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A Study on Waste Disposal Management in Textile Industry: A Case Study of Gul Ahmed

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ABSTRACT

The objective is to determine how the disposal of Waste, GSCP, and WR affected the company's productivity. The study used a correlational design to examine the relationships between variables. Furthermore, the study was descriptive, and data were acquired using various methods (qualitative and quantitative). In addition, the study's quantitative component was a questionnaire-based survey, and its qualitative component was a series of in-depth interviews with key individuals. A Likert scale questionnaire was used to gather the research's primary data, while the secondary data was gathered through reviewing previous articles. The data gathered was then measured using a statistical technique and the SPSS software. The study concluded that Waste and WR disposal is significant, but GSCP has an insignificant impact on the company's productivity. Furthermore, waste directly impacts human development, both socially and technologically. Waste management is distinct from resource recovery, which is concerned with lowering the pace at which natural resources are used. All waste materials, whether solid, liquid, gaseous, or radioactive, are included in WM. WM practices might differ across developed and emerging countries, urban and rural areas, industrial producers, and residential areas.

Keywords: *Waste, Recycling, Disposal of Waste, Green SC Practices, Productivity of the Company, Gul Ahmed*.

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1. Introduction

Gul Ahmed's tale is the story of textiles in the Indian subcontinent. In the early 1900s, the gang launches their textile business. With the founding of the company, now known by its current name, Gul Ahmed Textile Mills Ltd., the group joined the textile sector in 1953. Since its first public offering on the Karachi Stock Exchange in 1970, the company has maintained a dominant position in the textile sector. It has been recognized as one of the top businesses experiencing rapid growth. Gul Ahmed is a significant player in retail as the owner of Ideas by Gul Ahmed. Gul Ahmed was founded in Karachi and now has the largest network of more than 40 retail locations around the country, providing the most incredible selection of products from home furnishings to clothing. Gul Ahmed has remained a byword for excellence, creativity, and dependability for over 50 years. Gul Ahmed Textile, like other textile businesses, struggles with poor waste management, but this issue can be resolved with a little extra effort (Javed & Khan, 2014).

Waste is a direct result of human technical and social progress. Resource recovery, which aims to slow down the rate at which natural resources are consumed, is distinct from waste management. Trash management includes all types of waste, including radioactive, liquid, solid, and gaseous. There can be differences in waste management practices between developed and developing nations, urban and rural areas, industrial producers, and residential settings. Local government agencies frequently manage non-hazardous residential and institutional waste in urban areas. In contrast, the generator typically manages non-hazardous commercial and industrial waste under the supervision of local, national, or international authorities. (Kavitha & Manimekalai, 2014). Production processes create waste of clothes and woven; the second is employee working activities that make different types of waste. Because it is a textile industry, thousands of people work there. So, it is necessary to monitor or check the waste and its amount so it will be easy to identify the waste areas and waste-generating activities. Hundreds of new products are produced due to modernization and increased purchasing power. So, the waste is also increasing daily and is dumped; some amount is sold at a low price for other use, so this is alarming pollution and will cause a profound effect on humans and the environment. Moreover, the land space is reducing. So, in this scenario, it is necessary to develop or adopt better waste management practices (Aishwariya, 2018).

Solid trash is created by the manufacturing operations (Waste from the fabric store) and is dispatched when needed. Therefore these textiles come from outside and may be damaged or of lower quality than necessary. As a result of the intended inspection and audit procedure, these damaged textiles may be recognized early, allowing for prompt waste reduction. Fabrics in the cutting room produce cutting waste, marker use, roll excess etc. (Aishwariya, 2018). This is a vital manufacturing process that generates trash. Fabric pieces are given to the bundling room before they are sent to the manufacturing floor. A significant quantity of garbage may be produced in the bundling room. This is the primary source of garbage. The process states that the loader fills the manufacturing lines with fabric bundles. The required inspection occurs here, and the operators discover damaged fabric pieces. In the textile business, aqueous systems are used for fabric preparation stages such as de-sizing, bleaching, scouring, and mercerizing. The textile business consumes a significant quantity of water. Water baths are used to apply finishing chemicals and other compounds to textile substrates. Several contaminants are present in the water when it exits the system. In addition, malfunctioning valves, leaks, and poor aqueous system management may result in significant wastewater generation in the sector. The textile industry has pioneered many chemical processes. Chemicals are used on cloth for a variety of reasons. This produces hazardous chemical Waste, which must be controlled inside the industry (Aishwariya, 2018; Victory et al., 2022).

Waste has a direct social, technological, economic, and environmental impact on the human

world. It is critical to managing solid waste to maintain the environment and natural resources for future generations. Even in the best-case scenario, the treated wastewater's quality prevents it from being used in delicate operations like textile dyeing. Ultrafiltration water may be recycled to feed "minor" textile processes (rinsing and washing) in which salt is not a concern (Minke & Rott, 1999; Asif, 2022). To decrease the environmental effect, it is necessary to conduct research and studies as well as innovations. There are two significant ways to generate waste in the textile business. The first path is made up of all waste-producing operations, and the second path is made up of all waste-removing activities. Pollution can be reduced in three ways: (1) by utilizing new, less noxious technologies; (2) by successfully treating effluent to ensure that it complies with all disposal regulations; and (3) Waste can be recycled multiple times before being discharged, which is seen to be the most practical approach. (Sule & Bardhan, 1999; Uddin, 2022).

The amount of clothing dumped in the US has doubled over the last 20 years, going from 7 million to 14 million tons. According to data from the Environmental Protection Agency, seventeen million tons of textile waste, or 5.8% of all MSW generated in 2018, were dumped in landfills. The World Resources Institute estimates that 2,700 gallons of water are needed to produce one cotton shirt. Textiles can take up to 200 years to decompose in landfills. (see other breakdown times here). Furthermore, many individuals may be surprised to find that 84% of clothing is disposed of in landfills or incinerators (McQueen et al., 2021). Textiles are a long-established industry with a wide range of goods dating back to the start of human existence. Flat or rotating screens are used for most printing, and the wastewater contains some leftover paste after each printing session. Adding fresh stock allows it to be used for printing in comparable tones. Colour distribution on fabric may now be controlled electronically using screen-free printing processes, such as ink-jet printing and electrostatic printing. Methods of printing without the use of screens are appealing for reducing pollution (Lukanova & Ganchev, 2005). Another critical aspect of the problem is the waste produced by manufacturing and using textile goods. Although all textile and clothing waste may be recycled theoretically, only a tiny portion of it is for as long as the existing linear system is in operation.

The linear economy is a crucial notion in analyzing and comprehending the situation. Since the Industrial Revolution, linear economics has been the dominant production model. It generally works like this: "subtract the raw material from the source, turn it into a product, sell the product to the customer, who then disposes of the product after use." Consumer-disc, these dyes are either adsorbed or retained in bio-flocs under this paradigm, impacting streams' ecology. Thus they must be distant from wastewater before disposal. Chemical coagulation, air flotation, and adsorption techniques may all be used to remove colours from wastewater (Malik & Sanyal, 2004; Seshadri et al., 1994). Carded goods are discarded as waste, frequently in landfills or through incineration. Keeping this in view, this research study is based on the following questions:

Q1. To what extent does waste disposal effect the company's productivity?

Q2. To what extent do green supply chain practices effect the company's productivity?

Q3. To what extent does waste recycling effect the productivity of the company?

2. Literature Review

Research on green supply chain practices is being more concentrated nowadays because the world is moving towards a shortage of resources, and industrialists are looking for tools and techniques to produce goods with a reduction of wastage of material and good quality. This can opt-in many different ways. One of them is lean manufacturing; Toyota was the first company to implement Just-in-Time (JIT), a part of lean manufacturing, back in 1950. Worldwide, businesses have been more focused on improving the quality of products during the last few years (Bendul et al., 2017). Therefore, many businesses or industries are more focused on reducing other related costs such as inventory and purchase costs by making it possible to recycle the excess purchase or purchase the raw materials depending on the current demand of a particular product. An industrialist may have a massive budget to make their

products consistently available in the market and influence their customers towards their products, which is leading us to a shortage of resources in the entire world at a high pace (Aslam & Azhar, 2013). Now this shortage of resources has gained more attention towards green supply chain practices of industries around the world. Industrialists are now accountable for complying with all environmental practices and rules by their government, NGOs and customers (Agi & Nishant, 2017; Laari et al., 2017). There are many barriers to shape wastage, reducing the production lead time and efficiency. According to Magee et al. (2007), various types of wastes in the process can disrupt production and are as follows:

a. Excessive production: Producing more goods than demand for certain products can occupy a warehouse space and extra transportation costs.
b. Delays in raw material: waiting for the raw material to reach to manufacturing plant can be a waste of production time
c. Extra processed: Due to using of inappropriate procedure, which adds no value to the final product
d. Excess raw material: Each extra raw material is associated with each extra cost. For example, an extra raw material would need extra warehouse space, extra WIP inventory and extra transportation costs.
e. Faulty products: Defective products are always a waste, which cannot be used or sold to the customers
f. Unutilized creativity: Not utilizing employees' ideas is termed unused employee creativity (Katz-Buonincontro & Anderson, 2020).

To get consistent improvement in the production cycle, we need to keep all these wastage possibilities in mind before heading towards the production process, including purchasing raw materials. Continuous improvement (CI) can be termed as an Organized and systematic approach aiming to improve industry performance (Alam, 2022). The action plan which leads to continuous improvement is problem-solving for the increased lead of production before acquiring the raw material, and some other (CI) tools such as a diverse multitasking team, compliance with policy and a team evaluating the (CI) process. To implement a successful (CI), the story does not end just giving training to employees regarding the use of tools and procedures but creating a learning environment so that its learning culture does not end in the company just by adopting skills one at a time (Collins, 2002; Ayaz, 2022). Continuously learning new skills, tools, procedures, and applications can bring continuous improvement to the industry. Otherwise, various industries have lost their values and failed to survive due to a lack of knowledge of a current trend, just like Nokia, a leading cellular phone manufacturing company.

The world's population has exploded in recent decades, and the same period has seen significant changes in living ethics. According to Ute et al. (2019), these two advancements have boosted textile consumption, increasing textile output. Globally, manufacturing all garments and knit textiles totalled more than 110 million tons per year, resulting in a large volume of textile waste. We must apply the circular economy model to maintain sustainability and minimize environmental effects in the textile and apparel business. Textile waste must be recycled if a circular paradigm is to be adopted. This study offers a comprehensive analysis of textile waste management, focusing on ensuring sustainability and minimizing environmental effects (Ütebay et al., 2019). Textiles are an old industry that extends back to the start of human existence, with goods ranging from necessities to technical marvels. The clothing business includes all types of knitted, nonwoven and woven textile garments. According to research, manufacturing (textile) is one of the most polluting businesses in the world since both the production and processing of raw materials contribute to massive pollution. Another critical issue component is the waste generated by manufacturing and using textile items. Though theoretically, all waste in the textile and garment business can be managed, it seems that we will not be able to utilize resources efficiently and reduce pollution as long as the linear system now used in manufacturing is in place (Ütebay et al., 2019). If current global trends continue, the textile industry will account for a quarter of the global carbon budget by 2050—26 per cent, to be exact. If present trends continue, the textile and garment industry's raw material consumption will exceed 300 million tons by 2050, with 22 million tons of microplastic dumped into the seas (Ali, 2022).

Linear management is a vital notion for examining and comprehending the issue. Since Manufacturing Revolution, the linear economy has essentially worked: "Minus the raw material from the primary source, turn it into a product, and then sell the result to the customer. Under this paradigm, consumer waste is viewed as rubbish and is frequently burned or dumped in landfills. (Çay et al., 2020). The core of the linear economics approach is the consumption of raw materials required for manufacturing. The world's limited resources appear to prevent the current dominant economic paradigm from existing in its current form. Observing raw materials is not a practical option. Furthermore, linear economy-oriented production and business models become an environmental problem—the environmental component, the damages they create, and the waste that emerges from them are typically not recognized (Çay et al., 2020). The central gap between old and new research shows how to control waste. However, new research shows how there is an alternate use of waste from fabric, keeping waste materials in use, and regenerating natural systems by making undergarments, cloths to cleaning mirrors, chair and table covers etc. from fabric waste.

Multinational companies' competition and vital changes in the retail market have put much pressure on industries; high-paced competition has led to firms' centres of attention on customer satisfaction to survive in the long run (Amjad, 2022). In this speedy competition, textile industries have also set their foot in the race to search for opportunities to reduce costs and improve quality, despite having various challenges in the garment industry such as pricing, sourcing of raw material, delivery and service etc. However, the garment industry has numerous opportunities to succeed in this tough competition by implementing the lean concept. (Mercado, 2007). By using lean practices, the garment industry can opt for many benefits, such as cost reduction, production lead time, and good customer service by delivering quality products at the right time. Lean principles can help reduce the work in process time as other countries are also practising lean tools and observing a tremendous response (Bruce et al., 2004).

Research has been done on the relationship between lean practices and firm manufacturing performance Ferdousi and Ahmed (2009); Papadopoulou and Özbayrak (2005) have shown that lean techniques improve manufacturing. A Mexican business that manufactures world-class power and signal distribution equipment looked at its present production system and identified possibilities for improvement. Lean was applied to enhance the current performance of the organization. According to the research, applying lean resulted in a 34% reduction in inventory and 93.5 per cent uptime during 12 months. According to the study, flexibility is one of the secrets to developing quality in manufacturing. According to a 2002 Society of Production Engineers report, Novartis International AG's manufacturing process might use some improvement. They implemented a lean picking system to transport items from the warehouse to the packaging lines. This new material supply system is similar to a Kanban system. The company's waste decreased significantly as a result of this picking procedure.

2.1. Productivity

According to the article, waste directly affects productivity, material loss and the project's consummation season, bringing about a loss of a lot of income (Hunaid et al., 2022). Waste does not simply colossally affect our current circumstances; it can likewise adversely influence business. Suppose the textile sector generates too much trash. In that case, it will raise company costs and create an unconcerned appearance about sustainability and lowering carbon footprints (Nikmehr & Najafi-Ravadanegh, 2015). Other than the expenses for organizations discarding much waste, there are additionally ecological expenses to consider. Most waste is shipped off landfill destinations to be covered, and here it produces harmful landfill gas, contained basically methane, which adds to the nursery impact. Synthetic substances can likewise defile the dirt, harming plants and creatures, and they can get into neighbourhood lakes and waterways (Jenkins & Orth, 2004). One of the primary necessities of efficiency improvement is quantifying creation (of items and additional benefits), the human and actual assets utilized, and their connections. Without usefulness measures, we do not have the foggiest idea of where we are or how we could get to the next level. (Bernolak, 1991). While the fundamental standards of efficiency are similar at both the large scale and miniature levels, it is fundamental to acknowledge both in principle and practice that at the microeconomic level, a durable "family" of

usefulness estimates should be utilized in a casing work coordinated with productivity. This strategy gives practical solutions to the monetary inquiries that are important to the microeconomic players, which is, after all, the pith of financial aspects at the miniature level. The result of this measurement system is illustrated by numerous examples of lessons learned by company managers and corrective activities carried out because of the actions (Hunaid et al., 2022).

2.2. Disposal of Waste

Textiles are items made with ingredients and procedures that are safe for people and the environment, from the production of textile fibres to the final product's composition that can be disposed of without damaging human health or the environment. Incineration, decomposition, and recycling are all options for waste disposal. Textile wastes are categorized as either post-industrial (resulting from industrial processes) or post-consumer (resulting from consumer procedures). Post-industrial textile waste generated throughout the textile and garment production process includes cutting waste, quality rejections, and surplus fabrics. (Dissanayake et al., 2021). Post-industrial textile wastes produced throughout the textile and clothing manufacturing process include cutting waste, high-quality rejects, and surplus materials. (Dissanayake et al., 2021). Environmental programmers should focus first and foremost on waste management. It is necessary to design appropriate policy procedures with the cooperation of governmental and waste management/environmental authorities to dispose of, collect, and sort textile waste.

The textile industry is vital to our economy, contributing more than $2.5 trillion in global revenue and supporting more than 75 million employees. Between 2000 and 2014, clothing production increased, demonstrating that the sector witnessed a tremendous boom. People bought 60% more clothes in 2014 than in 2000, but they only kept them for half as long. Although the textile industry is expanding, a more significant focus is being placed on the sector's numerous detrimental environmental effects. The production of textiles is responsible for 10% of the world's CO2 emissions, water resource depletion, environmental damage, and pollution of streams and rivers. In addition, 85% of all textiles are thrown annually. Some clothing kinds discharge much plastic into the water when they are washed. The equivalent of a garbage truck full of garments being burned or dumped in a landfill happens every second. About 60% of all materials used in the textile industry are plastic. Each year, washing garments contribute 500,000 tons of microfibers to the ocean, the equivalent of 50 billion plastic bottles. The textile industry is responsible for 8–11% of all worldwide carbon emissions, more than all international flights and marine freight. If current trends continue, the textile industry might contribute 26% of the carbon budget by 2050. The textile sector uses 93 billion cubic meters of water annually, enough to supply five million people's needs and dramatically worsens water shortages in some areas. The clothing sector causes around 20% of worldwide industrial wastewater pollution. In just a few decades, the amount of clothing purchased per person in Pakistan has increased by 40%, thanks to lower prices and faster delivery of textiles to consumers. Clothing contributes between 2% and 10% of the environmental effects of fabric usage. (Swaby, 2020). The effect is commonly seen in third-world nations since most manufacturing occurs outside the country. Producing raw materials, spinning them into fibres, colouring and weaving clothing uses a lot of water and chemicals, including insect repellant in the case of cotton. Because of the water, power, and chemicals used in washing, tumble drying, and ironing, as well as the microplastics released into the environment, consumer consumption significantly negatively impacts the environment. Because techniques for recycling used clothing into virgin fibres are still developing, less than half of them are collected when they are no longer needed for reuse or recycling. Only 1% of them are recycled into new clothing. (Swaby, 2020). Along with changes in technology over the past few years, changes in the textile industry and many other industries have significantly impacted how bad environmental problems have become. The main effect of the textile industry on the environment is the release of large amounts of chemicals into the environment (Toprak & Anis, 2017b). High use of chemicals and water, energy use, pollution of the air, solid waste, and smells are all critical factors. The textile and garment industry's environmental problems begin with the pharmaceuticals used in natural fibre production and the pollutants released during synthetic fibre production. To treat the fibres and generate the final textile product, many procedures require hundreds of different chemicals, tons of water, and a large amount of energy (Toprak & Anis, 2017a).

2.3. Green SC Practices

Manufacturing facilities are believed to be the core reason for the negative environmental impact (Zhu et al., 2008). Accepting the method of green design and practices can help improve environmental friendliness in a manufacturing facility. It is also considered that green supply chain practices are one of the main reasons for creativity, building a brand image and business communication (Santolaria et al., 2011). Previously there have been studies regarding the implementation of green manufacturing, which mainly focuses on green technology, raw material and production time to reach the environmental friendly goal. A model has been used to build a bridge between vendor and firm to ensure green raw materials and components selection. A method has been used by Tsai et al. (2016) to select a green technology by costing over every activity and has also proposed that investing in green can help improve the environment, which brings value to the investment (Rashid et al., 2022). Combining green and lean manufacturing methods has decreased manufacturing costs by 10.8% (Laosirihongthong et al., 2013).

Remanufacturing is also one of the well-known green supply chain practices methods, which reuses the scrap raw material or used material to remanufacture it. This manufacturing is essential for the environment. It has the potential to reduce badly affecting factors of the environment. As per Atasu et al. (2008), remanufacturing is good in a competitive market, even though the un surety of a zero-life product's quality and quantity makes it difficult for remanufacturing for economic performance. Economic performance can be gained by optimizing the resources used in this process. This will increase the need to optimize the production plan, including the cost of reverse logistics, remanufactured inventory, and processing costs. Correll and Martinoli (2011) discussed that remanufacturing would lead companies to replace their suppliers, which are below average quality and reconditioned.

2.4. Waste Recycling

Recycling is sending material through a system that permits it to be reused. The collection, classification, and cleaning of waste products are all part of waste recycling. Waste recycling lowers energy consumption and saves raw resources by reducing the demand for new goods and consumables. Recovering used or other textiles from landfills for reuse or material recovery is known as textile reclamation. The foundation of the textile recycling industry is; intelligent, used clothing, fibre industries, and association of wiping materials all represent this group in the US. Key phrases in the recycling of textiles include donation, sorting, gathering, processing, and finally transporting used clothing, rags, and other recovered materials to end consumers. The textile industry is, of course, the foundation for developing a textile recycling business. Clothing, furniture and mattress material, draperies, linens, recreational equipment, various other products, and cleaning materials have grown nearly $1 trillion worldwide. The textile industry is, of course, the foundation for the developing textile recycling business. Clothing, together with furniture and mattress material, linens, cleaning supplies, leisure equipment, and a range of other things, has evolved into a roughly $1 trillion global industry. Recyclable textiles are becoming increasingly important, and this awareness is growing. Worldwide, an estimated 100 billion pieces of clothing are made each year. The US EPA estimates that in 2018, there were over 17 million tons of textile municipal solid waste (MSW), or 5.8% of all MSW produced. In 2013, 13.0 per cent of the textiles used to make clothing and footwear were recycled, while 15.8 per cent of the textiles used to make sheets and pillowcases were recovered. As a result, textile recycling is a critical concern that must be tackled as we work toward a zero-waste future.

Furthermore, many worldwide issues are causing significant worries in the waste management industry. Of course, the textile sector provides the cornerstone for the growing textile recycling business. Clothing, together with furniture and mattress material, leisure equipment, linens, draperies, cleaning supplies, and a range of other things, has evolved into a roughly $1 trillion global business. Furthermore, given China's ‘National Sword’ considerable disruption of traditional recycling operations, this issue has been cited as a top worry for our industry, underpinning and supporting theories and models (Sarkis & Dou, 2017). Theories of waste disposal management in materials address a more top-to-the-bottom record of the area and contain practical examinations of waste, the action upon

squander, and a comprehensive perspective on the objectives of garbage removal by the executives. Waste disposal management theory is founded on the expectation that squandering the board will forestall squandering, hurting human well-being and the climate (Fedorova et al., 2019).

2.4.1. Evolving theories of technology in waste disposal management

Constructing Waste Management Theory (WMT) is an effort to identify waste administration. WMT is a conceptual explanation of waste management that defines all waste-related concepts and proposes a waste management system. It is a work to put together the various factors of the waste administration framework the way things are today (Lee et al., 2022).

2.4.2. Defining waste – Analysis of the concept of waste management

Controlling trash disposal was the primary goal of regulations governing waste disposal. However, the secret to efficient waste management is waste minimization, particularly waste reduction at the source. Waste reduction is the primary goal of the Community Waste Strategy, according to Sixth Environment Action Program (Wilson, 2007). This dual objective of resource conservation and removal strategy brings about the absence of precise meanings of key terms. Suppositions wander strongly on the legitimate meaning of Waste (Zhang et al., 2022).

2.5. Empirical Review

According to Sushil (1990), the waste management hierarchy governs most waste management processes. Trash management may be broken down into a series of steps ranging from reducing waste to reusing to recycling to finally disposing of it. A hierarchical framework categorizes these waste management solutions depending on the most environmentally friendly way to dispose of rubbish. Recycling and reuse are favoured over landfill disposal because waste management is shown in a hierarchical form (Wilson et al., 2006). According to Phillips et al. (2002), waste accounting is essential in waste management since it expands the literature via its knowledge base. According to the literature, trash may be handled in various ways, with the most acceptable method being one that not only preserves the environment but is also cost-effective. This means that waste management is a deductible method for reducing Waste (Porter & Van-der-Linde, 1995). According to the literature, controlling waste formation during manufacturing leads to reduced or no waste to handle. As a result, the reduction is at the top of the waste management food chain (Price & Joseph, 2000). Input and output waste are two distinct sorts of waste; the term input waste refers to input that has not been extensively recorded in the literature, while output waste refers to output that has been documented. Because of this, waste is a byproduct of both the input and output systems, with input waste arising primarily in the service industry (Singh, 2017). This input waste introduces the new waste management paradigm in the company. The research adds to the notion of input waste by using TISM to construct a hierarchical link between waste management components. TISM is frequently used in the management and technical domains to model conceptual frameworks (Bala et al., 2020; Kademani et al., 2013; Srivastava, 2013). The paper aims to identify essential waste management components and construct a model that depicts the hierarchical connection between them. Based on the literature the figure 1 illustrates a research framework and the following research hypotheses will be empirically tested:

H1: The productivity of the organization is significantly impacted by disposal of waste.

H2: The productivity of the organization is significantly impacted by green SC practices.

H3: The productivity of the organization is significantly impacted by waste recycling.

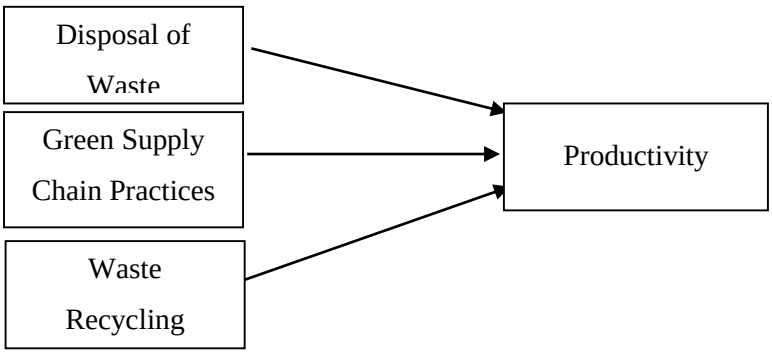

Figure 1: A research framework

3. Research Methods

This study aims to ascertain the connection between the textile industry's productivity and the effects of waste disposal. This study was produced by combining research, synthesis, and analysis. Secondary and primary data sources were anticipated to address the study topics. The topic will centre on the industry's view on trash disposal, critical waste management problems, and other essential queries regarding the operations and culture of the sector. In order to help the respondent better understand the idea of waste disposal, the survey requires a lot more research and explanation. A semi-structured interview was conducted to understand the relationship between the various components indicated in the concept. This study aims to ascertain the relationship between industrial production and trash disposal. This study was created by a mix of investigation, synthesis, and analysis. The study is explanatory since we will measure trash's effect on Gul Ahmed Textile (Hashmi et al., 2021a; b).

Explanatory research. In order to answer the study questions, the research endeavour anticipated using both secondary and primary sources of information (Hashmi et al., 2020a; b**).** The inquiry will focus on the company's perspective on trash disposal, the key obstacles of waste recycling management, and other pertinent topics about the industry's output. In order to help the respondent better understand the idea of waste disposal, the survey requires a lot more research and explanation. In a study that explains something, a semi-structured interview is performed to understand the relationship between the various elements discussed in the concept. Our study aims to increase public knowledge about solid waste management. All solid wastes produced by human and animal activities discarded as useless or undesirable are considered solid waste. (Peavy et al., 1985; Muzammil, 2022). Inadequate solid waste disposal may result in unsanitary circumstances, which can cause environmental contamination and outbreaks of vector-borne disease. Increasing population, a thriving economy, expanding urbanization, and rising communal living standards significantly impacted. It is increasing the development of municipal solid garbage in emerging nations (Minghua et al., 2009; Basit, 2022). Some garbage may be valuable to someone in its current condition or after it has been converted. The term "trash" has become increasingly popular in recent years. The overall state of the environment will improve if waste is properly managed. Trash management refers to the activities and procedures required to manage waste from its conception to its ultimate disposal. This includes waste collection, treatment, disposal, transportation, monitoring, and control. In addition, it contains a legal and regulatory framework for waste management and recycling rules. Even a few decades ago, environmental deterioration due to unplanned trash dumping and improper waste management in urban areas was not a significant worry in developing nations like Bangladesh (Bhuiyan, 2010). However, environmentalists consider scientific waste management a vital issue in urban planning in emerging countries because of the growing urban population. The research will be qualitative as we find results through the internet and interviews with a group of people related to the research knowledge.

3.1. Sampling Design

The sampling design allows us to survey with a smaller sample size than all eligible

respondents. Because of the following factors, sample design is critical: It is challenging to conduct a poll that includes all eligible respondents/households. With the time spent on the survey, gathering data from every group member when performing research is rare. Instead, pick a sample. The sample size is the number of persons participating in the study. It must carefully evaluate how it will choose a sample typical of the whole group if it wants to make correct conclusions from the data. The study was descriptive, and data was gathered using various methods (qualitative and quantitative). A questionnaire-based survey served as the quantitative component of the study, while in-depth interviews with key informants served as the qualitative component. The researchers used a cross-sectional strategy that combined systematic and purposeful selection processes to choose the study area and respondents. The questionnaire's household and demographic characteristics portions were adapted from a conventional questionnaire, while the authors created the remaining components based on the study's objectives and a literature review. Each of them has its sample design function. The researcher's position and priorities will influence the sampling approach selected. Occasionally, non-probability sampling techniques such as convenience sampling will be utilized (Alrazehi et al., 2021; Das et al., 2021; Haque et al., 2021; Agha et al., 2021; Hashmi & Mohd, 2020).

3.1.1. Target population

Gul Ahmed textile mills are the primary focus of this study. Gul Ahmed Group started selling textiles in the initial twentieth century. When the group decided to pursue a career in industry, they created Gul Ahmed Textile Mills Limited, a privately held firm, in 1953. A publicly traded Pakistani textile company, Gul Ahmed Textile Mills Limited, produces and sells various textile goods. In 1972, it was listed on the PSX. The firm has developed fast since then and is now one of the world's top composite textile companies.

3.1.2. Sample size

From whom we may create output, the Gul Ahmed textile mills employees are the sample from which we will conduct our surveys using questionnaires and other methods. The company manufactures, sells, and distributes a wide range of textile products, including home textiles (bed linen, curtains, towels, kitchen and bath yarn, accessories, woven fabrics such as lawn, custom-made garments for women, men, and children, and fashion accessories like handbags and shoes). It is the major exporter of home textiles in Pakistan, including bed linen, curtains, and fabric. Nevertheless, our target employees are from the waste, disposal and recycling management department. Therefore, 30 respondents will constitute a sample for this study (Rashid et al., 2021).

3.1.3. Sampling technique

A sampling technique is a label or other indication of the precise process by which the sample entities were chosen. And simple random sampling, a type of probability sampling in which participants are selected at random from a population, is the sampling technique we use in our study (Khan et al., 2021; Rashid et al., 2021)

3.2. Instrument of Data Collection

Our study's primary data is collected using a Likert scale questionnaire. The questions are based on our hypothesis, which proposes the relation of our independent variables to our dependent variables. While our secondary is collected from reviewing previous articles. The primary data collected will then measure using a statistical technique using SPSS software.

3.3. Reliability and Validity of Instrument

A regression model assesses a dependent variable's link to many independent factors. The regression model determines the relationship and significance level between each independent variable and the dependent variable. Additionally, a correlation model will be employed to determine the effects

of each independent variable's relationship to the dependent variable (Rashid & Rasheed, 2022).

3.4. Procedure of Data Collection

According to this heading, we use the qualitative method in Gul Ahmed textiles to get the data by making a questionnaire, as it is the most effective technique to measure responses from the respondents. The research data is qualitative, and the instruments used are pre-defined. For sampling, we use a random sampling technique by involving specific departments in our selected company. From the supply chain department, we use the manager. We use the head of the supply chain department to understand historical events of wastages and production deficiency, past performance, and work strategies and then analyze to study and propose a solution.

3.5. Statistical Techniques

The statistical analysis gives meaning to the meaningless numbers, bringing life to the dead. To ensure data accuracy, researchers must choose the correct query sample size. A questionnaire must be 500 to 1000, depending on the company and department size. Our research uses a sample size of 50-75 respondents.

4. Data Analysis and Findings

This is the fourth chapter of the thesis, and it has substantial importance regarding statistical analysis and hypothesis testing approach. This chapter provides the demographic profile of the respondents, followed by validation of the model, including descriptive statistics of the variables based on mean, standard deviation and Skewness/Kurtosis statistics for the normality test. Later, the chapter provides reliability analysis using Cronbach's alpha to estimate the variables' internal consistency. Furthermore, this section has discussed model summary and ANOVA statistics for model fitness estimations, while this chapter has finally employed multiple linear regression analysis for hypothesis testing. The last section of the chapter provides a hypothesis-testing summary.

4.1. Demographic Profiles

Table 1 displays the demographic analysis of 30 respondents. Regarding the demographics, the study has collected data from 30 respondents. Of these, 28 (93.3%) were male, and 2 (6.7%) were female. Also, 11 (36.7 %) were between the age bracket of 20-30, 14 (46.7%) were between the age bracket of 31-40, 4 (13.3%) were between the age bracket of 41-50, and 1 (3.3 %) were between the age bracket of 51-60. Moreover, 6 (20%) participants were intermediate, 19 (63.3%) were graduate, 5 (16.7%) were post graduate. Additionally, 9 (30%) have work experience between 0-5 years, 10 (33.3%) have experience of 6-10 years, 4 (13.3%) have experience of 11-15 years, and 7 (23.3%) have experience of 16 years and more (Rashid et al., 2020).

Table 1: Respondents' profile (n = 30)

		Frequency	Per cent
Gender	Male	28	93.3
	Female	2	6.7
Age	20-30 years	11	36.7
	31-40 years	14	46.7
	41-50 years	4	13.3
	51-60 years	1	3.3
Level of Education	Intermediate	6	20.0
	Graduate	19	63.3
	Postgraduate	5	16.7
Working Experience	0-5 years	9	30.0
	6-10 years	10	33.3
	11-15 years	4	13.3
	16 years and above	7	23.3

The variables' descriptive statistics are displayed in table 2 below. As seen in the table, there were 30 responses with the mean value of 3.860 and the standard deviation of 0.458 for waste disposal, 30 responses with the mean value of 3.720 and the standard deviation of 0.636 for green SC practices, 30 responses with the mean value of 3.153 and the standard deviation of 1.043 for waste recycling, and 30 responses with the mean value of 3.633 and the standard deviation of 0.691 for company productivity. Additionally, all variables have Skewness and Kurtosis coefficients between 2 and 7, respectively, which is considered acceptable (Mishra et al., 2019); therefore, data is usually distributed.

Table 2: Descriptive statistics

	N	Mean	S. D.	Skewness	Kurtosis
Disposal of Waste	30	3.860	0.458	0.304	-1.563
Green SC Practices	30	3.720	0.636	0.310	-1.060
Waste Recycling	30	3.153	1.043	-0.751	0.628
Productivity of the Company	30	3.633	0.691	0.064	0.436

Table 3 shows the reliability analysis result for estimating the variables' internal consistency (Khan et al., 2022a). Hashmi et al. (2021a); and Khan et al. (2022b; c) suggested that the alpha coefficient should be higher than 0.70 (70 per cent) for acceptable internal consistency of the variable. The above table shows that waste disposal has 74.3 per cent internal consistency, green SC practices have 75.1 per cent internal consistency, waste recycling has 94.9 per cent internal consistency, and the company's productivity has 78 per cent internal consistency. Therefore, all variables have achieved substantial internal consistency for data analysis.

Table 3: Reliability analysis using Cronbach's alpha

Variable Name	N Items	Cronbach's Alpha
Disposal of Waste	5	0.743
Green SC Practices	5	0.751
Waste Recycling	5	0.949
Productivity of the Company	5	0.780

The regression analysis's model summary is displayed in table 4 below. The above table shows that the company's productivity has been predicted up to 93.3 per cent by all the exogenous variables in the model. Therefore, model fitness has been validated based on R-Square statistics (Hair et al., 2018).

Table 4: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.966	0.933	0.925	0.189

a. Predictors: (Constant), Waste Recycling, Disposal of Waste, Green SC Practices

The following table 5 shows the ANOVA statistics of the regression model. The above table has shown that F-Statistics was estimated 120.916 and found statistically significant at 5 per cent; therefore, ANOVA has manifested that model fitness has been achieved for regression analysis (Hair et al., 2018).

Table 5: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.921	3	4.307	120.916	0.000
	Residual	0.926	26	0.036		
	Total	13.847	29			

a. Dependent Variable: Productivity of the Company

b. Predictors: (Constant), Waste Recycling, Disposal of Waste, Green SC Practices

4.2. Hypothesis Testing

The study used regression analysis for hypothesis testing because the model has one outcome variable and more than one predictor (Ramli et al., 2018). The following table 6 shows the result of regression analysis for hypothesis-testing. The above table shows that waste disposal has a beta value of 0.396 and a probability level below 5 per cent with a VIF coefficient below recommended 5 (Rashid, 2016); therefore, hypothesis-1 has been accepted/supported, and there is no evidence of multicollinearity with other predictors. Moreover, green SC practices have a beta value of 0.037 and a probability level above 5 per cent with a VIF coefficient below recommended 5 (Rashid & Amirah, 2017); therefore, hypothesis-2 has been rejected/not supported, and there is no evidence of multicollinearity with other predictors. Lastly, waste recycling has a beta value of 0.604 and a probability level below 5 per cent with a VIF coefficient below recommended 5 (Rashid et al., 2019); therefore, hypothesis-3 has been accepted/supported, and there is no evidence of multicollinearity with other predictors.

Table 6: Multiple regression analysis

	Beta	S. E.	t-Stats	Sig.	VIF	Decision
(Constant)	0.061	0.346	0.176	0.862		
Disposal of Waste	0.396	0.078	5.106	0.000	1.029	Supported
Green SC Practices	0.037	0.078	0.475	0.638	1.987	Not Supported
Waste Recycling	0.604	0.047	12.821	0.000	1.970	Supported

Dependent Variable: Productivity of the Company

5. Conclusion

The study aimed to ascertain how waste disposal, GSCP, and WR impacted the company's production. The research effort anticipated using secondary and primary data sources to address its research questions. The study also measured the impact of waste on a company's productivity using explanatory research, and the study employed qualitative research to find results and conducted interviews with a group of individuals who had information related to the research. The study used a correlational design to examine the relationships between variables. Furthermore, the study was descriptive, and data were acquired using various methods (qualitative and quantitative).

Also, the study's quantitative component was a questionnaire-based survey, and its qualitative component was a series of in-depth interviews with key individuals. In order to choose the study area and respondents, the researchers employed a cross-sectional strategy incorporating systematic and purposeful selection methods. A Likert scale questionnaire was used to gather the research's primary data, while the secondary data was gathered through reviewing previous articles. The data gathered was then measured using a statistical technique and the SPSS software. Additionally, a random sample of participants was taken from the study's population using the simple random sampling technique. A regression model was used to analyze the connection between a dependent variable and numerous independent factors. The study concluded that Waste and WR disposal is significant, but GSCP has an insignificant impact on the company's productivity. Furthermore, human development is directly

impacted by garbage, both socially and technologically. Resource recovery is different from waste management, which is concerned with lowering the pace at which natural resources are used WM encompasses all waste products, whether they are solid, liquid, gaseous, or radioactive. WM practices might differ across developed and emerging countries, urban and rural areas, industrial producers, and residential areas.

5.1 Discussions

5.1.1. disposal of waste and productivity of the company

The study found a significant relationship between waste disposal and the company's productivity. This result is also supported by Jimenez et al. (2019). They concluded that companies are satisfied with developing a system for eliminating waste, i.e. increasing recycling can save disposal costs and increase profits. Tracking waste management activities on a single platform and utilizing a set of uniform indicators makes sharing information with stakeholders and boosting business productivity simpler. WM is a crucial component of essential urban services and an environmental health service. Companies may increase productivity and sustainability by managing waste, water, and energy more effectively. Improving an organization's sustainability may enhance its image, attract desirable tenants to its facilities, and increase employee engagement (Baloch & Rashid, 2022; Shaheen, 2022). Also, Ushakov et al. (2021) indicated the same result and concluded that waste management is crucial for a company's profitability. In order to obtain the benefits of downstream waste reduction and the strength of incentives for upstream and downstream innovation, a company may be able to charge more for its product if it can lower the cost that its customers must bear. This will increase the resource productivity of the company.

5.1.2. Green SC practices and productivity of the company

The study also identified an insignificant effect of GSCP and company productivity. This outcome is also in line with Zhu et al. (2011) and showed that most firms across a wide range of industries could categorically state that GSCP is considered an environmental innovation. Firms must adopt GP to increase productivity since they improve environmental performance via decreased pollution and create economic gains through reduced energy and resource use. Similarly, Pinto (2020) found that each firm must effectively measure performance to manage its operations, activities, and SCM. The financial advantages for firms with environmental management plans are not assured. This can result from the significant financial resources required to fund such initiatives. Due to a shortage of resources, firms must view GP as an expense rather than a means of firm development. In order to increase productivity, companies must have the resources to invest in green policies. Agyabeng-Mensah et al. (2020) also indicated that GSCPs produce eco-friendly products and services that satisfy customer needs and promote financial success and operational excellence. Integrating green practices throughout the whole SC is essential if a company wants to increase the performance and competitiveness of its supply networks. The GSC collaboration is essential to increasing a company's productivity since it is linked to better quality, delivery, and flexibility and forms the standard dimensions of manufacturing performance (Anwar, 2022).

5.1.3. Waste recycling and productivity of the company

The study also analyzed that WR significantly affects a company's productivity. This result is also with Alhamdi et al. (2019) and revealed that reducing waste improves production and quality while lowering costs and speeding up customer deliveries. This effect results from the company's goal to promote flexible systems that deal with waste recycling and environmentally friendly products to help decrease waste. Also, Nyemba et al. (2018) indicated the same result and stated that recycling also benefits the company financially and environmentally. Using recycled materials will cost the company significantly less than producing new materials from the beginning. Consequently, firms may reduce their costs by using recycled materials. The savings achieved when recycling is widely implemented can be very significant. Therefore, companies may increase their productivity by adopting WR.

Likewise, Kowalski and Makara (2021) identified that reducing, reusing, and recycling also helps to reduce the company's environmental effects. It will be necessary to divert waste from landfills and toward more ecologically friendly solutions to manage waste sustainably. Furthermore, minimizing environmental effects through sustainable WR may improve a company's reputation and image with customers, employees, and external stakeholders. It can also provide a competitive edge while seeking business opportunities (Rasheed, 2022).

5.2. Implications

This study has provided several managerial implications. Firstly, GSC practices affect a company's productivity. Managers must increase consumer awareness of environmentally friendly operations, product design, and organizational practices to attract consumers to buy products from companies that care about the environment. As a result, businesses will adopt GSC techniques to flourish in cutthroat marketplaces and boost production. Additionally, coordination and integration must be maintained for businesses to benefit fully from GSCM processes. Additionally, senior management's support can make it simpler and more successful for firms to apply GSC techniques and increase productivity. Managers should also implement green practices into their supply chain to meet financial and business objectives. This encourages firms to adopt the GSCP to constantly improve their operations' environmental friendliness, reduce risks to people and the environment, and enhance their goods and services, all of which will raise their productivity.

Likewise, GSCP adoption promotes environmental safety in firms, reducing environmental accidents and saving them money on medical costs. As a result, firms can direct their resources toward projects that will increase their productivity. Managers need to be encouraged to keep implementing the GSCP to fulfil the environmental needs of customers on the global market, grow market shares and sales, and ultimately improve profit margins and earnings per share. Second, waste recycling also affects a company's productivity. The firm's manager should be interested in waste management, and any actions to execute the policy should be widely published so that all employees know their commitment. Further, environmental education and stricter enforcement of sanitation bye-laws should be combined with the encouragement of WM cooperation. Therefore, managers should provide environmental education that raises awareness of the environment and alerts individuals to environmental problems. The firm's manager should also make stricter policies and enforce them since it is necessary to stop individuals from dumping carelessly.

Moreover, a firm may benefit significantly from green initiatives focused on sustainability-related to industrial products sold through retailers. Recycling for a firm is easier when products are given to consumers or returned to them by retailers. The firm's manager should provide information on product sales to support the success of loyalty programs by enticing current customers to exchange their old products for new ones. The company's manager also tries to limit waste, cut expenses, and utilize resources effectively through green initiatives. The management of such projects aims to make all people aware of the demands of the environment and urge them to contribute to sustainability by encouraging them to use products or services. It encourages marketing to persuade consumers to be careful of the items they consume. Lastly, waste disposal has an impact on a company's productivity. Increasing the workforce's contribution to waste disposal, recycling, segregation, and garbage collection is essential. The firm's manager should give the employees proper training, a morale program, extra benefits, and incentives that will encourage them to increase the company's productivity. Strong regulatory measures must also be made to implement the specified policy properly. The firm's manager should create strict laws and regulations that will offer practical ways of influencing the general public to behave sustainably. Such a law should forbid the use of plastics and increase the cost of grocery bags, polythene, and plastic materials, including alternatives to polythene and plastics, permitting households and companies to offer incentives for those who reduce the quantity of waste and create sustainable solutions for waste disposal. The management of the company should also regularly run awareness campaigns. Such campaigns should educate people about waste segregation, reduction at source, environmental protection and public health responsibilities.

5.3. Limitations

The current study's limitations limited the findings' generalizability and applicability. Firstly, the limited sample size did not represent conclusive results. Second, because the study was limited to textile firms, its conclusions might not be generalizable. Furthermore, while adequate measures were taken to prevent or reduce common method bias, the study's conclusions might still be affected. The textile mills in Karachi, Pakistan, were also the subject of this study. Additionally, the current study solely included data from manufacturers of textile mills and used a correlational design for hypothesis testing. Also, the generalizability of this study may be limited because it was restricted to Karachi, Pakistan. Importantly, this research was conducted on a tiny scale due to a lack of time. The study, however, ignored the comprehensive viewpoint and in-depth perspective of the phenomenon because it was purely quantitative. Furthermore, the thorough literature review demonstrated that the research model only included a small number of the framework's factors and that the model might be improved by integrating a few more significant variables. Lastly, the sampling method for this study was an online questionnaire survey, which could have biased the results. The complete research model developed in this study needs more empirical validation.

5.4. Recommendations

Several future recommendations are included in the paper. Firstly, by increasing the sample size, more studies can make a more significant contribution. To make this research's contribution more comprehensive and applicable to a broader range, other industries can be investigated. Moreover, future research may examine how the GSCP affects other performance metrics, such as environmental and social performance, to test the model in various economies. Also, a change in the pattern of producing and distributing green products may arise from future research that demands more resources to implement GSCP reasonably. In the future, this research may be conducted in any developing country except Karachi, Pakistan. Likewise, the influence of several other factors on the manufacturing industry's productivity may be studied in the future. Future research may also minimize common method bias by collecting data using observational analysis and qualitative techniques. Future studies might select samples using different sampling techniques. Lastly, similar studies might be carried out using various other research approaches, methodologies, and techniques, together with a different theoretical background.

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Appendix-A: Questionnaire

Part 1 –Demographic Profile

a) Gender

Male Female

b) Age

20-30 Years 31-40 Years

41-50 Years 51-60 Years

c) Level of Education

Matric Intermediate

Graduate Postgraduate

d) Experience in Dairy Sector

0-5 Years 6-10 Years

11-15 years 16 Years and above

Part 2 –Please rate strongly agrees or strongly disagrees on the basis of options mentioned below of the dependent and independent variables related to waste disposal management in Gul Ahmed Textile industry by placing a checkmark in the suitable box.

1) Strongly disagree
2) Disagree
3) Neutral
4) Agree
5) Strongly agree

Title	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1) Disposal of Waste					
1.1) The innovation in the production process in the textile industries has an impact on waste disposal.					
1.2) Most issues that arise in the production in the textile industries could be minimized if the disposal of waste is managed properly.					
1.3) The disposal of waste is a major issue currently affecting the production process in the textile sector.					
1.4) Recycle and reuse practices of waste in textile industries could be the solution to reduce pollution in the environment.					
1.5) Waste recycling has an essential role in the productivity of the company.					
2) Green Supply Chain Practices					
2.1) The green environmental management in the textile industry will be affected by competitor's green environmental protection strategy.					
2.2) The government requires textile industries to use the green supply chain management practices to reduce the pollution.					
2.3) Textile industries can use solar energy system to contribute in green environment. Less usage of fuel can reduce pollution of environment.					
2.4) The use of organic fiber in textile helps to create a green and sustainable environment.					
2.5) The practice of green supply chain management significantly influences the competitiveness of business in the textile industry.					
3) Waste Recycling					
3.1) Company can save their cost of production by recycling the waste generated in cutting of fabrics.					
3.2) Quality of recycled garment products is as good as the original ones.					
3.3) Waste Recycling saves the time & cost of re-ordering the new material from suppliers.					

3.4) Waste recycling makes a major positive and healthy impact on the company's profitability.
3.5) Waste management system includes the processes and actions required to manage waste from its inception to it's the processes.
4) Productivity of the Company
4.1) Reduce timeline in textile industries can enhance the productivity of the company.
4.2) Waste recycling management system has an positive impact on the productivity.
4.3) Increase in productivity also enables reduction in prices.
4.4) More productivity ensures good quality of the final products.
4.5) Benefit of higher productivity ensures stability of the company.