NITIE – Genpact Crate Assessment Matrix

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Introduction

Across several industries, plastic crates are frequently used for the storage, shipping, and transportation of goods. Depending on their intended purpose, plastic crates require different handling procedures, although they typically involve routine cleaning, damage inspection, sorting, stacking, and transportation/storage. When they are no longer needed, plastic crates should be recycled or properly disposed of because they are made to be sturdy and reusable. Safe handling practices should prioritize cleanliness and durability to ensure that plastic crates are effective and long-lasting.

Plastic crates vs other packaging containers

Plastic crates are widely used in various industries for packaging and transporting goods. They offer several advantages over other packaging containers, including durability, lightweight, and ease of cleaning. However, their use should be evaluated in comparison to other packaging containers to determine their appropriateness in respective context.

Here are some factors to consider when comparing plastic crates to other packaging containers:

Cost: Plastic crates are generally less expensive than other packaging containers such as metal, wood, or cardboard. They are also reusable and can withstand multiple uses, making them cost-effective in the long run.

Some cost statistics:

How does price of Plastic Crates vary on Brand?

Price range of Plastic Crates according to Brand in India [1]

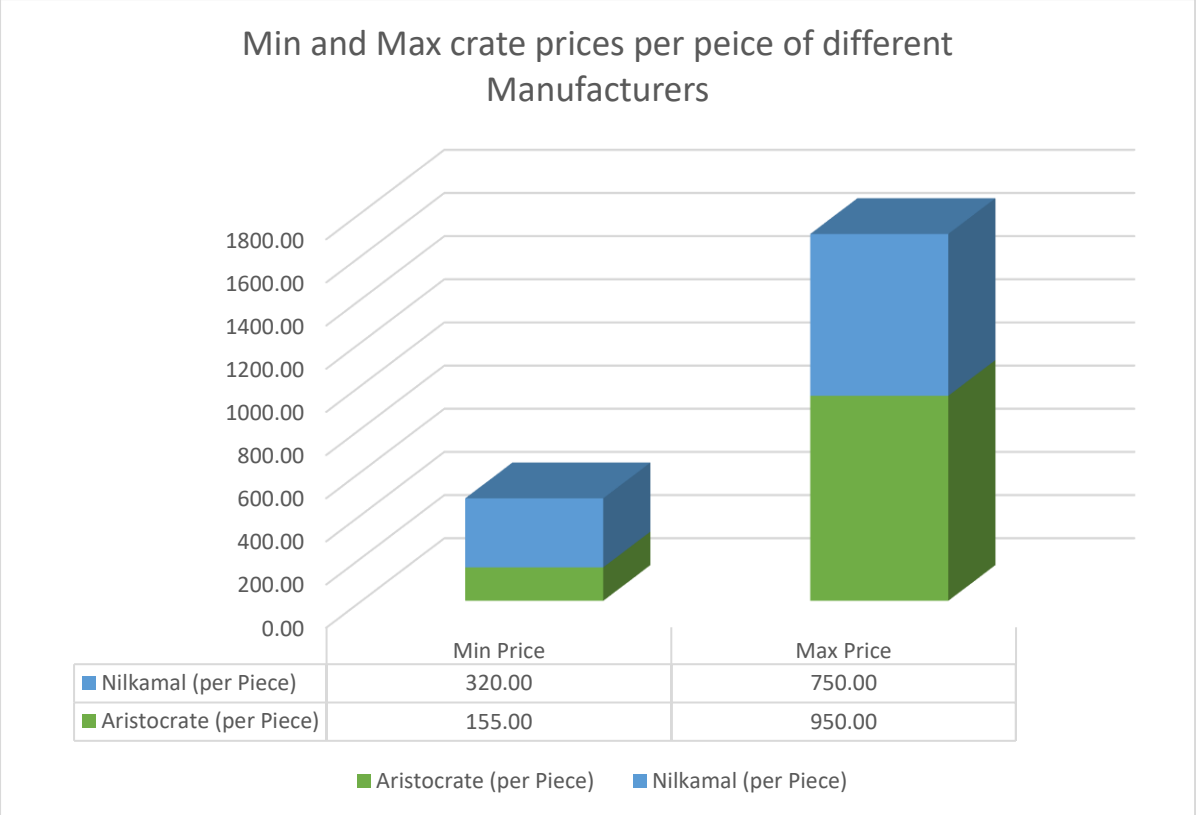
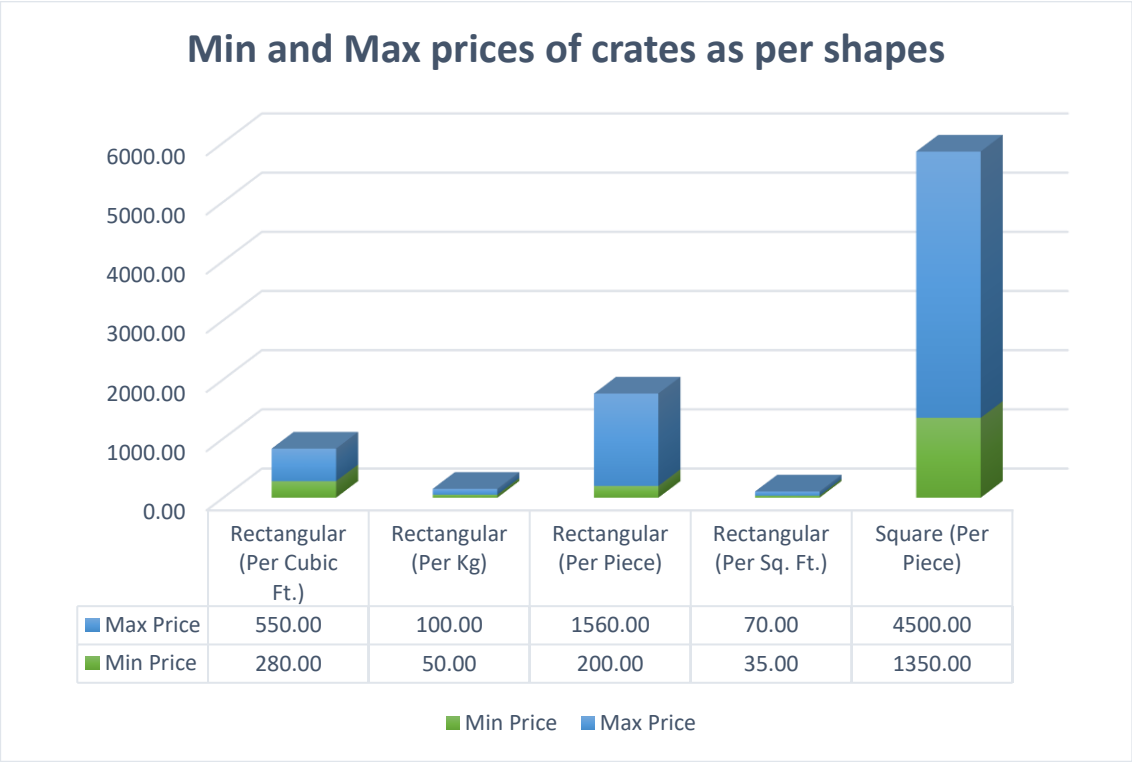


Figure 1: Crate price per piece by different Manufacturers (All prices in INR)

How does price of Wooden Crates vary on Shape?

Price range of Wooden Crates according to Shape in India [2]



	Rectangular (Per Cubic Ft.)	Rectangular (Per Kg)	Rectangular (Per Piece)	Rectangular (Per Sq. Ft.)	Square (Per Piece)
Max Price	550.00	100.00	1560.00	70.00	4500.00
Min Price	280.00	50.00	200.00	35.00	1350.00

Figure 2: Crate prices as per different shapes and qty. units (All prices in INR).

Durability: Plastic crates are sturdy and can withstand harsh handling and transport conditions. They are resistant to impact, water, and chemicals, making them ideal for transporting fragile or hazardous materials.

Environmental impact: Plastic crates are made from petroleum-based materials, which are not biodegradable and can have a negative impact on the environment. Other packaging containers such as wood, paper, or cardboard are more environmentally friendly as they are biodegradable and can be recycled.

Furthermore, as per data from an LCA conducted in Canada, replacing all plastic packages with the non-plastic packages:

1. Would require almost 4.4 times more packaging material by weight.
2. Would increase energy usage by 2 times.
3. Would result in increase of global warming potential by 2.3 times.

(Source: [3])

Storage space: Plastic crates can be stacked easily, saving space in storage and transportation. They can also be nested when empty, reducing the volume of storage required [4].

Hygiene: Plastic crates are easy to clean and sanitize, making them suitable for use in industries where hygiene is essential, such as food or medical industries. They are also resistant to bacteria and can withstand high temperatures during washing [5].

Overall, plastic crates are a popular packaging container in many industries due to their low cost, durability, and ease of cleaning. However, the choice of packaging container should consider the specific requirements of the industry, such as environmental impact, storage space, and hygiene.

Some statements from industry leaders regarding Plastic Crates

"The future of the supply chain depends on a shift towards more sustainable solutions, and plastic crates play an important role in this transition. By choosing reusable and recyclable options, we can reduce our impact on the environment while improving our bottom line."

- Steve Hoppes, VP of Sales and Marketing at Orbis Corporation.

"As an industry, we need to work together to ensure the continued growth and sustainability of the plastic crate supply chain. This means investing in innovative technologies and practices that reduce waste and increase efficiency."

- Jim Walsh, CEO of Tosca

Current industry problems in absence of proper crate need assessment

Challenging to determine the quality of recycled plastic crates: It is difficult to assess whether the quality of recycled plastic crates is suitable for use in absence of an assessment matrix or process. This further leads to the conundrum on whether to reuse or discard the set of crates in hand.

Inconsistency in quality of recycled plastic crates: The quality of recycled plastic crate is expected to vary significantly in absence of any assessment matrix that can capture the usage pattern. This can lead to variability in the performance and operational efficiency of crates usage.

Safety risks associated with plastic crate usage: The quality of plastic crates being used for transportation or storage can increase a safety risk in the operation. For example, loading a plastic crate beyond its load carrying capacity (which may have been reduced due to repeated usage) can lead to damage to goods as well as harm the workers.

Cost implications: The usage of plastic crates can be associated with increased cost of handling in absence of an assessment matrix. For example, if a company decides to discard a large chunk of its crate inventory without requisite assessment, it incurs unnecessary costs in the operations.

Environmental impact: A company's perception as well as reputation might be at risk in case they continue to encourage the usage of plastic crates which have negative environmental impact. The assessment matrix can help improve the sustainability of operations by identifying the underlying hazard.

Proposed Solution

A 2x2 matrix has been envisioned by a team of researchers at NITIE and Genpact to depict the types of plastic crates and their usage for respective industries based on the inventory turns (high or low) and the supply chain model (closed or open loop). Named as "NITIE – Genpact Crate Assessment Matrix", this tool will help the industries in assessing more accurately as in which type of plastic crates will be the most appropriate and cost-beneficial for a specific industry. The solution has been shared in the following sections.

General Description

A 2x2 matrix for Inventory Turns vs Supply Chain Model for concerned industry can be used to show the types of plastic crates and their current usage for respective industries based on the **Inventory Turns (high or low)** and the **Supply Chain Model (closed or open loop)**. The four quadrants can be analysed to understand the factors that influence the usage of plastic crates in various industries.

Crate Assessment Matrix

HIGH INVENTORY TURN	Reusable Crates (E.g., **Cold-Drinks, Milk, Fruits and Vegetables**. Most common type in use in India)	Limited Use and Recyclable Crates (E.g., **Retail, Fast Fashion, E-Commerce Industries, etc.**)
LOW INVENTORY TURN	Reusable Crates (E.g., **Electronics, Chemical, Healthcare Industries, etc.**)	Single Use and Recyclable Crates (E.g., **Luxury Goods, Furniture, Art and Antiques Industries, etc.**)
	CLOSED LOOP	**OPEN LOOP**

Figure 3: NITIE – Genpact Crate Assessment Matrix

1. **High Inventory Turns & Closed Loop Supply Chain (Quadrant 1):** In industries where the supply chain follows a closed loop approach, and the inventory turns are high, plastic crates find large scale usage owing to their **reusability, stack-ability, and durability.** These crates help reduce **overall cost** and **packaging wastage** by getting returned to suppliers and being reused in supply chain.
2. **High Inventory Turns & Open Loop Supply Chain (Quadrant 2):** In industries where the supply chain follows an open loop approach and inventory turns are high, **usage of plastic crates is frequent** but **without being returned** to the supplier to be reused. They are either disposed-off after limited use or recycled. High inventory turns still entails that plastic crates are preferred for packaging and transportation.
3. **Low Inventory Turns & Closed Loop Supply Chain (Quadrant 3):** In industries where supply chain follows a closed loop approach and the inventory turns are low, the usage of plastic crate although prevalent, has comparatively **less frequency of reuse** as compared to industries with high inventory turns. The crates are typically used for **transporting and storing products** but are **not reused** as often as in high inventory turn industries.
4. **Low Inventory Turns & Open Loop Supply Chain (Quadrant 4):** In industries where supply chain follows an open loop approach and inventory turns are low, plastic crates have **minimal usage**. Due to the **low frequency** of **product transportation and storage**, alternative packaging options such as **cardboard boxes** may be **preferred over plastic crates**.

In conclusion, the matrix highlights the interplay between inventory turns and supply chain models in determining the usage of plastic crates across various industries. The matrix can act as a tool to unearth the underlying factors that can assess the demand for plastic crates which can form a basis for strategic decision making in packaging and transportation processes.

Usage of the 2x2 Matrix in favour of industries

The 2x2 Matrix, depicted in **Figure 3**, can be used in favour of industries in several ways, listing a few as below:

1. **Identifying the most appropriate type of plastic crate:** By assessing whether any industry has **high** or **low inventory turns** and a **closed or open loop supply chain**, most appropriate type of plastic crates can be selected for usage. For example, companies with **high inventory turns** and a **closed loop supply chain** will benefit from **reusable plastic crates**.
2. **Reducing cost of operations:** Industries can leverage the assessment matrix identify opportunities for cost savings in the packaging domain based on their supply chain model and industry needs. For example, industries having high inventory turns and closed loop supply chain can use **reusable crates** to bring down cost of operations. Contrary to that industries with low inventory turns and an open loop supply chain can use **recyclable crates** to ensure reduce cost through salvage value of crates.
3. **Improved sustainability through suitable material selection:** By selecting plastic crates as per industry requirement, companies **reduce waste** and **improve sustainability.** For example, industries with high inventory turns and closed loop supply chain can **reuse the plastic crates** and invest on incorporating **rugged materials in it,** while companies in industries with low inventory turns and an open loop supply chain can use recyclable materials for plastic crates.
4. **Competitive advantage and brand perception:** Companies can use the 2x2 assessment matrix to strategize the use most suitable plastic crate types for their industry and supply chain model. They can gain a competitive advantage and have better brand perception by reducing costs of operation, improving sustainability of supply chain, and increasing overall efficiency.

In summary, the "NITIE – Genpact Crate Assessment Matrix" can be a valuable tool for industries looking to optimize their packaging and transportation processes. By understanding the factors that influence the usage of plastic crates, companies can make **informed decisions** in **packaging, material selection** that **can reduce their bottom line, promote profitability,** and **support their sustainability goals**.

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