

Ten trends in packaging operations



***Based on the firsthand observations
of a packaging automation specialist,
third party analysis, industry forums
and press reports***

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Introduction

Aside from the incessant drive to make packaging machinery more productive, we are beginning to see the conscious leveraging of automated packaging systems as a strategic business advantage. This is occurring on several fronts.

This paper presents a number of trends to watch for, underlying business and technical strategies, and the enabling technologies that are changing the game.

These trends are based on the observations of a technology provider that has for over a decade specialized exclusively in automation packaging machinery. This paper also aggregates best practices that have visibility in the marketplace and/or have been reported by research analysts and the press.

This paper is intended primarily for consumer packaged goods manufacturers, but is equally applicable to the life sciences. The perspective of this paper is global. For the sake of clarity, acronyms requiring special knowledge have been avoided.

This paper is simply intended to offer practical initiatives that your management team can readily implement for your packaging operations to actively support your consumer marketing strategy, sustainability initiatives, supply chain strategy, and lean manufacturing programs.



Packaging as a business strategy: it's about more than incremental gains in performance.

1. Progressive companies don't treat packaging lines as overhead

Packaging engineers sometimes lament that they are an afterthought to manufacturing. Manufacturing thinks marketing calls all the shots. Marketing feels it plays second fiddle to finance. Finance jumps when the CEO calls, but Wall Street keeps the CEO up at night. Meanwhile the employees' 401(k) investments drive the Street in this vicious circle!

In reality, we all go out and buy the products that come in the neat new packages. From putting coffee in filter pods to plastic coffee cans, it's obvious what innovative packages can do. But it is also very easy to take this machinery and associated engineering activities for granted.

Forward thinking companies are now paying closer attention to how their packaging systems can get those neat new packages into the market faster and do it more cost effectively. For example, Miller Brewing, Frito-Lay and P&G Gillette shared their future needs at a recent Packaging Machinery Manufacturers Institute event (read the full story at <http://www.packworld.com/view-22914>):

- Innovation often takes place in the manufacturing facility and 'bubbles up' to corporate. Some companies are setting up global portals to better communicate these best practices
- They recognize packaging's role in time-to-market and want packaging system suppliers need to be more agile in delivery, on the order of 4 month leadtimes for standard equipment
- The term 'cost innovation' refers to delivering productivity gains earlier in a product's life cycle, because with new consumer products lasting only 3 to 4 years, it's no longer feasible to wait for products to mature to start working on margins
- They are looking to their packaging machinery providers to provide not just short-term innovations, but market changing innovations that are 3 to 5 years out. This will require the packaging system providers to work more closely with innovative automation providers to provide the enabling technologies

Conclusion: expect to see more attention paid, at higher levels of management, to ways that automated packaging systems can contribute to bottom and top line objectives.



Packagers share future needs at PMMI's Market Trends conference

2. Recognize that most SKUs are package changeovers

One reason for this newfound -- or renewed -- appreciation of packaging is the recognition that a typical consumer packaged goods company has ten package SKUs for every product SKU. That same batch of chocolate can come in a whole array of flow wrapped bars, twist wrapped shapes, multipacks, bags, cartons and shipping and display cases.

And there will be twice as many SKUs if the European Commission goes ahead with its plan to ban supplemental English units of measure on January 1, 2010 and require labeling that is solely metric. Virtually every product made in the U.S. and exported to Europe would need to be run with two different labels. And not all U.S. states permit consumer quantities to be packed with metric-only labeling. So European products would also need a second label for import into the U.S.

The good news is that most pint bottles have already been replaced by half liters. But we have an awful lot of one pound packages that will likely change to 500 gram formats, too.

Conclusions: don't expect labeling to go all-metric until it becomes obvious that the European regulation is inevitable. Do, however, anticipate that companies seeking easy ways to reduce packaging costs will both weed out nonessential package sizes and go with machinery that's more adjustable.

For example, stick packs have become immensely popular as part of on-the-go lifestyles. Just some of the products appearing in stick packs include yogurt (with a separate chamber for topping), pudding, drink powder, powdered aspirin, powdered vitamins, and of course the traditional condiments. There appears to be a race among food companies to see how many of their products they can market in stick packs.



Left: there appears to be a race to get products to market in stick packs. Right: therefore, the most popular stick pack machines will be flexible enough to accommodate many new products.

To accommodate all these different products, the most popular stick pack machine is going to be the one that can change pack size from 4" all the way to 8" in length (or should we say 100mm to 200mm) by fingertip from the operator's touchscreen and change diameters with simple change parts (read related article at <http://www.packworld.com/view-23966>).

3. Lean packaging operations get the cost out

Expect long-overdue techniques -- such as Overall Equipment Effectiveness to reduce downtime -- to start getting more traction.

At ELAU, Schneider Electric's packaging automation specialist, we believe so strongly in the potential of these techniques that we are sponsoring a series of workshops (<http://www.packworld.com/view-24256>). These Packaging Line Performance workshops are being produced by Summit Publishing, publisher of packaging and automation trade magazines. They will teach hundreds of people each year how to lean out their packaging operations.

OEE has been around since the late 1960's in Japan, one of the host of productivity- and quality-enhancing acronyms that have migrated from high tech industries to general manufacturing. Essentially, OEE calculates machinery's uptime vs. downtime, actual output vs. potential, and quality of output.

What's kept packagers from implementing is the effort to get started, difficulty accessing – and effectively defining – the data being measured, and what to do with the information once it's gathered.

Now, better methods and standards are emerging for data acquisition (Trend #8) and best practices have been established. So, the workshops in question will be two days long and teach the fundamentals, provide a simple spreadsheet tool to get started, and offer actionable implementations that don't involve require advanced mathematical skills.

Three good reasons for corporate management to embrace this trend are those 10 packaging SKUs being produced for every manufacturing SKU (once again), the fact that the results will be found money, and the ability to increase capacity without capital investment or added labor.



OEE: it makes sense to focus on efficiencies in packaging operations because packaging typically accounts for 10X as many of your SKUs as manufacturing does.

4. Packaging machine OEMs become *packaging systems providers*

Historically, most packaging machine builders have concentrated on the workings of their machine. Engineers at the packagers' plant or perhaps a systems integrator worried about how to integrate them into lines.

Increasingly, OEMs are being asked to guarantee their equipment's performance – performance that's probably being impacted by upstream or downstream machinery.

Packagers have fewer engineering resources to take responsibility for the entire system. Yet, they also need more production data as well as better controllability of packaging lines. And what good is isolated performance data for individual machines?

The need for interaction between packaging machines and even with upstream manufacturing processes is causing two trends. One is the turnkey, single vendor packaging system. The beverage industry

The other is alliances, such as the relatively new Packaging End of Line Solutions (PELS) group of companies, taking responsibility for integration, documentation, training and support of their multi-vendor installation (<http://www.packworld.com/view-23832>).

Conclusion: either way, expect more machinery suppliers to add value by becoming packaging systems providers.

A perfect example is Nuspark Engineering (<http://www.packworld.com/view-23705>), a Toronto-based company that has partnered with ELAU for modular automation and Schneider Electric for a global electrical solution.



Trend: Nuspark Engineering is not only an innovative machine builder, they have become a packaging systems provider, putting all these pieces together..

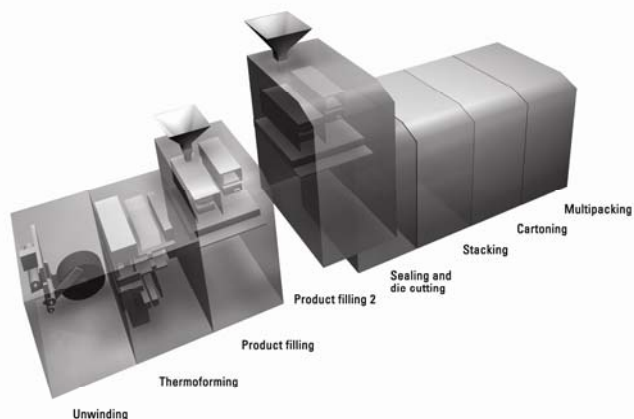
Nuspark has a delta robot case packing module that can double throughput in the same envelope simply by hanging a second robot arm on the module. They can supply not only all the equipment modules for cartoning through palletizing – they specialize in putting together all the servo conveying and infeed systems to connect the modules in minimal floorspace.

And because they distribute their servo modules (<http://www.packworld.com/view-24125>) out to the equipment being automated, adding new modules doesn't require expanding control cabinets. It literally is plug-and-play.

5. Packaging modules replace packaging machines

When machinery builders evolve to systems providers like Nuspark has done, they no longer think their business is about crating and shipping a machine. They start to think in terms of creating standardized modules to configure a customized packing solution that will 'plug and play.'

And packagers can start thinking about rearranging these packaging modules to package different products.



Interchangeable modularity is reinventing how packaging systems are designed.

So, expect greatly increased reconfigurability that will reduce risk in capital expenditures and adapt faster to changing consumer requirements.

This sounds good, but to make packaging modules plug-and-play takes modular software, modular control hardware and modular mechanical designs.

Conclusion: to achieve this, encourage greater collaboration between your packaging system designers and their automation providers – a model implemented several years ahead of its time by German packaging systems provider Harro Hoefliger (<http://www.packworld.com/view-16244>).



Harro Hoefliger, headquartered in this idyllic valley Near Stuttgart, Germany, was ahead of its time in Developing modular, automated packaging systems.

6. Machineability: the biggest challenge to sustainable packaging?

As sustainable packaging initiatives proliferate (<http://www.packworld.com/view-23986>), the cart needs to get connected with the horse. That is because a variety of new materials and package designs are destined for the packaging floor. But some of the most promising ideas may perish for lack of machinery capable of running them. Unless packagers, machine builders and materials suppliers work together to build scenarios that anticipate the machineability (runnability) as yet unknown material attributes.

Conclusion: plan to purchase machinery with a new level of flexibility, beyond what you're anticipating to need to run today's packages. Think on the level of reconfigurability rather than changeover. This fits in well with the modular concept. It also requires automation with a broad range of adjustment. Robots come to mind for their reprogrammability, but feedback is the fundamental enabler.

Packaging engineers know that packaging machines use lots of servo motors these days. But what makes a servo motor different from a regular one? Feedback. Any engineer worth his or her salt at our company can tell you that.

It is the feedback device on the back of that motor that allows the control system to make infinitesimal and continual adjustments. So you can run thinner or thicker gauge materials, or recycled or renewable materials with rougher surfaces. For example, bottles made of polylactic acid require sidewalls many times thicker than today's familiar PET resin. Corrugate in developing countries may not be as consistent as desired, which can lead to handling and printing issues.

That same feedback can also help you take the pulse of your packaging operation, yielding production data and maintenance advisories. For example, it's possible for a capping servo to record the precise amount of force it has applied to the cap, even though the system is capping thousands of bottles per hour. The wrong torque value can indicate a missing cap, improper seal or cross-threaded cap. Pneumatic Scale/Angelus built these and other capabilities into their capping systems (read the article at <http://www.packworld.com/view-22231>).



This Pneumatic Scale capper uses servo feedback (the black devices with the green cables are the servos) to not only cap with more precision, they also get valuable information about sealing quality – for each and every cap!

7. Do you recall *Design for Disassembly*?

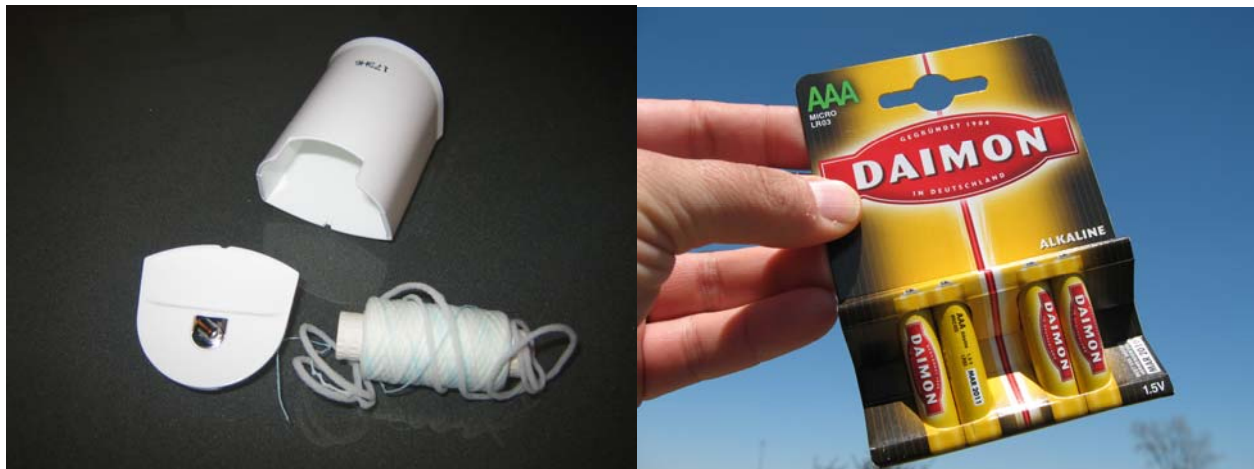
Although you're not hearing much about it these days, DfD is still out there, for everything from cars to electronics (for a synopsis, <http://www.npd-solutions.com/dfe.html>). Expect to hear more about Design for Disassembly not only of products, but of packaging.

Ever try to recycle a dental floss container? One well known brand has a plastic spool, plastic housing and a plastic top with a steel cutter. It's exceptionally easy to disassemble -- except for that cutter. Redesign it with a sharp, molded-in plastic cutting edge and it's not only DfD, you've eliminated the costs of a part and an assembly step.

Take fresh egg packaging as another example. Instead of the familiar paperboard or foam egg cartons, some of the new cage-free, high-omega, organic brands are coming in clear plastic cartons with colorful printed paper inserts in the lid. This has a premium look, you can see the product through the transparent carton, and it's really easy to separate the paper from the plastic.

But let's not pick on paperboard. In Europe, some batteries come in neat all-paperboard hanger packs (<http://www.packworld.com/view-19592>). So there is no plastic blister to separate from the card upon disposal. And what a great way to stand out from all those other batteries in the display.

Conclusion: consumers will pay money to get these packages, and retailers will give these pack high sustainability scores, so expect to see more of them on store shelves soon.



Left, in the spirit of sustainability, this dental floss container is almost 'Design for Disassembly'. Just replace the metal cutter with a molded-in device. Right, an all-paperboard 'blister' pack replacement for batteries from Germany.

8. Multinational companies standardize packaging systems worldwide

People are talking and emailing and web searching all over the world. In so doing, they're learning not to reinvent the wheel.

Just one of many examples is the Weihenstephan standard (<http://www.packworld.com/view-24255>), a once-obscure data acquisition model developed by the German beer brewing industry. But a brewer in South Africa found out about it, and that company also became active in a packaging standards group in the U.S., so now American CPGs are looking hard at this standard to standardize data acquisition at their plants worldwide. An entire group of standards for packaging systems has in fact been developed by the OMAC Packaging Workgroup, led by packagers (www.omac.org).

What's the big deal? Such standards allow old, less automated equipment to be moved to markets where labor costs are lower and look familiar to operators and technicians. Likewise, the new equipment will have less of a learning curve because even though it's much faster, it looks the same to the operator.

And that's only one example. There are useful standards for communications, programming and much, much more.

And where the good ideas come from, nobody seems to care any more. Whereas there used to be a 'not invented here' syndrome that caused needless duplication and even served as trade barriers (like metric-only labeling), today's global marketplace seeks harmonized standards.

The key to new standards entering the marketplace is to separate as much as possible the underlying technologies that must continue to advance from the parts that need to remain common to all. In other words, standardize the electrical plugs and wall sockets, not the appliances.

Conclusion: if your operations are global, encourage investigation into global suppliers implementing scalable, global standards to support you everywhere you operate.



Global companies need global standards.

9. As networks converge, new efficiencies emerge

Hard to believe it's been ten years since the vision of a single network for machine automation started dawning on visionaries. The contradictory needs of synchronization for motion, low cost for I/O devices and bandwidth for data acquisition had long thwarted this convergence.

But that's changed with new technologies – not unlike running your cable TV, phone and broadband on one wire.

For example, ELAU has announced it will standardize on SERCOS III, which does put all these tasks together across a fast, broad, economical Ethernet network (www.sercos.com).

Even with today's SERCOS II technology, the company offers a single cable and snap-fit connector solution to replace four or more (www.elau-insider.com) power, feedback motion and device network cables.

This makes it practical for packaging modules (see Trend 5) to be plugged together, unplugged, rearranged and plugged back in to run different products. That's true future-proofing for your capital investment.



Already, it's possible to plug packaging machinery modules together with a single cable and plug – bringing the same efficiencies to packaging operations as combining cable TV, telephone and broadband service on one cable at home.

10. No contradiction between convenience and conservation

It's actually been twenty years since the archeologists of The Garbage Project at the University of Arizona began sifting through the nation's landfills (<http://traumwerk.stanford.edu:3455/Symmetry/174>). They discovered that packaging did not constitute as much of the waste stream as most environmental activists assumed.

Rather, construction debris and newspapers were among the top cast-offs (interestingly, a lot of current DfD emphasis is being placed on building construction).

Likewise, societies without packaged food have much higher levels of food waste in their trash heaps. First of all, food processors waste nothing they can find a market for. But if we squeeze oranges at home, we throw away the peels. Processors sell the pulp, peel and seeds for use as ingredients in perfumes, a Brazilian brandy, cat litter, paint, resins, animal feeds, cleansers, emulsifiers, food flavorings and pectin. (<http://www.hort.purdue.edu/newcrop/morton/orange.html>)

Second, packaged foods don't spoil so fast, aren't damaged in transit, and because they are offered in more practical quantities, less is wasted compared to bulk foods. (And please don't say you'll freeze the what's left over, because you know you're just expending electricity to forestall the inevitable.)

So, the conclusion here is – feel good about pouring that stick pack of drink mix into your half liter water bottle. Don't feel bad about drinking water from a bottle if you're substituting that for a soft drink containing high fructose corn syrup. And since you're getting your industry news electronically, feel good about keeping some of that paper out of the land fill, too. Even if you printed this story out, you're only putting the articles that interest you on paper!



This robotic case packer from Fallas Automation is called the Adabot because up to 4 robots can be plugged together to meet packing demand. The future is here, it's efficient and flexible!

Recommendations for CPGs

- Establish a multi-disciplinary Innovation Team comprising Marketing, Manufacturing, Packaging operations, Packaging design and Finance to define your company's top packaging issues in a concise briefing document
- This team should next identify and invite visionary packaging machinery, automation and materials suppliers -- that may or may not be your current suppliers – to participate in an ideation session
- Via email, introduce the suppliers to each other and provide the invited suppliers with your briefing document to prepare for the ideation session
- For packaging machinery participant recommendations and to invite ELAU's participation on the Innovation Team, contact John Kowal, global marketing manager, at +1 847 490 4270 or john.kowal@elau.com
- For additional background reading on trends in packaging machinery, visit www.packagingautomation.net



About ELAU

ELAU, Schneider Electric's packaging automation specialist, is the only company worldwide exclusively focused on the automation of packaging machinery. ELAU's PacDrive™ automation system offers the only automation platform purpose-built for the packaging industry.

ELAU equips over \$1 billion worth of the world's best machines annually, with over 40,000 PacDrive systems already deployed in packaging machinery worldwide.

The market demands packaging operations that are more flexible and efficient to fulfill marketing, supply chain and global business strategies. ELAU innovations have enabled a revolution in mechanical, software and hardware modularity to deliver these agile packaging systems.

For more information, visit www.elau.com or email info@elau.com.