Industry Report On
Specialized Packaging Sector

3rd September 2025

Arvind K. Singhal
Managing Director

TECHNOPAK ADVISORS PVT. LTD.

1. Overview of Global and Indian Economy

Overview of Global Economy

1.1 GDP and GDP Growth of Key Global Economies

India continues to be the fastest growing major economy, projected to surpass Germany and Japan to become the third largest by 2028, driven by strong domestic demand and policy reforms.

The global nominal GDP is forecasted to grow from USD 110.6 trillion in CY2024 to USD 137.8 trillion by CY2029, reflecting a CAGR of 4.5% during the forecast period. The CAGR of major economies such as India (10.1%), China (5.4%), UK (5.5%), Japan (3.7%), Germany (2.8%), USA (4.1%) are expected to grow favourably for the same forecast period of CY2024-2029 indicating an upward trajectory, as per IMF July 2025 estimates.

India is projected to be the fastest growing major economy in the coming years, driven by strong domestic demand, policy reforms, and a favourable demographic profile.

India is ranked fifth in the world in terms of nominal GDP, at USD 3.9 trillion as of CY2024 and is expected to be a USD 6.3 trillion economy by CY2029, becoming the third largest, surpassing Germany and Japan.

Exhibit 1.1: GDP at Current Prices (Nominal GDP) (In USD Trillion) CY and GDP Ranking of Key Global Economies

Country	Rank in GDP (CY2024)	2018	2019	2020	2021	2022	2023	2024	2029P	CAGR (CY2018 - 23)	CAGR (CY2024 - 29P)	Rank in GDP (CY2029 P)
USA	1	20.7	21.5	21.4	23.7	26.0	27.7	29.2	35.7	6.0%	4.1%	1
China	2	14.1	14.6	15.1	18.2	18.3	18.3	18.8	24.5	5.4%	5.4%	2
Germany	3	4.1	4.0	3.9	4.4	4.2	4.5	4.7	5.4	1.9%	2.8%	4
Japan	4	5.0	5.1	5.1	5.0	4.3	4.2	4.0	4.8	-3.4%	3.7%	5
India	**5**	**2.2**	**2.4**	**2.3**	**2.8**	**3.2**	**3.5**	**3.9**	**6.3**	**9.8%**	**10.1%**	**3**
UK	6	2.9	2.9	2.7	3.1	3.1	3.4	3.6	4.7	3.2%	5.5%	6
France	7	2.9	2.7	2.7	3.0	2.8	3.1	3.2	3.6	1.3%	2.4%	7
Brazil	9	1.9	1.9	1.5	1.7	2.0	2.2	2.2	2.5	3.0%	2.6%	8
World	-	**86.8**	**88.0**	**85.8**	**97.8**	**101.9**	**106.4**	**110.6**	**137.8**	**4.2%**	**4.5%**	

Source: IMF; Indian Data taken from RBI, for India CY2018 refers to FY2019, CY2024 refers to FY2025 and CY2029 refers to FY2030.
For calculation purposes, 1 USD = 85 INR

India had the highest Real GDP growth rate at 7.0 % in CY2024 and is projected to have growth rate of 6.6 % in CY2025.

Global real GDP grew by 3.2% in CY2024 and is projected to sustain a positive trajectory with similar growth forecast for CY2025, as the global economy stabilizes post-pandemic and transitions toward long-term sustainable growth. In CY2024, advanced economies such as the US recorded moderate growth rates of 2.8%. India and China led this growth, achieving the highest rates among major economies at 7.0% and 4.8%, respectively during the year.

Exhibit 1.2: Real GDP Growth Rate of Key Global Economies (CY) (%)

Country	2018	2019	2020	2021	2022	2023	2024	2025P
USA	3%	2.6%	-2.2%	6.1%	2.5%	2.9%	2.8%	2.2%
China	6.7%	6.0%	2.2%	8.4%	3.0%	5.2%	4.8%	4.5%
Germany	1.1%	1.0%	-4.1%	3.7%	1.4%	-0.3%	0.0%	0.8%
Japan	0.6%	-0.4%	-4.2%	2.7%	1.2%	1.7%	0.3%	1.1%
India	**6.5%**	**3.9%**	**-5.8%**	**9.7%**	**7.0%**	**8.2%**	**7.0%**	**6.6%**
UK	1.4%	1.6%	-10.3%	8.6%	4.8%	0.3%	1.1%	1.5%
France	1.6%	2.1%	-7.6%	6.8%	2.6%	1.1%	1.1%	1.1%

Arvind K. Singhal
Managing Director

Brazil	1.8%	1.2%	-3.3%	4.8%	3%	2.9%	3%	2.2%
World	**3.6%**	**2.9%**	**-2.7%**	**6.6%**	**3.6%**	**3.3%**	**3.2%**	**3.2%**

Source: IMF, Technopak Analysis; For India, RBI Data is considered. For India CY2018 refers to FY2019 and CY2024 refers to FY2025.

1.2 Global Inflation

Global inflation spiked to 8.7% in CY2022. The increase in global crude oil and commodity prices, along with COVID-19 supply chain disruptions, have driven inflation, prompting countries to raise interest rates in response. Global inflation has eased to 6.8% in CY2023 and further dropped down to 5.9% for CY2024. Pre-pandemic inflation was 3.5% in CY2019.

India's CPI inflation is expected to drop from 5.4% in CY2023 to 4.2% in CY2025. In the USA and Germany, inflation has dropped from 4.1% and 6.0% in CY2023 to 2.9% and 2.4% in CY2024 and projected to reach 2.0% in CY2025. China's inflation may rise from 0.2% in CY2023 to 2.0% in CY2025.

Exhibit 1.3: Global Inflation Rate, Average Consumer Price Index (%) of Key Economies (CY)

Country	2017	2018	2019	2020	2021	2022	2023	2024	2025P	2026P	2027P	2028P
USA	2.1%	2.4%	1.8%	1.2%	4.7%	8.0%	4.1%	2.9%	2.0%	2.1%	2.1%	2.1%
China	1.6%	2.1%	2.9%	2.5%	0.9%	2.0%	0.2%	1.0%	2.0%	2.0%	2.0%	2.0%
Japan	0.5%	1.0%	0.5%	0.0%	(0.2%)	2.5%	3.3%	2.2%	2.1%	2.0%	2.0%	2.0%
Germany	1.7%	1.9%	1.4%	0.4%	3.2%	8.7%	6.0%	2.4%	2.0%	2.0%	2.0%	2.0%
India	**3.6%**	**3.4%**	**4.8%**	**6.2%**	**5.5%**	**6.7%**	**5.4%**	**4.6%**	**4.2%**	**4.1%**	**4.0%**	**4.0%**
UK	2.7%	2.5%	1.8%	0.9%	2.6%	9.1%	7.3%	2.5%	2.0%	2.0%	2.0%	2.0%
France	1.2%	2.1%	1.3%	0.5%	2.1%	5.9%	5.7%	2.4%	1.8%	1.8%	1.8%	1.8%
Brazil	3.4%	3.7%	3.7%	3.2%	8.3%	9.3%	4.6%	4.1%	3.0%	3.1%	3.0%	3.0%
Australia	2.0%	1.9%	1.6%	0.9%	2.8%	6.6%	5.6%	3.5%	3.0%	2.7%	2.7%	2.6%
World	**3.3%**	**3.6%**	**3.5%**	**3.2%**	**4.7%**	**8.7%**	**6.8%**	**5.9%**	**4.5%**	**3.7%**	**3.5%**	**3.4%**

Source: IMF Projections, Technopak Analysis

1.3 Global Population and Growth

The global population has been consistently increasing, growing from over 7.5 billion in CY2018 to a projected 8.2 billion by CY2028, representing a CAGR of 0.9% over the decade. This growth, however, varies across countries. India, currently the most populous country, has grown from 1.37 billion in CY2018 to 1.44 billion in CY2024 and further projected to reach 1.49 billion by CY2028, growing with a CAGR of 0.9%, highlighting its expanding demographic weight. The United States and United Kingdom's population is further expected to grow at a CAGR of 0.6% and 0.7% respectively between CY2018 to CY2028. China and Japan are experiencing population decline, with projected CAGRs of -0.1% and -0.4% respectively, driven by aging populations and low birth rates.

Exhibit 1.4: Population of Key Economies (in millions) and growth (%) (CY)

Country	2017	2018	2019	2020	2021	2022	2023	2024E	2025P	2028P	CAGR 2018-28
USA	325.3	327.0	328.5	331.3	332.5	334.3	337.0	340.1	342.4	348.5	**0.6%**
China	1,400.1	1,405.4	1,410.1	1,412.1	1,412.6	1,411.8	1,409.7	1,408.3	1,405.1	1,395.2	**-0.1%**
Japan	126.7	126.5	126.2	125.8	125.5	125.1	124.5	123.9	123.3	121.3	**-0.4%**
Germany	82.7	82.9	83.1	83.2	83.2	83.8	84.5	84.7	84.9	85.1	**0.3%**
India	**1,354.2**	**1,369.0**	**1,383.1**	**1,396.4**	**1,407.6**	**1,417.2**	**1,428.6**	**1,441.7**	**1,454.6**	**1,491.7**	**0.9%**
UK	66.0	66.4	66.8	67.1	67.3	67.6	68.5	69.2	69.9	71.2	**0.7%**
France	66.8	67.0	67.3	67.4	67.7	68.1	68.2	68.4	68.6	69.2	**0.3%**
Brazil	205.2	206.5	207.9	209.2	210.1	210.9	211.7	212.6	213.4	215.4	**0.4%**
Australia	24.8	25.1	25.5	25.6	25.8	26.3	27.0	27.1	27.4	28.4	**1.2%**
World	**7,458.2**	**7,538.3**	**7,619.0**	**7,693.7**	**7,758.9**	**7,823.9**	**7,899.0**	**7,934.2**	**8,006.3**	**8,224.7**	**0.9%**

Source: IMF Projections, Technopak Analysis

Arvind K. Singhal
Managing Director

1.4 Global Employment Rate

The global labor market has demonstrated resilience, with the unemployment rate declining from 5.9% in CY2017 to 4.9% in CY2024. This improvement is driven by job creation in high growth sectors, and increased investment in infrastructure and technology driven industries. Japan has emerged with low unemployment rate at 2.6%, followed by Germany (3.4%) and United States and Australia with 4.1% each in CY2024. India's unemployment rate stood at 4.2% in CY2024.

Exhibit 1.5: Global Unemployment Rate (CY)

Country	2017	2018	2019	2020	2021	2022	2023	2024
USA	4.4%	3.9%	3.7%	8.1%	5.3%	3.6%	3.6%	4.1%
China	4.5%	4.3%	4.6%	5%	4.5%	5.0%	4.7%	4.6%
Japan	2.8%	2.5%	2.4%	2.8%	2.8%	2.6%	2.6%	2.6%
Germany	3.8%	3.4%	3.2%	3.9%	3.6%	3.1%	3.1%	3.4%
India	**7.6%**	**7.7%**	**6.5%**	**7.9%**	**6.4%**	**4.8%**	**4.2%**	**4.2%**
UK	4.5%	4.1%	3.6%	4.5%	4.8%	3.7%	4.0%	4.1%
France	9.4%	9%	8.4%	8%	7.9%	7.3%	7.3%	7.4%
Brazil	12.8%	12.3%	11.9%	13.7%	13.2%	9.2%	7.9%	7.6%
Australia	5.6%	5.3%	5.2%	6.5%	5.1%	3.7%	3.7%	4.1%
World	**5.9%**	**5.8%**	**5.6%**	**6.6%**	**6.1%**	**5.3%**	**4.9%**	**4.9%**

Source: World Bank

Working Age population

The working age population indicates the earning potential within households, contributing to higher consumption levels. Moreover, individuals in this demographic group have busier lifestyles, leading them to prefer packaged products for convenience and time saving. Among these economies, India has a working age population of 47%.

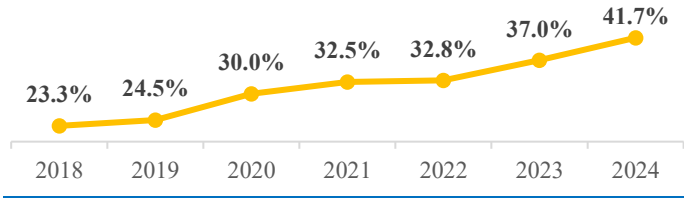
Exhibit 1.6: Comparison of Percentage of Working Age Population (%) (CY2023)

Source: World Bank

Increasing number of women entering the workforce leading to dual income households

In India, the female labour force participation rate for aged 15 years and above was 41.7% in FY2024 as per PLFS survey. With the increasing number of women entering the workforce, household income increases, thus increasing disposable income and purchasing power. This shift is fuelling demand for premium products, convenience driven services, and organized retail, reshaping consumer behaviour and market dynamics.

Exhibit 1.7 Participation of women aged 15 years and above in workforce (%)



Source: Periodic Labor Force Survey (PLFS)

1.5 Global Investment Scenario

The global investment landscape is shaped by macroeconomic trends, geopolitical shifts, and technological advancements. Investors navigate a complex environment, influenced by interest rate fluctuations, market volatility, and emerging opportunities in sustainable and digital economies. Geopolitical tensions and shifting policies are further

Arvind K. Singhal
Managing Director

influencing investment flows. For example, the US administration's "America First" approach has introduced trade uncertainties, leading investors to reevaluate their positions and explore markets with more predictable trade environments. Trends in Global Investment include:

- In CY2024, Global Foreign Direct Investment (FDI) increased by 11%, reaching USD 1.4 trillion. However, when excluding investment flows through European conduit economies, global FDI recorded an overall decline of 8%. Investments in sectors linked to the Sustainable Development Goals declined by 11% globally. The number of projects in key areas such as agrifood systems, infrastructure, and water and sanitation was lower compared to 2015, the year the SDGs were first adopted.

- Private equity activity witnessed a strong recovery in CY2024, with total deal value increasing by 14% to reach USD 2 trillion. This marked 2024 as the third most active year ever for private equity transactions. High growth industries drawing investment include AI, clean energy, healthcare advancements, and cybersecurity. These sectors are set for expansion and present strong potential for investor returns.

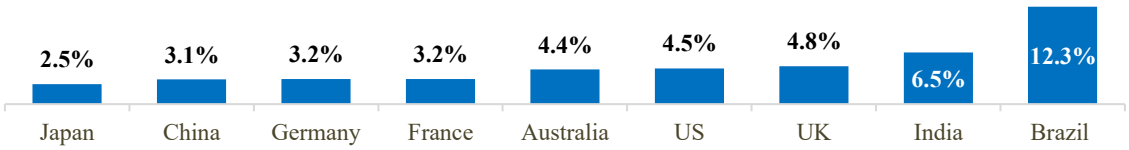
India has emerged as a key FDI destination in recent years, has climbed three spots in the World Competitiveness Index, ranking 40th in 2024, up from 43rd in 2021. The country's FDI inflows have grown nearly 2 times from ~USD 36 billion in FY2014 to USD 71 billion in FY2024, driven by improved ease of doing business and relaxed FDI norms. India's service sector attracted the highest FDI equity inflow, followed by computer software and hardware, trading, telecommunications and the automobile industry since April 2020.

1.6 Key Global Economic Indicators - Trade Dynamics, Supply Chain and Global Economic Risks affecting Packaging Industry

i. **Economic Conditions and Supply Chain Disruption:** Market uncertainties have created supply shortages and price volatility within the packaging sector. In the first half of FY2023, intermittent supply disruptions and fluctuating costs of resins and raw materials were observed, largely driven by market dynamics. Factors like the Russia-Ukraine conflict have further disrupted supply chains.

ii. **Inflation Impact:** Rising inflation has significantly affected the packaging industry, particularly through increased costs for energy, fuel, and labor. Inflationary pressures, especially prevalent in Europe and the United States, have led central banks to raise interest rates. This has resulted in higher interest expenses for companies with variable rate debt denominated in currencies like the U.S. dollar and Euro. Additionally, these inflation trends have influenced consumer behavior and contributed to customer destocking during FY2023.

Exhibit 1.8: Interest Rates of Key Economies (as of December 2024)



Source: Secondary Research, Technopak Analysis

iii. **Global Trade policies**: Trade policies, including tariffs and regulatory measures, have the potential to significantly disrupt global supply chains and reshape cost structures within the packaging industry. For example, the recent imposition of tariffs by the United States on some of its major trading partners has had a considerable impact on exports to the country. These tariffs would increase the costs of the products, primarily due to the higher import duties levy of the goods.

iv. **Currency Fluctuations:** Fluctuating currency exchange rates also impact the packaging industry, manufacturers rely on imported raw materials**,** especially in emerging markets like India. For example, the depreciation of the Indian Rupee against the U.S. dollar can led to increased costs for imported raw materials, such as plastics and chemicals, which are essential for packaging production.

Arvind K. Singhal
Managing Director

v. **Consumer Demand:** The rapid expansion of e-commerce has significantly boosted the demand for packaging solutions that not only provide durability and protection but also enhance visual appeal. This growing demand has driven companies to explore innovative, cost-effective, and sustainable materials that balance functionality with aesthetics.

vi. **Shift towards Ecofriendly Preference:** The market is increasingly prioritizing environmentally friendly packaging. This shift in behaviour is driving companies to adopt sustainable practices, such as using eco-friendly, biodegradable materials and implementing closed-loop systems that is materials are continuously recycled and reused within the production cycle.

vii. **Industry Consolidation:** Mergers and acquisitions enable companies to achieve economies of scale, reduce operational costs, enhance bargaining power with suppliers and customers, and expand into new markets. For example, In November 2024, Amcor's USD 8.4 billion all stock acquisition of Berry Global created a plastic packaging leader with USD 24 billion in annual revenue.

viii. **Trade Globalization**: With the growing impact of globalization, FMCG brands are expanding globally to access high growth markets and sectors. India is well positioned to benefit from the "China Plus One" strategy, as companies aim to diversify supply chains by including alternative manufacturing or sourcing hubs outside China.

ix. **Impact of U.S. Tariffs on India:** The imposition of U.S. tariffs on Indian goods has led to several notable impacts on India's trade dynamics, industrial performance, and broader economic strategies. These tariffs will cause export slowdowns and cost pressures which will make the Indian goods relatively more expensive in the U.S. market, eroding price competitiveness and reducing export volumes. As a result, manufacturers and exporters are compelled to realign their focus towards exploring alternative international markets as well as boosting the domestic demand. Despite these challenges, the direct economic impact of the U.S. tariffs remains relatively limited, with estimates suggesting a potential effect on only around 0.19% of India's GDP.

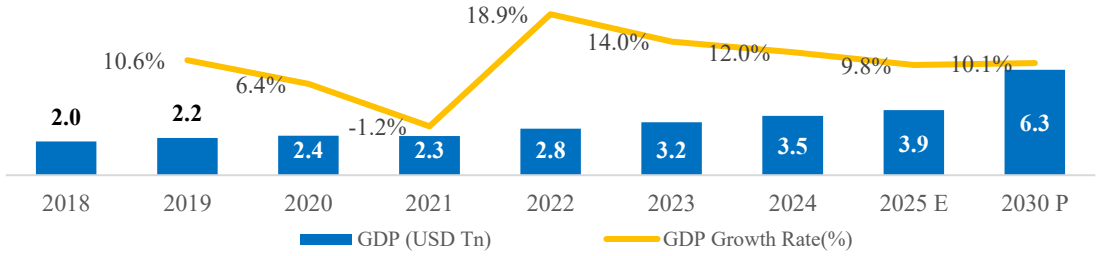
Overview of India Macro-Economic Outlook

1.7 Indian GDP and GDP Growth (Real and Nominal) - Historical, Current & Projected Trajectory

India is the world's 5th largest economy and is expected to be in top 3 global economies by FY2029

India ranks fifth in the world in terms of nominal gross domestic product ("GDP") for CY2024 and is the third largest economy in the world in terms of purchasing power parity ("PPP"). India is expected to be a USD 6.3 trillion economy by CY2029 and is estimated to become the third largest economy, surpassing Germany, and Japan.

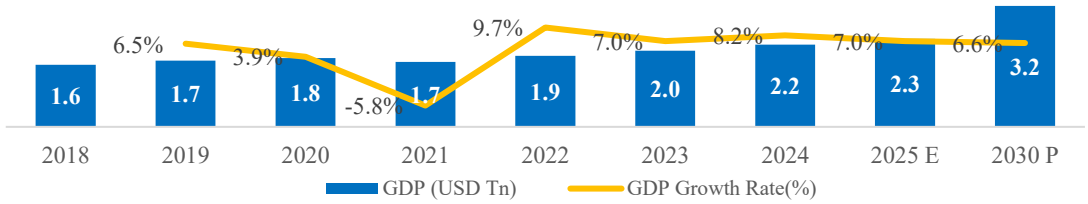
Exhibit 1.9: India's GDP at Current Prices (Nominal GDP) (In USD Trillion) and GDP Growth Rate (%) (FY)



Source: RBI Data, Technopak Analysis
For calculation puirposes, 1 USD = 85 INR

Arvind K. Singhal
Managing Director

Exhibit 1.10: India's GDP at Constant Prices (Real GDP) (In USD Trillion) and GDP Growth Rate (%) (FY)



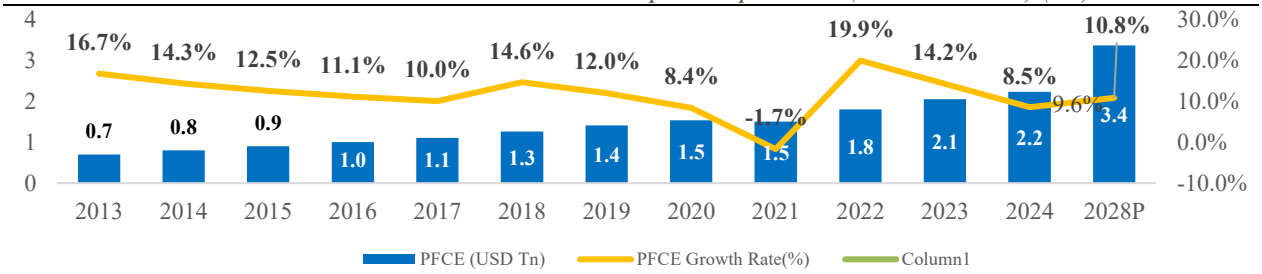
Source: RBI, IMF Projections, Technopak Analysis
Note: 1 USD = 85 INR

India's nominal GDP has grown at a CAGR of 9.3% between FY2019 and FY2024 and is expected to continue this upward trend by registering a CAGR of 10.1 % for the 5-year time-period from FY2025 to FY2030.

1.8 Private Final Consumption Expenditure

GDP growth in India is expected to be driven by rising private final consumption expenditure. The high share of this consumption to GDP has the advantage of insulating India from volatility in the global economy. India's domestic consumption has grown at a CAGR of 9.6% between CY2019 and CY2024. With the rapidly growing GDP and PFCE, India is poised to become one of the top consumer markets globally.

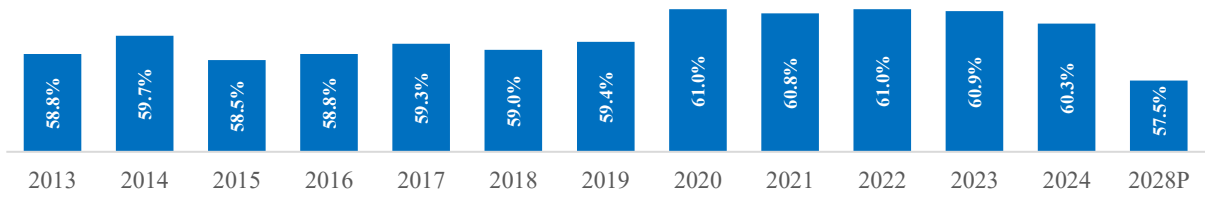
Exhibit 1.11: India's Households and Private Final Consumption Expenditure (In USD Trillion) (CY)



Source: Secondary Research

India's share of PFCE to GDP has increased over the years, reaching 60.3% in FY2024, up from 58.5% in FY2015. According to the Ministry of Statistics and Program Implementation, the share of India's PFCE to GDP is expected to decrease and reach approximately 57.5% by FY2028.

Exhibit 1.12: Share of Private Final Consumption Expenditure to India's GDP (Nominal) (%) (FY)



Source: Ministry of Statistics and Program Implementation

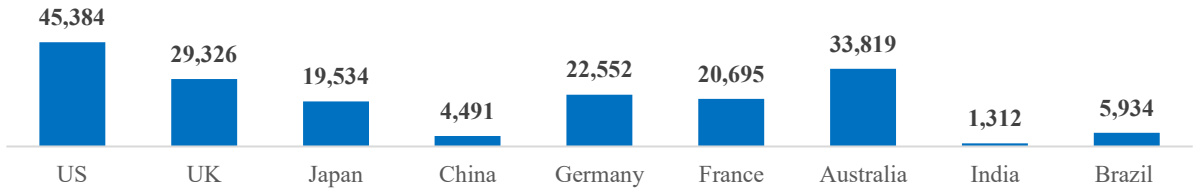
1.9 Per Capita Consumption

India's relatively low final consumption expenditure per capita of USD 1,312 signifies a significant untapped potential, especially when compared to developed economies. As incomes rise, urbanization accelerates, and the middle class expands, India is poised for a surge in consumer spending across sectors such as food, retail, healthcare, and e-commerce. This shift will directly boost demand in the packaging industry, which will need to adapt with

Arvind K. Singhal
Managing Director

scalable, sustainable, and innovative solutions to meet the growing volume and evolving preferences of Indian consumers.

Exhibit 1.13: Final consumption expenditure per capita (Household & NPISHs) (USD) (CY2023)



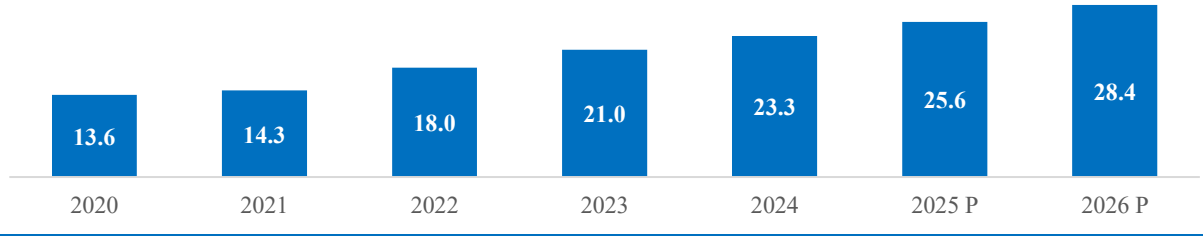
Source: World Bank

1.10 India's Fiscal Policies

Fiscal policy plays a crucial role in shaping a nation's economy by using government spending and taxation to influence economic activity. The key objective of the fiscal policy includes Economic Growth, Price stability, Employment, Capital Formation etc. Various tools of the fiscal policy's include:

Taxation: India's taxation policy aims to balance revenue generation with economic growth. It also aims to create a tax framework to encourage investment and support social objectives through specific tax initiatives. For example, The Indian government implemented key fiscal measures in the 2025-26 budget to boost household consumption, savings and investment, including raising the tax exemption threshold to INR 12.8 lakhs and reduced tax rates for individuals earning above the revised threshold. India's revenue generated from tax stood at INR 23.3 trillion in FY2024 and is estimated to reach INR 28.4 trillion in FY2026.

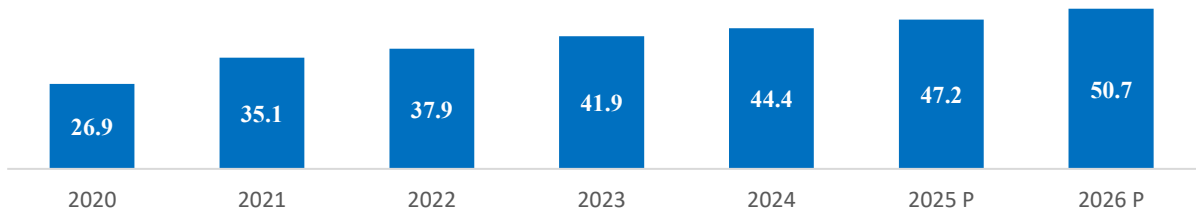
Exhibit 1.14: Net Tax Revenue generated by Centre (In INR trillion) (FY)



Source: Ministry of Finance

Government Spending: India's fiscal policy focuses on higher expenditure to stimulate economic growth, with a focus on infrastructure development, social welfare programs, and rural employment schemes. By increasing spending in these areas, the government aims to boost demand, create jobs, and promote inclusive development. India's total expenditure reached INR 44..4 trillion in FY2024 from INR 26.9 trillion in FY2020 and is estimated to further spend INR 50.7 trillion in FY2026.

Exhibit 1.15: Total Expenditure and Capital Expenditure (In INR trillion) (FY)



Source: Ministry of Finance

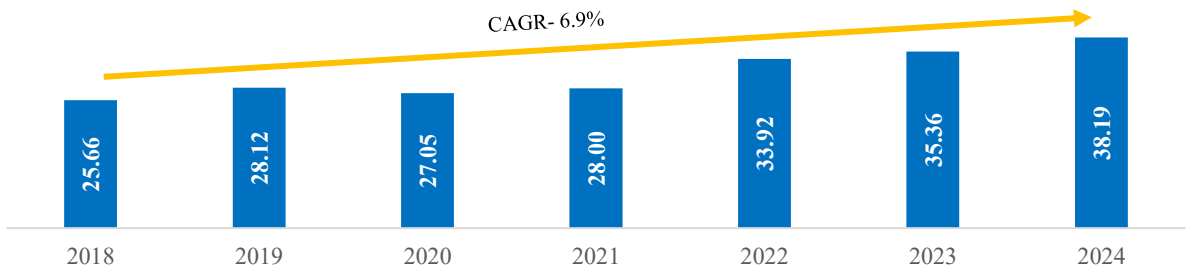
Arvind K. Singhal
Managing Director

1.11 Industry Specific growth

Manufacturing Industry in India

Manufacturing has emerged as one of the high growth sectors in India, with the better performance of key sectors like automotive, engineering, chemicals, pharmaceuticals, and consumer durables. Contributing around 14% to India's GDP in FY2024, it is poised to grow to approximately 21% - 22% in the next 5 years. The manufacturing Gross Value Added (GVA) at current prices was INR 25.66 trillion in FY2018, which has reached to INR 38.19 trillion in FY2024 at a CAGR of 6.9% over the period. Furthermore, the Indian manufacturing sector is experiencing a surge in investments with various government initiatives such as 'Make in India,' and the Production linked incentive scheme.

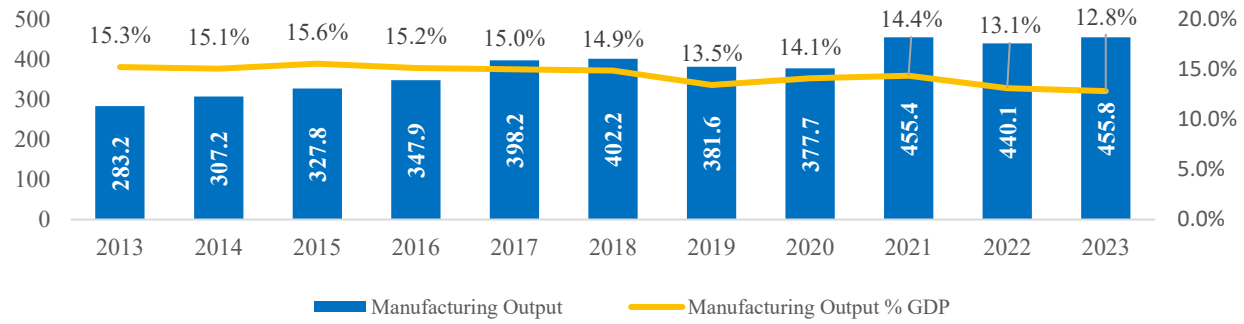
Exhibit 1.16: Manufacturing GVA at Current Prices (In INR trillion) (FY)



Source: RBI

India's manufacturing output experienced steady growth from CY2013 to CY2017. In CY2023, manufacturing output reached USD 455.77 billion, marking a 3.57% growth from CY2022. In CY2023, India's manufacturing sector's share of GDP was around 12.8%, having declined from 15.3% in CY2013. Despite this decline in GDP share, the sector remains a key contributor to India's economy, showcasing resilience amid global challenges.

Exhibit 1.17: Manufacturing Output & Manufacturing Output % of GDP (CY) (USD Bn)



Source: Secondary Research, Technopak Analysis

Government Initiative to boost Manufacturing in India - Make in India

The 'Make in India' initiative, introduced in FY2014 with the ambitious aim of increasing India's strides in manufacturing and transforming the nation from primarily an importer to a significant exporter. Conceived during a period of sharp economic growth decline and critical development challenges, the initiative sought to transform India into a global hub for design and manufacturing. Its core objectives included facilitating investment, encouraging innovation, and developing world class infrastructure.

Arvind K. Singhal
Managing Director

Major initiatives have been undertaken to enable the 'Make in India' vision:

- **Production Linked Incentive (PLI) Schemes**: Introduced in line with the 'Atmanirbhar' (self-reliant) vision, PLI schemes aim to enhance manufacturing capabilities and boost exports. With an outlay of ₹1.97 lakh crore, these schemes cover 14 key sectors aimed at fostering investment in cutting edge technology and promoting global competitiveness. The primary goals are to attract substantial investments, incorporate advanced technology, and ensure operational efficiency. As of July 30, 2024, 755 applications have been approved, resulting in an investment realization of ₹1.23 lakh crore by March 2024 and generating approximately 8 lakh jobs.
- **PM Gati Shakti**: Launched on October 13, 2021, this initiative aims for Aatmanirbhar Bharat and a US USD 5 trillion economy by 2025 through the creation of multimodal and last mile connectivity infrastructure. It focuses on enhancing logistics efficiency and bridging critical infrastructure gaps by promoting holistic planning and coordination among 36 Ministries/Departments. PM Gati Shakti is driven by 7 engines: Railways, Roads, Ports, Waterways, Airports, Mass Transport, and Logistics Infrastructure, all working in unison to pull the economy forward.
- **Semiconductor Ecosystem Development**: Recognizing the need for a robust policy framework, the Union Cabinet approved the Semicon India program in 2021 with a substantial financial outlay of INR 76,000 crore. This initiative fosters the development of a sustainable semiconductor and display ecosystem, providing impetus to manufacturing by facilitating capital support and technological collaborations.
- **National Logistics Policy (NLP)**: Launched on September 17, 2022, the NLP complements PM Gati Shakti by focusing on enhancing the soft infrastructure of the logistics sector. It aims to drive economic growth through an integrated, efficient, and sustainable logistics network by leveraging technology, processes, and skilled manpower. Targets include reducing logistics costs and improving India's Logistics Performance Index ranking.
- **National Industrial Corridor Development Program**: This program is India's ambitious infrastructure initiative to create "Smart Cities" and advanced industrial hubs with robust multimodal connectivity. Recent cabinet approval of 12 new project proposals, involving an estimated ₹28,602 crore investment, signifies a major step in positioning India as a leading global destination for manufacturing and investment.
- **Startup India Initiative**: Launched on January 16, 2016, this initiative supports entrepreneurs and builds a robust startup ecosystem. As of September 25, 2024, India has the third largest startup ecosystem globally, with 148,931 DPIIT Recognized Startups that have created over 15.5 lakh direct jobs.
- **Tax Reforms (GST)**: The implementation of the GST on July 1, 2017, unified the country's markets, simplifying the tax structure and reducing the cascading effect of multiple taxes. This has lowered production costs, making local manufacturing more competitive.
- **Record FDI**: Foreign Direct Investment (FDI) inflows have significantly bolstered the initiative Between April 2014 and March 2024, India attracted USD 667.41 billion in FDI, representing nearly 67% of the total FDI received over the last 24 years. In FY2023-24, total FDI inflows amounted to USD 70.95 billion.

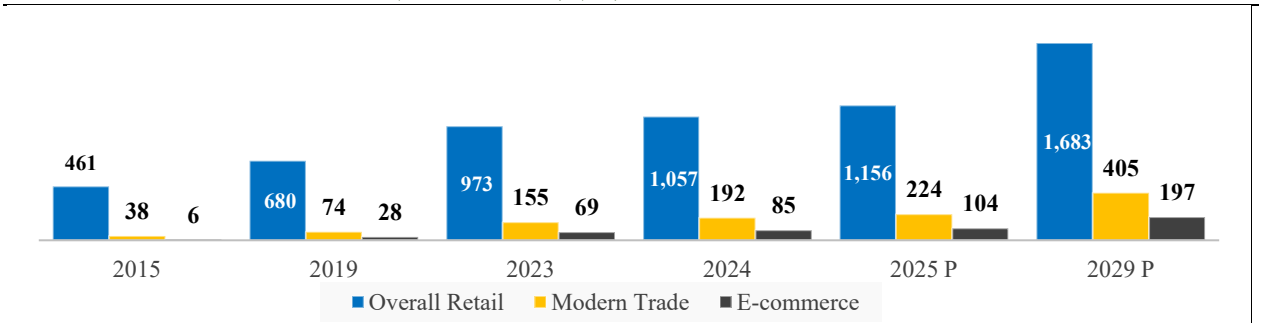
Retail Market in India

The Indian retail market has historically been characterised as largely fragmented and unorganised. In FY2015, the total retail market in India stood at USD 461 billion. Modern trade (organized retail formats such as supermarkets, hypermarkets, that operate with standardized processes and technology), while still in its nascent stage, contributed 8.2% to the total retail market in India while general trade (traditional retail formats, including local kirana stores, wholesalers, and small independent shops, operating with conventional business practices) had a significant share, contributing to 90.5% of the total retail market. The emergence of an increasing middle class, rise of consumerism and entry of foreign retailers gave a significant push to the development of organised retail in India. While the total retail market in India in FY2024 reached a value of USD 1,057 billion and grew by 9.2% CAGR over the past five years, modern trade grew by 21.0% CAGR, reaching a value of USD 192 billion contributing to 18.2% of the overall retail market. By FY2029, it is projected that the overall retail market would reach a value of USD 1,683 billion growing at a CAGR of 9.7% between FY2024-29 whereas the modern trade market is expected to grow at a CAGR of 16.1% to reach a value of USD 405 billion contributing to 24.0% of the total retail market in India.

Arvind K. Singhal
Managing Director

TECHNOPAK ADVISORS PVT. LTD.

Exhibit 1.18: Overall Retail Market (in USD Billion) (FY)



Source: Technopak Research

Retail Market	CAGR (FY2015-19)	CAGR (FY2019-24)	CAGR (FY2024-29)
Overall Retail	10.2%	9.2%	9.7%
Modern Trade Retail	18.1%	21.0%	16.1%
E-commerce	47.0%	24.9%	13.6%

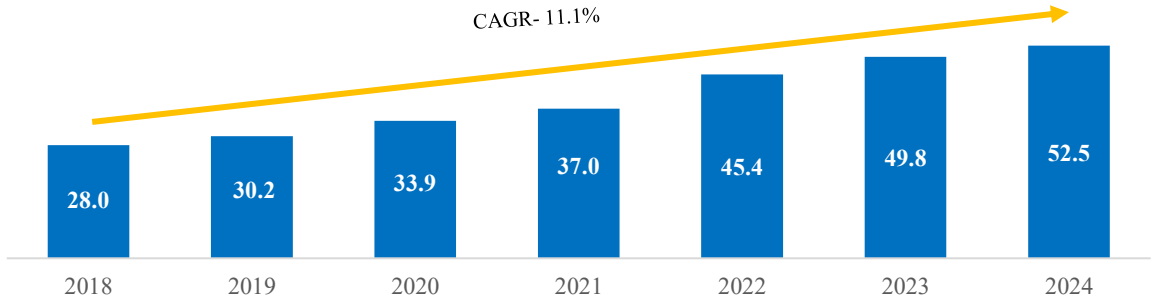
Source: Technopak Research

E-commerce, which currently constitutes 8.0% of the overall retail market, is expected to grow at a CAGR of 13.6% from FY2024 to FY2029, and account for 11.7% of the total retail market.

India's Agricultural Sector

The Indian agriculture sector sustains approximately 42.3% of the population and has contributed 18.2% to the nation's GDP at current prices in FY2024. The GVA at current prices for agriculture, forestry and fishing has also seen significant improvement, which was INR 28 trillion in FY2018 and has reached INR 52.5 trillion in FY2024 at a CAGR of 11.1% over the period.

Exhibit 1.19: Agricultural GVA at Current Prices (In INR trillion) (FY)



Source: PIB, Ministry of Statistics and Program Implementation

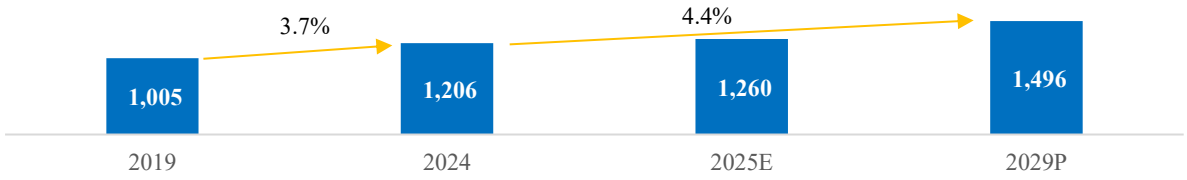
Arvind K. Singhal
Managing Director

2. Overview of the Global Flexible Bulk Packaging Industry

2.1 Global Packaging Market Overview

The packaging industry plays a critical role in the global economy, encompassing a vast range of materials and applications, it ensures the protection, transportation, and presentation of countless products. The global packaging market was valued at USD 1,206 billion in CY2024 and is estimated to reach USD 1,260 billion in CY2025. It is further projected to grow at a CAGR of 4.4% to reach a market size of USD 1,496 billion by CY2029. This growth is majorly driven by the growing population, urbanization, rising income levels and rrising demand from sectors such grains and pulses – rice, dal, lentils, etc., flour & spices, sugar, salts, fruits & nuts, animal & pet foods, agriculture, seeds, charcoal, detergents powders & granules, fertilizers, chemicals, cement, tile adhesives, building materials, mineral bags, shopping or promotional bags, e-commerce etc. in both developed and developing economies. Key global players in the flexible packaging space such as Amcor Plc, Mondi Group, Polytex Fibers, Pro-Ampac, Hood Packaging etc. have significant international footprint and diversified end user exposure.

Exhibit 2.1: Global Packaging Market Size (in USD Billion) (CY) (CAGR %)



Source: Secondary Research, Technopak Analysis

2.2 Types of Packaging Material and its Share in the Global Packaging Sector

The global packaging market includes a wide variety of materials, such as metal, glass, plastic, paper, corks, and caps. Paper based packaging features products like kraft paper, packaging boards, and other specialized packaging papers. Plastic, a highly sought after material, is increasingly favored in industry due to its versatility, durability, and cost-effectiveness, particularly in sectors as mentioned above (section 2.1).

Based on the material type it can be segmented into 5 major segments:

- **Rigid Plastic:** Composed of durable plastics such as polyethylene terephthalate (PET), polyvinyl chloride (PVC) and high-density polyethylene (HDPE). This category provides exceptional strength and clarity. Common rigid plastic products, including water bottles, detergent containers, and buckets, are manufactured using injection molding and blow molding techniques, ensuring long lasting performance.
- **Flexible Packaging (Plastic and Paper):** This segment utilizes lightweight, adaptable plastics like polyethylene (PE), polypropylene (PP), Biaxially Oriented Polypropylene (BOPP) etc. which is appropriate for flexible plastic packaging, making them suitable for a wide variety of end products, including bags, pouches, sachets, liners, and Flexible Intermediate Bulk Containers etc. Flexible plastic packaging is most widely used in sectors as mentioned above (section 2.1). A key subset within this segment is a printed and laminated woven polypropylene (PLWPP) bags, which is a type of PP woven bags, that are widely used for packaging products that require high clarity, strength, and moisture resistance - such as grains & pulses, like rice, flour, maize, pulses etc., other food items, animal and pet food, agrochemicals, fertilizers, seeds, cements, building materials etc. - due to their improved branding, marketability and shelf appeal.

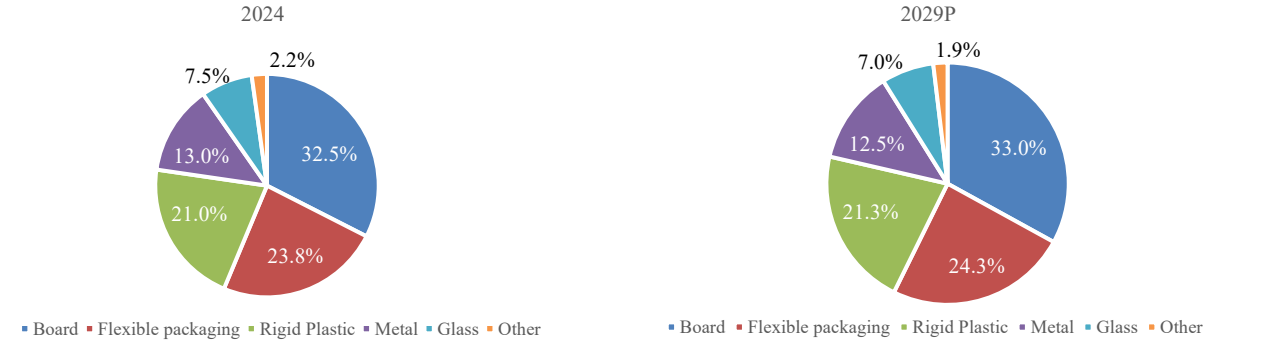
  While flexible paper takes shape as wrapping materials, bags, and labels. Production involves pulping wood and forming it into sheets. Flexible paper packaging usage alone is less as compared to flexible plastic; this is mostly used in multilayer packaging by the E-commerce and quick-commerce industry.

- **Paperboard:** This segment is derived from wood pulp. Paperboard, a thicker type of paper, is commonly used for products like cereal boxes and shoe cartons. It often features printed information, is lightweight, recyclable,

and is often regarded as a biodegradable option.

- **Glass:** This inert and transparent material is made from silica sand. Glass jars and bottles, commonly used in the food & beverage sector, are crafted by blowing molten glass. With excellent chemical resistance, glass is ideal for sensitive products and those undergoing high heat processing, while also offering clear visibility of the contents.
- **Metal:** Metal packaging, made from materials like aluminum, steel, or tin, provides excellent protection and extends shelf life. Shaped through processes such as rolling and stamping, metal packaging is highly suitable for heat resistance, light protection, and long-term storage.

Exhibit 2.2: Global Packaging Type and Share (%) by Value for Material Type (CY)



Source: Secondary Research, Technopak Analysis
Note: Flexible packaging includes plastic & paper materials

Exhibit 2.3: Packaging Material Product Types

Paper board	• **Product type**: Courragted boxes, paper boxes, carton boxes etc.
Flexible Plastic & Paper	• **Product type**: Woven bags including woven PP Bags, bags etc., Shrink films, wrappers, pouches, other bags- paper and plastic etc.,
Rigid Plastic	• **Product type**: bottles, jars, trays, tubs, cups, pots, plastic cases, containers etc.
Metal	• **Product type**: Foil, tubes, metal containers, cans, closures etc.
Glass	• **Product type**: Bottles, jars, jug, vials etc.
Other	• **Product type**: wooden boxes, cloth bags, jute bags, etc.

Source: Secondary research, Technopak analysis

In the global packaging industry, board has the highest share of 32.5% in CY2024 (USD 392.1 billion) and is expected to see an upward growth to reach 33% by CY2029 (USD 493.7 billion) growing at a CAGR of 4.7%. This is primarily due to the growing e-commerce industry which uses cardboard boxes as it is tertiary packaging. This is followed by flexible packaging, as the second largest with a share of 23.8% in the market in CY2024 (USD 286.5 billion) and is expected to reach at 24.3% by CY2029 (USD 363.9 billion) growing at a CAGR of 4.9%. Flexible packaging includes flexible plastic and paper packaging. Flexible plastic was 75% of the total flexible packaging market in CY2024 (USD 215.3 billion) and it is growing faster as compared to paper packaging, which is relatively a smaller market (USD 71.8 billion). The flexible plastic packaging market is projected to grow at a CAGR of 5.1% over the next five years, reaching USD 276.3 billion market in CY2029, compared to a CAGR of around 4.0% for flexible paper packaging during the same period, with an estimated market value of about USD 87.2 billion.

Based on end-user industry application, the flexible plastic packaging can be further segmented into consumer and bulk/industrial flexible packaging.

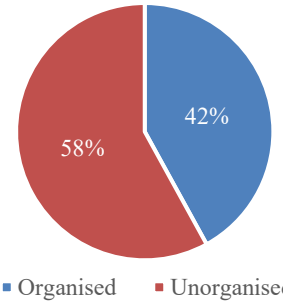
Exhibit 2.4: Break up of Flexible Plastic Packaging into Consumer and Industrial

Consumer (70%)	• **Purpose:** Packaging designed for direct purchase by consumers. • **Formats**:Includes pouches, sachets, wraps, and smaller flexible bags • **Sizes:**<5kg and 5-50kg capacity • **Consumer share** in bulk packaging (i.e. 5-50kg): 12.6%
Industrial (30%)	• **Purpose**:Bulk packaging for B2B supply chains, including transportation and storage. • **Formats**: Includes woven sacks (various types including printed and laminated woven polypropylene sacks), multi-wall paper bags, industrial plastic bags, heavy-duty pouches, and FIBCs, Jute Bags, Woven + Paper Bags, Container & Liner, Silo Bags • **Sizes:** 5-50kg and >50kg capacity • **Industrial share** in bulk packaging (i.e. 5-50kg): 71.2%

Source: Secondary research, Technopak Analysis

Exhibit 2.5: Break up of Global Flexible Plastic Packaging market by Organized and Unorganized sector (CY2024)

The global flexible plastic packaging market is characterized by the presence of both organized and unorganized sectors, each playing a distinct role in market dynamics. The organized sector comprises large multinational corporations and established regional players that leverage advanced technologies, standardized processes, and strong distribution networks to supply high quality, innovative, and often sustainable packaging solutions. Whereas, the unorganized sector consists of numerous small and medium enterprises (SMEs) and local manufacturers, particularly prevalent in developing economies, who typically offer cost-competitive products with lower entry barriers and limited technological sophistication.



Source: Secondary research, Technopak Analysis

Given the current market dynamics, industry experts foresee a gradual consolidation in the plastic packaging sector over the next few years, driven largely by mergers and acquisitions. Larger, organized and branded players are likely to acquire smaller, unorganized and unbranded entities to boost their market share and improve operational efficiency. Therefore, the organised and the branded sector is expected to grow and capture the market share of the unorganised market in coming years.

2.3 Global Flexible Bulk (5-50kg) Packaging Market Overview

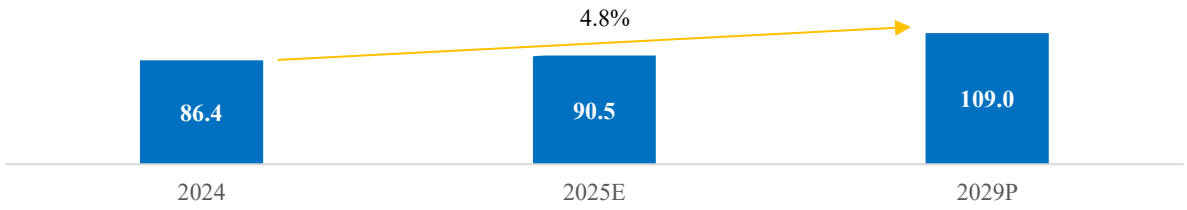
In CY2024, the global flexible bulk packaging market was valued at USD 100 billion. Within this, the 5-50kg segment held a share of 86.4%, amounting to USD 86.4 billion in CY2024. The segment is estimated to grow at a CAGR of 4.8% to USD 90.5 billion by CY2025. This includes a variety of materials including woven polypropylene (WPP) bags, printed and laminated woven polypropylene (PLWPP) bags, multi-wallpaper sacks, plastic based PE/LLDPE bags, paper, jute bags etc., catering to diverse industrial applications such as grains and pulses – rice, dal, lentils, etc., flour & spices, sugar, salts, fruits & nuts, animal & pet foods, agriculture, seeds, charcoal, detergents powders & granules, fertilizers, chemicals, cement, tile adhesives, building materials, mineral bags and shopping or promotional bags to name a few. The growing focus on sustainable and high barrier flexible materials is further driving innovation in this segment.

The global flexible bulk packaging (5-50 kg) market is estimated to reach USD 109.0 billion by CY2029, growing at a CAGR of 4.8%. Bulk flexible packaging is a cost-effective, high volume solution made from durable and flexible materials like plastic film, foil, WPP, jute, paper etc., Common packaging formats include FIBCs (bulk bags) for powders and grains, WPP and BOPP laminated bags for dry goods such as grains, pulses, pet food, fertilizers, and many other sectors, liners for drums and containers, form-fill-seal bags for automated production lines, gusseted bags, roll stock film for high speed packing, and shrink film for bundling or palletizing items. This type of packaging offers several advantages, including reduced material and transportation costs, space saving storage, strong protection against moisture, dust, and other contaminants, and complete customization in terms of size, barrier properties, and branding.

Arvind K. Singhal
Managing Director

These features make bulk flexible packaging an ideal solution for a wide range of industrial and commercial applications.

Exhibit 2.6: Global Flexible Bulk Packaging (5-50kg) Market Size (in USD Billion) (CY) (CAGR %)



Source: Technopak Analysis, Secondary Research,

2.4 Key Growth Drivers and Trends for Global Flexible Bulk Plastic Packaging Market

1. **Growth in Key Sectors Fuelling Demand for Flexible Bulk Plastic Packaging:** The growth in the key sectors such as food products, grains and pulses, animal & pet foods, agriculture, seeds, charcoal, detergents powders & granules, fertilizers, chemicals, cement, tile adhesives, building materials, e-commerce, etc., are driving demand for bulk flexible packaging solutions. Additionally, the expansion of global trade practices is further propelling this demand. For example, the world merchandise exports rose from USD 19.48 trillion in CY2018 to USD 24.43 trillion in CY2024. Therefore, increased industrial production and global supply chain integration have led to a growing need for efficient, durable, and cost-effective bulk packaging solutions, particularly in sectors requiring large scale storage and transportation of raw materials and intermediate goods.

Exhibit 2.7: Market value of key end use sectors for flexible plastic packaging and their growth (CY) (USD Bn)

	2018	2023	2028P	CAGR (2018-23)	CAGR (2023-28)
Packaged Food Market	2238.2	2939.8	4152.3	5.6%	7.1%
- Packaged Pulses Market	58.2	75.7	97.4	5.4%	5.2%
- Packaged Rice Market	257.8	293.8	340.0	2.6%	3.0%
- Packaged Flour Market	138.9	166.6	207.8	3.7%	4.5%
- Packaged Spice Market	19.6	24.8	32.1	4.8%	5.2%
- Packaged Dry Fruits Market	8.7	10.8	14.0	4.3%	5.3%
- Packaged Sugar Market	75.6	86.8	101.8	2.8%	3.2%
Pet Food Market	84.5	134.0	185.7	9.7%	6.7%
Animal and Cattle Feed Market	36.0	42.0	52.0	3.1%	4.4%
Charcoal Market	6.6	8.0	9.8	3.9%	4.1%
Laundry Care Market	81.9	101.2	135.1	4.3%	5.9%
Tiles Adhesives Market	3.4	4.5	7.8	5.6%	11.6%
Seed Market	40.4	54.0	70.0	6.0%	5.3%
Fertilizer Market	185.1	202.2	232.6	1.8%	2.8%
Cement Market	320.0	420.8	550.0	5.6%	5.5%

Source: Technopak Analysis, Secondary Research,

2. **Sustainability and Regulatory Compliance**: Growing emphasis on sustainability, driven by the principles of Reduce, Reuse, and Recycle (RRR), to minimize waste generation, extend the life cycle of packaging materials, and promote the use of recyclable content to reduce environmental impact, is influencing the market dynamics in the packaging sector. As a result, there is an increasing pressure on manufacturers to adopt eco-friendly packaging materials (e.g., woven polypropylene (WPP), biodegradable films etc.) and compliance with global environmental regulations is becoming critical. Key regulatory developments such as the EU's Packaging and Packaging Waste Regulation (PPWR), China's ban on non-recyclable plastic packaging in key industries and the U.S. Plastic Waste Reduction and Recycling Act are driving the demand for recycled, reusable and biodegradable industrial packaging materials at a global level.

An article of "*Columbia Climate School* on *Plastic or Paper*" has highlighted that plastic bags have a lower overall environmental impact than paper bags when assessed through life cycle analysis and reusability, primarily due to lower energy, water use, and emissions. The article further states that Sulphur dioxide and nitrogen oxide, emitted from coal fired power plants used in bag production, contribute to acid rain. Plastic bags generate 50.5 grams of sulphur oxides and 45.4 grams of nitrogen oxides, whereas paper bags produce significantly more 579 grams of sulphur oxides and 264 grams of nitrogen oxides. However, plastic's long-term persistence in the environment and its contribution to litter and marine pollution remain significant concerns.

3. **Cost-Effectiveness and Efficiency:** Flexible bulk plastic packaging offers significant advantages over rigid bulk packaging, such as lower transportation costs, reduced material usage, and ease of handling. The lighter weight of flexible bulk plastic packaging reduces shipping expenses, while its collapsible nature allows for more efficient storage when not in use. Additionally, India enjoys a cost advantage in the manufacturing as compared to other nations including China, Vietnam, and other competitive countries. This is primarily due to lower labour costs, large, young workforce, and a well-established production ecosystem, enabling Indian manufacturers to compete globally on both cost and scale.

4. **Growth in E-Commerce and Logistics:** The expansion of global supply chains and third-party logistics (3PL) services has increased the need for durable, strength, tear resistant, visually appealing bulk packaging solutions which offers a superior protection during transport transportation. As e-commerce sales continue to rise, they will fuel demand for flexible bulk packaging solutions for specific products, that can protect them during extended shipping durations. The rise of cross border trade and just-in-time inventory models has further accelerated the need for flexible bulk packaging that ensures safe and efficient transportation.

5. **Advancement in Material Technology:** Innovations in multilayer films, barrier coatings, and high strength polymer blends are enhancing the durability and efficiency of flexible bulk packaging. The development of nanocomposite materials and biobased resins is leading to improved tensile strength, moisture resistance material in primary packing, and recyclability. Additionally, smart packaging solutions incorporating RFID and IoT sensors are being explored to enable real time tracking and condition monitoring of bulk packaged goods.

2.5 Global Flexible Bulk (5-50kg) Packaging Market Segmentation-by Application

The global flexible bulk packaging market (5–50kg) was valued at USD 86.4 billion in CY2024, with demand primarily driven by the food & beverage segment (including rice, flour, spices, sugar, salt, beverages, dairy etc.) with 30.5% market share; bulk food and agricultural commodities (including Dal, Grain, Pulses, Lentils, Millets, Pet & Bird Food, Animal, Poultry and Cattle Feed, seeds etc.) with 25.3% share; the industrial & chemicals segment (including fertilizer & Chemicals, Detergent Powder & Granules, Charcoal, etc.), captures a market share of 23.0%. These three sectors together account for 80% of market demand, underscoring the prominence of food, agriculture, and industrial bulk packaging applications. The construction materials sector (including cements, tiles adhesives and other building materials) account for 18.8% market share of global flexible bulk packaging market.

Exhibit 2.8: Flexible Bulk Packaging (5-50kg) Market Share (%) Split by Value for End User Industries (CY2024)

Source: Secondary Research, Technopak Analysis

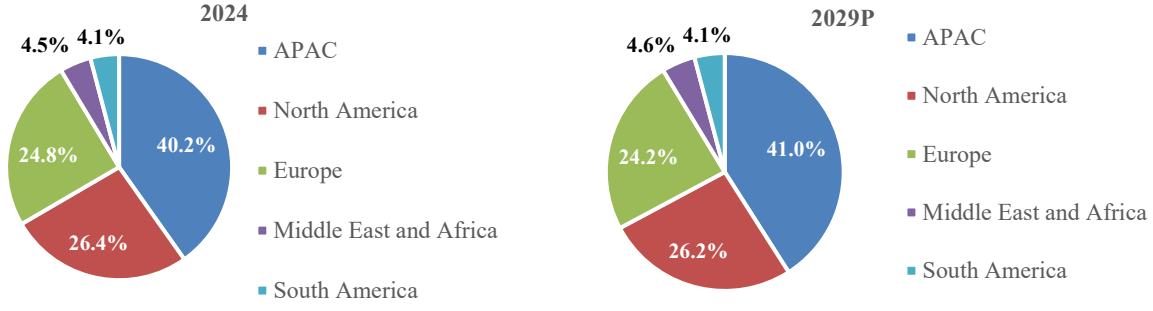
2.6 Global Flexible Bulk (5-50kg) Packaging Market Segmentation- by Geographies

The global flexible bulk packaging industry is set to experience significant growth, particularly in developing regions. The Asia Pacific region is projected to exhibit strong growth, with an estimated CAGR of 5.2% from CY2024 to

Arvind K. Singhal
Managing Director

CY2029. It is expected to maintain its position as the largest market with a share of 40.2% in CY2024, growing from USD 34.7 billion in CY2024 to USD 44.7 billion in CY2029. Within the region, countries such as India and China are emerging as key players in this growth trajectory, on account of their growing sectors as mentioned above (section 2.1 & 2.3). For India, another factor contributing to this growth is the rapid growing e-commerce industry due to the increasing digital consumer base and growing online shopping trend. Additionally, the expanding manufacturing sector across Asian markets is boosting the demand for packaging solutions. Followed by APAC, North America is the second largest region with a share of around 26.4%, accounting for USD 22.8 billion in CY2024. It is further expected to grow at a CAGR of 4.6% to reach USD 28.6 billion by CY2029.

Exhibit 2.9: Global Flexible Bulk Packaging (5-50kg) Market Share (%) Split by Value for Key Geographies (CY)



Source: Secondary research, Technopak Analysis

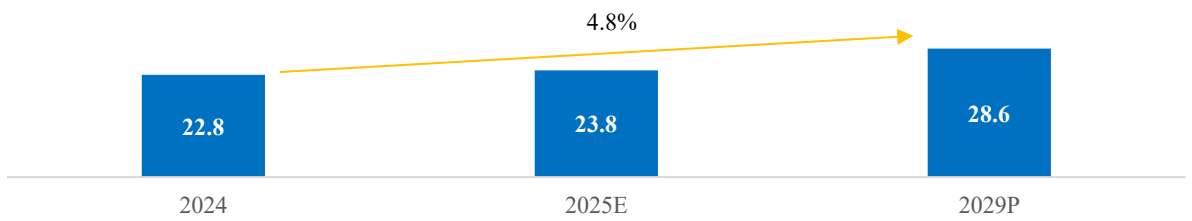
2.7 North America Flexible Bulk (5-50kg) Packaging Market

Market Overview

The North America packaging market is a key segment within the broader packaging industry, catering to high volume transportation and storage needs across multiple industries. As of CY2024, the North America flexible bulk packaging market (5–50kg) was valued at USD 22.8 billion, accounting for 26.4% of global demand. The market is projected to grow at a CAGR of 4.8% to reach USD 28.6 billion by CY2029, while maintaining a stable global share.

Within the North America, the United States is expected to continue driving majority of the demand, accounting for 80–85% of the region's market. The USA flexible bulk packaging (5-50kg) market was valued at USD 18.7 billion in CY2024, is projected to reach USD 19.6 billion in CY2025 and is expected to grow at a CAGR of 4.9% to reach USD 23.7 billion by CY2029. Mexico is expected to continue to account for 8-10% of the North America's flexible bulk packaging (5-50kg) market. Mexico's flexible bulk packaging (5-50kg) market was valued at USD 2.0 billion, is projected to reach USD 2.1 billion in CY2025 and is expected to grow at a CAGR of 5.1% to reach USD 2.6 billion by CY2029.

Exhibit 2.10: North America Flexible Bulk Packaging (5-50kg) Market Size (in USD Billion) (CY) (CAGR %)

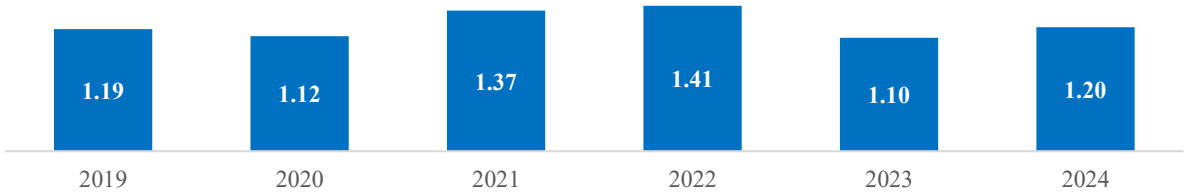


Source: Technopak Analysis, Secondary Research

Arvind K. Singhal
Managing Director

The growth of the flexible bulk packaging industry in North America is fuelled by increasing demand from key industries such as animal & pet foods, agriculture, food products, grains and pulses, seeds, charcoal, detergents powders & granules, fertilizers, chemicals, cement, tile adhesives, building materials etc. Its advantages over rigid alternatives, including lower transportation costs, reduced material usage, and greater adaptability, are further accelerating its adoption. Additionally, innovations such as high strength multi-layer films, recyclable WPP bags, PLWPP Bags and biodegradable bags and Flexible Intermediate Bulk Containers (FIBCs) are enhancing its appeal. Sustainability initiatives, such as closed loop recycling programs and favouring lightweight packaging are also driving the industry's shift toward flexible solutions.

Exhibit 2.11: Import of Flexible Bulk Packaging materials, bags, films etc. by USA (in USD Billion) (CY)



Source: ITC Trade Map; HSN Code: 39232990, 63053300, 46029000, 48193000

Economic Trends and Growth Drivers

1. **The Resurgence of Domestic Manufacturing in the USA and Canada**: This is boosting demand for high performance flexible bulk packaging solutions, particularly in industries mentioned above (section 2.3). Additionally, North America's role as a producer and exporter of pet foods, animal and bird feeds, corns, grains, food items such as rice, beans, flours etc., dairy packing, fertilizers, resins, industrial chemicals etc. has increased demand for robust flexible bulk packaging solutions, particularly following the implementation of the United States-Mexico-Canada Agreement (USMCA), which has reinforced regional trade growth.
2. **Sustainability and Regulatory Compliance**: With stringent environmental regulations such as bans on single use plastics and recycling mandates encouraging companies to adopt recyclable and biodegradable flexible bulk packaging solutions. The adoption of woven polypropylene and biobased materials is accelerating, particularly in the chemical and agricultural sectors. Regulations such as the U.S. Environmental Protection Agency recycling mandates, Extended Producer Responsibility programs, and California's Plastic Pollution Reduction Act are influencing packaging trends across industries.
3. **Expansion of Agricultural and Chemical Industries**: Increasing agricultural output in USA and Canada is driving demand for bulk bags, WPP bags and PLWPP bags, FIBCs, and container liners. The chemical sector, particularly in petrochemicals and industrial solvents, is also a significant contributor to flexible bulk packaging adoption.
4. **Rising Transportation and Labor Costs**: Companies are shifting to cost-effective flexible bulk packaging that reduces weight and maximizes storage. Its collapsible, reusable design offers an edge over the traditional packaging options, while the products suitable for atomized plants helps in reducing manual handling and labour cost and enhance operational efficiency in packaging.
5. **Technological Advancements**: Innovations in multi-layer barrier films, anti-static coatings, and tamper proof packaging are boosting safety and efficiency in North America's flexible bulk packaging market. Automation in filling and dispensing, along with growing use of biodegradable and recyclable materials, is further driving growth.

2.8 Key Global Economic Indicators Impacting Flexible Bulk Packaging Industry Demand

1. **Global Trade and Industrial Output:** The growth of flexible bulk packaging is closely tied to global trade volumes and industrial output. Rising manufacturing activity, particularly in the industries mentioned above (section 2.3), is driving demand for flexible bulk bags including WPP bags, PLWPP bags, FIBCs, and container

liners. However, supply chain disruptions, fluctuating commodity prices, and geopolitical trade policies influence production costs and market expansion.

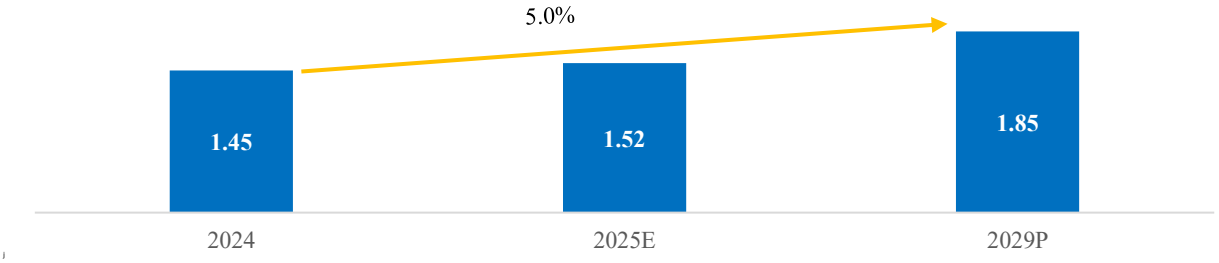
2. **Inflation and Raw Material Price Volatility:** Fluctuations in the prices of polypropylene (PP), polyethylene (PE), and other resin-based materials directly impact the cost structure of flexible bulk packaging. Higher resin prices often lead to increased costs for FIBCs and woven sacks, affecting profit margins and pricing strategies. Higher inflation rates also increase manufacturing, logistics, and labour costs, affecting pricing strategies and profit margins for packaging companies.
3. **Trade Policies & Tariffs:** Changes in trade policies, including tariffs on imported packaging materials or finished goods, can reshape supply chains. Protectionist measures, such as those seen in the U.S., may encourage domestic manufacturing, boost regional packaging demand while limit imports. Conversely, trade liberalization can increase competition and sourcing flexibility.
4. **Logistics & Supply Chain Costs:** Global shipping rates, fuel prices, and transport infrastructure significantly influence the demand for flexible bulk packaging by driving the need to reduce logistics costs. Flexible bulk packaging, in certain cases, offers significant logistical advantages over traditional options like corrugated boxes, barrel drums for agrochemical powders, multi wallpaper bags, rigid plastic containers, and heavy duty LLDPE bags—all of which are more material intensive and expensive. Unlike these products, which adds considerable weight to shipments, flexible bulk packaging, in such case, minimizes packaging weight and maximizes product load per container.
5. **Regulatory & Sustainability Mandates:** Stricter environmental regulations, including carbon taxes and EPR laws, are raising costs in the flexible bulk packaging industry. Rising demand for sustainable packaging is reshaping supply chains, investments, and pricing, making eco-driven policies a key factor in profitability and growth.

3. Overview of Global Printed and Laminated WPP Bags

3.1 Overview of Printed and Laminated Woven Polypropylene Bags (PLWPP)

The PLWPP bags (5-50kg) market, which forms 7.0% of the global woven polypropylene (WPP) bags and sacks, was valued at USD 1.45 billion in CY2024. The market is expected to reach USD 1.85 billion by CY2029, expanding at a CAGR of 5.0%. It's share in the global WPP bags and sacks market is expected to increase to 7.5%. This growth is being driven by rising demand for durable, cost-effective, tear-resistant and visually appealing packaging solutions across diverse industries. These bags integrate the strength of woven polypropylene with the superior printability of BOPP films, which makes them suitable for packaging applications across various sectors such as grains and pulses – rice, dal, lentils, etc., flour & spices, sugar, salts, fruits & nuts, animal & pet foods, agriculture, seeds, charcoal, detergents powders & granules, fertilizers, chemicals, cement, tile adhesives, building materials, mineral bags, shopping bags and many other industries.

Exhibit 3.1: PLWPP Bags Market Size (5-50kg packaging) (in USD Billion) (CY) (CAGR %)



Source: Secondary Research, Technopak Analysis

3.2 Growth Drivers of the Global PLWPP Bags Market

1. **Rise of Branding in Bulk Commodities**: There is a growing trend toward branding in bulk commodity segments, driven by the need for product differentiation, consumer trust, and enhanced shelf presence. PLWPP bags offer excellent possibilities for high quality printing and visual branding, making them an ideal packaging solution for companies aiming to build strong brand identities in the bulk segment. These bags are now widely used across a broad range of products as mentioned above (section 3.1). The transition from plain, generic packaging to high quality branded formats is evident across both offline retail and e-commerce platforms. PLWPP bags not only enhance shelf appeal and brand recall but also provide superior durability and product protection, further driving their adoption across industries.

2. **Enhanced Barrier Properties:** The BOPP lamination layer enhances the barrier properties of the bags, making them resistant to moisture / water, dust, and other environmental factors such as UV exposure. This protective barrier ensures that the packaged products remain undamaged, preserving their quality and extending their shelf life which fosters consumer preference consequently leading to growth of these bags.

3. **Strength & Durability**: PP fibres possess a high tensile strength, allowing bags to endure heavy loads of 25 to 75 kg or more, depending on the fabric's GSM, weave density, and construction. Additionally, BOPP coating further enhances abrasion resistance, damage resistance against mishandling ensuring durability and extended usability. This superior strength and resilience make PLWPP bags a preferred choice across industries mentioned above (section 3.1) which drives demand, contributing to the sustained growth of the market.

   Additionally, increasing demand for durable, visually appealing, tear resistant and moisture resistant packaging is driving the shift from traditional PP bags, jute bags, paper bags etc. to PLWPP bags, further accelerating market expansion.

4. **Eco-friendly and Lightweight Nature**: PLWPP bags, made from polypropylene, can be recycled and reprocessed into new products, reducing plastic waste. They are an environmentally friendly packaging solution having lower carbon footprints and emission, compared to several traditional packaging materials such as single use plastic bags, HDPE, rigid containers etc. Their low-density composition makes them significantly lighter

than jute bags, multi wallpaper bags or high micron LDPE bags, minimizing transportation cost as well as carbon emissions. As industries increasingly prioritize sustainable packaging solutions, PLWPP bags are emerging as a preferred choice due to their strength, recyclability, durability, and light weight features.

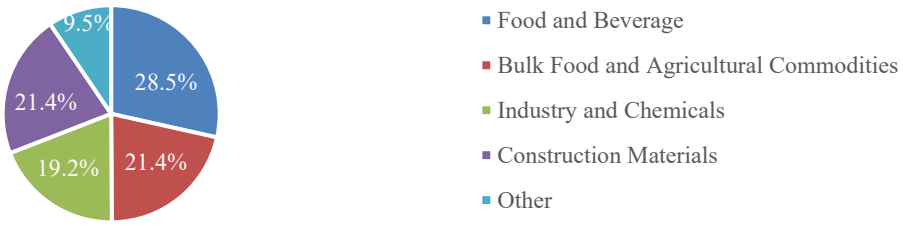
5. **Enhanced Printability**: The BOPP film enhances the printability of PLWPP bags by providing a smooth surface that allows high quality printing. This film supports advanced printing techniques like rotogravure and CI flexographic printing, enabling vibrant, high-resolution graphics, brand logos, and product information. Additionally, its excellent ink adhesion ensures long lasting, smudge resistant prints, making these bags an ideal choice for industries that prioritize branding and product visibility.
6. **Evolution of PLWPP Pinch Bottom Bags**: The PLWPP Pinch Bottom bags create a premium packaging solution that merges the structural advantages of pinch bottom design with the superior printability, durability, and moisture resistance features of BOPP films. These bags offer 6-side branding and maximum visual exposure, thus making them ideal for effective self-marketing in both modern retail and traditional trade settings. Their customizable design and versatile structure allow for tailored specifications in terms of size, shape, and graphics, catering to a wide variety of industries. Additionally, the flat bottom design improves stickability, storage efficiency, and shelf presentation, enhancing inventory management and reducing space wastage during transportation and retail display.
7. **Smart Packaging Features**: Smart packaging formats in PLWPP bags such as Pinch Bottom, Block Bottom, Bottom Gusset, and Handle Bags are gaining traction due to their practical design and improved product presentation. These formats offer better stickability, storage efficiency, and ease of handling, while also allowing for multi-side printing that supports clearer branding and product information.

BOPP bags present a more sustainable packaging solution for bulk quantities (5-50 kg) compared to jute and high micron LDPE bags. Moreover, the rapid expansion of industries has fuelled the demand for durable, light weight, tera and moisture resistance, effective branding, easy to stack, cost-effective, sustainable, reusable and eco-friendly packaging solutions, driving the increased adoption of PLWPP bags. Therefore, the growing emphasis on these features is expected to accelerate the shift from traditional WPP bags to PLWPP bags in the coming years.

3.3 PLWPP Bags Market Segmentation- by Application

In terms of application, food and beverage (including rice, flour, spices, sugar, salt, beverages, dairy etc.) industry holds market share of 28.5% by value, driven by the demand for moisture resistant and durable packaging. The bulk food and agricultural commodities sector (including Dal, Grain, Pulses, Lentils, Millets, Pet & Bird Food, Animal, Poultry and Cattle Feed, seeds etc.) and the construction materials sector (including cements, tiles adhesives and other building materials) each account for 21.4% of the market share. Additionally, the industrial and chemicals segment (Fertilizer & Chemicals, Detergent Powder & Granules, Charcoal, etc.) holds a 19.2% market share.

Exhibit 3.2: PLWPP Bags Market Share (%) Split by Value for End User Industries (CY2024)



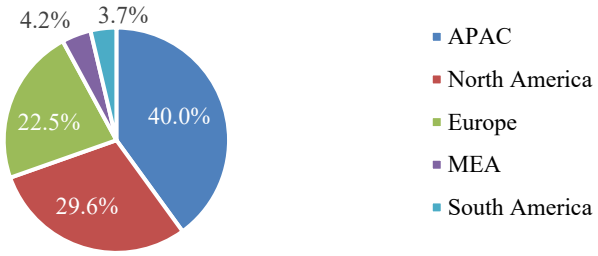
Source: Secondary Research, Technopak Analysis

3.4 PLWPP Bags Market Segmentation-by Geographies

The Asia Pacific region dominates the market with a 40.0% market share by value, followed by North America (29.6 %) and Europe (22.5%), reflecting strong demand in these regions. Middle East & Africa holds 4.2% of market share, followed by South America with 3.7% share, highlighting potential growth opportunities in emerging markets.

Arvind K. Singhal
Managing Director

Exhibit 3.3: PLWPP Bags Market Share (%) Split by Value for Key Geographies (CY2024)



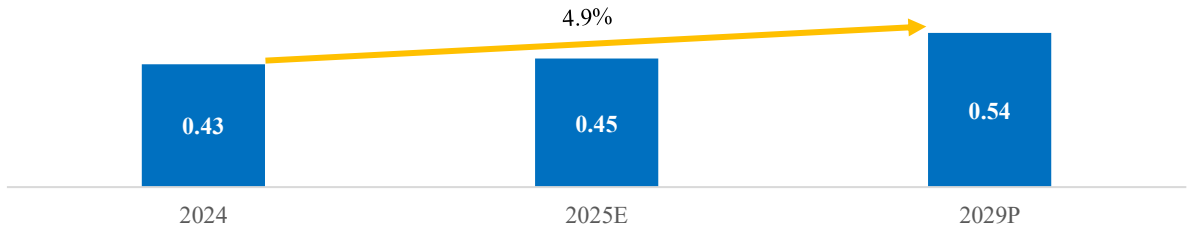
Source: Technopak Analysis, Secondary Research

3.5 North America PLWPP Bags Market

North America remains a significant region in the PLWPP bag market. As of CY2024, the market was valued at USD 0.43 billion, representing 29.6% of global demand. It is projected to grow at a CAGR of 4.9% to reach USD 0.54 billion by CY2029. The market is estimated to reach USD 0.45 billion by CY2025. Within the region, the United States has the dominant share (80-82%), followed by Canada and Mexico (. The United States holds the largest share, 80% - 82%, of the North American market for printed and laminated woven polypropylene (PLWPP) bags. This is primarily due to the strong presence of agriculture, pet food, fertilizer industries and other sectors such as food, grains and pulses, etc. that require durable, moisture resistant, and visually appealing packaging. The Canadian market is comparatively smaller but is experiencing steady growth due to rising adoption of high barrier packaging across the sectors.

Within the North America, the USA PLWPP market was valued at USD 0.35 billion in CY2024, is expected to reach USD 0.37 billion in CY2025, and is forecast to grow at a CAGR of 5.1% to USD 0.45 billion by CY2029. Mexico's PLWPP market was valued at USD 0.032 billion in CY2024, is expected to reach USD 0.033 billion in CY2025, and is forecast to grow at a CAGR of 5.0% to reach USD 0.040 billion by CY2029.

Exhibit 3.4: North America PLWPP Bags Market Size (5-50kg) (in USD billion) (CY) (CAGR %)



Source: Technopak Analysis, Secondary Research

3.6 Overview of Global PLWPP Pinch Bottom Bags

The PLWPP Pinch Bottom bags are particularly valued for their excellent moisture resistance, high durability, and strong visual appeal due to their superior printability, making them ideal across industries mentioned above (section 3.1). Globally, the PLWPP pinch bottom bags market remains a niche segment, currently accounting for less than 0.2% of the overall WPP bags market, however, these bags are gaining traction as a durable, visually appealing, and cost-effective packaging solution in global markets. The global PLWPP Pinch Bottom Bags market is projected to grow at a CAGR of 5–7%, with Asia-Pacific and North America is emerging as key high growth regions driven by rapid industrialization, expanding agriculture, and increasing demand for branded packaging. Additional details, including the features, usability, and other aspects of PLWPP pinch bottom bags, are discussed across various sections of the report.

4. Competitive Mapping of Key Players in Global Packaging Industry

4.1 Key players overview

1. **Mondi Group:** Mondi is a multinational provider of sustainable packaging and paper solutions, offering a diverse portfolio that spans industrial and consumer packaging. The company offers eco-conscious alternatives like paper-based BOPP substitutes and high-performance industrial bags.

Mondi Group Highlights	
Year of Establishment	1967
Headquarters	Vienna, Austria
Geographical Presence	Key operations in Europe, North America, and Africa
Production Locations	100+ production sites in more than 30 countries
Revenue (CY2024)	USD 8.35 billion
EBITDA Margin (CY2024)	14.1%
Capacity (2024)	4,20,000 MTPA
Key Product Categories	Multi-wallpaper bags, flexible plastic packaging, corrugated/rigid packaging, paper-based plastic alternatives, PLWPP bags, PLWPP Pinch bottom bags
Key Industries	Food & Beverages, Pet & Animal Nutrition, Industrial & Construction, Retail & E-Commerce, Stationery & Education
Innovation/Brand Highlights	Focuses on sustainable flexible packaging, paper-based alternatives to plastic, and advanced industrial bags. Offers custom engineered solutions with recyclable BOPP laminated options. In 2024, 87% of their packaging and paper revenue was from products that were reusable, recyclable, or compostable and they have also set up a "Mondi Action Plan 2030 (MAP2030)" for their commitments and targets for sustainable development and performance

Source: Company website, Annual Report, Secondary Research
Note: 1 Euro= 1.08 USD

2. **Amcor Plc**: Amcor is provider of responsible packaging solutions, offering a comprehensive range of flexible and rigid packaging for the food, beverage, healthcare, pharmaceutical, and personal care sectors. The company specializes in flexible packaging, rigid containers, specialty cartons, closures, and related services, catering to some of the world's most recognized brands. With a strong focus on innovation and sustainability, Amcor delivers high performance, recyclable alternatives to traditional packaging materials.

Amcor Plc Highlights	
Year of Establishment	1896 (originated as Australian Paper Mills Company)
Headquarters	Zürich, Switzerland
Geographical Presence	Operations in over 40 countries across Europe, North America, Asia-Pacific, and Latin America
Production Locations	212+ sites globally
Revenue (FY2024)	USD 13.64 billion
EBITDA Margin (FY2024)	14.4%
Capacity (2024)	1.2 million MT
Key Product Categories	Flexible packaging, rigid plastic containers, closures, specialty cartons
Key Industries	Food & Beverage, Healthcare & Pharmaceuticals, Home & Personal Care, etc.
Innovation/Brand Highlights	Amcor emphasizes sustainable packaging solutions, with a focus on recyclable and reusable materials. The company is included in several sustainability indices, such as the Dow Jones Sustainability Index and the FTSE4 Good Index Series.

Source: Company website, Annual Report, Secondary Research

3. **Polytex Fiber (Five Star Holding LLC):** Polytex Fibers is an U.S. based manufacturer focusing in sustainable, high performance flexible packaging solutions. With over four decades of experience, the company offers a

diverse product portfolio that includes PLWPP bags, PLWPP pinch bottom bags, quad seal pouches, roll stock films, and recyclable PE packaging solutions to its customers.

Polytex Fibers Highlights	
Year of Establishment	1980
Headquarters	Houston, Texas, USA
Geographical Presence	North America
Production Locations	Houston, Texas
Revenue (CY2024)	USD 16.7 million
EBITDA Margin (CY2024)	NA
Capacity (2024)	NA
Key Product Categories	PLWPP bags, PLWPP pinch bottom bags, quad seal pouches, roll stock films
Key Industries	Pet food and treats
Innovation/Brand Highlights	Offers 100% recyclable PE packaging structures, Polytex provides a comprehensive range of commercially available packaging solutions made from mono-materials and featuring high PCR content.

Source: Company website, Secondary Research

4. **ProAmpac:** ProAmpac is a US-based flexible packaging company offering customised packaging solutions to various sectors including food, pet care, healthcare, and industrial markets. It emphasizes innovation in recyclable and post-consumer recycled (PCR) packaging.

ProAmpac Highlights	
Year of Establishment	2015 (formed via merger of Prolamina and Ampac packaging companies)
Headquarters	Cincinnati, Ohio, USA
Geographical Presence	Serve 90 countries including countries in North America, Europe, Asia
Production Locations	51 manufacturing centres in eight countries (including U.S., U.K., Canada, Germany, Switzerland, Ireland and Southeast Asia
Revenue (CY2024)	USD 2.5-5 billion
EBITDA Margin (CY2024)	NA
Capacity (2024)	NA
Key Product Categories	Flexible plastic packaging, pouches & bags, roll stock, multi-wallpaper bags, recyclable rigid alternatives, PLWPP bags
Key Industries	Food & Beverage, Pet & Animal Nutrition, Home & Garden, Retail & E-Commerce, Healthcare & Pharma, Industrial & Construction
Innovation/Brand Highlights	Emphasis on sustainable formats like Pro-Active recyclable and PCR-based products. offers advanced printing, lamination, and converting capabilities

Source: Company website, Secondary Research

5. **Hood Packaging:** Hood Packaging operates across the US and Canada, providing both paper and plastic packaging solutions. The company offers a broad range of woven polypropylene bags and has expertise in printing and converting for industrial applications.

Hood Packaging Highlights	
Year of Establishment	1978
Headquarters	Madison, Mississippi, USA
Geographical Presence	USA and Canada
Production Locations	23 manufacturing facilities across North America, including 15 flexible paper packaging plants and 8 plastic packaging production locations in the United States and Canada
Revenue (CY2024)	USD 1-1.5 billion
EBITDA Margin (CY2024)	NA
Capacity (2024)	NA

Arvind K. Singhal
Managing Director

Key Product Categories	Multi-wallpaper bags, flexible plastic packaging, liquid packaging & filling equipment, specialty coated materials, PLWPP bags
Key Industries	Agriculture & Seeds, Industrial & Construction, Pet & Animal Nutrition, Food & Beverage
Innovation/Brand Highlights	Offers diverse formats and closures with printing and converting capabilities tailored to industrial applications

Source: Company website, Secondary Research

6. **Anduro Manufacturing:** Anduro manufactures woven polypropylene packaging bags, primarily catering to the North American market. The company caters to sectors such as pet food, animal nutrition, bird feed, home & garden, and industrial applications. In January 2025, Anduro was acquired by Five Star Holding.

Anduro Manufacturing Highlights	
Year of Establishment	2009
Headquarters	Atlanta, Georgia, USA
Geographical Presence	Primarily in North America and Latin America
Production Locations	San Pedro Sula, Honduras
Revenue (CY2024)	USD 20-50 million
EBITDA Margin (CY2024)	NA
Capacity (2024)	NA
Key Product Categories	PLWPP bags
Key Industries	Pet & Animal Nutrition, Home & Garden, Industrial & Construction
Innovation/Brand Highlights	Adopted practices such as using post-consumer resins, compostable films; solar-powered, GFSI-compliant facility focused on reducing emissions

Source: Company website, Secondary Research

7. **Graphic Packaging Holding Company**: Graphic Packaging is a provider of sustainable consumer packaging solutions, focusing on products made from renewable and recycled materials. The company designs and manufactures a broad array of packaging products, including cartons, multipack cartons, trays, carriers, paperboard canisters, cups, and bowls, primarily utilizing unbleached, recycled, and bleached paperboard.

Graphic Packaging Holding Highlights	
Year of Establishment	1991
Headquarters	Atlanta, Georgia, USA
Geographical Presence	Operations in over 20 countries worldwide
Production Locations	Over 100 facilities globally
Revenue (CY2024)	USD 8.81 billion
EBITDA Margin (CY2024)	USD 1.68 billion (19.1%)
Capacity (2024)	NA
Key Product Categories	Cartons, trays, carriers, paperboard canisters, cups and bowls made primarily from unbleached paperboard, recycled paperboard, and bleached paperboard.
Key Industries	foodservice, household products, beauty and health care
Innovation/Brand Highlights	The Company is pursuing strategies to develop and promote innovative packaging products and applications that align with and capitalize on consumer-driven sustainability trends; developing eco-friendly consumer packaging using renewable resources and creating alternative solutions to replace traditional plastic packaging.

Source: Company website, Annual Report, Secondary Research

8. **JohnPac:** JohnPac specializes in woven polypropylene bags for agricultural, food, and industrial use. The company emphasizes integrated manufacturing and consistent print quality.

JohnPac Highlights	
Year of Establishment	1953
Headquarters	Crowley, Louisiana, USA

Geographical Presence	USA and other markets
Production Locations	Crowley, Louisiana, USA
Revenue (CY2024)	USD 10-50 million
EBITDA Margin (CY2024)	NA
Capacity (2024)	NA
Key Product Categories	Woven PP bags, multi-wallpaper bags, FIBCs, flexible plastic packaging, shipping cartons, PLWPP bags
Key Industries	Agriculture & Seeds, Food & Beverage, Industrial & Construction
Innovation/Brand Highlights	Offers a comprehensive suite of packaging products, including bulk bags and woven polypropylene bags, with in-house USA manufacturing for customisable solutions; Specialises in "above the pallet" offerings, such as stretch films, strapping, and dunnage bag

Source: Company website, Secondary Research

9. **PrintPack:** Printpack Inc. is a U.S.- based manufacturer of flexible and specialty rigid packaging, serving major global brands across food, healthcare, and consumer goods industries.

Printpack Highlights	
Year of Establishment	1956
Headquarters	Atlanta, Georgia, USA
Geographical Presence	USA, Mexico, Europe and other markets
Production Locations	20 manufacturing plants across the United States and Mexico.
Revenue (CY2024)	USD 1.1 billion
EBITDA Margin (CY2024)	NA
Capacity (2024)	NA
Key Product Categories	**Flexible Packaging**: Plastic films, metallized films, aluminium foil, paper with specialized coatings **Rigid Packaging**: Containers and trays for various applications. **Medical Packaging**: Sterile barrier systems and pharmaceutical packaging.
Key Industries	Food & Beverage, Pharmaceutical & Healthcare, Agriculture & Consumer Goods
Innovation/Brand Highlights	First manufacturer of all-plastic labels for PET bottles in 1978, Developed extrusion coating for potato chip bags in 1970, Multiple Flexible Packaging Association (FPA) Achievement Awards, including Gold for Printing and Shelf Impact (2017)

Source: Company website, Secondary Research

10. **Trans-Continental Packaging:** TC Transcontinental is a provider of flexible packaging solutions in North America, with approximately 3,500 employees across a network of 25 operating sites. The company offers a variety of flexible plastic products, including roll-stock, labels, die cut lids, shrink films, bags and pouches and advanced coatings.

Trans-Continental Packaging Highlights	
Year of Establishment	1976
Headquarters	Montreal, Quebec, Canada
Geographical Presence	Canada, USA, Latin America and United Kingdom
Production Locations	25 operating sites in USA, Canada, Latin America
Revenue (CY2024)	CAD 2.81 billion
EBITDA (CY2024)	CAD 0.42 billion
Capacity (2024)	NA
Key Product Categories	Flexible plastic products – Roll-stock, labels, die cut lids, shrink films, bags and pouches and advanced coatings.
Key Industries	Dairy, coffee, meat and poultry, pet food, agriculture, beverage, home and personal care products, and consumer and medical products.

Source: Company website, Annual Report, Secondary Research

Arvind K. Singhal
Managing Director

11. **Lucky Star Weaving Co. Ltd. :** Lucky Star Weaving Co., Ltd., founded in 1982 and based in Thailand, is manufacturer of woven polypropylene packaging serving variety of sectors such as Agriculture ,Pet &Animal Nutrition, Petrochemical, Construction &Chemical and others .The company has also introduced a Sustainable Packaging Series as part of its efforts to reduce carbon footprint and support the circular economy.

Lucy Star Weaving	
Year of Establishment	1982
Headquarters	Nakhon Pathom, Thailand
Geographical Presence	Thailand
Production Locations	Thailand
Revenue (CY2024)	USD 5 million
EBITDA (CY2024)	NA
Capacity (2024)	NA
Key Product Categories	Plastic woven bag - Rice bags and agriculture, Seed bags, Bags of cement and minerals, Fertilizer bags and agricultural chemicals, Pet food bags, Petrochemical bags and plastic pellets, Flour bag, Shopping bag
Key Industries	Agriculture & Seeds, Pet &Animal Nutrition, Petrochemical, Construction &Chemical
Innovation/Brand Highlights	Holds certifications such as ISO 9001, ISO 50001, GMP, HACCP, C-TPAT, and BRCGS

Source: Company website, Annual Report, Secondary Research

12. **Trung Dong Corporation:** Trung Dong Corporation is a Vietnam based manufacturer of polypropylene woven packaging products. The company operates a closed loop, modern production chain from polypropylene thread imports to high quality printing and finishing of PP bags ensuring efficiency, consistency, and quality control.

Trung Dong Corporation	
Year of Establishment	1990
Headquarters	Dong Nai Province, Vietnam
Geographical Presence	Vietnam
Production Locations	2 units Dong Nai Province, Vietnam
Revenue (CY2024)	USD 1 million
EBITDA (CY2024)	NA
Capacity (2024)	46 million bags per month (550 million bags per annum)
Key Product Categories	PP Woven Bags, Flexo-Printed PP Woven Bags, BOPP/MCPP Laminated PP Woven Bags, PP Woven Geotextiles, HDPE / LDPE Liner Bags
Key Industries	Agriculture & Food, Industrial &Construction, Chemicals
Innovation/Brand Highlights	Member of Vietnam Chamber of Commerce and Industry (VCCI). Holds certifications such as ISO 9001:2015, ISO 14001:2015, FSSC 22000, also certified by Norwegian DNV (Det Norske Veritas) in August 2006 and has received multiple Certificates of Merit from the Ho Chi Minh City People's Committee

Source: Company website, Annual Report, Secondary Research

13. **C.P. Poly-industry Co., Ltd:** Based out of Bangkok, Thailand, C.P. Poly-industry Co., Ltd is a packaging solutions provider with certified manufacturing units across Thailand and Vietnam. The company manufactures woven bags composed of polyethylene, polypropylene, food grade packaging, and industrial materials, exporting to key global markets including the USA, Canada, Australia, New Zealand, Southeast Asia.

C.P. Poly-industry Co., Ltd:	
Year of Establishment	1989
Headquarters	Bangkok, Thailand
Geographical Presence	Key operating countries are Thailand & Vietnam, exports to USA, Canada, Australia, New Zealand, Southeast Asia and other countries
Production Locations	6 manufacturing units spread across Vietnam and Thailand

Arvind K. Singhal
Managing Director

TECHNOPAK ADVISORS PVT. LTD.

Revenue (CY2024)	USD 8 million
EBITDA (CY2024)	NA
Capacity (2024)	NA
Key Product Categories	Woven Bag, Food Packaging, PVC Sheet & Coating, PVC Pipe & Fitting, Paper Cores, Nonwoven Fabrics
Key Industries	Food & Agriculture, Construction & Industrial, Chemical
Innovation/Brand Highlights	Holds certifications such as FSSC 22000, GMP, HACCP, ISO 14001, ISO 9001, and C-TPAT

Source: Company website, Annual Report, Secondary Research

14. **EPP Vietnam Co. Ltd.:** EPP Vietnam Co., Ltd is a Vietnam based manufacturer of FIBC bags, PP woven bags, laminated kraft paper bags, woven Fabric, and agricultural films. With a capacity of 6 million units annually, the company serves global markets with stable quality and competitive pricing.

EPP Vietnam	
Year of Establishment	2016
Headquarters	Hung Yen Province, Vietnam.
Geographical Presence	Exports to Australia, New Zealand, the United States, Canada, Germany, Norway, Portugal, Africa, UAE, Chile, and other countries
Production Locations	Operates one manufacturing unit located in Northern Vietnam
Revenue (CY2024)	NA
EBITDA (CY2024)	NA
Capacity (2024)	6 MT per annum
Key Product Categories	FIBC Bags, Woven Polypropylene Bags (includes BOPP Laminated Woven PP Bags, AD Star Bags), Laminated kraft paper bags, Woven Fabric, Agricultural Films
Key Industries	Food & Beverages,
Innovation/Brand Highlights	Hold certifications such as ISO9001:2015, ISO14001:2015, ISO22000:2005, HACCP, FSSC22000, BRC

Source: Company website, Annual Report, Secondary Research

15. **Shining Star Plastic Co., Ltd.:** Shining Star Plastic Co., Ltd. is a China based manufacturer of polypropylene based flexible packaging solutions, specializing in woven, BOPP laminated, and bulk bags for global clients in the agriculture, construction, chemical and consumer goods. The company exports around 1000 products globally.

Shining Star Plastic Co., Ltd.	
Year of Establishment	2003
Headquarters	Hong Kong, China
Geographical Presence	Operates primarily in China, with additional manufacturing footprints in Vietnam and Cambodia, and exports primarily to the USA
Production Locations	3 manufacturing units in China, Vietnam and Cambodia
Revenue (CY2024)	NA
EBITDA (CY2024)	NA
Capacity (2024)	24 M pieces of PP woven Bags annually of each SKU 12 M pieces of BOPP Bags annually of each SKU 24 M pieces of FIBC Bags annually of each SKU
Key Product Categories	PP Woven Packaging (FIBC/Bulk bags, Woven Polypropylene bags, BOPP bags, Paper poly bags, PP valve bags, BOPP valve bags), Paper Packaging, Pouches, Rolling Films, Non-Woven Bags, Aluminium Packaging (cans, bottles and lids)
Key Industries	Agriculture & Food, Industrial &Construction, Chemicals, Retail Packaging
Innovation/Brand Highlights	Hold certifications such as ISO 9001:2008, 9001:2015, HACCP

Source: Company website, Annual Report, Secondary Research

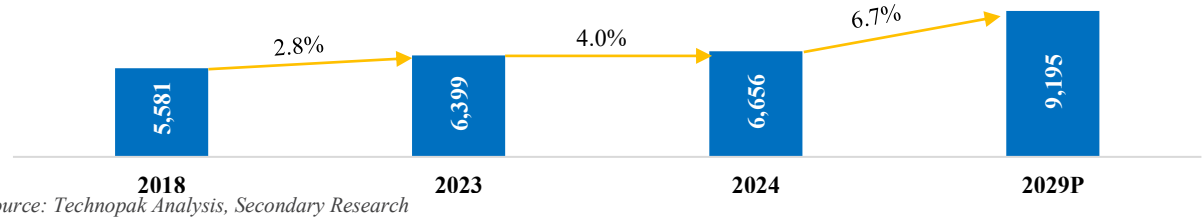
5. Overview of the Indian Flexible Bulk Packaging Industry

5.1 Indian Packaging Market Overview

The India's packaging industry spans a variety of materials, formats, and applications, serving multiple industries. From food products such as grains and pulses – rice, dal, lentils, etc., flour & spices, sugar, salts, fruits & nuts, animal & pet foods, agriculture, seeds, charcoal, detergents powders & granules, fertilizers, chemicals, cement, tile adhesives, building materials, mineral bags, shopping bags, e-commerce and many others, effective and innovative packaging solutions are essential for product protection, preservation, branding, and enhancing consumer convenience. Additionally, government initiatives aimed at promoting organized retail and food safety are driving the need for high quality, standardized packaging solutions.

In FY2024, the Indian packaging market was valued at INR 6,656 billion, marking a growth of 4.0% CAGR from INR 6,399 billion in FY2023, which grew at a CAGR of 2.8% from FY2018. Further, the market is projected to expand at a CAGR of 6.7%, reaching INR 9,195 billion by FY2029.

Exhibit 5.1: Indian Packaging Market Size – By Value (In INR Billion) (FY)

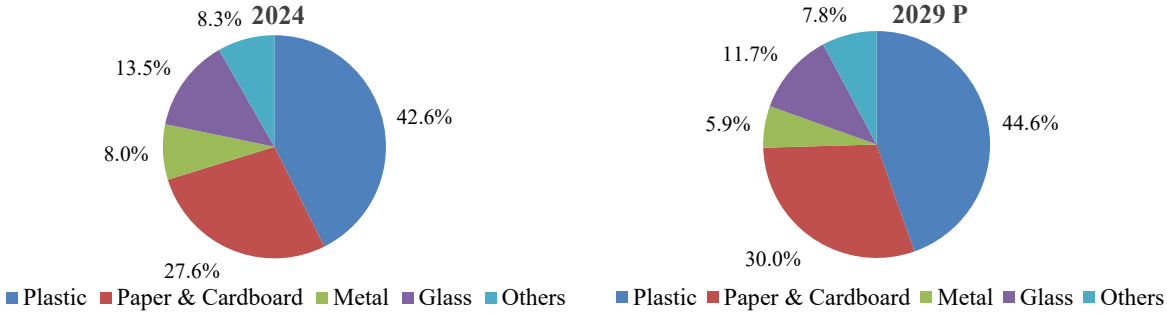


Source: Technopak Analysis, Secondary Research
Numbers in percentage represents CAGR

5.1.1 Indian Packaging Market - By Material

Packaging includes a variety of materials such as paperboard, metals, plastics, wood, glass, and others. However, among all the available alternatives, 'Plastic Packaging' is rapidly becoming the fastest growing trend in the industry. Plastics have become central to our "convenience consumer culture." Many traditional materials, including paperboard, metals, wood, and glass, have been replaced by plastics in numerous applications due to their favourable cost-to-performance ratio.

Exhibit 5.2: Indian Packaging Market Size – By Material Type – By Value (FY)



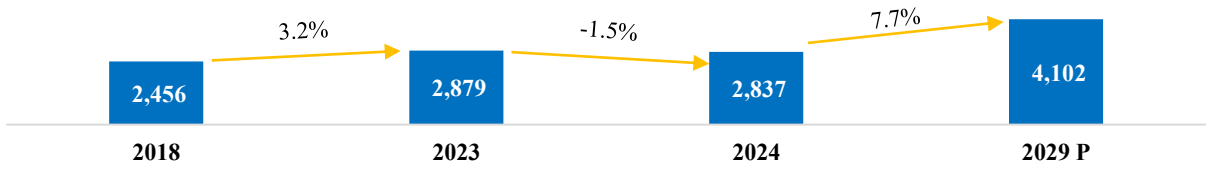
Material by Value (INR Billion)	FY2024	FY2029 P	CAGR (FY2024-29)
Plastic	2,837	4,102	7.7%
Paper & Cardboard	1,839	2,755	8.4%
Metal	534	547	0.5%
Glass	898	1,084	3.8%
Others	548	719	5.6%

Source: Secondary Research, Technopak Analysis

Arvind K. Singhal
Managing Director

Note: Other includes Cloth, Jute and Wood

Exhibit 5.3: Indian Plastic Packaging Market Size – By Value (In INR billion) (FY)



Source: Technopak Analysis, Secondary Research

The plastic packaging consists of either monolayer or multilayer of plastics. Multi-layered laminated plastic sheets primarily comprise Polyethylene (PE), Polypropylene (PP), Polyethylene Terephthalate (PET), and Polyvinyl Chloride (PVC). Among these, PE and PE together contribute to approximately 65% of the total polymer consumption in the flexible plastic packaging industry.

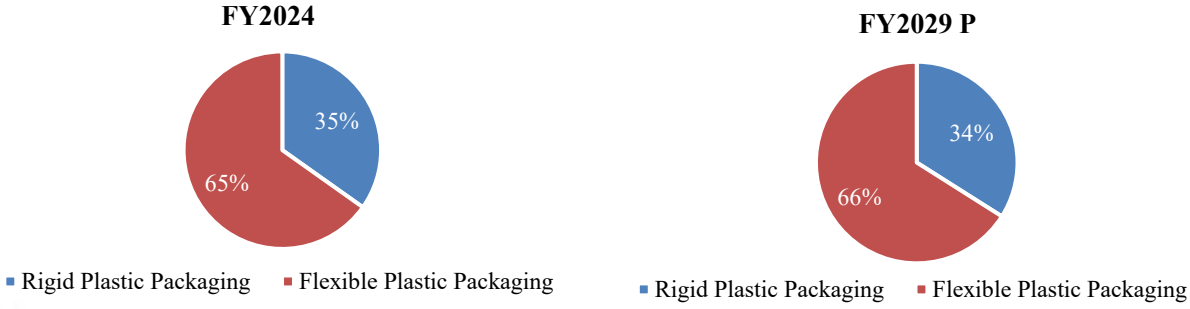
Exhibit 5.4: Classification (by material type) in Indian Plastic Packaging – Share (%) & Market size – By Value (in INR billion) (FY)

Source: Technopak Analysis

Polyethylene and Polypropylene are used in flexible plastic packaging. Po006Cyethylene, accounting for a significant share due to its low cost, flexibility, and durability, is available in various forms, primarily Low-Density Polyethylene (LDPE), Linear Low-Density Polyethylene (LLDPE), majorly used for pouches, bags, and films for snacks, frozen foods, dairy products, and edible oils; and High-Density Polyethylene (HDPE) used in grocery bags, cement sacks, gravel/stone bags etc. Polypropylene is another key material in flexible plastic packaging, valued for its low density, high heat resistance and resistance to chemicals and moisture. It is primarily used in applications for packaging, confectionery wrappers, woven sacks, and BOPP films.

The Indian plastic packaging market is divided into two segments based on product type: Rigid Plastic Packaging and Flexible Plastic Packaging.

Exhibit 5.5: Indian Flexible Plastic Packaging Market Size – By Value (in INR billion) – By Type (FY))



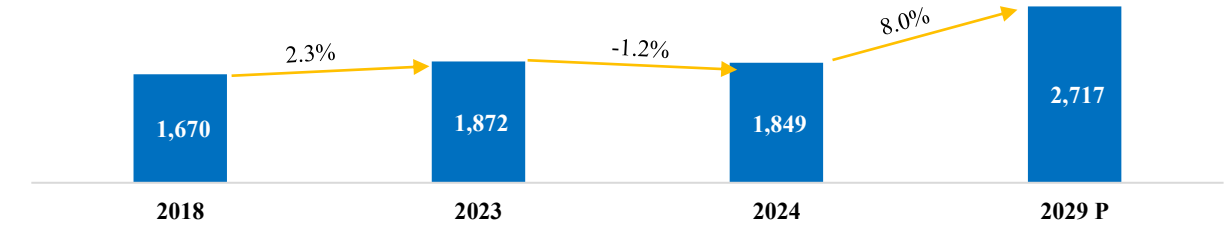
Arvind K. Singhal
Managing Director

Material by Value (INR Billion)	FY2024	FY2029 P	CAGR (FY2024-29)
Rigid Plastic Packaging	988	1,385	7.0%
Flexible Plastic Packaging	1,849	2,717	8.0%

Source: Technopak Analysis, Secondary Research

Flexible Plastic Packaging (FPP): Flexible plastic packaging makes use of flexible plastic films or laminates, such as Polyethylene (PE) and Polypropylene (PP), and others flexible plastic products of PET etc. often combined with materials. Representing 65% of the plastic packaging market in FY2024, the flexible plastic packaging market was valued at INR 1,849 billion and is expected to reach INR 2,717 billion in FY2029, growing at a CAGR of 8.0% over the next five years.

Exhibit 5.6: Indian Flexible Plastic Packaging Market Size – By Value (in INR billion) (FY))

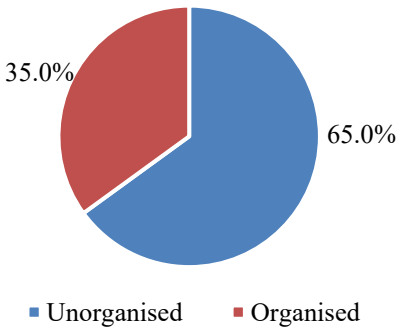


Source: Technopak Analysis, Secondary Research

Flexible packaging is one of the fastest growing segments in the Indian packaging industry, driven by the rise in FMCG consumption, e-commerce, food delivery services, and changing consumer lifestyles. It is defined by the use of non-rigid materials to create packaging that can easily change shape, offering lightweight, cost-effective, and sustainable solutions across various sectors. Based on the material types, the plastic flexible packaging can be broadly classified into Polyethylene (PE), Polypropylene (PP) and other materials.

Exhibit 5.7: Share of organized and unorganized sector - flexible plastic packaging in India (FY2024)

India's flexible plastic packaging industry is characterized by market structure comprising both organized and unorganized players. The organized sector consists of large and medium sized companies with modern manufacturing facilities, advanced machinery, and adherence to quality and regulatory standards. These players usually cater to national and international brands, offering consistent quality, large scale production, and innovative packaging solutions. The unorganized sector, on the other hand, is made up of small-scale manufacturers and local converters. The organized sector accounts for approximately 35% of the total flexible packaging market share, while the remaining 65% is held by the unorganized sector in terms of value in FY2024.



Source: Technopak Analysis, Secondary Research

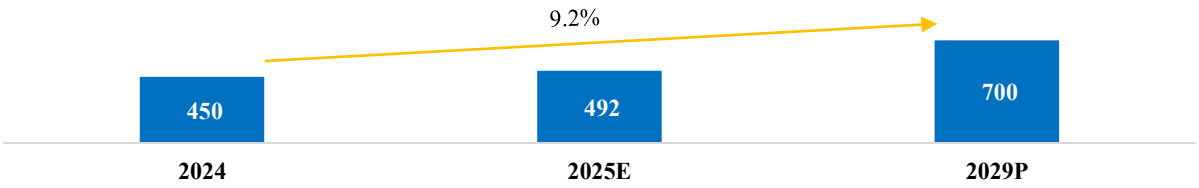
5.1.2 Overview of Indian Woven Polypropylene (WPP) Bags

WPP bags are a pivotal component in the flexible packaging industry in India, is known for their durability, lightweight, cost-effectiveness, and versatility. These bags have become crucial for various applications ranging from grains and pulses – rice, dal, lentils, etc., flour & spices, sugar, salts, fruits & nuts, animal & pet foods, agriculture, seeds, charcoal, detergents powders & granules, fertilizers, chemicals, cement, tile adhesives, building materials, mineral bags, shopping bags, e-commerce and other industrial packaging materials driving their growth. The domestic market is being propelled by the growing demand for sustainable and reusable packaging solutions. WPP bags are well positioned to meet this demand due to their recyclability and long lifespan. The ongoing transition toward environmentally friendly packaging has further accelerated the growth of the WPP bag segment. In response,

manufacturers are increasingly investing in innovative production techniques aimed at enhancing recyclability and minimizing the reliance on non-renewable resources.

Driven by the above factors, the PP woven bags market in India is expected to grow at a CAGR of 9.2% during the following five years and will reach to INR 700 billion in FY2029 from a market value of INR 450 billion in FY2024.

Exhibit 5.8: Indian Woven Polypropylene Bags Market Size – By Value (in INR billion) (FY)



Source: Technopak Analysis, Secondary Research

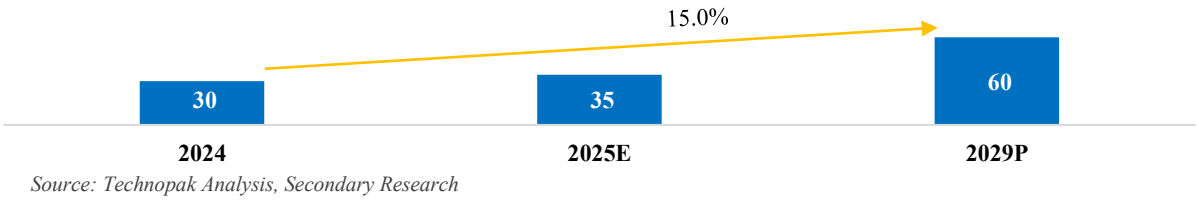
Indian WPP Bags are categorized into PLWPP bags, Uncoated WPP bags, Coated WPP bags, and others. Coated WPP bags dominate the Indian market with 61% share, followed by uncoated WPP bags at 20%, while PLWPP bags account for only 6.5%–7%, as they are a relatively new to the market as compared to others and in the growth phase. However, the share of PLWPP Bags is expected to increase over the next 4 - 5 years and is estimated to capture around 8.5%-9% of the total Indian WPP Bags by FY2029. Growing emphasis on branding, shelf appeal, and sustainability is driving shift towards adoption of PLWPP Bags from WPP bags.

5.1.3 Overview of Indian Printed and Laminated Woven Polypropylene (PLWPP) Bags

The Indian flexible packaging market, one of the fastest growing globally, has seen a surge in demand for PLWPP bags due to their cost-effectiveness and adaptability. These bags are crafted by laminating a BOPP film onto woven polypropylene fabric, creating a robust packaging solution that combines the strength of woven polypropylene with the high-quality printability and moisture resistance of BOPP film. These bags are widely used for packaging commodities like rice, wheat, pulses, fertilizers, cement, and pet food, catering to both domestic and export markets.

The expansion of organized retail and online grocery platforms has increased the need for durable, visually appealing packaging that can protect products during transit. Manufacturers in India, such as Knack Packaging Limited, Kaypee Polyfab Private Limited, Lakhdatar International Private Limited and many other players, have capitalized on this demand by investing in advanced production technologies to produce high-quality PLWPP bags.

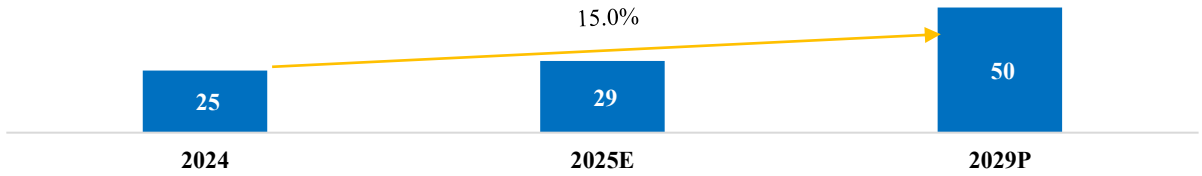
Exhibit 5.9: Indian PLWPP Bags Market Size – By Value (in INR billion) (FY)



Source: Technopak Analysis, Secondary Research

Coated PP woven bags, the highest share of the WPP bag market, have long been a popular choice in packaging due to their affordability and functionality. However, the PLWPP bags are emerging as a superior alternative, poised to capture the market share of coated PP woven bags in the future. This shift is driven by the bags' improved shelf appeal and performance benefits. India's domestic manufacturing base and growing export capabilities are further reinforcing the competitiveness of PLWPP bags. The growing adoption of PLWPP bags is further supported by the country's robust BOPP film production capabilities, a key raw material in their manufacture. The manufacturers are significantly increasing their BOPP film production capabilities to meet both domestic and international demand.

Exhibit 5.10: Indian PLWPP Bulk Bags (5-50kg packaging) (in INR Billion) (FY)



Source: Technopak Analysis, Secondary Research

The PLWPP bulk bags (5-50kg) market was valued at INR 25.0 billion in FY2024 and is expected to reach INR 50.0 billion by FY2029, expanding at a CAGR of 15.0% during the given period. This CAGR growth of 15% is fuelled by a combination of factors, including the current low market base of INR 25.0 billion in FY2024, which sets the stage for high percentage growth. The industry is also maturing, with increasing awareness among manufacturers and end users about the functional and branding advantages of PLWPP bags. The PLWPP bags (5–50 KG) can be preferred choice across industries where product protection, branding, and transportation efficiency are essential. With the Indian market's increasing emphasis on packaging innovation and sustainability, the demand for these versatile bags continues to grow in both domestic and international markets.

The PLWPP bags are emerging as a reliable packaging solution for highly automated manufacturing and packaging operations. Their consistent dimensions, high tensile strength, and durability make them well-suited for high-speed machinery, helping to reduce jams, misfeeds, and line stoppages. Features such as easy mouth opening, pre-gusseted, perforated, or micro-punched to facilitate air release, and strong sealing capabilities ensure efficient filling and secure closure, even under demanding conditions. The laminated finish enhances stacking strength and pallet stability, while the ability to print high-resolution barcodes and traceability data supports digital inventory systems. With options for customization—such as UV resistance, antistatic treatments, and user-friendly opening features—BOPP bags offer flexibility for diverse applications, contributing to increased throughput, reduced waste, and optimized equipment performance.

Printed and Laminated Woven Polypropylene (PLWPP) Pinch Bottom Bags

[1]The market for PLWPP pinch bottom bags in India is currently quite niche and emerging. Despite the broader WPP bag market being well-established across sectors mentioned above (section 5.1.2), the PLWPP pinch bottom bags represent less than 0.5% of the total WPP bags market in India. however, the segment is expected to witness CAGR growth of over 8%-10% in the next five years, as the product gains increasing recognition for its innovative design and advanced functional features, leading to wider acceptance across various end-use industries.

The demand for PLWPP pinch bottom bags will be driven by branded product categories—particularly food grains, pet food, animal feed, seeds, specialty chemicals and many other sectors—where packaging aesthetics, moisture protection, and strength are critical. These bags are made by laminating reverse printed Biaxially Oriented Poly Propylene (BOPP) film onto woven polypropylene fabric using extrusion lamination. The pinch bottom structure coupled with heat sealed laser cut closure ensures a secure, leak proof finish that withstands handling and transportation stress. Their design offers added protection against tear, leakage and moisture, making them ideal for bulk packaging. Further, the sealed pinch closure of the PLWPP pinch bottom bag safeguards contents from environmental exposure which helps in maintaining product quality and hygiene. Designed with a box-like, square structure of these bags improves stacking stability and optimizes space, which is ideal for export, storage, and logistics. The unique pinch bottom design not only enhances shelf stability but also supports easy filling and secure sealing. The easy-open and zipper closure options with pinch bottom bags allows users to conveniently open, reseal, and

Note: The pictures are for representation purpose only and has been taken from company website

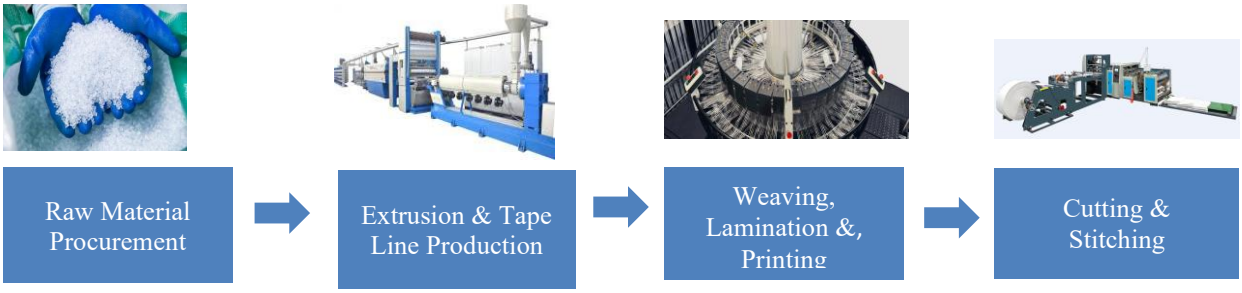
securely store the product after each use. With advancements in manufacturing technology, pinch bottom bags are customized in a variety of sizes and custom prints, allowing businesses to enhance their branding while ensuring the bags remain durable and reliable. The PLWPP pinch bottom bags support high quality rotogravure printing, resulting in vibrant, glossy visuals and better brand recognition. Further, these bag offers six-side branding facility (like a brick shape) which provides ample surface area for high impact branding on all sides, offering shelf visibility and stronger retail presence. The PLWPP pinch bottom bags act as self-marketing tools, helping brand owners enhance shelf appeal and drive sales at retail locations, while also offering superior damage protection.

Additionally, the high investment in packaging design, artwork, and cylinder development fosters stronger customer retention, as even minor changes or defects can impact brand image making consistency and supplier reliability critical. Some of the players manufacturing PLWPP pinch bottom bags in India are Knack Packaging Limited, Lakhdatar International Private Limited, Lincon Polymers Private Limited, Regal Woven Sacks Private Limited etc. The PLWPP pinch bottom bag market in India is expected to gradually expand from its current niche status, especially as brands prioritize better packaging differentiation.

Knack Packaging Limited holds approximately 10.1% market share in the Indian market for flexible bulk PLWPP bags, including PLWPP pinch bottom bags for FY2025.

5.2 Value Chain of PLWPP bags and PLWPP Pinch Bottom bags

Exhibit 5.11: Value Chain of PLWPP Bags



Raw Material Procurement: The value chain of PLWPP bags begins with raw material procurement, which includes PP Raffia H030SG & H030RG, PP Lamination H350FG & H350EC, BOPP film for lamination, and various additives such as UV stabilizers, colorants, and anti-blocking agents. In addition, specialized inks and adhesives are sourced for printing and lamination. These materials form the foundation of the bag's structure, aesthetics, and durability.

The cost of virgin polypropylene has shown significant volatility, rising from INR 88,054 per metric ton in January 2024 to INR 93,185 per metric ton in April 2025, marking a 5.8% increase. The imports of PP grew from USD 1.27 billion in 2018 to USD 2.05 billion in 2023, registering a CAGR of 10.0%. The growing import reliance exposes the value chain to risks such as shipping delays, currency fluctuations, and rising freight costs.

Additionally, competing demand from sectors as mentioned above (section 5.1), along with tightening environmental regulations, is placing further pressure on PP granules availability. These factors directly impact production planning, cost structures, and supply chain stability across the manufacturing process.

Extrusion & Tape Line Production: The extrusion and tape line stage are a core component in the value chain of PP woven and PLWPP bag manufacturing. Here, the polypropylene granules are melted and formed into thin plastic films, which is then slit into tape yarn. These yarns are then stretched to enhance strength and flexibility which are wound onto spools and later used to weave the fabric. This stage demands high capital investment, precise process control, and automation to maintain consistent tape tenacity and surface quality.

Weaving: In this process, the stretched polypropylene tapes are woven together to form a strong and flexible fabric. Using circular or flat looms, the tapes are interlaced, lengthwise (warp) and crosswise (weft), to create a mesh like woven fabric. This woven fabric serves as the structural core of the PLWPP bag, giving it the strength to hold heavy products like grains, fertilizers, and cement.

Printing: Printed sacks are produced using rotogravure or flexographic printing machines, Printing adds custom branding and essential product information. Quality here impacts both product appeal and regulatory compliance. Misprints or colour inconsistency can lead to rejection or rework, affecting profitability. Flexo printing is integrated tightly into the value chain as a value adding process, especially for retail and export markets.

Lamination (BOPP): In PLWPP bag production, woven fabric is laminated with a BOPP film using extrusion coating or adhesive lamination. This adds aesthetic and functional value enhancing barrier properties, moisture resistance, and printability. Lamination must maintain bond strength and surface smoothness, especially for high-end packaging. This stage adds brand value and shelf appeal, increasing the final product's marketability.

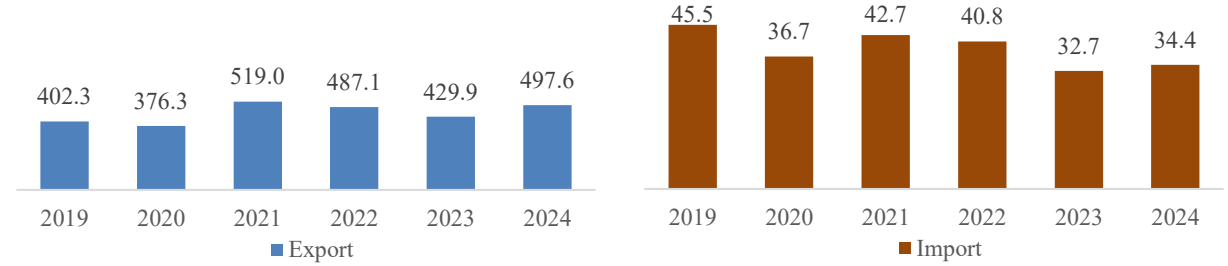
Cutting & Stitching: At this stage, woven fabric either in tubular or flat form is cut into specific dimensions based on the customer's requirements. This is followed by precision stitching, where industrial sewing machines are used to create the final shape of the bag, whether it involves side stitching, bottom stitching, or the incorporation of features like gussets, liners, handles, or zippers. This stage adds significant value by ensuring dimensional accuracy, improving the overall strength and durability of the bags, and allowing for product customization.

Vertical Integration in PLWPP Manufacturing: Companies control multiple stages of production—from PP granule processing into tape yarn extrusion, weaving of fabric, BOPP film extrusion, printing, lamination, cutting, stitching, and even in-house design and logistics —all within a single facility. Vertical integration offers several advantages, including reduced dependence on third-party suppliers, improved quality control, faster turnaround times, and greater flexibility in customization and scalability. Knack Packaging Limited follows vertically integrated manufacturing process (from PP granule processing to tapes, fabric, printing, lamination and packaging the final products of PLWPP bags and PLWPP pinch bottom bags) at its plant in Gujarat.

5.3 Import and Export Trends for Woven Polypropylene (WPP) Bags (Sacks and bags)

India's trade dynamics for woven polypropylene sacks and bags have evolved significantly over recent years, reflecting shifting global demand, domestic consumption patterns, and supply chain realignments. India's exports of WPP bags have increased from USD 402.3 Mn in CY2019 to USD 497.6 Mn in CY2024 at a CAGR of 4.3%. Furthermore, the imports have reduced from USD 890.7 million in CY2019 to USD 1329.4 million in CY2024, a drop in the CAGR of -5.4%. The rise in exports—particularly in CY2021 and CY2024, indicates heightened demand of Indian WPP bags in the international markets, driven by rising requirements across various key sectors.

Exhibit 5.12: Indias Trade of Woven Polypropylene Bags (Sacks and bags) (USD Mn) (CY)



Source: ITC Trade Map, Technopak Analysis, HSN Code-39232990, 63053300, 46029000, 48193000

5.4 Growth Drivers for WPP and PLWPP bags

- **Increasing Demand from Agriculture & Food Sectors:** The agriculture industry is a key consumer of woven sacks. Rising demand for inputs like hybrid seeds, fertilizers, and warehousing services is boosting market opportunities. India's GVA from agriculture, forestry, and fishing grew from INR 40.99 thousand billion in FY2022 to INR 46.92 thousand billion (at current price) in FY2024, with a CAGR of 7.0%.

- **Increasing Demand from growing Construction Industry in India:** India's growing construction and infrastructure sector is boosting demand for woven sacks, especially for cement packaging. As the world's second largest cement producer, India had 553 MTPA installed capacity as of April 2024. With 150–160 MT capacity addition planned by FY28, driven by housing, infrastructure, and smart city projects, the sector shows strong growth momentum.

- **Increasing demand for other key sectors**: Apart from agriculture and construction, several other industries (please refer to section 5.1.2) may contribute to the rising demand for WPP and PLWPP bags owing to their key features such as high printability, lightweight design, resistance to tearing and moisture, superior strength and durability, and the eco-friendly nature of PLWPP bags.

- **Rise in B2B Trade:** India's growing B2B trade driven by industrial growth, e-commerce, and government initiatives like Make in India is fuelling demand for durable packaging. WPP bags, valued for their strength and cost-efficiency, has positioned PP woven bags as one of the preferred packaging solutions across sectors to meet rising bulk transport and storage needs.

- **Export Opportunities**: India's emergence as a manufacturing hub has boosted exports of packaged goods, across several industries. WPP and PLWPP bags, meeting international standards (e.g., ISO 21898:2004, ISO 9001:2015, ISO 14001:2015, BRCGS certificate etc.), support this growth by providing reliable packaging solution for global markets.

- **Environmental Regulations Favouring Recyclable Materials:** Stringent regulations against single-use plastics have prompted industries to adopt more sustainable packaging options. WPP bags, being reusable and recyclable, have gained favour as an alternative.

In addition to the points mentioned above, several other key growth drivers for WPP and PLWPP bags (i.e. Rise of Branding in Bulk Commodities, Enhanced Barrier Properties, Strength & Durability, Eco-friendly and Lightweight Nature, Enhanced Printability, Evolution of PLWPP Pinch Bottom Bags, Smart Packaging Features etc.) are outlined in Section 3.2 of the report.

5.5 Barriers to Entry and key Challenges

- **High Capital Investment:** Producing PP and PLWPP bags requires specialized machinery, such as extrusion machines, Film Extrusion Line (for PLWPP bags), weaving looms (for PP woven bags), Printing, and

lamination systems. These machines are expensive and require significant upfront investment. New entrants with smaller operations may struggle to compete on price with established players who produce at high volumes.

- **Raw Material Access:** Both WPP and PLWPP bags rely on polypropylene resin, a petroleum-based product. Established manufacturers often have long-term contracts with suppliers, securing better pricing and reliable access. New entrants may face higher costs or supply chain disruptions, especially in volatile markets.

- **Process complexation and ERP requirements**: The production of PLWPP bags involves multiple stages—tape extrusion, weaving, lamination, printing, cutting, and stitching. Each SKU may require specific raw materials and settings, making the process time consuming and complex. To ensure timely delivery and consistency, companies must implement strict SOPs and rely on robust ERP systems for seamless coordination.

- **Graphics & Printing Cylinder Management**: High quality printing with customized, creative graphics is crucial for branding in PLWPP bags. This demands precision in designing, cylinder procurement, and color accuracy. New players may struggle with the high cost, technical know-how, and coordination needed for cylinder manufacturing, storage, and usage, which can impact quality and turnaround time.

- **Market Competition:** India has a robust packaging industry with players like Knack Packaging Limited, Kaypee Polymer Private Limited, Sah Polymers Limited, Kaypee Polyfab Private Limited, Lakhdatar International Private Limited, Shri Maa Polyfabs Limited etc., into the manufacturing of PLWPP bag. These companies have brand recognition, distribution networks, customer loyalties etc. The market is highly competitive, with new entrants may find it difficult to sustain during the initial phase while competing with incumbents.

- **Regulatory Environment:** The regulatory framework in India imposes significant hurdles, particularly for packaging materials used in food, pharmaceuticals, and chemicals. Compliance with environmental, safety, and quality standards is mandatory, adding to operational complexity and costs. Key regulatory concerns include environmental regulations, such as waste management, emissions control, and the use of recyclable or biodegradable materials, particularly as governments and consumers increasingly prioritize sustainability.

- **Labour Dependency and Skill Requirements**: Manufacturing flexible packaging requires a large workforce and involves multiple manual processes. Skilled and experienced operators are essential for critical stages like lamination, printing, and quality control. Recruiting, training, and retaining skilled labour becomes a critical challenge, particularly in regions with high labour turnover or where industrial skill levels are low.

5.6 SWOT Analysis for PLWPP bags

Strength

- **Strength, Durability and Wide Application**: WPP and PLWPP bags are used across diverse sectors as mentioned above due to their excellent strength, durability, tear-resistance, and protection against moisture and UV light, making them a staple in bulk packaging (5 kg to 75 kg range). This protective barrier safeguards the packaged products from damage, helping maintain their quality and prolong shelf life.

- **Cost-Effectiveness:** Flexible bulk packaging including WPP and PLWPP bags provides notable benefits over traditional rigid packaging in terms of cost efficiency. Its lightweight structure helps lower transportation costs, while the reduced material usage makes it more economical to produce. Additionally, WPP and PLWPP bags can be reused multiple times, adding to lifecycle cost efficiency.

- **Customization Potential, Enhanced Printability and Branding opportunity**: These bags offer exceptional customization capabilities in terms of size, shape, color, and print design. These bags support high quality printing (e.g. rotogravure, flexographic), enabling vibrant, multi-color graphics and full-surface branding on

all sides, including the top and bottom (in pinch bottom formats). Moreover, these bags function as self-mobile marketing tools—when reused or carried by consumers, they continue to promote the brand in both retail spaces and everyday environments, thereby increasing product exposure and positively influencing buying decisions.

- **Eco-friendly**: PLWPP bags can be recycled and reprocessed to manufacture new products—helping to minimize plastic waste. These bags offer a more sustainable alternative to conventional packaging options, with lower carbon emissions and a reduced environmental impact when compared to materials like single-use plastics, HDPE, and other rigid packaging formats.

- **Adaptable to Value-Added Features**: The PLWPP bags has ability to incorporate a wide range of value-added features that enhance functionality, usability, and shelf appeal. Metalized window feature for product visibility, Easy open peel off features, re-closable zippers and handles for portability allows the manufacturers and brands to cater to specific product requirements and consumer preferences, giving them a competitive edge in both B2B2C markets.

- **Strong Domestic Supply Chain for Raw materials**: India also benefits from a strong domestic supply chain for raw materials such as polypropylene granules, BOPP films, and printing inks, ensuring stable sourcing of the raw materials. Major petrochemical producers like Reliance Industries, Indian Oil Corporation, and ONGC supply polypropylene resin domestically can reduce the industry's dependency on imports.

- **Format Versatility**: WPP and PLWPP bags provide excellent structural versatility and adaptability, with options like Pinch Bottom Bags, Block Bottom Bags, Bottom Gusset Bags, and Handle Bags. These packaging formats can be customized in terms of design, shape, and closure mechanisms, offering improved functionality, better branding opportunities, and enhanced ease of handling.

Weaknesses

- **Environmental Perception**: Despite recyclability, WPP and PLWPP bags are plastics, may face issues from environmentalists and regulatory bodies pushing for reduced plastic usage, which could impact public perception and demand.

- **Limited Recyclability and Infrastructure Gaps**: Flexible packaging often consists of multi-layered materials (like plastic film and foil laminates), making it difficult to separate and recycle.

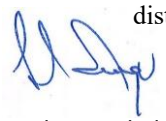
- **Raw Material Dependency**: The WPP and PLWPP bags are derived from petroleum-based materials making them vulnerable to crude oil price fluctuations and global supply chains, exposes the industry to cost fluctuations and potential shortages, especially with India's partial dependence on imports.

- **Regulatory Compliance Costs**: Adhering to standards like Plastic Waste Management Rules and FSSAI requirements involves significant expenses for certifications (e.g., BIS, ISO) and waste management systems, straining smaller players.

- **Shrinkage or Wrinkling Under Pressure**: Flexible films and laminates can shrink, wrinkle, or deform under pressure, heat, or improper handling, affecting shelf appearance and product presentation.

Opportunities

- **Growth in Key sectors fuelling demand for flexible packaging:** With the growth of sectors such as food products, grains and pulses, animal and pet foods, agriculture, seeds, charcoal, detergent powders and granules, fertilizers, chemicals, cement, tile adhesives, building materials, e-commerce, etc. the demand for bulk packaging solutions is significantly rising. This demand is driven by the need for packaging that can handle large volumes efficiently, ensure product protection during transportation and storage, and offer convenience in handling and distribution.



Arvind K. Singhal
Managing Director

- **E-Commerce Expansion**: The rapid growth of e-commerce in India, driven by platforms like Amazon and Flipkart, increases demand for attractive, durable, lightweight and branded packaging solutions that can withstand long supply chains while maintaining visual appeal, positioning WPP and PLWPP bags as bulk packaging solution in logistics and last-mile delivery.

- **Sustainability Innovations**: Developing recyclable, lightweight, or bio-based WPP and PLWPP bags aligns with environmental regulations and consumer preferences, opening new market segments and enhancing competitiveness.

- **Technological Advancements**: Investments in automation, high-speed production, and eco-friendly manufacturing processes can improve efficiency, reduce costs, and meet evolving customer needs, such as lightweighting for lower shipping expenses.

- **Improved Waste Management**: With the advancement of waste management infrastructure—such as better segregation, collection, and recycling systems— flexible packaging bags including PLWPP bags can become significantly more eco-friendly. As awareness and systems for plastic recovery improve in India, these bags can be effectively reprocessed, reducing landfill burden and environmental harm.

- **Expansion in Emerging Markets**: Rapid industrialization, urbanization, and growing organized retail in emerging economies like USA, Canada, European countries, Southeast Asia, Africa, etc. are driving demand for durable, cost-effective, and branded packaging solutions.

- **Increasing Focus on Branding & Consumer Appeal**: PLWPP bags provide an excellent platform for high-quality printing and impactful visual branding, making them a preferred packaging choice for companies looking to establish a strong brand presence in the bulk segment. Specifically, PLWPP pinch bottom bags offer six-side branding, allowing for maximum visual exposure and enhanced shelf appeal. This transforms the packaging into a self-mobile marketing tool, promoting the brand not only in retail settings but also in everyday public use—thereby increasing product visibility, influencing consumer preferences, and driving sales.

- **Better customer retention**: The investment in customized artwork development and printing cylinders encourages long-term partnerships with the customers and clients, as they are less likely to change packaging suppliers frequently. Even minor packaging defects or inconsistencies can negatively affect brand image, making consistency and reliability in supply a key differentiator for retaining clients.

Threats

- **Stringent Environmental Regulations**: Policies like the Plastic Waste Management Rules, 2016 (amended 2021), and potential bans on certain plastic thicknesses increase compliance costs and may favour alternatives to plastic packaging.

- **Competition from Substitutes**: Growing adoption of eco-friendly options (e.g., jute, paper, biodegradable plastics like PLA) may threatens market share, especially if competitors scale these alternatives at a faster rate.

- **Raw Material Price Volatility**: Fluctuations in crude oil prices or geopolitical disruptions affecting polypropylene supply could raise production costs, squeezing margins in a competitive market.

- **Supply Chain Disruptions**: Geopolitical tensions, port congestions or raw material export controls can interrupt specialty film imports, creating downstream shortages.

- **Shifting Consumer Preferences**: Increasing demand for sustainable, non-plastic packaging among environmentally conscious consumers and corporations may reduce reliance on WPP and PLWPP bags over time.

Arvind K. Singhal
Managing Director

Impact of U.S. tariffs on Indian flexible packaging market

In 2025, the United States has imposed a 50% tariff on Indian goods, targeting a wide array of sectors. The impact of U.S. trade policies, including tariffs and regulatory shifts, on the Indian flexible packaging market is indirect but notable. As a significant exporter of packaged goods such as packaged food, pet and animal foods, agriculture & fertilizers, chemicals, textiles, and other products to the U.S., any increase in tariffs or trade barriers affects demand for Indian exports, subsequently influencing the supply chain for flexible packaging industry. Slower orders or low demand may lead to price reductions or surplus inventory for domestic producers. Further, these tariffs on Indian goods will significantly raises their landed cost at the U.S, compelling manufacturers to either bear the additional expense, further pressuring their profit margins or transfer the cost burden to U.S. buyers, potentially driving them toward alternative global suppliers as higher packaging costs can lead to higher product prices for consumers.

Higher landed costs make Indian suppliers less competitive compared to regional alternatives. Countries like Vietnam, Mexico, and Thailand benefit from more favourable trade agreements with the U.S., making them stronger immediate contenders for displaced demand. Consequently, Indian exporters may be at potential risk of losing market share in one of their key export destinations.

6. Trends in WPP and PLWPP Bags in Flexible Bulk Packaging Evolution

The flexible bulk packaging industry is undergoing rapid transformation, driven by evolving consumer preferences, technological advancements, and evolving supply chain demands. Key trends driving the growth and transformation of the flexible packaging sector include:

a. **Rise of Sustainable and Bio-Based Materials**: The Indian flexible packaging industry has a growing emphasis on sustainability and eco-friendly materials. This focus towards more eco-friendly and sustainable products is largely driven by government regulations, such as India's ban on certain single-use plastics, and increasing consumer awareness of environmental issues. The push for sustainability is also leading to innovation in recyclable barrier coatings that replace traditional multilayer plastic structures, helping reduce landfill waste while maintaining the protective qualities of packaging.

b. **Mono-Material Packaging for Circular Economy**: As the demand for sustainable packaging grows, there is a significant shift toward mono-material flexible packaging, which enables easier recycling and supports the circular economy. Traditionally, flexible packaging consists of multi-layer laminates made from different materials like PET, aluminium, and polyethylene, making them difficult to recycle. To address this challenge, companies are now developing all-polyethylene (PE) or all-polypropylene (PP) structures that retain necessary barrier properties while ensuring full recyclability. In this context, PLWPP offers easy recycling and contribute to the circular economy. For example, used PLWPP bags can be collected, cleaned, shredded, and reprocessed into pellets—then remanufactured into new PP products, creating a closed-loop system.

c. **Migration from Non-Branded to Branded Packaging at Point of Sale (POS) for Bulk Packaging:** The bulk packaging (5 kg to 50 kg) segment in India, particularly for products like agriculture, food grains, pet food, animal feed, fertilizers, cement, chemicals etc., is shifting from non-branded, generic packaging to customized branded solutions. Earlier, large-volume products were sold in plain, unprinted PP woven sacks or jute bags, limiting brand visibility and quality differentiation. However, with the rise of organized retail and e-commerce, brands are increasingly using printed, high-quality packaging to attract consumers and establish a strong brand presence.

d. **Shift from Plain/Flexo Printed WPP Bags to PLWPP bags:** The bulk packaging industry is witnessing the increase usage from traditional Plain/Flexo printed WPP bags to PLWPP bags across sectors. This shift is primarily driven by the demand for enhanced durability, better moisture resistance and high-resolution printing which give it a superior (premium) aesthetics, and improved branding opportunities. These bags are now being enhanced with advanced features such as gussets for better storage efficiency, transparency to allow product visibility, handles for convenience, perforations for ventilation.

e. **Popularity of PLWPP Pinch Bottom Bags:** PLWPP Pinch Bottom Bags, though a niche segment at present, is gaining popularity in the bulk flexible packaging industry, particularly in sectors requiring durable, high-strength, and visually appealing packaging for branding. These bags offer 6-side branding and maximum visual exposure, thus making them ideal for effective self-marketing. Additionally, the pinch bottom bags with flat-bottom design improves stackability, storage efficiency, better handling, improved and cleaner appearance, making them an attractive choice for brands looking to improve their packaging aesthetics and functionality.

f. **Evolving from traditional Paper Bags to PLWPP Bags:** The paper bags often fall short in strength and barrier protection—especially for bulk or heavy-duty applications—leading industries like pet food, animal feed, and agricultural products to adopt WPP and PLWPP bags as a cost-effective, high-performance alternative that also supports recyclability and advanced branding.

g. **Branding**: The PLWPP bags support high quality rotogravure or digital printing on glossy or matte finishes, allowing for eye catching graphics, QR codes, and multilingual product information. Brand owners would therefore like to leverage the full-surface printability of these bags to establish strong shelf presence and visual differentiation. This elevates brand recognition in both retail and wholesale environments, especially in categories like pet food, fertilizers, agrochemicals and other sectors as mentioned above.

Arvind K. Singhal
Managing Director

h. **Premium Product demands for Premium Packaging**: Premiumization is a strong driver, especially in sectors like organic food, pet food, specialty flours, snacks, and health foods. As consumers increasingly link packaging appearance and durability with product quality, manufacturers of premium products aim for packaging that offers superior aesthetics, strong moisture resistance, and high structural integrity to meet the expectations of quality-conscious buyers.

i. **Easy to carry and reuse (5 to 10 Kg)**: Smaller pack sizes 5 to 10 kg PLWPP bags with integrated handles — like D-cut or soft loop—can be used for ease of handling and last-mile delivery requirements. Their light weight, yet high strength and water resistance, ensure that products remain protected during last-mile delivery, even under rough handling or adverse weather conditions. Beyond functionality, these bags offer a second life after the product is consumed. Unlike single-use plastic or paper alternatives, PLWPP bags are durable enough to be reused multiple times—for household storage, carrying groceries, or even as utility bags.

Manufacturers are also integrating advanced features such as gussets for improved stacking ability, transparent windows for product visibility, handles for easy carrying, micro-perforations for ventilation, matte and gloss finishes for a premium look, and back-seam technology for better sealing. These innovations not only enhance consumer convenience but also bolster brand differentiation in an increasingly competitive market.

Exhibit 6.1: Comparison between Woven PP bags, PLWPP bags and PLWPP pinch bottom bags

	Woven PP bags	PLWPP bags	PLWPP pinch bottom bags
Product			
Material	Woven polypropylene (WPP) fabric	WPP fabric laminated with BOPP film	Similar to PLWPP bags with pinch bottom construction
Branding	1-2 side branding	3-4 side branding (front, back, gussets)	5-6 side branding (front, back, top, bottom & side gussets)
Use of recyclable material	✓	✓	✓
HD printing		✓	✓
Superior aesthetics		✓	✓
Excellent sealing properties for strength			✓
Economic pricing	✓		
Moisture Protection	Limited	better moisture resistance	better moisture resistance

Source: Secondary Research, Technopak Analysis

7. Analysis of the User Industry - Flexible plastic packing

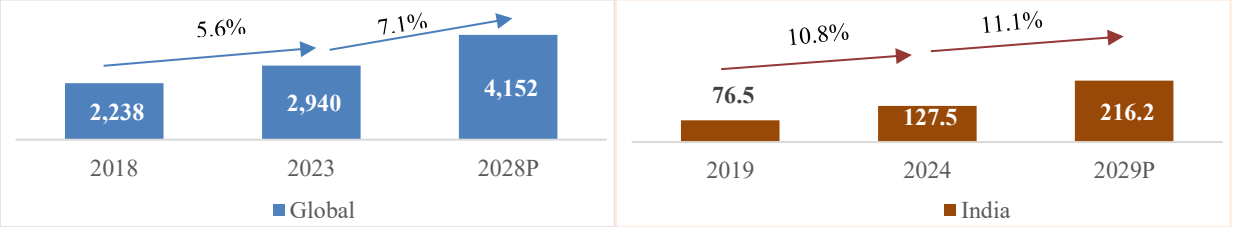
The packaging industry plays a critical role across diverse sectors, with packaged food leading demand due to the need for freshness, hygiene, extended shelf life, and convenience. Materials such as PET, biodegradable films, and multilayer laminates are commonly used in food packaging. Meanwhile, non-food industries including cement, fertilizers, seeds, tile adhesives, pet food, laundry care, and charcoal require robust and protective packaging to ensure durability during storage and transport. In India, woven polypropylene (WPP) and printed and laminated woven polypropylene (PLWPP) bags are widely adopted across these sectors for their strength, moisture resistance, and ability to support high quality, customizable branding, making them ideal for both utility and visual appeal.

7.1 Packaged Food Market Overview

The global packaged food market has demonstrated strong growth, increasing from approximately USD 2,238.2 billion in CY2018 to USD 2,939.8 billion in CY2023, and is forecasted to reach USD 4,152.3 billion by CY2028, registering a CAGR of 7.1%. This upward trajectory is primarily driven by a growing consumer preference for convenience foods, influenced by hectic lifestyles, urbanization, and evolving dietary patterns. Additional factors such as advancements in food processing technologies, the proliferation of efficient distribution networks, and the expansion of e-commerce and digital retail platforms have significantly contributed to the market's acceleration.

In parallel, the Indian packaged food sector is also witnessing robust growth, having expanded from USD 76.5 billion in FY2019 to an estimated USD 127.5 billion in FY2024, and is projected to reach USD 216.2 billion by FY2029. This growth is underpinned by several structural and demographic factors, including a rising middle-class population, increased urbanization, higher penetration of modern retail channels, and growing consumer awareness and acceptance of packaged and processed foods. Additionally, improvements in cold chain infrastructure, evolving taste preferences, and the rise of health-conscious consumption are further propelling the sector.

Exhibit 7.1: Packaged Food Market Overview - Global (CY) and India (FY) (USD Bn)



Source: Secondary Research, Technopak Analysis
**CY2018 refers to FY2019 for India, CY2023 refers to FY2024 and CY2028 refers to FY2029.*
Note: India's packaged food market size includes packaged edible oil, packaged rice, packaged flour (wheat flour, maida, ethnic, and gram flours), sooji & dalia, packaged pulses, packaged spices, and other packaged staples. (packaged ghee, sugar, jaggery, salt, millets, groundnut, sabudana, flattened rice, puffed rice, etc). Global Packaged Food market size includes Packaged Staples, other Packaged Food, Packaged Dairy (Fresh), Packaged Meat, Nutraceuticals and Packaged Beverage)

Exhibit 7.2: Summary of Packaged Food Market Overview - Global (CY) and India (FY) (USD Bn)

Particulars	Global			India		
	2018	2023	2028	2019	2024	2029
Packaged Pulses Market	58.2	75.7	97.4	1.0	1.6	2.4
Packaged Rice Market	257.8	293.8	340.0	1.7	2.5	3.5
Packaged Flour Market	138.9	166.6	207.8	2.5	4.7	9.6
Packaged Spice Market	19.6	24.8	32.1	2.3	4.3	7.7
Packaged Dry Fruits Market	8.7	10.8	14.0	0.6	0.8	1.1
Packaged Sugar Market	75.6	86.8	101.8	5.4	7.5	10.5
Packaged Pulses Market	58.2	75.7	97.4	1.0	1.6	2.4

Source: Secondary Research, Technopak Analysis.
Note: CY2018 refers to FY2019 for India, CY2023 refers to FY2024 and CY2028 refers to FY2029.

7.1.1 Packaged Pulses Market Overview

The global pulses market has witnessed robust growth, expanding from USD 58.2 billion in CY2018 to USD 75.7 billion in CY2023, at a CAGR of 5.4%, and is projected to reach USD 97.4 billion by CY2028, growing at a stable CAGR of 5.2%. Meanwhile, India's pulses market is exhibiting even stronger momentum, growing from USD 1.0 billion in FY2019 to USD 1.6 billion in FY2024, with a CAGR of 9.9%, and is expected to reach USD 2.4 billion by FY2029, continuing at a healthy CAGR of 8.4%.

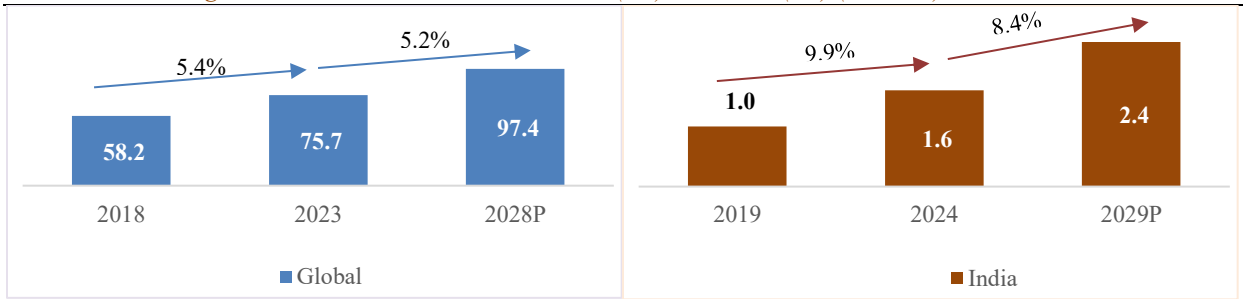
This growth is fuelled by several global and domestic drivers. Internationally, the rising preference for plant-based diets, increased awareness of sustainable agriculture, and the push for high-protein, low-fat nutrition are significantly boosting pulse consumption. Pulses are gaining popularity not only in traditional diets but also as ingredients in protein flours, snacks, and meat alternatives. Technological advancements in processing and packaging are making pulses more accessible and appealing to modern consumers.

In India, demand is being driven by both structural and demographic factors—population growth, urbanization, and a shift from unpackaged to branded and hygienically packaged pulses. Government initiatives such as price support schemes, improvements in cold chain infrastructure, and rising health consciousness have also contributed to increased demand. Furthermore, growing penetration of modern trade, e-commerce, and convenience-focused formats like ready-to-cook dals are expanding the market.

India stands as the largest producer and consumer of pulses globally, contributing approximately 25% of global production, 27% of global consumption, and 14% of global imports. Leading global producers alongside India include Canada, Australia, Myanmar, and Turkey. Within India, key pulse-producing states such as Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh play a critical role in both domestic supply and export potential. Pulses occupy nearly 23% of the area under food grains and contribute around 9–10% of total food grain production in the country. With nearly 30 million hectares under cultivation, India produces around 25 million tonnes annually, achieving an average productivity of 851 kg per hectare as of FY2023.

As global dietary trends continue to evolve in favour of plant-forward and sustainable nutrition, pulses are well-positioned to remain a critical component of the global food basket—particularly in emerging markets like India, where consumer preferences are rapidly modernizing.

Exhibit 7.3: Packaged Pulses Market Overview - Global (CY) and India (FY) (USD Bn)



Source: Secondary Research, Technopak Analysis
Note: CY2018 refers to FY2019 for India, CY2023 refers to FY2024 and CY2028 refers to FY2029.
**Includes only packaged pulses*

7.1.2 Packaged Rice Market Overview

The global rice market has demonstrated moderate but steady growth, increasing from USD 257.8 billion in CY2018 to USD 293.8 billion in CY2023, at a CAGR of 2.6%, and is projected to reach USD 340.0 billion by CY2028, growing at a CAGR of 3.0%. Whereas India's rice market has experienced more accelerated expansion, growing from USD 1.7 billion in FY2019 to USD 2.5 billion in FY2024 (CAGR of 7.9%) and is expected to reach USD 3.5 billion by FY2029, maintaining a robust CAGR of 7.0%.

This growth is driven by a mix of rising global food demand, increasing consumption in developing economies, and the expanding role of rice in convenience and packaged food categories. Additionally, climate-resilient rice varieties,

Arvind K. Singhal
Managing Director

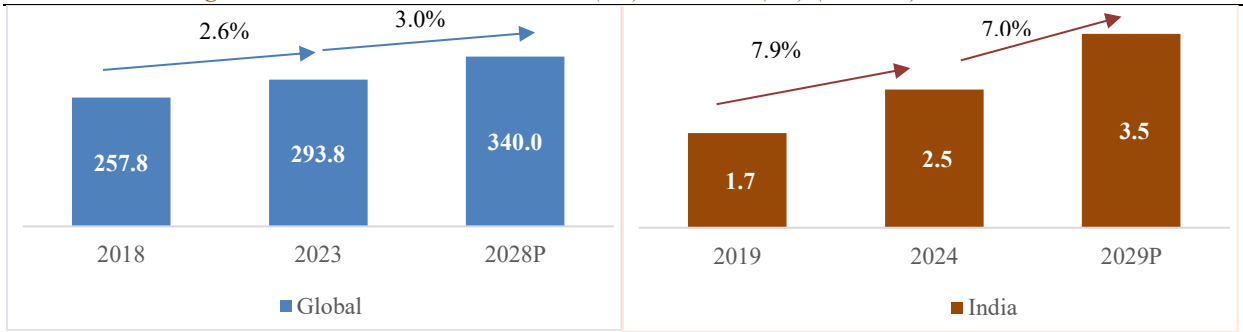
government procurement programs, and technological interventions in farming and supply chains are enhancing productivity and market stability.

India plays a central role in the global rice economy as both the largest exporter and a leading producer, contributing approximately 22% of global rice production (133 million metric tonnes in FY2024). Other major producers include China, Bangladesh, Indonesia, Vietnam, and Thailand, which together dominate global output.

Within India, key rice-producing states such as West Bengal, Uttar Pradesh, Punjab, Andhra Pradesh, and Bihar significantly support both domestic consumption and export volumes. Rice remains a dietary staple for a large segment of the Indian population, further emphasizing its importance in national food security and Agri-economy.

India's scale, supported by favourable agro-climatic conditions, strong procurement infrastructure, and growing demand for premium and packaged rice, reinforces its strategic position in the global rice trade. As consumer demand continues to shift toward branded, hygienically packaged, and premium rice varieties, particularly in urban markets and through modern retail channels, both global and Indian markets are poised for further value-driven growth.

Exhibit 7.4: Packaged Rice Market Overview - Global (CY) and India (FY) (USD Bn)



Source: Secondary Research, Technopak Analysis
Note: CY2018 refers to FY2019 for India, CY2023 refers to FY2024 and CY2028 refers to FY2029.
**Includes only packaged Rice*

7.1.3 Packaged Flour Market Overview

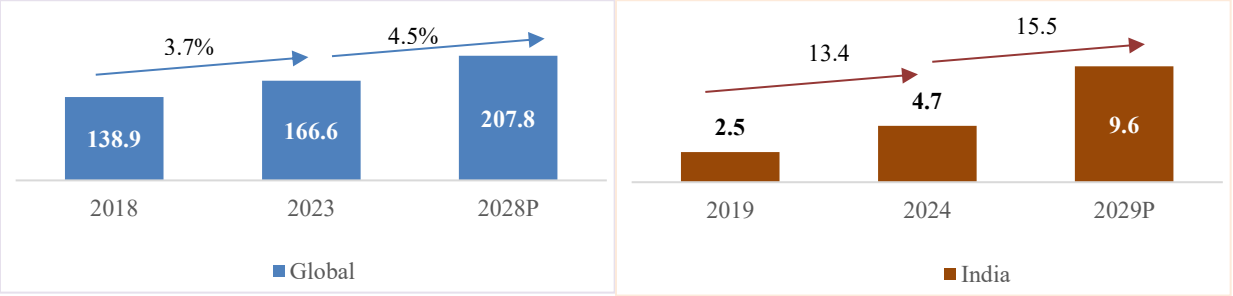
The global flour market has exhibited consistent growth, rising from USD 138.9 billion in CY2018 to USD 166.6 billion in CY2023 at a CAGR of 3.7%, and is projected to reach USD 207.8 billion by CY2028, growing at a healthy CAGR of 4.5%. In comparison, India's flour market has demonstrated significantly stronger growth, increasing from USD 2.5 billion in FY2019 to USD 4.7 billion in FY2024 (CAGR of 13.4%) and is expected to reach USD 9.6 billion by FY2029, at an even faster CAGR of 15.5%.

This robust expansion, especially in India, is fuelled by rising urbanization, changing dietary habits, and increasing demand for packaged, hygienic, and branded flour products. The growth in modern trade channels, emergence of health-conscious consumers, and a shift toward value-added flour variants—such as multigrain, organic, and gluten-free flours—are key contributors to this trend.

In India, the shift from traditional chakki (local mill) flour to branded packaged flour is particularly notable in urban and semi-urban regions, driven by concerns around food safety, convenience, and quality consistency. Additionally, the growth of e-commerce and demand for ready-to-cook products are creating new opportunities for innovation and market penetration.

Globally, similar trends are being observed, along with increased consumption of bakery, pasta, and convenience food items, especially in emerging markets. As health and nutrition continue to shape consumer preferences, manufacturers are diversifying their product offerings to include high-fibre, protein-enriched, and fortified flour options—driving further market value growth.

Exhibit 7.5: Packaged Flour Market Overview - Global (CY) and India (FY) (USD Bn)



Source: Secondary Research, Technopak Analysis
Note: CY2018 refers to FY2019 for India, CY2023 refers to FY2024 and CY2028 refers to FY2029.
**Includes only packaged flour*

7.1.4 Market Overview of Packaged Spices

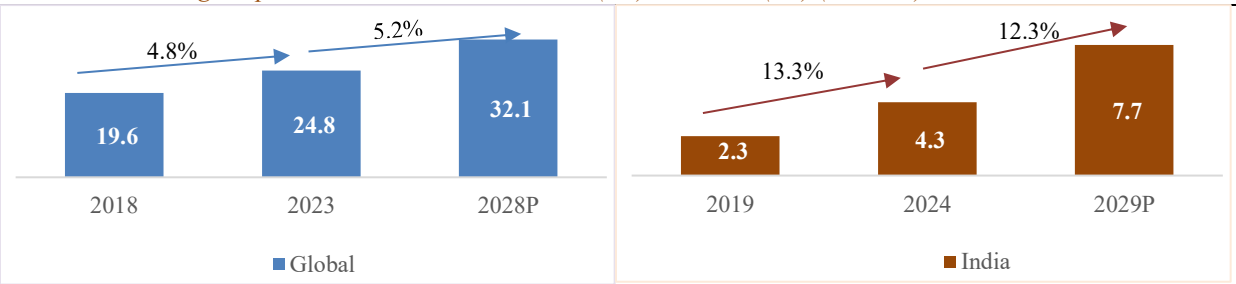
The global packaged spices market has been on a steady growth trajectory, rising from USD 19.6 billion in CY2018 to USD 24.8 billion in CY2023 and is projected to reach USD 32.1 billion by CY2028. This represents a moderate but consistent CAGR of 4.8% from CY2018 to CY2023, with an acceleration to 5.2% expected over the next five years. In comparison, the Indian packaged spices market has witnessed significantly faster growth. It expanded from USD 2.3 billion in FY2019 to USD 4.3 billion in FY2024 and is projected to reach USD 7.7 billion by FY2029, with an expected CAGR of 12.3%. This outperformance underscores India's strengthening role not only as a major consumer but also as a global supply hub.

Growth in this sector is fuelled by several key drivers: increasing urbanization, shifting consumer preference towards hygienically processed and branded food products, a growing demand for convenience, and heightened health awareness favouring natural ingredients over synthetic additives. The rising global appetite for diverse flavours and ethnic cuisines, especially in regions such as Asia-Pacific and Europe, further supports market expansion. Asia-Pacific continues to lead as the largest market, buoyed by both consumption and production dynamics.

India's dominance in the spice ecosystem is unmatched—it produces about 75 of the 109 spice varieties recognized by the International Organization for Standardization (ISO). India's spice production reached 11.14 million tonnes in FY2023, and its spice exports rose to USD 3.73 billion during the same financial year. The country remains the largest global producer, consumer, and exporter of spices, backed by a robust Agri-base, expanding food processing infrastructure, and proactive government initiatives to promote exports.

Other leading spice-producing and exporting countries include Vietnam (notably in pepper), China, Indonesia, and Turkey. As the global demand for ready-to-use spice blends and gourmet cooking ingredients rises, India is well-positioned to consolidate its leadership in the global packaged spice market through product innovation, value addition, and expanding its presence in international markets.

Exhibit 7.6: Packaged Spice Market Overview - Global (CY) and India (FY) (USD Bn)



Source: Secondary Research, Technopak Analysis
Note: CY2018 refers to FY2019 for India, CY2023 refers to FY2024 and CY2028 refers to FY2029.
**Includes only packaged Spices*

7.1.5 Packaged Dry Fruit Market Overview

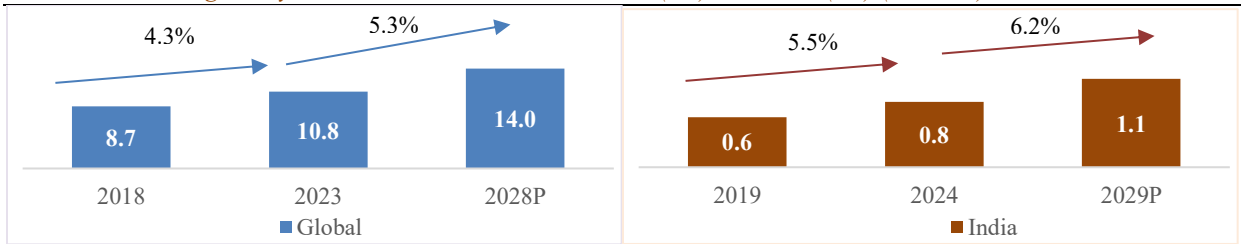
The global packaged dry fruits market has grown steadily over the past five years, increasing from USD 8.7 billion in CY2018 to USD 10.8 billion in CY2023 (CAGR of 4.3%) and is projected to reach USD 14.0 billion by CY2028, with a slightly stronger 5.3% CAGR for the next five years. India, while representing a smaller share, is witnessing similar momentum. The Indian packaged dry fruits market grew from USD 0.6 billion in FY2019 to USD 0.8 billion in FY2024 and is expected to reach USD 1.1 billion by FY2029, registering a 6.2% CAGR for the next five years—indicating growing domestic demand and a shift toward formalized retail and branded dry fruit consumption.

Several macro and consumer-driven factors are propelling this growth globally and in India. These include increasing health consciousness, rising disposable incomes, and changing snacking habits that favour natural, nutrient-rich alternatives. The popularity of on-the-go nutrition, functional foods, and gifting trends during festive seasons has further driven demand for hygienically packed and value-added dry fruit products like roasted, flavoured, or mixed assortments.

Globally, the United States, Iran, Turkey, and China are among the top producers and exporters of key dry fruits such as almonds, pistachios, walnuts, and raisins. India, while a major consumer, also plays a key role in processing and re-exporting dry fruits, particularly cashews and raisins. The country is gradually expanding its share in the global dry fruits value chain through investments in cold chain logistics, improved packaging technologies, and growing e-commerce penetration.

Key trends shaping the market include rising demand for organic and preservative free products, greater emphasis on sustainable sourcing, and a spike in demand through modern retail and digital channels. Premiumization, through attractive packaging and health focused positioning, is also helping brands cater to the evolving preferences of urban consumers seeking both wellness and indulgence.

Exhibit 7.7: Packaged Dry Fruits Market Overview - Global (CY) and India (FY) (USD Bn)



Source: Secondary Research, Technopak Analysis
Note: CY2018 refers to FY2019 for India, CY2023 refers to FY2024 and CY2028 refers to FY2029.
**Includes only packaged Dry Fruits*

7.1.6 Packaged Sugar Market Overview

The packaged sugar market has shown consistent growth globally and even more pronounced expansion in India, highlighting shifting consumer preferences and evolving retail dynamics. Globally, the market grew from USD 75.6 billion in CY2018 to USD 86.8 billion in CY2023, with a CAGR of 2.8%, and is expected to reach USD 101.8 billion by CY2028, reflecting a slowing growth rate of 3.2%. In comparison, the Indian packaged sugar market has seen a stronger upward trajectory, rising from USD 5.4 billion in FY2019 to USD 7.5 billion in FY2024, at a CAGR of 6.8%, and is projected to reach USD 10.5 billion by FY2029, maintaining a robust CAGR of 7.0%.

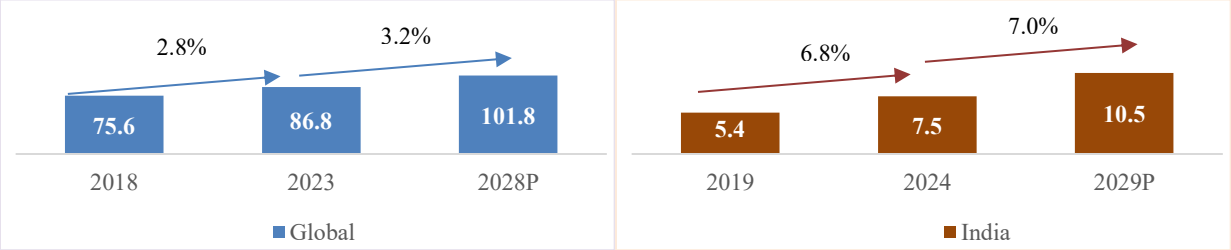
This growth in India is being driven by several factors: a rising middle-class population, increasing urbanization, and a growing consumer shift from unbranded loose sugar to branded and hygienically packaged alternatives. Enhanced awareness of food safety, the proliferation of modern trade channels, and digital commerce adoption have further accelerated consumption. Additionally, the increasing role of organized food services, home baking trends, and premiumization of basic commodities are contributing to the segment's momentum. Globally, however, the market is nearing saturation, with health-conscious consumption, regulatory interventions, and the rise of sugar alternatives tempering growth in developed economies.

Arvind K. Singhal
Managing Director

India is one of the largest producers and consumers of sugar, with the market experiencing fluctuations due to variations in sugarcane production. India annually produces approximately 35.5 crore tonnes of sugarcane, yielding about 3 crore tonnes of sugar.

India's market, therefore, offers a high-growth environment for packaged sugar brands looking to capitalize on rising demand, especially through product innovation, affordable SKUs, and expansion into semi-urban and rural markets.

Exhibit 7.8: Packaged Sugar Market Overview - Global (CY) and India (FY) (USD Bn)



Source: Secondary Research, Technopak Analysis
Note: CY2018 refers to FY2019 for India, CY2023 refers to FY2024 and CY2028 refers to FY2029.
**Includes only packaged sugar*

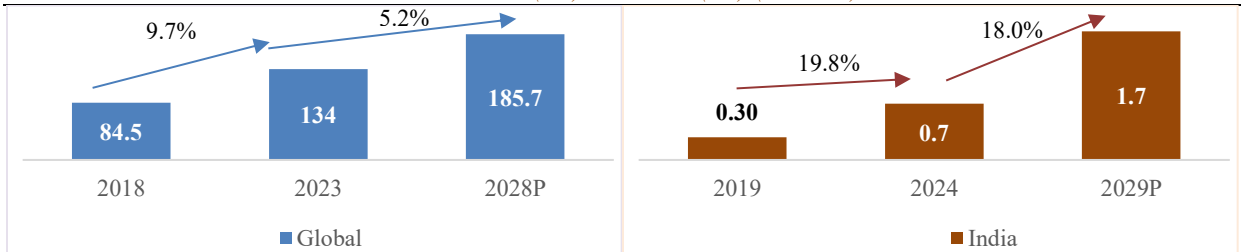
7.2 Pet Food Market Overview

The global pet food market has exhibited strong growth, expanding from USD 84.5 billion in CY2018 to USD 134.0 billion in CY2023, and is projected to reach USD 185.7 billion by CY2028, registering a CAGR of 9.7% from CY2018 to CY2023 and a projected CAGR of 6.7% over the following five years. India, although a smaller market in comparison, is experiencing an accelerated growth trajectory. The Indian pet food segment grew from USD 0.3 billion in FY2019 to USD 0.7 billion in FY2024 and is expected to more than double to USD 1.7 billion by FY2029, with a robust 15.0% CAGR projected for FY2024 to FY2029. In India, Dog food dominates the market, accounting for 84% of total consumption, followed by cat food at 18% and other pet food at 1%.

This surge is driven by several key factors: increasing pet ownership, especially in urban centres; rising disposable incomes; and growing awareness of pet nutrition and health. The humanization of pets, where pets are treated as family members, is influencing spending habits toward premium, customized, and functional pet food products. The shift from home-cooked meals to commercially packaged food, fuelled by convenience and nutritional reliability, is further strengthening demand.

In India, the rise of nuclear families, higher adoption of dogs and cats, and the proliferation of pet care startups and D2C (Direct-to-Consumer) brands are reshaping the market landscape. Global players are also increasingly entering or expanding in India, seeing it as a high-potential market. Key trends shaping the sector include the growing popularity of breed-specific and age-specific diets, grain-free and organic pet food options, and the rise of online retail as a primary distribution channel. Furthermore, increased veterinarian engagement and pet wellness awareness are expected to continue supporting the industry's strong growth momentum both globally and in India.

Exhibit 7.9: Pet Food Market Overview - Global (CY) and India (FY) (USD Bn)



Source: Secondary Research, Technopak Analysis
Note: CY2018 refers to FY2019 for India, CY2023 refers to FY2024 and CY2028 refers to FY2029.

7.3 Animal Feed Market Overview

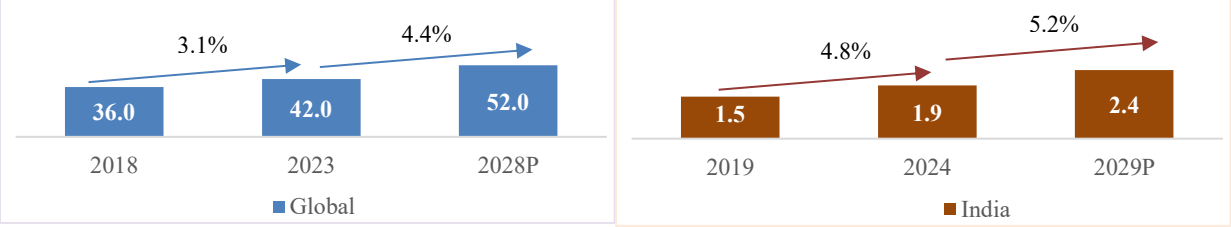
The global animal feed market has shown moderate yet consistent growth, increasing from USD 36.0 billion in CY2018 to USD 42.0 billion in CY2023, and is projected to reach USD 52.0 billion by CY2028. This reflects a CAGR of 3.1% during CY2018 to CY2023 and an anticipated 4.4% CAGR over the next five years. Poultry feed leads with 46% market share, followed by swine (26%), cattle (20%), aqua (4%), and others (4%)

The Indian animal feed market is growing at a faster pace—from USD 1.5 billion in FY2019 to USD 1.9 billion in FY2024, and is expected to reach USD 2.4 billion by FY2029, with a projected CAGR of 5.2% during FY2024 to FY2029. This growth is largely driven by the expansion of the livestock and poultry sectors, rising demand for high-yield dairy and meat products, and increasing awareness among farmers regarding the nutritional needs of animals.

India's rising livestock population—including cattle, buffalo, poultry, and small ruminants—plays a crucial role in fuelling feed demand. According to the 20th Livestock Census, India is home to over 536 million livestock and 851 million poultry, and this growing base continues to increase the need for nutritionally optimized feed solutions. In FY2023, poultry meat production reached 4.995 Mn MT, making up 51.13% of India's total meat production (9.77 Mn MT). Key trends shaping the animal feed industry include the adoption of compound and customized feeds, increasing use of feed additives to boost animal health and productivity, and the digitization of supply chains to support traceability and quality assurance.

Moreover, policy support from the government for improving animal husbandry practices, coupled with private investments in organized dairy and poultry sectors, is aiding market formalization and expansion. Sustainability is also becoming a priority, with rising interest in eco-friendly feed formulations and better waste management across feed production systems.

Exhibit 7.10: Animal Feed Market Overview - Global (CY) and India (FY) (USD Bn)



Source: Secondary Research, Technopak Analysis
Note: CY2018 refers to FY2019 for India, CY2023 refers to FY2024 and CY2028 refers to FY2029.

7.4 Charcoal Market Overview

The global charcoal market has expanded steadily from USD 6.6 billion in CY2018 to USD 8.0 billion in CY2023 and is expected to reach USD 9.8 billion by CY2028, reflecting a CAGR of 3.9% in the previous five years and a projected CAGR of 4.1% in the next five years' period. In 2023, the top exporters of wood charcoal were Indonesia (USD 417 million), China (USD 112 million), Poland (USD 90.3 million), Burma (USD 87.2 million), and Namibia (USD 80.5 million).

India's charcoal market, though smaller in scale, has demonstrated stronger momentum—growing from USD 0.5 billion in FY2019 to USD 0.7 billion in FY2024, with a of CAGR of 5.5%, and expected to reach 0.8 billion in FY2029, growing with a CAGR of 4.5% during the period.

Key growth drivers include rising industrial demand—particularly from the metal processing, cement, and energy sectors—as well as increased usage in household cooking and recreational grilling, especially in emerging economies. In India, the growing application of charcoal in water purification, cosmetics, and pharmaceuticals is further supporting domestic demand. Export potential, especially for hardwood charcoal, remains strong due to global interest in Indian-origin biochar and activated charcoal products.

Emerging trends include the adoption of sustainable production methods using agro-waste and forest residues, a shift toward eco-friendly alternatives like briquettes, and regulatory push for cleaner-burning fuels. Additionally, increasing

Arvind K. Singhal
Managing Director

consumer awareness around environmental impact is encouraging demand for responsibly sourced charcoal, both globally and within India.

Exhibit 7.11: Charcoal Market Overview - Global (CY) and India (FY) (USD Bn)

Source: Secondary Research, Technopak Analysis
Note: CY2018 refers to FY2019 for India, CY2023 refers to FY2024 and CY2028 refers to FY2029.

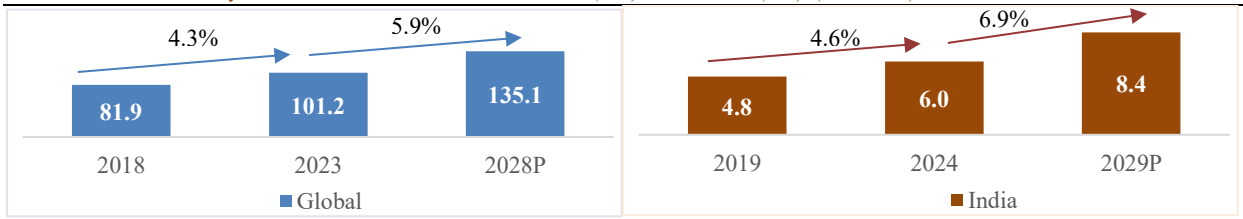
7.5 Laundry Care Market Overview

The global laundry care market has witnessed consistent expansion, growing from USD 81.9 billion in CY2018 to USD 101.2 billion in CY2023, and is projected to reach USD 135.1 billion by CY2028, registering a CAGR of 4.3% between CY2018 to CY2023 and an expected CAGR of 5.9% for the next five years. India, while representing a smaller share of the global market, is experiencing a faster growth trajectory. The Indian laundry care segment rose from USD 4.8 billion in FY2019 to USD 6.0 billion in FY2024 and is expected to reach USD 8.4 billion by FY2029, growing at a projected CAGR of 6.9%. Detergents account for 85% of the global laundry market whereas the ratio stands to 78% for the Indian market.

This growth is fuelled by increasing urbanization, rising disposable incomes, expanding middle-class consumption, and growing awareness of hygiene and personal care. In India specifically, the shift from traditional washing methods to modern detergents, fabric softeners, and liquid detergents is gaining momentum, especially in urban and semi-urban areas. Additionally, brand competition, premiumization, and product innovations—such as eco-friendly, plant-based, and skin-sensitive laundry products—are further propelling market growth.

Key global trends include the rise of compact and water-efficient laundry solutions, e-commerce penetration in FMCG, and increased demand for sustainable packaging. In India, growing penetration of washing machines, especially in Tier II and III cities, is boosting demand for machine-specific laundry care formats, while rural markets are increasingly adopting branded detergent products.

Exhibit 7.12: Laundry care Market Overview - Global (CY) and India (FY) (USD Bn)



Source: Secondary Research, Technopak Analysis
Note: CY2018 refers to FY2019 for India, CY2023 refers to FY2024 and CY2028 refers to FY2029.

7.6 Tiles Adhesives Market Overview

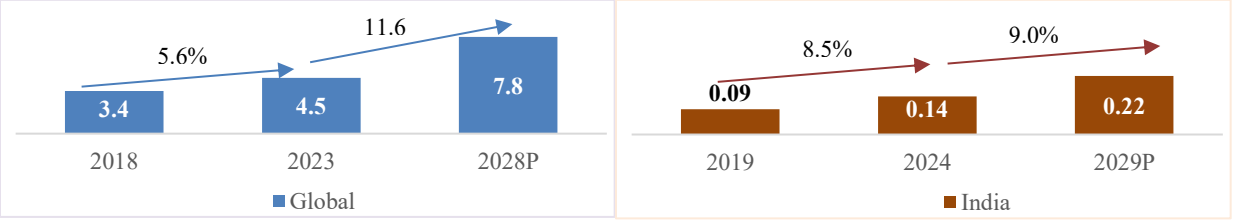
The global tile adhesive market has shown healthy growth, increasing from USD 3.3 billion in CY2018 to USD 5.1 billion in CY2023, and is projected to reach USD 8.5 billion by CY2028, marking a CAGR of 5.6% over the past five years and a sharper 11.6% expected CAGR through CY2028. India's tile adhesive market, though smaller in size, is on a similarly strong growth path, rising from USD 0.09 billion in FY2019 to USD 0.14 billion in FY2023, and projected to reach USD 0.22 billion by FY2029, at a CAGR of 9.0% during the period.

This growth is largely driven by rapid urbanization, booming residential and commercial construction, and increasing adoption of large-format tiles, natural stones, and designer surfaces which require specialized adhesives. Rising

disposable incomes, increased awareness of advanced construction materials, and growing renovation activities are further accelerating demand. In India, the shift from traditional cement-based methods to ready-to-use, high-performance tile adhesives is gaining traction, especially in metro and Tier I cities.

Key trends include the development of polymer-modified adhesives for better strength and flexibility, eco-friendly and low-VOC (volatile organic compound) products aligned with green building norms, and greater availability of multi-purpose adhesives catering to various surfaces and substrates. Market players are also investing in educating contractors and masons, promoting the shift toward standardized and efficient tiling solutions.

Exhibit 7.13: Tiles Adhesives Market Overview - Global (CY) and India (FY) (USD Bn)



Source: Secondary Research, Technopak Analysis
Note: CY2018 refers to FY2019 for India, CY2023 refers to FY2024 and CY2028 refers to FY2029.

7.7 Seed Market Overview

The global seed market has witnessed consistent expansion, growing from USD 40.4 billion in CY2018 to USD 54.0 billion in CY2023, and is projected to reach USD 70.0 billion by CY2028. This represents a CAGR of 6.0% over the last five years, with a slightly moderated yet steady 5.3% growth expected for next five years. India's seed market has mirrored this positive trajectory, increasing from USD 2.9 billion in FY2019 to USD 3.9 billion in FY2024, and forecasted to reach USD 5.6 billion by FY2029, showcasing a robust CAGR of 7.5% for the upcoming period, higher than the global average.

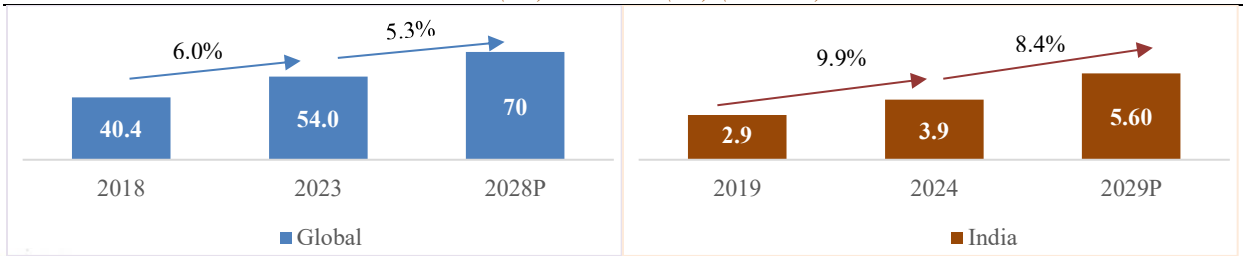
Key growth drivers include the increasing adoption of hybrid and genetically modified (GM) seeds, rising demand for high-yield and climate-resilient crop varieties, and technological advancements in seed treatment and biotechnology. Government support for agricultural modernization, greater awareness among farmers about quality inputs, and an expanding commercial farming base are further fuelling market growth, particularly in emerging economies like India.

Usage of quality seeds plays a pivotal role in improving crop productivity, enhancing resistance to pests and diseases, and ensuring food security. Cereals, oilseeds, vegetables, and pulses are among the major segments where improved seed varieties are being rapidly adopted.

Globally, leading producers and exporters of seeds include the United States, China, France, the Netherlands, and Brazil. India is also a significant contributor, particularly in the production of hybrid seeds for vegetables, cotton, and maize, and is gradually becoming a key exporter to African and Asian markets.

Notable trends include the rising demand for organic and non-GMO seeds, increased investment in seed R&D, and a growing shift toward precision agriculture that relies on data-driven seed selection. As climate variability intensifies, seed companies are focusing on developing drought-tolerant, pest-resistant, and nutrient-efficient varieties to ensure sustainable agricultural growth.

Exhibit 7.14: Seed Market Overview - Global (CY) and India (FY) (USD Bn)



Source: Secondary Research, Technopak Analysis

Arvind K. Singhal
Managing Director

Note: CY2018 refers to FY2019 for India, CY2023 refers to FY2024 and CY2028 refers to FY2029.

7.8 Fertilizer Market Overview

The global fertilizers market has exhibited modest growth in recent years, expanding from USD 185.1 billion in CY2018 to USD 202.2 billion in CY2023, reflecting a low CAGR of 1.8%. However, with rising global food demand, the market is expected to pick up pace, reaching USD 232.6 billion by CY2028 at a CAGR of 2.8%. The Indian fertilizers market has grown significantly faster, rising from USD 25.1 billion in FY2019 to USD 29.5 billion in FY2024, at a CAGR of 3.3%. It is projected to grow to USD 36.2 billion by FY2029, at a CAGR of 4.2%. In FY2024, India's fertilizer production stood at 45.2 million tonnes, reflecting the country's focus on self-sufficiency in fertilizer manufacturing.

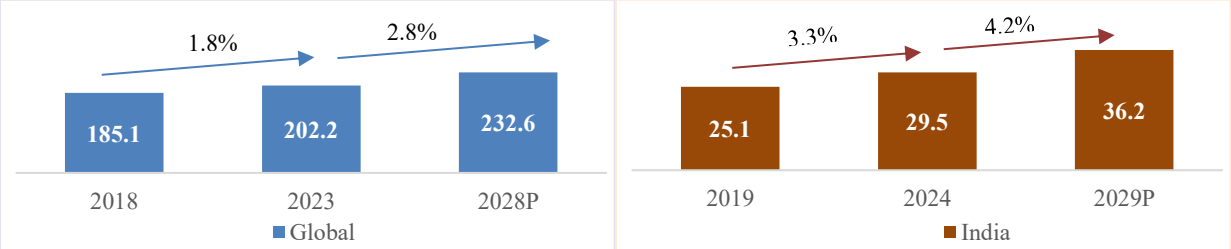
Key growth drivers include increasing global population, shrinking arable land, and rising pressure on food production, which are pushing farmers toward higher productivity through enhanced nutrient management. In India specifically, strong government subsidies, expansion of irrigation infrastructure, and growing awareness of balanced fertilization practices have accelerated fertilizer use.

Urea remains the most widely used fertilizer globally, followed by phosphate and potash-based fertilizers. There is a growing shift toward specialty and customized fertilizers, including water-soluble, biofertilizers, and micronutrient-enriched variants, driven by the need for sustainable agriculture and environmental concerns.

Top fertilizer-producing and exporting countries include China, India, Russia, the United States, and Canada. India, while a major consumer and partially self-sufficient in urea production, imports significant quantities of phosphates and potash to meet domestic demand.

Emerging trends include the increased adoption of precision farming technologies, promotion of organic and biofertilizers, digitization of supply chains, and a growing emphasis on improving soil health to ensure long-term agricultural productivity.

Exhibit 7.15: Fertilizer Market Overview - Global (CY) and India (FY) (USD Bn)



Source: Secondary Research, Technopak Analysis
Note: CY2018 refers to FY2019 for India, CY2023 refers to FY2024 and CY2028 refers to FY2029.

7.9 Cement Market Overview

The global cement industry was valued at USD 320 billion in CY2018 and USD 420 billion in CY2023, exhibited a CAGR of 5.6% during the past five years. Going forward, the cement industry is expected to grow at a similar pace with an expected CAGR of 5.5% for the next five years to reach a market size of USD 550 billion by CY2028. In India, the market was valued at USD 22 billion in FY2019 and USD 28.9 billion in FY2024. The cement industry in India will further grow at a CAGR of 8% from FY2024 to FY2029 and expected reach USD 42.5 billion by FY2029.

In terms of volume, India's cement production grew from 353 million tonnes in 2018 to 441 million tonnes in 2023 (CAGR of 4.6%) and is forecast to touch 550 million tonnes by 2028 with a similar CAGR of 4.5%.

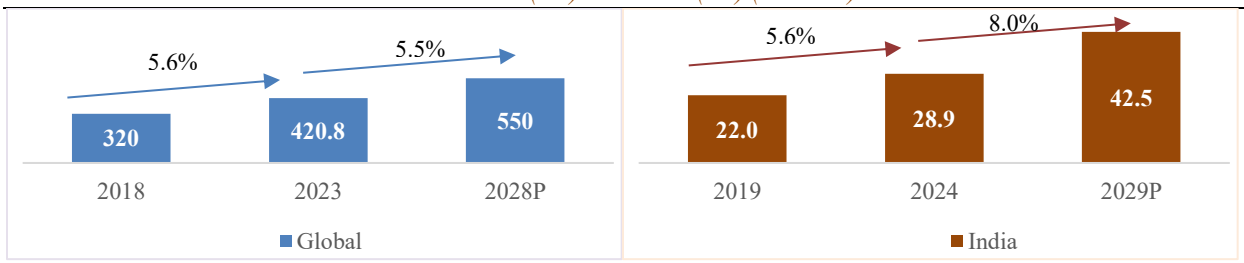
The industry's recent stagnation was significantly influenced by the COVID-19 pandemic, which disrupted infrastructure development and construction activities globally. Prolonged lockdowns, supply chain constraints, labour shortages, and delays in project approvals caused demand to slump, particularly in 2020. As economies recover, cement consumption is rebounding, driven by renewed public infrastructure spending, urbanization, and housing demand—especially in emerging markets.

Cement is a critical material in construction, used in building residential, commercial, and industrial structures, as well as transportation and utility infrastructure. Asia-Pacific dominates global cement consumption and production, led by China (the world's largest producer and consumer), followed by India, Vietnam, the United States, and Turkey. India is the second-largest producer of cement globally, yet the market remains underpenetrated, with per capita consumption ranging between 250-270 kg, significantly lower than the global average of 500-550 kg. The Indian cement industry has experienced steady growth, primarily driven by housing, infrastructure projects, and rural development initiatives. Under PMAY-G, 26.2 million houses have been completed as of June 2024, while the Bharatmala project targets the development of 60,000 km of roads.

Key growth drivers include rapid urbanization, government investments in affordable housing and infrastructure (such as roads, bridges, and smart cities), and the growth of the real estate sector. In India, initiatives like *Pradhan Mantri Awas Yojana*, *Bharatmala*, and *Smart Cities Mission* continue to boost cement demand.

Emerging trends include the push for green and low-carbon cement solutions, increased use of alternative fuels and raw materials (AFR), and innovations like blended cements and digitalization across manufacturing and logistics to enhance efficiency and sustainability.

Exhibit 7.16: Cement Market Overview - Global (CY) and India (FY) (USD Bn)



Source: Secondary Research, Technopak Analysis
Note: CY2018 refers to FY2019 for India, CY2023 refers to FY2024 and CY2028 refers to FY2029.

The flexible packaging industry is witnessing transformative growth, fuelled by the rapid expansion of sectors such as packaged food, cement, seeds, fertilizers, tile adhesives, pet food, animal feed, charcoal, and laundry care. As these industries diversify and scale in response to urbanization, rising incomes, and changing consumption habits, the demand for specialized and sustainable packaging solutions has surged. Each sector requires distinct packaging formats tailored to product characteristics and shelf-life needs. For example, the packaged food industry relies on multilayer flexible packaging, vacuum sealing, and retort pouches for freshness and hygiene. Cement and tile adhesives demand heavy-duty woven polypropylene sacks or laminated kraft paper bags for moisture resistance and durability. Seeds and fertilizers typically use HDPE, LDPE, and multi-wallpaper bags to ensure preservation and safety during transportation. Pet food and animal feed are increasingly shifting to barrier-lined flexible pouches and zip-lock bags to retain aroma and prevent spoilage. Charcoal packaging calls for breathable yet tear-resistant materials like laminated jute or polyethylene sacks. Laundry care products leverage HDPE bottles, refill pouches, and corrugated cartons depending on liquid or powder formats. This diverse requirement spectrum is encouraging innovation in packaging materials, with a growing focus on biodegradable, recyclable, and smart-packaging technologies to meet sustainability goals and enhance supply chain efficiency. The synergy between product expansion and flexible packaging innovation is thus reinforcing a robust growth trajectory for the packaging industry globally.

7.10 Major contributing end use industries as customers of India flexible plastic packaging market

The packaged Food & Beverages (F&B) segment dominates the Indian plastic packaging market, accounting for 53.5% share in FY2024. This significant share can be attributed to the growing demand for packaged and convenience foods, driven by changing lifestyles, urbanization, and rising disposable incomes of the Indian population. The F&B segment encompasses a wide range of products, including packaged snacks, beverages, dairy products, and ready-to-eat meals, all of which require packaging solutions to ensure product safety, freshness, and prolonged shelf life.

Following the above, is the Bulk Food & Agricultural Commodities segment which holds 14.0% share in FY2024. The packaging requirements in this segment are driven by stringent regulations and the need for robust packaging

solutions that ensure the integrity, safety, and efficacy of agricultural commodities such as seeds, fertilizers etc. as well as pet and animal foods.

The Industrial & Chemical segment holds a 12.5% share in FY2024. This segment encompasses packaging for products such as lubricants, charcoal, adhesives, construction chemicals, agrochemicals, and other industrial formulations. The Construction segments hold 5% of the Indian plastic packaging market. Apart from the major end-user categories, additional segments such as personal care, pharma, home care, hygiene products and many others collectively constituted the remaining 15% of the market share.

Exhibit 7.17: Indian Flexible Plastic Packaging Market (By Value Share in %) - By End-User Industry (FY2024)

Source: Technopak Analysis, Secondary Research

8. Key Growth Drivers and Innovations in Flexible Bulk packaging

8.1 Key Growth Drivers

i. **Growth in Key Sectors Fuelling Demand for Flexible Bulk Packaging in India:** The growth in the key sectors as mentioned above in the report are driving demand for bulk flexible packaging solutions**.** These industries require cost-effective, durable, and efficient bulk packaging solutions for storage and transportation of large volumes.

Exhibit 8.1: Key end use sectors for flexible plastic packaging usage and their growth in India (CY) (USD Bn)

	2018	2023	2028P	CAGR (2018-23)	CAGR (2023-28)
Packaged Food Market	76.5	127.5	216.2	10.8%	11.1%
- Packaged Pulses Market	1.0	1.6	2.4	9.9%	8.4%
- Packaged Rice Market	1.7	2.5	3.5	7.9%	7.0%
- Packaged Flour Market	2.5	4.7	9.6	13.4%	15.5%
- Packaged Spice Market	2.3	4.3	7.7	13.3%	12.3%
- Packaged Dry Fruits Market	0.6	0.8	1.1	5.5%	6.2%
- Packaged Sugar Market	5.4	7.5	10.5	6.8%	7.0%
Pet Food Market	0.3	0.7	1.7	19.8%	18.0%
Animal and Cattle Feed Market	1.5	1.9	2.4	4.8%	5.2%
Charcoal Market	0.5	0.7	0.8	5.5%	4.5%
Laundry Care Market	4.8	6.0	8.4	4.7%	6.9%
Tiles Adhesives Market	0.1	0.1	0.2	8.5%	9.0%
Seed Market	2.9	3.9	5.6	6.1%	7.5%
Fertilizer Market	25.1	29.5	36.2	3.3%	4.2%
Cement Market	22.0	28.9	42.5	5.6%	8.0%

Source: Technopak Analysis, Secondary Research,

ii. **Expansion of E-Commerce**: The rapid expansion of e-commerce is driving growth of the packaging industry by increasing demand for packaging solutions. Furthermore, demand for sustainable, durable, aesthetically appealing packaging is boosting innovations in the packaging industry. E-commerce requires packaging that ensures safe transit, enhances unboxing experience, and supports return logistics.

iii. **Growing Middle Class and Urbanization:** India's growing middle class is fuelling demand for modern retail formats, supermarkets, and e-commerce, leading to increased consumption of branded and packaged goods. This trend is driven by rising disposable incomes, urbanization, and evolving lifestyles. With rising disposable incomes, consumers are increasingly shopping at modern retail outlets and online platforms, demanding packaging that is hygienic, convenient, and resealable.

iv. **Expansion of the Food & Beverage Industry**: The growth of the processed food, ready-to-eat, and beverage segments is one of the strongest drivers for packaging innovation. As Indian consumers seek convenience, safety, and extended shelf life, the demand for sustainable, multilayer, and smart packaging is rising. This includes vacuum-sealed packs, tamper-proof lids, and microwave-safe containers that cater to busy urban lifestyles and rising health awareness.

v. **Cost Effectiveness:** India offers a significant cost advantage in packaging production due to the availability of raw materials, such as plastics and paper, and a large skilled labour force. Competitive pricing, along with economies of scale and improving automation, positions Indian packaging companies to effectively serve both domestic and global markets, boosting exports and investment.

vi. **Government Support**: Policy initiatives like "Make in India," the "National Packaging Initiative," and GST reforms have created a favourable business environment for the packaging sector. These policies encourage local manufacturing, support infrastructure development, and enforce standardization, improving the industry's global competitiveness and attracting foreign direct investment (FDI).

vii. **Premiumisation**: There is a noticeable shift toward premium packaging, driven by consumer demand for aesthetic appeal, brand differentiation, and luxury experiences. Packaging is increasingly seen as a tool to influence purchasing decisions, especially in categories like cosmetics, personal care, and gourmet foods. This trend is fostering innovation in design, texture, printing technologies, and the use of sustainable premium materials.

viii. **Shift from unorganized**: The shift from unorganized to organized players is boosting packaging industry sales by improving product quality, ensuring reliable supply, and strengthening customer trust. Organized players leverage better technology and scalable operations to meet rising demand for innovative packaging solutions which further boosts the growth of packaging industry.

8.1 Innovations in Packaging - Focus on packaging materials, technology, and sustainability

Innovations in packaging include blend smart labels, biodegradable materials, active freshness solutions, creating safer, eco-friendly products which boosts consumer trust. With consumers becoming more environmentally conscious, the recyclable, biodegradable, and reusable packaging solutions are gaining traction. The government's ban on single-use plastics is further driving the adoption of eco-friendly and sustainable packaging innovations.

Technological Advancement and Trends: Technological innovations are transforming the production of packaging materials, leading to lightweight, durable, and cost-effective solutions. Some significant advancements in the packaging industry include:

- Light weighting of rigid plastic packaging without compromising pack performance.
- Development and production of 100% bio-based plastic bottles.
- Use of use of high-performance materials and coatings with UV stabilization to protect contents from prolonged sun exposure.
- Automated technologies reduce labor costs significantly, enhancing operational efficiency at the customer's end.
- Recyclable BOPP laminated bags etc.

These technological strides are helping meet consumer demands for safer, more convenient packaging and are also helping the brands to take ownership of their brands, fueling growth in the global packaging industry.

Recent developments in the Indian packaging industry reflect global shifts towards sustainability, with growing emphasis on biodegradable films, recyclable plastics, and eco-friendly materials, aligning with international environmental standards and consumer preferences. Knack Packaging Limited offers a diverse range of packaging solutions, including PLWPP bags and PLWPP pinch bottom bags.

Exhibit 8.2: Illustrative images of different types of bags manufactured by Knack Packaging Limited

Note: The pictures are for representation purpose only and has been taken from company website.

The industry has witnessed advancements in HDPE/PP woven bags and PLWPP bags, with innovations focused on improving durability, sustainability, functionality, and aesthetics. Some key innovations and technological advancements in this area includes:

- **Use of high-performance materials and coatings**: Modern HDPE/PP woven bags are now designed with UV stabilization to protect contents from prolonged sun exposure, making them ideal for agricultural and industrial applications.
- Sustainability has been a major driving force behind recent innovations. **Recyclable PLWPP bags** are gaining popularity, allowing manufacturers to maintain high durability while ensuring that the packaging can be reused or repurposed.
- **Bio-based Compostable Films**: Advancements in bio-based and biodegradable additives are helping reduce plastic waste by introducing materials that break down more easily in controlled environments. Many companies are also integrating recycled PP/HDPE materials into their production processes without compromising on strength and print quality. For example,
- **Intelligent Packaging**: Companies are developing active and intelligent packaging solutions to improve product safety, shelf life, and consumer interaction. Active packaging incorporates technology to prevent spoilage and maintain freshness. Furthermore, intelligent packaging utilizes QR codes, RFID tags for real-time tracking, authentication, and enhanced transparency.
- **Lightweight and Durable Woven bags**: Companies are developing high-strength woven bags with multilayer structures that are both lightweight and durable, optimizing material usage for cost efficiency and sustainability. Advanced weaving techniques have enabled the production of high-tensile strength fabrics, reduced material consumption while maintaining excellent load-bearing capacity.

Knack Packaging Limited operates on a suitability-based model, where the rejected /defective products are reprocessed and broken down into granules, which are then repurposed for manufacturing of products such as woven fabric, pallets and chairs at an outsourced location.

8.2 Industry Specific Requirements in Packaging

Each industry requires customized bulk packaging solutions tailored to its specific needs. The food industry prioritizes freshness and safety, while the agriculture sector focuses on durability and protection against environmental factors. Animal and pet food packaging aims to preserve nutritional value and prevent contamination, whereas fertilizers require sturdy, moisture-resistant materials to maintain their effectiveness. Grain and pulses demand breathable yet secure packaging to prevent spoilage and pest infestation. Across all these sectors, durability, cost-efficiency, and sustainable packaging solutions remain essential to meeting evolving consumer expectations.

i. **Food & Beverage Industry**: The food & beverage industry requires barrier packaging to protect products from moisture, oxygen, light, and external contaminants, ensuring freshness, safety, and extended shelf life. Key companies serving this sector include Huhtamaki India Limited, UFlex Limited, Safepack Industries Limited, and Jupiter Laminates Private Limited. Further, Knack Packaging Limited also caters to food industry by providing bulk packaging solutions.

ii. **Grains and Pulses Packaging:** In the grains and pulses sector, encompassing products like rice, wheat, maize, sugar etc., packaging plays a crucial role in preserving quality and ensuring safe transportation. PLWPP bags are preferred due to their durability, moisture resistance, and ability to maintain product freshness. These bags are available in sizes ranging from 5 kg to 100 kg, with options for handle variants in the 5 kg and 10 kg categories, facilitating ease of handling.

iii. **Agrochemicals Packaging**: Agrochemicals, including fertilizers and pesticides, require specialized packaging to ensure safety and maintain chemical integrity. PLWPP bags with integrated liners, providing an additional barrier against moisture and contamination. These bags are designed to handle chemicals and water-soluble substances effectively, ensuring the safe storage and transportation of agrochemicals

iv. **Adhesives Industries**: adhesives require packaging that preserves their chemical properties while ensuring ease of handling and application. Given the fine, powdery nature of adhesives, packaging must be strong, tear-resistant, and moisture-proof. PLWPP bags with block bottom structures are widely used, as they provide excellent stacking ability and protection against humidity.

v. **Construction Materials**: The construction materials industry requires robust and durable packaging solutions to protect products from environmental factors such as moisture, dust, and mechanical damage. Cement packaging demands moisture-resistant, tear-proof PLWPP bags with block bottom or valve designs to ensure easy handling and minimal wastage. Sand, gravel, and other aggregates require heavy-duty woven

polypropylene sacks that can withstand rough handling and transportation stress while ensuring minimal spillage.

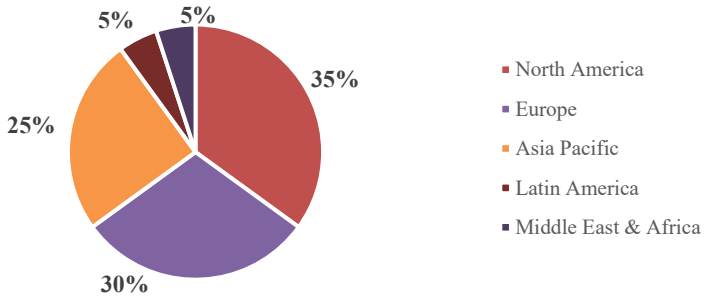
vi. **E-commerce & Retail Industry:** The E-commerce & Retail industry requires sturdy, lightweight, and economical packaging to ensure safe transportation of products to customers. Non-woven and woven polypropylene shopping bags are popular due to their reusability, strength, and eco-friendliness. These bags come in various sizes and handle configurations, catering to different retail needs.

8.3 Evolution of PLWPP Pinch Bottom Bags

Driven by the rising demand for easy, sustainable and cost-effective packaging solutions, the pinch bottom bags have emerged as a vital segment within the packaging industry. These bags, recognized for their distinctive design that enables easy filling and sealing, offer durability and convenience, are increasingly preferred across industries such as agriculture, food and beverage, construction materials, packaging grains, powders, and other bulk materials.

North America holds 35% market share in pinch bottom bags, followed by Europe with 30% market share, both driven by strict environmental laws, consumer preferences and premium packaging demand. Asia-Pacific region, led by China and India, is witnessing rising demand due to industrial growth, expanding retail, and preference for durable packaging.

Exhibit 8.2: Market Share of Pinch Bottom Bags (CY2024)



Source: Secondary research, Technopak Analysis

India: PLWPP pinch bottom bags are emerging in India as manufacturers prefer them for their flat base, stable standing shape, exceptional strength, moisture resistance, durability, and excellent printability which makes them ideal for secure packaging and attractive shelf display. For example, Knack Packaging Limited offers PLWPP pinch bottom bags, designed for bulk packaging for consumer and industrial players. It is the first company in India (and Asia) to provide laser cut and easy-open feature integrated into their PLWPP pinch bottom bags[2].

Note: The pictures are for representation purpose only and has been taken from company website.

The PLWPP pinch bottom bags offer several advantages as they provide superior durability and tensile strength, making them suitable for heavy or sharp-edged products like grains, fertilizers, cement, pet food etc. Their moisture resistance is notably higher, which is beneficial in humid or tropical climates where paper bags are more prone to weakening. Additionally, PLWPP pinch bottom bags offer better barrier protection, helping to preserve product quality and extend shelf life—especially important in food and other applications. They also enable high-quality rotogravure printing, enhancing shelf appeal and brand visibility. The PLWPP bags including the PLWPP pinch bottom bags have lower damage rate, reusability, and longer functional lifespan compared to other alternatives.

[2] *As certified by an internationally machinery manufacturer, Knack Packaging Limited purchased their 1st Conversion Lime PP*starKON X in India (and Asia) that produce printed BOPP laminated WPP pinch bags with laser cut and easy open device.*

Arvind K. Singhal
Managing Director

9. Environmental and Regulatory Impact

9.1 Recycling Practices of Woven Polypropylene (WPP) Bags

WPP bags, commonly used for packaging in industries such as agriculture, construction, and retail, pose significant challenges in recycling. Despite the widespread use of polypropylene (PP), its recycling rate remains at 3% in FY2024, compared to high-density polyethylene (HDPE) at 10% and polyethylene terephthalate (PET) at 15% (Source: Secondary Research).

Recycling Practices in the Industry for printed and laminated woven polypropylene (PLWPP) Bags includes:

- **Mechanical Recycling**: The most common recycling method in the industry involves mechanical processing, where used bags are collected, shredded, and melted down into polypropylene pellets or granules. These recycled materials are then used to manufacture new plastic products such as crates, pipes, non-food packaging, and household items.
- **Co-Processing in Cement Kilns**: When mechanical recycling is not viable due to contamination or mixed-material composition, co-processing in cement kilns offers an alternative. In this process, the high calorific value of polypropylene allows it to be used as a substitute fuel in cement production, reducing reliance on coal and fossil fuels. This practice is particularly useful for non-recyclable or heavily contaminated PLWPP bags that cannot be efficiently processed through conventional recycling methods.
- **Solvent-Based Recycling**: Solvent-based recycling involves dissolving the BOPP film in a specialized solvent to extract and purify polypropylene. The bags are first cleaned and shredded before being placed in a solvent that separates polypropylene from inks and adhesives. Once purified, the polypropylene is recovered by evaporating or chemically separating the solvent. This high-quality polymer can then be reused for new plastic products.

9.1.1 Eco-friendly alternatives

- **Woven HDPE Bags with Eco-Coating** offer a durable, moisture-resistant, and sustainable alternative to traditional plastic packaging. Made from woven HDPE fabric with biodegradable or recyclable coatings, they provide strength and flexibility while reducing environmental impact. Ideal for industries like agriculture, food, and chemicals, these bags support a circular economy by minimizing plastic waste.
- **Recycled Polypropylene Bags**: These bags are made from post-consumer or post-industrial recycled polypropylene, reducing reliance on virgin plastic. They retain the strength, durability, and moisture resistance of standard PP bags while promoting circular economy practices in bulk packaging. For example, UltraTech Cement Limited uses cement bags made with 50% recycled polypropylene (rPP), reducing virgin plastic use by 43% and minimizing landfill and incineration impact.
- **Non-Woven Polypropylene Bags**: Lightweight and reusable, non-woven polypropylene bags are made from bonded polypropylene fibers, offering flexibility and durability. They are widely used for retail and bulk packaging, with better recyclability and lower environmental impact than laminated plastic bags.
- **Biodegradable and Compostable Bags**: Made from natural or bio-based polymers like PLA or PHA, these bags break down naturally in composting conditions. They provide an eco-friendly alternative to plastic packaging, ideal for industries prioritizing sustainability, though strength may vary.
- **Paper Bags**: Paper bags, often made from kraft or recycled paper, are biodegradable and reusable, offering a sustainable alternative for dry bulk packaging, can be an alternative. However, they may not be as durable as PLWPP bags and may not be suitable for all bulk and heavy packaging of items.

9.1.2 Environmental footprint of PLWPP bags

- **Production Impact**: PLWPP bags are made from fossil fuel-based polymers primarily crude oil and natural gas, contributing to carbon emissions, however, lower than other traditional packaging solutions, during production. The extraction and processing of polypropylene require significant energy and resources. Approx 8% of all the

oil used in the world (approximately 400 million tons) is used in the manufacturing of traditional plastic, leading to significant CO_2 emissions.

- **Energy Use**: Polypropylene production requires high energy input, contributing to greenhouse gas emissions.
- **Low Recycling Rates**: In FY2024, WPP bags had a recycling rate of just 3%, with post-consumer recovery at less than 1%, making them one of the least recycled plastics.
- **Landfill Accumulation**: Due to low recycling rates, a significant portion of WPP bags end up in landfills, where they take decades to degrade.
- **Microplastic Pollution**: Degradation of improperly disposed WPP bags leads to microplastic contamination in soil and water.

9.1.3 Regulatory trends in packaging waste and sustainability.

- **Plastic Waste Management (Amendment) Rules, 2024:** The Plastic Waste Management (Amendment) Rules, introduce stricter measures to reduce plastic pollution, with key focus areas including:
    - **Regulation of Microplastics**: Restrictions on the production and use of microplastics to minimize environmental and health risks.
    - **Stronger Standards for Biodegradable Plastics**: New certification and testing requirements to ensure that only genuinely biodegradable plastics are used.
    - **Enhanced Extended Producer Responsibility (EPR) Compliance**: Producers must incorporate a higher percentage of recycled plastic in packaging and maintain better transparency in reporting their plastic waste management efforts.
- **Extended Producer Responsibility (EPR) Framework**: The Plastic Waste Management Rules, 2016, and its subsequent amendments mandate that producers, importers, and brand owners (PIBOs) take responsibility for collecting, recycling, and managing plastic waste. The 2022 amendment further introduced category-wise EPR targets for different types of plastic packaging, pushing companies toward higher recycled content adoption.
- **Ban on Single-Use Plastics (SUPs):** To curb plastic pollution, the Government of India banned 19 single-use plastic items (such as straws, cutlery, and polystyrene products) in July 2022. This ban has significantly impacted industries like FMCG, e-commerce, and food packaging, encouraging them to shift to alternative packaging solutions.
- **Mandatory Recycling Targets and Plastic Waste Reporting:** The government has set specific recycling targets for different types of plastic packaging, including Rigid plastic packaging, Flexible plastic packaging, Multi-layered packaging (MLP), Companies must also report their plastic waste generation and recycling progress, with non-compliance resulting in financial penalties.
- **Mandatory Barcodes/QR Codes:** Effective from July 1, 2025, all plastic packaging must include a barcode or QR code displaying the producer's details and registration number, enhancing traceability and compliance.

9.1.4 Recycling benefits with Mono-material PLWPP Bags

The packaging industry is shifting from multi-material structures to mono-material solutions to enhance recyclability and sustainability. For PLWPP bags, using a single plastic molecule material instead of multiple plastics improves efficiency and reduces environmental impact. By adopting a mono-material approach, where both the woven fabric and laminated film are made of polypropylene, the recycling process becomes simpler, ensuring better material recovery and reduced waste. One effective technique involves BOPP films laminated onto woven polypropylene fabric, which maintains durability and printability while enhancing recyclability. Additionally, special adhesives like maleic anhydride-grafted PP resins improve bonding between layers, ensuring strong adhesion without compromising recyclability, thereby supporting a circular economy.

Arvind K. Singhal
Managing Director

Alternatives to multiple plastic molecules materials for PLWPP bags

- **Mono-PP (Polypropylene) Bags**: Using only polypropylene for both the woven fabric and the lamination layer simplifies recycling. Mono-material structures are easier to recycle because they don't require separation of different polymers.
- **Mono-PE (Polyethylene) Bags**: If polyethylene is used for both the woven fabric and the lamination, it can also simplify recycling. However, this may require adjustments in the manufacturing process.
- **PLA (Polylactic Acid):** PLA is a biodegradable polymer derived from renewable resources like corn starch or sugarcane. It can be used as a lamination layer or even as the main material for the bag.

9.2 Key regulations regarding plastic packaging industry

The packaging industry in India has emerged as a vital component of the country's manufacturing sector, catering to the ever-growing demands of diverse end-user segments. As consumer preferences evolve and environmental concerns gain prominence, the regulatory landscape surrounding packaging, particularly plastic packaging, has undergone significant transformations. The Indian government has instituted a comprehensive set of regulations to address the environmental challenges posed by plastic packaging waste. The centrepiece of these efforts is the Plastic Waste Management (PWM) Rules, 2016, and its subsequent amendments in 2018, 2021, 2022, and 2024 consecutively.

Exhibit 9.1: Timeline of the PWM Rules in India

Source: Technopak Analysis, Secondary Research

Key highlights of the Plastic Waste Management Rules:

- **Plastic Waste Management Rules, 2016**: This comprehensive set of rules by the Ministry of Environment, Forest and Climate Change aims to regulate the manufacture, use, and disposal of plastic products, including packaging materials. It mandates the generators of plastic waste to take steps to minimize generation of plastic waste while also mandating the responsibilities of local bodies, gram panchayats, waste generators, retailers, and street vendors to manage plastic waste. It mandates the use of recycled plastics, sets recycling targets, and introduces the concept of Extended Producer Responsibility (EPR) for plastic waste management.
- **Plastic Waste Management (Amendment) Rules, 2018**: The amended Rules laid down the phasing out of Multilayered Plastic (MLP) which are "non-recyclable, or non-energy recoverable, or with no alternate use." They also prescribed a central registration system which were to be evolved by Central Pollution Control Board (CPCB) for the registration of the producer/importer/brand owner. While a national registry was prescribed for producers with presence in more than two states, a state-level registration was also prescribed for smaller producers/brand owners operating within one or two states.
- **Plastic Waste Management (Second Amendment) Rules, 2021**: These amendments prohibited identified single use plastic items by 2022 and increased the thickness of plastic carry bags from 50 to 75 microns from 30th September 2021 and to 120 microns from 31st December 2022, respectively.
- **Plastic Waste Management (Amendment) Rules, 2022**: These amendments further strengthen the EPR regime by introducing specific targets for the recycling of plastic packaging waste and mandating the use of recycled plastics in various applications. All obligated entities of EPR were also told to register on the central registration system as evolved by the Central Pollution Control Board (CPCB).
- **Plastic Waste Management (Amendment) Rules, 2024**: These amendments highlight significant efforts to address plastic pollution in India, particularly by targeting microplastics and setting stricter criteria for biodegradable plastics.

Other common Indian regulations and standards applicable in the packaging industry include:

- **Food Safety and Standards (Packaging and Labelling) Regulations, 2011**: These regulations, under the Food Safety and Standards Act, 2006, specify the types of materials that can be used for packaging food items, including plastics. They also outline requirements for labelling, ensuring consumer safety and transparency.
- **Legal Metrology (Packaged Commodities) Rules, 2011**: These rules regulate the packaging and labelling of packaged commodities, including requirements for net quantity declarations, ensuring fair trade practices, and preventing malpractices.
- **Drugs and Cosmetics Rules, 1945**: These rules, under the Drugs and Cosmetics Act, 1940, provide guidelines for the packaging of pharmaceutical and cosmetic products, ensuring safety, quality, and efficacy.
- **Bureau of Indian Standards (BIS) Standards**: BIS has established several standards for plastic packaging materials, including specifications for materials, dimensions, testing methods, and safety requirements.

In addition to these regulations and standards, there are also **prescriptive guidelines** in place as per the India Plastics Pact. It is a collaborative initiative launched in September 2021 by the Confederation of Indian Industry (CII) and WWF-India, enabling businesses, government, NGOs, and other stakeholders to work together towards a common goal of creating a circular economy for plastics in India. It has over 50 members and supports, including notable brands like ITC, Amcor, Tata Consumer Products, and Huhtamaki to name a few.

Exhibit 9.2: Guidelines for Plastic Packaging and Waste Management in India

Parameter	Guidelines
Awareness	• Public/private initiative bringing together businesses, government, NGOs fostering circularity principles
Recycling targets	• 50% of plastic packaging should be recycled by 2030
Reusability targets	• 100% of plastic packaging to be reusable, recyclable or compostable by 2030
Recycled content portion targets	• 25% of the average recycled content across all plastic packaging by 2030

Source: India Plastics Pact, Secondary Research

9.3 India's EPR Regime and its impact on the packaging Industry

Extended Producer Responsibility (EPR), which falls under the regime of Plastic Waste Management Rules, 2016, in India is a cornerstone of India's evolving policy framework for plastic waste management. EPR mandates that producers, brand owners, importers and plastic waste processors of plastic packaging are accountable for its collection and sustainable disposal. This approach shifts the burden of waste management from municipalities to the entities that bring packaging materials into the market. By placing financial and operational responsibility for end-of-life product management on producers, this regime is driving transformative changes within the packaging industry.

The EPR Guidelines covers the following with respect to plastic packaging:

- Reuse
- Recycling
- Use of Recycled Plastic Content
- End of life disposal

Obligated Entities of EPR:

- **Producer (P)** of plastic packaging
- **Importer (I)** of all imported plastic packaging and/ or plastic packaging
- **Brand Owners (BO)** including online platforms/marketplaces and supermarkets/retail chains other than those, which are micro and small enterprises as per the criteria of Ministry of Micro, Small and Medium Enterprises, Government of India
- **Plastic Waste Processors (PWPs)** except cement kilns and road construction

Key components of India's EPR regime include:

- **Phased Collection Targets:** Producers are obligated to collect and ensure the recycling or environmentally sound disposal of escalating percentages of plastic waste they generate.
- **Financial Mechanisms:** Companies can either establish in-house collection and recycling systems or collaborate with Producer Responsibility Organizations (PROs).
- **Penalties for Non-Compliance:** Failure to meet EPR targets can result in financial penalties and reputational damage.

In June 2020, the Unified framework for EPR proposed three implementation models which are under discussion stage. This includes a system of plastic credit, through Producer Responsibility Organizations (PRO) and setting up a fee-based mechanism. The new draft framework also has provisions to impose stringent penalties on producers if they fail to meet their targeted collection. The government is pushing for more evidence-based mechanisms so that authorities can monitor how companies undertake EPR obligations.

PROs (Producer Responsibility Organizations) work closely with stakeholders throughout the product-to-waste value chain, including brand owners, retailers, recyclers, and municipalities, to fulfill their missions. Their responsibilities include:

- **Waste Prevention and Consumer Awareness:** PROs work to educate consumers about waste prevention and promote sustainable practices.
- **Litter Prevention and Recycling:** They collect and recycle packaging waste to reduce litter and promote environmental responsibility.
- **Eco-Design Improvement:** PROs collaborate with stakeholders to improve the eco-design of products and packaging, aligning with life-cycle analyses and changing consumer habits.
- **Municipal and Waste Management Cooperation:** They work with municipalities and waste management companies to establish efficient collection and sorting systems based on administrative, territorial, and demographic factors.
- **Support for Circular Economy Development:** PROs invest in R&D to advance new circular economy sectors focused on reduction, reuse, and recycling, enhancing the value chain from collection to recycling.

These complementary missions help PROs drive sustainability and environmental responsibility across the entire product lifecycle. Karo Sambhav is one such PRO which is India's first producer-governed and owned PRO.

The Guidelines on EPR for plastic packaging vide PWM (Amendment) Rules, 2022, on 16th February 2022 stipulate mandatory targets on EPR, recycling of plastic packaging waste, reuse of rigid plastic packaging and use of recycled plastic content for the various obligated entities of EPR.

Exhibit 9.3: Plastic Packaging Categories covered under EPR:

Category I	Rigid Plastic Packaging
Category II	Flexible Plastic Packaging of single layer or multilayer (more than one layer of different kinds of plastic),
Category III	Multi-layered plastic packaging (at least one layer of plastic and at least one layer of material other than

We discuss the stipulated targets for **Producers (P)** below-

EPR targets:
Eligible Quantity in MT (Q1) shall be the average weight of plastic packaging material (category wise) sold in the last two financial years (A) plus average quantity of pre-consumer plastic packaging waste in the last two financial years (B) minus the annual quantity (C) supplied to the entities covered under sub-clause 4(iii) in the previous financial year as given below-

Q1 (in MT) = (A+B) – C

Arvind K. Singhal
Managing Director

Exhibit 9.4.: Plastic Packaging Categories covered under EPR: Extended Producer Responsibility Target

Plastic packaging category	Year	EPR target (as a percentage of Q1- category-wise)
I	2021-22	25%
II	2022-23	70%
III	2023-24	100%

Obligation for recycling:
The producer shall ensure minimum level of recycling (excluding end of life disposal) of plastic packaging waste collected under EPR target, category-wise, as given below-

Exhibit 9.5: Minimum level of recycling (excluding end of life disposal) of plastic packaging waste as a % of EPR target

Plastic packaging category	2024-25	2025-26	2026-27	2027-28 onwards
I	50	60	70	80
II	30	40	50	60
III	30	40	50	60

Obligation for use of recycled plastic content:
The producer shall ensure use of recycled plastic in plastic packaging category-wise as given below-

Exhibit 9.6: Mandatory use of recycled plastic in plastic packaging (% of plastic manufactured for the year)

Plastic packaging category	2024-25	2025-26	2026-27	2027-28 onwards
I	30	40	50	60
II	10	10	20	20
III	5	5	10	10

End of Life Disposal

(i) Only those plastics, which cannot be recycled will be sent for end-of-life disposal such as road guidelines issued by Indian Road Congress or Central Pollution Control Board from time to time.

(ii) The producers shall ensure end of life disposal of the plastic packaging waste only through methodologies specified in Rule 5 (1) (b) of Plastic Waste Management Rules, 2016.

Plastics Best Placed to Meet EPR Targets

Exhibit 9.7: Rigid Plastic Packaging best placed to meet EPR Targets

Category (As per EPR)	Recycling target (2025)	Recycled Content Target (2025)	Current Recycling Rates
I-Rigid Plastics	50%	30%	>60% for PET
II- Flexible Packaging	30%	10%	<10%
III- MLP	30%	5%	0-0.5%

India's regulations, together with the growing awareness among consumers, have increased the demand for higher-value recycling applications. In turn, industry participants have enhanced focus on increasing the PCR content in their products and adopting other innovative recycling improvements and technologies.

10. Key Trends for the Flexible Packaging Industry

10.1 Technological Innovations

- **Smart Packaging**: Smart packaging is an innovative trend gaining traction in India, driven by technological advancements, demand for convenience, transparency, and sustainability. It integrates technologies like QR codes, RFID tags, NFC, sensors etc. into packaging to enhance functionality—such as real-time tracking, monitoring, ensuring safety, and improving supply chain efficiency.

  Indian manufacturers are rapidly adopting smart packaging technologies as these advancements minimize waste, streamline logistics, and enhance product integrity, driving the widespread adoption of flexible packaging across the food, healthcare, and retail sectors. Companies use QR codes and holographic elements for anti-counterfeiting and traceability. Knack Packaging Limited offers an optional added security feature in their bags with RFID and Unique Barcoding features for enhanced real-time tracking and authenticity (Anti-counterfeit protection). Additionally, the company has introduced laser cut and easy open feature in their PLWPP Pinch Bottom bags, allowing for effortless access to the products inside the packages. This is a user-friendly design that eliminates the need for scissors or tearing, making it quick and simple for the customers to open and enjoy the contents inside

  - **RFID (Radio Frequency Identification) Tags**: Companies are leveraging RFID technology to enable real-time, bulk tracking of goods without requiring direct line of sight, significantly improving efficiency. This, in turn, enhances inventory management, reduces errors, and ensures superior security and product authenticity throughout the supply chain.
  - **QR Codes**: Companies are deploying QR codes to provide seamless access to product information through a smartphone scan, boosting traceability. They are cost-effective, easy to integrate into packaging, and help foster greater consumer engagement by offering direct connections to detailed product data.
  - **NFC tags**: NFC (Near Field Communication) tags are small, wireless chips embedded in packaging or products, enabling short-range communication with compatible devices, such as smartphones or scanners.

  PLWPP bags are increasingly embedded with QR codes and NFC technology, allowing consumers to access product details, promotions, and recycling info with a quick scan.

- **Integration of Automation**: Automation is emerging as a transformative force in the Indian Flexible Packaging Industry, driving efficiency, precision, and scalability to meet rising demand and global quality standards. Companies are increasingly utilizing robotics in packaging operations to enhance efficiency, precision, and hygiene. Automated machine handle filling, sealing, and palletizing, ensuring speed and consistency. Knack Packaging Limited's PLWPP bags, PLWPP Pinch Bottom bags etc. are suitable for automated plant, helping customers reduce labour costs and enhance operational efficiency and sales.

10.2 Rise of Sustainable packaging

With an increasing emphasis on sustainability, the Indian packaging market is witnessing a surge in demand for eco-friendly solutions due to rising environmental concerns, stricter regulations, consumer awareness, and technological advancements.

- **Adoption of Recyclable, Reusable and Eco-Friendly Materials:** Companies are increasingly shifting towards biodegradable packaging, plant-based plastics, and recycled paper alternatives to reduce environmental impact. India is witnessing a rise in the use of compostable packaging for food, e-commerce, and FMCG industries. Brands are increasingly embracing refillable and returnable packaging to reduce waste and promote sustainability. Companies are also implementing recycling take-back programs, forming sustainability pledges and holding events to enhance their green initiatives. For example, Huhtamaki India

has led industry discussions named as “Think Circle” on flexible packaging recycling, with stakeholders to enhance recyclability and circularity.

- **Use of recycled plastics**: Incorporating recycled materials, such as recycled polyethylene (rPE) and recycled PET (rPET), into flexible packaging reduces dependency on virgin plastics, lowers carbon footprints, and supports circular economy goals, while meeting regulatory mandates and consumer demand for sustainable solutions. Companies are integrating post-consumer recycled plastics into their packaging to reduce virgin plastic consumption.

  In India, the rising volume of plastic waste has prompted both government regulations and industry initiatives to promote recycling. The introduction of Extended Producer Responsibility (EPR) under the Plastic Waste Management Rules mandates companies to manage the end-of-life disposal of their packaging materials.

10.3 Impact of E-Commerce and Consumer Behavior: The exponential growth of e-commerce in India is one of the growth drivers for the flexible packaging market in the country. With the rise of online shopping, there is an increased demand for robust, lightweight, and versatile packaging solutions that can ensure product safety during transit. Further, the lightweight nature of flexible packaging reduces shipping weight and volume, aligning with the cost-sensitive logistics models of e-commerce giants, thus driving their preference over rigid alternatives.

10.4 Impact of Globalization and Trade on Indian packaging Industry

Globalization has opened international markets for Indian flexible packaging companies. The rise in global trade has increased demand for high-quality, cost-effective packaging solutions, particularly for food, beverages, pharmaceuticals, FMCG, construction, agriculture etc. Indian firms have capitalized on this by exporting products like WPP and PLWPP bags, pouches, and specialty films. Indian companies such as Knack Packaging Limited, Mayur Wovens Private Limited, and Shreeshakti Syn Bags Private Limited has more than 50% of their revenue coming from exports. Over the years, Knack Packaging Limited has exported its products across 68 countries, with the USA and Mexico accounting for 60% of their export revenue in FY2025.

- **Growing export opportunities**: Cross-border trade has significantly increased the export of flexible packaging materials from India, with the industry witnessing exports of packaging materials grew at a CAGR of 4.3% from CY2019 to CY2024, driven by rising global demand for cost-effective, lightweight, and durable solutions like sacks & bags, laminates, pouches, and films, positioning India as a key supplier in the international market.

- **Increase in Foreign Investments**: The Indian packaging industry presents a lucrative opportunity for investors, with the government allowing 100% FDI through a simplified route which encourages global players to invest and expand in India. Global players like SIG Combibloc and Amcor have invested in manufacturing facilities in the country. While Indian firms like Uflex have expanded through collaborations, this influx of capital and expertise has accelerated industry growth, modernized infrastructure, and improved product quality to meet global benchmarks.

11. Threats and Challenges for the Flexible Packaging Industry

i. **Raw Materials Price Volatility and Shortage**: The packaging industry has been impacted by global economic instability, with geopolitical crises like the Russia-Ukraine war disrupting supply chains and causing irregular raw material availability and price fluctuations. Furthermore, surging inflation has led to higher energy, fuel, and labour costs, putting additional pressure on production expenses.

ii. **Regulatory Compliance** The stringent regulatory landscape poses significant challenges for companies in the industry, compelling them to meet evolving standards while striving to remain competitive and profitable. Compliance with these regulations often demands considerable investments in innovation, technology, and infrastructure to ensure that packaging materials align with environmental and safety requirements.

In contrast, manufacturers of PLWPP Bags and PLWPP Pinch Bottom Bags hold a favourable market position due to their niche expertise and higher-value offerings. These bags offer greater durability, superior print quality, and enhanced aesthetics, making them ideal for branding and premium packaging. Higher profit margins, helps absorb regulatory compliance costs and raw material price increases. Additionally, technological advancements and evolving consumer preferences have driven strong market growth, further enhancing profitability.

iii. **Rising demand for sustainability:** The rising demand for sustainability in packaging is placing significant pressure on the flexible packaging industry. Brands, regulatory bodies, and environmentally conscious consumers are increasingly demanding eco-friendly materials to meet sustainability goals, companies are investing heavily in research and development to design mono-material packaging, use biodegradable or compostable materials, or incorporate recycled content.

iv. **Cost Challenges:** Integrating sustainable materials and advanced technologies can lead to higher initial costs, which may result in pricing pressures, reduced profit margins for manufacturers. For example, bioplastics and, come at a higher cost compared to traditional plastics. This is primarily due to restricted supply chains, high production expenses, and the continuous investment required for research and development to enhance their performance and scalability.

v. **Supply Chain Complexity:** The supply chain for flexible packaging involves multiple stages, from raw material sourcing to manufacturing and distribution. Sourcing sustainable materials like biodegradable films or recycled polymers can be challenging due to limited availability, higher costs, and varying regional regulations.

vi. **Design Challenges**: The flexible packaging industry faces several design-related challenges that significantly hinder the recycling process.

- **Multi -layer Structure**: Flexible packaging often consists of multi-layer structures made from polymer layers like PET-PE, PET-PP, or polymer-metal combinations which are difficult to separate and incompatible during recycling process, leading to lower recyclate quality.
- **De-Inking**: Flexible packaging is printed with vibrant colours for branding which gets trapped in plastic layers which makes de-inking difficult, leaving discoloured recyclate with limited reuse options.
- **Presence of Adhesives and Residuals**: Multi-layer flexible packaging often contains adhesives and product residues that are difficult to remove, reducing recyclate quality and increasing recycling costs.

vii. **Recycling Infrastructure Limitations:** The absence of a well-developed recycling infrastructure in India for flexible packaging materials creates further hurdle in ensuring widespread recyclability. For example, many biodegradable materials such as bio-degradable plastics need industrial composting conditions to break down properly, but India currently lacks adequate facilities for this.

Arvind K. Singhal
Managing Director

TECHNOPAK ADVISORS PVT. LTD.

viii. **Low Recycling Rate**: Recycling rates for flexible packaging remain low, with a large share of waste from flexible packaging not being collected or processed on a large scale. This is primarily due to their complex composition, lightweight nature, and the absence of strong demand for recycled materials.

ix. **Waste Segregation Challenges:** A key challenge in collecting flexible packaging is that collectors are unaware about which materials to collect or how to sort them properly. Lack of appropriate segregation leads to mixed waste, reducing both the quantity and quality of recyclables and increasing processing costs for recyclers.

Arvind K. Singhal
Managing Director

12. Competitive Landscape

12.1 Key Players and Manufacturing Capabilities

India's packaging industry includes several major players specializing in woven polypropylene (WPP) bags, flexible packaging, and bulk packaging solutions. Companies like Knack Packaging Limited, Mayur Woven Private Limited, and Sah Polymers Limited operate with significant manufacturing capacities, catering to industries such as agriculture, chemicals, and food packaging. Knack Packaging Limited, incorporated in 2013 (earlier established as a proprietorship firm in 2006), is a manufacturer of bulk flexible packaging solutions, with effective installed capacity of 36,400 MT per annum (as of March 31, 2025) of WPP bags, PLWPP bags, PLWPP pinch bottom bags and others at its plants in Gujarat.

Knack Packaging Limited, among the select peers, is the largest manufacturer of Printed and Laminated Woven Polypropylene bags and Printed and Laminated Woven Polypropylene Pinch Bottom bags in India, based on the revenue in FY2024.

Exhibit 12.1: Key Players and their Manufacturing Capabilities in India

Company Name	Inception Year	Manufacturing Capacity	Number of Plants	Location of Plants
Knack Packaging Ltd.	2013*	Effective Installed Capacity – 36,400 MT per annum	3	Gujarat
Mayur Wovens Pvt. Ltd.	2004	33,000 MT per annum	5	Gandhinagar-Gujarat
Rajasthan Flexible Packaging Ltd.	2009	Tape Production- 1,050 Tons per month, Looms Production- 1,050 Tons per month Bag Printing- 21 Mn Bags Finished bags- 32.2 Mn Bags per month	1	Kotputli (Rajasthan)
Alliance Poly Sacks Pvt. Ltd.	2010	30 million bags per month	NA	North America, South America, Europe, Africa, Asia, Oceania
Kaypee Polyfab Pvt. Ltd.	2011	12 Lakh Bags/Day	2	Gujarat
Shri Maa Polyfabs Ltd.	2005	16,100 MT per annum	2 Units	2 Asansol (West Bengal)
Lakhdatar International Pvt. Ltd.	2022	7,000 MT (4 Lakh Bags/ Day)	2 Units	2 Karnal (Haryana)
Dinman Polypacks Pvt. Ltd.	1993	7,200 MT (120 Mn Bags / annum)	1	Durgapur (West Bengal)
Shreeshakti Syn Bags Pvt. Ltd.	2018	NA	1	Pithampur (Madhya Pradesh)
Sah Polymers Ltd.	1992	9,120 MT per annum	2	2 Udaipur, (Rajasthan)

Source: Company website, annual reports, secondary research
NA refers to Not Available.
MTPA- Metric Tonnes Per Annum.
**Knack Packaging was established as a proprietorship firm in 2006 by the promoter, Mr. Rashmin Patel.*

In 2006, the company's promoter, Mr. Rashmin Patel, set up Knack Packaging as proprietorship firm for manufacturing of BOPP/ Printed and Laminated Woven Polypropylene Bags. Furthermore, Knack Packaging was one of the early movers in the manufacturing of BOPP/ Printed and Laminated Woven Polypropylene bags. Knack Packaging Limited is the first company in India (and Asia) to provide laser cut and easy-open feature integrated

into their Printed and Laminated Woven Polypropylene Pinch Bottom bags[3].

12.2 Presence Across Customer Segments

The packaging industry in India serves diverse consumer segments, including food & agriculture, agrochemicals, construction, FMCG, pet food, and bulk packaging. Companies like Mayur Wovens Private Limited, Shri Maa Polyfabs Limited, Knack Packaging Limited and Sah Polymers Limited have a strong presence across multiple industries, offering specialized packaging solutions. Knack Packaging Limited is a key player, catering to several industries including grains and pulses – rice, dal, lentils, etc., flour & spices, sugar, salts, fruits & nuts, animal & pet foods, agriculture, seeds, charcoal, detergents powders & granules, fertilizers, chemicals, cement, tile adhesives, building materials, mineral bags and retail packaging with a broad product portfolio.

Exhibit 12.2: Key Players and their presence across key customer segments

Players	Food & Agriculture	Agrochemicals & Industrial	Construction & Packaging	Essentials	Retail & Consumer FMCG Packaging	Pet & Animal Feed	Promotional & Shopping Bags	Bulk Packaging
Knack Packaging Ltd.	✓	✓	✓	✓	✓	✓	✓	✓
Mayur Wovens Pvt. Ltd.	✓	✓	✓	✓	✓	✓	-	✓
Rajasthan Flexible Packaging Ltd.	✓	✓	✓	-	-	✓	-	✓
Alliance Poly Sacks Pvt. Ltd.	✓	✓	-	✓	-	✓	-	-
Kaypee Polyfab Pvt. Ltd.	✓	✓	✓	-	-	✓	-	-
Shri Maa Polyfabs Ltd.	✓	✓	✓	✓	-	✓	✓	✓
Lakhdatar International Pvt. Ltd.	✓	✓	✓	✓	-	✓	-	-
Dinman Polypacks Pvt. Ltd.	✓	✓	✓	✓	-	-	-	-
Shreeshakti Syn Bags Pvt. Ltd.	✓	✓	✓	-	-	✓	-	✓
Sah Polymers Ltd.	✓	✓	✓	✓	-	✓	-	✓

Source: Company website, annual reports, secondary research
NA refers to Not Available

Exhibit 12.3: Key Players and their select customers

Players	Select customers' name
Knack Packaging Ltd.	Cargill Inc., Sacos Y Empaques Internacionales, United Bags Inc., Cristosa, Montego Pet Nutrition (Pty) Ltd., Drools, Pet Food Pvt. Ltd., Baba Agro Food Ltd., etc.
Mayur Wovens Pvt. Ltd.	NA
Rajasthan Flexible Packaging Ltd.	Ultra Tech Cement, ITC Limited, Nestle, ACC Cement, Binani, Britannia
Alliance Poly Sacks Pvt. Ltd.	JK Lakshmi Cement Ltd., RCCPL Pvt Ltd, etc.
Kaypee Polyfab Pvt. Ltd.	Tata Chemicals Limited, Pragati Foods, Rallis India Limited, RCF, GNFC, Supple Tek Industries Pvt. Ltd., Pavizham, Coromandel
Shri Maa Polyfabs Ltd.	Renuka Sugars, Tata chemicals, Birla Corporation, Odisha Cements Limited (Konark), Madras Cements, Mollarpur Rice Mill, Hemkunt Rice Mill
Lakhdatar International Pvt. Ltd.	NA
Dinman Polypacks Pvt. Ltd.	NA
Shreeshakti Syn Bags Pvt. Ltd.	NA
Sah Polymers Ltd.	NA

Source: Company website, annual reports, secondary research; NA refers to Not Available in public domain

[3] *As certified by an internationally machinery manufacturer, Knack Packaging Limited purchased their 1st Conversion Lime PP*starKON X in India (and Asia) that produced printed BOPP laminated WPP pinch bags with laser cut and easy open device*

Arvind K. Singhal
Managing Director

12.3 Product Portfolio

India's packaging industry is highly diversified, with key players offering a wide range of solutions catering to different sectors. Knack Packaging Limited, Kaypee Polyfab Private Limited, and Shri Maa Polyfabs Limited specialize in PLWPP bags, pinch-bottom bags, and gusset bags, serving industries as mentioned above.

Knack Packaging Limited was awarded as the second-best exporter of Woven Sacks/Bags/ Fabric (Other than FIBCs) at the Export Excellence Awards ceremony organized by The Plastics Export Promotion Council and sponsored by Ministry of Commerce & Industry, for FY2020, FY2021 and FY2023. Further, the company was awarded "Innovative Business of the Year" (MSME Recognition for making Aatma Nirbhar Bharat) at Vyapaar Jagat Convention & Awards 2020.

Exhibit 12.4: Key Players and their Product portfolio

Players	Product Type	Size	Material Type
Knack Packaging Ltd.	HDPE / PP Tapes	W – 1.81 mm – 4.23 mm Denier – 550 - 2000	HDPE / PP
	HDPE / PP Woven Fabric (Coated / Uncoated)	W- 285 mm – 1300 mm Denier – 550 – 2000 GSM – 48 - 175	HDPE / PP
	HDPE / PP Woven Bags	L-420 mm – 1150 mm W- 215 mm – 620 mm Denier – 550 – 1800	PP/ HDPE, UV
	BOPP Laminated Woven PP Bags	L-420 mm – 1150 mm W- 215 mm – 620 mm Denier – 550 – 1500	HDPE / PP
	BOPP Laminated Woven PP Pinch Bottom Bags	L - 500 mm to 1070 mm W - 165 mm to 480 mm	Gloss, Gloss Metalized, Gloss Holographic, Matt, Matt Metalized, Matt Gloss Combo and High COF Gloss/Matt
	BOPP/PP Block Bottom Bags	L - 430 mm to 910 mm W – 300 mm to 600 mm	Coated Woven PP Fabric
	BOPP Laminated PP Woven Bottom Gusset Bags (BGB)	L – 220 mm to 500 mm W - 80 mm to 250 mm	PP/HDPE Non-Woven
	Shopping Bag (Woven/Non-Woven Bag) (SB)	L- 220 mm to 500 mm W - 80 mm to 250 mm	PP/HDPE Non-Woven, Non-Woven Fabrics
	Multi-filament Yarn	Denier – 600 - 4800	PP Masterbatch
	Narrow Woven fabric	NA	PP, UV granules,
	Design and Cylinder Services	NA	NA
	Reprocessed Granules	NA	NA
Mayur Wovens Pvt. Ltd.	Uncoated Open Mouth Bags with/without Hemming on Top	NA	PP
	Bags with PE Liner Sewn in Top and / or Bottom	NA	PE/PP
	Coated Bags-Paper, Aluminium	NA	PP, PVC, EVOH, PET, Nylon, and aluminium foil
	Laminated Bags	NA	BOPP
	BOPP Bags	NA	BOPP
	Box Bags	NA	PP
	Jumbo (FIBC Bags)	NA	PP, PVC, EVOH, PET, Nylon
	Geotextile Fabric	NA	PP, and other
	Tarpaulin/Lumber Cover	NA	PE/PP
	Slit Fence	NA	PE/PP

	House Wrap	NA	UV-stabilized polypropylene
Rajasthan Flexible Packaging Ltd.	BOPP Laminated Woven Bags	NA	BOPP/PP
	Block Bottom Valve Bags	NA	PP/PE
	Filament Yarn	NA	PP
Alliance Poly Sacks Pvt. Ltd.	PP Tapes	W-1.50 mm-5.00 mm, Denier-550-2000	PP/HDPE
	PP Woven Fabrics (coated /uncoated)	W -285mm-780 mm, Denier-550-2000	PP
	PP Woven Bags	L-40-1150 mm, W-285mm-780 mm, Gusset width-60mm-200 mm, Denier-550-2000	PP
	PP / BOPP Block Bottom Bags	W-250mm-600 mm L-310mm-1190 mm Top / Bottom Patch-80mm-160 mm Denier-600-1200 BOPP thickness-12 µm -18 µm Extrusion coating thickness-16 µm -25 µm	BOPP, PP
	PP / BOPP 2Ply Block Bottom Bags	NA	PP, BOPP, LLDPE
	Multi-Filament Yarn	Denier-600-4800	PP Master Batch
	Reprocessed Granules	NA	NA
Kaypee Polyfab Pvt. Ltd.	Bopp laminated woven bags	NA	BOPP
	Bopp laminated Pinch Bottom woven bags	NA	BOPP
	Plastic Handle Woven Bags	NA	PP
	PP EZ Open Bags	NA	PP
	BOPP Laminated PP Woven Bottom Gusset Bags	NA	PP/HDPE
Shri Maa Polyfabs Ltd.	PP Woven Box Bags	NA	PP
	BOPP (Laminated) Bags	5 kg to 50 Kg	BOPP
	Valve / Normal Cement Bags	NA	Laminated PP
	LENO / MESH Bags	NA	PP
	Container Liner Bags	NA	PP
	Printed Shopping Bags	NA	PP/HDPE Non-Woven
	Jumbo (FIBC Bags)-Anti-Static FIBC, Conductive FIBC, Static Dissipative FIBC	500KG TO 2000 Kg	_
	BOPP Pinch-Bottom Bags	NA	BOPP
Lakhdatar International Pvt. Ltd.	Tubular BOPP bags	NA	BOPP
	Bag Seam BOPP bags	NA	BOPP
	Bag seam pinch bottom	NA	PP
	Tubular pinch BOPP bags	NA	BOPP
	Top Slider Pinch Bottom	NA	BOPP
Dinman Polypacks Pvt. Ltd.	BOPP Laminated PP Woven Pinch Bottom Bags (PBB)	NA	BOPP
	BOPP/PP Block Bottom Bags (BBB)	NA	BOPP
	BOPP Laminated PP Woven Bottom Gusset Bags (BGB)	NA	BOPP
Shreeshakti Syn Bags Pvt. Ltd.	Jumbo (FIBC Bags)- Cross Corner, UN, Dust Proof, Liner, Single/ Double Loop, Tunnel loop, Baffle	NA	PP, PVC, EVOH, PET, Nylon, and aluminium foil
	PP woven Sacks	NA	PP, BOPP

Arvind K. Singhal
Managing Director

Sah Polymers Ltd.	PP Woven Bags	NA	PP, BOPP
	PP Box Bags	NA	PP
	BOPP Laminated Woven Bags	NA	BOPP, PET, PE, or laminated structures
	FIBC Bags-U Panel Bags, Tubular Bags, Baffle Q-Bags, Conductive Bags, Tunnel Bags, Ventilated Bags, and Single & Two loop Bags	NA	PP, PVC, EVOH, PET, Nylon
	PP Woven Silt Fence	NA	PP/PE
	PP Woven Ground Cover	NA	PP

Source: Company website, annual reports, secondary research
NA refers to Not Available
PP (Polypropylene), PE (Polyethylene), HDPE (High-Density Polyethylene), LDPE (Low-Density Polyethylene), LLDPE (Linear Low-Density Polyethylene), BOPP (Biaxially Oriented Polypropylene), PET (Polyethylene Terephthalate), PVC (Polyvinyl Chloride), EVOH (Ethylene Vinyl Alcohol), PBL (Plastic Barrier Laminate), ABL (Aluminum Barrier Laminate), COEX (Coextruded Plastic Films), NA (Not Available), and DURALUMIN (A Hard, Light Alloy of Aluminum with Copper and Other Elements), µm-Micron, Silpaulin is a cross-laminated, multi-layered plastic film made from virgin-grade polyethylene, TN1-PL – Transparent Non-Sealable Premium Lamination (one-side), TN2-PL – Transparent Non-Sealable Premium Lamination (two-side), TH1-LTS (105 °C) – Transparent Heat-Sealable Low Temperature Seal, TH1-LLTS (95 °C) – Transparent Heat-Sealable Lower Low Temperature Seal, TH1-ULTS (85 °C) – Transparent Heat-Sealable Ultra Low Temperature Seal, TN1-LB – Transparent Non-Sealable Label BOPP grade, TN1-AT – Transparent Non-Sealable Adhesive Tape grade, TN1-TG – Transparent Non-Sealable Tape Grade, MN1-PL – Matte Non-Sealable Premium Lamination (one-side), MN2-PL – Matte Non-Sealable Premium Lamination (two-side), MN1-HCF – Matte Non-Sealable High Coefficient of Friction, MH1-PL – Matte Heat-Sealable Premium Lamination, TH2-AF – Transparent Heat-Sealable Anti-Fog (two-side treated), TH1-HCF – Transparent Heat-Sealable High Coefficient of Friction, TH1-LCF – Transparent Heat-Sealable Low Coefficient of Friction, VMH1-LTS – Metallized Heat-Sealable Low Temperature Seal, VMN1-WG – Metallized Non-Sealable Wrapper/Gift-Wrap Grade,VMN2-SW – Metallized Non-Sealable Sandwich-Wrap Grade, SMA-M3 – Super Moisture-Barrier Aluminium high-barrier metallized film, GSM- Grams per Square Meter, SWL-Safe Working Load.

12.4 Certifications & Patents

The packaging and polymer industry is a highly approval-based industry, requiring strict adherence to quality, safety, and sustainability standards. Certifications like ISO 9001 (Quality Management), ISO 14001 (Environmental Management), and ISO 45001 (Occupational Health & Safety) ensure compliance with global industry norms. Companies also obtain BRCGS (food safety), Eurofin (food safety solutions), and Sedex (ethical business practices) certifications, demonstrating their commitment to safety and sustainability.

Exhibit 12.5: Certifications And Patents Held by Key Players

Players	Certification and Patents
Knack Packaging Ltd.	ISO QAR 45001: 2015 ISO QAR 9001: 2015 ISO QAR 14001: 2018 ECO Vadis Bronze medal BRCGS Packing Material EN15343:2008
Mayur Wovens Pvt. Ltd.	ISO 9001 ISO 14000 ISO 22000
Rajasthan Flexible Packaging Ltd.	BRCGS
Alliance Poly Sacks Pvt. Ltd.	**Member of TBPA
Kaypee Polyfab Pvt. Ltd.	BRCGS Grade A+ ISO 9001
Shri Maa Polyfabs Ltd.	BRC food Certified Eurofin food safety Solution BRCGS Packing Material ISO:45001 ISO:9001 ISO:14001
Lakhdatar International Pvt. Ltd.	Eurofin food safety Solution Haryana State Pollution Control Board (HSPCB)
Dinman Polypacks Pvt. Ltd.	NA

Shreeshakti Syn Bags Pvt. Ltd.	ISO:9001 ISO:14001 ISO:22000
Sah Polymers Ltd.	ISO 9001

Source: Company website, annual reports, secondary research
NA refers to Not Available

Knack Packaging Limited, certified under EN15343:2008, has 38% recycled plastic content in their PP woven laminated bags, while their PP woven bags contain 72% recycled plastic content for manufacturing the finished products.

12.5 Key Features and Innovations in Indian Packaging Industry

The packaging industry is driven by innovations that enhance functionality, sustainability, and efficiency. Companies like Knack Packaging Limited, Kaypee Polyfab Private Limited, etc. focus on structural enhancements like gusset features and perforations for better stacking and breathability.

Exhibit 12.6: Key Features and Innovations by key players

Players	Key Features and Innovation
Knack Packaging Ltd.	Glossy, matte, Matte-Gloss combination or metallic finish; antiskid coating. Gusset Feature for better stacking, volume and form retention, Pinch Add-on Features for modern packaging needs. Metalized window feature in woven sacks for product visibility, and Perforation for breathability (in specific applications). Laser cut and easy open features in PLWPP Pinch Bottom bags.
Mayur Wovens Pvt. Ltd.	Mayur Wovens have developed and designed FIBCs are with a capacity of up to 3 cubic meters and can handle several tons in weight, making them suitable for transporting and storing dry bulk materials like grains, chemicals, fertilizers, and minerals.
Rajasthan Flexible Packaging Ltd.	Offers AD proTex® Block Bottom Valve which is adhesive-free, chemically inert PP construction with a durable, brick-shaped design, offering a lightweight, water-resistant, and recyclable solution that ensures high strength, minimal material usage, and seamless palletization.
Alliance Poly Sacks Pvt. Ltd.	*Offers bags equipped with AD*STAR technology, featuring a durable non-woven liner layered over standard woven fabric significantly enhancing moisture protection and product preservation.
Kaypee Polyfab Pvt. Ltd.	Customizable designs like MATT, METALLIC, GLOSSY, 3D, and features like gussets, handles, and perforations, alongside a significant production capacity increase.
Shri Maa Polyfabs Ltd.	Block Bottom Bags are a key innovation, made with a German automated unit, heat-welded without adhesives, and designed for efficient stacking, PLWPP Pinch Bottom Bags, launched in January 2024, are durable and moisture-resistant, used for animal food and rice packaging
Lakhdatar International Pvt. Ltd.	Incorporating eye-catching graphics and functional features to enhance product appeal while meeting specific client needs.
Dinman Polypacks Pvt. Ltd.	NA
Shreeshakti Syn Bags Pvt. Ltd.	The Q-Bag/Baffle Bag features inner baffles that prevent deformation, ensuring a cubical shape for better stackability and space utilization. This innovation reduces storage and transportation costs by up to 30% compared to standard big bags, enhancing efficiency and stability in bulk packaging.
Sah Polymers Ltd.	Offers U Panel Bags, Tubular Bags, Baffle Q-Bags, Conductive Bags, Tunnel Bags, Ventilated Bags, and Single & Two loop Bags, all customizable to meet specific customer needs.

Source: Company website, annual reports, secondary research
NA refers to Not Available

12.6 Mergers and acquisitions

Major players acquire smaller firms to diversify product portfolios and expand into emerging markets. Additionally, M&As help companies achieve economies of scale, reduce costs, and stay competitive amid evolving consumer demands and regulatory pressures.

Exhibit 12.7: Mergers and acquisitions by key players

Company	Acquisitions / Amalgamation	Year	Stake
Sah Polymers Ltd.	Sat Industries Limited	2025	NA
SRF Ltd.	CPP Film Division of Kanpur Plastipack Ltd.	2025	NA
Uflex India	Amplus Phoenix Energy Pvt. Ltd	2024	17.75%
Amcor	Phoenix Flexibles	2023	NA
Constansia Flexibles	Creative Polypack	2018	NA
Amcor	Packaging India Pvt. Ltd.	2015	NA
Huhtamaki	Positive Packaging	2015	NA
Uflex India	Cincom Systems India Pvt. Ltd	2000	47.15%
Safeflex International Ltd.	Mewad Polymers Pvt. Ltd.	NA	86.72%
Five Star Holding group*	Polytex fiber	2022	NA

Source: Company website, annual reports, secondary research
NA refers to Not Available
Note: Amcor acquired Packaging India Pvt. Ltd. for USD 26.4 Million
Uflex India acquired Amplus Phoenix Energy Pvt. Ltd. For USD 0.75 Million
SRF Ltd. acquired Kanpur Plastipack Ltd. for USD 5.7 Million
**In 2022, a company called The Jordan Company bought a majority share in Five Star Holding Group. As part of this deal, Five Star's subsidiary had already acquired Polytex. The entire Five Star Group, including Polytex, was valued at around USD 1.5 billion at the time of the deal*

13. Financial Benchmarking

13.1 Revenue from Operations

Revenue from operations serves as the primary indicator for assessing a company's financial performance. This metric acts as the indicator of business success, illustrating the company's capacity to generate income through its core activities. It shows how efficiently the business is performing in its primary operations. Knack Packaging Limited reported a revenue from operations of INR 6,583 million in FY2024, is highest among the select direct peer companies.

Exhibit 13.1: Revenue from Operations (INR Million) (Years in FY)

Player	2022	2023	2024	2025	CAGR 2022-24
Knack Packaging Ltd.	4,766	5,151	6,583	7,365	17.5%
Direct Peer Companies					
Mayur Wovens Pvt. Ltd.	5,370	4,265	3,187	NA	-23.0%
Rajasthan Flexible Packaging Ltd.	1,687	1,575	NA	NA	NA
Alliance Poly Sacks Pvt. Ltd.	4,047	2,984	NA	NA	NA
Kaypee Polyfab Pvt. Ltd.	1,642	1,715	1,648	NA	0.2%
Shri Maa Polyfabs Ltd.	3,723	3,059	2,840	NA	-12.7%
Lakhdatar International Pvt. Ltd.	NA	605	796	NA	NA
Sah Polymers Ltd.	805	954	1,092	1,292	16.5%
Sidhi Vinayak Polyplast Pvt. Ltd.	413	401	403	NA	-1.2%
Dinman Polypacks Pvt. Ltd.	982	1,095	1,292	NA	14.7%
Shreeshakti Syn Bags Pvt. Ltd.	498	506	710	NA	19.3%
Indirect Competition / Peer					
Mold-tek Packaging Ltd.	6,315	7,299	6,986	7,813	5.2%
TCPL Packaging Ltd.	10,857	14,749	15,414	17,703	19.1%
Time Technoplast Ltd.	36,498	42,894	49,925	54,570	17.0%

Source: Annual Reports, Secondary Research, Technopak Analysis, MCA reports
NA: Not Available, Na(1): Can't be calculated due to unavailability, negative numerator, denominator or both.
Note: All figures are standalone except for Knack Packaging Ltd., Sah Polymers Ltd., Mayur Wovens Pvt. Ltd., Safeflex International Ltd., Kaypee Polyfab Pvt. Ltd., TCPL Packaging Ltd., and Time Technoplast Ltd.
Note: Knack Packaging Limited financials, from FY2022 to FY2024, have been sourced from MCA. These numbers are based on I-GAP accounting standards to ensure better comparability with the direct peer companies (that follows I-Gap accounting standards). For FY2025, Knack Packaging Limited's numbers are based on IND-AS and has been considered from reinstated financials.

13.2 Gross Profit and Gross Margin

Gross margin indicates the portion of revenue that remains after subtracting the cost of goods sold. It shows how well a company controls its production expenses and establishes successful pricing strategies. A higher gross margin demonstrates better profitability and operational efficiency. Knack Packaging Limited recorded second highest gross margin among the select direct peer companies in FY2024 (37.4%) and FY2022 (31.8%) and recorded the third highest gross margin in FY2023 (33.1%) among the select direct peer companies.

Exhibit 13.2: Gross Profit (in INR Million), Gross Margin (%) (Years in FY)

Player	2022		2023		2024		2025		CAGR 2022-2024
	Gross Profit	Gross Margin	Gross Profit	Gross Margin	Gross Profit	Gross Margin	Gross Profit	Gross Margin	
Knack Packaging Ltd.	1,516	31.8%	1,704	33.1%	2,463	37.4%	2,917	39.6%	27.5%
Direct Competition / Peer									
Mayur Wovens Pvt. Ltd.	1,330	24.8%	1,518	35.6%	1,159	36.4%	NA	NA	-6.7%
Rajasthan Flexible Packaging Ltd.	487	28.9%	515	32.7%	NA	NA	NA	NA	NA
Alliance Poly Sacks Pvt. Ltd.	821	20.3%	571	19.1%	NA	NA	NA	NA	NA
Kaypee Polyfab Pvt. Ltd.	400	24.3%	418	24.4%	536	32.5%	NA	NA	15.8%
Shri Maa Polyfabs Ltd.	646	17.4%	581	19.0%	559	19.7%	NA	NA	-7.0%
Lakhdatar International Pvt. Ltd.	NA	NA	90	14.9%	163	20.5%	NA	NA	NA

Arvind K. Singhal
Managing Director

Sah Polymers Ltd.	212	26.3%	380	39.9%	437	40.0%	544	42.1%	43.6%
Sidhi Vinayak Polyplast Pvt. Ltd.	76	18.3%	80	20.1%	81	20.2%	NA	NA	3.9%
Dinman Polypacks Pvt. Ltd.	324	33.0%	232	21.2%	382	29.5%	NA	NA	8.5%
Shreeshakti Syn Bags Pvt. Ltd.	140	28.0%	120	23.7%	164	23.1%	NA	NA	8.4%
Indirect Competition / Peer									
Mold-tek Packaging Ltd.	2,549	40.4%	2,940	40.3%	3,020	43.2%	3,411	43.7%	8.8%
TCPL Packaging Ltd.	4,313	39.7%	5,870	39.8%	6,576	42.7%	7,633	43.1%	23.5%
Time Technoplast Ltd.	10,727	29.4%	11,879	27.7%	13,943	27.9%	15,711	28.8%	14.0%

Source: Annual Reports, Secondary Research, Technopak Analysis, MCA reports
Gross Profit= Revenue from Operation - COGS
*Gross Margin= (Gross Profit/Revenue from Operations)*100*
NA: Not Available, Na(1): Can't be calculated due to unavailability, negative numerator, denominator or both.

13.3 EBITDA and EBITDA Margin

EBITDA (Earnings Before Interest, Taxes, Depreciation, and Amortization) assesses a company's operational performance by excluding expenses not related to its core activities. It provides a view of profitability based solely on the company's primary operations. Knack Packaging Limited reported an EBITDA of INR 932 million in FY2024, INR 560 million in FY2023 and INR 500 million in FY2022, is the highest among the selected direct peer companies. Further, is has the highest CAGR of 36.5% from FY2022 to FY2024, among the select direct peer companies.

The EBITDA margin is derived by dividing EBITDA by total revenue. This ratio reveals the portion of revenue that is converted into EBITDA, showcasing how efficiently the company operates and its profitability before considering financial costs and non-cash accounting adjustments. Knack Packaging Limited has recorded the highest EBITDA margin during FY2022 (10.5%), FY2023 (10.9%) and FY2024 (14.2%) among the select direct peer companies.

Exhibit 13.3: EBITDA (in INR Million), EBITDA Margin (%) (Years in FY)

Player	2022		2023		2024		2025		CAGR 2022-2024
	EBITDA	EBITDA Margin	EBITDA	EBITDA Margin	EBITDA	EBITDA Margin	EBITDA	EBITDA Margin	
Knack Packaging Ltd.	500	10.5%	560	10.9%	932	14.2%	1,335	18.1%	36.5%
Direct Competition / Peer									
Mayur Wovens Pvt. Ltd.	203	3.8%	250	5.9%	151	4.8%	NA	NA	-13.6%
Rajasthan Flexible Packaging Ltd.	123	7.3%	145	9.2%	NA	NA	NA	NA	NA
Alliance Poly Sacks Pvt. Ltd.	366	9.0%	200	6.7%	NA	NA	NA	NA	NA
Kaypee Polyfab Pvt. Ltd.	128	7.8%	137	8.0%	201	12.2%	NA	NA	25.7%
Shri Maa Polyfabs Ltd.	254	6.8%	140	4.6%	112	3.9%	NA	NA	-33.5%
Lakhdatar International Pvt. Ltd.	NA	NA	38	6.3%	72	9.1%	NA	NA	NA
Sah Polymers Ltd.	70	8.7%	69	7.3%	47	4.3%	41	3.1%	-18.4%
Sidhi Vinayak Polyplast Pvt. Ltd.	21	5.1%	19	4.8%	19	4.7%	NA	NA	-5.7%
Dinman Polypacks Pvt. Ltd.	46	4.7%	-42	-3.9%	52	4.0%	NA	NA	6.6%
Shreeshakti Syn Bags Pvt. Ltd.	31	6.2%	20	3.9%	30	4.2%	NA	NA	-2.3%
Indirect Competition / Peer									
Mold-tek Packaging Ltd.	1,207	19.1%	1,354	18.6%	1,332	19.1%	1,416	18.1%	5.0%
TCPL Packaging Ltd.	1,550	14.3%	2,360	16.0%	2,516	16.3%	2,931	16.6%	27.4%
Time Technoplast Ltd.	5,058	13.9%	5,771	13.5%	6,908	13.8%	7,850	14.4%	16.9%

Source: Annual Reports, Secondary Research, Technopak Analysis, MCA reports.
EBITDA= (Finance Cost + Depreciation & Amortization + Profit before Tax) - Other Income
EBITDA Margin = EBITDA /Revenue,
NA: Not Available, Na(1): Can't be calculated due to unavailability, negative numerator, denominator or both.

13.4 PAT and PAT Margin

Profit After Tax (PAT) and the PAT margin are crucial metrics for gauging a company's profitability after all operational and overhead expenses have been considered. These metrics provide a transparent perspective on the company's efficiency in managing its operations and producing net income. Knack Packaging Limited reported a PAT

Arvind K. Singhal
Managing Director

margin of 6.4% in FY2024 is the highest among the selected direct peer companies. Further, the company's profit has grown at a CAGR of 50.3% from FY2022 to FY2024, is the best among the select direct peer companies.

Exhibit 13.4: PAT (in INR Million), PAT Margin (%) (Years in FY)

Player	2022		2023		2024		2025		CAGR 2022-2024
	PAT	PAT Margin	PAT	PAT Margin	PAT	PAT Margin	PAT	PAT Margin	
Knack Packaging Ltd.	186	3.9%	222	4.3%	419	6.4%	738	9.9%	50.3%
Direct Competition / Peer									
Mayur Wovens Pvt. Ltd.	158	2.9%	203	4.6%	53	1.7%	NA	NA	-41.9%
Rajasthan Flexible Packaging Ltd.	18	1.1%	37	2.4%	NA	NA	NA	NA	NA
Alliance Poly Sacks Pvt. Ltd.	166	4.1%	60	2.0%	NA	NA	NA	NA	NA
Kaypee Polyfab Pvt. Ltd.	63	3.8%	64	3.7%	74	4.5%	NA	NA	8.5%
Shri Maa Polyfabs Ltd.	69	1.8%	26	0.8%	22	0.7%	NA	NA	-43.8%
Lakhdatar International Pvt. Ltd.	NA	NA	10	1.6%	24	2.9%	NA	NA	NA
Sah Polymers Ltd.	44	5.4%	38	3.9%	9	0.8%	2	0.2%	-54.0%
Sidhi Vinayak Polyplast Pvt. Ltd.	7	1.7%	3	0.7%	3	0.7%	NA	NA	-34.3%
Dinman Polypacks Pvt. Ltd.*	0	0.0%	-78	-7.0%	14	1.1%	NA	NA	Na(1)
Shreeshakti Syn Bags Pvt. Ltd.	9	1.9%	8	1.6%	14	2.0%	NA	NA	24.4%
Indirect Competition / Peer									
Mold-tek Packaging Ltd.	637	10.1%	804	11.0%	666	9.5%	606	7.7%	2.3%
TCPL Packaging Ltd.	469	4.3%	1,104	7.4%	994	6.4%	1,430	8.0%	45.6%
Time Technoplast Ltd.	1,922	5.3%	2,238	5.2%	3,159	6.3%	3,945	7.2%	28.2%

Source: Annual Reports, Secondary Research, Technopak Analysis, MCA reports.
PAT= Profit (loss) after tax
PAT Margin= PAT/ Revenue from Operations
For all marked (*), CAGR is calculated for FY2023-24
Note: NA: Not Available, Na(1): can't be calculated due to one of the figures being 0, unavailability, negative numerator, denominator or both.

13.5 Debt-Equity Ratio

The debt-equity ratio evaluates a company's financial leverage by comparing its total debt to shareholders' equity. This ratio is crucial as it reveals the extent of debt financing relative to equity, helping investors and analysts gauge the company's financial stability and risk. A higher debt-equity ratio may indicate higher risk, suggesting the company relies more on debt, whereas a lower ratio points to a more cautious approach with less dependence on borrowed funds. Knack Packaging Limited maintained a debt-equity ratio of 1.1 in both FY2024 and FY2023, compared to 1.2 in FY2022. Further, the company's debt-equity ratio was recorded at 0.7 in FY2025.

Exhibit 13.5: Debt-Equity Ratio (Years in FY)

Player	2022	2023	2024	2025
Knack Packaging Ltd.	1.2	1.1	1.1	0.7
Direct Competition / Peer				
Mayur Wovens Pvt. Ltd.	0.6	0.4	0.5	NA
Rajasthan Flexible Packaging Ltd.	5.9	4.5	NA	NA
Alliance Poly Sacks Pvt. Ltd.	1.3	1.1	NA	NA
Kaypee Polyfab Pvt. Ltd.	1.6	1.5	1.8	NA
Shri Maa Polyfabs Ltd.	0.7	0.9	0.9	NA
Lakhdatar International Pvt. Ltd.	NA	9.6	7.2	NA
Sah Polymers Ltd.	1.1	0.2	0.3	0.3
Sidhi Vinayak Polyplast Pvt. Ltd.	1.1	1.5	1.2	NA
Dinman Polypacks Pvt. Ltd.	2.0	4.0	3.1	NA
Shreeshakti Syn Bags Pvt. Ltd.	3.8	3.2	2.8	NA
Indirect Competition / Peer				
Mold-tek Packaging Ltd.	0.1	0.1	0.2	0.3
TCPL Packaging Ltd.	1.3	1.1	0.9	0.9

Arvind K. Singhal
Managing Director

Time Technoplast Ltd.	0.4	0.3	0.2	0.2

Source: Annual Reports, Technopak Analysis
Net Debt = Current Borrowings + Noncurrent borrowings - Cash and Cash Equivalent
Debt Equity Ratio= Net Debt/Shareholder's Equity

13.6 Return on Equity and Return on Capital Employed

Return on Equity (ROE) assesses a company's profitability by measuring its ability to generate profit from shareholders' equity. This ratio is calculated by dividing Profit After Tax (PAT) by shareholders' equity. ROE offers critical insights into how well a company leverages investor funds to produce earnings and is a significant indicator of financial performance and management effectiveness. Knack Packaging Limited reported ROE of 29.2% in FY2024, 21.5% in FY2023 and 22.8% in FY2022.

Return on capital employed (ROCE) evaluates a company's profitability and efficiency in utilizing its capital. It is calculated by dividing operating profit by capital employed, which encompasses both equity and debt. ROCE offers insight into how effectively a company is generating profits from its total capital, highlighting overall financial performance and operational efficiency. Knack Packaging Limited reported ROCE of 33.3% in FY2024, 24.7% in FY2023 and 25.5% in FY2022.

Knack Packaging Limited has second highest ROE and ROCE among the selected direct peer companies in FY2024.

Exhibit 13.6: ROE (%) and ROCE (%) (Years in FY)

	ROE				ROCE			
Player	**2022**	**2023**	**2024**	**2025**	**2022**	**2023**	**2024**	**2025**
Knack Packaging Ltd.	22.8%	21.5%	29.2%	34.4%	25.5%	24.7%	33.3%	41.4%
Direct Competition / Peer								
Mayur Wovens Pvt. Ltd.	17.1%	17.7%	4.5%	NA	23.8%	26.2%	10.3%	NA
Rajasthan Flexible Packaging Ltd.	19.9%	28.7%	NA	NA	18.5%	24.5%	NA	NA
Alliance Poly Sacks Pvt. Ltd.	20.4%	6.8%	NA	NA	20.8%	11.4%	NA	NA
Kaypee Polyfab Pvt. Ltd.	28.1%	22.2%	20.4%	NA	33.8%	24.2%	18.5%	NA
Shri Maa Polyfabs Ltd.	7.6%	2.9%	2.3%	NA	17.1%	11.7%	11.6%	NA
Lakhdatar International Pvt. Ltd.	NA	28.0%	40.4%	NA	NA	15.0%	20.9%	NA
Sah Polymers Ltd.	16.4%	4.3%	1.1%	0.3	22.8%	7.5%	4.8%	3.8%
Sidhi Vinayak Polyplast Pvt. Ltd.	11.7%	4.6%	4.6%	NA	20.9%	19.3%	20.8%	NA
Dinman Polypacks Pvt. Ltd.	0.1%	-98.0%	14.8%	NA	12.6%	-47.7%	39.7%	NA
Shreeshakti Syn Bags Pvt. Ltd.	29.3%	18.1%	24.4%	NA	20.6%	17.0%	18.2%	NA
Indirect Competition / Peer								
Mold-tek Packaging Ltd.	14.4%	14.8%	11.2%	9.5%	19.1%	17.9%	14.2%	12.7%
TCPL Packaging Ltd.	13.7%	24.9%	19.0%	22.2%	16.5%	28.2%	23.3%	23.0%
Time Technoplast Ltd.	9.0%	9.6%	12.1%	13.3%	13.8%	14.9%	17.9%	18.7%

Source: Annual Reports, Technopak Analysis
Return on Equity= Profit after Tax (PAT)/Shareholder's Equity
Return on Capital Employed= EBIT (Finance Cost + Profit Before Tax) / Capital Employed (Total Assets-Current Liabilities)
NA: Not Available, Na(1): Can't be calculated due to unavailability, negative numerator, denominator or both.

13.7 Days Inventory, Days Payable and Days Receivable

Days Inventory (DIO) calculates how long it typically takes a business to sell its stock. Days Payable calculates how long it typically takes a business to reimburse its suppliers for goods or services. Days Receivable calculates how long it typically takes a business to get paid following a transaction.

Exhibit 13.7: Days Inventory, Days Payable and Days Receivable (Years in FY)

	Days Inventory				Days Payable				Days Receivable			
Player	**2022**	**2023**	**2024**	**2025**	**2022**	**2023**	**2024**	**2025**	**2022**	**2023**	**2024**	**2025**
Knack Packaging Ltd.	54	61	60	76	25	34	39	30	55	59	74	60

Arvind K. Singhal
Managing Director

Direct Competition / Peer												
Mayur Wovens Pvt. Ltd.	30	38	75	NA	17	10	19	NA	71	53	91	NA
Rajasthan Flexible Packaging Ltd.	69	102	NA	NA	64	49	NA	NA	56	48	NA	NA
Alliance Poly Sacks Pvt. Ltd.	58	98	NA	NA	31	16	NA	NA	60	50	NA	NA
Kaypee Polyfab Pvt. Ltd.	75	63	88	NA	40	41	36	NA	47	48	41	NA
Shri Maa Polyfabs Ltd.	49	60	69	NA	69	51	100	NA	80	90	113	NA
Lakhdatar International Pvt. Ltd.	NA	131	104	NA	NA	37	1	NA	NA	74	43	NA
Sah Polymers Ltd.	96	162	167	166	48	52	49	38	63	62	74	60
Sidhi Vinayak Polyplast Pvt. Ltd.	90	107	60	NA	45	43	25	NA	52	84	79	NA
Dinman Polypacks Pvt. Ltd.	142	88	79	NA	36	18	67	NA	58	40	66	NA
Shreeshakti Syn Bags Pvt. Ltd.	31	69	46	NA	40	62	57	NA	42	59	70	NA
Indirect Competition / Peer												
Mold-tek Packaging Ltd.	93	71	95	107	31	28	156	37	83	62	71	63
TCPL Packaging Ltd.	102	99	142	168	93	67	75	78	77	73	82	95
Time Technoplast Ltd.	129	117	107	108	55	48	45	42	87	80	79	78

Source: Annual Reports, Technopak Analysis
*Days Inventory = (Inventory/COGS)*365; Days Payable = (Accounts Payable/COGS) *365; Days Receivable = (Accounts Receivable/Revenue)*365*
NA: Not Available, Na(1): Can't be calculated due to unavailability, negative numerator, denominator or both.

13.8 Working Capital Cycle

This indicator assesses how well a business operates and how well it can control cash flow, which affects liquidity and overall financial stability. Working Capital cycle of Knack Packaging Limited was reported to be 84 in FY2022 and 95 in FY2024.

Exhibit 13.8: Working Capital Cycle (Years in FY)

Player	2022	2023	2024	2025
Knack Packaging Ltd.	84	86	95	106
Direct Competition / Peer				
Mayur Wovens Pvt. Ltd.	84	81	147	NA
Rajasthan Flexible Packaging Ltd.	61	101	NA	NA
Alliance Poly Sacks Pvt. Ltd.	87	132	NA	NA
Kaypee Polyfab Pvt. Ltd.	82	70	94	NA
Shri Maa Polyfabs Ltd.	61	99	83	NA
Lakhdatar International Pvt. Ltd.	NA	168	146	NA
Sah Polymers Ltd.	110	172	191	189
Sidhi Vinayak Polyplast Pvt. Ltd.	97	147	113	NA
Dinman Polypacks Pvt. Ltd.	163	111	79	NA
Shreeshakti Syn Bags Pvt. Ltd.	33	67	59	NA
Indirect Competition / Peer				
Mold-tek Packaging Ltd.	145	105	10	133
TCPL Packaging Ltd.	86	106	149	185
Time Technoplast Ltd.	161	150	141	143

Source: Annual Reports, Technopak Analysis
Working Capital Cycle= Inventory Days+ Receivable Days – Payable Days
NA: Not Available, Na(1): Can't be calculated due to unavailability, negative numerator, denominator or both.

13.9 Domestic and Export Revenue

Domestic revenue refers to the income generated from the sale of goods and services within a country. Domestic revenue of Knack Packaging Limited stood at 48% in FY2024. Export revenue refers to the income a company earns from selling goods and services to foreign markets. Export revenue of Knack Packaging Limited stood at 52% in FY2024 and 55% in FY2025.

Arvind K. Singhal
Managing Director

Exhibit 13.9: Domestic and Export Revenue as a share of Revenue from Operation (%) (Years in FY)

	Domestic Revenue Share				Export Revenue Share			
Player	**2022**	**2023**	**2024**	**2025**	**2022**	**2023**	**2024**	**2025**
Knack Packaging Ltd.	52%	58%	48%	45%	48%	42%	52%	55%
Direct Competition / Peer								
Mayur Wovens Pvt. Ltd.	34%	22%	17%	NA	66%	78%	82%	NA
Rajasthan Flexible Packaging Ltd.	100%	100%	NA	NA	0%	0%	NA	NA
Alliance Poly Sacks Pvt. Ltd.	82%	84%	NA	NA	18%	16%	NA	NA
Kaypee Polyfab Pvt. Ltd.	71%	74%	71%	NA	29%	26%	29%	NA
Shri Maa Polyfabs Ltd.	100%	100%	100%	NA	0%	0%	0%	NA
Lakhdatar International Pvt. Ltd.	NA	NA	NA	NA	NA	NA	NA	NA
Sah Polymers Ltd.	99%	99%	99%	NA	0%	0%	0%	NA
Sidhi Vinayak Polyplast Pvt. Ltd.	100%	100%	100%	NA	0%	0%	0%	NA
Dinman Polypacks Pvt. Ltd.	100%	100%	100%	NA	0%	0%	0%	NA
Shreeshakti Syn Bags Pvt. Ltd.	11%	17%	14%	NA	88%	83%	86%	NA
Indirect Competition / Peer								
Mold-tek Packaging Ltd.	99%	99%	99%	NA	1%	1%	1%	NA
TCPL Packaging Ltd.	75%	73%	74%	64%	23%	25%	24%	34%
Time Technoplast Ltd.	NA	NA	NA	NA	NA	NA	NA	NA

Source: Annual Reports, Technopak Analysis
Domestic Revenue Share= Domestic Revenue/ Revenue from Operation
Export Revenue Share = Export Revenue/ Revenue from Operation
NA: Not Available, Na(1): Can't be calculated due to unavailability, negative numerator, denominator or both.

13.10 Current Ratio

The current ratio is a financial metric that measures a company's ability to pay its short-term liabilities with its short-term assets. It is calculated using the formula Current Assets / Current Liabilities. Knack Packaging Limited reported a current ratio of 1.6, 1.5 and 1.4 in FY2022, FY2023 and FY2024 respectively.

Exhibit 13.10: Current Ratio (Years in FY)

Player	**2022**	**2023**	**2024**	**2025**
Knack Packaging Ltd.	1.6	1.5	1.4	1.5
Direct Competition / Peer				
Mayur Wovens Pvt. Ltd.	1.9	1.9	1.6	NA
Rajasthan Flexible Packaging Ltd.	1.0	1.0	NA	NA
Alliance Poly Sacks Pvt. Ltd.	1.6	1.8	NA	NA
Kaypee Polyfab Pvt. Ltd.	1.2	1.2	1.5	NA
Shri Maa Polyfabs Ltd.	1.3	1.3	1.2	NA
Lakhdatar International Pvt. Ltd.	NA	1.4	1.4	NA
Sah Polymers Ltd.	1.1	2.7	2.2	2.1
Sidhi Vinayak Polyplast Pvt. Ltd.	1.3	1.2	1.3	NA
Dinman Polypacks Pvt. Ltd.	1.2	1.0	1.0	NA
Shreeshakti Syn Bags Pvt. Ltd.	1.1	1.2	1.3	NA
Indirect Competition / Peer				
Mold-tek Packaging Ltd.	2.4	1.6	1.9	1.6
TCPL Packaging Ltd.	1.0	1.1	1.2	1.2
Time Technoplast Ltd.	1.0	2.1	2.2	2.6

Source: Annual Reports, Technopak Analysis
Current Ratio = Current Assets / Current Liabilities.
NA: Not Available, Na(1): Can't be calculated due to unavailability, negative numerator, denominator or both.

Arvind K. Singhal
Managing Director

13.11 Summary of Financial KPIs

Exhibit 13.11: Summary of Financial KPIs of Knack Packaging Limited and direct peers (FY2024)

	Knack Packaging	Mayur Wovens	Kaypee Polyfab	Shri Maa	Lakhdatar Inter.	Sah Polymers	Sidhi Vinayak	Dinman Polypacks	Shreeshakti Syn Bags
Revenue from Operation	6,583	3,187	1,648	2,840	796	1,092	403	1,292	710
Revenue Growth	17.5%	-23.0%	0.2%	-12.7%	NA	16.5%	-1.2%	14.7%	19.3%
Gross Profit	2,463	1,159	536	559	163	437	81	382	164
Gross Profit Margin	37.4%	36.4%	32.5%	19.7%	20.5%	40.0%	20.2%	29.5%	23.1%
EBITDA	932	151	201	112	72	47	19	52	30
EBITDA Margin	14.2%	4.8%	12.2%	3.9%	9.1%	4.3%	4.7%	4.0%	4.2%
PAT	419	53	74	22	24	9	3	14	14
PAT Margin	6.4%	1.7%	4.5%	0.7%	2.9%	0.8%	0.7%	1.1%	2.0%
Net Worth	1,436	1,198	364	935	58	871	66	93	59
Net Debt	1,645	652	657	830	420	233	82	286	165
Debt Equity Ratio	1.1	0.5	1.8	0.9	7.2	0.3	1.2	3.1	2.8
Return on Equity	29.2%	4.5%	20.4%	2.3%	40.4%	1.1%	4.6%	14.8%	24.4%
ROCE	33.3%	10.3%	18.5%	11.6%	20.9%	4.8%	20.8%	39.7%	18.2%
Working Capital Cycle	95	147	94	83	146	191	113	79	59
Current Ratio	1.4	1.6	1.5	1.2	1.4	2.2	1.3	1.0	1.3

Note: The above summary table data is for FY2024. Rajasthan Flexible Ltd. and Alliance Poly Sacks Pvt. Ltd. are not included above because their FY2024 financials/ annual report were not available.

Note: Revenue from Operation, Gross Profit, EBITDA, PAT, Net Worth and Net Debt figures are in INR millions. Working Capital Cycle figures are in days.

Arvind K. Singhal
Managing Director

Annexure

About Knack Packaging Limited

Knack Packaging Limited is one of the leading, integrated, innovation-oriented, export led and sustainable oriented packaging solutions provider offering a diverse range of packaging solutions, including Printed and Laminated Woven Polypropylene (PLWPP) bags and PLWPP Pinch Bottom bags that are customized, high-strength packaging solutions for a wide range of sectors, including food products and pet foods. The company follows vertically integrated manufacturing process (from PP granule processing to tapes, fabric, printing, lamination and packaging the final products of PLWPP bags and PLWPP pinch bottom bags), with an effective installed capacity of 36,400 MT per annum (as of March 31, 2025) at their manufacturing plants in Gujarat. Their integrated operations, from in-house thread manufacturing to advanced design and pre-press capabilities enable them to deliver packaging solutions aligned with the specific requirements of each sector. With a broad portfolio of over 12,000 SKUs, strong design capabilities, and a global distribution footprint, they support their clients in meeting complex packaging requirements. Their solutions enhance brand visibility on packaging, reduce the risk of counterfeiting, and improve operational performance.

Knack Packaging Limited is among the few companies in India with the capability to produce PLWPP Pinch Bottom Bags at scale, that are designed for bulk packaging for consumer and industrial players. The company has served over 1,900 customers across 68 countries, including fortune 500 companies, providing durable, functional, and visually distinctive packaging solutions. Knack Packaging Limited products offers an optional added security feature in their bags with RFID and Unique Barcoding features for enhanced real-time tracking and authenticity (Anti-counterfeit protection). Further, the PLWPP bags, PLWPP Pinch Bottom bags are suitable for automated plant, helping customers reduce labour costs and enhance operational efficiency and sales.

In 2006, the company's Promoter, Mr. Rashmin Patel, set up Knack Packaging as proprietorship firm for manufacturing of BOPP/ Printed and Laminated Woven Polypropylene bags. Furthermore, Knack Packaging was one of the early movers in the manufacturing of BOPP/ Printed and Laminated Woven Polypropylene bags. Subsequently in 2012, the Promoter along with other partners namely Alpeshbhai Tulsibhai Patel, Rashminbhai Tulsibhai Patel, Pravinkumar Ambalal Patel, Tulsibhai Keshavlal Patel and Kamlesh Ambalal Patel set up Knack Packaging as a Partnership Firm.

Knack Packaging Limited is the first company in India (and Asia) to provide laser cut and easy-open feature integrated into their PLWPP pinch bottom bags[4]. They cater to a variety of end user segments, including grains and pulses like rice, dal, lentils, etc., flour & spices, sugar, salts, fruits & nuts, animal & pet foods, agriculture, seeds, charcoal, detergents powders & granules, fertilizers, chemicals, cement, tile adhesives, building materials, mineral bags etc.

Knack Packaging Limited holds approximately 10.1% market share in the Indian market for flexible bulk PLWPP bags, including PLWPP pinch bottom bags.

Certified under EN15343:2008, Knack Packaging Limited has 38% recycled plastic content in their PP woven laminated bags, while their PP woven bags contain 72% recycled plastic content for manufacturing the finished products. Further, the company operates on a suitability-based model, where the rejected /defective products are reprocessed and broken down into granules, which are then repurposed for manufacturing of products such as woven fabric, pallets and chairs at an outsourced location.

Knack Packaging Limited was awarded as the second-best exporter of Woven Sacks/Bags/ Fabric (Other than FIBCs) at the Export Excellence Awards ceremony organized by The Plastics Export Promotion Council and sponsored by Ministry of Commerce & Industry, for FY2020, FY2021 and FY2023. Further, the company was awarded "Innovative

[4] *As certified by an internationally machinery manufacturer, Knack Packaging Limited purchased their 1st Conversion Lime PP*starKON X in India (and Asia) that produced printed BOPP laminated WPP pinch bags with laser cut and easy open device.*

Arvind K. Singhal
Managing Director

TECHNOPAK ADVISORS PVT. LTD.

Business of the Year" (MSME Recognition for making Aatma Nirbhar Bharat) at Vyapaar Jagat Convention & Awards 2020.

Arvind K. Singhal
Managing Director

Disclaimer

- This information package is distributed by Technopak Advisors Private Limited (hereinafter "Technopak") on a strictly private and confidential and on 'need to know' basis exclusively to the intended recipient. This information package and the information and projections contained herein may not be disclosed, reproduced or used in whole or in part for any purpose or furnished to any other person(s). The person(s) who is/are in possession of this information package or may come in possession at a later day hereby undertake(s) to observe the restrictions contained herein.

- Only leading players are profiled and benchmarked for the purpose of the report and does not necessarily cover all types of players.

- The information contained herein is of a general nature and is not intended to address the facts and figures of any particular individual or entity. The content provided here treats the subjects covered here in condensed form. It is intended to provide a general guide to the subject matter and should not be relied on as a basis for business decisions. No one should act upon such information without taking appropriate additional professional advice and/or thorough examination of the particular situation. Technopak and its directors, employees, agents and consultants shall have no liability (including liability to any person by reason of negligence or negligent misstatement) for any statements, opinions, information or matters (expressed or implied) arising out of, contained in or derived from, or of any omissions from the information package and any liability whatsoever for any direct, indirect, consequential or other loss arising from any use of this information package and/or further communication in relation to this information package.

- All recipients of the information package should make their own independent evaluations and should conduct their own investigation and analysis and should check the accuracy, reliability and completeness of the information and obtain independent and specified advice from appropriate professional adviser, as they deem necessary.

Arvind K. Singhal
Managing Director

TECHNOPAK ADVISORS PVT. LTD.