Value Chain Analyses: Polog Region

Manufacturing, ICT, Food and Agricultural Production

EU for Economic Growth Project

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AREA SCIENCE PARK

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2. Introduction

The Polog planning region is one of the eight regions of North Macedonia. It is in the north-western part of the country, and it borders the South-West and the Skopje regions. The Polog region covers an area of 2,416 km2, which represents 9.7% of the territory of North Macedonia1.

Polog region consists of nine municipalities in which Tetovo and Gostivar are the largest ones. Based on the latest information, the Polog region has a population of 322,605[2] with a density of 132.7 per km^2.

2.1 Economic Indicators

The Polog GDP per capita has increased in absolute values from 121,824 MKD in 2015 to 158,510 MKD in 2019. However, the Region of Polog has the lowest participation in the total GDP of the country, although its share has increased from 7% in 2015 to 7.4% in 2019. Therefore, in our value chain analyses, a special emphasizes will be given to understanding the sectors and the factors that have contributed to this increase. In this regard we review:

- sector participation in the National GDP for the same period (2015-2019)
- sector participation in the total export of the region
- sector employability

In the development of the overall economy of the Polog planning region the sector Real Estate Activities (L) has the largest share. However, its share in the regional economy has slightly decreased from 21.84% in 2015 to 21.46% in 2019 (decrease of 1.74%).

The other sectors that have double-digit share in the regional GDP include Wholesale and retail trade, repair of motor vehicles and motorcycles, transportation and storage, and accommodation and food service activities (G-I) with slight increase from 19.57% in 2015 to 20.41% in 2019 (increase of 4,25%).

Public administration and defence, compulsory social security; education; human health and social work activities (O-Q) which was slightly decreased from 17.93% in 2015 to 17.34% in 2019 (decrease of 3.3%). Mining, manufacturing and other (B-E) which increased from 11.86% in 2015 to 14.3% in 2019 (increase of 20.58%) and Agriculture, forestry and fishing (A) with decrease from 16.91% in 2015 down to 12.77% in 2019 (decrease of 24.47%).

In the period 2015 – 2019 the biggest increase of 2.58 times was in the sector Information and communication (J) which had very low starting share of 0.37%. In addition to the three above-mentioned sectors, only the Construction (F) sector experienced 29% growth of its contribution in the regional economy.

At the national level the situation does not show significant change when comparing Gross Value Added (GVA) according to the sector activity on regional and national level. The biggest increase was in the sector Information and communication (J). This sector has been increased from 0.77% in 2015 to 1.67% in 2019 (increase of 2.17 times). Based on the conducted interviews with the business owners of the ICT sector, there is considered a real potential for even more accelerated growth.

When it comes to other sectors, only four sectors have a contribution which is bigger than the

[1] https://www.macedonia-timeless.com/eng/cities_and_regions/regions/polog-region/
[2] State Statistical Office, makstat database

total share of the regional economy of 7.42%. The sector Real Estate Activities (L) has the biggest contribution to the sector on national level. Its' share increased from 12.09% in 2015 to 13.92% in 2019, an increase of 15.15%. The Agriculture sector (A) has decreased its share from 10.59% in 2015 to 10.21% in 2019 (decrease of 3.56%). The sector Public administration and defence, compulsory social security, education, and human health and social work activities (O-Q) has slightly increased its share from 8.80% in 2015 to 9.38% in 2019 (increase of 6.53%). The Construction sector (F) has considerably increased its share from 4.70% in 2015 to 8.21% in 2019 (increase of 1.75 times).

The following table provides the number of the active companies in the Polog region, and the positioning of each sector. When comparing the number of companies in each sector, to their national contribution to GDP and GVA, most sectors are either represented by smaller companies or under-perform compared to their national rivals. Exceptions to this are in Real Estate, Agriculture, and Mining.

	Sector	Republic of North Macedonia	Polog Region	National Share
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	22191	2858	12.88%
C	**Manufacturing**	**8011**	**1132**	**14.13%**
F	Construction	5263	905	17.20%
I	Accommodation and food service activities	4694	767	16.34%
M	Professional, scientific and technical activities	7651	642	8.39%
S	Other service activities	5063	441	8.71%
H	Transportation and storage	5625	417	7.41%
Q	Human health and social work activities	3304	401	12.14%
A	**Agriculture, forestry and fishing**	**2414**	**182**	**7.50%**
N	Administrative and support service activities	1856	165	8.90%
R	Arts, entertainment and recreation	1655	129	7.79%
P	Education	1277	121	9.48%
J	**Information and communication**	**2069**	**113**	**5.46%**
E	Water supply, sewerage, waste management and remediation activities	248	31	12.5%
K	Financial and insurance activities	473	30	6.34%
L	Real estate activities	608	25	4.11%
O	Public administration and defence; compulsory social security	260	18	6.92%
D	Electricity, gas, steam and air conditioning supply	198	16	8.08%
B	Mining and quarrying	201	15	7.46%
	Total	73061	8408	11.51%

Table 1. Number of active companies in the Republic of North Macedonia and in Polog planning region according to the sector of activity as for 31st December 2019

As it can be seen from the table, the selected sectors hold different places in the table of active registered businesses. Manufacturing sector has the second place for the region of Polog, and the agricultural, forestry and fishing sector the 9th place. It is important to mention that from the 4th position up to the 8th position, these sectors do not have high potential of growth with export possibilities.

In terms of Exporting, the Region of Polog has a share of 2.1% for the year 2019 in National

Level. This percentage is lower by 0.4% compared with the year 2015.

Exports	Polog region (in Million EUR)	Share of Polog region (%)[3]
2015	102.19	2.5
2016	96.59	2.2
2017	100.37	2.0
2018	135.07	2.3
2019	135.10	2.1

Table 2. Exports from Polog region, 2015-2019[4]

In the same period, imports in Polog region have increased from 179.84 Million EUR in 2015 to 253.23 Million EUR in 2019 (increase of 40.8%). The share of imports in Polog region has remained rather stable with small decrease to 3.0% in 2019.

The Manufacturing sector in the Polog Region has the biggest contribution at total export of the sector in the national level. Three subsectors in this category (furniture, Rubber and Plastic products, basic metals) represent 51.56%.

Furniture (C31) with share of almost 35% of total exports from the sector at national level, Rubber and plastic products (C22) with share of 8.37%, Basic metals (C24) with share of 8.19% and Products of agriculture, hunting and related services (A) with share of 7.43%.

This is one of the main reasons, why the manufacturing and Agricultural Production sectors have been taken into consideration as one of the sectors that should be support by the project.

2.2 Environmental Indicators

There are not many relevant environmental indicators on regional level. The following Table provides information of water supply, use and protection against pollution in industry and mining in the Polog region.

It is obvious that different indicators in Polog region in 2019 account for significant or very high percentages (for ex. 96.73% discharge of purified water). 2017 seems to be an anomaly year with values very different from other reporting periods.

Only three of the municipalities in the Polog region have prepared strategy for climate change: Bogovinje, Tearce and Mavrovo and Rostushe. The two major urban municipalities, Tetevo and Gostivar do not have these strategies.

[3] Republic of North Macedonia = 100%

[4] Source: State Statistical Office, makstat database, Regions in the Republic of North Macedonia 2020, Estimates of the project team

Description	2015	2016	2017	2018	2019
Water supply	115,142	137,196	833	546,871	393,023
(%)	2.69	3.70	0.04	16.19	16.82
Water used for technological purposes	113,614	131,521	834	445,277	315,357
(%)	2.66	3.56	0.06	19.99	19.56
Discharge of un-purified water	114,107	131,378	706	102,436	77,183
(%)	2.67	3.58	0.07	5.57	5.80
Discharge of purified water	5,320	31	116	342,831	238,154
(%)	32.86	0.25	0.05	97.64	96.73
Discharge of wastewater	7,071	26,010	823	445,267	315,337
(%)	2.52	11.95	0.07	20.33	19.98

Table 3. Water supply, use and protection against pollution in industry and mining in Polog region, in 000 m^3, 2015 – 2019[5]

2.3 Social Indicators

2.3.1 Indicators foreseen in the Strategy for Regional Development 2021 - 2031

The following social indicators for the Polog region in 2019 have been extracted from the Strategy for regional development 2021 – 2031 showing a rather challenging situation:

- Activity rate of women is 35.1% (2019)
- Activity rate of youth is 45.2% (2019)
- Activity rate of those with not finished primary education is 7.9% (2019)
- Employment rate of women is 22.5% (2019)
- Employment rate of youth is 26% (2019)
- Employment rate of those with not finished primary education is 6.2% (2019)
- Unemployment rate of women is 35.8% (2019)
- Unemployment rate of youth is 42.4% (2019)
- Rate of poor people as % of the population in Polog region is 34%
- Rate of poor or socially excluded people (AROPE) is 51%
- NEET rate for young people neither in employment nor in education and training (15 – 29) is 37.8%.

2.3.2 Activity rate in the Polog Region

In the period 2015 - 2019, the activity rate in the Polog planning region is lower than the national average. Although Polog has the lowest activity rate activity (active working population) of 51.9%, it is continuously increasing as provided in the following chart:

[5] Source: State Statistical Office, Regions in the Republic of North Macedonia, various editions

When it comes to employability the Polog region has the second lowest employment rate of all regions in the country (37.1% in 2019).

The unemployment rate in Polog region has slightly decreased from 29.6% in 2015 to 28.5% in 2019. This represents the second highest of all regions in the country.

The total number of male employees is significantly higher than female, and this is true also for those at the age 15 – 40 years. The ratio of total number of male to female employees is 2.35, while this ratio for the employees at the age 15-40 is 1.98.

The largest number of employees is in the sector Wholesale and retail trade, and repair of motor vehicles and motorcycles (G), followed by the Manufacturing sector (C), Construction (F) and Education (P).

The highest number of men are employed in the Construction sector, while the highest number of women are employed, almost equally, in Trade, Education and Human health and social work activities (Q) sectors.

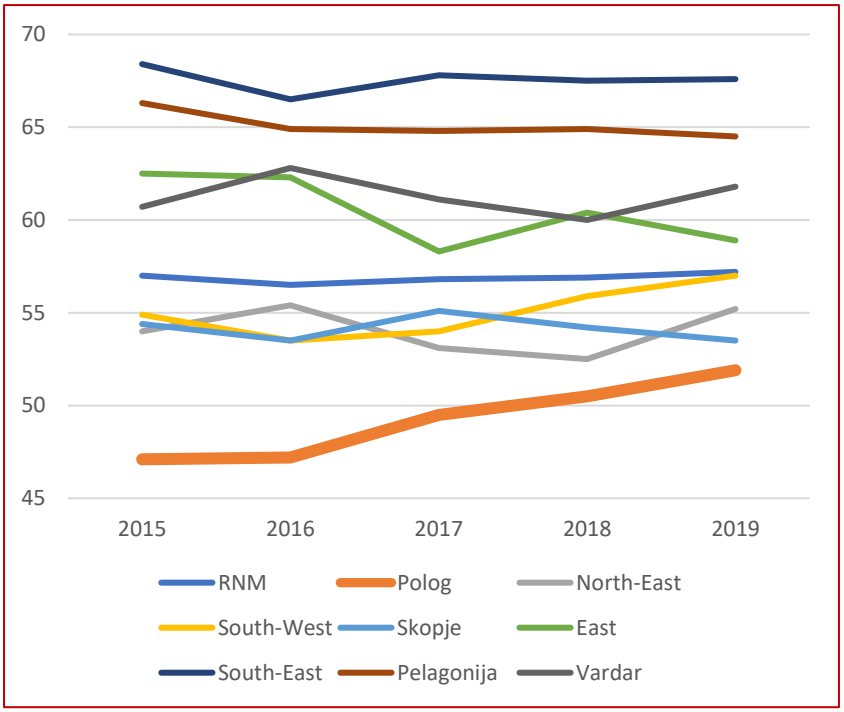

Figure 3: Activity rate of the population at age 15+, by regions, 2015-2019

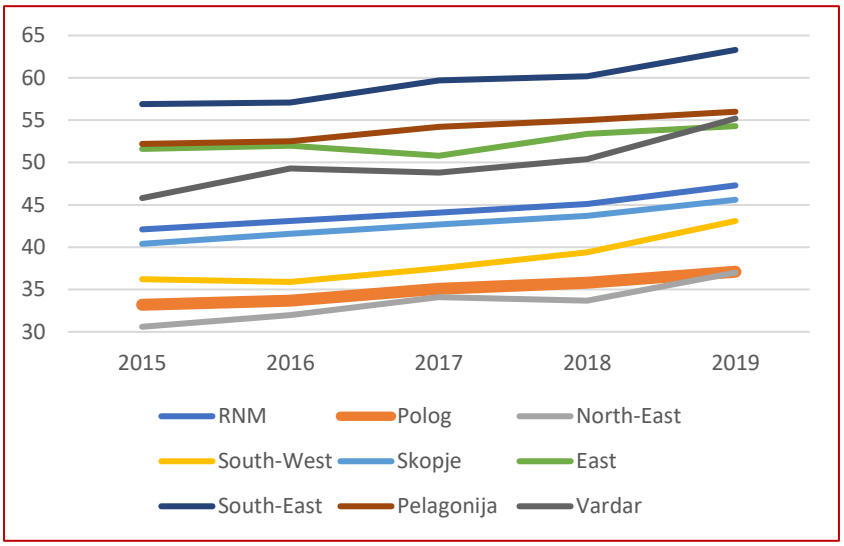

Figure 4: Employment rate of the population at age 15+, by regions, 2015-2019

The highest number of men under 40 years old are employed in the Construction and Education sectors, while the highest number of women under 40 years old are employed in the Trade sector.

The interventions of the project are expected to contribute to youth and women employability in the targeted sectors.

Total Men and Woman					Men				Women			
NACE	Total	15-40	41-64	65+	Total	15-40	41-64	65+	Total	15-40	41-64	65+
A	4953	691	3543		4223	528	3094		730			
B												
C	13235	7883	5344		9221	6022	3192		4013	1480	2152	
D	1182		982		1182		982					
E	768				768							
F	11348	5209	5826		11002	4863	5826					
G	15956	9644	6273		10214	5005	4544		5742	3911	1729	
H	4849	1540	3216		4260	1323	2844		589			
I	5635	2404	2785		5239	2117	2675					
J	894				761							
K	1124				547				577			
L												
M	1654	774	720						1189	661		
N	1605		934		1270		701					
O	8317	5334	2623		6555	3923	2273		1761	1344		
P	10507	4216	6129		5000	1241	3257		5507	2307	2871	
Q	7436	3627	3734		1993	0	1029		5443	2326	2706	
R	3520	2553	758		2380	1770	610		1140	625		
S	2718	1480	1138		1998	0	1090		719			
Total	**96191**	**50145**	**45511**	**534**	**67485**	**33324**	**33669**		**28701**	**16823**	**11842**	

Table 4. Number of employees per sector and per gender in the Polog region, according to the NACE, rev.2 classification, 2020[6]

[6] NACE classifications:

A - Agriculture, forestry and fishing
B - Mining and quarrying
C - Manufacturing
D - Electricity, gas, steam and air conditioning supply
E- Water supply, sewerage, waste management and remediation activities
F - Construction
G - Wholesale and retail trade; repair of motor vehicles and motorcycles
H - Transportation and storage
I - Accommodation and food service activities
J - Information and communication
K - Financial and insurance activities
L - Real estate activities
M - Professional, scientific and technical activities
N - Administrative and support service activities
O - Public administration and defence; compulsory social security
P - Education
Q - Human health and social work activities
R - Arts, entertainment and recreation
S - Other service activities

The indicators related to education are provided in the tables that follow. The number of enrolled students in primary and secondary education have decreased.

Indicator	2015/16	2016/17	2017/18	2018/19	2019/20
Number of enrolled pupils in primary schools	29.632	31.831	32.097	28.982	28.624
Number of enrolled pupils in secondary schools	12.729	10.841	11.032	11.110	10.687

Table 5. Total number of enrolled pupils in primary and secondary schools in Polog region, 2015/16 – 2019/20[7]

The number of graduated students in the Polog region shows small variation with slightly positive trend in the analysed period. The Polog region had in total 1,080 graduated students and 3.3 graduated students per 1000 inhabitants in the school year 2018/2019.

Indicator	2014/15	2015/16	2016/17	2017/18	2018/19
Number of graduated students[8]	1.047	1.022	1.016	954	1.080
Number of graduated students per 000 inhabitants	3,3	3,2	3,2	3,0	3,3

Table 6. Analysis of the indicators related to higher education in the Polog region, 2015/16 – 2018/2019[9]

[7] Source: State Statistical Office, makstat database, Regions in the Republic of North Macedonia, 2015 - 2020
[8] Number of graduated students is based on their place of residence.
[9] Source: State Statistical Office, makstat database, Regions in the Republic of North Macedonia, 2015 – 2020

3. Value Chain Selection

Based on the in-field interviews and the desk research three value chains have been selected for the region of Polog which are explained below.

ICT Sector

There are several reasons which led in selection of the ICT sector as one of the value chains that should be support by the EU4EG project:

- The ICT sector has the biggest growth for the last 5 years. This trend continues and there is still market demand for further growth in terms of participation in the national GDP.
- The ICT sector has the biggest growth when it comes to the number of newly established companies for the region of Polog.
- The sector has high growth potential in global level. Currently most successful companies in the region are already providing services for the companies in United States market and EU market.
- There is a great potential for development of the human capacities in this sector. On one hand there are existing Higher education institutions and private accredited providers that are offering training in this field and on the other hand, the existing ICT companies are interested and are continuously investing in training of the human capital.
- There is a great potential to support digitalization of the existing companies in the region of Polog and support cross sector cooperation. And when talking about the start-ups and the accelerator program the ICT sector can easily be engaged in finding and development of product that solve issues for other sectors too.
- The ICT sector salaries are one of the highest in North Macedonia, and the interest in youth studying in this sector is increasing.
- The ICT sector represents a great sector were women employability could be boosted in the Region of Polog.

Manufacturing Sector

The manufacturing sector in the region of Polog has high potential for exporting and there are several reasons why the EU4EG project should support:

- Manufacturing sector has second biggest number of active companies in the region of Polog. As such it is also the second biggest job provider in the region.
- The manufacturing sector covers more than 50% of the total export of the region of Polog. And these companies have already investment plans and with some support these company could fulfil several quality and standards in order to increase exporting.
- There is a great possibility to increase the energy efficiency of the manufacturing process through the intervention in this sector.
- There are concrete examples where there could be developed products through waste materials.
- There is high potential to bring up new products through cross sector cooperation that could be supported through the accelerator program.
- The sector has high export potential, with the support of the project companies will be able to meet several required export standards

Food and Agriculture Sector
The food and the agricultural sector is the sector that is involving the local rural areas and the family businesses to the greatest extent within its supply chains.

- The sector offers great possibility for employment of women and disadvantages groups, especially women coming from the rural areas.
- The support of the project could support the SMEs to improve the quality of their products and as such to access new markets.
- The sector is already one of the five sectors with the biggest participation in the GDP of the Polog region.
- There is a great potential for development of new products that through cross sector cooperation.
- The support of the sector will initiate production of new food products with export potential.

3.1 Activity Type

	Innovative nature	Expected Market Disruption	Expected Additional Income	Local Job Creation (esp. Target Groups)	Contribution to Circular Economy	Overall Assessment
ICT Sector	***	***	***	***	**	***
Food and Agricultural Production Sector	**	**	**	**	**	**
Manufacturing Sector	***	***	***	**	**	***

ICT Sector

- **Innovative Nature**: The project will be focused in increasing the cooperation between the ICT sector and other sectors. This will allow development of new innovative products and services that can have solution with the support of ICT, which later can access the international markets. The ICT will also play a crucial role in development of smart innovative solutions for different problems. And currently there is existing potential, human and infrastructure that can support these activities.
- **Expected Market Disruption:** The ICT sector represents one of the most competitive sectors of the region. With the project support the companies be able to develop new products. This will increase their market share and bring the companies at a position to be more competitive globally.
- **Expected additional income:** It is expected that the ICT companies will increase their income over 30% once the intervention will take place and the number of the services and service providers will increase. And as related start-ups, the ICT sector is the one that can have a significant growth.

- **ICT Local Job Creation:** The ICT sector has a high potential for creation of new job places. It is a sector with highest growth and there is a high interest for the existing companies to be supported in development of new human capacities. It is the sector that at high level can support employment of youth, women and vulnerable groups.
- **Contribution to the Circular Economy:** ICT can contribute in supporting smart services that can decrease the level of wasted energy. In the same time, it can include new start-ups that are green driven (mapping and collection of recycled glass, food waste management etc.)
- **Overall Assessment:** The ICT sector is a specific sector that could be easily engaged and cooperate with the other sectors in the value chain. It is one of the most promising sectors when it comes to youth and women employability. It has the potential to bring innovative products with the support of the project.

Manufacturing Sector

- **Innovative nature:** The innovative nature of the Manufacturing sector, relies in supporting development of new products that have never been produced in North-Macedonia. At the same time, the project will support the companies to increase the cooperation with the other sector, including the ICT sector in order to bring innovation in the way of management of different processes. Currently, based on the meetings with the engineering schools and engineers, there is a potential for development of newly designed products, however there is lack of knowledge to make these products marketable. In this regard the project will cooperate with the existing BSO, and the companies to support development of new products.
- **Expected Market Disruption:** There is a great potential for the development of highly competitive products. Some of the Polog companies are already competitive in the market, while some other companies with the project support will be able to improve their production processes and provider competitive products in the European market.
- **Expected Additional Income:** The furniture manufacturing is essential for understanding how one industry could use the diaspora, the existing capacities of the BSOs in accessing the new markets. If seen form the figures the furniture sector had increased the participation in the export for around 20%. Similar expectation will be also for other manufacturing industries.
- **Local Job Creation (esp. Target Groups):** The Manufacturing sector will contribute in increasing the local jobs and skills. There will be a need for new engineering capacities, software developers, designers, sales managers etc, and also the labour force engaged in the production process. In this regard it is expected that the salaries in the manufacturing sector will be improving for this category. The project will support companies with highly growth potential and higher-value jobs.
- **Contribution to Circular Economy:** Companies that are oriented in production of green products will be targeted for support by the project. In the same time, a special support will go for companies that are developing new marketable products for waste management. Usually due to lack of knowledge and funding, for the SMEs is hard to deal with waste management. Therefore, the manufacturing sector could be very attractive in supporting green activities.
- **Overall Assessment:** the manufacturing sector has high growth potential, since the operating SMEs are very well established, and they have specific investment plans. With the support of the project, these companies will be able to increase the quality of the products and introduce new products in the market. Increasing energy efficiency highly possible in this sector.

Food and Agricultural Production Sector

- **Innovation nature:** food and Agriculture sector relies on development of new products after the project intervention. As such these new products will be as a result of cross sector cooperation. Currently there are scientific laboratories in the education institutions that are not used by the business sector. In this regard the project will contribute to increase the cooperation among the processing companies and these laboratories. The food processing industries is one of the most relevant in this aspect. It has been seen from the field investigation that currently the SMEs in the Polog region do not have the capacities to support analyses and tests for production of new products that can increase their participation in the market.
- **Expected Market Disruption**: The project support will allow the companies to decrease the production costs, increase production capacities and the production quality. As a result, these companies will have highly competitive chances in the international market.
- **Expected Additional Income:** With the support of the project, it expected that the companies in this sector will increase their share in the market with existing product or enter the market with new products.
- **Local Job Creation:** The processing industry and rural development will contribute in opening new job places. It will impact the current value chain especially in the food processing industry by supporting new family businesses. By supporting development of new products, there will be a need for more engagement of the rural community.
- **Contribution to Circular Economy:** Processing of the waste materials will be one of the main target group of this industry. There are specific examples in the Polog Region where they use the waste of production process for development of energy or re-use for other purposes. As such this industry provides more possibility in supporting circular economy.
- **Overall assessment:** The existing companies in the sector have the potential for growth, as such new job places will be open with the support of this sector. The region has the conditions for development of new food products and in the same time to improve the way how they are dealing with the waste.

3.2 Sector Type

	Circular and Green Economy	Innovation and IT	Highly Competitive Economic Sector	Rural development Business Development Services	Export Potential/ Import Substitution	Overall Assessment
ICT Sector	* *	***	***	*	***	***
Food and Agricultural Production Sector	**	**	**	***	***	**
Manufacturing Sector	**	***	***	**	***	***

ICT Sector

- **Circular and Green Economy:** Currently the ICT sector in the region of Polog at large scale is oriented in offshoring activities. In the same time ICT is not linked with different fields such as: Medicine, food industry, construction etc. In this regard the companies in the region could use the ICT sector to increase energy efficiency. Development of the ICT sector will support development of the digitalization of the existing companies and as such it will have indirect effect on increasing energy efficiency, reduce of printing materials etc.
- **Innovation and IT**: The Support of the ICT sector will provide development of new innovative products that are based on cross sector cooperation. At large scale the ICT sector support for start-ups will be linked to innovation on new services.
- **Highly Competitive Economic Sector:** The ICT sector is highly competitive since the North Macedonian Companies will have to compete worldwide. In internal market the companies are competing on hiring new human resources and keeping them as long as possible as their human capital. As a result, the ICT sector salaries are one of the highest in the country.
- **Rural development Business Development Services**: The rural areas in the region of Polog do have access to the internet and the development of the ICT sector can support increase of the youth in rural areas, and in the same time some of the start-ups ideas can be focused on rural development.
- **Export potential:** The main market of the targeted ICT companies are international markets. As such there is a high export potential of the services. We are expecting that the ICT companies of Polog will be able to compete internationally with their new products after the project intervention.
- **Overall Assessment:** Development of this sector and support its link with the other sector will result in different benefits. The sector has the potential to support the manufacturing processes of the Existing companies. The intervention of the project will support companies in developing new products and this will have high potential for accessing international markets.

Manufacturing Sector:

- **Circular and Green Economy:** the manufacturing sector could be oriented in developing new products based on the waste materials. In the same time manufacturing of eco-friendly products will be also one of the pillars that can be supported during this process.
- **Innovation and IT:** The manufacturing companies in the Polog region with the support of the project will be linked with the ICT sector and the scientific laboratories existing in the region. In this regard, there will be the possibility for increasing the efficiency of different production processes and also development of new products. Currently, based on the interviews, this cooperation is very low.
- **Highly Competitive Economic Sector:** Polog has good geographical position for accessing the EU markets. With the support of the project, the existing companies that are already competing in the market will increase their competitiveness due to: reduction of the production cost, meeting new EU standards, and launching new products.
- **Rural development Business Development Services:** The manufacturing companies in the Polog region are mostly situated in the rural areas. As such they play a good role in employability of the local community and support in the rural development. In this regard the municipalities are trying to prepare the needed infrastructure for creating good conditions for these businesses. And in many cases, the companies play a good role in support different social and sport activities in the rural areas.

- **Export Potential/Import Substitution:** Most of the manufacturing companies are oriented in exporting potential ex: manufacturing of construction materials, manufacturing of white goods, construction materials etc. However even in the construction sector and also other sectors, the Polog region is still importing and as such the support of the manufacturing sector will both contribute on exporting and reduce the importing of the goods.
- **Overall Assessment:** The sector has high growth potential. Development of this sector will increase the employability of targeted groups. The manufacturing companies are already exporting in the EU market. The project will support the companies to go greener, reduce production cost and bring in market new products.

Food and Agricultural Production Sector

- **Circular and Green Economy**: Currently in the Polog Region among the most successful companies are the ones dealing within the food processing sector. The industry represents a great sector where the Circular and Green Economy principles can be developed. Usually due to lack of the technology the agricultural and other products end up as a waste. However, the project will be able to support these companies to use these companies to re-use the waste material for development of new products.
- **Innovation and IT:** The project will aim to bring new innovative production by bringing together the ICT sector, the existing engineers, the education institutions in developing new and innovative products that can have export potential. Currently, there are only food products and the variety of the products is not large. Through this cooperation the project will create conditions for new development new products.
- **Highly Competitive Sector:** At the current stage the companies haven't managed to fulfil the requirement of the domestic markets. This means that the sector is competitive from other foreign companies at larger scale.
- **Rural development Business Development Services:** At large scale supporting this industry will support Rural development. First, most of the raw material will have to be collected with the support of the domestic businesses in the rural areas. Secondly, existing businesses will be able to increase their technological capacities and sell them as final product.
- **Export Potential:** Polog has cheaper labour force and compered with the other regions, Polog still has the lowest average salary. Secondly, the Polog Region does have the geographical characteristics and the rich bio nature that can allow development of qualitative products. Thirdly, Polog Region has strong diaspora that can support access to markets for the products.
- **Overall Assessment:** The food and agriculture production sector has high potential for growth. There is essential presence of human capital that can support development of this sector and the existing companies have already a good market share.

4 Value Chain Selection Grids

Dimensions	Key Criteria	
ECONOMIC	Market demand prospects (local and/or export)	The ICT sector represents the fastest growing sector in North Macedonia with the biggest increase of 2.58 times on its contribution to the Gross Added Value at the regional level. The main market for the companies is the US market. This market is growing rapidly therefore there is a need for more trained people that can be employed. The companies are not yet specialized in producing new products, with the project support new access to new markets will be possible. The digitalization process of the Polog Region is in the development process, e-commerce is starting to slowly to take place. This means another perspective for future employability in this sector.
	Opportunities for employment creation add	Based on the information provided by the South East European University in Tetovo the students that finish the studies in the ICT sector have the highest employment rate (more than 90%) and in the same time the highest rate working in the profession that they have studies. This clearly shows that, ICT has a positive market demand. ICT Companies in Polog Region are constantly investing in training of new human capital. The increase for service demands requests more trained work force. However, the market demand is increasing faster than the ability of companies in training the new human capital. As a result, the shortage of qualified labour results in a loss of time and money as opportunity cost. The companies are oriented on providing services for the international companies, because this is a cheaper process and does not require big investments compared to product development. The process for development of the new products and the process for accessing the market takes a lot of time. At the development stage that they are now, this represents risky and expensive process for them. However, with some support these companies can work on development of new products and the demand for the new job places will be created.

	Comparative advantage of production	The Polog-based companies are offering more competitive prices than companies in the EU and the US and therefore have a comparative advantage on the market. Cheaper labour force: the ICT salaries are the highest in the region, however they remain cheaper compared with the salaries in US and EU countries. This makes the product to be comparative in the above-mentioned markets. Based on the official announcement of the US Embassy in Skopje, the "ICT in North Macedonia is a promising sector for U.S. companies", since there is a solid telecommunication infrastructure, low corporate taxes and skilled and cost-effective work force[10]. Existing higher education institutions offer training and study programs on ICT in the region and the ICT sector is becoming more attractive during the last years. And these institutions remain a great source of identifying possible Employees. The local students in these department have good English-speaking skills. Currently in the region of Polog there are already active BSOs that are focused on the ICT sector and provide co-working space, mentoring, incubating services etc. In the same time these BSOs and the tenant already have their existing network of cooperation which can be expanded during the project implementation.
ENVIRONMENT	Impact of the value chain functions on the environment	The ICT does not have a considerable negative impact on the environment. ICT can offer solutions and mechanisms for reducing energy use, material wastage, and developing systems for smart management systems. ITC can also have a direct positive impact on the environment through its application in all sectors including agriculture, waste treatment and recovery, etc. Currently North Macedonia is importing the electronic devices that are needed for functionality of the ICT sector. As such the only negative impact that the ICT sector can have on the environment is the e-waste[11] that can be created through years. At the current stage there is no manufacturing of these devices happening in North Macedonia.
	Impact of the environment on value chain functions (Low) vulnerability of the value chain to (degraded) environment and climate change.	The environment can have a positive impact in increasing the need for using the technology in different other sectors such as food industry, agriculture etc, production, retail etc. ICT can support be included in providing more efficient irrigation system based on the climate changes needs. It can support monitoring and measurements of humidity in different crops. etc. As a result, the project could provide support intervention to provide solution through ICT in other sectors. Similar situation could apply in different production sectors

[10] https://mkusembassy.gov/wp-content/uploads/sites/249/CCG-2019-North-Macedonia-Final.pdf

[11] Personal Computers, Laptops, mobile phones, printers, scanners, monitors etc.

	Green Opportunities	In different production processes the ICT sector could play a crucial role in the Region of Polog to reduce the level of consumed energy in different sectors through monitoring of the production and through data communication. Ex. Based on the climate condition and humidity of the air, the technology can support the irrigation process and reduce the water waste during. As a result, it will also decrease the energy costs needed during this process. The same situation could apply also in other sectors. The reduce of the energy could also be used in the in the refrigerators where different agricultural products have been exposed. ICT could support digitalization of the municipalities in the region of the Polog and as such to reduce the need for people mobility for different services that are currently provided by physic presence. E-commerce: development of the e-commerce similar will have positive indirect effect on reducing the energy costs. The ICT sector also can increase the efficiency in the manufacturing sector by reducing the level of the goods needed in production and in the same time save energy in production. And also, it can have positive impact in supporting the transporting of goods.
SOCIAL	(Prospects for) Inclusion of disadvantaged groups (poor, women, youth, refugees, minorities, handicapped, …)	ICT-sector represent an industry which supports the employment of women and youth. More than 95% of the interviewed ICT companies in the Polog Region, they have employed people younger than 40 years old and have mixed genders of employees. Women graduation rate in the Polog Region is higher than men, as such also their orientation on ICT is becoming a new trend. Since there is access to internet, home office is becoming more attractive. Covid-19 increased the trend of the home office culture. Digitalization's also provides more access to trainings and to work for people with disabilities. Moreover, there are such initiatives from the BSOs in the region that are providing vocational training for the disadvantages people.
	Impact of the value chain on surrounding communities	The development of the ICT sector can have different indirect benefits to the community: • It can support the education process of the adults and the children • Can improve the managerial processes in the companies • Support youth to work in international level • Support connection of the local companies worldwide • Help local small businesses to promote at easy and cheaper way • Help networking • Improve manufacturing processes etc.

	Evidence of private sector, government and/ or donors having plans for investment in the value chain	• **APPRM -Entrepreneurship Support Agency**: The agency's primary purpose is to implement the Government policies for SMEs and other related projects/programs adopted by the Government to support entrepreneurship, competitiveness, and innovation. The budget for 2021 for the competitiveness of SME's is €338,000. • **NCDIEL** - The National Centre for developing innovation and entrepreneurial learning • The Smart Specialization Strategy • Fund for innovation and technological development (**FITD**) • The Increasing Market Employability Programme (**IME**) • **European Union** Funding • **EASME**, is the most important agency to monitor all events, as it coordinates projects (COSME, SME Instrument, EIC Fast Track to Innovation, Horizon 2020 INNOSUP, etc.) and initiatives that are of major importance for financing, grants, and support to SMEs and organizations that mediate between companies and European agencies. • **Private Sector** - They are providing on the job trainings according to their needs.
	Sector (promotion) policies and regulations are in place and effective	• National Short-Term ICT Strategy has been issued (2016-2017), • The National Cyber Security Strategy (2018-2020) • National Small and Medium Enterprise Strategy (2018 – 2023).
	Chain actors / government / donors / support organizations' readiness to change, to collaborate and to align interventions	**Governmental institutions** The Ministry of Information Society and Administration performs tasks related to the development and promotion of the information society, Fund for innovation and technological development **Business Associations** ICT Chamber of Commerce MASIT, Innovation Hub **Donors** Delegation of the European Union to the Republic of North Macedonia, GIZ, USAID, SECO, JICA
	Feasibility of the intervention	The project intervention will be focused on: • Supporting the ICT companies in the region to develop new products that could be sold in international market. • In cooperation with the ICT companies and the education institution support development of the human capacities in line with the company needs. • Facilitate cross sector cooperation in order to support ICT solution for the existing local companies in the region.

Dimensions	Key Criteria	
ECONOMIC	Market demand prospects (local and/or export)	The food and agricultural sector is growing in the region of Polog and there are already well-established SMEs that are active in this sector. Each of these SMEs have already 15-60 employees and have their share in the domestic market. Companies are still working in covering the demand in the domestic market, which for the moment has been covered by imported products at relevant scale. In this regard, they are looking to find ways on increasing their production capacities, improve quality and then to consider exporting their products.
	Opportunities for employment creation add	With the increase of the capacities of these companies, it will have direct and indirect contribution to the employability. The companies will employ directly personnel that will work in the company as a result of development of new products or increase of production capacities. And secondly, private farmers, private families will be able to get engaged in the process of collection of the raw fruits, milk etc. There is increasing interest that the companies support rural areas and family business to grow their farms in order to improve the quality and the quantity of the raw materials. Currently in this industry are employed food engineers that are graduates from the University of Tetovo or Kiril and Metodij University in Skopje. However, most of the companies do not have the capacities for designing and development of new products. With the project support will be intended to also support cross sector cooperation and increase their capacities for development of new products. As a result, it is expected that there will be increase of employability of more engineers in this industry.
	Comparative advantage of production Level of competitiveness (in comparison to competing producers)	Existing laboratories and internal engineers that can support development of new products. The University of Tetovo has a laboratory for food that it is in the accreditation stage for offering licenced services for the companies. In the same time, it plays a crucial role in development of the new human capacities. Other comparative advantages: • Cheaper labour force. • Internal market that is filled through imported products. • Product Quality – the region offers condition for development of qualitative products that can be marketed in Europe and more. • Existing channels for distribution in EU – there is a good connection of the domestic companies with different partners and channels in the European Union. • Geographical position, proximity to EU markets • Cheap access to the basic ingredients, and good chances for qualitative products

		Another advantage could be if the product is produced in a sustainable and organic way so it could position itself in the higher price segment instead of competing with low priced and low-quality products
ENVIRONMENT	Impact of the value chain functions on the environment`	Negative impact can be created in terms of CO2 production if the animal products are scaled up. However, if the production is done in an organic and sustainable manner it can be contained. Water consumption: Due to the climate changes more water consumption will be needed in supporting the value chain development. Biowaste – There is a waste that is created especially in the meet processing industry where at some of the cases there is no solution for the waste, however there are existing companies that are using this waste as renewable energy source.
	Impact of the environment on value chain functions (Low) vulnerability of the value chain to (degraded) environment and climate change.	The climate changes and with the increase of the heats, will have a negative effect on some of the agricultural products in terms of quality and quantity With the increase of the temperature there will be increase the need for improvement of the irrigation systems There will be a need to improve the air conditioning systems in the Farms due to the climate changes.
	Green Opportunities	• Development of the companies for using the bio waste as energy resource • Introduce smart technologies in the irrigation system in order to reduce the water consumption • Introduce new technologies that can increase the production efficiency by reducing the level of the energy consumption. • Smart agriculture – Soil sensors for moisture levels, pH value and soil nutrient levels, soil compaction or mechanical resistance, etc. Integrated fruit production (IFP), economical production of market quality crops, prioritizes the safest possible human health and the environment, and integrated pest management (IPM) to control pests and diseases
SOCIAL	(Prospects for) Inclusion of disadvantaged groups (poor, women, youth, refugees, minorities, handicapped, …)	Almost all activities of these sector are focused on rural areas and as such they provide high possibility for: • Employment of women, especially in rural areas. • Employment of youth in jobs that are connected to accessing new market of the products. • Good possibility for employability of minorities
	Impact of the value chain on surrounding communities	The development of this sector will have different indirect contribution in the community such as: • Increase of the employability of the family farms • Support development of food engineers • Local Groceries stores can profit from selling locally produced products • Motivate other farmers to soil the unused agricultural field. • Improve the way how the cattle is been fed.

	Evidence of private sector, government and/ or donors having plans for investment in the value chain	The Smart Specialization Strategy Agency for Financial Support in Agriculture and Rural Development[12] Instrument for pre-accession assistance for rural development[13] (IPARD), 2014-2020 budget 60 m €
	Sector (promotion) policies and regulations are in place and effective	There are several laws define primary agriculture production: • Law on agriculture and rural development • Law on Phyto pharmacy • Law on organic agricultural production • In addition, the processing industry is regulated by the Food Safety law, the law on Environment, and the Waste Management Law. However, as there is pollution through the extensive use of fertilizers, and illegal waste dumping of rotten apples and trimmings, the laws on i) organic agricultural production, ii) the law on environment and iii) the waste management law, need more effective enforcement to address the real problems.
	Chain actors / government / donors / support organizations' readiness to change, to collaborate and to align interventions	**Government institutions** The Ministry of Agriculture, Forestry and Water Economy The Agency for Financial Support in Agriculture and Rural Development The Agency for Promotion of Agricultural Development (National Extension Agency) **Business Associations** Economic Chamber of North West Macedonia Macedonian Chambers of Commerce, The Macedonian Association of Processor, Small Business Chamber, The Macedonian association of agricultural cooperatives – MAAC **Donors** Delegation of the European Union to the Republic of North Macedonia, GIZ, USAID, SECO, JICA, World Bank According to the statements given by the actors met during the phase of the mapping of the eco system, they voiced their consent to contribute in this regard and to undertake the necessary changes and alignments to their programs.
	Feasibility of the intervention	Several interventions could be undertaken for development of the sector: • Support the companies to increase the production quality and capacities through purchase of new technology • In cooperation with the BSOs support their access to new markets once they have achieved the quality standards • Support companies in inclusion of smart systems in order to reduce production cost and energy resources costs. • Support them in launching new products that could compete in European Level.

[12] http://www.ipardpa.gov.mk/Root/default_eng.asp

[13] https://ipard.gov.mk/en/home/

Dimensions	Key Criteria	
ECONOMIC	Market demand prospects (local and/or export)	The manufacturing sector currently makes up the second largest sector related to active businesses in the region of Polog with 1132 active businesses. It has the biggest contribution at total export of the sector in the national level. Three subsectors in this category (furniture, Rubber and Plastic products, basic metals) represent 51.56%. Furniture (C31) with share of almost 35% of total exports from the sector at national level; Rubber and plastic products (C22) with share of 8,37%, Basic metals (C24) with share of 8,19% and Products of agriculture, hunting and related services (A) with share of 7,43%. This is one of the main reasons, why the manufacturing sectors has been taken into consideration as one of the sectors that should be support by the project. SMEs in Polog region have already established a cooperation with different EU companies. They have already accessed different EU and Swiss markets, especially when it comes to Furniture production. This sector covers 35% of the total exports of Polog Region.
	Opportunities for employment creation add	As related to the employability, according to the NACE classification for year 2020, the Manufacturing sector has the second highest total number of employed people in the Region. The companies already have plans for further expanding, in this regard supporting the manufacturing companies in increasing their product quality and expansion into new international market will have a direct impact in the creation of new jobs and increased cooperation.
	Comparative advantage of production Level of competitiveness (in comparison to competing producers)	Connection with the EU markets and Swiss market due to high presence of Polog Diaspora, represents a great comparative advantage. There is an interest of the Polog Diaspora, which has already gained experience in the manufacturing sector in EU countries to establish their businesses in Polog Region due to lower production costs. The local companies are looking forward to investing in such initiatives. Business support services (including product design, accounting services, legal services etc.) are cheaper in North Macedonia. Good geographical positioning in terms of accessing EU markets.

ENVIRONMENT	Impact of the value chain functions on the environment	The value chain of Manufacturing can have several negative effects on the environments. • Air pollution due to the manufacturing process. • Possibility for water contamination • Soil Pollution • waste created during the manufacturing process. However, there might be several aspects where manufacturing can also play a positive role in the environment. Especially when new products have been developed out of the different waste materials. In this regard there is a good possibility in finding ways how to manage and deal with the manufacturing waste.
	Impact of the environment on value chain functions (Low) vulnerability of the value chain to (degraded) environment and climate change.	The region of Polog has favourable climate conditions for production of solar energy. In this regard this climate conditions offer a great possibility to include solar energy in different manufacturing processes. This could be also one of the pillars where the project intervention could be focused. Changes in environmental standards and legislation will require manufacturers to become more resource and energy efficient and also require that their products meet greener standards. This will affect both production processes and the manufactured products.
	Green Opportunities	Based on the Survey with the SMEs in the Polog Region, a very small percentage of the companies consider themselves as green companies. These companies usually are buying second-hand technology that is used in their production process. However, they are looking for ways of how they can reduce their production costs by introducing new technologies. These conditions show that in Polog we have these green opportunities in the manufacturing sector: • Reduce of the level of the energy resources needed for production due to inclusion of new production technology with the support of the project. • Recycle and production of new marketable products out of manufacturing waste • Development of alternative energy sources for manufacturing process.
SOCIAL	(Prospects for) Inclusion of disadvantaged groups	At large scale the manufacturing companies in the region of Polog are suited in rural areas. Being a sector in increase it is always demanding skilled human capital that can support the business activities and the manufacturing process. As a result, the strengthening of this sector will increase the demand for skilled human capital especially youth.
	Impact of the value chain on surrounding communities	With the increase of the competitiveness of the manufacturing sector of the Polog several direct and indirect impacts will take place on surrounding communities. • Initially it will increase the employability of the people in the community – especially youth • It will increase the need for skilled workers, as such the companies will invest in training and educating the people • It will develop further and bring new mindset of doing business and push youth on how to produce and create new products • It will support development of other local economic businesses

	Evidence of private sector, government and/ or donors having plans for investment in the value chain	**Donor funded Projects** The SME Competitiveness Support Programme Republic of North Macedonia The Western Balkans Investment Framework (WBIF) The Smart Specialization Strategy, **Local support** APPRM NCDIEL - National Centre for developing innovation and entrepreneurial learning, Fund for innovation and technological development (FITD): co-financed grants for newly established start-ups and spin-off companies. The European Union Funding
	Sector (promotion) policies and regulations are in place and effective	National Energy Efficiency Action. The Republic of North Macedonia has taken number of commitments in harmonization of its legislation with the EU legislation related to energy and environment. These changes will affect the manufacturing companies in North Macedonia. • Industrial Strategy of the Republic of North Macedonia (2018-2027) • Industrial Strategy with a focus on the Manufacturing Sector • Economic growth plan • National Strategy for Small and Medium Enterprises (2018-2023) • National Strategy for Sustainable Development (2009-2030)
	Chain actors / government / donors / support organizations' readiness to change, to collaborate and to align interventions	**Government institutions** Deputy Prime Minister in charge of economic affairs, coordination with economic departments and investments, Ministry of Economy, Invest North Macedonia, Agency for Promotion of Entrepreneurship, Fund for innovation and technological development, Centre for Development of Polog Planning Region, LED offices and municipal stakeholders in Polog Region, **Business Associations** Economic Chamber of North Macedonia, Macedonian Chambers of Commerce, Chamber of Commerce of North-West Macedonia, The Macedonian Association of Processors, Textile Trade Association, Small Business Chamber **Donors** Delegation of the European Union to the Republic of North Macedonia, GIZ, USAID, SECO, JICA
	Feasibility of the intervention	There are several interventions that can take place in order to support development of the manufacturing sector and its value chain. - Support manufacturing companies to improve their technological capacities in order to increase quality and reduce production costs. - Facilitate cross sector cooperation, especially with the ICT sector, in order to make the companies "smarter" in their management processes - Support development of new products that meet the needed standards for accessing the EU markets and more.

		- Support companies in introducing alternative energy sources. - Establish connection between the companies and different experts through BSOs and instruments such as the Senior Experten Service - Increase cooperation with the education sector and order to create condition that the manufacturing sector could play more active role in development of the human capacities.