

ASSESSMENT OF THE REUSE POTENTIAL OF INDUSTRIAL BUILDINGS IN TETOVO CASE STUDY: "TODOR TSIPOVSKI — MERJAN" TETEKs

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Abstract: Old industrial buildings represent an important aspect of our cultural and architectural heritage. Regular shapes, large sizes, their structures and used materials, are witnesses of the development of industrial architecture; the production of goods, machines and equipment speak for the technological advancement; while an increase of wealth and the standard of living testify for the economic and social development. Unfortunately, the production process has been interrupted in most of these facilities. As a result, many buildings are abandoned, and as such they are transformed in areas where crime and vandalism rule or they are demolished to make room for new buildings. This process of destroying these historic buildings and replacing them with new ones, adds to greater economic costs, energy loss, and unfortunately erases a part of the country's history that future generations will not recognize. Recently, people's awareness of the importance of these buildings, as industrial heritage, has increased, and there has been a growing number of research on how to protect these buildings and sites, but also how to use them again and benefit society.

The subject of this research is the history, the current state and the potential for reuse of the textile plant "Todor Tsipovski — Merjan" Teteks, one of the largest Macedonian textile manufacturers. The historical development is researched to understand the value of this location for the city of Tetovo and its citizens. The field observations of spatial and technological resources create a picture of the existing situation and provide insight into the potential for transformation.

For further analysis, one of the warehouses of the complex is studied based on the 6 building functional layers, and is categorized according to the degree of flexibility, to evaluate its potential for reuse and development.

Keywords: industrial heritage, textile manufacturer, transformation, reuse, sustainable development

1. INTRODUCTION

The industry in Macedonia started developing later than in other countries. This process brought many changes in citizens' lifestyle, improved the education, urbanization and changed social-economic relations. (Georgievski, 1980) The industrialization grew at different speeds in different areas and faced many challenges. (Manojlovski, 2004) The first steps of industrialization appeared in the period between the two world wars, when began the establishment of industrial enterprises in cities, and the development of the food, tobacco, wood and textile industries. (Kartalov, 1982)

Over time more industrial factories were built and the volume of production increased. Around the sixties, in Skopje, Tetovo, Bitola and others, there were many industrial centers and the number of employees in the industry had increased. (Kartalov, 1982)

In Tetovo, as in other Macedonian cities, a more intensive industry development appeared after the Second World War, when were built many industrial facilities for the processing of wood, plastic, tobacco, food, etc. (Pavlovski, 1999)

There was a sharp drop in industrial production, after the collapse of the Socialist Federal Republic of Yugoslavia. During this time, there were a series of changes not only in Macedonia, but also in the most developed countries, leading to a significant amount of abandoned industrial buildings. (Stojkov, 2019)

The results from field observations in Tetovo, show that many of the factories built after the Second World War, have stopped the production process; these locations are either vacant industrial sites, or are rented out for industrial or other purposes, and part of the locations (abandoned or partially active) are planned to be demolished for the construction of new buildings. Among these facilities is Teteks, one of the most important textile producers in the country, which in 2020 completely stopped the production process. However, the site and buildings of the complex seem to have potential to receive new urban programs and functions that enable contemporary spatial and economic development, but to find out precisely which buildings can be used and what functions are more suitable, additional research is necessary.

It is really important to save these buildings and reuse them according to nowadays needs while preserving the qualities that make them distinctive, otherwise they may turn to areas with negative impact on the neighborhood or be demolished and lose part of our culture and history. (Ibraimi, 2022)

2. MATERIALS AND METHODS

Research on abandoned industrial facilities is usually accompanied by a series of challenges. Throughout the transition between old use and new use many documents are lost, because their value is not appreciated and no one feels accountable for them. The collection and analysis of first information on this paper involved a range of methods; archival research, field observations and conversation with stakeholders (people and institutions connected to the location). Most of the data have been collected from the city archive or the archives of the respective complexes.

Research through observation (sketching, measuring, photography and video recordings) – was necessary to study the spatial quality, physical features and adaptive condition of industrial buildings and complexes, understanding the interactions between people and the built environment, etc.

As for the methods used to evaluate the importance of the building and the capacity to accept new functions, in most researches, the methods are qualitative in nature, because they focus on the experience and opinions of people. However, other authors consider that people's opinions can be different, and may not be reliable, so recently, there are more tendencies to practice quantitative methods in these researches. Combination of qualitative and quantitative methods can help towards understanding how valuable old factories and buildings are, how risky it is to use them, and how they can be used again.

With the increase of research in this field, the diversity of the methods used has also increased, for example Avrami et al. (2019) focus more on the new values and actual approaches for reuse, Claver et al. (2018) focus on reuse methodologies while Isenia (2022) analyzes building and location factors.

The method used in this research has to do with the assessment of flexibility based on building functional levels (site, structure, skin, services, space plan, stuff) as defined by Brand (1995) and Duffy (1988). The implemented method was initially introduced in 2014, by Geraedts et al. at the International Union of Architects in Durban. As mentioned, the method is based on the evaluation of the object based on functional layers, where each layer has a certain number of indicators that must be analyzed. Each indicator is then rated from 1-4 for weighting and value. Conception of indicators and weighting value was based on "Methods for reading strategies and capacities for adaptive reuse in industrial buildings" by Elina Amiri and "Flex 4.0, a practical tool for assessing the adaptive capacity of buildings" by Rob Geraedts.

3. ANALYSIS OF THE TEXTILE PLANT "TODOR CIPOVSKI - MERJAN" TETEX A.D., TETOVO

In the period after the Second World War, Tetovo, was becoming an important industrial centre, where the textile industry dominated. Teteks, one of the largest textile manufacturers was founded in 1951, May 25. During the opening of the factory, there were about 37 trained workers, while later this place generated income for one third of the citizens of Tetovo. (Pavlovski & Serafimovski, 1986)

The opening of Teteks was an important social event. At the time, first hours of work on machines, the first kilograms of wool produced, were accompanied by many cheers and applause. The new product was called Tetovka (Gogovski, 1996)

Teteks, consisted of four main factories. Yarn and wool factory since 1951, then Fabric Factory 1954, the Garment Factory 1963, and the Knitting Factory 1968 year. Providing fabrics, blankets, men's suits, men's and women's coats and jackets, sweaters, etc., Teteks was a significant supplier to the Yugoslavian market. (TETEEKS, 2009)

Furthermore, Teteks began to develop as a complex, where, near the 4 main factories, various amenities were built; such as its own source of electricity and heat, vehicles for transporting products and its own vehicle maintenance section, a canteen with hot meals for all employees, transportation to and from the factory and home, teteks banks, kindergartens, bakeries, shops and showrooms used for product presentations, etc. (Gogovski, 1996)

"In 1970, Teteks was involved in 42 % Tetovo's production, and accounted for 35.8 % of the national income, and one third of the total industrial workers in the Municipality, was employed in Teteks". (Gogovski, 1996)

However, in June 1991 Tetex experienced a significant turnaround, when it was transformed from a social enterprise into mixed joint stock company, with mostly private capital. (Gogovski, 1996)

Later on, other countries, such as China, began to produce, and for the factories in Macedonia it was more difficult to sell their products, so despite their huge efforts to continue with the production, Teteks stopped the textile production on 10.02.2020 year. (TETEEKS, 2009)

Nowadays, Teteks company offers 250,000 m2 industrial space with complete infrastructure, where other businesses are welcomed to use these spaces if they need storage or want to start their own production. The organization offers

industrial infrastructure, including technical steam, technological water, and power, and the space is available for rent in various sizes. Teteks provides additional services as well, like maintenance and security. Customers can get assistance from Teteks offices with services like accountancy and IT services. There are several domestic and foreign companies that have so far have rented a total of about 22,000 m² of industrial space. (TETEKS, 2009)

Fig.1. Teteks has a total land area of 250,000 m², from which 140,000 m² are under objects. (Source: Google maps, edited by author)



Table.1. The current and previous use of buildings in Teteks

	The building	Previous use	Current use
1	Gate	Entry and exit control	Entry and exit control
2	Ambulance	Health centre	For rent
3	Administrative building	Administration	Administration
4	Canteen	Workers' canteen	Restaurant
5	Yarn factory	Production of yarn and wool	For rent
6	Fabric factory / knitwear factory	Fabric and knitwear production	For rent
7	Telephone central	Telephone central	Telephone central
8	Plumbing and compressor station	Compressed air station	For rent
9	Substation	Substation	Substation
10	Administrative building	Administrative building	For rent
11	Machine and electrical workshop	Machine and electrical workshop	Rented
12	Technical warehouse	Spare parts warehouse	For rent
13	Factory and warehouse	Yarn production	Partly rented / partly for rent
14	Bakery and warehouse	Bakery and warehouse	Rented
15	Metal structures and warehouse	Production of metal structures	Rented
16	Warehouse	Warehouse	For rent
17	Warehouse	Warehouse	For rent
18	Blanket factory	Production of blankets	For rent
19	Warehouse	Warehouse	Rented
20	Regenerate factory	Sorting of regenerate	Rented
21	Fuel oil tanks	Storage of fuel oil	Rented

22	Construction operations and carpentry	Construction operations and carpentry	For rent
23	Warehouse	Warehouse	For rent
24	Energy centre	Production of technological steam	For rent
25	Garage with workshop	Garage with workshop	For rent
26	Fabrics and knitwear warehouse	Finished goods warehouse	Finished goods warehouse
27	Confectionery old part	Production of ready-made clothing items	For rent
28	Confectionery new part	Production of ready-made clothing items	For rent
29	Clothing warehouse	Finished goods warehouse	Finished goods warehouse
30	Canopy	Canopy	For rent

For the compilation of this table, the data were collected from archival materials, in order to define the primary function of the buildings, while the actual use was defined by field research and conversations with employees. Of the total built area of 140,000 m², 22,000 m² are rented, 4,000- 5,000 m² have preserved their primary function, while the rest of over 113,000 m² is ready for rent, for industrial or other functions.

Fig 2. The ratio between the built (56%) and unbuilt part (44%) in Teteks



Fig 3. The current state of buildings in Tetex:

active, rented, for rent



4. RESULTS AND DISCUSSIONS

During the field visit, access was only possible to the location but not inside the buildings, for this reason the flexibility analysis are carried according to the plans and documentation collected from the archive. Based on the analysis of the adaptive capacity of one of the warehouses in Teteks, using the Flex method, it results that the building can receive new uses, but it is part of the class of objects with limited adaptive capacity. Which means that this building may be suitable for some new functions but not for those that require greater flexibility.

Table.2. Assessment of reuse potential based on building functional layers in one of the warehouses of Teteks

Flexibility of the building and its adaptive capacity				
Layer	Flexibility indicators	Weighting	Assesment value	Score
Site	1. Expandable site	4	3	12
	2. Multifunctional site	3	4	12
Structure	3. Free floor height	4	4	16
	4. Centralized building access	2	3	6
	5. Available floor space	3	3	9
	6. Load bearing elements position	3	3	9
	7. Possibility of adding stairs and elevators	2	1	2
	8. Column shape	1	3	3
	9. Possibility of horizontal expansion	3	2	6
	10. Possibility of vertical expansion	4	1	4
	11. Possibility to single out part of the building for sale to third parties	2	3	6
Skin	12. Thermal and acoustic insulation	2	1	2
	13. Facade openings	2	1	2
Services	14. Measure and control techniques	3	2	6
	15. Distribution facilities	4	2	8
Space	16. Flexibility of internal walls placement	4	2	8
	17. Possibility of suspended ceilings or raised floors	2	4	8
Flexibility results				119
Flexibility class				3

Table.3. Flexibility class score range

Flexibility class	Score range
Class 1: Not flexible at all	17-54
Class 2: Hardly flexible	55-108
Class 3: Limited flexibility	109-163
Class 4: Good flexibility	164-218
Class 5: Excellent flexibility	219-272

5. CONCLUSIONS

The industry in Tetovo developed most intensively after the Second World War. The buildings built during that period are witnesses of the industrial development and contain great historical and cultural values. In recent years, as result of economic, technological and social changes, most of these buildings are abandoned and are often in danger of demolition.

One of the locations with the greatest industrial value is Teteks, the textile factory with land of 250000 m², which for many years has been a source of income for citizens of Tetovo. After stopping production in 2020, a significant number of Teteks buildings have been issued under lease, while others are being prepared for rent for industrial or other purposes.

However, the need to reintegrate and transform these buildings to suit modern society needs does not mean that every building is suitable for accepting new functions. Through the example of one of the warehouses on the site, it has been proven that the facility is suitable for accepting new functions, but more analysis need to be done to define which functions the building is more suitable for. The same analysis should be carried out with other buildings of

the selected location to define whether all objects are suitable for reuse and which class of adaptive capacity they belong.

REFERENCES

- Amiri, E. (2020). *Methods to read adaptive reuse strategies and capacities in industrial buildings*. Torino: Politecnico di Torino, Master thesis.
- Avrami, E., Mason, R., Macdonald, S., & Myers, D. (2019). *Values in Heritage Management: Emerging Approaches and Research Directions*. Los Angeles: Getty Conservation Institute.
- Brand, S. (1995). *How buildings learn; what happens after they're built*, . New York: Viking.
- Claver, J. G., García Domínguez, A., & Sebastián, M. A. (2018). Decision-Making Methodologies for Reuse of Industrial Assets. *Hindawi* , 1-17.
- Duffy, F. (1988). *Design for change, The Architecture of DEGW*. Basel: Birkhauser.
- Geraedts, R. (2016). FLEX 4.0, a practical instrument to assess the adaptive capacity of buildings. *Energy procedia*, 568-579.
- Geraedts, R., Remøy, H., Hermans, M., & Van Rijn, E. (2014). ADAPTIVE CAPACITY OF BUILDINGS, A determination method to promote flexible and sustainable construction. *International Union of Architects World Congress* . Durban.
- Ibraimi, F. (2022). Industrial heritage buildings in Tetovo: Between demolition and reuse. *KNOWLEDGE – International Journal* , 455-460.
- Isenia, G. (2022). *Adaptive reuse of industrial heritage-Empirical building and location factors*. Eindhoven University of Technology: Master program: Architecture, Building and Planning.
- Unknown. (2009). *Teteks AD*. Повратено од History: <http://www.teteks.com.mk/Default.aspx?mid=137&Lan=EN>
- Георгиевски, П. (1980). Индустијализацијата, урбанизацијата и промените во социјалната структура на повоениот период (1947-1977) во Југославија. *Годишен зборник на Филозофскиот факултет*, 369-388.
- Гоговски, Г. (1996). *ТЕТЕКС- Вистинска приказна*. Тетово: ТЕТЕКС АД.
- Карталов, Х. (1982). Некои аспекти на урбанизацијата во СР Македонија. *Годишен зборник на Филозофскиот факултет*, 263-299.
- Манојловски, М. (2004). Индустриското производство во Македонија за време на Втората Светска Војна. *Историја*, 111-135.
- Павловски, Ј., & Серафимовски, Т. (1986). *ТЕТЕКС 1951-1986*. Тетово: НИП Нова Македонија.
- Павловски, Н. (1999). Индустијата во Македонија. *50 години Архитектонски факултет- Јубилеен зборник*, 62-75.
- Стојков, А. (2019). *Индустриската структура, индустриската политика и економскиот растеж на Република Македонија*. Скопје: Македонската академија на науките и уметностите (МАНУ).