THE EVOLUTION OF SOFTWARE

SOFTWARE ARCHITECTURES FOR THE PACKAGING INDUSTRY IN THE 21ST CENTURY

AN ARTICLE BY CONSTANTINE GOULIMIS, TIETOEVRY.

Is there a common theme for the software needs of the packaging industry? It is not hard to argue that the sector encompasses such a broad spectrum of solutions, from corrugated boxes for e-commerce to super-sophisticated, environmentally sensitive, security-protecting multi-layer boxes, via aluminium beverage cans that it would be impossible to imagine a common software platform solution for all these.

Indeed, the attempts to use generic Enterprise Resource Planning (ERP), some of the world's most comprehensive business software, have always, in the end, had to incorporate industry-specific components. Often these come from small, niche players and almost always, they provide business-critical functionality.

I recall working in a project for the world's biggest paper company, which was running, at that time, the largest ERP implementation project in North America. Hundreds of consultants, multi-year budgets well into nine figures. In the vast array of cubicles, there was a handful of desks, whose purpose was to adapt some configuration software supplied by a tiny European company that would allow the monster ERP to take in orders for the corrugating plants. There were several other such companies (my own at the time included), without whom the big project could not deliver its promises.

So, what are the difficulties that packaging companies present to generic software vendors? I would claim that they revolve around the following functional areas:

- **Estimation:** thanks to the infinite complexity of the marketplace and the incredible ingenuity of the marketing departments, pretty much every packaging container is unique. This gives rise to configurable products, perhaps chosen from a template list (e.g. FEFCO), but always with the need to estimate each individual enquiry and offer pricing that reflects the specifics and the piece count. Sometimes, if the requirement is completely new, this may involve CAD as well.
- **Production scheduling:** once the item has been estimated and the quote accepted by the end-user, there is an overwhelming need to produce it efficiently. The needs here can be specific, such as trim optimisation for corrugators (rather confusingly

known as corrugator scheduling), colour sequencing on a printing press, or even multi-part assembly in the case of boxes with lids. The paper machines need block scheduling (with quota management) and the converting plants need multi-stage scheduling to maximise throughput and avoid bottlenecks.

Speaking the Language

The niche companies that provide solutions that address such complexity have, over time, gained another advantage: they speak the language of their customers. They are not deterred by core sizes, scoring knives, tear tapes or the trade-offs in substituting paper of one grammage for another in a corrugated box.

Yet this is not the whole story. As the packaging companies have grown, they have integrated up and down the supply chain. One of the most successful business models appears to be the company that owns both paper mills and the associated corrugating/ converting plants – integrated companies. There seems to be a ratio in fact of one paper mill for every 10-20 corrugating/converting plants. These integrated companies account, very roughly, for one third of the world's paper production.

Historically, these companies source their software solutions from completely different vendors, perhaps with one thin integration layer at the top, to link the financials. But the software that runs the converting plants, at least so far, is different from the software that runs the paper mills. This poses all sorts of subtle problems, because the fundamental building blocks (what is a product, what is an order) of these two separate strands are not aligned. To give a very specific example, the number of companies that use the same software for trim optimisation of the paper machines as for the corrugators is, I believe, smaller than the number of fingers of one hand.

Into this schism comes Tietoevry's Pulp, Paper & Fibre group. With 400+ staff and a 50+ year history, we are now able to provide a solution to both types of sites in an integrated company. Our software, whilst always speaking the language of the industry, covers in particular:

Of course, our solution is modular and not everybody needs every module. But for those that adopt the entirety of the Tietoevry solution, the only things that they need to add are:

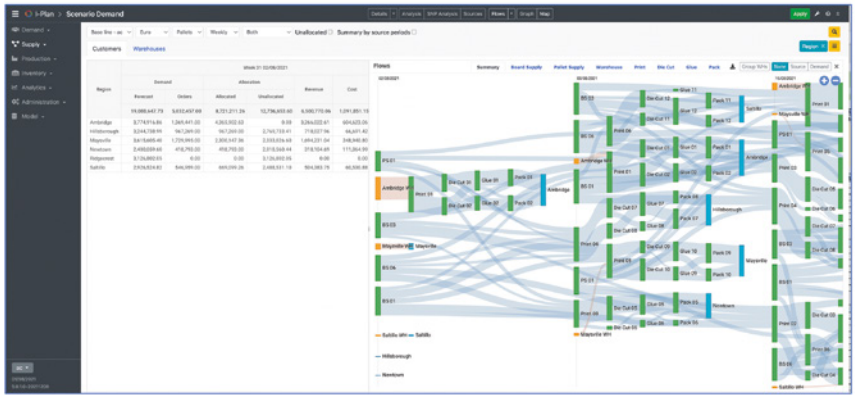
- Financials;
- Human resources;
- Maintenance.

An article such as this one cannot do justice to the entire solution, so let me illustrate using just three elements.

1 Supply Chain Optimisation / Sales & Operations Planning

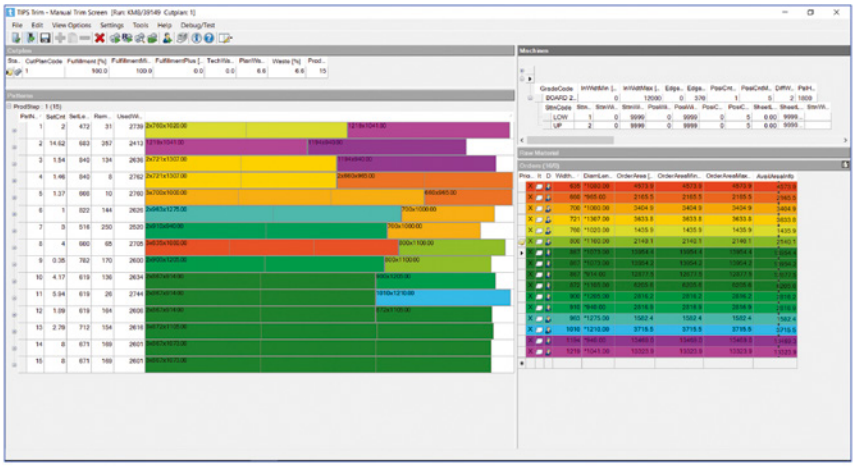
The TIPS for Packaging solution contains a comprehensive industry-proven supply chain / sales & operations planning solution. This covers all the aspects one would expect such as collaborative demand management, but also crucial supply sourcing optimisation (see below).

Tietoevry complements the pure software offering with additional complementary consulting services. Prominent amongst those is a Reel Stock Analysis, which carefully selects the optimal reel widths to stock at each converting plant. The optimisation looks at both paper machine and corrugator efficiency, as what is often good for one is terrible for the other.



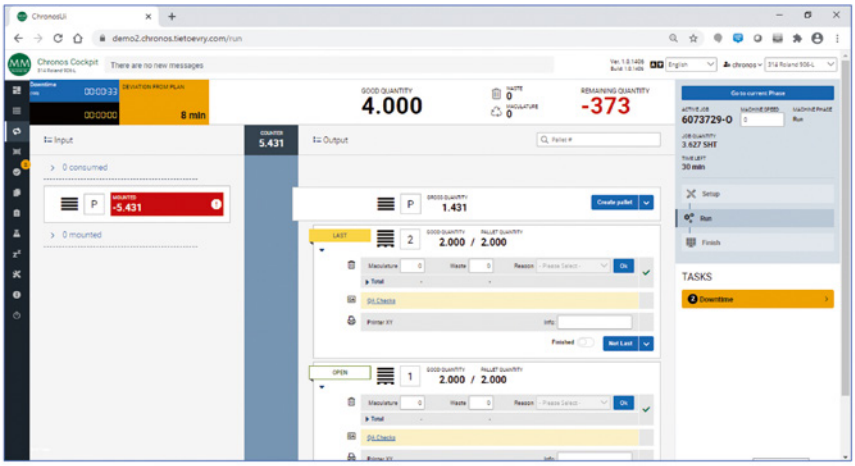
2 Trim Optimisation

Many hundreds of paper machines are being trimmed with the TIPS Trim solution. What is perhaps less well known is that TIPS Trim is equally at home with corrugators, handling both double and triple-knife scenarios.



3 Manufacturing Execution

The ever-growing need to improve shop-floor efficiency is driving the software towards more and more integration with automation and intelligent reaction to events, planned or unforeseen:



When writing an article such as this, one is conscious of the need to anchor the claims to reality. Indeed, Tietoevry has partnered with two large companies so far, delivering this type of solution. One of them is MM, the Austria-based company with over 50 locations, employing more than 10,000 people. After a joint initial implementation, MM is currently taking most of the responsibility for the roll out to additional plants, demonstrating the maturity of the software.

In proposing this solution Tietoevry aims to overcome the difficulties of both the generic ERP solutions (that require such tremendous work before they can be implemented successfully) and the point industry-specific solutions (that in turn require time-consuming and less-than-perfect integration with the other systems).

So far, I have argued that a single-vendor solution for both arms of an integrated company is not only feasible, but also presents optimisation possibilities that are impossible to achieve otherwise. This, of course, is not the end of evolution, so “What about the future?” I hear you ask. Well, generative AI such as ChatGPT has not gone unnoticed in the hallowed depths of our R&D department. But that, as they say, is a story for another day. ■

About the Author

Constantine Goulimis has been involved with the paper industry since 1982, writing one of the first algorithms for trim optimisation, which formed the basis of his Ph.D. from Imperial College. The company he co-founded, Greycon, then became involved in packaging, specifically scheduling for the paper, plastic film, printing and corrugated industries. He has worked in projects with some of the smallest and some of the largest companies in this sector, in more than 40 countries and has seen both successes and some embarrassing failures. He has now joined Tietoevry with responsibility for this company’s offering to the packaging industry.

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TIPS for Packaging

Single-vendor solution for the entire supply chain, from paper mills to converting plants

Pulp, Paper & Fibre at Tietoevry -
the world's largest team for this sector
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