10 opportunities to cut costs in Custom and On Demand manufacturing

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Volume was cranking and new products were scaling well as peak season crept inexorably closer. Staff were struggling with new machines and processes but gradually getting on top of things. The real challenge was the widely varying quality and fail rates on the 2nd and 3rd shifts and the weekend was a work in progress.

It's a true story. From a distance I watched a company at the peak of apparent success run itself into the ground and end up in liquidation.

Leading an On Demand manufacturing business is hard. A line producing a product with Cost of Goods Sold in the cents can be making a batch in the tens of dollars minutes later, volumes dance around, machines break and stocks vary. It demands agility and attention to detail.

In this article we explore 10 opportunities for stripping cost from Custom and On Demand Manufacturing through Workflow Automation.

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Different Perspectives

I've worn a wide variety of hats throughout the many years I have been in On Demand manufacturing. I've founded and managed a successful retail brand, provided a full service to white label brands, built and run a manufacturing plant with multiple peak retail white label clients. Currently, my team and I are developers of the ZenSmart workflow automation software platform which maximizes manufacturing plant efficiency and minimizes cost.

These diverse roles have taken me into a 'lot' of On Demand plants across the world from textiles to photo, print, giftware, label and display. Some factories produce just a few items a day and others churn out tens of thousands, some have ranges as small as 100 SKU's and others thousands. Some are incredibly capital intensive with the latest in machine automation whereas others use a people centric approach. I've seen companies fail when they thought they were succeeding and others brilliantly execute expanding their product ranges, growing new businesses and creating a super-aligned culture. Collectively they provide a range of really valuable insights into how different companies tackle the challenge of running their factories as efficiently as possible.

There are 10 categories of cost savings to be realised, as a list those categories are:

1. Orders: Automate order processing
2. Press Room: Automate orders onto the press
3. Imposition: Optimise press impositions (ganging) and eliminate waste
4. People: Tracking productivity and creating performance accountability
5. Machines: Automation and making dumb machines smart
6. Materials: (Almost) eliminate waste
7. Shipping: Optimise freight costs
8. Scheduling: Right product, right time
9. Culture: Singing from the same hymn book
10. Insight: Finding the truth

A single item in the list can drive 6 figure savings, collectively they can transform a business.

Cost Saving 1: Orders.

Automate order processing –

no staff from file to ready

There's a good argument to split Cost Saving 1 into 2 parts, but then I would break my even 10. There are

two distinct savings to be realised here, firstly order processing and secondly pre-press or image correction/processing. Often these are distinct groups of people and skills.

Regardless, it's still surprising to me how many firms manually move files within their systems, run jobs and wrangle the order data on a daily basis to correct the files and the file data. Anything that gets in the way of order processing increases the risk that you will miss your Service Level Agreement (SLA) target and adds variable cost to each order.

> ***"There should be zero touch on an order into the production queue"***

So, cost reduction area 1 starts with fully automating order processing, and I mean fully. All the order data from Web to Print or Print MIS systems should be structured impeccably, fields real-time validated (including address validation), and any out-of-bounds values re-mapped and corrected so the order can flow straight through to the production process, all without any manual intervention.

If you are chasing work from some of the better known consumer print, photo, apparel and label brands that outsource their work be aware that they all have issues and idiosyncrasies. They structure their data differently and have various errors that need to be coded around. To deal with these issues any field validation should be done as you receive the order and any data re-mapping and standardisation totally automated – it is totally doable. The goal should be to achieve a zero-cost order processing system with no labor required.

The data needs to be fully logged and readily accessible. When you are taking work from various brands this will richly pay off. All the brands have issues with intermittent gateway and transfer issues, they will blame you for it in the first instance and the best defence is data.

Knowing that your order data is beautifully structured, then the next step is to streamline all pre-press actions – image XY dimensions, scaling & cropping, colour management and image optimisation and embed that into wholly automated systems which seamlessly hand off to 3rd party systems where required. Similarly to order processing, zero-cost image management should be the goal.

In summary, savings available to be realised are:

1. Reduction in IT/File Management and done well, elimination of the role
2. Rapid recovery from file interruptions and ability to prevent/minimise cost
3. Eliminate/redeploy pre-press effort

Cost Saving 2: Press room. Automate orders onto the press – zero staff from file to press

We have seen press room staffing reinvented in some sites, and huge savings realised, fast. The goal here is to 1) queue, batch, and get files onto the press in a zero-touch way and then 2) embed all the rules of what products are printed on what presses on what substrate and imposed to the right finishing option all automatically.

The objective is to stretch your sights as far as no staff involvement or costs between the file and the moment ink meets paper. This means that for this type of workflow that prepress can be removed and a big reduction in the size of the print press room achieved. It also means that all the rules around how orders are manufactured are stored inside workflow and so staff can't hold the business hostage or absences interrupt production. While it's challenging to eliminate people entirely due to the maintenance and support required for the printing presses, the aim should be to eliminate all variable costs associated with getting work onto the printing press. One of our clients, for example, eliminated all senior press operators, retained a single Press Room Manager for each shift, and rehired casual workers to supply consumables to the presses and handle paper removal. This move resulted in the removal of hundreds of thousands of dollars in press room costs.

Cost Saving 3: Imposition. Optimise press impositions and eliminate waste

One of the challenges of Custom and On Demand manufacturing is the fragmentation of batches and the

sheer number of options, styles and variations that drive daily volume.

The sheer quantity of these job numbers either drives batches that are not optimised for downstream finishing or are jobs which are not ideally imposed (ganged) for the product option-substrate. Materials waste and poor press utilisation results.

The goal is to create material and press time optimised batches that are the combination of 1) customer Due Date 2) product SKU 3) substrate and 4) the volume that is in pre-production WIP. The challenge is that the quantity of combinations beats people's ability to juggle the batch sizes by SKU, time of day and day of week to optimize the batches. This means that Orders miss due dates or batches aren't optimally imposed for the layout that means least-cost wait.

This is where workflow automation can have a big impact. Systems are ideal for juggling the myriad of inputs to make optimised decisions, multiple times per second and handle other parameters such as different week day patterns, weekends and public holidays so that batches can be optimised for those permutations. Simplistically batches can (normally) build out and grow fatter across weekends when SLA is not at risk, whereas during the week there is a time based pressure that may drive a different time-batch formation decision. Automation can totally drive this execution.

Multiply this strategy over a year and big savings are realized.

Cost Saving 4: People.

Tracking productivity and creating performance accountability

In most factories, work simply progresses from one stage to the next. Volume and variety of tasks obscure visibility into who is doing what. While there's a general sense of who the top workers are, hard data is almost always lacking. This means that there is a lack of accountability for the work being done and a lack of intelligence around the rate at which product moves through the factory.

The next significant cost-saving opportunity in workflow automation arises from having precise, actual, and well-informed knowledge about who is doing what work, when, and on which workstation. With this data, you can make informed decisions about how to allocate effort to meet production demands.

I was at a site very recently where they had strong scheduling capability but no accountability for task level performance. Management felt that they couldn't explain 10-20% of effort but on average they were hitting their deadlines. It demands the question of what could be?

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On the other hand, one of our sites used ZenSmart's scan data to overhaul their dispatch department. Several weeks of data made it clear who was consistently meeting customer order dispatch deadlines and at what hourly rate productivity. Key counselling and staff selection decisions flowed from the hard statistical data that was available to underpin the decision.

Cost saving 4 flows from having staff log into their workstations and setting short no action time outs on their workstations. Coupled with scanning of Batch or Job Sheets the data foundation for being able to attach work quantity to individuals is established.

By having staff logged in at their workstations and scanning work passing their workstation, we establish the "who, what and where" of all work. Who is working, what they are working on and where they are working.

It may sound simple (it's not) but the implication of this information is profound. The level of staffing and scheduling decisions that can flow from this data enables whole production flows (and flow schedules - but more on that later) to be recast and significant cost to be removed.

Cost Saving 5: Machines.

Automation and making dumb machines smart

When people think of workflow automation, this area of machine automation is often what first springs to mind. It's unfortunate because automation rather

than being a way of thought, gets associated with hardware and potentially large capital expenditure. That creates a blocker for a more structured approach to workflow automation and a view that automation is about removing people from processes.

Going straight to a new level of machine driven automation is an immediate productivity win and a variable cost saving albeit with a (potentially large) capital requirement. Whether it's loading, inserting, folding, casing, cutting or packing there's a machine that at a cost will get the job done faster. Most of the current generation of new machines offer either direct integration ability or the pulling of logs to directly observe the work being done on the machines. The integration of smart machines into workflow is a single focussed piece of work that can unblock workflow in a particularly impactful way.

In order to make sure that the capital is focussed at the most impactful function in the facility, I recommend reading into the Toyota Manufacturing Method and in particular the project they mounted to unblock die change and the factory wide impact this had. It's a really interesting case study in where to focus effort.

> ***"Focussing on a single piece of hardware obscures a broader factory wide opportunity to reduce cost by seeing all machines in the factory as a whole"***

Having said that, focusing on a single piece of hardware obscures a broader factory wide opportunity to reduce cost by seeing all machines in the factory as a whole and taking an 'no-islands' approach to the work that is being done by the machines.

By taking any machine and converting it into a work recording station, critical insight can be gained into how work moves through the factory – we'll take a closer look at this in Cost Saving 8.

The best way to do this (and able to be done easily and cheaply) is to attach a scanner and either a Raspberry Pi or a cheap Windows Mini PC to record every unit of work that goes past a machine. This method even works up to high speed laminators.

This gives the ability to remove staff from a barcode scanning task or additionally the data can supplement existing insight and build out an even more complete picture of the movement of product and how the cost is being incurred.

Cost Saving 6: Materials. (Almost) eliminate waste

A few years back we outsourced a part of one of our brands to a sprawling production facility. At this site the General Manager managed efficiency by the 240lt and 500lt bin. He would roam the factory, inspect the bins every day or two and challenge different staff members about what was happening. Unfortunately staff were aware of this routine, so they made sure to empty the bins into the shredder as quickly as possible. Thousands of dollars were draining from the business every week, and there was no accountability.

Significant (there's that word again) savings can be realised by making every fail event visible, trackable and accountable. In good factories they prevent reprints from being issued without a trackable quality fail event initiating the ability to reprint the file. In the very best of the factories we see fail-budgets per staff member implemented, requiring escalation if budgeted limits get exceeded.

The trick is to be able to do this without reducing productivity (and in fact speed it). We observe two ways to drive down on this cost – either i. grant the ability to quality fail work widely and then track via budget limits or ii. Centralise the fail function and have someone given the task of fail processing to inspect and fail, but do it with the Station ID of where the work was failed.

Regardless of the method being used, the objective is to create accountability and attach ownership of the failed work. In doing this it's important that you have the ability to see the whole workflow, as the fail reason could have originated in an upstream workflow.

We've seen this fail accountability technique used to great effect. In another site, each peak season as they moved to peak operations and a three-shift, seven-day operation, waste levels would spike, reaching a peak of 20% of total production. With a large number of seasonal workers, skill and knowledge fell when management was under peak of pressure. It became easier amidst tight seasonal deadlines to simply reprint work.

By introducing fail accountability the culture of the plant was rapidly transformed and within 8 weeks the issue had been solved. The outcome was transformational. In addition to dollars saved it unlocked capacity for innovation.

Cost Saving 7: Shipping. Optimize freight costs.

Cost saving 7 votes itself in. Covid put the accelerator down on ship costs. Inflation plus fuel surcharges has kept it planted. Everyone is feeling the pinch.

There are several ways to cut costs in shipping. Depending on your volume, variability and ship destinations, one of the easiest ways is through one of the online shipping platforms. Some provide community wide negotiated rates and well documented API's that enable direct integration to their service. They support label production, customs and shipping documentation and can provide good rates.

But this doesn't fit everyone's requirement and many companies have fixed freight contracts and lack agility in selecting freight options based on different time, weight and cubic trade-offs.

To maximise freight savings a workflow automation system should have the ability to:

1. Enable live rate shopping between different shipping options – basically putting out a live bid request from the various logistic providers and selecting the best time/cost bid and automatically consigning the shipment.
2. Vary ship options based on day of week, time of year to balance deadline ship date
3. Vary ship options by weight, cubic and service level to optimise freight selection
4. Forward analyse production looking for new combine options for the same shipping destination, working out whether it is optimal to hold an order waiting for a partner to join it.
5. Drop shipping – mass shipping individual orders to a destination and then unboxing and consigning them directly into the local postal or courier service provider.

Collectively savings can be rapidly realised as well as tying information back into the organisation providing better customer service where shipping issues are encountered by the customer.

Cost Saving 8: Scheduling. Right product, right time

This area of cost savings is a little more subtle and rests on having implemented several of the preceding areas of savings – critically Cost Saving 4 – People and Cost Savings 5 – Machines.

Finding the right cadence in a plant is a skill and an art. Often plants are run to the capability of their most productive piece, rather than focus on where the process bottleneck is inhibiting the plant. That bottleneck injects cost into the process through lumpy labor costs, higher spoil rates and missed SLA.

Back in Cost Saving 5, I mentioned Toyota's single minded pursuit of creating a whole ability to change a cast die. This project was about the ability to run a Toyota plant to a different cadence and level of flexibility that proved to be transformational. The Toyota philosophy is founded on focussing on the process bottlenecks.

> ***"With this richness of data available the way that production can be looked at can be 100% inverted"***

In a Custom and On Demand manufacturing plant it can be a little more challenging, particularly with high SKU counts, multiple parallel production lines and several finishing types. This makes data important and therefore why having good scan data available for both people and machines is a critical enabler. With this in place deep insight can be gained into the cadence of goods in a factory.

When this richness of data is available the way that production can be looked at can be 100% inverted. Instead of examining what WIP must be completed to hit Service Level today, management focus can shift to *the components of production that are running behind schedule*. It's a forest versus trees perspective shift.

When plant volume exceeds a tipping point trying to keep track of everything in production is just too hard, supervisors get overwhelmed by detail. A 'variance to optimal dwell time' approach means that supervisors know that everything is OK, except for the listed

problem orders. They become problem solvers and efficiency drivers to optimize workflow.

With product flow unblocked, savings flow down through the plant and labor, product and missed SLA cost will be removed from the business. It also creates a powerful capability for continuous improvement and continuing to push down on dwell time by process stage and that will keep the savings flowing.

Cost Saving 9: Culture.

Singing from the same hymn book

Culture as a cost saving – sounds a little nebulous doesn't it? Far from it. Culture drives behaviour and workflow automation has a powerful part to play in supporting the culture that management is seeking to implement. We note a wide disparity in the focus on culture between low and high performing factories.

The big difference I note is the level to which people are informed and empowered and what type of information is shared to support a change in attitude and performance.

In some factories I see staff simply doing the work in front of them. They are trained and skilled in a task but they have no context for their performance, no understanding of the cadence of the work that is coming to them, or the wider performance of the business.

> ***"In some factories I see staff simply doing the work in front of them"***

In some factories (unfortunately only a small number) rich dashboards play on big LCD TV screens, refreshing every minute. They provide information about volume, work outstanding, throughput and quality rates. In the best of the factories these are distributed down to the individual cell level providing fine grain influence on performance of small teams that each have their own cultures.

The really interesting thing about this approach is that it doesn't just change the behaviour of staff, it also changes management behaviour. The reason is that done well, these dashboards replicate a large part of the data that is available in the back office. This means that the old management adage of 'management by walking around' becomes possible and a new level of relationship between management and staff created. With live data available to both staff and management conversations move from being episodic (and often too late) to spontaneous and real time.

The potential for this to engender a big shift in cost through creating continuous improvement cannot be underestimated. The only word of caution is that the technique is only as good as your data and this rests on having implemented Cost Savings 4 and 5 to give maximum cost impact.

Cost Saving 10: Insight.

Finding the truth

As we've run through the preceding areas of cost saving in Custom and On Demand manufacturing you will have seen a gradually growing emphasis on data.

Our philosophy is that workflow automation is not about machines and removing tasks - although that certainly comes into it - it is first and foremost about information particularly in Custom and On Demand Manufacturing.

What is unusual about this industry is how fragmented and agile manufacturing is and how widely the cost of goods can vary from batch to batch in the facility. COGS can move from a few cents to tens of $ from one batch to the next.

What that means is that only by having access to the data down to the batch and the product code level and being able to see trends over time can long run costs be removed from the business.

Many of the cost saving initiatives above are targeted at observable incidents happening 'now'. They are about building a new level of agility to either prevent or contain the cost.

This last area of cost saving takes a different perspective.

Some costs are incurred as a pattern or might be at a lower incidence but at a higher per unit cost and therefore demand a response.

Cost Saving 10 is developing the capability to see the patterns in the business and being able to diagnose and solve for those problems. Sometimes it might require collecting more data to help solve the

problems but an effective workflow automation system will provide the mechanism to be able to capture information through your daily operations that will associate the events with the components, orders, products and batches that the events are associated with.

We've seen big cost savings found through identifying patterns in shifts, weather, machines and materials. At times these patterns have existed for long periods of time but the nature of the pattern meant that it was just accepted as being part of an average level of experience of running the plant. From humidity to mill variance, machine maintenance cycles and different stock suppliers they are all drivers of cost for which data driven insight can have enormous impact on plant cost.

Summary

In Custom and On Demand Manufacturing, the pursuit of cost savings is more than just numbers in a Profit and Loss statement — it's about cultivating a holistic approach that intertwines efficiency, culture, and foresight. From the factory floor to the management desks, every detail counts, every process can be refined, and every individual has a role in this tapestry of efficiency.

This journey through the ten areas of cost savings underscores the significance of adaptability, data-driven insights, and the transformative power of an informed and empowered workforce. The future of the Custom and On Demand manufacturing industry doesn't solely lie in the reduction of costs but in reimagining how we see, interpret, and act upon the intricate dance of processes and people.

As we move forward, armed with these insights and strategies, businesses can anticipate not just reduced expenses but a paradigm shift in how Custom and On Demand Manufacturing defines success.

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