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Packaging Technology Survey 2017 | REPORT

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Introduction

PACKAGING TECHNOLOGY SURVEY 2017 REPORT

For food and beverage manufacturers to remain globally competitive depends in large part on the operational efficiency of their plants. Packaging and processing operations rely heavily on continued capital investment and when there is a reluctance to re-invest regularly to keep pace with global innovation and its associated productivity benefits, a vicious cycle can occur where re-investment lags and returns inch lower over time, making capital investment even harder to attract.

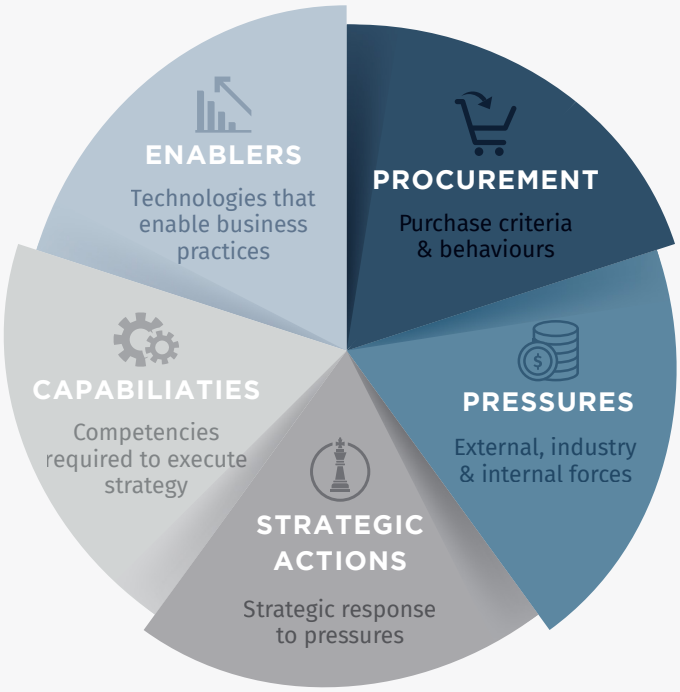
The Australian Food & Grocery Council (AFGC) State of the Industry Report 2016 stated that capital investment in the food and beverage sector had declined significantly for three years and is now back to levels not seen since the middle of the GFC in 2009-10.

The AFGC's report prompted the PKN Packaging News and Food & Drink Business Packaging Technology Survey 2017.

In this survey, we sought input from industry to gain insight into current Australian industry practices, drivers and future plans related to the purchase of packaging line equipment and robotics automation technology. We also explored capital expenditure equipment procurement practices pertaining to the selection, purchase and commissioning of packaging equipment.

Respondents to the in-depth survey and telephone interviews comprised professionals from senior management (32%), operations management (22%), engineering (14%), sales and marketing (17%) and quality assurance (12%) functions.

"The AFGC's report prompted the PKN Packaging News and Food & Drink Business Packaging Technology Survey 2017."



A broad spectrum of industries were represented in the research: 50% were food or beverage manufacturers; 25% produced consumer packaged goods; 12% were in the agriculture and livestock industry, and 7% were in the pharmaceutical industry, among others.

Company size comprised: 48% small enterprises with up to 50 employees; 19% medium enterprises with between 50 - 250 employees; and 33% large enterprises with over 250 employees.

The survey and report are based on the Aberdeen Group's PACE research framework that evaluates the business pressures, strategic actions, capabilities, and enablers (PACE) for business behaviour in specific business processes.

- Pressures – external forces that impact an organisation's market position, competitiveness, or business operations (e.g. economic, political, regulatory, technology and changing customer preferences)
- Actions – the strategic approaches that an organisation takes in response to industry pressures (e.g. align the corporate business model to leverage industry opportunities, such as product service strategy, target markets, financial strategy, go-to-market and sales strategy)
- Capabilities – the business process competencies required to execute corporate strategy (e.g. skilled people, brand, market positioning, viable products/services, ecosystem partners and financing)
- Enablers – the key functionality of technology solutions required to support the organisation's enabling business practices.

We hope that this Report will provide readers with research insights and understandings that will help them to make well-informed capital investment decisions, prepare for the future and present an intervention to the vicious cycle.

"The survey and report are based on the Aberdeen Group's PACE research framework."

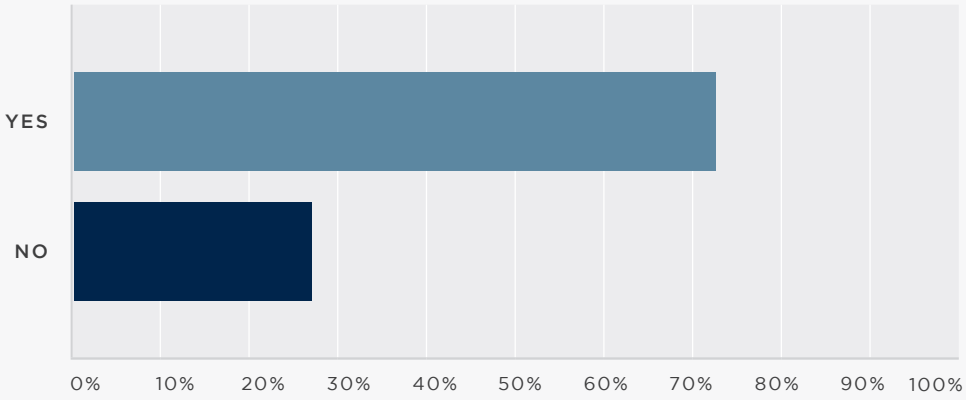
Executive Summary

Today's business managers, engineers and operations managers are facing a plethora of pressures, and notwithstanding increasing costs, chief among them is the constant demand for increased operational efficiency and throughput without compromising quality.

This research shows that market and operational pressures are now forcing manufacturers to focus on acquiring capabilities delivered by equipment and technologies that will enable them to remain competitive by optimising overall operational performance.

Close to three quarters (72%) of survey respondents have recently installed or were intending to install new packaging, product inspection or robotics automation equipment within the next year.

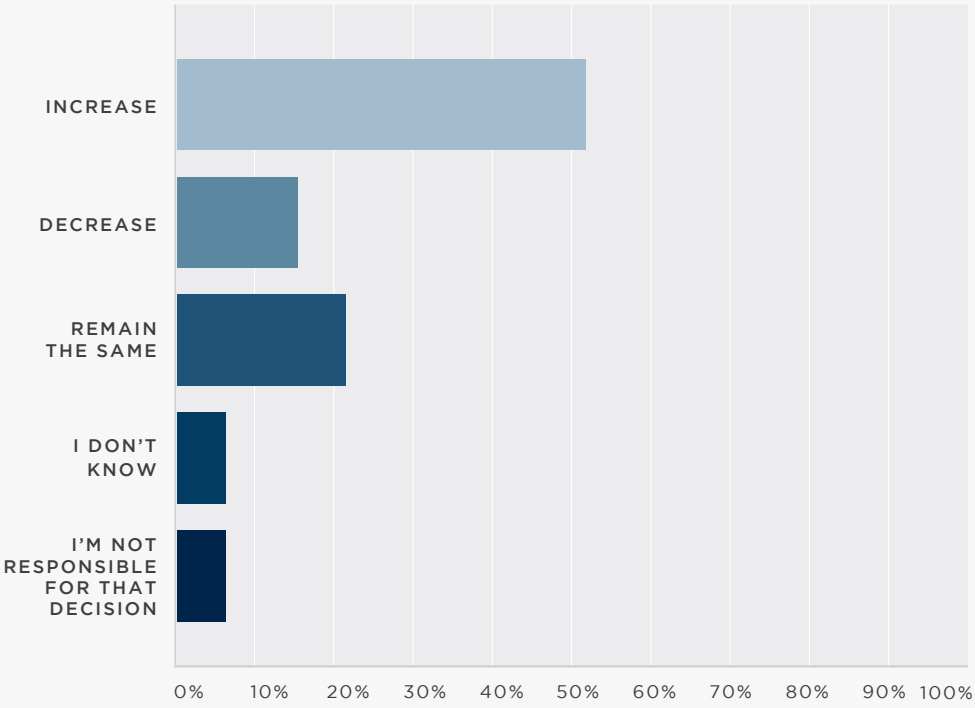
Have you installed new packaging, product inspection or robotics automation equipment over the past year or do you intend to in the next year?



"Market and operational pressures are forcing manufacturers to acquire new capabilities that will enable them to remain competitive."

To address market and operational challenges, over half (52%) of the respondents reported that they expect their capital expenditures to be more than the previous year.

Compared to this financial year, what will your capital expenditure buget for packaging equipment in the next financial year do?

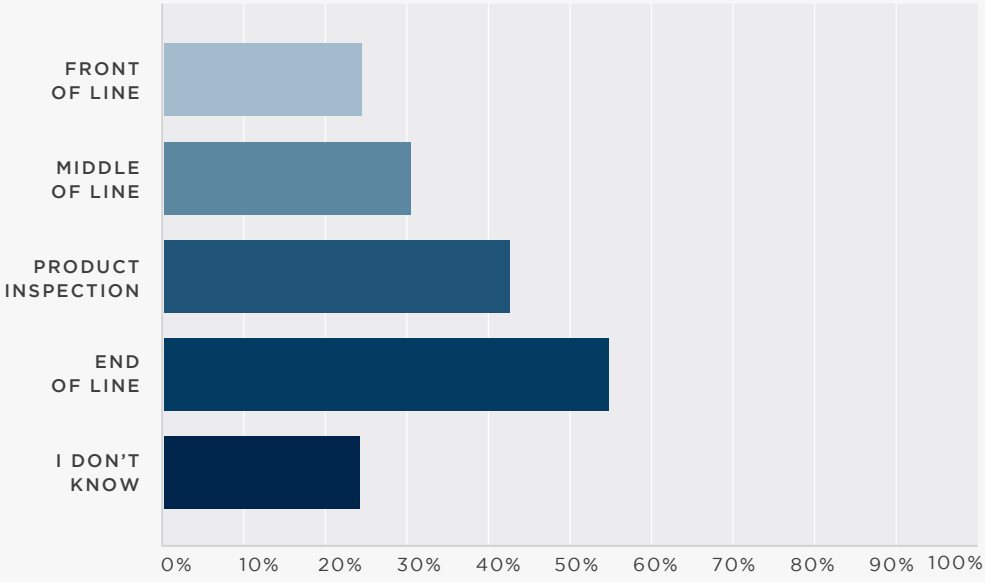


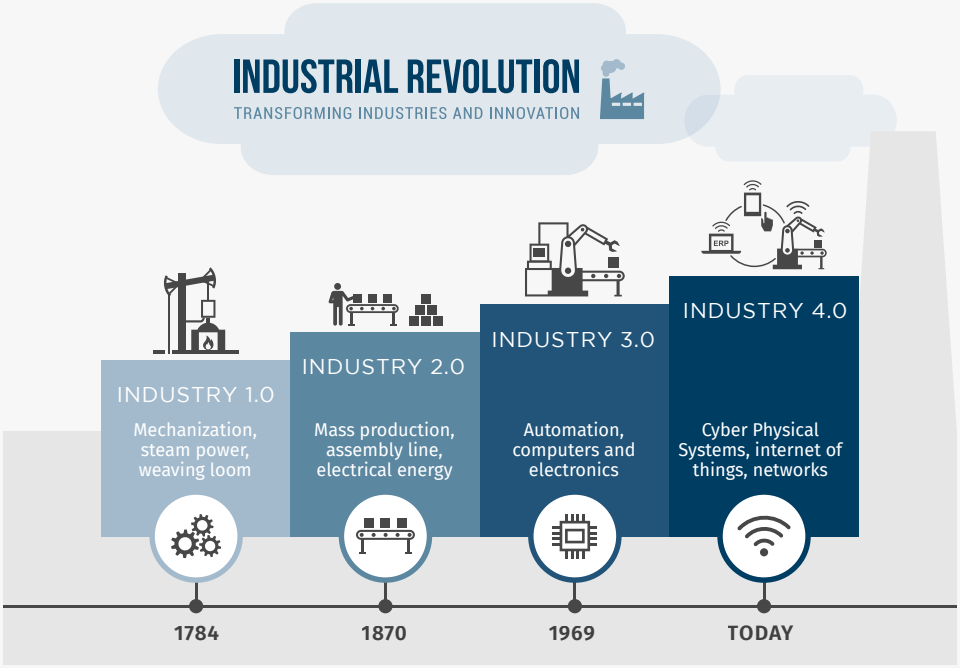
"Over half of the respondents reported that they expect their capital expenditures to be more than the previous year."

So, where will they invest their capital expenditure budgets? The survey research reveals that at the operational level, 54% of companies intend to install equipment at the end of the packaging line for case packing or palletising applications. Many of these companies also reported that this was to remove the source of a bottleneck in their packaging line.

Food safety/security remains a top factor driving packaging work, with 95% of food and beverage manufacturers intending to purchase new product inspection equipment, which includes metal detectors, X-rays and checkweighers.

Which area(s) of the packaging line do you plan to buy packaging or robotics automation equipment for? (check all that apply)





In a drive to reduce labour costs, waste and product quality, 30% of companies plan to implement fully automated systems within the next few years, and 45% plan to implement semi-automated systems.

And, consistent with news about the rise of robotics automation technologies, over half of companies (53%) intend to implement robotics automation technology within the next two years for a range of applications. 26% of companies surveyed currently use robotics automation technology for materials handling, picking, sorting, packing and palletising applications, and a further 15% already use robotics for food processing applications.

Data-driven intelligence is the order of the day, with 36% of respondents reporting that their companies intended to increase operational visibility and 54% of companies currently managing or intending to manage data using real-time, event-driven dashboards to improve their ability to rapidly respond to production issues and business demands. Companies that reported that they already possessed real-time visibility into the status of all production processes, and quality and compliance data performed better across a range of operational metrics, which included manufacturing cycle time and annual output, than those that did not possess these capabilities.

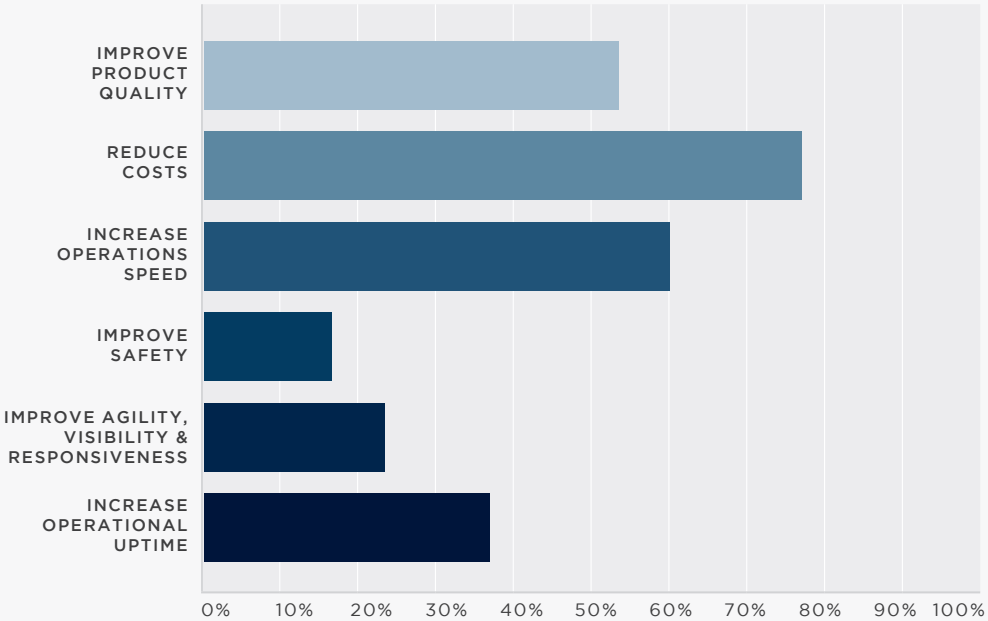
Companies that did not possess these capabilities and technological enablers reported year-on-year increased operational costs, while those who have implemented them have reaped benefits, which include reduced total cost per unit and increased manufacturing cycle times.

Asked about the three top benefits that respondents expect from the purchase of new packaging line equipment or technologies, reduced costs was ranked first (76%), followed by increased operational speed (60%) and then increased product quality i.e. freedom from defects (53%). While not occupying a podium position in the rankings, increased operational uptime was also cited as a key benefit by 36% of respondents.

However, the research also shows that 50% of project sponsors experience challenges making a clear business case for funding approval. One respondent said that this was 'the greatest bottleneck' he encountered in his operational improvement efforts.

"50% of project sponsors experience challenges making a clear business case for funding approval."

What are the three top benefits you expect from the purchase of new packaging line equipment or technologies?



Pressures

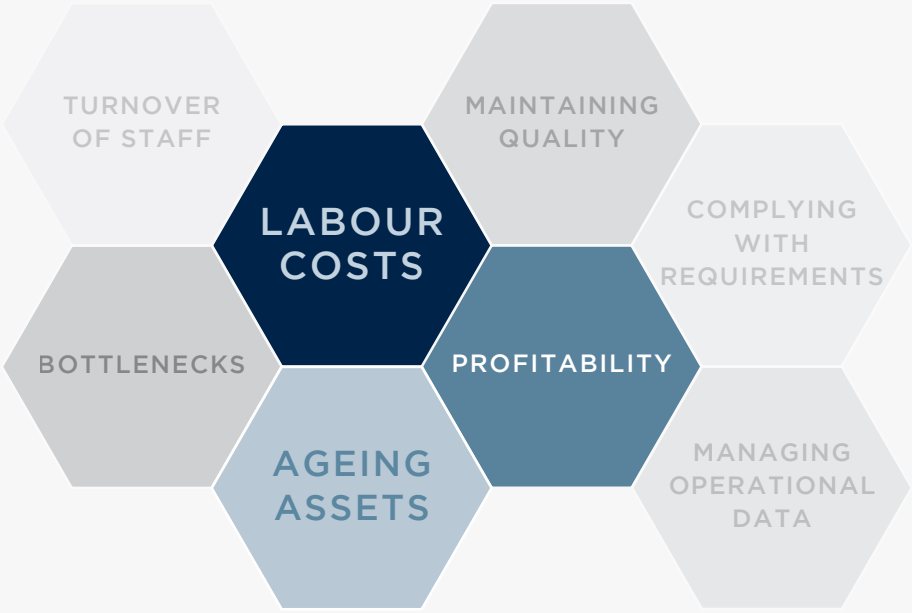
Managing labour costs was ranked first (55%) in the top three challenges that Australian companies are encountering in managing their packaging operations.

The research shows that this is driving companies to examine their packaging process and re-appraise systems to find ways to reduce headcount, while improving efficiency and quality, by automating some (or all) of their packaging processes. While the upfront costs associated with automation are often a barrier to implementation, respondents report that return on investment calculations often show a clear case for automation in the medium to long run.

Profitability is being affected by rising manufacturing input costs, including raw materials and energy and so was ranked second by 48% of companies in the top three challenges that companies are encountering in managing their packaging operations.

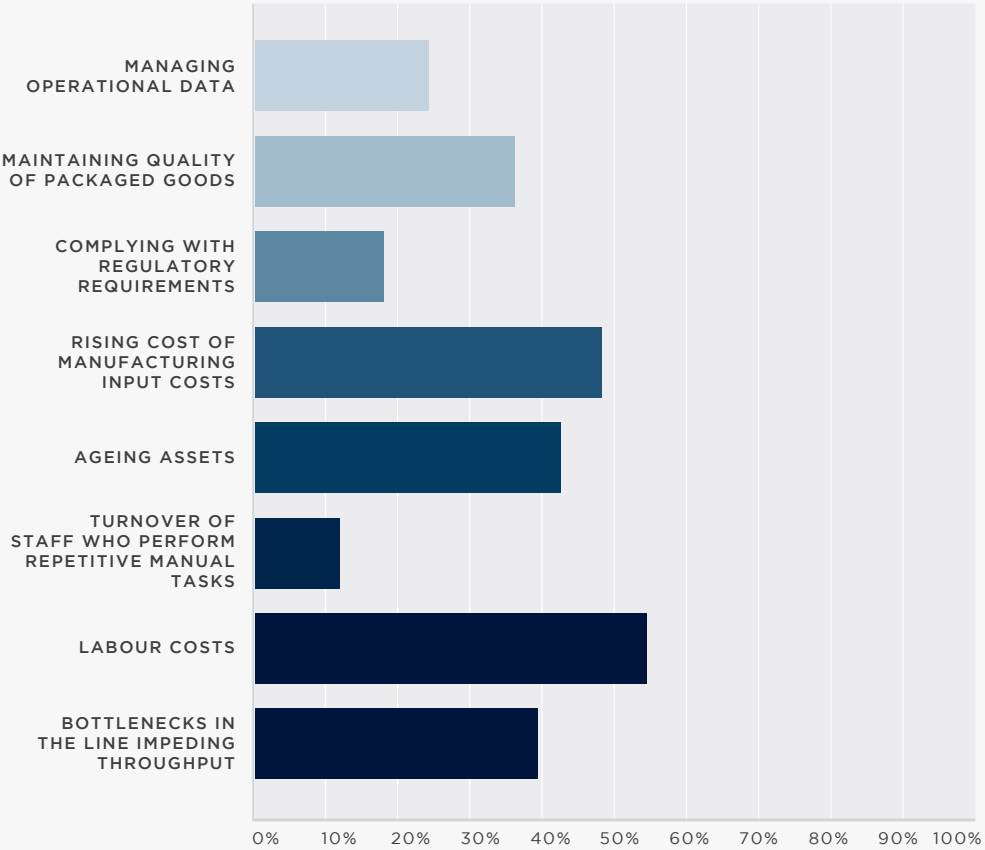
Ageing assets was ranked third, with 42% of respondents reporting that these impede operational performance, not to mention the increased maintenance costs that are often associated with older equipment. Clearly, the continued use of equipment that fails to provide the production capabilities enjoyed by rivals sets the conditions for a business to suffer the consequences of becoming uncompetitive on cost and inflexible in their packaging capabilities, as was reflected in the operating metrics of these companies.

“Managing labour costs was ranked first (55%) in the top three challenges.”



Other significant challenges include maintaining product quality and bottlenecks in the production line (39%) that impede throughput.

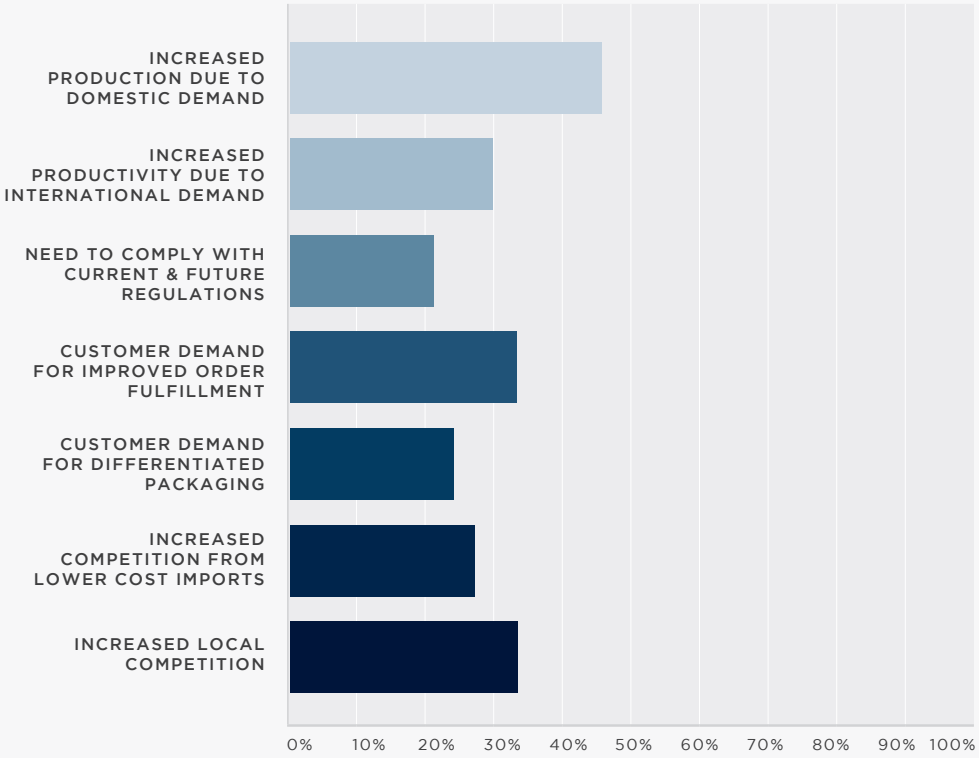
What are the top three challenges in managing your operations?



"Profitability is being affected by rising manufacturing input costs."

Competitive market pressures – from both local and international industry rivals – were cited by 61% of companies as one of the factors driving them to enhance or upgrade packaging line machinery to reduce costs, increase operational speed and improve product quality.

What are the top three market pressures driving your company to enhance or upgrade its packaging line capabilities?



"Competitive market pressures are one the major factors driving the respondents to enhance or upgrade."

The research also shows that over three quarters of companies (75%) will enhance or upgrade packaging line equipment to support the increased output that is required to meet both increased and international and domestic demand and 30% of companies will do this to increase order fulfilment rates. These pressures are made manifest in the research on company performance.

Over the past two years, what were the changes in the following metrics?

	Increased by > 50%	Increased by 30-50%	Increased by 16-30%	Increased by 1-15%	Remained the same	Decreased by 1-15%	Decreased by 16-30%	Don't know
Operating Costs	10%	3%	13%	33%	6%	10%	0%	23%
Total Cost Per Unit	3%	3%	6%	30%	13%	20%	0%	23%
Manufacturing Cycle Time	3%	3%	16%	13%	33%	6%	0%	23%
Annual output	6%	6%	23%	13%	16%	10%	3%	20%

60% of companies reported that operating costs had increased. Of these, over 25% reported they had increased by more than 15% and 10% by more than 50%.

While 43% of companies reported that total cost per unit had increased, with 13% reporting increases greater than 15%; over 20% of companies reported that they had managed to reduce total cost per unit by up to 15% through a range of strategies, capabilities and enablers.

Consistent with the increase in market demand for manufactured goods, 50% of respondents reported an increase in annual output, with 23% of these reporting an increase of 15-30%.

“43% of companies reported that total cost per unit had increased.”

Strategic Actions

Asked what strategic actions their companies are pursuing to address the challenges, responses show that management aim to:

- reduce costs by reducing wastage;
- increase operational efficiency and effectiveness; and,
- gain increased operational visibility and actionable insights into operational performance

The survey showed, reducing costs by reducing wastage was the top ranking strategic action that 70% of companies were intending to take to address market pressures. A further 27% of companies reported that they intended to reduce costs by reducing product give-away.

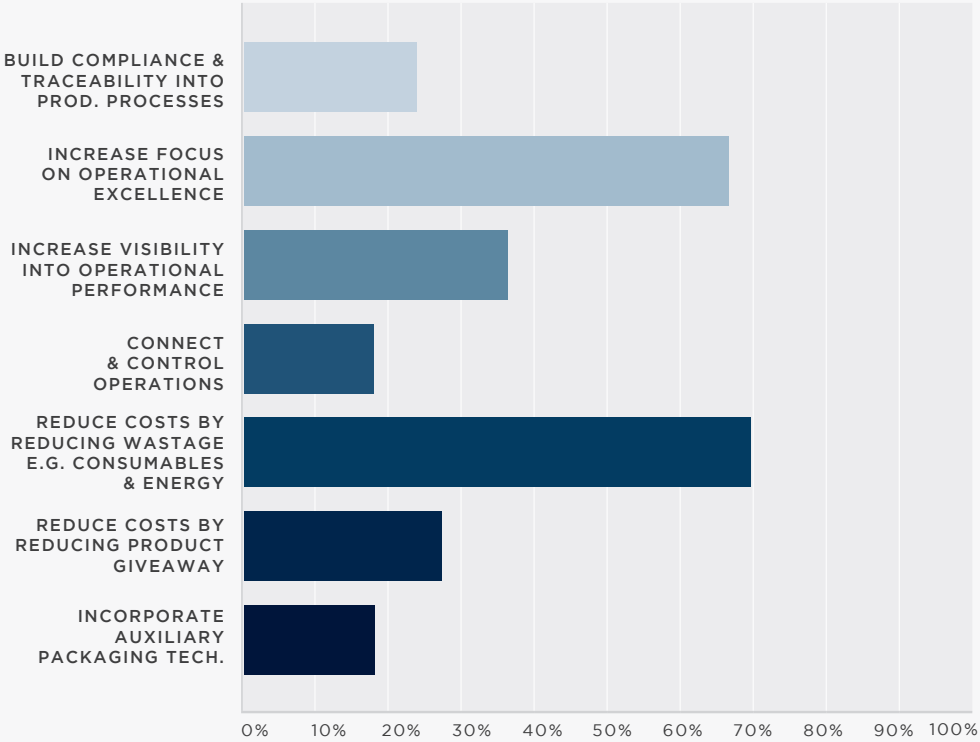
While waste reduction programs are often associated with the sustainable manufacturing management practices, they are also an outcome of lean manufacturing and efficiency initiatives.

A focus on operational excellence initiatives to improve operational efficiency and/or effectiveness was ranked second in the top three strategic actions that 66% of companies are intending to take to address market pressures. With the growing implementation of automation into production lines, companies are better positioned than ever to actualise these initiatives and reduce costs, provide even more consistent quality products and improve profit margins.

“Reducing costs by reducing wastage was rated as the top strategic action companies planned on taking to address market pressures.”

Increasing visibility into operational performance was ranked fourth by 23% of companies. This strategy will enable management to improve their ability to respond to business and operational demands and optimise production, which is integral to realising operational excellence.

What are the top three strategic actions your company is intending to take to address the previous market pressures?



Capabilities

Asked what capabilities their companies possess or will acquire to realise their strategies, over half of companies (53%) intend to implement robotics automation technology within the next two years for a range of applications to boost performance. 26% of companies surveyed currently use robotics automation technology for materials handling, picking, sorting, packing and palletising applications, and a further 15% already use robotics for food processing applications.

While materials handling has traditionally been the focus for robotics automation applications within the FMCG industry, the development of food-grade articulated robots that are able to handle raw food in processing applications has spurred increasing investment in this area.

Robotics technologies automate repetitive, time consuming manual tasks and enable any enterprise to increase productivity, product quality and efficiencies – leading to lower costs, increased profitability and customer satisfaction, increase demand and reduced OH&S risks.

"53% of companies surveyed intend to implement robotics automation technology within the next two years."

Furthermore, a new era in automation has begun with the development of smart, flexible, collaborative robots (cobots) that are able to work alongside humans. These robots are set to transform productive processes in Australia because they can be easily integrated into existing production environments and can perform a great range of tasks. Equipped with a collision detection function and a safety function that slows down its motion when near a person, the robot can be reliably operated in tandem with the operations of workers adjacent to the machine.

"Cobots are set to transform productive processes in Australia."

Which of the following production capabilities does your company possess?

	Currently use	Plan to implement	No plan to implement	Don't know
Manufacturing effectively collaborates with product engineering/design	43%	23%	10%	23%
Qualified in-house engineer/ maintenance capabilities	43%	10%	26%	20%
Systems integrators are viewed as strategic partners in the design & implementation packaging lines	23%	23%	20%	33%
Central line control	3%	24%	30%	43%
Vision system technology	16%	23%	23%	36%
Robotics automation technology - materials handling, picking, sorting, packing, palletising	26%	26%	26%	20.%
Robotics automation technology - food/product processing	15%	26%	26%	30%
Barcode tracking	23%	36%	20%	20%

CENTRAL LINE CONTROL – MACHINES SPEAKING THE SAME LANGUAGE

While only 3% of companies surveyed currently use central line control systems, 24% of companies report that they intend to implement the technology. Line integration systems can provide real-time insights into issues and prevent and diagnose production issues, such as how and why a line has stopped. Additionally, the system can transmit information to other areas and direct machines to adjust behaviour, such as slowing down, increasing speed or stopping, and so balance/optimise the production system.

If, for instance, a line is running 2400 SKUs per month, and cycle time is improved by an average of 30 seconds per SKU, they're now gaining 1200 minutes – or 40 hours – of recovered downtime per month.

Central line control systems that integrate packaging processes are especially useful in packaging operations. This is because packaging machines – such as fillers, case makers, wrappers, labellers, palletisers – that are used in many operations are usually sourced from different original equipment manufacturers (OEMs). This makes it difficult for machines to communicate with one another, requiring customised integration work and hard coding.

However, Packaging Machine Language (PackML) is now a common language for these machines, and new line-integration technologies are leveraging PackML to create a link between machines across the entire packaging operation, even for legacy equipment. This enables managers to monitor each machine in a holistic manner, providing them visibility into the throughput of each machine and a centralised view of how the entire line is performing.

VISION SYSTEMS – PROVIDING MACHINES A WAY TO 'SEE'

16% of companies surveyed employ vision system technology in their operations and 23% of companies report that they intend to implement vision system technologies.

Vision systems can play a critical role in improving the efficient and effective functioning of production and packaging lines. Vision sensor technologies can manage production challenges within in all industries where a standard sensor would not work.

By interpreting multi-dimensional, real-time images of objects at high-speed according to pre-defined criteria, vision systems make rapid 'decisions' and then inform the actions that other machinery or robots take in their interaction with the object. Operational simplicity is ensured by automatic setup, intelligent algorithms and a common, intuitive user interface.

In manufacturing environments, vision systems check part positions, provide precise and accurate measurement of items and their orientation and are used to automatically control sensors, PLCs, servomotors and other equipment. In packaging and palletising applications, they are used to ensure that: labels and/or barcodes are affixed correctly; that packaging is complete; and that packed items are stacked correctly. When integrated into an inspection system, vision systems inspect the product integrity and look for flaws according to pre-defined criteria.

Vision systems provide myriad benefits, which include: better quality control, faster production/packaging times, reducing manufacturing costs (including labour) and reduced OH&S issues that are caused by performing repetitive or dangerous tasks.

Which of the following process capabilities does your company possess or will develop?

	Currently Implemented	Plan to implement	No plan to implement	Don't know
Standard KPIs	60%	20%	6%	13%
Automated alerts based on defined conditions	13%	36%	26%	23%
Automated workflows to manage non-compliance, non-conformance & recall events	16%	46%	16%	20%
Quality assurance results for products recorded	60%	23%	3%	13%
Data is managed using real time/ event-driven dashboards with role-based accessibility	16%	36%	20%	26%
Ability to collect, plan/schedule and respond to real-time production events	16%	43%	16%	23%

"Data-driven intelligence is the order of the day."

Asked how management oversee operations and problem solve, data-driven intelligence is the order of the day, with 36% of respondents reporting that their companies intended to increase operational visibility and 54% of companies currently managing or intending to manage data using real-time, event driven dashboards to improve their ability to rapidly respond to production issues and business demands.

This is where operational dashboards excel by enabling management to handle real-time events with role-based data accessibility, navigation, aggregation and data-drill down. With visibility comes insight, and insight spurs action through problem solving and production optimisation. The data, gleaned from these dashboards, also offers opportunities for operational improvement and to enhance productivity.

Companies that have real-time visibility into the status of all production processes and quality and compliance data performed better than those that did not possess these capabilities.

Which of the following business management capabilities does your company possess or will it develop?

	Currently implemented	Plan to implement	No plan to implement	Don't know
Owners or senior management have visibility into operational performance	53%	23%	6%	16 %
Operational metrics are linked to financial metrics	36%	36%	3%	23%
Real-time visibility into status of all production processes	30%	36%	10%	23%
Real-time visibility into quality and compliance data	26%	36%	13%	23%
Energy consumption and costs are used as KPIs for operational decision making	20%	36%	23%	20%

"Operational dashboards excel by enabling management to handle real-time events with role-based data accessibility."

Procurement Practices

Asked to rank the following procurement criteria in order of importance, the flexibility and adaptability of machinery to accommodate future requirements ranked first. Considering that product life cycles are getting shorter, the requirement for versatile machines is clear.

TOP 10 PROCUREMENT CRITERIA

1. Flexibility and adaptability to accommodate future packaging applications
2. Ongoing service and support
3. Cost
4. Materials savings
5. Safety i.e. the machine eliminates repetitive motion or heavy lifting required by an operator
6. Machine's capability of providing quality improvements and reducing rework
7. Quick changeovers
8. Cost and/or availability of change parts
9. Professional services consultant's expertise
10. Australian-made

Packaging operations look to flexibility in machinery with a future focus, so they can package products with a wide range of containers, caps, labels, sleeves, and products. Respondents report that they want machines that can accommodate different sized or shaped containers as a standard feature, without additional add-ons or a custom solution.

Ongoing service and support was ranked the second most important criterion. The importance of this, and the availability of change parts cannot be understated. Operations that depend on continued uptime cannot afford to suspend production for days while a supplier sources a spare part from overseas.

Cost, always an important criterion, was ranked third. This is not an altogether surprising result considering that most decisions are financial at core and made on a rational cost/ benefits analysis. However, report contributors advise that it's important to put cost in proper perspective by evaluating machinery features and reliability relative to other OEMs' machinery.

Research has also revealed the challenges that companies experience in buying, testing, commissioning, and the start-up of packaging equipment.

While general management (63%) usually specify the machinery for packaging lines company, owners (30%) and packaging line engineers (30%) are also key project sponsors.

50% of project sponsors cited making a clear business case as one the greatest challenges in successfully procuring and/or commissioning packaging line equipment or systems.

"Packaging operations look to flexibility in machinery with a future focus."

Making a case for providing capital purchase involves providing data that demonstrates a clear financial return on investment. This, of course, requires supporting evidence of the operational and competitive benefits that will flow from the project.

In this respect, it's advisable to work with your system integrators to identify and quantify all sources of increased profits and cost savings, such as:

- Reduced maintenance costs
- Reduced operational downtime
- Additional sales due to increased throughput or more uptime
- Reduced labour headcount, production shifts and/or overtime
- Obsolete controls
- Availability and cost of change parts for aged/ obsolete machinery
- Equipment flexibility and versatility – since product life cycles are getting increasingly shorter, this requires creative versatile machines
- Materials and energy savings
- Improved quality and reduced re-work
- Safety

47% of respondents reported that their company has experienced challenges in integrating equipment from other OEMs, and 40% reported that they didn't possess requisite in-house engineering expertise to inform testing, commissioning, and start-up processes.

36% of companies reported that they experienced challenges with acceptance testing.

Considering these factors, contributors to this report advise that best practices for specifying packaging machinery include:

- Document and discuss your requirements. Every machine purchase should start with an in-depth requirement analysis that leaves no area unexplored and which could surface to slow or stall project process. Success is all in the planning.
- Determine the overall system goals, looking at each transfer point. While it's important to carefully specify each component in the packaging system, try to avoid specifying it in splendid isolation. Rather, examine the entire system as an integrated whole and that all components must work in concert to achieve optimal output.
- Source insights and perspectives from cross-functional teams – operators, engineers and technicians - on requirements. Many heads are better than one.
- Factor in future requirements and applications, rather just present needs, by using 'what if' scenario planning.
- Explore new and improved packaging technologies, many of which may be easier to implement that initially imagined. Don't replicate current solutions.
- Anticipate the need for support, service and spare parts.
- Invest in training
- Establish a multi-functional project steering committee and culture that fosters clear, open communication between all project stakeholders. Communicate!

"Best practices for specifying packaging machinery include documenting and discussing your requirements."

We gratefully acknowledge the expertise and contribution of the following business analysts, consultants and engineers.

AUKE DE RUYTER DE WILDT

Auke De Ruyter de Wildt is General Manager of AccuPak, one of Australia's leading packaging line solution providers.

He has 16 years experience in the design, manufacture, integration and commissioning of end-of-line factory packaging and product inspection solutions for a wide range of businesses, from those with small scale operations through to high-throughput factories that work around the clock. Auke partners with customer stakeholders to conceptualise and implement best practice inspection and packaging solutions.

Auke now leads a team of like-minded, enthusiastic and highly technically experienced colleagues.

ROSS WALLER

Ross Waller is the Engineering Director for AccuPak and a recognised expert in automation, pneumatics and packaging technologies. In 1997, Ross merged his own packaging company, Weighpack Services with AccuPak/AccuWeigh and is today instrumental in directing the technical aspects of the company's operations.

Ross has over 35 years industry experience in the design, integration and commissioning of filling, packaging and palletising lines for businesses within industries that include food processing, FMCG, agriculture and chemicals.

TRINTON SMITH

Trinton is General Manager of Robot Technologies-Systems Australia, one of Australia's leading robotics system integrators. He has over 30 years experience in the design and implementation of automation control and robotics solutions. He possesses an interdisciplinary skill suite, which includes business and systems analysis, engineering and project management.

He has designed and integrated robotics automation solutions, for companies within a broad range of industries, for applications that include: industrial automation (welding, cutting and painting), material handling (sorting, picking, packing and palletising), and food processing.

Consequently, Trinton is well-qualified to help businesses review and re-engineer current processes and step forward into growth equipped with the latest industrial and factory robotics automation technologies.

PETER SLAGER

Peter is a Senior Product Inspection Applications Engineer for Accuweigh. He is an electrical fitter mechanic and industrial electronics technician who has 30 years experience in all facets of the product inspection industry, from customer consultation through to designing and manufacturing bespoke systems, machine assembly, customer site implementation, customer service and on-going management of the solution. He specialises in checkweighing, metal detection, X-ray and vision systems.

In his current role, Peter aims to assist AccuWeigh's customers to protect their brands and consumer safety through use of effective product inspection technologiesl; and to assist them maximise their profits by minimising product 'give-away' and re-work and so maximise their Overall Equipment Effectiveness (OEE).

Contributing Editor

LINDY HUGHSON

Lindy Hughson is Managing Editor & Publisher of PKN Packaging News and Food & Drink Business, both industry-leading media brands owned by Australian independent publishing house, Yaffa Media.

Lindy has over 20 years' experience writing about FMCG manufacturing and packaging for business-to-business publications in Australia and abroad. She is Secretary General of the International Packaging Press Organisation (IPPO) and has travelled widely to cover international packaging and food processing exhibitions and conferences.

In her current role, Lindy aims to deliver engaging and insightful content to the niche audiences of PKN Packaging News and Food & Drink Business. She has a particular interest in innovative, sustainable and accessible packaging design and its potential to enhance the consumer's experience of a brand.

PKN Packaging News and Food & Drink Business thank all the survey respondents and the analysts, consultants and engineers involved in the compilation of this report.

Click here to view the 2017 Packaging Line Technology survey.

We welcome comments and feedback and if you would like to participate in our 2018 survey, contact us at editor@packagingnews.com.au.