar case? The following sections detail the answers.

3. Review of post-conflict recovery and growth experiences in the case of small and medium scale enterprises

Post-war, also named as post-conflict [24] or post-crisis [25], situations are territories that have previously suffered from significant problems such as armed conflict. In response to these situations, financial resources and scholarly propositions need to be mobilized to deal with immediate post-conflict priorities [26] and long-term necessities. The goal is to promote the conditions for a comparative return to economic, political, and social stability. Acknowledging this conception, let us shortly review the experiences of Taiwan, Sri Lanka, Uganda, Liberia, Bosnia & Herzegovina, Northern Italy, former Western Germany, and Angola in promoting post-conflict economic recovery and growth of small and medium scale enterprises.

SMEs have been particularly active in Taiwan's post-war development and this fact has attracted much attention in recent years [2]. SMEs relative importance meant that Taiwan's post-war growth path has been close to that of free-market capitalism [27]. It is further believed that the abundance of SMEs made Taiwan's economy more flexible and hence more resilient to crisis [2]. Case studies on footwear and bicycle firms in Taiwan for instance revealed SMEs played an important role for economic development due to interactive conditions [28], [29].

The emergence of Sri Lanka from three decades long conflict brings new opportunities for the country's economic growth and development. The post-conflict has given the opportunity to realize the country full potential in increasing entrepreneurial SMEs mostly concentrated in the war-torn areas [30]. Besides, [31] have discussed the contribution of SMEs to economic development in post-war Sri Lanka and the possibilities for further promotion. This study correspondingly attempted to identify the policy changes necessary for enhancing the role of SMEs in economic development of the country. The work of [32] has also witnessed the growth and issues of SMEs in Post conflict Jaffna, Sri Lanka. All the scholarly discussions then confirm SMEs have been recognized as strategically important sector in the economic recovery of Sri Lanka.

What ratifies the situation in Africa? A lot of studies have been emerged to show the SMEs experiences' in Africa too. The study by [33], for example, present a collaborative role of

institutions for survival and growth of SMEs in post-war communities in Northern Uganda. In their study, collaboration variables such as business skills, capital adequacy, access to finance, entrepreneurial education, and government support have positively affected SMMEs survival and growth in post-war Uganda. Their study further showed advocates of recovery programs and interventions in developing countries should consider government support as a vital factor to enhance SMMEs growth in post-war communities. Within African context, [34] discussed the role of SME financing for job creation in fragile states taking the post-war notes in Liberia. [35] also dictated the post-war role of SMEs for tourism development in Angola. They explored the importance of SMEs in the process to establish the foundations for tourism development.

The institutional development obtained by implementing microfinance model in Bosnia & Herzegovina is another example that witness the role of SMEs for post-war recovery and growth. According to [36], extensive programme supports for a reinvigorated SME sector have been one of the recoveries and growth opportunities considered by the first wave of post-war politicians elected in the country. [36] outlined the microfinance model introduced in Bosnia's & Herzegovina's post-war has made an important net contribution to the economic and social recovery of post-war Bosnia and Herzegovina. The study by [37] also has considered the case of Bosnia & Herzegovina to delineate entrepreneurship and SME development in post-conflict societies. Let us lastly perceive the experiences in Northern Italy and former Western Germany. Because of the World War II, the economy of these two countries had been significantly devastated. However, after 1945, the role of SME-driven reconstruction has taken premier role for rapid economic development in both countries. [38] confirmed this fact saying "SME-driven recovery approach has played a very considerable role in the successful reconstruction of Northern Italy and former Western Germany".

To sum-up, SMEs have been serving actively for post-war recovery development of nations and/or provinces mainly via job creation and income generation. The issue here is how war impacted countries and/or provinces should customize the witnessed role of SMEs for their own cases. As part of this customizing effort, section 5 provides a scholarly recovery and growth eco-system for the overwhelmed SMMEs in the war-torn Tigray, Ethiopia.

4. Recovery and Growth Eco-system: Enabling pathways and policy environment

Post-conflict recovery and growth processes consist of a series of overlapping processes - like colors in a rainbow 39. It is not a direct return to pre-war income levels and growth rates. Rather it must be distinctive and spontaneous to permit structural break with the past [40]. It involves rehabilitating regional and/or national economy through design and implementation of job creation, income generation, and livelihood restoration [41], [39]. How could this be achieved? Definitely through collaborative effort. Who to collaborate? Federal and/or regional governorships, local and international funding agencies, technical institutions, business associations, etc. Does the SMMEs’ case in the war-torn Tigray demands similar approach? Sure! It demands similar collaboration eco-system to recover and hence to contribute for economic growth of the country. Fig. 4 therefore delineates the honest and transparent eco-system by discussing recovery roles of contributing actors and by offering enabling pathways and policy environment.

4.1 Contributing actors and their collaboration approach

Contributing actors, presented in Fig. 4(a) in our case, are required to use recursive and a phase-by-phase recovery approach including a ‘watching brief’ to provide knowledge for operations, a ‘transitional support strategy’, early recovery activities, and ‘post-war recovery’.

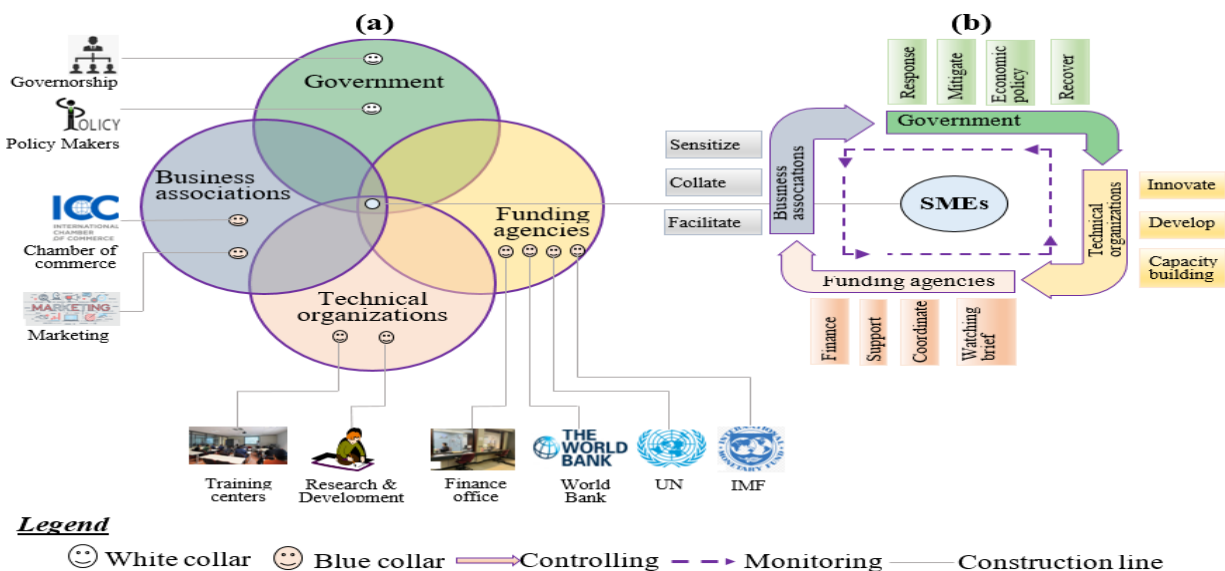


Fig. 4 Collaborative post-conflict recovery and growth eco-system for SMMEs in the war-torn Tigray

- (a) Quartile-helix collaboration model
- (b) Systematic collaboration approach

Government(s)

Studies such as [33] have showed advocates of recovery programmes in developing countries should consider government support as a vital actor to enhance SMMEs growth in post-war communities. Knowing this fact, as shown in Fig. 4(a), governorships and policy makers (both designated as ‘white collar entity’) within the Federal government of Ethiopia and the Regional government of Tigray are authorized to provide strong and interlinked support to infant SMMEs in the post Tigray war.

The governments meanwhile should create responsive political and economic governance to adhere rule of law and should offer investment incentives and tax waivers to infant SMMEs after a war. Mitigating recovery challenges, introducing poverty alleviating measures, providing physical infrastructure, investing in skill development and recovery programmes, encouraging trade and investment, initiating labor reforms could also be listed as the SMMEs recovery contribution of government(s). Besides, to ensure the sustainability of the recovery, the governorship (Fig. 4(a)) should consistently check both levels of management system: the control data marked by a solid and clockwise directed arrow in Fig. 4(b) and the monitoring data marked by dotted and anti-clockwise directed arrow in Fig. 4(b)). Policy makers, who are on the verge of tactical decision within the government bodies on the other hand, are required to collaborate mainly with funding agencies, technical institutions, and business associations in order to continuously influence the implement-ability of the recovery project.

Funding Agencies

Global practices show that cessation of hostilities brings unprecedented opportunities for war hit countries to rebuild their societies, policies, and economies and to embrace reforms that have been elusive in the past [42]. However, the recovery and development project could not be achieved only by motivations emanated from local government(s). Substantial economic and technical assistances are required from local and international funding agencies. This is because funding is important for the recovery of local SMEs, which would probably be the principal sources of long-

term employment in most post-conflict communities [43]. Nevertheless, this reversely needs working closely with government(s) or related other stakeholders.

Keeping these global facts, the local or international funding agencies including IMF [44, 19], World Bank [45], Federal and Regional finance offices, United Nations Office for Project Services (UNOPS), Fig. 4(a), are selected to support the infant SMMEs in Tigray after the war lasted for two years. The modality of the support could be direct financing or associating in kind upon their demand and feasibility satisfaction level of the SMMEs. Meanwhile, they have to install mechanisms to monitor progress of recovery projects, work with other funding agencies to attract more funding, focus on design and development of vast arrays of projects and programmes, etc. This kind of stimulus was successfully used by USAID's Office of Transition Initiatives (OTI) in its Kosovo Transition Initiative Program [46].

Technical Institutions

A blue collar designated technical institutions including entrepreneurial training centers, research & development centers, technical and vocational schools, and Universities are mainly required for innovation, development of low-cost designs, and capacity building, Fig. 4(b). Creating strong networks with academic institutions, educating both business owners and employees, strengthening indigenous drivers, and cultivating appropriate partners are additional operations expected from technical institutions to make the recovery project progressive and sustainable.

Business Associations

Similar to funding agencies and technical institutions, business associations are designated as blue-collar entity. As shown in Fig. 4(a), chamber of commerce and marketing constitutes the business associations. They are aimed to sensitize ownerships, collate best practices of previous post-conflict recovery achievements, and to facilitate skilling of employees and business owners as well as counterpart effective implementation of the recovery project.

4.2 Enabling Pathways and Policy environment

When a conflict ends, creating enabling pathways and policy environment for SMEs recovery directly affects long-term stability of nations via creating new employment and driving economic growth [43]. The following recovery pathways and policies are discussed with an anticipation to

recover the impacted SMMEs in Tigray and hence to prosper sustainable economic growth of the Tigray region and the parent country after the war.

Policy #1: Define and simultaneously deal with challenges SMEs face in post-conflict recovery

Countries emerging from armed conflict have to simultaneously deal with several major challenges. This is because the problems of post-war are complex and challenging. The recovery is certainly not without its challenges and requires vast amounts of determination, patience and effort. Keeping this awareness, the SMMEs in the war-torn Tigray are expected to face the following challenges while they are on their tour to recover after the war.

Challenge 1 - Accessing and securing finance: enterprises face challenges in accessing finance. The work of [47] for example listed challenges such as difficulty in providing collateral or a guarantee, processing time for loan applications, lack of knowledge about available schemes, procedural complications, high service fees for processing loan requests, high interest rates, and difficulty in completing the required documentation.

Challenge 2 - Developing Business Operation Model: business competition is rapidly increasing because of operational factors such as marketing mix [48], cooperation network [49], creativity [50], and production management [51] and because of sustainable factors such as value creation [52], resource optimization [53], risk reduction [54], and social benefit [55]. Businesses consequently need to adapt these factors and need to enhance their competitiveness through developing strong and time-flexible business operation model [56]. However, such business operation model may not be considered by SMMEs who aspire to recover from post-war impact as they give much attention mostly to mechanical recovery,

Challenge 3 - Embracing technologies: if the first challenge is not fully secured, embracing technologies within the SMMEs seeking to recover may not be easier,

Challenge 4 - Retaining technically valuable employees: a lot of technically valuable employees of SMMEs before the civil war have got highest chance to either internally displaced, became refugee, or to the worst suffered from death during the civil war. And retaining such employee demands further investments and efforts if the recovery is to become successful,

Challenge 5 - Attracting new customers: new customers always fear for unexpected events after a civil war. They are afraid for security and peace, political instability, and for business non-productivity. Consequently, governorships and other local legal bodies fail to lobby and attract them in post-conflict scenario of their nation or province.

Challenge 6 - Maintaining profitability: if one or all of the previous challenges are missed to achieve, maintaining profitability of the SMMEs after the civil war is difficult.

Therefore, stakeholders and contributing actors who aspire to recover SMMEs in the war-torn Tigray must simultaneously deal with these challenges and promote suitable conditions that make the resumption spontaneous and that tackle severe horizontal inequalities.

Policy#2: Defining and verifying cross-cutting parties

Previous studies such as [57] presents most post-war recovery and reconstruction programmes are faced with blocked or seriously diminished economic foundation, lack of experience of youths in the performance of economic activities, and an attitude of feeling inequality on the part of other populations equally affected by war. Thus, during the SMMEs recovery in Tigray, these problems should be considered at the early stage. Otherwise, they have highest probability to hinder social integration, foster tension, pose security challenges, and destroy a favorable economic development platform. Acquainted to this and [57] listed beneficiaries of recovery scene, household women, gender-based victims, jobless youths, disability, high risk ex-combatants, resettlers, and refugee returnees are the expected cross-cutting parties in the post-conflict SMMEs recovery activities in Tigray.

Policy #3: Strengthening partnership among contributing actors

Coordination between relief and development agencies, public and private businesses', and governing bodies is necessary if a recovery is to be positive [45]. The four contributing actors presented earlier hence should strength socio-economic partnership by applying strong regulation and rule of law to promote the required recovery of the enterprises diminished. Balancing social and economic policy to restore enterprises confidence and capabilities and encouraging investment and hiring could be considered as the regulatory law.

Policy #4: Ensuring sustainability

Literatures such as [58] designate that society-aware, environment-aware, and human-oriented sustainability is meeting the needs of the present without compromising the needs of future generation. This verifies, maintaining their financial profitability, recovering conflict-affected SMEs must consider their compatibility with the three sustainability pillars and check their sustainability to economic growth of nations [59, 60]. The question is “how to ensure this compatibility in the case of SMMEs in the war-torn Tigray”?

To ensure the sustainability of recovering SMMEs in Tigray, an integrated project consistent to environmental, social, and economic impacts should significantly be addressed. Environmental impacts should be measured in terms of resilience, biodiversity, natural resources, and pollution and the social impact in terms of poverty, gender equality, diversity (including culture, religion, ethnic values), and outreach programmes. Certified supply chain and marketing, product mix, risk management, consistent and profitable growth on the other hand constitute the economic sustainability factors. Synergetic impacts created among these pillars is also important to ensure the compatibility. Socio-environmental, eco-environmental, and socio-economic are the synergetic impacts recognized by this study. While recovering the SMMEs project, the socio-environmental impacts should be measured in terms of crisis management, popular participation, health and safety, and regulations. The eco-environmental on the other hand needs to be restrained in terms of valuation, internalization, resource efficiency and the socio-economic synergy in terms of employee welfare initiatives, stakeholder equity, training and development, community relief. If all of the sustainability impacts are spontaneously considered, the recovery project could definitely be accompanied by job creation, competitiveness, and regional economic development.

5. Synthesis and Discussion

The proposition offered in this study is a theoretical framework and quartile-helix collaboration model is used to develop the framework. To draw up this proposition, to the best knowledge and understanding of authors, important and recent materials on economic importance of small and medium scale enterprises and post-conflict SMEs recovery policies are reviewed and discussed. Correspondingly, a reactive role of governorship, policy makers, funding agencies, training centers, research and development centers, chamber of commerce, marketing, and business associations are discussed to leverage the proposition which could also be considered as novelty

of the study. The intention was to shape post-conflict SMMEs recovery challenges through correlating contributing actors and enabling recovery policy environment, Table 2.

Table 2. Recovery correlation matrix between contributors and enabling pathways and policy environment

Correlation variables		Enabling pathways and policies			
		<i>Policy #1</i>	<i>Policy #2</i>	<i>Policy #3</i>	<i>Policy #4</i>
Contributing actors	<i>Government(s)</i>	+	+	+	+
	<i>Funding Agencies</i>	+		+	+
	<i>Technical Institutions</i>	+			+
	<i>Business Associations</i>		+	+	+

The following points could also to be synthesized from the study:

- The trivial number of SMMEs in Tigray have been created promising jobs and were fairly generating income before the war eruption in Tigray,
- The socio-economic impact of the war in Tigray has been devastating [11] and The SMMEs become part of this devastation,
- After the cessation of hostilities signed between the Federal government of Ethiopia and the TPLF in south Africa, Pretoria, on November 02, 2022, Tigray is breathing a respite from the civil war,
- Following the cessation of hostilities, rethinking for recovery and growth of devastated economy of the Tigray region by large and the SMMEs in particular is on its commencement in which this work could be listed as the rethinking recovery.

6. Conclusion

The purpose of this study was achieved through theoretical generalization and scientific methods of comparative and statistical analysis. The contribution of SMEs for economic development of

nations was key subject of the theoretical generalization and scientific methods of comparative analysis. Exploring the status of small and medium scale manufacturing enterprises in Tigray prior to the Tigray war erupted in November 2020 was the prior work of the contribution. Analysis and characterization of the war's impact on the SMMEs was then followed considering an eight months' conflict incidents' record from a study by [18] and zonal pre-war economic status in the Tigray region. Once it is understood that the trivial number of SMMEs in Tigray have been created promising jobs and were fairly generating income before the civil war and presenting the significant socio-economic impact of the Tigray war in the SMMEs, global post-war recovery and growth experiences considering the case of SMEs is shortly reviewed with an aim to serve as spring board for a post-conflict recovery and growth proposition in this work.

A collaborative post-conflict recovery and growth eco-system delineating a recursive contribution of government(s), funding agencies, technical institutions, and business associations is finally proposed with an expectation to give insights for policy makers and governorship to spontaneously recover the financially and socio-economically impacted SMMEs in the war-torn Tigray. Job creation, zeal entrepreneurial scene, income generation, and prospering sustainable economic growth are the auxiliary objective of the proposition. The say of John Robinson, a Strategic Client Advisor to Digital Supply Chain at SAP, "collaboration is a base to successful to transition and/or transformation" is used as a spring board to propose the eco-system.

However, the implement-ability of the proposed eco-system is yet to come as of now. Scholarly researchers and contributing factors discussed in this study are therefore recommended to proceed with the validation believing that the eco-system could easily be implemented and bring socio-economic growth after recovery of the impacted sector. Meanwhile, as it is presented in [61], change has never been constant. Hence, it is important to continuously explore, understand and discuss recovery approaches that help the manufacturing enterprises boost their production after the destructive two years' civil war.

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Conflicts of Interests

The authors declare that they have no competing financial or non-financial interests or personal relationships that could have appeared to influence the work reported in this paper. Meanwhile, the paper in whole or in part has not been previously published, is not under consideration elsewhere, and the authors did not receive support from any organization for the submitted work.

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