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Sr. No.	Product	Grade	Therapeutic Category
1	Itopride HCL	IP / INH	Gastro Prokinetic
2	Rosuvastatin Calcium	IP/EP/USP/BP	Anti-cholesterol
3	Betahistine HCL	IP / EP / USP	Antivertigo
4	Betahistine Mesylate	IP / EP / USP	Antivertigo
5	Deferasirox	IP / EP	Iron Chelator
6	Deferiprone	INH / EP	Iron Chelator
7	Atomoxetine HCL	IP / EP / USP	Antidepressant
8	Fluoxetine HCL	IP / EP / USP	Antidepressant
9	Desvenlafaxine Succinate	USP	Antidepressant
10	Desvenlafaxine Benzoate	INH	Antidepressant
11	Doxofylline	IP / INH	Bronchodilator
12	Fenpiverinium Bromide	INH	Antispasmodic
13	Pitofenone HCL	INH	ALS Treatment
14	Edaravone	JP / INH	Anti-cholesterol
15	Cyproheptadine Acefylline	INH	Antiasthmatic Agent

Under Validation

Sr. No.	Product	Grade	Therapeutic Category
1	Toludesvenlafaxine HCL	-	Antidepressant (SNDRI)
2	Tegoprazan	-	P-CABs
3	Cariprazine HCL	-	Antipsychotic
4	Sacubitril Valsartan	-	ARNIs Treatment
5	Rosuvastatin Zinc	-	Antilipidemic

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Rethinking on machinery, pkg for long-term biz value

DR. SANJAY AGRAWAL

In pharmaceutical manufacturing, the true value of machinery is measured not simply by production speed or installed capacity, but by its ability to deliver consistent quality, operational flexibility and sustainable business performance. As the Indian pharmaceutical industry navigates pricing pressures, changing product portfolios and increasingly complex global supply chains, manufacturers are rethinking how they approach equipment procurement and packaging investments.

For years, capital expenditure decisions were largely driven by production volumes, equipment specifications and purchase costs. Today, the equation is more complex. Manufacturers must consider the total cost of ownership, product changeover requirements, maintenance efficiency, regulatory readiness and the ability to adapt to future market demands.

This shift is creating a new opportunity for pharmaceutical machinery and packaging companies. Rather than functioning solely as equipment suppliers, technology providers are increasingly expected to become long-term partners in improving manufacturing performance.

Economics of equipment investment

Pharmaceutical machinery represents a significant capital commitment, making investment decisions critical to both operational efficiency and financial performance. However, the lowest purchase price does not necessarily translate into the lowest manufacturing cost.

Equipment performance must be evaluated across its entire lifecycle, including installation, qualification, maintenance, energy consumption, spare parts, downtime and eventual replacement. A machine that offers higher throughput but requires frequent maintenance or lengthy changeovers may deliver less value than a more flexible alternative.

Overall equipment effectiveness (OEE), which considers availability, performance and quality, provides manufacturers with a useful framework for assessing operational productivity. Identifying losses associated with breakdowns, slow running, rejected products and changeovers can reveal opportunities to improve existing assets before investing in additional capacity.

For pharmaceutical companies operating in competitive generic markets, these improvements can have a direct bearing on margins. Better utilisation of installed equipment can increase output without proportionately increasing fixed costs, while reduced rejection rates can lower material consumption and production losses.

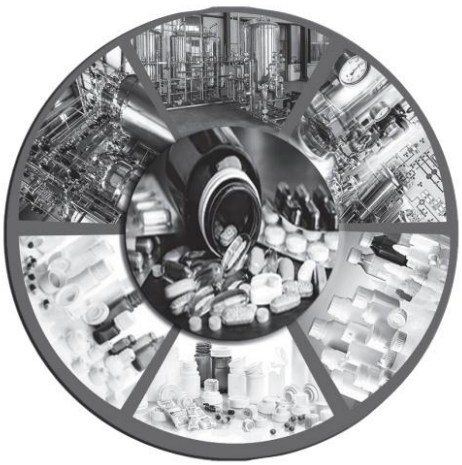
The strategic priority is therefore to align equipment investments with measurable business objectives. Manufacturers should establish baseline performance indicators, define expected improvements and evaluate the return on investment over the machine's useful life.

Flexibility becomes competitive advantage

The pharmaceutical product landscape is evolving, with manufacturers balancing high-volume generics alongside specialised formulations, complex dosage forms and products requiring more sophisticated manufacturing controls.

This diversity places new demands on production equipment. Facilities must often accommodate different batch sizes, formulations, packaging formats and product changeovers without compromising quality or delivery schedules.

Flexible machinery can help address these requirements. Modular equipment



configurations, recipe-driven controls, rapid changeover mechanisms and simplified cleaning procedures can improve responsiveness to changing production needs.

The benefits extend beyond the factory floor. Greater manufacturing flexibility can help companies respond to shifting demand, manage smaller production runs and introduce new products with fewer operational disruptions.

Packaging lines are particularly important in this context. A production line capable of handling multiple pack sizes, formats and coding requirements can support portfolio diversification while reducing the need for separate dedicated systems.

However, flexibility must be balanced against process requirements. Equipment selection should reflect the products being manufactured, the required level of containment, cleaning validation needs and the complexity of changeovers. A carefully designed production system can offer greater long-term value than one optimised exclusively for maximum speed.

Packaging: From cost centre to business enabler

Packaging is often evaluated primarily through material costs and line efficiency. Yet its contribution to pharmaceutical business performance extends much further.

Effective packaging protects product integrity, supports shelf-life requirements, enables accurate identification and helps maintain the quality of medicines throughout distribution. Packaging failures can result in rejected batches, product recalls, supply disruptions and reputational damage.

For manufacturers supplying multiple domestic and international markets, packaging decisions must also accommodate different labelling languages, market-specific information and applicable regulatory requirements.

This makes packaging-line flexibility and control systems increasingly valuable. Automated inspection, precise coding, integrated weighing and seal-integrity checks can help identify defects before finished products enter the supply chain.

Packaging can also support product differentiation in increasingly competitive markets. Appropriate pack formats, clear instructions, tamper-evident features and user-friendly designs can improve usability while protecting patients.

The challenge for manufacturers is to optimise packaging costs without weakening product protection or compromising compliance. Material selection, pack design and machinery configuration should therefore be assessed together rather than treated as separate procurement decisions.

The digital shift: Making existing assets work harder

Digitalisation offers pharmaceutical manufacturers an opportunity to improve productivity without relying exclusively on capacity expansion.

Connected sensors, equipment monitoring systems and production analytics can provide greater visibility into machine performance. By tracking recurring stoppages, output variations and maintenance patterns, manufacturers can identify the underlying causes of inefficiency.

Predictive maintenance can further support this transition by using equipment-condition data to identify potential failures before they interrupt production. Compared with purely reactive maintenance, a data-informed approach can help organisations plan interventions more effectively and reduce avoidable downtime.

Integration between production equipment, manufacturing execution systems and quality management systems can also improve information flow across operations. When appropriately validated and controlled, digital records can support traceability, deviation investigations and more informed production planning.

Nevertheless, digital transformation does not require every facility to undertake a complete technological overhaul. Manufacturers can be-

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Phased approach helps to evaluate results

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gin with high-impact equipment, recurring operational bottlenecks or packaging lines experiencing frequent stoppages.

A phased approach allows organisations to evaluate results, develop internal capabilities and expand successful initiatives. The objective is not to adopt technology for its own sake, but to use reliable data to improve decisions and operational outcomes.

Supply-chain resilience and role of domestic manufacturing

Global supply-chain disruptions have highlighted the importance of reliable sourcing, technical support and access to critical spare parts. For pharmaceutical manufacturers, equipment downtime can affect production commitments, inventory availability and customer relationships.

The domestic machinery ecosystem offers opportunities to strengthen operational resilience. Indian equipment manufacturers can provide application-specific engineering, local technical assistance and potentially shorter service response times. These advantages can be particularly relevant for small and medium-sized pharmaceutical enterprises seeking to upgrade facilities while managing capital constraints.

However, local sourcing decisions must remain performance-driven. Equipment reliability, engineering quality, documentation, validation support, service infrastructure and compatibility with existing systems are essential evaluation criteria.

Machinery manufacturers can strengthen their competitiveness by investing in standardised components, remote diagnostics, operator training and responsive after-sales service. Such capabilities help build customer confidence and establish relationships that extend beyond initial equipment installation.

Collaboration between pharmaceutical companies, machinery suppliers and packaging-material providers can also improve system integration. When equipment and materials are evaluated together, manufacturers can identify compatibility issues earlier and reduce the risk of commissioning delays or avoidable production losses.

Sustainability and lifecycle thinking

Sustainability is becoming another consideration in equipment and packaging decisions. Manufacturers are increasingly examining energy consumption, water use, packaging-material efficiency and waste generation alongside traditional performance measures.

Energy-efficient motors, optimised utilities, improved process controls and reduced material wastage can contribute to more resource-efficient operations. Packaging optimisation may also help reduce unnecessary material use and improve transportation efficiency.

However, pharmaceutical sustainability initiatives must preserve product stability, material compatibility and patient safety. Any significant packaging change requires appropriate technical assessment and, where applicable, stability studies and regulatory review.

Lifecycle thinking provides a practical framework for balancing these priorities. Equipment and packaging systems should be evaluated according to their long-term operational impact rather than individual purchase specifications.

Conclusion

The future of pharmaceutical machinery and packaging will be defined by the value they deliver across the manufacturing lifecycle. As Indian pharmaceutical companies seek to strengthen competitiveness, investment decisions must increasingly balance productivity, flexibility, quality, resilience and sustainability.

For machinery manufacturers, this creates an opportunity to move beyond product specifications and demonstrate measurable improvements in customer operations. For pharmaceutical companies, it calls for a more strategic approach to procurement, one that considers not only what equipment can produce today, but also how effectively it can support tomorrow's requirements.

Ultimately, competitive pharmaceutical manufacturing depends on more than installed capacity. It depends on making every asset, process and packaging decision contribute to reliable production, responsible resource use and long-term business growth. ❍

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