




# How to Uncover Hidden Profits in Manufacturing with Time-Based Analytics



Surprisingly, more often than expected, manufacturing executives are not able to provide a clear answer when asked which products and customers are generating most of their profits. This poses the question how this is possible in today's world of sophisticated analytics. It is possible because of a profound weakness inherent in traditional unit-based management accounting. It turns out, these 'tried and true' techniques for measuring profitability are misleading and cloud a decision-makers' vision when it comes to driving bottom line results. There is a better approach to profit maximization that is built on time-based analytics.

## Why ROE is the Ultimate Measure of Profitability

Since profitability is the essential goal of every manufacturing business, it is astonishing just how much confusion surrounds the topic. Asking six people for a definition of profit will likely produce six different answers. Several will talk about gross margin, profit after tax, earnings per quarter, earnings per share, return on assets or return on equity. Others will refer to ROS, EBITDA, ROCE, ROI, RONA, EVA and so forth. Each one is a measure of profit, but there is only one profit metric that summarizes all the others.

The ultimate measure of corporate profitability is return on equity or ROE. ROE is a time-based formula. It is the ratio of the current year's profit divided by shareholders' equity (accumulated past equity investments plus prior year profits) or profit/equity for that year. The higher the ROE, the faster shareholder equity grows, driving up the share price and shareholder wealth with it.

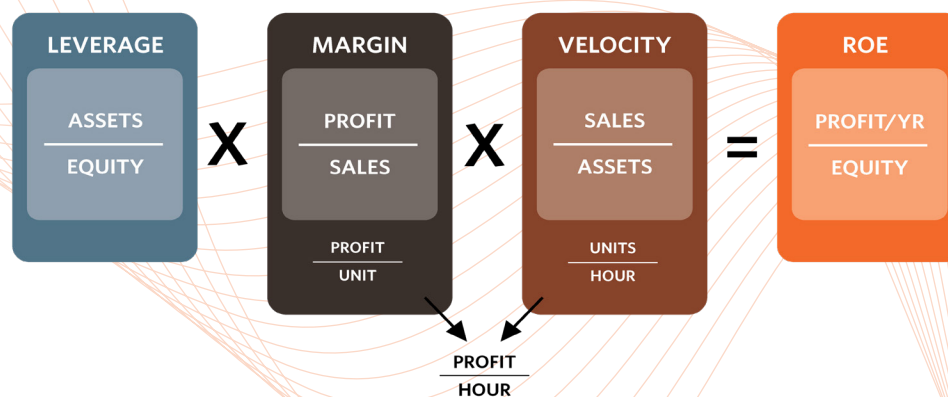
The ultimate measure of corporate profitability is return on equity (ROE), a time-based formula.

While generating and sustaining the highest possible ROE is the overarching goal, decision-makers in complex manufacturing firms have traditionally had precious little information to go on when it comes to managing their product and customer portfolios to achieve their ROE objective. As a result, day-to-day managerial decisions are at best only loosely aligned with the strategic goal of raising ROE. To see how this profound, but widely overlooked weakness in traditional profit metrics can be remedied, we first need to break down the **profit/equity** ratio into its three component parts.

## Revisiting the DuPont Profit Formula

The most elegant explanation of what drives **profit/equity** is the famous, century-old 'DuPont Profit Formula.'

The Dupont Profit Formula is not theory. It is arithmetic, and its math is unforgiving. If the management team running a complex manufacturing firm does not exert ongoing, detailed and integrated control over all three ratios that comprise ROE, they cannot be in control of ROE or the destiny of their business.



Of the three ratios, by far the simplest to control is **assets/equity**, the realm of 'financial engineering.' From the standpoint of gaining a sustainable competitive advantage, however, manipulating debt leverage is not that relevant. Bankers and financial markets allow similar debt leverage ratios for the competitors in a given business segment, since all players face similar operating risks. Trying to beat competitors' ROE over the long-term by overleveraging is rarely successful because it is so risky. Debt leverage works wonders in boom times but having too high an **assets/equity** ratio (and interest payments) can be disastrous during downturns.

Manufacturing businesses pay close attention to their **profit/sales** ratio or product margin data. They do their best to calculate the profit generated by each unit of each product shipped or each dollar of revenue generated. Organizations expend vast resources to accurately calculate the full cost of each product type made. Accountants dive into countless costing studies, standards setting, activity-based costing and unit margin analyses in a never-ending effort to perfect the **profit/sales** figures for each of their many products. And although this unit margin data is crucial, by itself it is insufficient to determine how to maximize ROE. This is the key point that many manufacturers overlook.

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In sharp contrast to their focus on unit margin analysis, finance teams often make almost no effort to measure and exploit the equally vital **sales/assets** ratio – how fast product units (and sales dollars) physically flow through the equipment. All manufacturers do, of course, use production control data to measure the throughput rates of their various products. But their finance teams almost never integrate detailed production speed data with detailed unit margin data to calculate the time-based profit metric of **profit/asset** (profit per asset hour) for each product, each order, each customer, etc. And without this highly detailed time-based, operational finance measure of return on assets (ROA), decision-makers simply do not have the information they need to align their sales, production, and pricing strategies to maximize ROA – and ROE.

## Driving Fast Nickels Versus Slow Dimes

Let's look at a simple example of how speed affects a manufacturer making thousands of distinct products. If a production line makes a per unit margin of \$50 on Product A and only \$25 per unit on Product B, is Product A really twice as profitable from an ROE standpoint? What if making Product A takes one hour to flow through the key production equipment and Product B only takes 20 minutes?

In this scenario, Product B would actually be generating \$75 of profit per hour compared to Product A's \$50 of profit per asset hour.

Now it becomes clear why traditional unit margin analytics fall short for complex manufacturers that make thousands of product SKU varieties on many production lines across multiple plants in widely varying quantities for dozens of industrial customers paying different prices. When production speed is not factored into the equation, the DuPont Profit Formula is ignored, and it is simply impossible for management teams to determine how to best commit time on their equipment to maximize total cash flow, EBITDA and ROE for a given period of time.

METRIC	PRODUCT A	PRODUCT B
Price/ Unit	\$500	\$600
Material Cost/ Unit	\$300	\$300
Cash Margin/ Unit	\$200	\$300
Cash Margin %	40%	50%
Units/ Machine Hour	8	4
Cash Margin/ Machine Hour	\$1,600	\$1,200

**Investor's Priority's**  
Product A yields a 33% higher return on each machine hour

**Controller's Priority's**  
Product B has a 50% higher margin on each product unit

### Prioritizing products and customers by UNIT-based margin metrics, actually reduces TIME-based investor returns

Based on a traditional margins per unit analysis, product B is 50% more profitable than Product A. But when the speed of production is factored in, it becomes clear that Product A delivers 33% higher returns to investors than Product B.

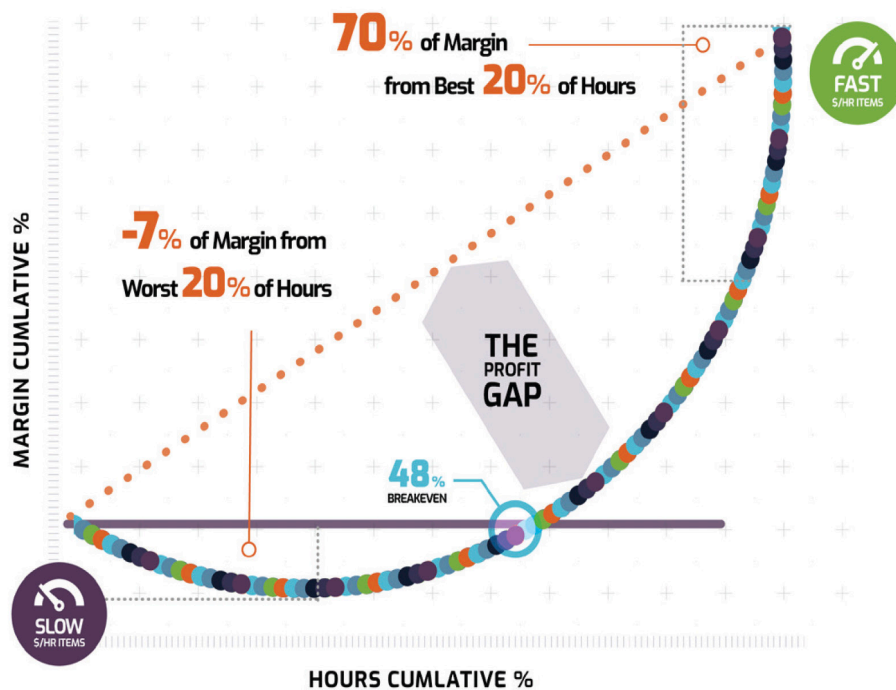


## Gaining a Distinct Advantage

Despite decades of massive investment in ERP systems, supply chain planning solutions, pricing systems and the like, nearly all complex manufacturing enterprises are still in the dark when it comes to optimizing ROE. Unless they embrace time-based profit metrics, they will continue to misallocate precious production hours to slow money-makers instead of shifting their emphasis to fast money-makers. As a direct consequence, complex manufacturing industries such as specialty chemicals, metals, building products, electronic components, packaging and plastics will continue to deliver investor returns well below their readily achievable potential.

By contrast, executives who leverage time-based profit metrics in their decision-making are able to gain a sustainable competitive advantage. By integrating their **sales/assets** (production speed data) with their **profit/sales** (unit margin data), they can precisely measure and manage their profits per asset per hour (aka ROA) to pursue their full ROE potential.

Studies of time-based profitability metrics employed by complex manufacturers reveal that for the typical firm, the 20% of production hours consumed making the highest profit-per-hour products generate profit more than 8x faster than the 20% of production hours spent producing the lowest profit-per-hour items. In fact, the data shows that most complex manufacturers make about 70% of their total margin dollars in just 20% of their production hours.



Notice the huge 'profit gap' that exists in this all-too-common manufacturing scenario. This company actually earns 70% of its total margin in the 20% of the time that it's making its highest profit-per-hour products. It loses 7% of its total margin during the 20% of the time it's making its lowest profit-per-hour products.

## Leveraging the Data You Already Have

As every experienced manager knows, there is no point in implementing a tool unless there is data of sufficient quality to feed it. Great software cannot make up for outdated or incomplete data. One without the other is a waste of time and money.

Having invested heavily in the rollout of ERP and other transaction processing systems, most manufacturers today have accumulated vast troves of detailed, reliable operational data. Invoice data, for example, tends to be extremely accurate because customers are quick to point out billing errors. Product codes, prices, quantities and shipping dates may not be absolutely perfect, but they tend to be very close.

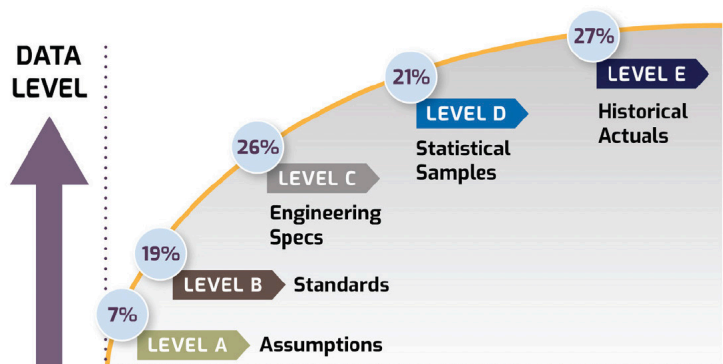
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When handled properly, only eight data elements are needed to measure the speed of profit in complex manufacturing. Of these, the first six are taken from the invoice file:

- Sales order number
- Ship date
- Product ID
- Quantity
- Revenue
- Customer

The seventh required data element is direct cost per unit by product type. In most cases, this is material cost. But, in some cases, companies may decide to add to their material cost charges for freight, energy and other unit-driven cost elements such as direct labor. Together, these data elements allow for the calculation of total direct variable cost per unit. The quality of these data elements can vary, but generally, transaction data from purchasing records is of very high quality.

The eighth data element needed to calculate profit per machine hour is production speed by product type. Depending on the situation, a manufacturer's production speed data will fall into one of five data quality levels per the chart below.



Today, most large manufacturers have data available at Level C or better. But any of the five levels can be used to calculate profit-per-hour metrics that will reveal significant profit gain opportunities. Of course, whenever more current and precise productivity data becomes available, more refined profit gain opportunities can be identified.

## 10 Chronic Dilemmas Complex Manufacturers Face that Time-based Analytics Can Resolve

### 1 Product Mix

Which products are truly most profitable?  
How can we get a more profitable mix?

### 2 Customer Preference

Which customer should we grow with?  
Offer better terms or service? Pull back from?

### 3 SKU Rationalization

How can we profitably deliver more customer value without costly SKU proliferation?

### 4 Growth Priorities

Which market segments, distribution channels and product groups should we focus on?

### 5 New Bid Pricing

When making customer deals, on which product items do we cut, raise or hold price?

### 6 Line & Plant Decisions

How can we most profitably allocate orders across our network of lines and plants?

### 7 New Asset Evaluation

How can we trade-off CAPEX investment vs. more profitable use of existing capacity?

### 8 New Product Investment

How can we simulate profit impact before investing in development of new products?

### 9 Make vs. Buy

How can we make more precise insource vs. outsource trade-offs?

### 10 Profit Modeling

How can we instantly and accurately predict the profit results of alternative scenarios?

## The Path to Improved Profit Analytics

Argano offers a proprietary solution that enables manufacturing decision-makers to gain a complete understanding of how profits are generated with time-based profit analytics. It is a solution that enables companies to:

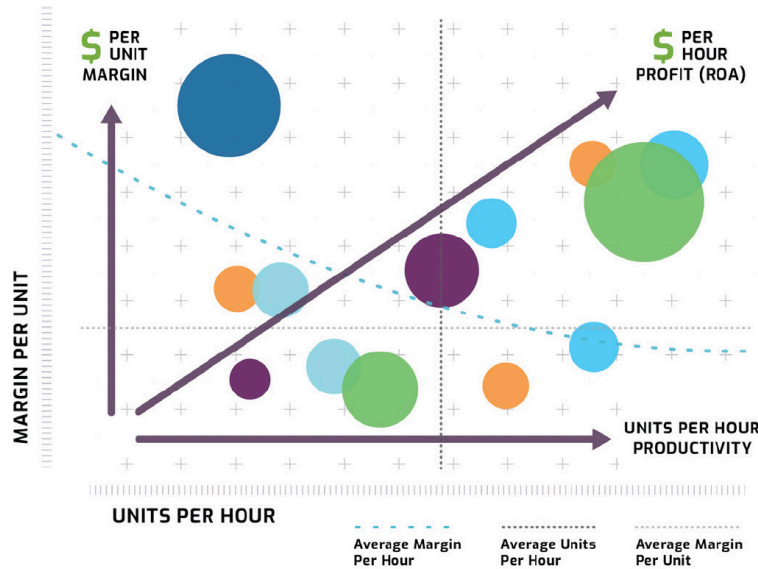
- Provide management with total visibility into how to run operations at maximum profitability
- Align sales, production and finance teams on choices that maximize shareholder value
- Uplevel debates over inconsistent data into productive discussions based on meaningful analytics

This unique time-based profit analytics and planning visualization platform precisely measures the profit per hour of each product made, each order delivered, and each customer served. Our innovative time-based profit analysis and planning solution enables decision-makers to achieve and sustain breakthrough levels of revenue and EBITDA growth by revealing insights currently hiding in their data. We pinpoint previously unseen revenue and profit gain opportunities masked by traditional unit margin profit metrics.

Typically, it only takes about a month for our time-based profit analytics and planning platform to be set up and begin generating the insights a complex manufacturer needs to **identify and start capturing 300 to 500 bps of revenue in margin gains.**

Argano's innovative time-based profit analysis and planning solution enables decision-makers to achieve and sustain breakthrough levels of revenue and EBITDA growth by revealing insights currently hiding in their data.

Regardless of whether a manufacturer is operating with plenty of spare capacity or is fully utilized, Argano's time-based insights quickly become a crucial driver of revenue and EBITDA growth. Our unique 'Profit Maps' highlight opportunities to grow profitable revenue by adjusting pricing, production and sales efforts. It is all based on which products and customers actually generate profits the fastest from the equipment.



At first glance, it appears that the navy blue ball in the upper left represents the most profitable product in this portfolio because it has the highest margin per unit. But from an investor's standpoint, the products represented by the three balls in the upper right generate the highest *Return on Assets (ROA)* since they yield more margin dollars per machine hour given their much faster production speed. This is the type of business intelligence manufacturing industry leaders desperately need, but cannot find anywhere else.

**Argano's state-of-the-art, time-based profit analysis and planning platform enables complex manufacturers to measure and improve the speed of profit generation.**

Rather than just looking in the 'rearview mirror' to analyze historical performance, our enterprise-scale 'what if' planning capabilities enable managers to see into the future by instantly quantifying the revenue and profit impact of various strategies and operating scenarios.

Our proprietary technology delivers invaluable insights to management teams, financial consultants, investment bankers, private equity investors and management consultants. We provide decision-makers with an entirely new level of control over how they manage their businesses, empowering them to grow revenue, maximize profits and achieve the ROE results that their investors demand.

Ready to revolutionize your approach to profit maximization? Talk to us today! To start the conversation and find out how Argano can help you uncover hidden profit opportunities to drive growth, contact us at [info@argano.com](mailto:info@argano.com).



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## About Argano

Argano is the world's largest global digital consultancy exclusively connecting design and delivery for the transformation of high-performance business operations, extending our clients' commercial agility, profitability, customer experience, and growth. Our strategic consulting, bolstered by proprietary IP, provides a comprehensive view of business operations, pinpointing areas of strength and unveiling opportunities for improvement. Then, with our global talent and guided by industry experts, we lead in operational design and technology delivery across business applications, cloud, data and analytics, automation, operational technology, and AI, spanning all major software publishers. Learn more at [www.argano.com](https://www.argano.com).