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Dr. Seda Özlem ÖZGÖZ
https://orcid.org/0000-0002-6228-8738
Atlantic International University, Doctorate in Art, Project Management, Honolulu/ Hawaii / USA

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THE BENEFIT OF TEXTILE RECYCLING TO ECONOMY, ENVIRONMENT, AND ITS PLACE IN METAVERSE TECHNOLOGY[1]

ABSTRACT

As the textile industry, it is a part of contemporary life. The impact of the textile industry on health, economy, and environmental pollution in production, processing, and recycling is important both in our country and on a global scale. Textile wastes pose a threat to air, water, and soil in terms of their environmental impact. Reducing waste in the textile industry, and its effects on health and the environment is possible with recycling. Alternatives are gaining importance in the world and related training, project management, and evaluation studies should be accelerated. The main goal should be to adopt the concept of sustainability to future generations, taking into account the correct use of natural resources, the way of processing and environmental factors with less chemical treatment. The main purpose of the study is to have a general knowledge of the Sustainable Development Goals, activities in this direction, awareness-raising, and therefore actions and activities related to total factor productivity. İs to develop feasible projects with planning.

Keywords: Integrated Waste Management, Metaverse, Textile Recycling.

1. INTRODUCTION

As the textile industry, it is a part of contemporary life. It is seen as a necessity of protection from the first human to the present day. Textile Products, which maintain their effectiveness in almost every field, are used in every field from underwear to outerwear, from home textiles to automotive, from yachts to trains and airplanes. Today, where natural resources are consumed rapidly, it leaves their place to the search for filling lost raw material resources. The effects of environmentalist movements, which started in the 1980s and spread gradually, are spreading all over the world. The impact of the textile industry on health, economy, and environmental pollution in production, processing, and recycling is important both in our country and on a global scale. Textile wastes pose a threat to air, water, and soil in terms of their environmental impact.

The supply chain throws textile products into landfills, causing raw material shortages and loss of value. Intervention in the supply chain causes more energy and resource consumption and loss of value instead of raw materials. Financial sizes and the concept of a sustainable environment have attracted attention in this sector in recent years. Unless recycled materials are used, manufacturers need purer materials to meet their needs. It pollutes both the air and the water by passing into the soil with the chemicals mixed with the soil. It causes the formation of greenhouse gases while being dissolved by chemical processes.

[1] This article is derived from the PhD thesis "The Benefit of textile recycling to economy, environment, and its place in metaverse technology."

Reducing waste in the textile industry, and its effects on health and the environment is possible with recycling. Alternatives are gaining importance in the world and related training, project management, and evaluation studies should be accelerated.

Recycling in the textile industry is one of the most effective tools of the circular economy with its environmental, social, and economic benefits. Businesses reduce production costs with industrial recycling applications. It captures new market opportunities as a result of the system established to generate additional income from waste and by-products instead of production. Environmental quality is maintained by controlling pollution at its source. Resource efficiency is achieved through waste recovery and reuse. By creating content with ecosystem data, user data, avatars in Metaverse technology, virtual assets such as clothing, design, architecture, residential land, etc.

In reality, shopping takes place. This area, which has a great impact and investment share in every field, can be collected in a metadata warehouse with user-centered features such as waste industrial products, textile recycling, and sustainability concepts, environmental protection, and security. Can make correct use of industrial and textile waste, evaluation investments, and inventory trade and investment. Environmental protection can participate in the voting for the sustainability platform. Its contribution to environmental protection and waste management education can be great. Production, consumption, and waste education should be evaluated as modules in the life cycle in the most effective way.

2. USAGE and HISTORY OF TEXTILE PRODUCTS

2.1. Definition of Textile

In order to know the history of textile, first of all, it is necessary to know what it means, how it got this name, and it's meaning. The word “textile” is derived from the Latin word “texere” meaning “weaving”. Textile refers to a flexible material made with a web of natural or artificial fibers known as yarn. Textiles are created by weaving, knitting, crocheting, knotting, and interlacing fibers (Choudhury, 2014).

2.2. Textile History

Although textile has become rich by expanding itself over time, its history is almost as old as human civilization. B.C. The earliest indications of the use of fibre, linen, and woolen cloth in the 6th and 7th centuries have been found in excavations in Switzerland. Traces of silk culture were found in India around 400 BC. Cotton was discovered in 3000 BC. B.C. (Güngör, Palamutçu & İkiz, 2009).

Silkworm breeding and spin silk technique were discovered in China in 2640. B.C. Traces of thread, linen, and weaving art in Egypt can be seen in the 3400s. A wider textile market has been created by developing varieties such as synthetic fibers and nylon (Muthu, Li, Hu & Ze, 2012). Then natural fiber resources were transferred to a strong system. Textile art has led to many developments according to the climatic conditions of the countries in which it is located (Chen & Burns,2006).

Textile History by Country Turkey has a long history in textile production. Turkey remains an important country in the global textile and apparel industry since the Ottoman Empire. The textile sector in Turkey is developing rapidly and when we look at the statistics, it is seen as the fourth textile exporter in the world. The value of exported textile and apparel products has more than doubled since 2000. Most of the textile and apparel products produced in Turkey were imported by Germany, England, Spain, and Italy. Thanks to these countries, the sector reaches serious figures in textile exports.

Japan showed cultural and artistic development in textile during the Edo and Meiji periods (1868-1912). With the relocation of Japan's capital from Kyoto to Tokyo in 1869, the weaving tradition of the Nishijin Textile Center was in danger of extinction. In 1890, Japan implemented its new capitalist economic policies.

3. RECYCLING OF SMART TEXTILES AND TECHNOLOGICAL DEVELOPMENTS

3.1. Global Innovations

Although textile production is not intensive, textile wastes The importance of recycling draws attention in Europe and America. The low amount of used textile waste, causes them to focus more on the industry for the recovery of existing wastes.

- Shape Memory Textiles
- Color Changing Textiles
- Use for thermoregulation
- Camouflage Use
- Security Brand Protection Use
- Phase Changing Textiles
- Wearable Smart Electronic Textiles

Picture 1. Global Innovations

Microencapsulated phase change materials; During fiber spinning, the coating can be made on synthetic fiber and nonwoven textile surfaces (Deguillement, 2003).

3.2. What is Smart Textile?

Smart textiles, any effect or change in effect. It is the name given to textiles that have the ability to perceive and react. Smart textile technology is revolutionary. In terms of useful features and functionality. It is different from other traditional textiles. Passive smart textiles; can only be defined as smart textile products that have the ability to detect environmental effects.

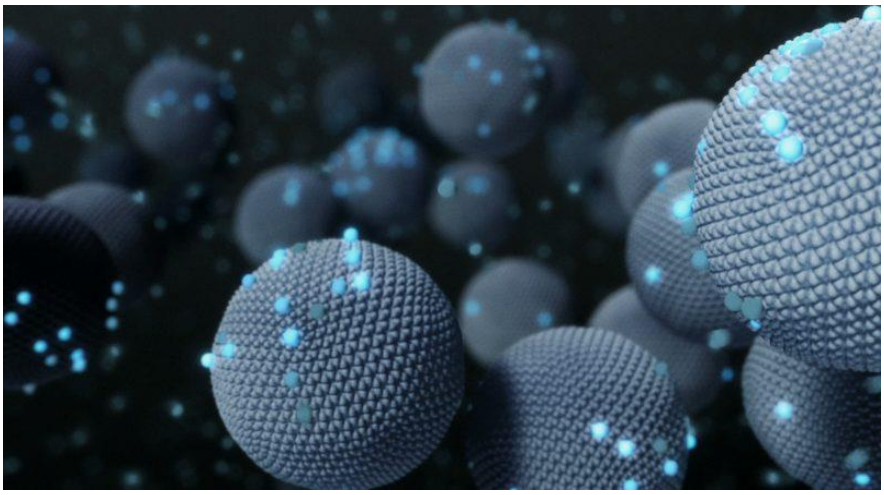
Wearable sensors used today are in this group. If it also reacts to the effect or changes it perceives, active smart can be defined as a textile product. Change color a product dyed with a chemical dyestuff dimming and glowing against the light situation whose color changes according to the direction it receives the light active smart textile can be an example.

Picture 2. Smart Textile

High-tech textiles, drivers, color change according to room temperature measuring how fast we run or the steps we take shoes, warning drivers and stimulating car seats, regulating body temperature, color communicating, listening to your heartbeat sheets, especially those that cause the sudden death of the sleeping baby. It is effective in preventing death syndrome.

When breathing stops, heart rate or body Notify parents of an unexpected change in temperature. It is an indication that it is extremely important in terms of health and safety. With the integration of constantly developing technology into smart textiles, its importance is increasing and it leads to more work.

The use of microtechnology and nanotechnology is the focus of attention in smart textiles. Too many small electronic components and sensors (sensors) invisibly integrated into the textile they were done.



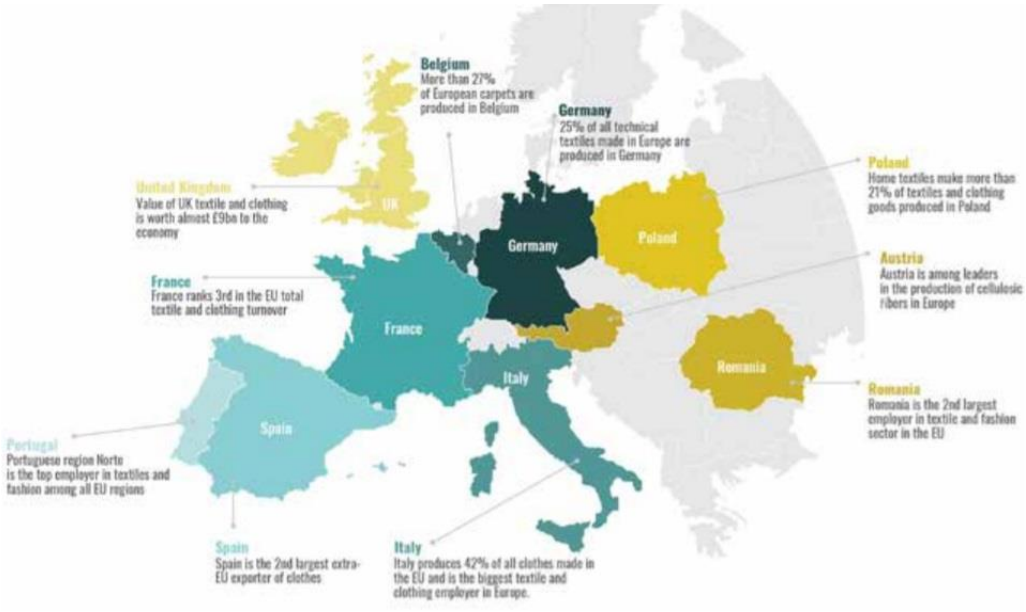
Picture 3. Smart Textile

Advances in smart textiles progressed in parallel with the developments in textile technology and synthetic fibers. First, with aerospace, military, and medical clothing.

Smart textiles, which are mainly focused on, have started to gain importance in the textile and ready-made clothing sectors in line with the needs of people who are intertwined with technology in recent years. Individualclothes that can control and transfer data, wearable electro-textile clothes, and many similar applications are new-created concepts.

Thanks to color-changing chromic materials, which are an important area of smart textiles, both are textile products enriched with both technological and aesthetic, and visual features.

3.3. European Commission Principles on Environmental Design

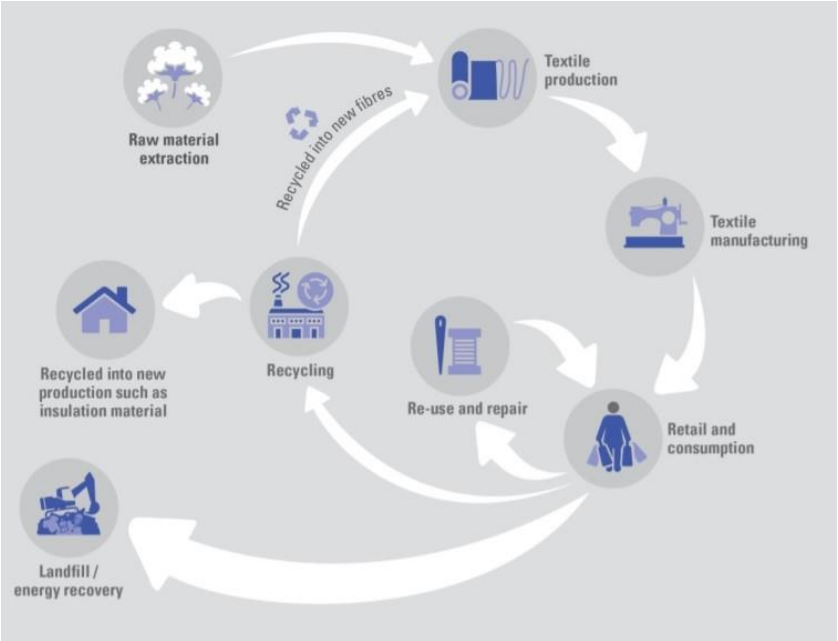


Picture 4. EU Textile and Clothing Producers

- As low-impact material as possible use: the need for natural resources (such as energy and water) for processing and transportation is very low, or nonexistent, its use threatens biodiversity. Non-toxic, sustainable manufactured or recycled materials.

- Focus on the efficiency of resources: possible creating production processes, services, and products that consume as few natural resources as possible Investing in quality and durability: aesthetics aging without losing its properties, long-lasting and product change effect through functional products reduction.
- Reuse, recycling, and refurbishment: reusable, recyclable, or design of compostable products.

The issue of using textile wastes as fuel has recently come to the fore due to its high calophyric structure.



Picture 5. The Life Cycle of Textiles

In today's world, when oil is consumed and gradually depleted, incineration of synthetic-based wastes should be brought to the agenda as the last option.

Textile products, whose production continues to increase, are needed in many areas, starting from the most basic needs of our lives. İn production processes to reduce the effects of environmental damage, to prevent the problems that will occur when thrown into nature, Sustainable recycling is seen as the best solution for regenerated and synthetic-based textile wastes.

3.4. Waste Ecology Strategies on Textile Waste

The most well-known waste management strategy, OECD's 'Sustainable Materials Management Policies' study report focuses on three basic rules about sustainable resource use.

Saving resources and energy use, reusing and prolonging product life, and recycling. In the study covering fourteen OECD countries, the scope of sustainable material management principles was between 2007 and 2011. expanded, the countries and product categories to which the principles are applied have been increased. Textile wastes as of 2011; glass, paper, ranks seventh among materials with high usage and waste amounts such as plastics and plastics (OECD, 2005: 21).

One of the waste reduction studies on the textile industry in Europe is the European Union Cost Action No. 628, the Textile Products Life Cycle Project (EU Cost Action 628: Life Cycle Assessment of Textile Products).

On the subject of Turkey and a study was conducted in which a total of sixteen universities from European countries participated. Accordingly, supporting the studies on recycling with ecological production stages, from raw material supply to packaging process and eco-label applications (OECD, 2005).

All production stages should be made ecological. In the recyclability of textile waste, it is necessary to determine the production stages that are the most difficult to make ecological and to determine the harmful substances during textile production. Reducing its spread is key. Quality textile waste is an environmentally friendly waste with a high recycling rate. Recycling costs are low (Jones, Comfort & Hillier, 2010).

The emergence of these wastes, the tendency of textile production to clean technologies, more effective and less use of natural resources, and more generally, textile production can be achieved by changing consumption patterns. In the development of production models, textile with human health and environmental awareness.

It is important to determine the standards to be brought to production. The European Union is preparing a proposal on ecological strategies for recycling a significant amount of waste.

Turkey, Back it aims at the same rates as the European Union criteria in the long term in its Transformation and Waste Action Plan studies. In the proposal, textile The energy spent for the recycling of textile wastes processed for use in the industry, the polluted water, and it has been stated that the amount of chemicals used is much less compared to making new products.

Accordingly, solid waste it is the substance that needs to be converted into a new product at the highest rate as a utilizable resource proposal for textile waste.

Since 2015, recyclable materials, especially recyclable materials, are buried or sent to landfills for disposal. includes the restriction.

With the strategy published in the study, the textile wastes sent to the landfill since 2025 It is foreseen to be recycled at a rate of 95%. The ecological practices suggested in the study can be grouped under three headings:

- To increase the amount of recyclable material in the waste stream.
- Classifying their sources emphasizes the necessity of categorizing waste. 3. To predict annual waste recycling rates with the help of producers' responsibility to inform.

3.5. Yarn Samples from Waste Metal and Usage Areas in Smart Textile

Threads routed from recycled metals to textiles can cause discomfort when in contact with human skin, but with normal strings, comfortable use can be achieved when used with fabric at certain intervals. Natural or synthetic metal fibers mixed with fibers. Metal composite yarns together with winding yarn and knitting yarns are used.

Of metal composite yarns threads made from this material have conductivity and electrical and anti-wear properties.

The sensors can be used in industrial applications such as electrostatic discharge, electromagnetic interference protection, dust-free clothing, military applications, data transfer in clothing, and electronic smart textiles. Explosions caused by static electricity are prevented especially in military ammunition depots.

High electrical conductivity of metallic threads and the ability to discharge static electricity from the human body there is.

Electromagnetic shield silver as it has excellent conductivity in both electromagnetic and radiofrequency can be used for shielding. Defense industry military When used in products, Statex fabrics prevent detection by infrared and radar.

3.6. Effects of Waste Metal and Textile Use on Human Health

The recent use of metals in textiles is known to have an effect on human health, primarily as an anti-stress. Also, it provides electromagnetic protection.

Similarly, metal threads or fabrics with antistatic properties can protect humans against static electricity.

It provides the discharge of electromagnetic waves. When static electricity loading is examined in terms of health, it is effective in reducing human energy, restlessness in children, and regulating blood flow, especially in the elderly. Serotonin and melatonin secretion is important for human hormones.

Picture 6. Intelligent Textile Study that Discharges Static Electricity in Humans Produced from Textile and Metal Waste

I worked on a system that quickly discharged static electricity in the body by integrating waste metal and textile. I designed it to prevent explosions in military ammunition depots.

In the measurements made, the full conductor gives the value 0 and it has been determined that it is a product with the ability to ground. With this system I developed, negative ions enter the body thanks to the textile and metal waste component. The more free radicals and positive charges, the more they affect the fluidity of the blood.

It is a very important factor in terms of health. Inflammation is suppressed by both blood thinning and electron transfer. Inflammation is the cause of many diseases, from cancer to atherosclerosis, from rheumatism to asthma. Antioxidants are essential in the prevention and treatment of diseases in terms of health.

According to studies, 80 minutes are needed for free electrons to pass from soil to blood. In the human body, there are cells called neurons that produce electricity.

One of the biggest negative aspects of electromagnetic pollution that causes stress is that it pushes people to laziness. Electromagnetic waves cause stress and fatigue In our daily life, electromagnetic pollution that can be caused by waves emitted from electronic devices, especially mobile phones, can cause electrostatic charge accumulation in the body which causes stress and fatigue.

Explosion news at gas stations due to static electricity has come to the fore. As a result of research and studies, studies can be expanded by integrating waste textiles and metals. Smart textiles can serve humanity in terms of safety and health.

4. TEXTILE RECYCLING PROJECT PROPOSAL WASTE MANAGEMENT AND METEVERSE INTEGRATION

The textile sector is one of the important branches of industry on a global scale. The concept of a sustainable environment has been found in this sector in recent years, especially after rapid consumption.

It ensures that the wastes generated in the textile industry are reduced, recovered, and the new products that come out with synthetic fibers are in demand as a result of the correct evaluation in terms of use. It shows that the textile industry does not only consist of the use of raw materials or products but also that by-products and many other types of waste can be raw materials with the right evaluation.

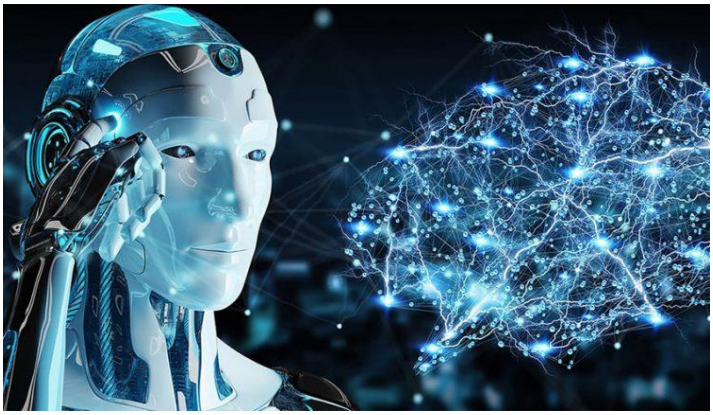
As sustainable development becomes a global issue, its environmental policy is gaining more and more importance. For this reason, the correct use and management of waste are one of the priority problems of central-local governments.

Picture 7. Metaverse Fashion Textile

It is considered a concept in the fields that it evaluates waste management as a whole and that it will provide benefits in terms of efficiency and effectiveness one by one. It defines the intertwined goals and objectives of recycling within the system. The aim of the system is to contribute to the environment and economy with the recycling process instead of eliminating waste. Minimizing the size of the waste damage.

For an integrated waste management system to be applicable, management objectives must be determined and optimally planned. Local, regional, economic, social and environmental impacts and current situations should be addressed and progress should be made in the plan. Only 4% of the total oil produced in the world is used for plastic production. Only 3% of this 4% rate used in plastic production is used as plastic and synthetic.

4.1. What is the Impact of Metaverse on Textile Use and Waste Evaluation?



Picture 8. Metaverse on Textile

Metaverse, ıt is a platform where users can move in the digital and augmented reality virtual universe, pushing the limits of many elements of technology. Roblox: Founded in 2004, Roblox creates virtual shopping scenarios where users like Bloxburg and Brookhaven can build houses and buy clothes and accessories.

The metaverse platform, which carries the world to a different dimension, brings a new understanding to production and consumption processes while accelerating the transformation of the changing reality and perception of needs in the textile industry. The concept of metaverse creates its own agenda, especially in the fashion industry (Wang, Wu & Li, 2000).

The demands of textile design brands to establish and develop this hyper-interactive creative environment are increasing day by day. Metaverse Studies; While combining the creativity of fashion with technological possibilities, the excitement of the game industry, and the power of storytelling, it can be strengthened with add-ons such as post-consumption waste evaluation.

The virtual reality metaverse adds great economic value by making it possible to interact with users in line with the waste control assessment.

With the spread of artificial intelligence and technological applications in the eyes of society, the effect of its transformative role is increasing day by day. Waste management research should focus on

promoting innovation program strategy development and the importance of acting in global collaboration to manage it efficiently.

Technology current regulations for recycling and sustainability should be reviewed. Alternative approaches to metaverse and waste management can be provided with the participation of national and international multi-stakeholder organizations, research academy thought leaders, and the business world.

Picture 9. Metaverse on Textile

At Mataverse, users can view textile design, consumption, and subsequent recycling as a useful model in this direction, as in many other real-world events. The meeting of the consumer's conscious and instructive way with technology makes it possible to create an impressive and educationally conscious consumer platform.

The fact that this platform will take place more and more in people's daily lives day by day makes clothes gain more importance in the virtual world as well as in the physical world. Therefore, although the metaverse is a market with significant opportunities for the fashion industry, it can play a strong, sustainable and accelerating role in the digital recycling of post-consumer products (Hertleer & Schwarz, 2012).

Metaverse will be environmentally friendly by bringing awareness to textile products. It will highlight the environmental concerns of the challenges and problems associated with the management of textile waste and enable us to develop methods to increase the usefulness of this resource.

Metaverse indicates an effective transformation in the life of the whole society, the imagination and creative area of the current formation, between the virtual and the real, which is pointed as beyond the universe.

As an extension of the real world economy of production, consumption, ownership, investment and creation, Metaverse enables us to experience a three-dimensional and richer experience than the world we watch in two dimensions. Metaverse can redefine a space where we can express ourselves through consumption.

With Metaverse technology, it can offer privilege and awareness as design, production, consumption and then waste investment. Technology innovation can play the role of increasing and facilitating communication with each other and access to the virtual environment. These technologies can provide a new formation to the sustainability of public life, economy, investment and trade by regulating waste control as a result of production and consumption with existing laws and new regulations.

4.2. Integration of Textile, Production, Consumption and Waste into Metaverse Technology

Noting that the recent popularity of Metaverse has to do with virtual reality, Petrock said, “Facebook and other companies have invested heavily in virtual reality, and augmented reality is now doubling down on their efforts to find the perfect app that can take the internet to the next level of connectivity and utility. Can have an id and have an unlimited number of items in the metadata store,” he explained.

Production, consumption and waste in the life cycle. An endless loop. According to my research, one should not look too far for the greatest unlimited perfect application as augmented reality described above. The biggest and only reality in virtual investment is textile products used in every field, with

never-ending consumption and waste generation as a result. There will be endless and enormous economic gains in capital investment and recycling.

5. INTERNATIONAL CONTRIBUTION OF TEXTILE RECYCLING

The environmental, economic, physical, and biological effects of waste must be effectively controlled and managed. Considering that wastes harm the environment and human health due to physical, chemical and biological reasons, the necessity of systematic implementation of waste management comes to the fore. Waste management is an issue that needs to be addressed through systematic education, in universities, and even gradually starting from primary school, by directing individuals of all ages and supporting them as conscious consumers.

System approach; In addition to the basic elements of waste management such as waste generation, collection, processing and disposal, it requires that it be dealt with in integrity with issues such as energy, environmental protection, protection of resources, productivity increase and employment. The system approach in waste management is not only the removal of wastes from human living space but also the development of the environment and human health by protecting it. It will make positive contributions by supporting economic development.

6. GENERAL ANALYSIS

The main goal should be to adopt the concept of sustainability to future generations, taking into account the correct use of natural resources, the way of processing and environmental factors with less chemical treatment. For waste management, which should be included in the sustainability plans for the depletion of natural resources, the main item should be the place of use of technology. Virtual reality, which contains not only social media entertainment but also economic content, should take its place in the metaverse Sustainability platform. Sufficient data has been given throughout the thesis to create content in this field in Metaverse.

7. DISCUSSIONS

Sustainable production systems should be developed by reducing the use of limited natural resources with cyclical production processes. Joint management of operations is important in terms of raw material/material purchases, joint evaluation of similar market days and related transportation/logistics.

In order to ensure sustainability, it should be applied not only in the industrial production phase but also in all activities with high resource consumption metaverse

It will provide content by integrating waste management, which should be the main idea of the economy with giant investments that will form the important link of the technology sustainability chain with its applications.

For a sustainable life, the correct use of natural resources with sufficient and effective content, increasing the investment power of public awareness, is of great importance. In the face of natural resources, consumption rates will make serious contributions to sustainability by integrating its balance with metaverse contents. As the most beneficial model of the technology age, the metaverse is expected to play a leading role in sustainable development.

Although it may seem innocent in terms of form and use, the formation of textiles goes through many processes, from organic and chemical interactions to its formation. My aim here is to ensure that technology takes an active role in sustainability with its effective use of it. With the right moves, it is to less risk to the environment and to recycle the existing produced product at low cost (Hansen & Schaltegger, 2013).

With the integration of Metaverse technology the main purpose of recycling waste is to eliminate environmental effects and to leave a more livable world for future generations.

Metaverse redefines a space where we can express ourselves through consumption, as an extension of the real-world economy of ownership and creation. With its wide range of design, product, and social competition that will shape the metaverse and economy, it attracts the attention of technology giants beyond imagination.

The biggest and only reality in virtual investment is textile products used in every field, with never-ending consumption and waste production as a result. It is an inevitable fact that it will provide endless and enormous economic gains in capital investment and recycling.

7.1. Site Selection and Planning of Textile Recycling

For an integrated waste management system to be applicable, management objectives must be determined and optimally planned.

Rapid urbanization and population growth in parallel with technological developments and industrialization are rapidly increasing the pressure of human activities on the environment in the world.

Waste is the new name for post-recycled garbage and its value to the economy is known. Textile waste was useless before recycling and was an object we wanted to get rid of. If we define it in general, without harming the environment and human health, from waste generation to disposal.

Waste textile object, usage area, raw material, structure, person, age, culture and wastes that occur depending on environmental factors depending on the time used. Therefore, waste is a relative concept with some researchers' recovery methods and its impact on the economy. Because many discarded textile objects can be used as raw materials and other synthetic fibers.

Recently, scientific researchers have proven that even fruit waste is buried in the soil and adds strength to its essence by making a fertilizer effect in the soil. Likewise, it has been observed that textile is transformed into a raw material with recycling evaluations.

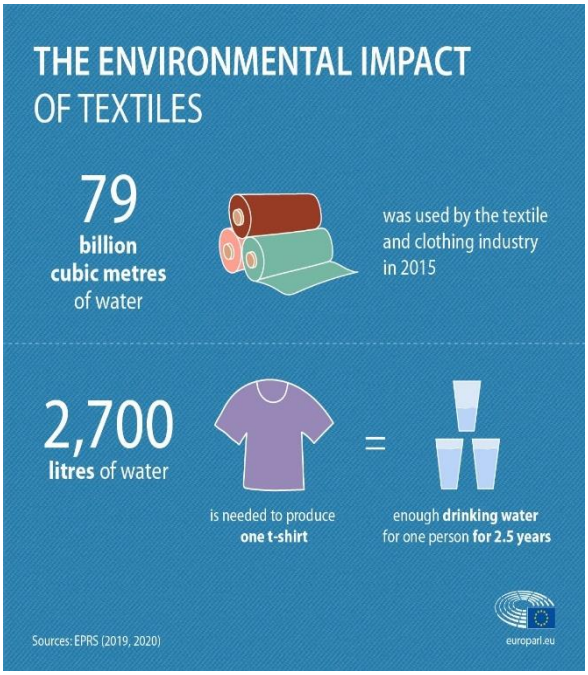
7.2. Water Factor in Recycling Textile Wastes

Compared to other industries, textile wastes generated after textile production and use are considered cleaner. Textile wastes are synthetic-based products such as polyester, nylon and polypropylene.

These products are thrown into landfills instead of being recycled, meaning the oil, chemicals, water and energy needed to produce the same amount of raw materials are wasted. Pollution of ground and river waters requires the use of cotton fiber production, pesticides, fertilizers and water. It's a build that causes levels to drop.

Fertilizers used in cotton production in Turkey are generally nitrogen-based. Between 1997-2001, an average of 9 thousand tons of nitrogen leaks into water resources annually due to cotton production.

As it is known, nitrogen causes eutrophication and accelerates global warming. The resulting greenhouse gases and polluted drinking water sources.



Graphic 1. Infographic with facts and figures about the environmental impact of textiles

In the recycling of textile wastes, water and energy consumption should be used correctly, as in manufacturing. Observation wells should be drilled both above and below the facility to monitor groundwater quality and damage. Water flow should be measured annually by facility officials.

7.3. Logical Framework of Textile Recycling Project and Needs Analysis Report

Table 1. Project Operation Model

	Project Evaluation Criteria	YES	NO
1	Are the project log frame and needs analysis report available?	+	
2	Does the project have a business model?	+	
3	Textile Recycling, is the approximate profit of the project known?	+	
4	Is Project (business) Financing Resources foreseen?	+	
5	Textile Recycling Project (business) Financing Are the source investors known?	+	
6	Are there any similar scale operation or construction projects implemented by the Textile Recycling Integrated Waste Management project partners?	+	
7	Do they have national or international organizational experience in waste management among project partners?	+	
8	Does the project have a draft timetable?	+	
9	Were the project partners under consideration informed of the draft?	+	
10	Has the metaverse data been created, is there a timeline on this?	+	
11	Have Project Risks been identified?	+	

In this process, the expansion in production and marketing activities depending on the needs significantly affects the rapid consumption of natural resources. The amount of consumption in the use of the product is also increasing. It is seen that all of these create environmental, economic, health and global problems.

The necessity of transforming and protecting natural resources, from a macro point of view, requires a lot of responsibility from large enterprises, organizations, companies, public institutions and organizations and many others.

To raise awareness among consumers about the amount and consequences of the products they consume, their harmful effects, their economic dimensions and what they can do to minimize them from a micro perspective. It is clear that they need to be aware.

7.4. Business Model of the Project Recycling Technologies in the Project

An invest-operate model or cooperation with public partners can be made. To recycle a product to its original condition. It is the conversion of waste into a new product with low physical, mechanical and chemical properties and a different application area from its original state. It is the conversion of waste into simple chemicals or fuels through pyrolysis, gasification and hydrolysis. It is the production of heat by incineration of solid waste.

Original recycling is the most effective recycling method. This method is especially for recycling synthetic fibers such as polyester and polyamide. This method is also called closed loop recycling.

Closed-loop recycling of textiles is the collection of post-consumer waste, sorting according to its raw material and color, and producing yarn from these wastes to be used in new clothes. The most common recycling is the open loop. It is the use of lower-level products since the quality of the materials obtained after the recycling process is too low to be used in new clothes.

Recycled materials are used as car upholstery or insulation material rather than being incinerated. All these applications do not meet the need for raw materials in ready-made clothing production. On the other hand, the virtual reality metaverse of the digital age is spreading rapidly and investments in post-production consumption and waste evaluation platform should be supported by establishing textile design and fashion shows.

Metaverse can develop a different application. Waste Ecology Strategies for Textile Waste It should form a bridge for people's energy saving, product reuse and prolongation of the life cycle, and recycling awareness.

7.4.1. Project Approximate Cost, Project Annual Operating Approximate Cost, and Cost Components

Approximate Project Cost;

Project Approximate Implementation Cost: 200.000.000 USD

Project Annual Operational Approximate Cost / Cost: 3.500.000 USD

Annual Approximate Income of the Project: 10,000,000,000 USD

7.4.2. Project (Production, Operation) Projected Financing Sources

Project (Business) Projected Funding Sources

Different possibilities were taken into account while creating project financing resources;

• Project sales and joint venture financing.

• Financing will be provided for data sources for all software and technology integration in the project implementation.

7.4.3. Public or Private Partners of the Project

All technology companies and companies interested in recycling can participate in this project. It can spread all over the world with the support of project partners and companies that give importance to recycling. In line with sustainable development goals, they can become business partners in our global world with government support.

7.4.4. Business Projects of Similar Scales that Project Partners Have Implemented Before

As a fictional reality, Metaverse, as a concept, allows people to enter the digital world rather than the digital space. We can actually see the metaverse as a virtual 3D environment accessed over the internet. Increasing the technology gains attracts the attention of investors and companies who want to be a part of the next stage.

A fictional universe is created that they can access over the internet, this time the person lives as an embodied member that he can enter instead of just looking, watching and following. The metaverse concept, which came to the fore with the billion-dollar investment plan of companies such as Facebook, Microsoft, Roblox and Epic, is seen as the next high-level stage in the development of the internet.

7.4.5. National or International Organizational Accumulations Between Project Partners

Announcing that he will employ 10 thousand people across Europe for the construction of the Metaverse, Zuckerberg founded Facebook in 2004. He founded it and turned it into a company worth nearly a trillion dollars on the stock market. New types and areas of "economic opportunities" in the Metaverse are increasing day by day. Microsoft Chief Executive Satya Nadella and Tim Sweeney, president of computer game developer Epic Games

Sony Electronics executive Tyler Ishida is also working on developing tools, services or content for the metaverse from companies such as Microsoft, Nvidia and Unity Software. Metaverse's popularity has also been supported by NFTs. These are the fact that the metaverse has been popular lately and that there is development work in every field, that all tech companies want to be at the forefront of this next era's biggest acquisition platform.

FlickPlay was backed by investment from Muse Capital and Magma Partners in June 2020, bringing the company's total investment to $6.3 million. Lightspeed Ventures, Abstract VC, Long Journey VC, Warner co-founder Vivi Nevo and King co-founder Sebastian Knutsson joined with Metaverse influence.

7.4.6. Project Draft Timeline

The design and implementation period of the project is 12 months.

• Design phase

• Project pre-research process

• Project design software process

• Project presentation preparation process

• Project prototype construction process

7.4.7. Promotion Process

• Project promotion preparation process

• Project organization creation process

• Project sourcing process

• Project launch process

• Implementation Process

• 17 months.

7.4.8. The Sustainable Development Goals

The creativity, know-how, technology, and financial resources from all of society are necessary to achieve the SDGs in every context.

(SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity (Cuc & Vidovic, 2011).

Picture 10. The Sustainable Development Goals

When we review the basic principles of sustainable development goals, you can observe that my thesis is a more appropriate integrated study.

Picture 11. The Sustainable Development Goals

Each goal consists of specific goals measured by a series. The European Union contributes to the implementation of the objectives through a wide range of policies and actions at the EU level.

The relationship of my thesis project with sustainability, which has about 17 specific goals, ıt is an indicator of how people, production, consumption and waste control, natural resources, water, environment, health, education, technology and clean energy can be associated with the total factor productivity of the targets. Stable and continuous Creating an enabling environment for economic growth possibilities is possible with the use of technology and natural resources. Sustainable ın the effective realization of the Development Goals, development is fundamental (Chiras, 1998).

To draw attention to the role of the Metaverse in the private sector industry and technological development, which is one of the actors. Life is a sustainable cycle. With this study, the participation of

young people in the realization of the Sustainable Development Goals is important for the rights of future generations. 2030 Agenda, paragraph ın 53, “The future of humanity and our planet is ours and also the torch (Cuc & Vidovic, 2011).

It is said that it is in the hands of today's young generation, who will pass it on to future generations.

In the place of women in society in the UN Women's Empowerment Principles application booklet, he also states that companies have important responsibilities in order to be economically stronger. The most important task for large organizations and companies is one of their responsibilities. Women in all areas and at all levels of economic life. To encourage and contribute to the increase of its presence (Fletcher, 2008).

The gender equality perspective is not just about the economic situation of women.

Not only in terms of participation in processes but also in all communication processes, important to promote a gender-sensitive and anti-discrimination approach. Unnecessary and divisive communities such as gender, religion, language, and racism are doomed to disappear. We are all passengers in the same ship, we either sail together or sink this ship together, drown and perish.

Sustainable Development Goals ıt creates a roadmap for us to realize and fulfill our duties. By presenting the necessary framework and concrete steps in line with this presented framework tells. It is our duty to fulfill this responsibility.

8. CONCLUSIONS

A wide variety of wastes are also produced in the textile industry. Textile waste, which is classified as yarn production, weaving and post-consumption, consists of all kinds of fibers, yarns and fabrics originating from production. Consumption waste, on the other hand, has more variety. Recycling such a large amount of waste to the economy will be a great gain for the global world industry.

Many organizations, including the Textile Recycling Council (CTR), are working to raise awareness about textile waste and aim to have no textile waste in landfills by 2037. The main purpose of the studies is to establish a healthy and sustainable waste management system, to develop the R&D principles, objectives and targets determined at the national level and to establish policies for implementation.

It is necessary to raise awareness of consumers, save money, time, and energy, determine their needs, and purchase products in a planned manner. In addition to paying attention to the label and product content when purchasing products, they should be encouraged to prefer recyclable products and packaging. In addition to production, in terms of waste generation, sustainable consumption and environmental protection. Consumers should be conscious of purchasing products with the Recycle sign on them (Women's Empowerment Principles, 2017).

Informative education programs on waste should be prepared for consumers and their participation in practices that positively improve consumers' behavior towards recycled products should be supported. Authorized institutions should continue the collection, transportation and disposal processes of wastes in accordance with government policies. It is necessary to work with a sustainable approach that increases environmental awareness and spreads the environmental product strategy to society, together with non-governmental organizations working on the recycling of waste, which is one of the main causes of global climate change in schools.

It is not possible to prevent the formation of textile wastes that are produced and consumed so much. But minimization, ie waste, must be minimized and recycled. Some items discarded by Recovery or Reuse can be reused as raw materials. In recent years, the private sector has gained great importance with the broad framework of the use of recycled synthetic fibers and the investments and investments made for this purpose.

Textile waste evaluation, R&D and project development incentives should support technical textile, smart textile and environmental investments. Alternative and lower cost raw material sources should be created. The impact of waste on the environment will be reduced with the raw materials obtained by the correct evaluation of wastes, and natural resources will be used more effectively and efficiently thanks to recycling. With today's technology metaverse virtual reality, textile design should support consumers about what they should pay attention to before, during and after purchasing products.

We can raise awareness of young audiences by presenting the concepts of recycling and sustainability and game theory. Recycling waste usage strategies, which have a very important place in the economy and industry, should be shown as a course in universities in every field, but especially in the most used textile.

Textile industry companies should accept the priority in project and business management as a waste management project, and business management as a conditional condition. In addition to smart technological textiles, they should offer a separate social and state-supported support package to industry and companies for waste recycling studies. Textile-related industries with a significant amount of hazardous waste are of great concern.

We can create integrated waste management with the business model in which it turns into an investment. Metaverse will be environmentally friendly by raising awareness for textile products. It will highlight awareness of the environmental concerns of the challenges and issues related to the management of textile waste and enable us to develop methods to increase the usefulness of this resource.

As an extension of the real-world economy of ownership and creation, Metaverse will provide consumption awareness, waste control, and a space to express ourselves.

Metaverse has a significant impact on technological developments, trade, social and public life. Production, consumption and waste are in an endless life cycle. The biggest and only reality in virtual investment is the textile products used in every field, the never-ending consumption and the resulting increased waste. There will be endless and enormous economic gains in capital investment and recycling.

The main purpose of my thesis is to have a general knowledge of the Sustainable Development Goals, activities in this direction, awareness-raising, and therefore actions and activities related to total factor productivity. İs to develop feasible projects with planning. To act within the understanding of sustainable development, national and tech giants should play a role as key actors in the global development process.

Industrial companies, public and private sector representatives, it aims to encourage strong investors, universities, academics, think tanks and consultancy organizations that shape the business world and economy, to take a position as a useful role models in this process, with all content documents and to progress with merit.

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