The Garment Costing Guide

for small firms in value chains

International Trade Centre

TRADE IMPACT FOR GOOD

The International Trade Centre (ITC) is the joint agency of
the World Trade Organization and the United Nations.

Street address: ITC
54-56, rue de Montbrillant
1202 Geneva, Switzerland

Postal address: ITC
Palais des Nations
1211 Geneva 10, Switzerland

Telephone: +41 22 730 0111

E-mail: itcreg@intracen.org

Internet: www.intracen.org/publications

The Garment Costing Guide

for small firms in value chains

About the guide

This guide shows small garment manufacturers how to cost both traditional and value-added services they can offer their clients. It also shows how to reduce costs while aligning production processes and being better informed when engaging in contract negotiations.

Publisher: International Trade Centre (ITC)

Title: The Garment Costing Guide: for small firms in value chains

Publication date and place: Geneva, August 2022

Page count: 133

Language: English

ITC Document Number: SEC-22-65.E

Citation: International Trade Centre (2022). The Garment Costing Guide: for small firms in value chains. ITC, Geneva.

For more information, contact: Matthias Knappe (knappe@intracen.org)

For more information on ITC's Global textiles and Clothing Programme see:
https://www.intracen.org/projects/Global-Textiles-and-Clothing-Programme-GTEX/

ITC is the joint agency of the World Trade Organization and the United Nations.

ITC, Palais des Nations, 1211 Geneva 10, Switzerland (www.intracen.org)

Foreword

For many developing countries, the textile and clothing industry is vital. It is a principal manufacturing sector and a first step to industrialization. While garment manufacturing has been lucrative in the past, this is changing. What's more, COVID-19 has accelerated this change, which has a disproportionate impact on the sector.

Garment manufacturing has evolved from a simple manufacturing operation into a complex service industry. The actual cut and sewing operations are the simplest and least remunerated tasks. First-generation garment producers in Asian cities such as Hong Kong, Singapore or Seoul have transformed from simple product makers to multinationals. They operate globally and invest in engineering, advanced information technology and cutting-edge technology.

Yet most small and medium-sized garment manufacturers in developing countries, and especially least developed countries, have not adapted to this changing industry. They remain focused on simple cut and sewing operations, provide few services and produce commodity-type garments. They may not know how to develop their services and doubt their customers would pay for them.

To stay in business, these companies need to expand their services. All-inclusive costing is an essential step for this expansion. Accurate costing and valuing are the first step to move up the value chain. Without that, the all-important business case cannot be made.

This publication offers guidance to small garment manufacturers so they take an important step towards becoming a preferred supplier to their strategic customers. It also serves as a manual for basic service operators to provide guided training to small and medium-sized enterprises (SMEs), especially with regard to costing services that go beyond sewing operations.

The guide forms part of the International Trade Centre's (ITC) technical assistance to support the textile and clothing sector in developing countries. ITC also offers training and coaching on lean manufacturing, yarn and textile knowledge, material sourcing, product development, design and digitalization along the apparel supply chain.

This publication was developed within the framework of the ITC Global Textiles and Clothing programme (GTEX) and its application in the Middle East and Northern Africa (MENATEX).

Pamela Coke-Hamilton
Executive Director
International Trade Centre

Acknowledgements

The International Trade Centre (ITC) commissioned this paper as part of its global textiles and clothing programme.

David Birnbaum wrote this publication under the supervision of Matthias Knappe (ITC) Senior Officer and Programme Manager, Fibres, Textiles and Clothing (ITC).

Special thanks go to Ram Sareen, Sean Kim and Ganesan KJ from Tukatech for providing technical input to Chapter 2 and Josephine Bow, who pre-edited the work.

Jayna Kika (ITC), Senior Programme Assistant for Fibres, Textiles and Clothing (ITC), Mariana Alves Tavares and Imane Cherifi International Consultants (ITC), reviewed the paper in its final stages.

We would also like to thank Natalie Domeisen and Anne Griffin (both ITC), who oversaw the editing and production process, Claire Rispe, who edited the paper, Franco Iacovino (ITC), who provided graphic services, and Serge Adeagbo (ITC), for the printing support.

Contents

Boxes, Tables, Figures

Acronyms

Unless otherwise specified, all references to dollars ($) are to United States dollars, and all references to tons are to metric tons.

CEO	Chief Executive Officer
CIF	Cost – Insurance – Freight
CM	Cut and make
CMT	Cut, make, trim
CSR	Corporate Social Responsibility
DDP	Delivery Duty Paid
FOB	Free on board
GPS	Global Positioning System
HTS	Harmonized tariff schedule
ILO	International Labour Organization
ITC	International Trade Centre
LDC	Least developed countries
LDP	Landed duty paid
MBA	Master of Business Administration
OTEXA	Office of Textiles and Apparel
QA	Quality assurance
QC	Quality control
SME	Small and medium-sized enterprise
UNCTAD	United Nations Conference on Trade and Development
WTO	World Trade Organization

Executive summary

Textile and clothing companies face similar issues when determining the cost and value of their garment manufacturing operations, no matter where they are. Most small and medium-sized garment manufacturers in developing countries remain focused on simple cut and sewing operations, providing low value services, and producing very basic commodity-type garments. As a result, these companies often do not know how to develop their services or believe that their customers would not pay more for them.

Accurate costing and valuing are the first step to moving up the value chain.

Most manuals teach garment costing as a list of costs: material, trim, and cut and make (labour + factory overhead + factory profit), which add up to free on board (FOB) cost.

This guide provides manufacturers with a view on costs that garment makers find along the value chain and that are beyond manufacturing.

In addition to traditional garment cost sheets, it provides garment manufacturers with a key tool for planning and decision-making. It explains how to measure and calculate overhead costs, introduces job costing – which allows companies to retroactively calculate the exact cost of an executed order – enabling factories to compare their profitability vis-à-vis their clients and determine which styles generate higher profits.

It also describes costing to increase productivity, through labour training and better organization.

Technology and engineering are reshaping the garment industry. This guide offers innovative ideas for small factories to become strategic suppliers to e-commerce businesses. For example, through closer collaboration with their customers, they can issue smaller production runs and improve speed-to-market.

Finally, the guide also contributes to a wider discussion on how to balance risks and rewards between manufacturers and brands or retailers. This will help to avoid situations similar to those witnessed during the COVID 19 pandemic, where brands and retailers were unilaterally cancelling orders, postponing shipments or requesting price reductions.

Chapter 1
Basic Costing is not enough

There are many books on garment costing. This one is different, if only because most of what we know about costing is incomplete or incorrect.

Often, factory owners consider costing as a list of elements, material, trim and cut and make (CM), i.e., labour + factory overhead + factory profit, which together add up to the free on board (FOB) cost. The challenge is that the FOB itself is not relevant. Whatever the cost, the price a buyer will pay is determined by value.

This is particularly challenging in the world of garment sourcing, because the buyer has often already negotiated the price of the fabric at the mill and has designated every trim supplier and price, leaving only the CM to discuss. Factories that provide only the CM are finding it increasingly hard to compete.

To make money, factories have to provide value in excess of their cost. To do so, they need to go a step beyond their normal operations to find out what the buyer really wants, establish how much it will cost to deliver and how much the buyer is willing to pay.

The capacity to understand and tap into the value demanded by the buyer makes the difference between factories that are fighting day-in, day-out to keep their heads above water, and factories, both big and small, that understand the secret and are building a viable and sustainable future.

This guide is a manual for cost-to-value costings. It shows how to quantify both cost and value and in so doing, increase both the profit accrued by both the factor and the buyer. And it does so using data that factories normally already collect.

The fundamental problem

Our industry is faced with a fundamental problem: increasingly the decisions made are based on an outdated model on reducing costs and therefore do not deliver the solutions required for a service-oriented industry that should focus on value.

We blame this on incompetent management. Where once CEOs held their position for a decade or longer, their life expectancies are now just two or three years.

We blame this on our inability to keep up with an ever-changing industry. We continually search for better data and more sophisticated analysis to tell us what is going on in our own company.

Whereas in fact, the real problem lies with the decision-making process itself. We operate in a world where managers are increasingly more educated, with access to ever-more sophisticated tools, and yet often reach their most important decisions by asking veterans of the industry, also known as let’s-ask-cousin-Phil.

The industry today has many Cousin Phils. They may indeed be someone’s cousin, a senior manager, a well-known expert, or an international consultancy. What they all share in common is their ability to provide plausible solutions to every problem.

The problem is that the solutions they propose are based on past experience within a given context of operation, such as the quota system. These solutions do not necessarily take into consideration future developments in the textile and clothing industry, nor do they necessarily consider a service-oriented approach as is being advised.

Here are two examples of how decisions are often made in the garment industry.

Box 1 Continue producing, or invest in environmental upgrading?

A senior executive at a major leatherware company is concerned about consumers´ ever-growing environmental concerns.

Since leather is probably the fashion industry’s greatest source of pollution, the executive thinks that perhaps his company might do well to take a proactive approach:

- Communicate with the end consumer;
- Show that his company works with the very best tanneries in Italy, Spain and France, while avoiding the very worst;
- Open a new division producing vegan leather clothing, shoes and handbags.

Before going further, the senior executive goes to the president of the company’s leading brand.

The president is adamant: ‘Are you crazy? I have been in this business 25 years and I can tell you that our consumers don’t focus on pollution. They care more about design and status. If you open up this can of worms you will put us all out of business!’

And he is right. At least until the moment he is wrong, at which point the whole company folds and Cousin Phil goes on to write his best-selling book about his adventures in the leather trade.

What is true of from the customer perspective is equally true for the supplier.

Box 2 Remain a product maker based on cost advantage, or become a service supplier?

A factory owner operating in a cheap labour country believes he should evolve his business from being a simple product maker to a more sophisticated service provider. This will require some worker training and employing better educated technicians and managers, but he believes the services will more than pay for themselves.

Before going further, our factory owner goes to the head of the national industry organization.

The head is adamant: ‘Are you crazy? I have been in this business 25 years and I can tell you that our customers don’t care about services. They only care about low FOB price. Take my advice, concentrate on keeping costs down. That is how our industry was established and it is what will keep us going in the future.’

In this case, the head of the industry organization is creating a self-fulfilling prophecy. With this approach, both buyers and suppliers will agree – buyers come for inexpensive basic zero-service goods. If they want higher value fashion goods with services, go elsewhere.

The problem is that both local factories and concerned outsiders don’t like it when customers continually fight for lower CM prices.

On the other hand, since low CM price is the only thing these factories offer it is hardly surprising that customer/factory negotiations would be focused entirely on the subject of CM price.

Despite the many changes that have occurred over the years, senior managers often still look to established experts who often continue to have this singular focus on cost-cutting.

In the future, managers will be asked to make the decisions on a wider understanding not just of cost but of the factors that drive value.

How factories and customers have changed their approach

This book provides information about where the industry is headed and the direction factory owners should be taking to be at the cutting edge.

To understand how this has evolved, it is important to understand the three models the modern global garment industry has operated within since the 1950s.

Competitive model

In the early days, when products were limited to cheap, basic commodities such as T-shirts, cotton casual trousers, basic woven shirts and underwear, customers' expectations were inevitably extremely low: a decent garment shipped on time at a low, low price. Very quickly, supplier selection became a zero-sum game where the lowest FOB price won the order. Because there were many more factories than customers, factories became disposable tools – if low prices forced one factory to go out of business, there were two more ready to take its place.

In turn, factories took the same position with regards to their workers. Because workers were for the most part semi-skilled semi-literate women, they too were seen as disposable tools. If 10 workers quit, there were 20 more ready to take their place. It was the era of the zero-service factory, where suppliers were equipped to do nothing more than cut and sew. Today, 65 years later, despite sophisticated modern technology, many customers still remain firmly trapped in the competitive strategy mentality.

Cooperative model

In the mid-1970s, the move from commodity to fashion created an opportunity for change on both the customer and the supplier side. Customers (retailers and brands) began to recognize that while pushing down factory manufacturing prices might bring price reductions of 50¢-70¢ per unit, transferring product development work to the factory and developing fast turnaround could save up to ten times that amount. Where once factories were limited to the status of product makers, they could now upgrade and become service suppliers.

Both the customer and supplier recognized that in order to meet the needs of the industry, they had to cooperate with each other to develop the necessary services. Under this new strategy, the zero-sum competitive model slowly began to go out of fashion, reduced largely to factories producing only commodities or subcontractors. At the top of the pyramid were the full-service transnational giants and the specialist factories able to achieve strategic-supplier status.

Collaborative model

This model is still in a nascent state. New industry customers, particularly large and smaller e-commerce companies, are the catalyst for this latest model in which the entire supply chain is hollowed out.

In the cooperative model, the customer gave the supplier increased responsibilities. In the collaborative model, the role of the customer is reduced to the first stages – determining what the consumer wants and providing the factory with the original design – and the final sales and marketing stage. Everything else is ceded to the factory.

In this new model, both the customer and supplier side recognize that neither can move forward without the other. Consequently, the relationship between the customer and supplier is a true partnership. Where originally this concept was limited to newcomer customers, we now see a growing realization that what is relevant to e-commerce is equally relevant to the industry as a whole.

The great factory question: I want to provide services, but will my client pay?

Here comes the great factory question:

'I want to provide new services. I want to develop the necessary skill sets.

'I am willing to make the necessary investment in terms of time and money, but my customer will not pay.'

This has been a common refrain from managers for decades. And at one point it was true. However, over the last 20 years, some factories have evolved to provide new services and are able to charge premium prices, because their customers recognize the need for these services and will pay for them. Now the apparel industry is moving into a service driven industry and factories that are unable to evolve will be under intense competitive pressure.

Buyers that have adopted the cooperative model recognize that important costs come from the areas where a zero-service factory is unable to play a role. By cooperating with a full-service factory, the buyer can still considerably reduce their costs, even after paying the full-service factory a premium for their value-added services.

As the customer increasingly benefits from the services provided by suppliers, so their demands for value-added services grow to the point where almost all pre-production, production and most post-production is given over to the supplier. This is known as the collaborative model.

These three models reflect the changing customer/supplier relationship: from the competitive, where the supplier is seen as a disposable tool; to the cooperative, where the supplier is seen as an important asset; to the collaborative where customer and supplier join together in partnership.

Evolution seldom takes place uniformly. The global garment industry follows the same pattern. Some businesses remain trapped in an already outmoded competitive system. Others, having moved ahead to the more efficient cooperative system, will in turn become trapped when the industry moves on, making the previous, seemingly more efficient system outmoded. Finally, there are those who recognize that the future lies with the collaborative system, where customer and supplier become locked together to create greater value and increased profits for both sides.

Fairness between the customer and the factory

There is a growing argument that customers (retailers and brands) should pay their factory suppliers a fair FOB price. This discussion began in lower labour rate industries up to the point at which they were often paying prices that were below factory costs. The data is clear, and many factories have been forced to close because of low FOB prices.

The conclusion is that the fault lies with the customer and therefore they should be forced to pay a higher FOB price.

However, when we look at this problem using a cost-to-value analysis, we see a different picture. The problem is not that customers are paying these factories less, but rather that customers are paying everyone else more. The data is equally clear. Customers pay a lower price because the value provided by the failing factories is worthless.

Consider the following data from the United States of America Government Office of Textile Apparel, that analyses 10 of the Bangladesh's most important exports for 2020, comparing their FOB prices with those their 10 biggest competitors for each product.

In each case, supplying countries such as Bangladesh, Pakistan, and Cambodia are consistently paid below world average prices. While supplying countries such as Vietnam, Indonesia, Turkey and Mexico are repeatedly paid above world average rates. The problem does not lie with the customers. They are willing to pay higher prices to some countries but rather less to supplying countries that are unable to meet their needs.

Table 1 FOB prices by product: 10 top exporting countries

6203424516	**Men's woven cotton trousers**	
Bangladesh	$7.01	-9.20%
Pakistan	$7.10	-8.10%
World	**$7.72**	**0.00%**
Sri Lanka	$8.00	3.60%
India	$8.41	9.00%
Indonesia	$8.74	13.30%
Cambodia	$8.81	14.20%
Mexico	$8.97	16.30%
Vietnam	$10.38	34.50%
CAFTA-DR	$10.76	39.30%
6203424511	**Men's cotton jeans**	
Pakistan	$6.60	-21.50%
CAFTA-DR	$7.53	-10.50%
Bangladesh	$7.81	-7.20%
Lesotho	$8.19	-2.60%
World	**$8.41**	0.00%
Mexico	$8.82	4.90%
Cambodia	$8.90	5.80%
India	$9.13	8.50%
Egypt	$9.53	13.30%
Vietnam	$11.55	37.30%
6204628021	**Women's cotton trousers**	
World	$5.22	0.00%
Cambodia	$5.26	0.80%
Pakistan	$6.35	21.70%
Bangladesh	$6.43	23.30%
India	$6.71	28.50%
Egypt	$6.80	30.30%
Vietnam	$7.51	44.00%
Jordan	$8.21	57.30%
Sri Lanka	$8.67	66.10%
Indonesia	$9.14	75.10%
Turkey	$15.84	203.60%
6204628011	**Women's cotton jeans**	
Bangladesh	$7.56	-14.00%
Jordan	$8.07	-8.10%
Pakistan	$8.36	-4.90%
Sri Lanka	$8.60	-2.10%
World	$8.79	0.00%
Cambodia	$8.83	0.50%
Vietnam	$8.94	1.80%
Egypt	$8.94	1.80%
Indonesia	$9.81	11.60%
Turkey	$14.16	61.20%
Mexico	$15.25	73.60%

6205202051	**Men's woven cotton shirts**	
Bangladesh	$5.45	-26.50%
Indonesia	$7.30	-1.40%
World	$7.41	0.00%
Philippines	$7.58	2.30%
Vietnam	$8.50	14.70%
Sri Lanka	$8.66	16.90%
India	$9.38	26.60%
Malaysia	$10.29	39.00%
Madagascar	$11.39	53.70%
Mauritius	$11.53	55.70%
CAFTA-DR	$12.24	65.20%
6205302070	**Men's made fibre (MMF) woven shirts**	
Egypt	$4.86	-32.00%
Bangladesh	$5.43	-24.10%
Madagascar	$5.52	-22.80%
Vietnam	$6.93	-3.10%
World	$7.15	0.00%
CAFTA-DR	$7.84	9.60%
India	$7.86	9.90%
Indonesia	$8.33	16.40%
Cambodia	$8.83	23.50%
Mexico	$8.91	24.60%
Jordan	$11.53	61.20%
6109200012	**Men's cotton T-shirt**	
World	$1.20	0.00%
Bangladesh	$1.47	23.10%
Pakistan	$1.53	27.80%
CAFTA-DR	$1.64	37.40%
Mexico	$2.02	69.10%
India	$2.14	78.60%
Cambodia	$2.18	82.50%
Jordan	$2.83	136.50%
Vietnam	$3.32	177.80%
Peru	$8.46	607.30%
61091000040	**Women's cotton T-shirts**	
Bangladesh	$1.64	-21.60%
Cambodia	$1.82	-13.10%
CAFTA-DR	$1.83	-12.40%
Pakistan	$2.00	-4.10%
Indonesia	$2.08	-0.50%
World	$2.09	0.00%
Mexico	$2.23	6.60%
India	$2.36	12.90%
Vietnam	$2.86	36.90%
Peru	$7.27	247.80%

6202929061	**Woven cotton jacket**	
Pakistan	$8.27	-18.70%
Bangladesh	$10.10	-0.70%
World	$10.17	0.00%
Vietnam	$11.96	17.60%
Sri Lanka	$12.95	27.40%
Cambodia	$15.68	54.20%
India	$15.93	56.60%
Indonesia	$16.08	58.10%
Mexico	$34.11	235.30%
Thailand	$48.86	380.30%
6212109020	**MMF bras**	
Bangladesh	$3.19	-18.00%
World	$3.89	0.00%
Indonesia	$4.29	10.20%
India	$5.18	33.20%
Myanmar	$5.40	39.00%
Thailand	$5.69	46.30%
Cambodia	$5.86	50.60%
Vietnam	$6.06	55.90%
Sri Lanka	$6.06	56.00%
CAFTA-DR	$6.32	62.50%

Source: US Government Office of Textile Apparel for 2020

Chapter 2
The traditional garment cost sheet

There are three types of cost analyses:

- **Costing:** The total sum of all cost factors for a specific style. This may include hundreds, even thousands of separate items, we may never know all of them and we will certainly never replicate the complete costing. In a sense this is a limit.
- **Cost sheet:** The list of items that we create. This may include only seven to eight cost factors, but it should be a reasonable estimate of the per unit cost of that particular style. Typically, the cost sheet is used by the factory as a tool to negotiate the FOB price with the customer. It is therefore created at the very beginning of the of the order process.
- **Job costing:** The sum of all costs for a particular order divided by the number of pieces shipped. This gives us the actual cost per unit. It is calculated only after the order has been produced and shipped.

Table 2 The basic cost sheet

Basic cost sheet		
Fabric	60%	$6.00
Trim	10%	$1.00
CM	30%	$3.00
FOB	100%	$10.00

CM breakdown	
Labour	$0.64
Net Profit	$0.50
Overhead	$1.86

Note: We will be using this basic cost sheet throughout the book. Please bear in mind that the actual figures are not relevant, it is the methodology that counts. The examples below are based on a wage of $150 per month and productivity at 50%[1]. Almost all garment cost sheets - from handkerchiefs to overcoats - follow the same pattern.

Table 3 Basic cost sheet: T-shirt

T-shirt		
Fabric	43.5%	$0.80
Trim	10.9%	$0.20
CM	45.7%	$0.84
FOB	100.0%	$1.84

CM breakdown	
Labour	$0.19
Profit	$0.09
Overhead	$0.56

Note: This is one of the simplest basic commodity items. The cost sheet is based on 12 minutes production time.
The only deviation is that T-shirts generally require two fabrics: circular knit single jersey, flat knit 1X1 rib.

[1] Productivity percentages are based on China = 100%

Table 4 Basic cost sheet: Woven jeans

Woven jeans		
Fabric	60.2%	$4.80
Trim	10.7%	$0.85
CM	29.1%	$2.32
FOB	100.0%	$7.97

CM breakdown	
Labour	$0.48
Profit	$0.40
Overhead	$1.44

Note: This is very close to the standard basic costing. In some cases, jeans have a leather or fabric badge. This costing does not include the badges.

Table 5 Basic cost sheet: Bespoke worsted man's suit

Bespoke worsted man's suit: Italy		
Fabric	10.0%	$300.00
Trim	1.0%	$30.00
CM	89.0%	$2 681.25
FOB	100.0%	$3 011.25

CM breakdown	
Labour	$1 075.00
Profit	$800.00
Overhead	$806.25

Note: This is top of the line. Although the cost sheet has the same categories, the amounts are very different.

- Direct labour accounts for over 33% of FOB.
- Fabric, calculated at 3 metres at $100 per metre is just 10% of FOB.
- Trim, which includes special and expensive items accounts for just 1% of FOB.

Bespoke clothing is different. For example, we are taught that trading higher value products increases profit for both the brand and the factory. This is true for the great names, such as Tom Ford, Armani and Brioni, who can charge $10-20,000 for a suit, but most of that is eaten up by overhead. Even these great names rely on accessories and lower price goods for their profit. The small Italian Satoria is even worse off. In their operations, the tailor earns more than his boss.

There is one major garment type, however, that does not follow the normal cost sheet, the sweater.

All other cost sheets start with dyed and finished fabric ready for the needle. The sweater, by definition, is knit-to-shape. As a result, the sweater factory resembles a vertically integrated operation. It begins with yarn, which it then knits into the garment parts: back, front and sleeves. The factory determines the type of knit fabric:

- Gauge (number of stitches to the inch)
- Stitch (the type of knit)
- Weight

The actual make is also very different; knitting can be undertaken in three ways:

- Computerized (as with this garment)
- Machine
- Hand

The pieces are joined by a process called linking or looping.

Table 6 Basic cost sheet: Men's basic V-neck sweater

Men's basic V-neck sweater						
Merino 2/48 14-gauge 253 gg						
Yarn	44.4%	$7.34				
Trim	5.1%	$0.85				
CM	50.4%	$8.33	Labour	$2.92	Knitting	$1.28
FOB	100.0%	$16.52	Overhead	$3.43	Looping	$0.81
			Net profit	$1.98	Finishing	$0.59
					Washing	$0.24

Traditionally, cost sheets serve two purposes:

- Externally: To negotiate FOB prices with the customers. However, customers no longer negotiate price based on factory cost, but rather on the value the factory can provide.
- Internally: To help factory management make the best decisions. It is in this area that the basic cost sheet provides its greatest value. The good news is that every factory already has the information required.

Calculating cost factors

Cost factors are important because factories and their customers use this information to make decisions. However, these cost factors do not directly relate to the cost sheet, because when we create the cost sheet we have no detailed knowledge of the cost factors. For example, we can estimate material consumption long before we can determine actual material consumption and use that estimate on our cost sheet.

We can calculate the actual cost only after the order has been produced and shipped. That calculation is the job costing fabric cost[2].

Fabric costing

Width

- Besides consumption and cost per metre, fabric width is the primary factor determining fabric cost. While today, most fabric width is 150 cm, some is still available in 120 cm and even 90 cm. This creates complications. The narrower the fabric width the greater the consumption, but the narrower the width the lower the cost per metre. As a result, in some cases the factory may determine that the added consumption is offset by the lower fabric cost.
- Cost per metre versus number of widths per garment. If, for example, the fabric width is 150 cm, it might be possible to fit a complete garment in a single width equalling 1.4 metres. However, if the fabric width measures 120 cm, this may not be possible. In which case we might have to move to a second width, with result that 1.4 metres becomes 1.8 metres.
- Range of width. Fabric widths are not precise, e.g. 150 cm is actually a range from 145-155 cm. If the fabric is expensive, it must be sorted by width, i.e. 145-149 cm or 150-155 cm.

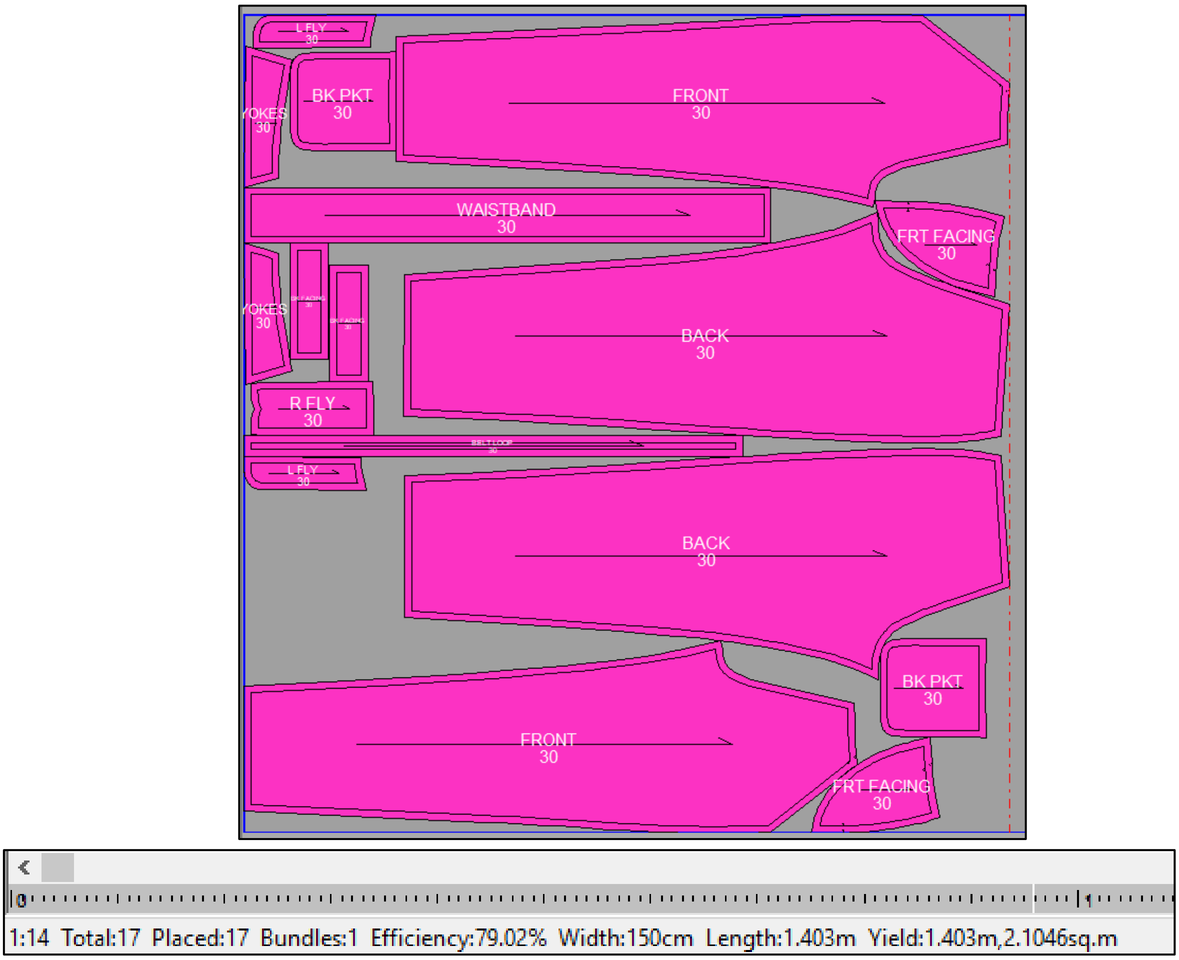
[2] Fabric cost = consumption in metres x cost per metre

Markers

A marker is like a giant jigsaw, where all the pattern pieces are placed together to ensure the lowest consumption. The marker may consist of a single garment, or as many as 12 garments. As a rule, the marker must include all sizes.

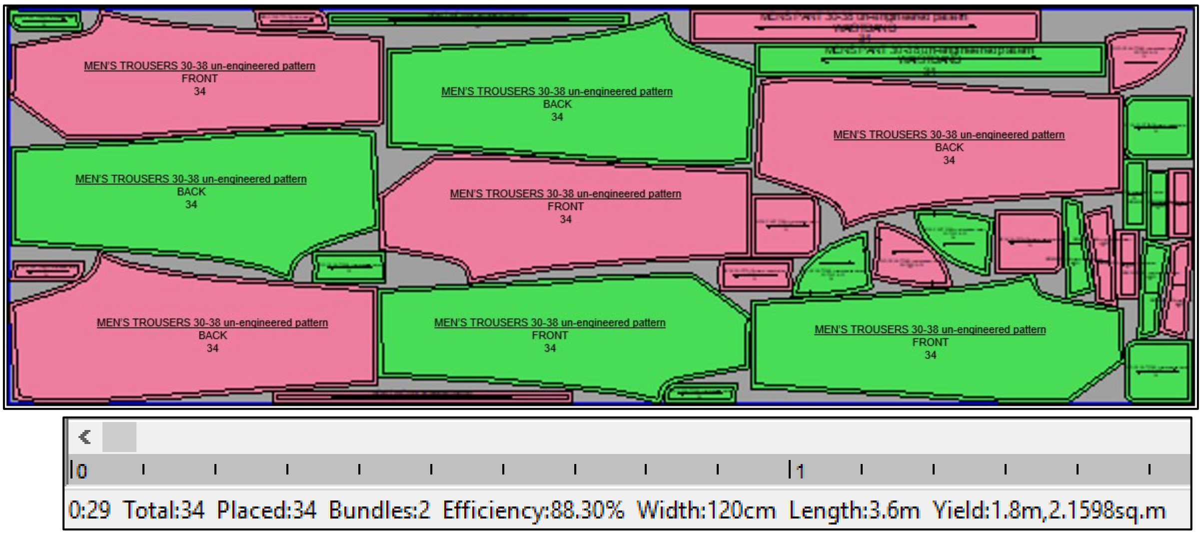
A simple marker (each size separate) is made up of four pieces. For example, the marker for a pair of trousers is 5.6 m (1.4 x 4).

Figure 1 Basic marker: Bespoke worsted man's trouser



Source: Ram Sareen Tukatech

Figure 2 Marker 120 cm width



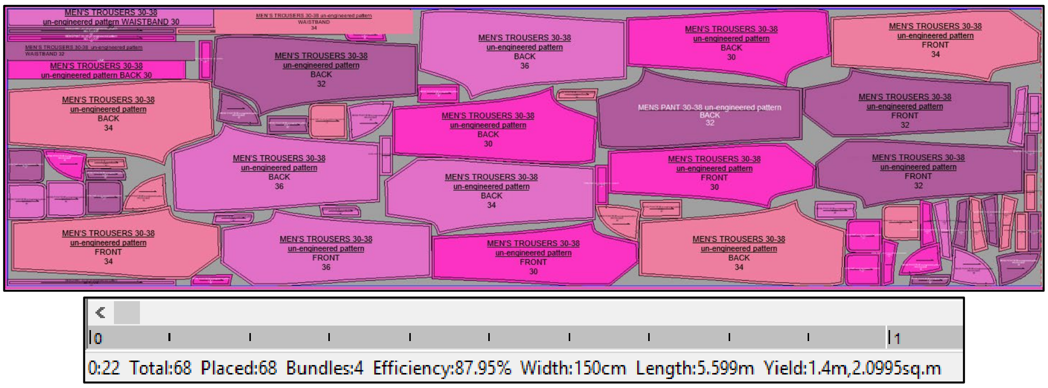
Source: Ram Sareen Tukatech

Note: 120 cm

Three legs = 1 width requires 4 widths	@ 1.2 m = 4.8 m
Three small piece sets	@ 0.2 m = 0.6 m
Total	5.4 m
Divided by 3 garments	= 1.8 m

Source: Ram Sareen Tukatech

Figure 3 One garment, one-way marker



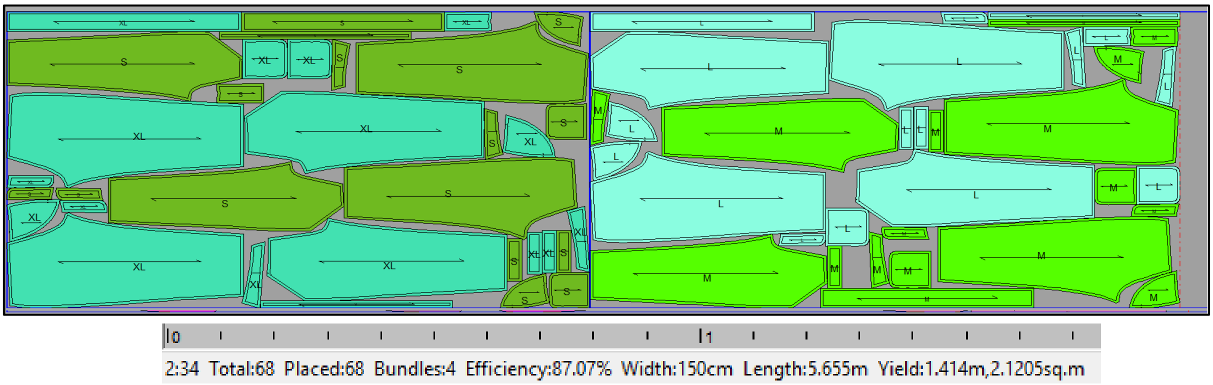
Source: Ram Sareen Tukatech

Complex marker

Where pattern pieces for different sizes are placed together to reduce consumption. For example, the leg pieces for size S are placed together with size XL, and the pieces for size M are placed together with size L. In piece-dyed articles there can be a problem of length-to-length shading. For example, in a 12-piece marker the leg pieces may be placed 15 metres from small pieces; and in some instances, there may be shade variations within a single piece. While width-to-width shading can be considered a generic flaw, length-to-length shading, unless extreme, is considered acceptable with the result that pattern pieces for the same garment, when placed far apart, may render the garment damaged.

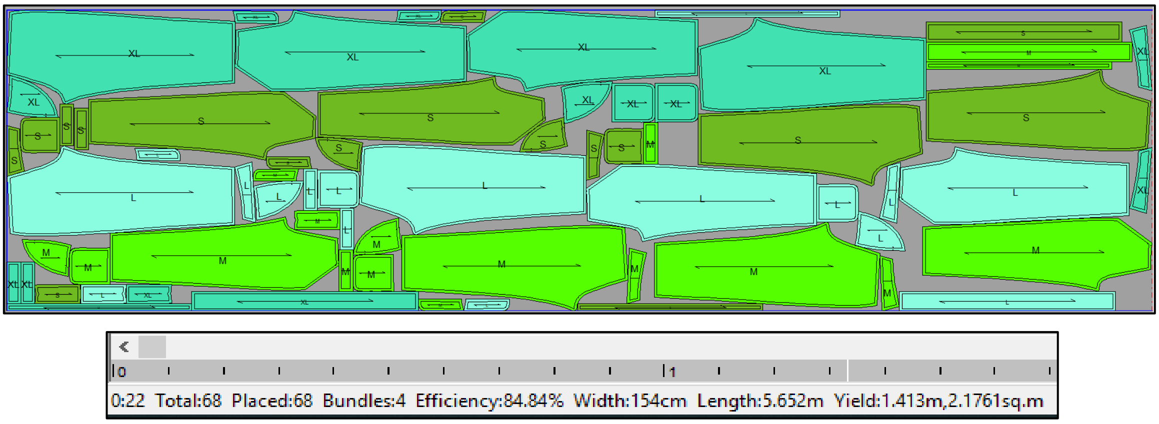
Figure 4 Illustrative example of an S and XL size combined, and an M and L size combined

Also, an example of a length wise colour-shading marker



Source: Ram Sareen Tukatech

Figure 5 Illustrative example of a centre to selvedge colour-shading marker

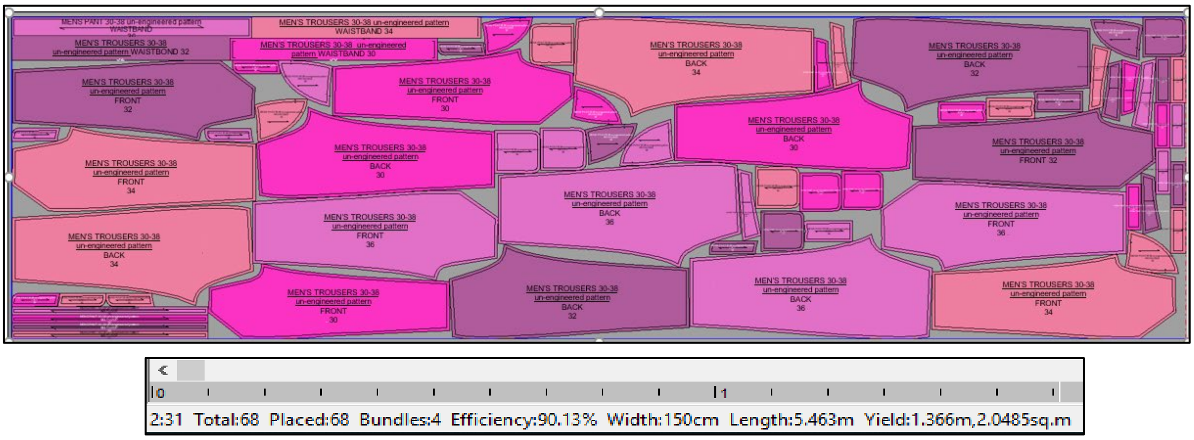


Source: Ram Sareen Tukatech

Two-direction marker

Considerable savings can be derived by placing pattern pieces in different directions. For example, since the trouser leg pattern is wider at the top (the hip measurement) than at the bottom (the ankle measurement), many markers place four leg patterns up-down-up-down.

Figure 6 Two-way marker



Source: Ram Sareen Tukatech

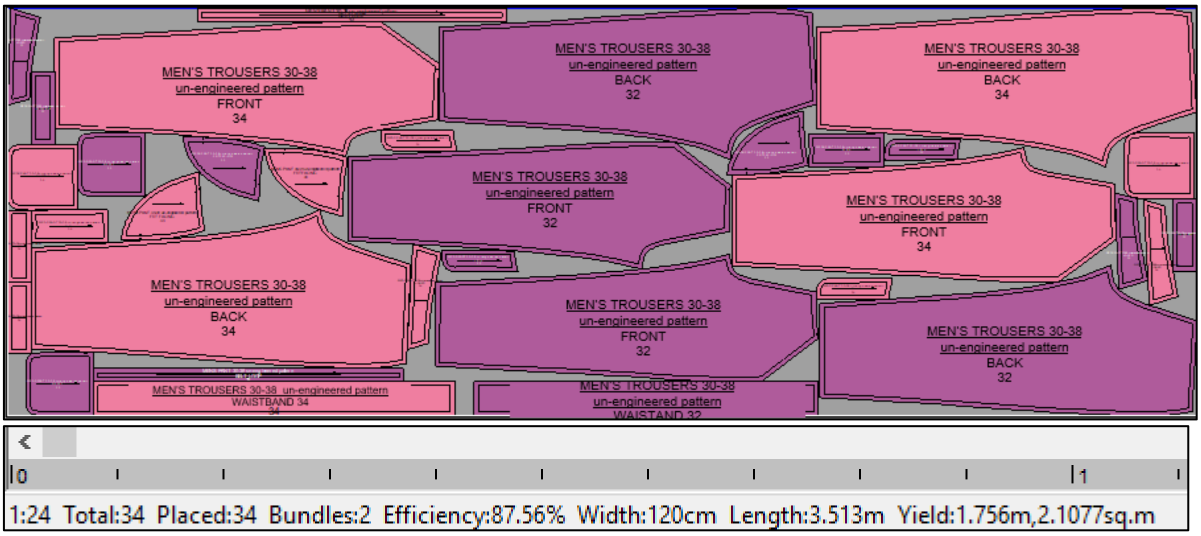
One-direction marker

There are exceptions that require one direction only:

Fabric with a one-way nap, such as velveteen and corduroy are one direction markers only. If you move your hand up, then down the legs of corduroy trousers you will note that moving in one direction feels smooth, while moving in the opposite direction feels rough. This difference is also apparent in the shade of the fabric. Up, against the nap, will seem darker than down, with the nap. Ironically the U.S. wears these fabrics nap-down, while the European Union wears them nap-up. There is no logic, or even reason for this, it is just cultural and because mixing the two will invariably result in shading.

Prints, jacquards and yarn-dyes are also often only worn in one direction.

Figure 7 Illustrative example of a one-way nap fabric



Source: Ram Sareen Tukatech

Exotic marker variations

In today's industry, technology allows the customer to determine marker yardage for any style thus taking away one of the main sources of factory profit. However, there are ways for factories to circumvent these limitations.

- Multiple style markers: Customers often order multiple styles in the same fabric. For example, a jacket and a pair of trousers. Putting these styles all together on a single marker can deliver remarkable hidden savings. All customer orders allow leeway for under and over shipment, e.g. 3% short or 2% over. Provided the factory does not exceed these limits, multi-product markers can be a source of hidden profit.

- Skimping: In some instances, even very small changes in pattern width may result in remarkable savings. For example, the pattern seam allowance may be 1.5 cm. A small reduction to 1.3 cm may bring real gain when you multiply to 0.2 cm by eight seams, with the result that the marker that was planned to accommodate four legs to the width, may now allow five legs per width. While technically not allowed, the customer's quality control will never discover the change particularly when the seam has been overlocked.

Material consumption additional factors: Damage, wastage, shrinkage

When we consider total fabric consumption, we have to recognize that marker yardage is just one part of total consumption. Other factors such as damages, wastage and shrinkage must also be considered.

Fabric damage

All fabric has damages, and the fabric buyer must accept a reasonable number of these. Of course, generic damages, such as width-to-width shading, excessive shrinkage, pilling, and banned chemicals and dyestuffs render the entire order damaged and therefore unacceptable. For this reason, fabric buyers require specific tests to be carried out by recognized impartial organizations. One such organization is the American Association of Textile Chemists and Colourists (AATCC), which offers a complete list of tests.

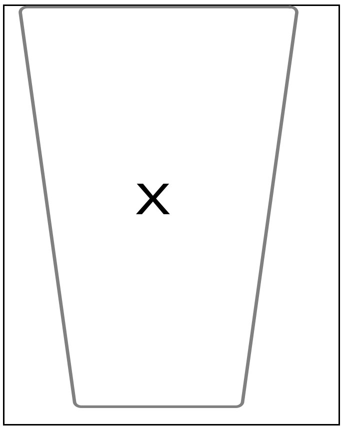
Each damage adds to fabric consumption.

- Size of damage: A damage of 1 cm requires 3 cm additional fabric. Clearly, if the damage extends for 3 m the factory will require 3 m additional fabric.

- Based on the overlap, normally calculated at 0.5 m per damage: Once the damage has been cut away it is necessary to ensure that when the fabric is cut it includes complete pattern pieces.

For example, the trouser leg is 1.4 m. If the fabric damage occurs where the marker has the trouser leg, the trouser leg must be recut, requiring 1.4 m of fabric, plus overlap.

Figure 8 Calculating damage allowance



Note: There comes a point where the number of damages renders the fabric piece unacceptable.
For example: 10 damages @ 0.5 m per damage = 10% of a 50 m piece.

Source: David Birnbaum

For some fibres, notably better-quality wool, the mill will mark each damage with a white thread on the selvage at the beginning and end of each damage and provide a replacement. Each piece will have a hangtag showing gross and net metres, e.g., 52/49 m.

When that option is not available, it becomes the responsibility of the garment factory to inspect the fabric. Typically, the factory will inspect 10% of the fabric. If the damage rate exceeds acceptable limits, the factory will inspect 100% of the fabric.

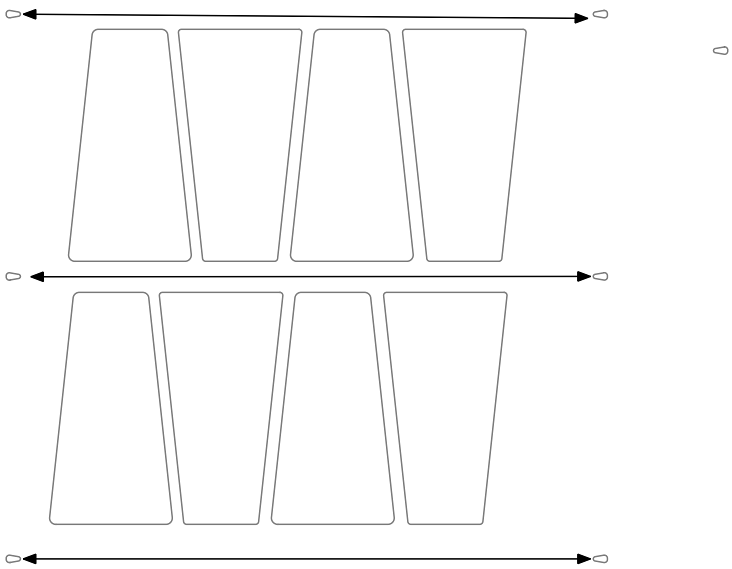
There is a cost to inspection. As a rule, the warehouse is included in overhead costs. The normal 10% is paid by the factory as part of its overheads. The question arises therefore, who pays the cost of added inspection due to damages. There is no simple answer. Most factories will absorb the cost of added inspection, although, where the customer has ordered the fabric directly from the mill, they should be held responsible to some degree. In the case of damaged fabric, there are far greater costs than added inspection, such as problems with scheduling and delivery delays, etc. In these instances, the factory will discuss the matter with the customer. In real life, the customer will seldom pay; however, they will owe the factory a favour.

Do not rely on inspection on the cutting table. Yes, laying out the fabric 10-20 m at a time where the lighting is very good saves time. However, remember the first rule of cutting! If you cut it, you own it!

Wastage

As you lay out the fabric on the cutting table you invariably come to the end of the roll. Very often, the end of the fabric occurs in the middle of a pattern piece. If the marker includes spaces where there are no pattern pieces, the solution is easy. Simply end the fabric from the old roll on the space and begin the fabric from the new roll on the same space (allowing for a small overlap to avoid the fabric slipping apart).

Figure 9 Material consumption factors: Wastage and shrinkage

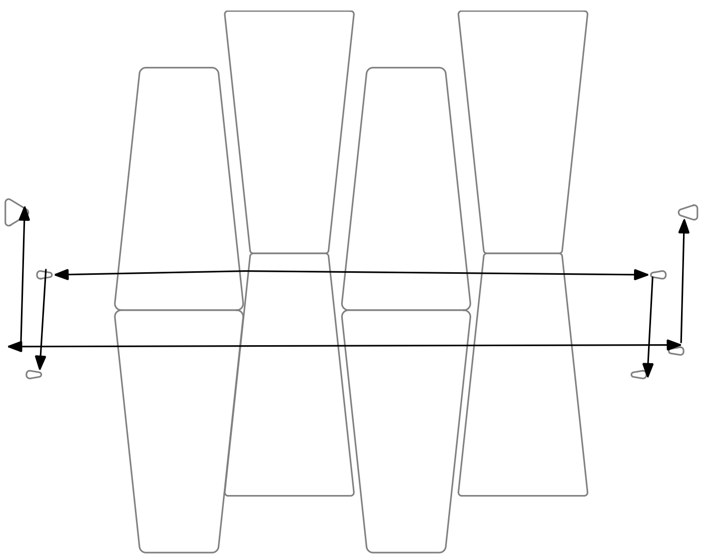


Source: Davis Birnbaum

The problem occurs where there is no space at all. Here, the overlap must be extended to the point where fabric from both the old and new rolls includes complete pattern pieces (together with parts of pattern pieces that are scrapped).

Shading

Figure 10 Material consumption factors: Wastage and shrinkage



Source: Davis Birnbaum

Shading is the second factor related to wastage. Different fabric pieces may have slightly different shades. These shades may not be noticeable on the fabric but will appear when the trouser leg has two different shades. The most common cause of this issue is dye-lots. Fabric dyeing normally takes place in closed vats, or other containers. The size of each vat is specific to the weight or number of metres of fabric. Therefore, if you are ordering 750 m of the colour blue, the dyer may use three vats: 500 m, 200m and 50 m.

Each vat will yield a different shade, so fabric pieces are marked by dye lot. The factory cannot mix dye lots. Sometimes, as in the case of denim, each piece may have a different shade. Here, you must ensure that all the pattern pieces for each garment are cut from the same piece of fabric, thus increasing wastage.

Shrinkage

All fabric shrinks. Greige Goods shrink more than finished fabrics but finished fabric does shrink. Indeed fabric-finishers will build a 2% shrinkage into all fabrics. The factory must test the fabric for shrinkage and having done so must either allow for it in the finished garment length or allow for it in the pattern.

Material cost: Price per metre

We generally think of fabric cost in very simple terms, and we are generally correct:

- Factory orders fabric;
- Fabric supplier delivers fabric;
- Factory pays for fabric.

Consider three common scenarios:

- Customer designates fabric supplier. Traditionally, customers bought garments and the factory supplied all the materials. However, well over 30 years ago customers moved from garment buying to garment sourcing, whereby the customer negotiated directly with the fabric supplier and agreed the price. This leaves the factory paying for the fabric at the agreed price, and any additional fabric costs, such as local transportation, taxes, etc. are recoverable from the customer.
- Factory purchases locally dyed and finished fabric. Here, the only additional cost arises when the fabric is bought ex-factory and the factory pays the cost of local transportation.
- Factory purchases fabric produced in another country. As a rule, most factories will order through the mill's local agent, who arranges delivered duty paid (DDP) terms. The only exceptions here are when major factory groups have their own overseas buying offices (usually located in Hong Kong) staffed with fabric specialists.

There are some exceptional cases, where the factory purchases fabric and must oversee the fabric-making process. This can become extremely complex and is fraught with risks. Here, the factory may have to deal with four factors:

- Nature of the fibre;
- Nature of the fabric;
- Nature of the textile industry;
- Where the factory is located;
- Where the customer is located.

The following two case studies give you some idea of the problems and risks involved.

Box 3 Trapped by the textile mill

In some countries, mills only produce Greige Goods, leaving the factory to supervise and pay the costs of all successive processes:

- Cost of Greige Goods;
- Cost of transportation from the fabric mill to the dyer/printer/finisher;
- Cost of dyeing/printing/finishing;
- Cost of transportation from the finisher to the garment factory.

These are but the opening acts of the drama. Having paid the mill for the Greige Goods, the factory must suffer the losses caused as a result of any fabric damages. Regrettably, many of these damages, such as width-to-width shading, pilling, barre shading and irregular shrinkage do not become apparent until the fabric has been dyed and finished.

Furthermore, many if not most dyeing/finishing plants are SME operations with old and poorly maintained machinery, adding additional risks.

When the finished goods are delivered late, damaged, or both late and damaged, the factory is faced with a number of no-win scenarios:

- Should the factory produce the goods and risk cancellation for late delivery?
- Should the factory produce and ship damaged goods?

Garment factories in these countries may have a reputation for great product development, but fabric quality has often been a risk. There are products where the fabric supply chain is so complex that only the most experienced professionals would dare become involved.

Box 4 Material sourcing – cashmere suiting

Here is the supply chain:

- Bayantsagan Mongolia for the greasy cashmere fibre auction;
- Transportation + duty/tax;
- Italy for best quality yarn spinning + top dyeing or yarn dyeing;
- Transportation + duty/tax;
- China for fabric weaving;
- Transportation + duty/tax;
- Multiple countries for garment making.

This is not a product for the inexperienced.

Trim costing

For costing purposes, trim is defined as any other processes or materials (other than top fabric, which is listed separately) where payment is by unit, e.g., pieces, metres and kilograms.

For example, embroidery can be trim, direct labour or both, i.e.:

- Embroidery thread is always listed as trim;
- When embroidery is given out and payment is by the piece, the process is also listed as trim;
- When embroidery is given and each worker is paid by the day, the process is included under direct labour.

The trim sheet

The trim sheet is a tool. As with any tool its value is in what it does and how well it does it. As we see below, the trim sheet serves multiple purposes providing value for each.

All data listed in the trim sheet must be available, but not necessarily at the outset of the process.

- Available at the outset:
    - Item: lining
    - Supplier's name (or code number): L101
    - Quality number of the item: B601
    - Description : 100% rayon, 150 cm, colour ecru 105
    - Unit: metre
    - Price: $2.70
- Available on receipt of colour/quantity breakdown:
    - Purchase order number: L101-100
    - Order quantity required: 2,500
    - Order quantity in-house: 700
    - Order quantity total: 1,800
    - Estimated days: 21
- Available on receipt in-house:
    - Quantity received: 1,926
    - Estimated days: 21
    - Actual days: 30

Table 7 The trim sheet

Trim sheet		Sketch or photo											
1	Date												
2	Style #												
3	MO #												
4	Description												
5	Customer												
		A	B	C	D	E	F	G	H	I	J	K	L
6	Item	Supplier	Qual #	Description	Unit	Price	PO	Order quant			Est days	Quant rec	Actual days
7								Require	In house	Total			

	Product sub-material												
1	Lining												
2	Interlining												
3	Interlining												
4	Tape												
	Ribbon												
	Lace edging												
5	Thread												
6	Thread												
7	Button												
8	Button												
9	Snap												
10	Hook and eye												
11	Zipper												
12	Elastic												
13	Shoulder pad												
	Labels and packing												
14	Main label												
15	Content label												
16	Care label												
17	Hangtag												
18	Hanger												
19	Tissue												
20	Polybag												
21	Carton												
22	Other												
23	Other												
24	Other												
	Ornamentation												
25	Embroidery												
26	Beading												
27	Washing												

The trim sheet serves a wide range of potentially valuable purposes, among the most important being the ability to move from manual to computer generated trim orders.

- Saving time. Large factories that produce 500+ styles per month require substantial staff to place and follow up trim orders.
- Avoiding unrecognized errors. In the old days, when the trim buyer ordered 6” zippers instead of 7” zippers, the incorrect items disappeared into a desk drawer, and the zippers could be reordered with no one the wiser. Those days are over.
- Providing important information on a timely basis. If the trim item is running late or the quantity received is incorrect, management is alerted in a timely fashion.

The good news is that the data necessary for computer generated trim orders is the same data required for the old manual ordering system.

Labour (cut and sew) costing

The basic cost sheet can be divided into two parts:

- Material:
  - Fabric
  - Trim
- CM:
  - Labour
  - Overhead
  - Profit

Material is covered in the previous pages.

For costing purposes, we define labour as wages and benefits paid to workers who are directly involved in the manufacturing process:

- Cutters
- Bundlers
- Sewers
- Inspectors
- Pressers
- Packers

This does not include supervisors who are classified as staff and are therefore included in overheads.

Labour cost for each style is calculated by the number of minutes required to produce one garment of that style multiplied by the worker’s wage per minute.

For example, a sewer paid $150 for a 26-day month, working nine hours per day would be paid 1.1¢ per minute. Therefore, the sewing cost for a garment requiring 40 minutes would equal 43¢.

If the worker were paid $300 per month, the sewing cost would total 86¢.

If the factory increased productivity by 25%, reducing sewing time from 40 minutes to 30 minutes, the sewing cost per unit would be 64¢. (This is covered in detail below).

Table 8 Calculating labour cost per minute

Wage per month	Per day	Per hr	Per min	Per unit
$ 150.00	26	9	60	40
	$5.77	$0.641	$0.011	$0.427

Wage per month	Per day	Per hr	Per min	Per unit
$ 300.00	26	9	60	40
	$11.54	$1.282	$0.021	$0.855

Wage per month	Per day	Per hr	Per min	Per unit
$ 300.00	26	9	60	30
	$11.54	$1.282	$0.021	$0.641

To this we have to add the labour cost per unit for cutting, bundling, pressing, inspection and packing. We can obtain a remarkably good estimate of these costs from the factory's accounting department. They have records for total wages paid each month, for each department. By dividing total wages by total sewing, they can tell you the ratio between sewing costs and all other costs. For example, if sewing wages are twice other wages and sewing costs per unit are 43¢, then the total cost of all other wages equals 21.5¢ per unit.

Management should: Audit these figures each month;

- Aggregate labour costs for each style shipped that month;
- Calculate total wages paid;
- Allow for work in process.

This last factor raises potentially difficult issues. At the end of any time period there are orders that are undergoing processing. We therefore need a simple method for allocating value to work in process. While any method is arbitrary, provided the method remains unchanged the results make little difference in the long run.

Box 5 Calculating minutes per piece

This is one of the most important factors, determining many areas in a factory management's decision-making process.

- Labour cost
- Scheduling
- Productivity

Factories are told that many companies use a method known as standard allowed minutes. This is a garment industry extension of a method first developed by Henry Ford in 1919. It is based on Ford's famous query, "*Why is it every time I ask for a pair of hands, they come with a brain attached?"* Ford's solution was to take uneducated people with minimal training and make them a productive workforce by making each person an extension of the machine.

Simply put:

- The production process (sewing in our industry) is divided into specific operations.
- The number of minutes required for each operation is determined, originally by someone physically standing at the machine with a stopwatch, and more recently by a computer.
- The sum of minutes for all operations equals the number of sewing minutes for the garment.

However, the garment industry presents special problems:

- Down time:
  - Before introducing a new style, the line must stop production for line balancing.
- Lost time:
  - The introduction of any new style requires workers to go through a learning curve.
  - Introducing a new style does not automatically lead to production starting up on all machines on the line. The work must pass through all the sewing steps before the entire line is engaged.

The most serious problem here is that the number of minutes added because of down time and lost time is fixed and is unrelated to the size of the order, with the result that the smaller the order greater the number of minutes added to each garment.

Of course, this problem did not affect Henry Ford and his model-T factory, because that factory was designed to produce only one model of car, six days a week, 52 weeks of the year, forever.

What was true of Henry Ford and his model-T factory was equally true of Levi Strauss and their 501-jeans. Their factory was also designed to produce just one model, six days a week, 52 weeks a year, forever.

The 501 Production Manual was probably the all-time, very best example of standard allowed minutes. It closely mirrored Ford's original concept, taking uneducated people with minimal training and transforming them into a productive workforce by making each person an extension of the machine.

There was a limitation however. Both were based on a commodity product. As both automobiles and clothing moved from unchanging commodities to ever changing fashion, the factory designed to produce only one model, six days a week, 52 weeks per year, forever developed severe liabilities.

In the case of Levi Strauss, their failure to recognize the existence of designer jeans almost wrecked the company. Between 1997 and 2001, sales volumes fell from $7 billion to $4.2 billion and have never recovered.

Today there are no universal garment designs. The closest we have are the cheap labour industries producing low-end, mass-market commodities, where factories operate with semi-skilled workers.

However, an easier more rigorous method for calculating the minutes per piece exists, and we have all the necessary data. It begins with an understanding that due to line balancing, a sewing line can only produce one style per day:

- The factory knows the specific dates the line sewed the order.
- The factory knows the total wages paid to the line sewer during that period.
- The factory knows — after allowing for overtime and absenteeism — the number of hours (and minutes) required to produce the order.
- Total minutes divided by number of pieces equals minutes per piece.
- Total wage divided by number of pieces equals sewing cost per piece.

No stopwatch – no computer – no down time – no lost time.

Overhead costing

We define overhead as all costs other than material trim, labour, and profit. The following is a non-exhaustive list of overhead costs that frequently occur in garment factories.

Accountant	Motorcar expenses
Advertising	Packing materials
Consumable stores	Penalties
Contingent liabilities	Pest control
Corporate social responsibility (CSR)	Printing and stationary
Courier local	Professional fees
Courier overseas	Repairs – building
Donation	Repairs – furniture and fixtures
Electricity and water	Repairs – machinery
Entertainment	Repairs – office equipment
Finance costs	Repairs – production area plant
Finance costs - interests	Salaries (includes all fringe)
Food and drink	Stationery, office
Gasoline	Stationery production
Insurance	Telephone – e-mail
Legal fees	Rubbish collection
Local travel	Travelling – overseas
Loose tools	Depreciation
Magazines and periodicals	Provision for staff bonus
Memberships (trade organizations)	Provision for taxes
Motorcar expenses	Provision other

The problem occurs when we try to allocate overhead on a per unit basis.

The accounting department has a complete record of total overheads for a period, just as they have a complete record of total direct costs for the same period. Because labour per unit and overhead per unit are both based on time, the ratio of labour to overhead will provide a reasonably accurate determinant for overhead per unit.

This ratio is one of the single most important factors, not only determining product cost, but more importantly analysing the value of a number of specific methods to reduce garment costs.

There are two important differences between overhead in industrialized countries and overhead in less developed countries where garment export production usually takes place.

- In industrialized countries, productivity increases are usually between 1%-3% simply because developed countries have developed education and technology over a period of generations, while less developed countries now have almost immediate access to these technological and educational assists. The result is that productivity increases of 25%-60% in garment producing countries are not uncommon.

- In industrialized countries, overhead may typically be 50%-70% of labour costs, while garment exporting countries overhead may be 250%-600% of labour costs.

- Low wages: The worker in a garment exporting country that may be paid $150 per month, could be paid twenty times that amount in an industrialized country.
- High overhead: Operating costs in garment exporting countries are not necessarily relatively lower than those in industrialized countries. For example, it costs more to turn on the lights in Mumbai than in Manhattan. In fact, in some garment exporting countries electricity may equal 5% of the garment FOB price. As a result, while the benefit of increased productivity in industrialized countries is reduced labour cost, the benefit in garment exporting countries is reduced overhead. With the proper tools and commitment by management, a productivity increase of 25% in a garment exporting country can be achieved within a year, with the result that net profit could increase from 5.0% to 9.5%. Even if management increased wages by 25%, profit would still increase from 5% to 7.5%. (See Chapter: Intrinsic costs).

Profit

Profit remains after all costs have been covered. While these Figures are only estimates and should not be taken as real, it is fair to say that 5% net is a good profit, provided it is net – i.e. money in the bank.

Cost sheets and data that make up these cost sheets are important tools. To be of value the data must be complete and 100% accurate. In business, we often provide less-than-accurate information for a variety of reasons.

Job costing

Every factory should produce two cost sheets:

- The basic cost sheet, which is created at the outset, before negotiating with the customer. Because it is created at the beginning of the process, the cost sheet is at best an inaccurate estimate of the style's per unit cost.

The job costing, which is created after the order has been completed. This is the accurate listing of all costs. It is one of the most important tools in a company's toolBox, because it is created at the end of the process once all cost items are known.

As job costing uses the actual real costs for each order, style or customer, one needs to determine these real costs. This would be easy to do if all the fabrics and trims ordered were consumed for the specific order. However, this is never the case. Overheads also vary depending on the season and time of year. We therefore need to find accurate estimates for fabric and trim leftovers, as well as overheads.

Job costing: Fabric

In real life, there are difficulties with each of the items listed above.

Let's first consider the fabric, where there are two interrelated problems. How does a factory account for leftover fabric? Imagine 50,000 metres is delivered and after cutting all orders for that fabric, there are 600 metres left over. The factory initially has two choices:

- Add the leftover fabric to the fabric costs of the various styles on a pro rata basis;
- Add the additional fabric to the inventory, thus listing the fabric as an asset.

To make a rational decision, you have to look at the fabric type.

- If the fabric is 125 g white jersey and the factory's business is T-shirts, of course the leftover fabric can be added to the inventory;
- If the fabric is chartreuse rayon shirting with puce polka dots, which no future customer is likely to want, the factory has no choice but to add a pro rata cost to each unit produced.

The second issue is how to prorate the added cost of fabric across the styles that use the same fabric. This is the basic joint cost problem. There are again two choices:

- Apportion the cost of the fabric on the basis of consumption.

For example:

- Total order 200 pieces each
- Short 100 m
- 2 styles:
  - A coat that consumed 3 m
  - Trousers that consumed 1.5 m

You would allocate as follows

- Coat 67 m
  - 67/200 = 3.33 m
- Trousers 33 m
  - 33/200 = 1.665 m
- Apportion the cost of the fabric on the basis of FOB price

For example:

- Coat FOB price $30
- Trouser FOB price $10

Allocate as follows:

- Coat 75 m/200 = 3.375 m
- Trousers 25/200 = 1.625 m

Job costing: Trims

Trim costing is more straightforward. While joint cost problems involving fabric are relatively unusual, those involving trim are extremely common and complicated. With the possible exception of customer's labels, the cost of all purchased trim should be applied to the order. The leftover trim is not included in the inventory for accounting purposes. However, it does exist and might be usable for future orders[3].

Job costing: Labour

The factory's records will show how many sewers worked on the style, the number of days the sewers spent on it and the total wages received. Ancillary labour – cutting, bundling, QC, pressing, packing, etc. – must be added to this. The factory's accounts department has records of total wages for the designated period. If, for example, wages for the period totalled $1,000, of which sewers received $667, then for the purpose of wage calculations, ancillary wages may be estimated to equal 50% of sewing wages. These calculations should be based on a one-year period. This will prove to be very important.

Job costing: Overheads

There are two problems here:

Breaking down overheads: As we have seen above, the factory's accounts department can provide data for total overheads for the period. The problem is how to break down this total to overhead-per-unit. The simplest and most practical solution is to relate overhead costs to labour. We know that more sophisticated

[3] Before ordering trim for any order, we should first check existing inventory and subtract the in-house quantities from any new trim orders.

styles take longer than simpler styles, making overhead costs greater. We also know that labour costs per unit reflect the degree of difficulty. Therefore, we can calculate overheads as a proportion of labour.

Seasonality: This is a more complex problem. A factory is a closed-room operation with a maximum level of production. At some point production reaches 100% of capacity. At the same time, because our industry operates on a seasonal basis, there are months when production falls below capacity. Therefore, the annual average must be less than 100% of capacity and as a result, we cannot base overheads on 100% capacity.

Working with the accounts department, the factory can come up with a reasonable estimate for overall annual capacity. A reasonable overall annual Figure might be 70%, a Figure that we will be using for all subsequent calculations.

Keeping the job costing as it is – this will still show the profit (or loss) for each style but will not show the total profit (or loss) for the company – when carrying out profit and loss statements, we have to calculate the ratio of total overhead for each month against total overhead for all job costings for the month and increase overhead accordingly. The job costing is a very important management tool. It provides important information not available elsewhere.

Box 6 Cost sheet versus job costing

The factory has an order for 10,000 pieces.

Basic sheet: 10 000 pieces					
Fabric (2 metres @ $2.00 per metre)	60%	$60 000			
Trim	10%	$10 000			
CM	25%	$25 000	CM breakdown		
FOB	100%	$100 000	Labour	$6 410.26	
			Overhead	$18 589.74	2.9
Total cost		$95,000			
Total revenue		$100 000			
Net profit	5.00%	$5 000			

However, the job costing, done once the order has been completed, tells a different story.

Job costing: 10,000 pieces					
Material	60%	$61 000			
Trim	10%	$9 300			
CM	30%	$2 8478	CM breakdown		
FOB	100%	$100 300	Labour	$6 169.87	
			Overhead	$22 307.69	4
Total cost		$98 778			
Total revenue		$100 300			
Net profit	1.50%	$1 522			

Material: the factory ordered 30,000 metres of our well-known chartreuse shirting with puce polka dots but received 30,500 metres. The outstanding 500 metres was written off, with the result that the added cost of the leftover fabric (500 m @ $2.00 per metre) had to be added to the cost of material, making the total fabric cost $61,000 rather than $60,000.

Trim: the factory enjoyed a 7% saving here because trim was available from existing stock at no cost.

Labour: the factory did well here as well. The cost sheet listed production time at 40 minutes, but the actual production time was 38.5 minutes.

Overhead: this was the big loss. The cost sheet was based on $1.86 per unit (2.9 times labour) but due to the fact that the order was produced during a slow period, when total orders were less than capacity, the overhead increased from $1.86 per unit to $2.23 per unit.

Table 9 Which customer brings the greatest profit

Customer			
Customer name	Total sales	Gross profit	Net profit
Able	$1 000	12.5%	4.0%
Baker	$800	30.0%	12.0%
Charley	$700	20.0%	6.0%
Delta	$550	5.0%	-3.0%
Echo	$400	16.0%	1.0%
Frank	$320	16.0%	2.0%

Table 10 Which is the most profitable product

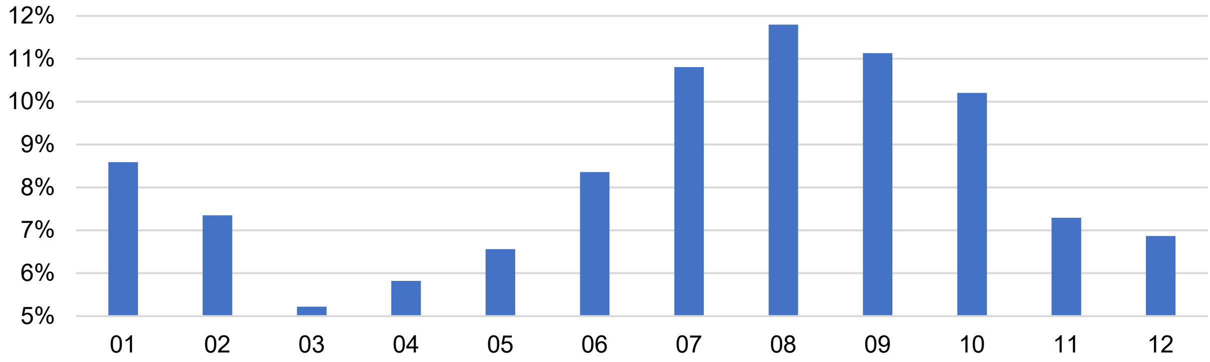
Product (circular knit - cut & sew)			
Product	Total sales	Gross profit	Net profit
T-shirt	$1 000	10.0%	2.5%
Polo shirt	$700	15.0%	4.5%
Fashion Blouse	$500	30.0%	8.0%
Dress	$550	40.0%	15.0%

Table 11 High season versus low season

Percentage garment exports by month													
Month	01	02	03	04	05	06	07	08	09	10	11	12	
% of Annual	8.6%	7.3%	5.2%	5.8%	6.6%	8.4%	10.8%	11.8%	11.1%	10.2%	7.3%	6.9%	
Value ($.000)	859	735	522	582	656	836	1 081	1 179	1 113	1 021	729	687	10 000

In a world without seasons, business volumes would remain constant at 8.33% each month, because 8.33% times 12 months equals 99.99%. We can see from the table that exports in March were 50% more than in August, with the result that the overhead per unit more than doubled.

Figure 11 PCT total exports by month



Source: David Birnbaum

The loss incurred during the low season is a major problem facing every factory and reducing that loss is everyone's goal. There are two strategies for overcoming it, both are based on the fact that even in low season every customer has orders to give out. The factory's goal therefore is to take a greater share of those orders.

- Become a strategic supplier: Every customer has factory suppliers that are so important that the customer will give that factory steady business. You must become a strategic supplier.
- Reduce your price: The lower your price, the more competitive you become and the more business you will receive. To succeed, you must accept reality. In the low season you will lose money; by reducing your price you will still lose money, but less.

Branch factories

Factory groups with multiple branch operations should treat each branch as an independent unit. This allows management to compare the performance of one branch over another. There are important factors to consider:

- You do not want to subsidize the branch with work performed by the home office. For example, if the company provides product development, the added cost of product development should be added to the branch factory cost sheet.
- You do want the branch that performs special services to benefit from those services. For example, if the branch offers fast turnaround, both the added cost and profit should be included in the branch factory cost sheet.
- If the branch factory offers value to the customer completely apart from its operations, such as close proximity or duty-free access, those benefits should be included in the cost sheet.

Subcontractors

For the purpose of costings, the relationship between the factory and the subcontractor should be the same as factory agent, with the subcontractor playing the role of a separate factory. As with any agent-factory relationship, gross profit should be calculated as a commission.

Once again, you do not want to subsidize the work of the subcontractor. It is therefore important that all work provided by the parent company be part of the overhead to be deducted from the gross profit.

As the industry progresses and the role of the supplier becomes increasingly important, qualified factories no longer have to accept any order, from any customer, at any price. In this new model industry, the factory will have choice. The data obtained from your job costing is indispensable when making the right choice, whether choosing one customer over another or one product over another.

Equally important, the decision may be based on the customer and/or product that will provide orders in low season.

Determining profit and loss

There are two ways to determine profit and loss:

- Standard accounting: aggregates all items, e.g., total revenue, total material cost, etc.
- Unit cost accounting: aggregates all job costings.

Table 12 Standard cost accounting

	Total		**$7 355 000**	
	Sales discounts	$434 000		
	Sales returns	$790 000		
	Net revenue			$6 131 000
	Cost of sales			
	Opening inventory		$5 204 650	
REVENUE	Purchase materials		$3 105 000	
	Purchase discounts	$54 750		
	Purchase returns	$566 750		
	Closing inventory	$4 588 750		
	Total cost of goods			$3 099 400
	Gross profit/loss			$3 031 600

	Salaries/wages	**$600 000**		
	Admin			
	Electricity/water/phone	$65 000		
	Rent	$50 000		
	Insurance	$25 000		
EXPENSES	Repair & maintenance	$28 500		
	Office supplies	$27 500		
	Depreciation equipment	$6 250		
	Depreciation vehicles	$50 000		
	Misc.	$27 500		
	Total expenses			$879 850
Other income/ expenses	Exp finance charges	$1 500		
	Total			$11 000
	Net profit/loss			$2 162 780

Unit cost accounting profit and loss

Creating a unit cost accounting statement is relatively easy. You create a database that consists of the data in the job costing sheet. Once you have the database in place, you can obtain virtually unlimited information at the push of a button, for example: profit and loss from October 17 to December 11.

You can even customize your database by simply adding one more Box. If you are in the casual trouser business for example, you can add:

- Denim
- Other cotton fabric
- MMF fabric

You employ one technician with IT knowledge, and you are ready to go. You can get the answer to questions such as:

- How much business did we do with ABC during the period April - November this year compared with last year?
- What was the profit per unit, for both periods?

Chapter 3
Costing for value added services

Labour

Calculating sewing cost is relatively easy and is dependent on two factors: the number of sewing minutes per piece and the sewing cost per minute.

With one major exception, all sewing departments are made up of lines consisting of between 20-80 machines operated by semi-skilled, single-tasked sewers. With the exception of poorly managed factories (for reasons explained below) a line can produce only one style at a time.

For example, an order of 10,000 woven cotton shirts produced in a line consisting of 50 machines, requires 13.5 days sewing time = 40.5 minutes per piece.

Table 13 Calculating sewing minutes per piece

No. days	No. hrs	No. min	No sewers	Min per pc
13.5	10	60	50	40.5
	135	8 100	405 000	10 000

A sewer is paid $150.00 per month. Based on a 26-day month and a 10-hour working day, the sewer is paid approximately $0.01 per minute. Therefore, a garment requiring 40.5 minutes sewing, costs $0.389 per piece in terms of direct labour.

Table 14 Calculating sewing cost per minute

Wage month	Per day	Per hr	Per min	Per unit
$ 150.00	26	10	60	40.50
	$5.77	$0.577	$0.010	$0.389

Wages

How wages are calculated is almost as important as how much the worker is paid. For the most part, the decision is based on how the factory values the worker. Typically, wages are calculated three ways, as well as some more complex methods.

- Monthly pay
- Daily pay
- Piecework

Monthly pay

As a general rule the factory draws a distinction between staff who are paid a salary (by the month) and workers who are paid a wage (by the piece, the day or the month).

However, there is an important exception.

Some factories will calculate wages on a monthly basis in order to show the authorities that their wage rates are above the minimum set by law. Of course, many of these same companies go into the grey economy by subcontracting orders to factories where wages are well below the minimum.

In the long run, these factories trap themselves at the bottom of the industry because they are unable to train their workers. As one factory owner put it, “Why should I train my workers? The moment they are trained they will run away to work at a factory where wages are higher.”

However, better trained workers create higher value, not only for the company but also for themselves. To keep the higher-valued worker, you have to pay them based on their value to the company. We think of this as a phenomenon limited to the least developed countries, when in fact it is universal.

Daily pay

When considering daily versus monthly pay there is always a question of benefits. Does daily pay include any form of social security benefits? If not, how would this be reflected when comparing daily pay to the monthly salary?

In theory, this is a very complex question because different countries have different rules governing different sectors and different categories of workers. The reality is much simpler. Factories providing information to the social security office do not always list their entire workforce. As a result, the whole question becomes moot. The factory need not pay benefits because as far as government is concerned, those workers not listed do not exist.

For the most part, two worker categories are paid on a daily basis:

- Workers brought in for short periods to perform special tasks;
- Unskilled workers, such as thread cutters, who might work for a few days or weeks and then quit.

However, there is a third group that relates to a complex wage system.

Piecework

Piecework is illegal in many countries because factories may set piecework rates at an unfairly low level, while other companies may set quotas at unreasonably high levels. However, at the very top, factories that view their workers as important human capital, will set piecework rates sufficiently high to keep their existing workers and encourage other qualified workers to join their factory.

The result is a complex system including both daily pay and piecework.

Complex systems

Successful factories divide workers into three groups: A – B – C.

A potential sewer is hired and unlike the low-end, which will invest 2-3 weeks in training, the high-end factory will invest as much as 2-3 months. During this time the sewer is paid on a daily pay basis.

C-class sewers: after training, the worker joins a line, where they are still paid on a daily pay basis.

However, while wages are paid on a daily basis, they are also calculated on a piecework basis.

B-class sewers: at a certain point, typically 2-3 months on the line, the wage based on piecework exceeds the daily pay. At that point, the worker shifts from daily pay to piecework. At some factories, the worker is actually reimbursed for the difference. On the other hand, workers that fail to achieve B-class status often have to leave.

A-class sewers: in every factory there are sewer-superstars, either because of their ability to carry out difficult work to high quality, e.g., blazer-jacket sleeve setting; or because of their amazing speed. Piece rates for A-class sewers are adjusted to the point where often they earn more than their supervisors.

The complex system works because factories have and keep the very best workers.

Above the top: multitasked teams.

If a factory organises itself with lines based on semi-skilled, single task sewers and their business is fashion garments at the designer level, their business will invariably fail, because:

- Smaller quantities reduce the number of machines in the line to the point where it can no longer be balanced;
- Quality demands become so high that the line cannot produce to the required standard or level.

Box 7 The ultimate fast delivery

We are a multitasked-team factory operating in Hong Kong, producing dresses for designer labels,

My most important customer was Oscar, the leading couture designer in the United States at the time. I was not making their high-priced stuff — dresses retailing for $5,000-$10,000 — but rather their cheap, prêt-à-porter dresses retailing for $400-$600.

One Sunday morning, Oscar’s partner Jerry telephoned me. He had a problem. They had an advertisement running the following Saturday for Saks 5th Avenue showing a style that we had not yet produced. Could we produce 550 pieces of the order, to arrive not later than Friday morning New York time?

The manager pointed out that all he could guarantee is everything up to the moment the finished goods left the factory.

The ultimate question was therefore, could we produce 550 dresses in 24-hours?

The manager called a meeting of senior staff and asked them. There was no question, the job could be done.

Wasn’t this the world’s greatest factory? Any doubt of their super-competence would be an insult.

How much do you want?

The world’s greatest factory workers required 30 minutes to reach a consensus: triple pay.

<u>The following day was a day off</u>

Again, triple pay.

Of course, everybody cheated.

The cutters worked from Sunday through to Monday morning. The goods were printed plaid and had to be blocked and nailed to the table.

The factory day began at 9:30, but everybody arrived at 6:30.

Even the manager had a role to play. His job was to provide cakes, soft drinks and tea.

On Tuesday morning at 8:00 the truck pulled up to take the goods to the airport.

Oscar’s partner was suitably impressed and offered to pay a bonus, which the manager of course refused. After all, we were the world’s greatest factory.

The total cost was under $8,000, but the reward was worth millions.

Once again, we proved to ourselves that we were indeed the world’s greatest factory.

For us, doing the impossible was all part of a day’s work. You too can create the world’s greatest factory

At that point the factory must change from single-tasked lines to multi-tasked teams.

The multitasked team requires an entirely different structure, one that is totally independent and is self-managed. The closest example would be that of a sub-contractor who uses your machines.

In a well-organized team system, the factory no longer pays wages but rather, as with any sub-contractor, pays one amount for the entire order, which the team divides up as it sees fit.

Caputuring value in cost sheets

The unlearning experiences

It is worth repeating once again: our industry faces a serious problem. Increasingly, the decisions we make do not always deliver the solutions we expect. The purpose of this book is to encourage a new way of approaching the decision process.

Ironically, this book provides no new information. Everything outlined here is well known to professionals on both the supplier and customer sides. The real problem is that in order to understand these new concepts, we must first put away our current ideas of how the industry operates and how we must operate in the industry.

We may not be able to calculate costs accurately, but as we have seen above, the job costing will provide a reasonably close estimate of costs.

Price may not be calculable because it is based on value, which is subjective and may not even be rational. And in any case, a buyer is not necessarily interested in cost. You go to a pharmacy to buy toothpaste, or a car dealership to buy a car. You do not care how much Colgate or Porsche paid for materials and manufacturing; you only consider that… The item is worth the price.

What is true for you when you buy toothpaste, or a car is equally true when you buy 50,000 woven shirts.

The only difference is that for cost to value analysis… Cost and value must be calculable.

The challenge of the basic cost sheet

The reality is that there is no such thing as a cost sheet because there is no such thing as the cost of any style. The cost of any style cannot be fixed because other external factors can change the cost:

- The factory: Each factory will have its own unique costs because each factory has its own unique structure and system – think productivity.
- The order: Quantity directly affects cost. The cost per garment for an order of 100 pieces is greater than the cost per garment for an order of 1,000 pieces; while an order for 1,000 pieces is greater than the cost per garment for an order of 10,000 pieces; and an order for 10,000 pieces is greater than the cost per garment for an order of 100,000 pieces, and so on ad infinitum.
- Date: The cost per garment in low season is less than the cost per garment for the same style in high season when the factory faces capacity issues, availability of materials, etc.
- What you pay for an item may not be the total cost. To take the simplest case, you may pay 10¢ for a zipper, but as we will see below, the cost of that zipper may be $10.00. This is not theory.

The cost to value cost sheet

The cost to value cost sheet is all about change. It is divided into two parts: the before and the after.

This table shows the cost to value cost sheet format. Because there is not before and after, both sides of the table are identical. When we apply the format to different factors the changes will become apparent.

For the purposes of calculation, wherever possible we will use these same cost factors and assume the product to be a woven cotton shirt.

Table 15 Cost to value cost sheet

		No added services		Added services	
		Cost factors	Cost	Price	Cost factors
1	Material		$6.00	$6.00	
2	Trim		$1.00	$1.00	
3	CM labour		$0.64	$0.64	
4	CM overhead		$1.86	$1.86	
5	CM total cost		$2.50	$2.50	
6	Added cost				
7	Total cost		$9.50	$9.50	
8	Added profit				
9	Factory profit		$0.50	$0.50	
10	Total FOB cost		$10.00	$10.00	
11	Agent commission	5.0%	$0.50	$0.50	5.0%
12	Freight		$0.25	$0.25	
13	Duty	16.2%	$1.62	$1.62	16.2%
14	Clearance		$0.10	$0.10	
15	Transport		$0.15	$0.15	
16	Total delivery duty paid (DDP)		$12.62	$12.62	
17	Product development cost centre	20.0%	$2.52	$2.52	20.0%
18	Distribution cost centre	5.0%	$0.63	$0.63	5.0%
19	In-store		$15.78	$15.78	
20	Markup	75.0%	$47.03	$47.03	75.0%
21	Retail		$63.10	$63.10	
22	Markdown	35.0%	$22.09	$22.09	35.0%
23	Net retail		$41.02	$41.02	
24	Net retail profit	40.0%	$25.24	$25.24	40.0%

An explanation of the rows in the cost to value cost sheet:

- 1-10: the basic cost sheet;
- 6: added costs for the work. Every new service increases factory cost;
- 8: added profit (value). Every new service provided, against which the factory is entitled to higher profit;
- 11-19: the cost of items up to in-store arrival. Here there is one important consideration:
- 17: the product development cost centre. Customers can calculate the total cost of product development for any particular period because they have the data, e.g. total wages, total overhead, total material costs, etc. However, the customer cannot break down these costs on a per unit basis.

  This is because the cost of each factor, such as sample making, is fixed and therefore changes with the number of units in the order on a per unit basis. The cost of product development also changes with each product type. For example, it is greater for an overcoat than for a handkerchief.

  The solution is to relate the product development cost with DDP, since changes in DDP are similar to changes in product development. The conclusion may not be 100% accurate; however, the customer only cares that the aggregate is approximately the same as the total product development cost for the period.

- 20-24: cost of items up to retail sale of last piece.

Cost factors: this is the data on which the calculations are based. For example, agent commission = 5%. For the purposes of this guide, the Figures are arbitrary and should be replaced with real data.

- Duty: 16.2% reflects the United States of America duty HTS 6205.20.20 for men's cotton woven shirts.

Cost savings

Every effort on the part of management to increase profit by reducing costs can be divided into two parts:

- Added cost: the investment of time, effort, and capital;
- Added value: the profit derived from the investment.

When the cost of the investment is paid for by the company and the value received goes back to the same company, we define this as intrinsic cost savings.

These cost savings can be based on work either by the customer or the supplier, but because they are intrinsic costs these cost savings are transferable to the other side. Work carried out by the factory benefits only the factory, whereas work carried out by the brand or retailer customer benefits only that customer.

The customer side

Cost savings may come from different areas:

- Expansion to new markets;
- Added products;
- Introduction of new technology;
- Garment cost reduction.

The factory side

Cost savings may come from different areas, the two involving increased productivity are the most relevant to our work:

- Capital investment in high-tech equipment;
- Capital investment in worker training.

Investment in high-tech machinery

Assume a machine that costs $25,000 will do the work of four sewers. This sounds pretty good. With enough investment, a factory with 200 sewers could be reduced to 50 sewers. But let's take a closer look at the numbers.

Let's assume the following:

- The cost of the machine will be amortized over a period of 5 years = $5,000 per year;
- Interest at 5% = $625 per year;

- Cost = $5,625 per year;
- Cost per month = $468.75.

Table 16 Investment in capital equipment replaces four workers on a wage of $150/month

Machine cost	Annual amortization	Interest	Cost per annum	Per month
	5 years	5.0%		$12.00
$25 000.00	$5 000.00	$625.00	$5 625.00	$468.75

To calculate the capital cost per minute, we divide the total number of working minutes per month (10 hrs/day x 26 days/month = 15,600 minutes). This comes to 3cts/minute. The capital cost of a 40-minute garment is therefore $1.20.

Capital cost per unit (40 min/per garment)		
Per month	Per minute	Per unit
$468.75	$0.03	$1.20

Table 16 shows how the investment in one machine that replaces four workers breaks even on a per-unit basis.

For the cost sheet, we use material and trim costs multiplied by four, because we are talking about the work done by four workers.

Capital investment stays at $1.20, because there is only one machine.

We then should calculate the sewing labour cost per unit. Here we go back to the 15,600 minutes/worker, per month, divided by the $150/month wage. This works out at 0.96¢/minute or 38¢ per 40-minute garment.

Sewing labour only represents part of the CM total labour, about 60%. The rest is made up of labour from other departments (cutting, pressing, packing, etc.), which is not affected by capital investment calculations. CM overhead remains the same because the number of units produced is unchanged, only the number of workers decreases.

Table 17 Capital Investment when one machine replaces four workers

	Without capital investment		After capital investment	
	Cost factor	Cost	Cost	Cost factor
Material	60%	$24.00	$24.00	
Trim	10%	$4.00	$4.00	
Capital investment		$0.00	$1.20	
CM labour sewing		$1.54	$0.38	
CM labour other		$0.77	$0.77	
CM overhead*		$6.69	$6.69	
FOB		$37.00	$37.04	-$0.04

*CM overhead calculated at industry average of 2.9 x total CM labour

But there are other issues to consider. How many factories in developing countries have access to funds for capital investment? To make matters worse, we haven't even factored in the cost of maintenance yet. Furthermore, the 50 remaining workers would not be illiterate, semi-skilled sewers, but rather university graduates with engineering degrees. And if we are located in one of the least-developed countries, we have to ask ourselves whether we could find qualified engineers in our area, and if so, how much would we have to pay them.

There is a good reason why new technology is only successful in factories located in industrialized countries. Imagine you are one of these factory owners. You face the same problems. Wages are rising and unlike your counterpart located in a developing country, who can no longer afford to pay his workers $150 a month for a 60+ hour week, you are paying $3,000 a month for an eight-hour day, five days a week. Your situation is very different. In your case the machine is cheaper than the worker. Your $25,000 capital investment is almost paid off when it replaces one worker. You begin to see real savings when it replaces two workers.

Table 18 Capital investment when one machine replaces two workers

	No capital investment		With capital investment	
	Cost factor	Cost	Cost	Cost factor
Material	60%	$12.00	$12.00	
Trim	10%	$2.00	$2.00	
Capital investment		$0.00	$1.20	
CM labour sewing		$17.79	$8.89	
CM labour other		$8.89	$8.89	
CM overhead		$26.68	$26.68	
FOB		$67.36	$59.66	Factory savings $7.70

From these calculations, it is obvious that many manufacturers in high labour cost countries will benefit from the current high-tech revolution. But there are exceptions. For example, for products such as sweaters and hosiery, computerized machinery can reduce the number of workers to the point where capital investment could be amortized profitably even in the least developed countries (LDC). Similarly, manufacturers in middle-income countries can invest profitably in some high-tech machinery, such as computerized laser cutting and computerized garment sorting, to provide pick and pack services.

Investment in worker training

There is a vast difference between productivity in industrialized countries and the garment exporting countries located in the developing and least developed countries of the world. In industrialized countries, a 2-3% increase in productivity is considered to be very good news. While, in many garments exporting countries productivity remains very low. However, a garment that requires 40 minutes in most countries can be produced in 20 minutes in China.

We have seen productivity increases of 25% are possible in low productivity countries in a few short months provided the factory has access to world-class engineers and is willing to make the investment.

In industrialized countries, where labour rates are high and overheads relatively low, the benefit of higher productivity is reduced labour costs. In most garment producing countries, where labour rates are very low and overheads relatively high, the greatest benefit of increased productivity is reduced overheads.

For the purpose of our calculations, we will assume the following:

- Labour cost = 64¢ per garment (40 minutes at 1.6¢ per minute);
- Productivity at 50% = 40 minutes per garment (based on China = 100%);
- Pieces per machine, per day before productivity increase = 15 (600 mins/day ÷ 40 minutes per garment);

- After 25% increased productivity = 32 minutes per garment and 18.75 pieces per machine, per day;
- Cost of training = $250,000 or $2,083.33/month (amortized over 12 months);
- A 250-machine factory at 30 minutes per garment has a capacity of 130,000 units per month (250 x 26 days x 20 units/machine/day);
- Estimating average production at 75% capacity, the factory will produce 97,500 units per month;
- Cost of training per unit ($2,083 ÷ 97,500) = 21¢.

Based on a cost of $250,000 for the training, the cost rises by 21¢ per unit. At the same time, labour cost falls by 25% per unit, or 13¢. More importantly, since overhead is calculated as a factor of labour, the overhead per unit also falls by 25%, equalling 61¢ total overhead savings. Furthermore, once the training has been completed, the cost of refresher training in subsequent years falls considerably.

Table 19 25% increased productivity from 40-30 minutes per piece

	No worker training		With worker training	
	Factor	Cost	Cost	Factor
Material	60%	$6.00	$6.00	
Trim	10%	$1.00	$1.00	
CM labour		$0.64	$0.48	75%
CM overhead		$1.86	$1.40	75%
CM total cost		$2.50	$1.88	
Added training cost		$0.00	$0.21	
Total cost		$9.50	$9.09	
Total revenue		$10.00	$10.00	
Profit	5%	$0.50	$0.91	9.1%

Box 8 Productivity comparison and standard allowed minutes

The search for an international standard of number of minutes per garment:

This standard does not exist. Professionals have unintentionally created an artificial index of productivity where China equals 100, against which all other industries and factories can be measured.

We have to ask ourselves:

- What China? Is this the highly efficient factories of the Shanghai area and Pearl River Delta, or is this the inefficient factories of Gansu and Anhui?
- What factories? Is this the modern high-tech operations or the old ramshackle state-owned enterprises (SOE)?

The origin of the China = 100 myth comes from professionals who many years ago were sent by Hong Kong, Taiwanese and Korean factory groups to set up factories in the Pearl River Delta, adjacent to Hong Kong. Their efforts led to very successful and highly efficient operations, with the result that when these same professionals were retained to set up factories elsewhere, their goal was to replicate their successes in China.

	Product	(Average)	(Range)
1	T-shirt	8	6-12
2	Polo shirt	15	10-20
3	Dress shirt	21	17-25
4	Tailored trousers	35	25-50
5	Hoodie	45	35-55
6	Blazer jacket	101	70-135
7	Blouse	18	15-45
8	Bra	18	16-30

One of the most difficult concepts related to productivity is reduction of overheads. We can understand that increased productivity results in reduced labour cost because by reducing the number of minutes from 40 to 30, we can produce a greater number of garments within the same time. What is true of labour is equally true of overheads per unit. The total overhead for the period remains the same, but since the number of garments produced in the period rises, the overhead per unit decreases.

There is yet another advantage to training workers to increase productivity. In a world where there is constant pressure for higher wages, factory management may decide to return the 16cts of cost savings to the workers, effectively increasing wages by 33%. The factory's profit would be reduced to 75cts, but it still represents 7.5% of FOB and is 50% higher than their 5% profit previously.

There is an argument that worker training fails where high worker turnover exists. This is a valid concern, after all you do not want to invest in worker training that will benefit your competitor. However, it does beg the question, why are you losing workers in the first place? What should you be doing to retain them? Increasing worker productivity does not depend on developing new skill sets alone, but more importantly, on worker empowerment. In this scenario, the worker becomes the factory's greatest capital asset, and it is for precisely this reason that investments are being made.

We recognize that cost sheets must provide both comprehensive and accurate information. There is yet another equally important consideration. Full value cost sheets may involve thousands of mathematical relationships and millions of pieces of data. This is easy for the computer, but most people need everything boiled down to a one-page report that answers a specific question in a readily understandable manner.

So ideally when the salesperson comes to sell you a robotic piece of machinery, as the factory owner you should be able to go to your computer with a simple request:

You: “Irving, this guy wants to sell me a machine for $250,000, which will take the place of four workers. Should I buy it?”

Irving, the computer: “Are you out of your mind? Replacing just four workers gets you nowhere. The machine would have to replace more than 10 workers just to break even.”

China

The importance of intrinsic cost reduction cannot be overemphasized. The best example to look at here is China, the world’s largest garment exporter with a 29.4% market share. There are many reasons why China’s garment industry is the world’s largest: easy access to locally produced materials; ease of doing business; concentration on sophisticated fashion products. However, these reasons alone do not explain why China’s garment exports are so large compared to everyone else. Of the world’s 10 largest garment exporting countries, China ranks not only first, but with the exception of the EU it ranks larger than the next seven garment exporting countries combined.

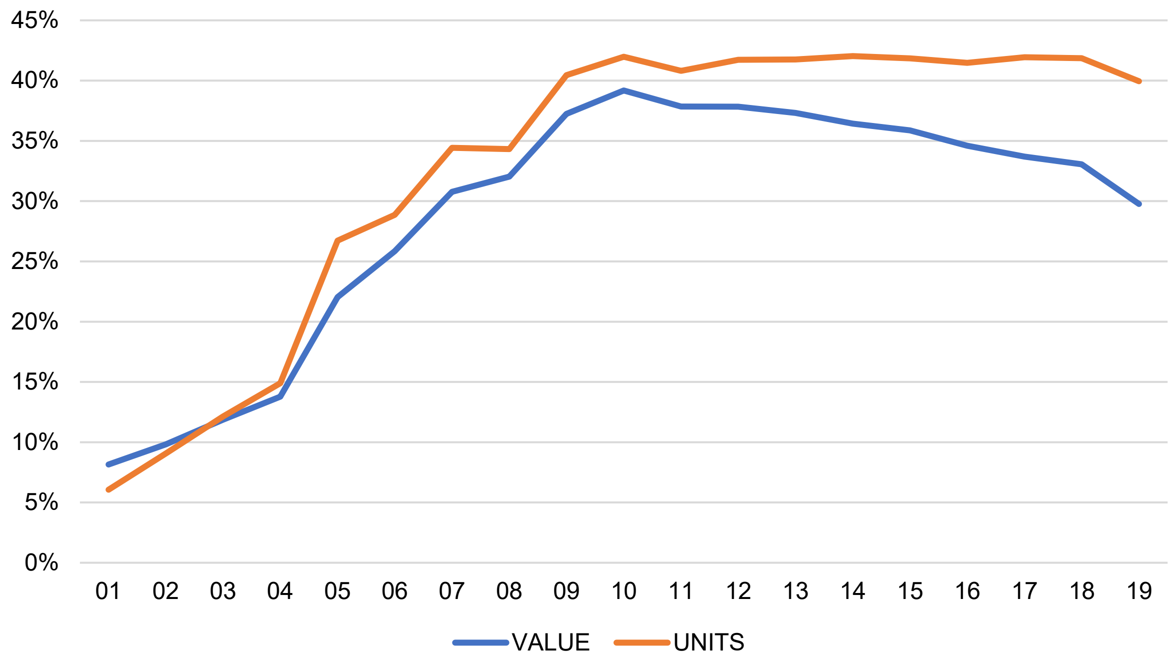
Table 20 Top 10 garment exporters (2019)

Rank	Country	Value $Mn	Market share
1	China	138,238	29.40%
2	EU	134,531	28.60%
3	Bangladesh	40,715	8.70%
4	Vietnam	30,038	6.40%
5	India	16,508	3.50%
6	Turkey	15,540	3.30%
7	Indonesia	8,246	1.80%
8	Cambodia	8,287	1.80%
9	Pakistan	5,843	1.20%
10	Sri Lanka	5,638	1.20%

Source: ITC-Trade map

We are told that China is gradually losing its premier position as the world’s leading garment exporter, but if we look at the long-term trends over the past two decades, we see a very different picture.

Figure 12 Garment import market share (2001-2019)



Source: OTEXA

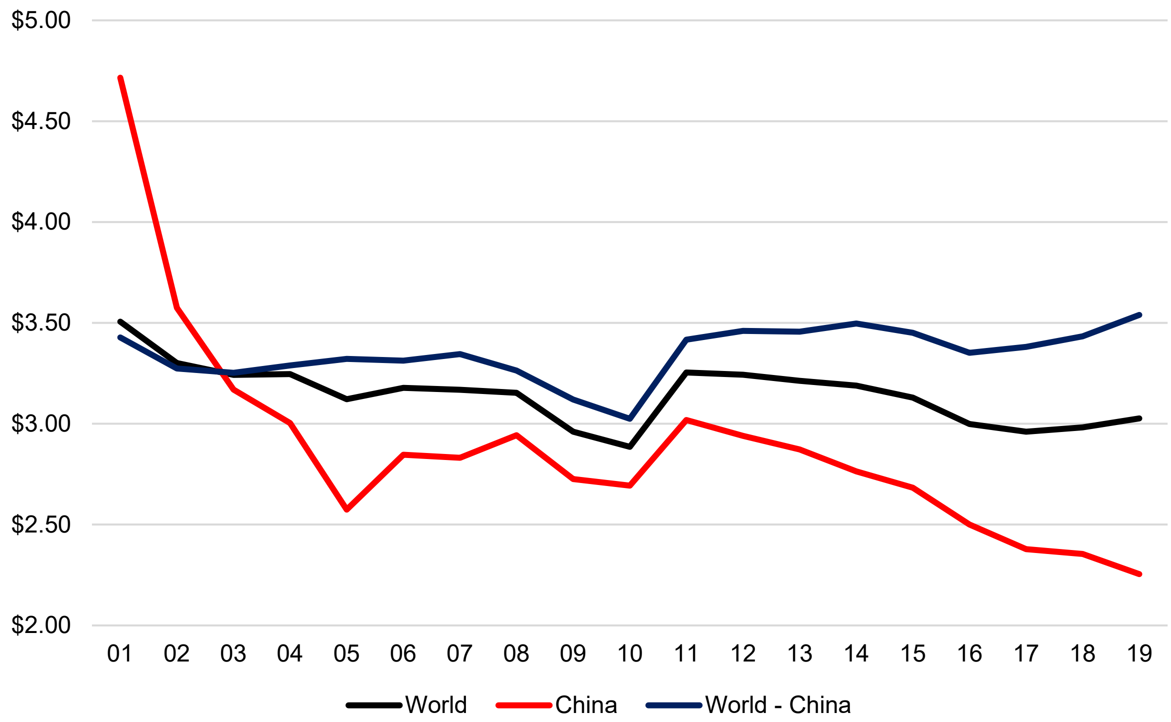
Twenty years ago, the Chinese garment industry was still in the early stages of development. Its garment exports were also restricted by quota. These were phased out over a period of time, with the end of the quota regime on 1 January 2005. We can see the effects of the phase-out when we compare Unite States of America imports from China over the period 2001-2010: market share as measured in units rose from 6.1% to 42% and by value from 8.2% to 39.2%.

Beginning in 2010, market share by value began declining, moving from nearly 40% down to 29.8% in 2019, thus leading to the China-is-in-decline thesis. But although market share by value did indeed decline, market share in units remained little changed.

The reality is that China's garment exports have not declined, only their average FOB price. This is a critical issue. If we look at the FOB price data from 2001 to 2019, we see a very different story. In 2001 FOB prices from China peaked at $4.72 compared with $3.51 for the world average, a difference of 34%. The end of quotas brought dramatic reduction in average FOB prices. FOB prices from China were 18% below world average. By 2019, the FOB prices from China were at a discount of 26%. Some of this price drop was attributed to the end of the quota premium. But most of the price drop was the result of Chinese factories having to compete with suppliers located all over the world.

For a more detailed description of services that can be developed by garment factories that would help creating value for customers, please see Appendices.

Figure 13 USA garment imports, world versus China: FOB price per unit



Source: OTEXA

These remarkable FOB price reductions occurred during a period when average wages were rising. This could only be the result of equally remarkable increased productivity in China. When we examine the graph further, we can see the effects of China's increased productivity on the global garment industry as a whole. Not including China, from the period 2011 to 2019, the global average FOB price fell from $3.25 to $3.02.

Addressing supply chain costs

When company management decides on a specific project, the project can usually be divided into two parts:

- Added cost: the investment of time, effort and capital;
- Added value: the profit derived from the investment.

When the added cost comes from one company and the added value goes to the other, we define it as extrinsic cost savings.

These cost savings are based on a cooperative effort between the customer and its factory supplier. Many customers and suppliers do not believe that extrinsic cost savings exist because they believe that cooperation between customer and factory is impossible. Nevertheless, the cooperative model does indeed exist and can produce the greatest cost savings.

Table 21 Basic cost sheet

	% Total cost	Cost
Fabric	60.0%	$6.00
Trim	10.0%	$1.00
CM labour	6.4%	$0.64
CM overhead	18.6%	$1.86
CM total cost	25.0%	$2.50
Total cost	95.0%	$9.50
Factory profit	5.0%	$0.50
Total FOB cost		$10.00

Most importantly, extrinsic costs cannot be lumped together with overhead. Rather they must remain as separate distinct items in our cost sheet so that we can deal with them apart from other costs.

There are two extremely important extrinsic costs, which have never been included in the basic garment cost sheet:

- Product development (sample making, material sourcing, trim selection, etc.). See Appendices;
- Markdowns.

Let's look first at the sample making process. At first glance it would appear that sample making is an intrinsic cost for the following reasons:

- By definition, the sample must be related to the garment on order;
- Production cannot start until a sample is approved;
- There must be a quantifiable cost to making a sample.

The reality is different and this results from two problems. First of all, most styles that go through the sample making process never go into production. Perhaps two out of every three styles are discarded. To quantify the cost of sample making, we have to include the discards, which are by definition neither related nor required for the garment that goes into production.

Second, we cannot calculate the sample making cost per piece in advance because the cost of the sample making process is unrelated to the size of the final order. Accurate information is possible only with the job costing.

There is a three-step solution to the extrinsic cost problems. They are not 100% accurate, but they are a great deal better than the alternatives. Here are the steps:

- Quantify the cost of sample making in the supplier country:
  - Assume a worker is paid $9.62 per day, calculated on the basis of $250 per month for a 26-day month;
  - Assume overhead equals 290% labour as per the cost sheet on page 11;
  - Assume that each sample requires 1.5 work days, including sample making, pattern making and other related work;
  - Assume the following are the requirements for the sample making process:
    - First sample;
    - Two duplicates required before designer approves the style;
    - Two additional styles that never go into production.

Table 22 Cost of sample making process for one style: Overseas factory

	Wages per day	1.5 days per sample	Overhead: 2.9 times labour	CM total	Material & trim	FOB
First sample	$9.62	$14.42	$41.83	$56.25	$7.00	$63.25
2 Duplicates						$126.50
Total cost before designer approval for style going into production						$189.75
Cost of sample making process for two styles that are rejected and never produced						
2 Styles @ $189.75 per style						$379.50
Total sample making cost chargeable for one style going into production						
3 @ $189.75						$569.25

- Cost per piece (based on $0.50 profit per piece as shown on basic cost sheet):

Order quantity	1 000	5 000	10 000
Sample cost per piece	$0.57	$0.11	$0.06
Percentage of profit	114%	22%	12%

- Quantify the cost of sample making in the customer's home country:
  - Assume a worker is paid $225 per day calculated on the basis $3,300 per month for a 22-day month;
  - Assume overhead equals 100% of labour;
  - Assume each sample requires 1.5 worker days, the same as the factory listed above;
  - Assume sample requirements as the factory shown above:
    - First sample cost;
    - Two samples before designer approval;
    - Two samples rejected.

Table 23 Cost of sample making process for one style: Customer's home country

	Wages per day	1.5 days per sample	Overhead 2.9 times labour	CM total	Material & trim	FOB
First sample	$150	$225	$225	$450	$7.00	$457
2 duplicates						$914
Total cost before designer approval for style going into production						$1 371
Cost of sample making process for two styles that are rejected and never produced						
2 styles @ $189.75 per style						$2 722
Total sample making cost chargeable for one style going into production						
3 @ $189.75						$4 113

- Cost per piece:

Order quantity	1 000	5 000	10 000
Sample cost per piece	$4.11	$0.82	$0.41

- Calculate the customer savings after allowing for added factory cost, plus added factory profit for sample making. Allocate the savings between the parties based on 5,000 piece orders (75% for the customer and 25% for the factory).

Based on 5,000 units:

- Sample cost per unit to the customer in home country = $0.82;
- Added cost if factory making the sample = $0.11;
- Difference of $0.71 allocated:
  - Factory = $0.10
  - Customer = $0.61

Table 24 Sample making transferred from customer to factory

	Customer sample making		Factory sample making	
		Cost	Cost	
Fabric		$6.00	$6.00	
Trim		$1.00	$1.00	
CM labour		$0.64	$0.64	
CM overhead		$1.86	$1.86	
Added cost sample making		$0.82	$0.11	
Added factory profit		$0.00	$0.10	
CM total cost		$3.32	$2.61	
Total cost		$10.32	$9.71	
Factory profit	5.0%	$0.50	$0.60	6.0%
Total FOB cost		$10.82	$10.41	
Customer savings			$0.61	

The introduction of additional services is just one of the ways in which a factory can create greater value by reducing the customer's costs. In this instance all cost factors – for material, trims and CM – remain unchanged. Later on in this book, we will examine areas where the factory can create greater value by further reducing customer costs.

Transferring sample making from the customer to the factory generates several other advantages, which may ultimately be of greater value than increased direct profit for both sides. The first advantage revolves around Quality Assurance (QA), which is a serious potential problem for the customer.

Even when the first sample is approved, there is no guarantee that the factory will be able to produce a garment equivalent to the sample. This is what we call design integrity, whereby the factory approval duplicate looks like the original designer sample and the stock garment looks like the factory approval duplicate. Moving to a zero-service factory increases the risk of lost design integrity, while moving to a full-service factory obviates that risk.

In addition to the direct savings of 61¢ per unit, lead times are reduced. It is well known that factories can carry out the entire sample making process faster than the customer, because they have more qualified staff, with greater knowledge and experience in garment making.

Static versus dynamic cost sheets

As discussed above, the basic cost sheet relates only to FOB cost.

Table 25 Basic cost sheet

Fabric	60%	$6.00
Trim	10%	$1.00
CM	30%	$3.00
FOB	100%	$10.00

The problem is that the basic cost sheet, while undoubtedly accurate as far as it goes, does not go far enough. For example, the cost sheet shows fabric cost to be $6.00 (2 m at $3.00/m). If the price of fabric rose to $3.50/m then the fabric cost would rise by 16%, increasing the FOB price from $10 to $11, an increase of 10%.

However, a 10% increase in FOB price may not necessarily cause an increase in the customer's costs. For example, if a factory located in Mexico replaced the made in China fabric with fabric produced locally, in North America, its products would be entitled to duty free access to the United States of America. The cost of fabric may have increased from $6.00 to $7.00, but the savings on duty, $1.62, would have more than compensated for the increased FOB.

Table 26 Chinese fabric versus local fabric

	Chinese fabric		Local fabric	
	% of total cost	Cost	Cost	% of total cost
Fabric	60.0%	$6.00	$7.00	63.6%
Trim	10.0%	$1.00	$1.00	9.1%
CM	30.0%	$3.00	$3.00	27.3%
FOB	100.0%	$10.00	$11.00	100.0%
Duty	16.2%	$1.62	$0.00	
LDP		$11.62	$11.00	

The problem is that the basic cost sheet is static, it is complete in itself but it is unable to take into consideration any external factors. As we will see, the value of every single cost factor is based on other cost factors. If we do not include these other cost factors, we have no way of determining actual costs. This really means every cost factor.

For example, which is more expensive: air freight or sea freight? Considered in isolation, we would all agree that air freight is far more costly than sea freight. However, if we look closer, we would probably all agree that in many cases a 10-hour freight time compared to 10-day freight time may be worth the additional cost. Unfortunately, in our basic cost sheet, there is no way to include the relative value of air versus sea freight.

When we criticize a cost sheet, it is usually because the numbers are wrong. The button did not cost $6.00/gross. The garment did not require 24 minutes of production time. The overhead per unit was not $1.74. In addition, these errors are almost always incremental. The button cost was $7.00/gross. The production time was 28 minutes. The overhead per unit was $2.54. Really serious problems occur because we failed to include cost factors.

In the case outlined above, the exclusion of import duty in the basic cost sheet resulted in an error of $1.62, an amount greater than the trim cost, the total labour cost and almost equal to the total overhead cost.

The effects of the failure to include all costs have been aggravated as customers' strategies evolved over time. In the early days, the customer engaged in garment buying whereby the factory supplied all materials and manufacturing and made added profit on both materials and CM[4]. Later, customers moved to garment sourcing, whereby the customer negotiated prices for all materials directly with the fabric mill and all trim suppliers, leaving only CM prices open for negotiation.

Recently, some, albeit few, sophisticated buyers have moved to open sourcing, whereby new technology has given them the ability to calculate all cost factors including material consumption and, more importantly, the number of minutes required to produce the garment. In this case, the only area open for negotiation is the cost per minute.

Using open sourcing, the customer no longer negotiates prices on a per style basis, but rather on all styles to be produced during a specific time period and entirely on a cost-per-minute basis. For example, if the customer pays 6¢ per minute, he will pay CM $1.20 for all garments requiring 20 minutes production time regardless of the style.

As the industry moves from garment buying, to garment sourcing, to open sourcing, those factories still trapped in the old-world system will eventually be forced out of business because they cannot see beyond the static world of fabric, trim and CM. Those that understand the dynamics of cost and that include all cost factors in their cost sheet will see the move to garment sourcing and open sourcing as an opportunity, an opening door that will increase their profit. If anything, as customers increasingly depend on open sourcing, smart factories will be in the driver's seat with customers only too happy to accept their conditions.

For the factory, the purpose of the cost sheet is to not only show them how to define costs, but to also show them how to create value. Factories still operating under the old system need to know that in a world where the customer already knows the cost of fabric and trim, if all they can offer is ever-lower CMs, they cannot survive.

To survive the factory has to provide increased value, not just to the customer but to its own bottom line as well.

[4] CM: Literally cut and make, a term that includes all manufacturing costs: labour, overhead and factory profit.

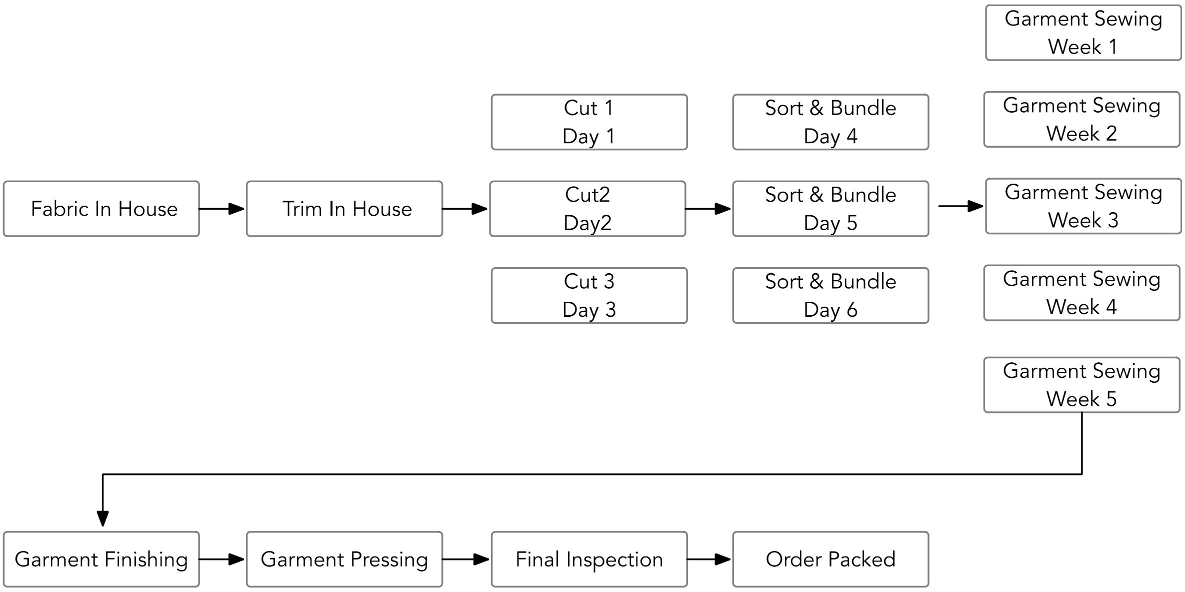
Schedules and capacity

The well-run factory depends on detailed, real-time information of two interrelated factors:

- Schedules
- Capacity

From the very first step, long before production begins or any materials are ordered, the factory must create a schedule. The schedule starts at the end, with the final date: stock garments packed. To reach this point we have approximately seven major events, each of which must occur on or before a specific date if the order is to be shipped on time.

Figure 14 Schedule planning



Source: Birnbaum on Strategy

Schedule

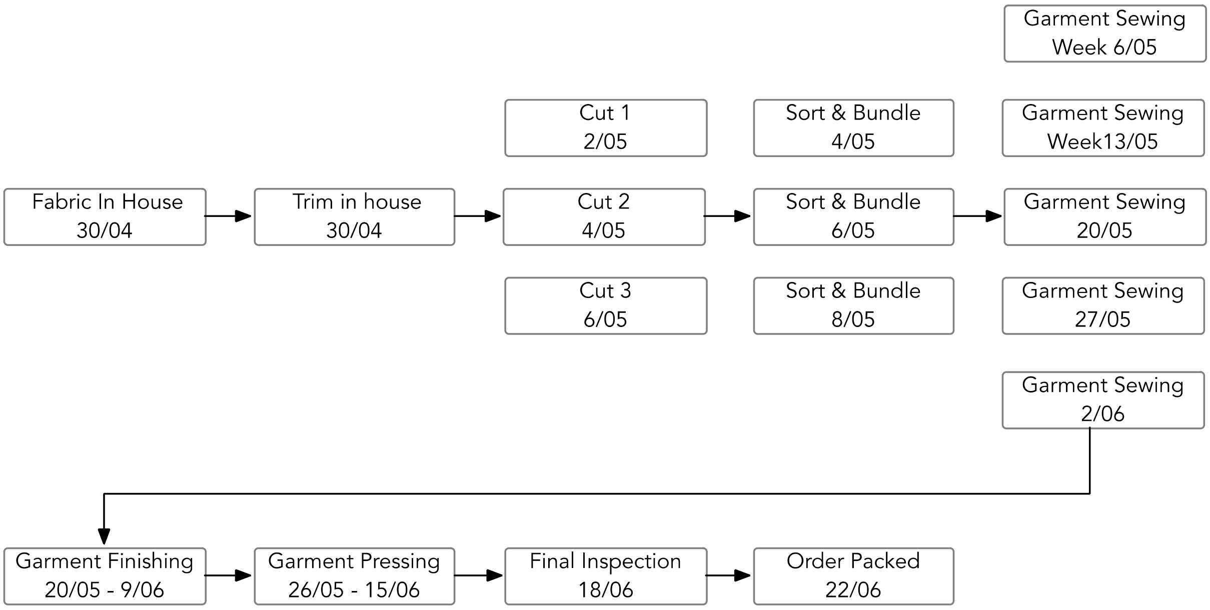
Some of the steps are obvious, or at least they should be. To begin the process you need all the materials – fabrics and trims. Trims require considerable advance planning. A garment may require anywhere between five to 25 trim items. The failure of the zipper to arrive on time is equally as serious as the fabric not arriving on time because in neither case can production start. Therefore, the schedule must include the arrival date of each and every single item.

Some steps require special consideration. The most important step in the process is probably garment sewing. To arrive at a reasonable cost Figure we have to consider a number of factors, such as the difficulty of the style, the availability of equipment and the size of the order. We must first determine how many minutes are required to sew one piece. This is often a relatively straightforward calculation: we look for a similar style that has been produced in the past. Our costing template requires the following information:

- Number of sewing lines;
- Number of sewing machines in each line;
- Number of sewing days required to complete order.

From this we can easily determine the number of minutes per machine per garment. In the beginning, the estimates will often be less than accurate. However, with time, estimates and reality will coincide.

Figure 15 Schedule



Source: Birnbaum on Strategy

Individually, each schedule not only defines the time required to complete each order, but, more importantly, it determines the moment that delays and/or problems occur that will affect the final delivery date. While the prudent factory will include extra time in each schedule to allow for unforeseen delays and problems, that extra time may still prove insufficient. For example, if the zippers arrive one week late, on 7 May, the completion date of 22 June may well be delayed until 29 June. The customer should be notified of expected delays as soon as possible. They won't be happy but knowing 30 days in advance about a delayed shipment is much more preferable than finding out at the last minute.

Furthermore, when compiling schedules, overtime production has its own considerations. Factory professionals recognize that time lost is never recovered. Also, excessive overtime, while resulting in more production today, means less production tomorrow – the workers are tired.

Capacity

Collectively, the aggregate of all schedules provides the data necessary to measure capacity. Each additional schedule notifies management just how much more business the factory can accept for each period. Overbooking business is regrettably common in our industry, with the result that factories and, in some cases entire national industries, are branded unreliable.

Box 9 Measuring orders against capacity: Sample monthly report

The Figures shown below are hypothetical but reasonable. In any case, they should not be taken as an accurate description of all factories.

Imagine the following:

Factory size: 200 machines

Wages: $250 per month

Working days: 26 days per month

Working hours: 10 per day

Wages: 1.6¢ per minute

	Wages/month	Days	Hours	Minutes
Amount	$250.00	26	10	60
		$9.62	$0.96	$0.016

Number of total production minutes per month based on 200 machines:

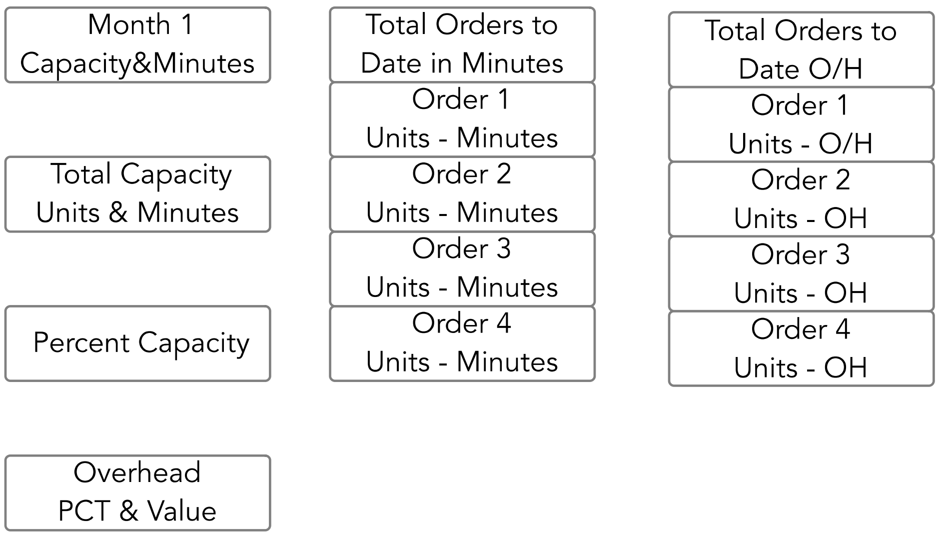
Units	Machine numbers	Minutes per worker	Total minutes
	200	15 600	3 120 000

The following are the confirmed orders at the time of the report for the target month.

Orders for target month				
	Units per order	Minutes per piece	Total minutes	
Style 1	6 300	30	189 000	
Style 2	9 000	26	234 000	
Style 3	23 200	42	974 400	
Style 4	11 350	37	419 950	
Style 5	11 200	33	369 600	
Total			2 186 950	
Percentage capacity				70.1%

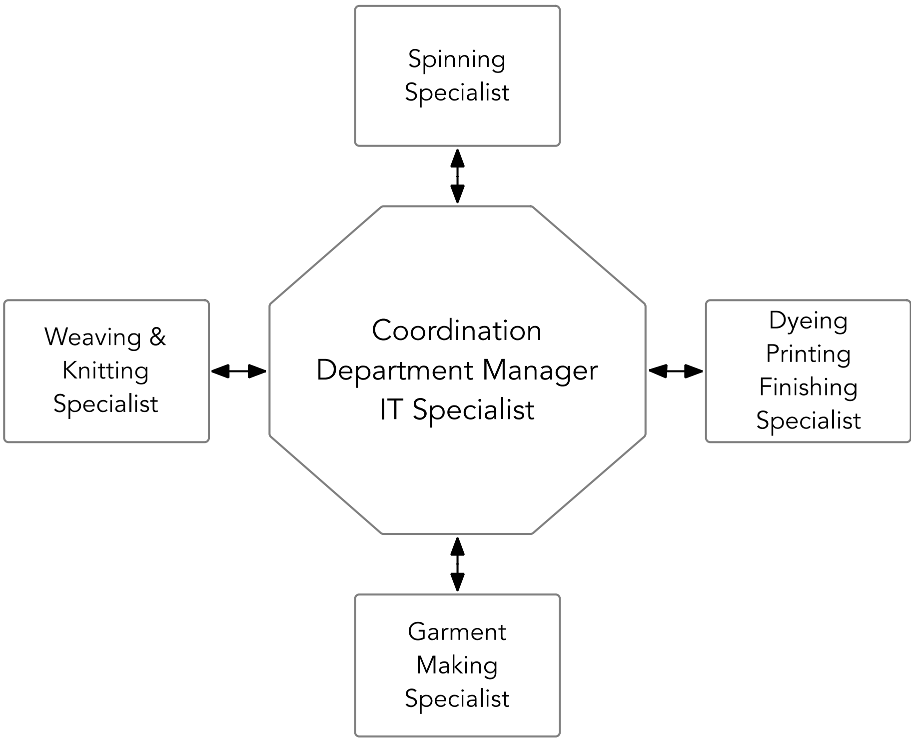
If, as shown in the Figure above, the factory is operating at 70.1% capacity for the month, overhead per unit for each order must be adjusted accordingly

Figure 16 Determining overhead based on capacity



Source: Birnbaum on Strategy

Figure 17 Coordination department



Source: Birnbaum on Strategy

Vertically integrated operations

All of the scheduling and capacity data is gathered together in a single document compiled by the coordination department. This is important to all factories, but of fundamental importance to vertically integrated operations.

The coordination department plays a key role. While it makes no decisions, it provides management and customers, who do make the decisions, with the necessary information at all levels. These are the roles of the coordination department:

Post all data related to schedules. Ideally, this information should be available to everyone, including: Management.

Technical staff dealing with each process, i.e., spinning, weaving or knitting, dyeing-printing-finishing and garment making;

Factory merchandisers dealing with the customer;

The customer who is given a pin number to receive real-time data for their orders.

Alert management and all relevant parties to serious problems on a timely basis.

Field all communications between factory merchandisers and technical staff in each department.

Coordination in a vertically integrated company is particularly challenging because while sales increase arithmetically, data volume increases exponentially. For a company that is increasing sales at 10% annually, it is not unusual for communications to increase exponentially: 10% in year one, 20% in year two and 40% in year three.

Some years ago, a factory was retained by a large vertically integrated factory group (circular knitting, to dyeing/finishing, to garment making) to increase annual sales from $250 million to $500 million. In the 20 months the factories collaborated, volume indeed doubled, but the company was forced to completely change its data collection. The single greatest problem was communication. They reached a point where the dye master was receiving 350 internal e-mails a day from merchandisers, technical staff and management. They also received additional e-mails from outside customers who were ordering fabric for their own factories.

The solution was to create a separate coordination department. Under the new system, all queries between the marketing, sales and customer relations teams and the operation departments would come through the technical specialists in the coordination department, who:

- Provided answers;
- Met with operation managers to discuss issues and try to work out solutions beneficial to everyone;

Kicked some problems up to senior management, who decided in the event of unforeseen problems which customers would be given priority and which customers would have to wait.

At the end of the day, the purpose of the coordination department is to ensure there is no interruption in the production flow. Substantial programming work was required to make things work smoothly but the outcome was well worth the effort.

Soft cost services

The purpose of this book is to define costs and to calculate costs compared to value. In each instance the factory must be able to calculate the cost of each service and the value of that service. Where value is greater than cost, both the factory and customer benefit.

For example, as we have already seen, when the factory is located in a duty-free area (FTA) where local or regionally produced fabric is required for duty-free access, the added cost of using local fabric rather than imported Chinese fabric is more than offset by the benefit to the customer from the eventual duty-free import of the finished garment.

When the factory carries out sample making, the added CM cost is more than offset by the benefit to the customer of the reduced price of samples made by the factory. Similarly, when the factory provides Pick &

Pack redistribution services (see Chapter 4), the added cost of this service is more than offset by the savings achieved by outsourcing the work to the factory because the factory, having multiple customers, has the advantage of economies of scale.

In each case where factory costs are less than customer costs, the remaining net value provides areas of increased profits to both customer and factory.

But there are also what we will call soft services, where the cost is calculable but not the value. This applies to investments where there is potential value that has not yet been realized. When we calculated the added cost of the investment in high-tech machinery, we knew the cost ($250,000) as well as the value based on the number of workers that could be replaced by each machine. We accepted that the machine would actually work and deliver as specified.

But when we know the cost, but not the future benefit, we often do not know if there will be any benefit in the long run. At best we can only assume there will be a potential benefit, but until that benefit has been realized we cannot calculate the value of our investment. Nowhere is the balance between potential and realized value more apparent than when customers and suppliers invest in industrial development. The move offshore to build branch factories always carries a risk. When the new factory is located in a country with a new export garment industry, that risk rises to the level where the value of the investment is only potential.

Let us compare two examples of recent offshore industrial development, the first in Ethiopia and the second in Myanmar.

Box 10 Ethiopia

This country has undeniable potential, beginning with the low cost of electricity at 3.5¢/kwh. In many respects Ethiopia is the textile/garment industry's version of the discovery of oil in Saudi Arabia in 1938.

Africa has an abundance of cotton, and it is only natural that local cotton be used to produce cotton fabric and cotton garments. Usually, the obstacle to this logic is the high cost of electricity, because the first step when building a viable textile industry is spinning, whose single greatest cost (after the cotton) is electricity.

At 3.5¢/kwh, Ethiopia offers possibly the lowest cost electricity in the world, with the result that it could potentially become the centre of a major cotton textile/garment industry.

Table 27 Ethiopia top 10 garment export products (2018)

HTS	Product description	Value US$,000	PCT share
620342	Men's or boys' trousers, bib and brace overalls, cotton	$33 283	10.80%
620520	Men's and boys' shirts, cotton	$31 034	10.07%
611120	Babies' garments and clothing accessories in cotton, knitted	$27 578	8.95%
610910	T-shirts, singlets and other vests in cotton, knitted or crocheted	$26 453	8.58%
620462	Women's or girls' trousers, bib and brace overalls, cotton	$21 246	6.89%
610462	Women's or girls' trousers, bib and brace overalls	$18 440	5.98%
620343	Men's or boys' trousers, bib and brace overalls, MMF	$14 883	4.83%
610990	T-shirts, singlets and other vests, textile materials	$12 496	4.05%
611030	Sweaters, cotton	$11 762	3.82%
611030	Sweaters, MMF	$10 590	3.44%

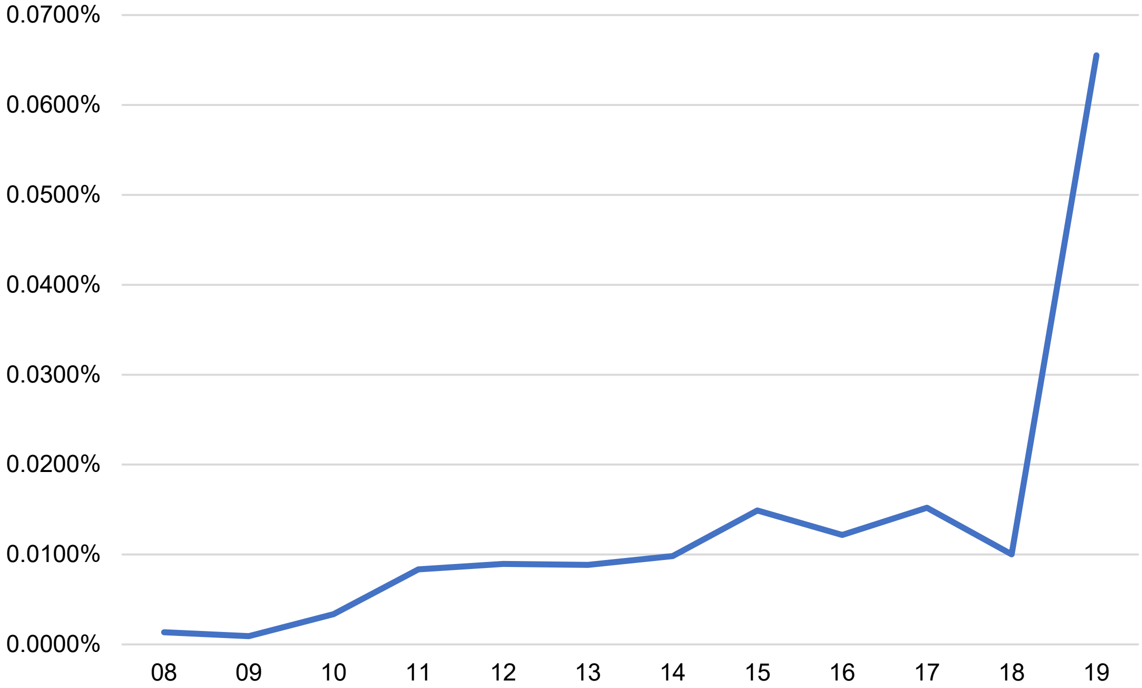
Source: ITC – Trademap

But Ethiopia also presents definite problems:

- Landlocked country;
- No existing export-orientated garment industry before foreign investors built branch factories;
- No educated management;
- No trained workers ready to work in the export-oriented industry;
- Poor logistics.

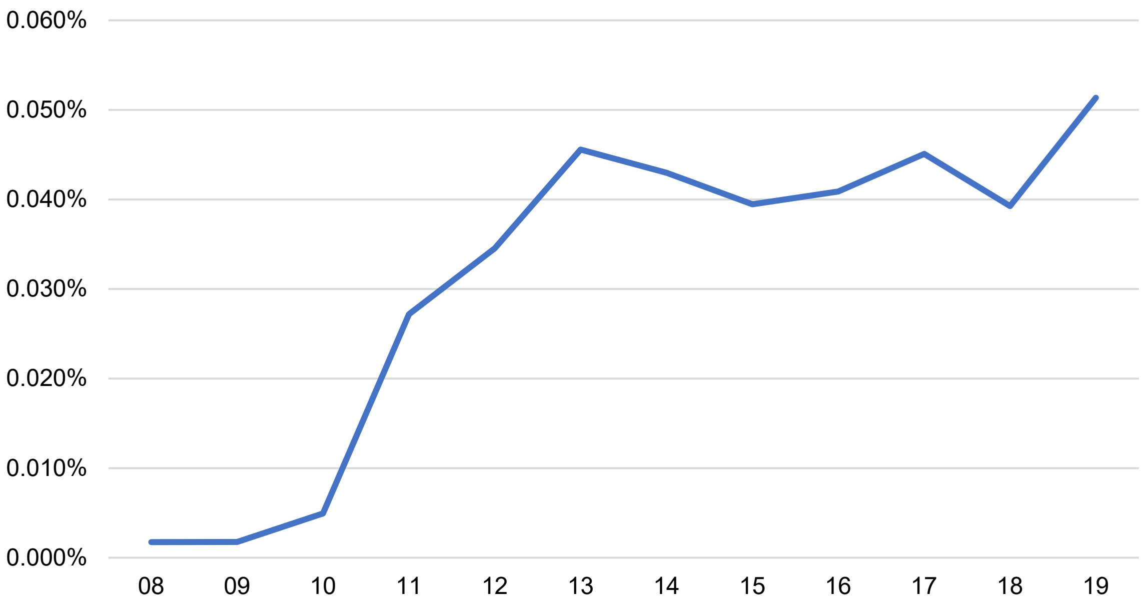
Regardless of the problems, over the past decade Ethiopia's export garment industry has advanced rapidly, albeit from a very low base.

Figure 18 Global garment export market share (2008-2019): Ethiopia



Source: OTEXA

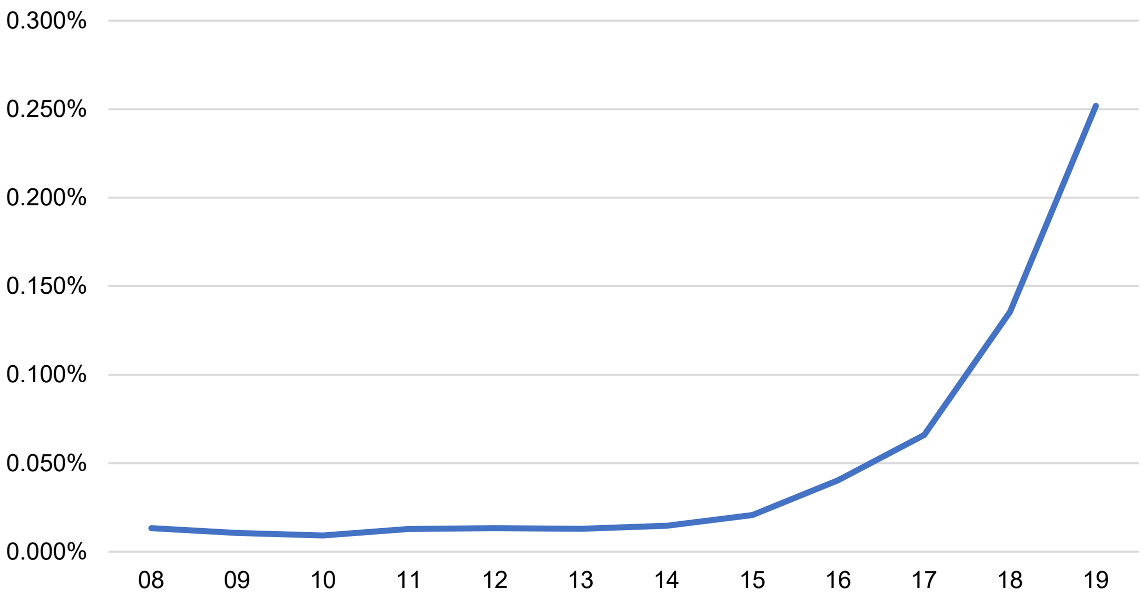
Figure 19 EU garment import market share (2008-2019): Ethiopia



Source: ITC – Trademap

Contrast that with the United States of America, where garments made in Ethiopia continue to rise dramatically.

Figure 20 USA garment import market share (2008-2019): Ethiopia



Source: OTEXA

Clearly Ethiopia is a case where it is too early to calculate the real value of investment, because:

- Projects may well take 20 years before showing a profit;
- Costs may run into the billions;
- Political risks are important.

Investment is based on return. Ethiopia's industry while growing has yet to become profitable. Until that time benefits can only be considered as potential.

The advantage offered by Ethiopia – cheap electricity – is real, tangible and quantifiable. However, there are several problems:

- Because the Ethiopian industry exports basic commodities, issues such as lead times, increased factory services and better trained workers are not of the greatest importance. However, without advances in these areas the industry will not be able to move forward to fashion.
- If Ethiopia fails, that failure will be the result of political and social problems. Again, this situation is similar to that faced by foreign investors in the oil business. The difference is that the oil companies had greater knowledge and skill sets to assess political risk.

The case of Myanmar

Myanmar is different. While foreigners must build the Ethiopia garment industry from the ground up, Myanmar already had an existing garment industry with a pool of skilled workers. Furthermore, as we can see from the table below, Myanmar's industry is not in the cheap commodity garment business.

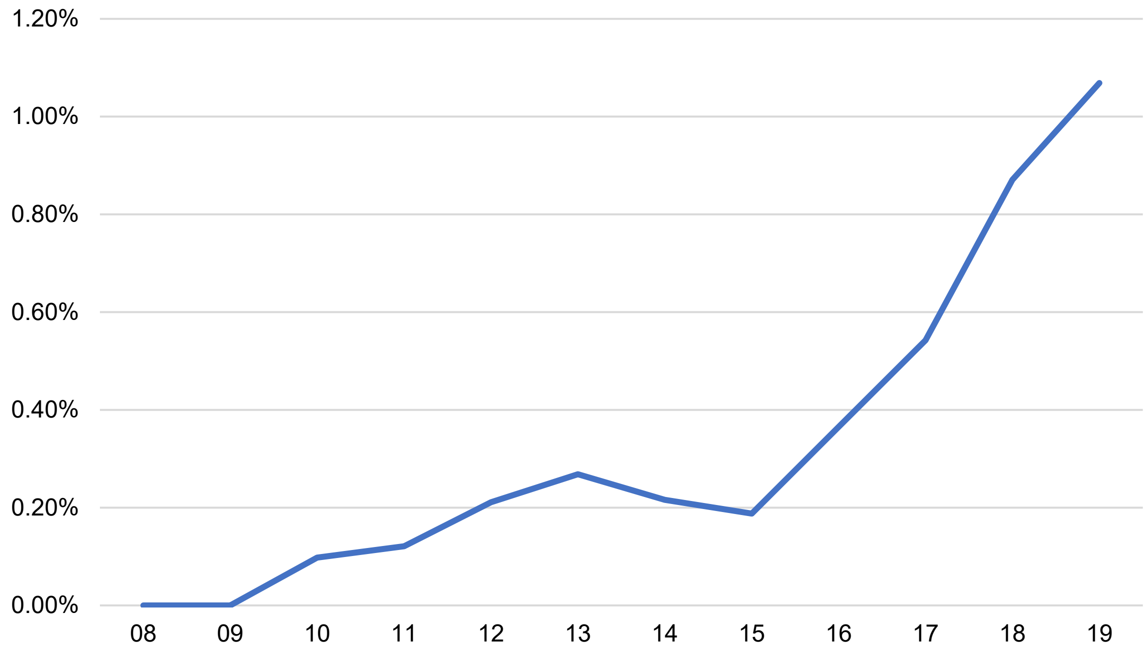
Table 28 Myanmar 15 top export products

HTS	Product description	Value US$	PCT share
620432	Women's or girls' jackets and blazers, cotton	$530 075	10.54%
620332	Men's & boys' jackets and blazers, cotton	$441 812	8.79%
620339	Men's or boys' jackets and blazers in other textile materials	$410 639	8.17%
620342	Men's or boys' trousers, bib and brace overalls, cotton	$312 931	6.22%
620469	Women's or girls' trousers, bib and brace overalls, other textile materials	$217 999	4.34%
620213	Women's or girls' overcoats, raincoats, car coats, MMF	$138 740	2.76%
621210	Bras	$133 731	2.66%
620690	Women's or girls' blouses, shirts and shirt-blouses, other textile materials	$122 141	2.43%
620462	Women's or girls' trousers, bib and brace overalls, cotton	$72 565	1.44%
620630	Women's or girls' blouses, shirts and shirt-blouses, cotton	$62 627	1.25%
620193	Men's or boys' anoraks, windcheaters, wind jackets, MMF	$62 208	1.24%
620442	Women's or girls' dresses, cotton	$61 248	1.22%
621111	Men's & boys' swimwear	$35 431	0.70%
620319	Men's or boys' suits in textile materials	$32 352	0.64%
620640	Women's or girls' blouses, shirts and shirt-blouses, MMF	$30 247	0.60%
620293	Women's or girls' anoraks, windcheaters, wind jackets, MMF	$30 050	0.60%
620333	Men's & boys' jackets and blazers, MMF	$19 887	0.40%
620312	Men's or boys' suits, MMF	$19 562	0.39%
620433	Women's or girls' jackets and blazers, MMF	$18 405	0.37%
620610	Women's or girls' blouses, shirts and shirt-blouses, silk	$18 310	0.36%
620211	Women's or girls' anoraks, windcheaters, wind jackets, wool	$10 202	0.20%

Source: ITC – Trademap

Due of sanctions, from 2003-2010, garment exports from Myanmar were sharply curtailed. The end of sanctions placed Myanmar in the unique position of being a new industry that did not have to go through the usual long period of development, from T-shirts and underwear to more complex products. If the customer wanted men's suits, women's coats or skiwear, Myanmar was ready to produce and deliver from Day 1. The challenge of working in Myanmar has been the perception of their goods given geopolitical tensions. These tensions continue to very significantly affect production and exports.

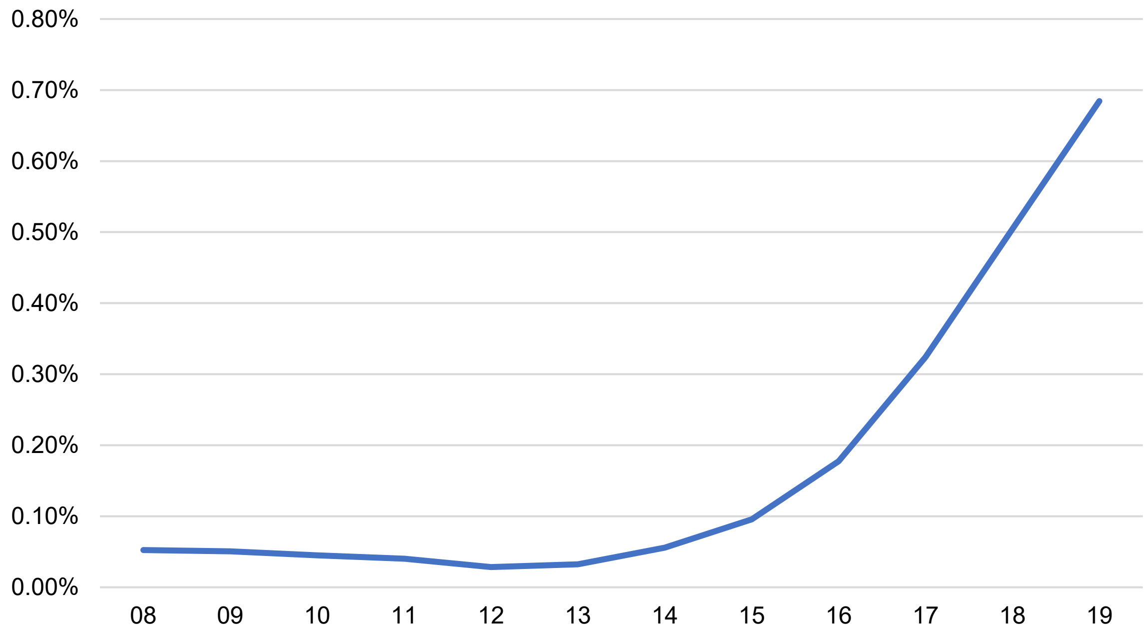
Figure 21 Ethiopia global garment export market share (2008-2019): Myanmar



Source: ITC – Trademap

Beginning in 2015, Myanmar exports to the European Union jumped.

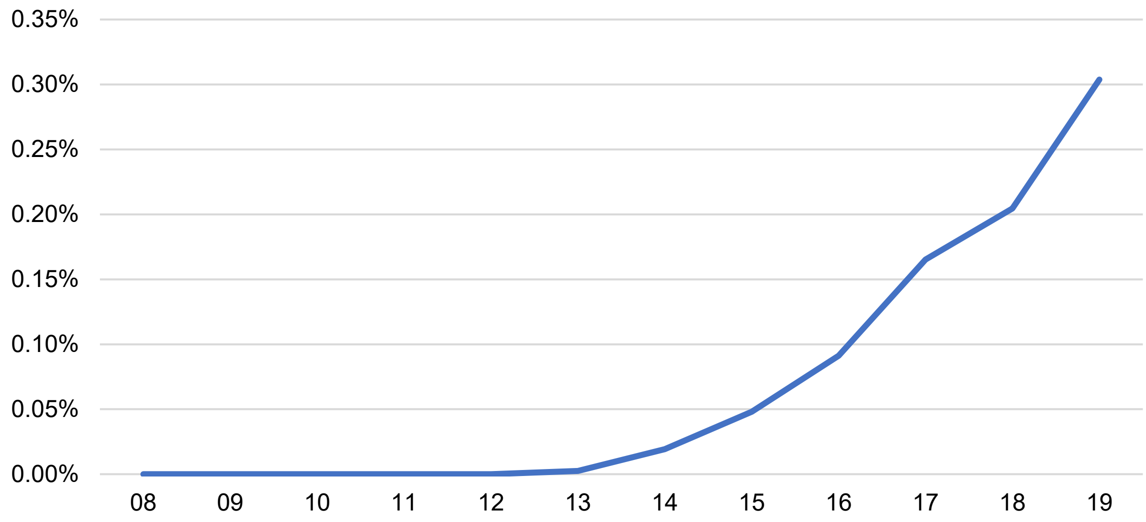
Figure 22 EU garment import market share (2008-2019): Myanmar



Source: ITC – Trademap

The same was true of United States of America imports of Myanmar garments:

Figure 23 USA garment import market share (2008-2019): Myanmar



Source: OTEXA

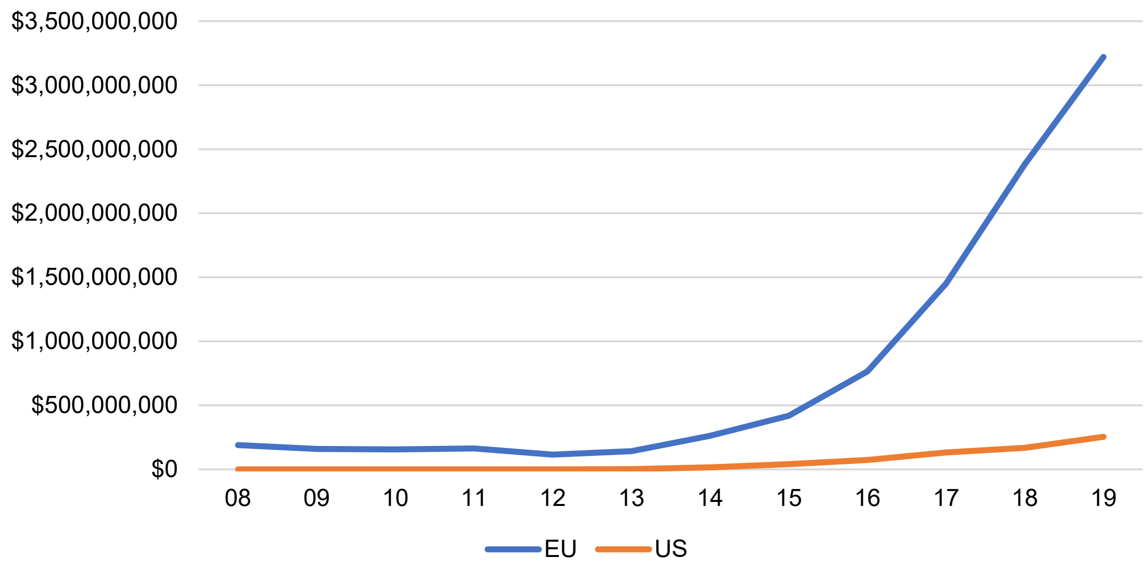
Until very recently customers were optimistic. Despite the potential political problems, between 2015-2019, Myanmar exports to the world increased substantially. More recent political events have increased risks substantially.

There are three possible outcomes:

- Neither the USA nor the EU take any action regarding trade;
- Both the USA and the EU impose trade sanctions;
- The EU ends their free-trade agreement under Anything But Arms (ABA).

Both the second and third scenarios will cause serious harm to Myanmar.

Figure 24 Myanmar garment exports (2008-2019): EU versus USA

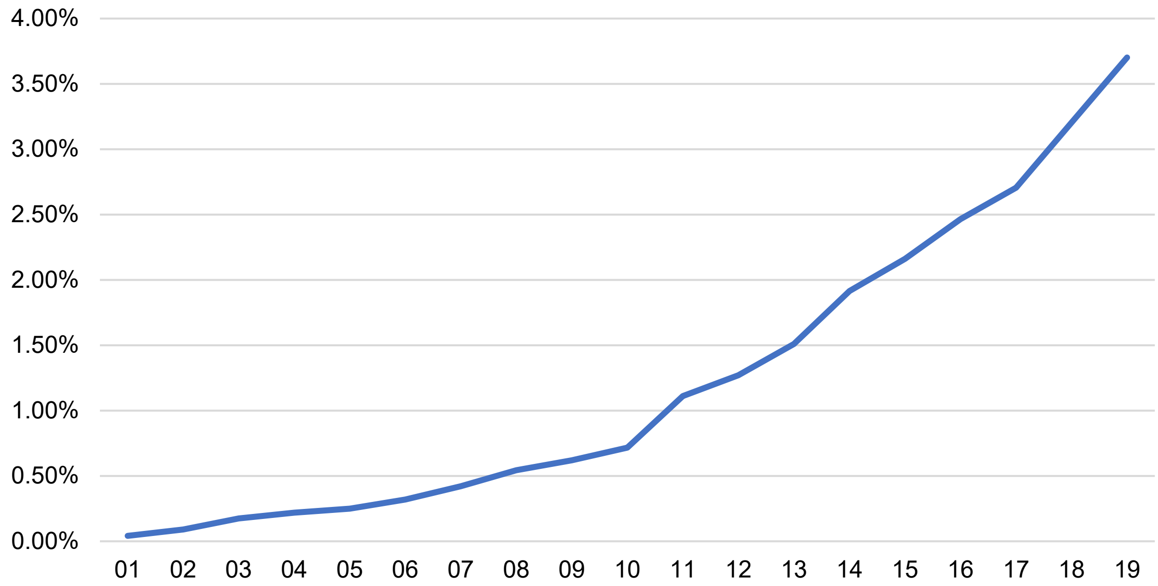


Source: ITC – Trademap

Myanmar's market share of under 1% to the European Union and United States of America for 2017 is still very low. This is not true of Japan, where Myanmar accounts for 3.2% of Japan's global garment imports and is one of the nation's most important garment suppliers. You will note that Japan's import policy is normally apolitical. As we can see from the graph below, during the period 2003-2010 when both the United States of America and the European Union placed sanctions on imports from Myanmar, Japan's imports continued to grow.

In 2010, after the lifting of sanctions, Japanese imports from Myanmar accelerated. To a large degree this was due to Japanese direct investment in Myanmar's garment industry. Given their pragmatic approach, one can assume that Japan will not walk away from that investment.

Figure 25 Japan garment imports market share (2001-2019): Myanmar



Source: ITC – Trademap

Valuing soft services

In our consumer-dominated market, brands and retailers all work first to understand consumer demands and then to meet them. Everyone understands that following consumer demand is not only the necessary road to success, but also the necessary way to avoid failure.

Consumers want clothes that are well designed, well made and available at the best price. These are all areas of positive value. If you are a brand or retailer and you meet these demands, there is a good chance the consumer will buy your merchandise.

But consumers also make demands that create negative value. These are areas where meeting these demands will not necessarily result in increased sales, but where failure to meet them will certainly result in decreased sales, not only for the brands and retailers but also for their factory suppliers. These areas also fall in the category of soft services, but we can only quantify the negative value – the loss that ensues from the failure to provide those services. There is no real way to relate cost to positive value.

Number one on the list is Corporate Social Responsibility (CSR), this is particularly relevant to millennials and post-millennials. These younger consumers are not only an already important segment, but they will become increasingly important as older consumers die off. Sustainability, transparency and compliance are already becoming the single most important factors in determining who on the supplier side will not get the order, and who on the customer side will not get the sale.

It would seem obvious that if the consumer wants CSR standards to be met, then everyone (on both the customer and supplier sides) should be working hard to provide meaningful CSR. Unfortunately, this is currently not the case.

On the positive side, many companies see CSR to be of primary importance. Some have always had a culture of ethical behaviour; their customers have always believed in ethical sourcing and working with suppliers that have built zero-carbon-footprint factories. Other companies have more recently seen the light and adopted CSR. Sometimes these newcomers become zealous converts, anxious to convert the entire world.

The move towards CSR is indeed growing, yet it remains a movement upheld by a minority of companies on both the customer and supplier sides. On the negative side, there are those who consider CSR an advertising gimmick, something to stick on a hangtag even if the company doesn't really apply the standards. Even here there is an upside. Those who dishonestly claim to follow ethical standards must still believe that the market considers CSR important, or why bother lying.

Unfortunately, senior executives at many companies still take the position that CSR compliance is not a priority. Their argument is that although consumers say they care about CSR, may sign petitions favouring CSR and even picket stores found guilty of unethical behaviour, at the end of the day CSR is irrelevant to what they buy. For the most part consumers buy clothing on the basis of design, fit, make and price. This position has a great deal of support from economists, sociologists and most particularly, big data specialists.

Nevertheless, this conclusion does not make sense. Take, for example, child labour and assume just for the sake of argument that only 10% of consumers are truly against child labour. The other 90% do not favour child labour, but simply do not care. It is relatively easy for those in the industry to jump on the bandwagon and oppose child labour. Even if 90% of consumers do not care, suppliers and customers alike have to support the 10% who do care.

Greater compliance, sustainability and transparency all come with an added cost, but those costs are difficult to calculate because they are offset by other factors. A factory operating with high CSR standards may be able to attract better quality customers who also demand high levels of CSR from their suppliers. In this case, the added cost of CSR could be offset by the increase in value they provide to their customer who is willing to pay a higher FOB price.

The difficulty comes at the consumer level. The consumer may demand greater compliance and sustainability, but they may not be willing to pay for it.

Becoming a strategic supplier

Cost is what the supplier pays. Everything has a cost, and that cost is quantifiable. We may not know the cost. We may forget to add the cost of a particular item to our cost sheet. Nevertheless, our failure to add the cost of the zipper to our cost sheet does not reduce the cost of the garment. It just makes our cost sheet inaccurate.

Price is what the customer pays. It is not quantifiable because the amount the customer pays is based on value. Therefore, any attempt to relate price to cost (price = cost plus+), although commonly accepted by the U.S. Department of Defence, almost invariably leads to irrational conclusions, such as the $24,000,000 refrigerator (CNN, 27 January 2018).

For the rest of us, both individual consumers and companies, the decision to buy is based on the ratio between value and price. When the value is greater than price, we buy. When the value falls below price, we do not buy. Value is personal. It may not be rational, but it is real.

Box 11 Buying a Porsche

The price of a Porsche is $100,000. If you have $100,000 and want to a Porsche, you buy the Porsche. You do not care what Porsche paid for materials and production. Your reason for paying $100,000 for a car need not be rational.

You might have grown up in a modest-income family. Each day you rode to school on your second-hand bike, while Richie Rich zoomed past you, his father driving him in a brand-new Porsche.

So it was that at the age of 12, you decided that one day, having achieved success you would own a brand-new Porsche. Why you bought your Porsche is a matter between you and your therapist. Another person might think you are crazy to buy a Porsche, when for the same amount of money you could have bought a first-class Persian carpet.

The difference between price and cost is one of the most important factors determining factory success or failure.

Clearly, if everything has a cost, then everything must also include the intangibles, such as quality, reliability, reduced lead times, etc. We can quantify these costs, at least indirectly, because factories capable of providing those intangibles will, as a rule, charge a higher price. However, we cannot calculate the value of these items to the customer using the basic cost sheet, because those areas of value simply do not exist on our cost sheet.

Once we accept that the intangibles do not appear on our cost sheets, we are forced to accept one of two possible and mutually exclusive conclusions, which are fundamental to the whole question of costings and cost sheets:

- Intangibles such as quality, reliability and reduced lead times have no value.

  Or
- Our entire methodology of cost sheets is irrevocably flawed.

Don’t kid yourself, choosing between these two conclusions is not obvious. For over 30 years, our entire industry voted for the first of these, and even today, major brands and retailers still vote this way. This is what we term the competitive model. Nowadays, as our industry recognizes they are operating in a consumer-dominated market, customers are beginning to recognize the importance of intangibles.

Strategic suppliers

Where once factories were defined only as product makers, customers now recognize that more qualified factories can also be service suppliers. The move from zero-service to full-service supplier has separated the supply side into two groups: the replaceable supplier and the strategic supplier.

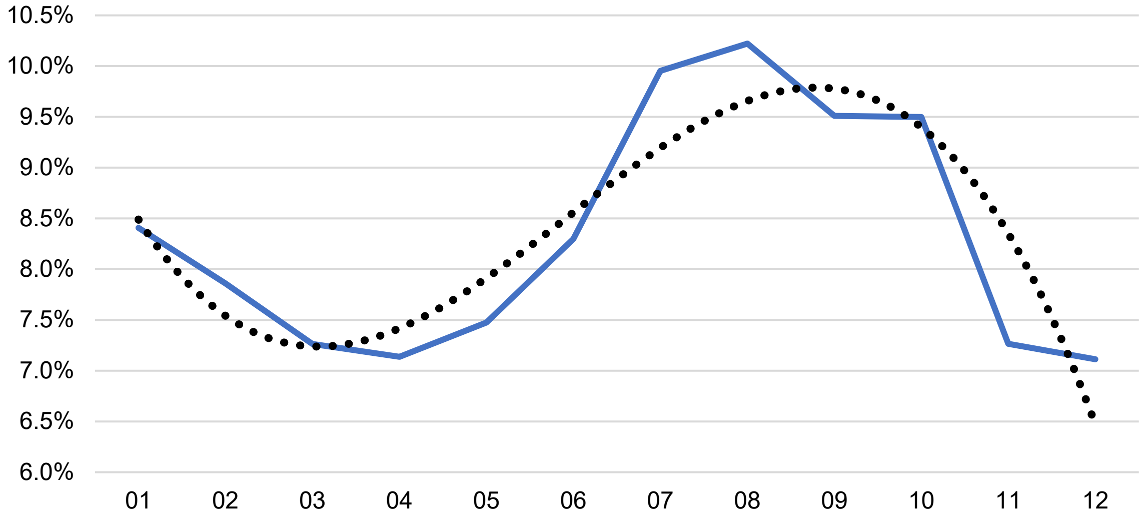
Not only can the strategic supplier charge more, but they can also avoid seasonality, the bane of garment factories everywhere.

Our industry is, to a large extent, controlled by climate. We have high seasons and low seasons. We have cold weather clothing. We have warm weather clothing. We even have clothing for those people who want to escape from their local climate and take a holiday in places with a different climate.

In a world without seasons, every factory would produce 8.333% of its annual production each month.

The graph below shows the actual monthly average of world imports for the period 2013-2017. As you can see, the year begins with imports at world average (8.333%), which represents the arrival of spring season garments. It then falls each month until reaching a trough in April, rising again as fall season garments begin to arrive. It finally reaches a peak in August, after which it slowly begins to decline again. Consider the Figure below where we compare monthly percent of annual garment imports with months (1-12).

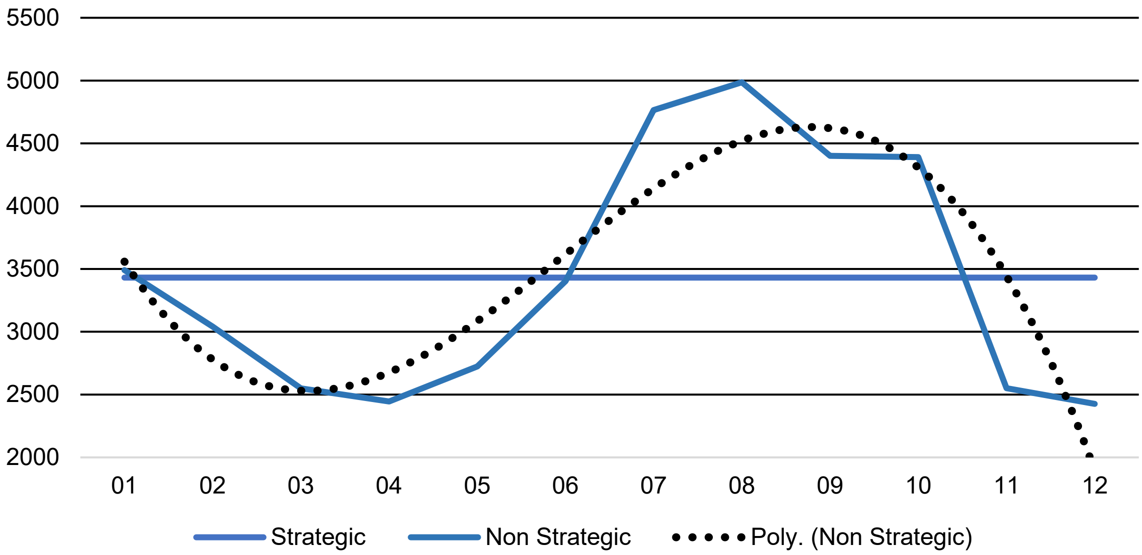
Figure 26 USA annual garment imports PCT by month (2014-2019)



Source: OTEXA

Some factories are able to escape seasonality because they are able to provide added value such that their customers have a vested interest in securing their production. These are the strategic suppliers. In order to secure production space, customers must guarantee constant orders during both the high season and low season. As the industry has developed, customers have had an ever-greater need for suppliers capable of providing additional services, which in turn has increased their need for more full-service factories. As the number of strategic suppliers increases, the problems associated with seasonality worsen for non-strategic suppliers. If 50% of all garment orders were given to strategic suppliers, the overall peaks and troughs remain unaltered, but variations become far more extreme for non-strategic suppliers.

Figure 27 Seasonal chart garment imports (2014-2019): Strategic versus non-strategic supplier



	01	02	03	04	05	06	07	08	09	10	11	12
Strategic	3 431	3 431	3 431	3 431	3 431	3 431	3 431	3 431	3 431	3 431	3 431	3 431
Non-strategic	3 491	3 042	2 549	2 445	2 725	3 403	4 766	4 987	4 401	4 391	2 551	2 426
No strategic	6 923	6 473	5 981	5 877	6 156	6 834	8 197	8 418	7 832	7 822	5 982	5 857

Source: OTEXA (US$ millions)

Table 29 Peak versus trough (2013-2019)

	Peak	Trough	
World without strategic suppliers	Aug	Apr	
	8 418	5 877	44.0%
World with strategic suppliers	Aug	Dec	
	4 987	2 426	105.9%

Source: OTEXA

In a world without strategic suppliers the difference between high and low season is 44%. In that same world, where 50% of orders are placed with strategic suppliers that difference grows to 106%. Unless your factory is a strategic supplier to someone, survival becomes very difficult. Clearly, every factory wants to be at least someone's strategic supplier.

There are three factors any one of which will allow a factory to become a strategic supplier:

- Product
- Quality
- Service

Product

Product type is important, because at the low end of the scale are factories producing basic commodities such as T-shirts, jeans and underwear. It is almost impossible for the basic commodity factory to become an important supplier, let alone a strategic supplier, because at any given time there are more suppliers than customers.

Box 12 The world's greatest factory (slight exaggeration)

A small factory (80 machines) located in France produced very high-quality women's tailored jackets, skirts and trousers. Their customers were some of the best designers in the world. Accordingly, their prices were very high: a jacket averaged CM $80-$120. Unfortunately, their customers had only two seasons, meaning that during the six months of high season orders the factory did very well indeed. But for rest of the year, they pretty much lost all the profit from the high season.

Eventually the factory brought in a consultant. The consultant's first step was to carry out a cost-to-value analysis, creating job costings for a certain number of styles. He recognized that in France a factory could not lay off workers. That meant that during low season, losses came from more than just overhead, but also included wages and therefore the entirety of what the factory would have earned from CM had they had orders.

The consultant's next step was to determine the breakeven point, where CM prices charged to the customer would equal annual CM costs. Finally, the consultant designed a workable strategy to return the factory to profit. The plan he submitted suggested doubling the size of the factory from 80 to 160 machines. To the factory management and its owners, doubling the size of a money-losing factory seemed insane.

The consultant reasoned that to the right importer from the United States of America, the combination of ultimate high quality, together with a made-in-France label would define the factory as a strategic supplier. Consequently, during high season when the factory had orders from their regular couture customers, the U.S. importer would provide orders for 80 machines and for low season orders for all 160 machines. After all, even 160 machines would not produce all that many high-end garments.

The only question that remained was determining a CM price agreeable to both parties, which worked out to be $40-$50 per unit. At that level the factory was able to cover the cost of labour and about 65% of overhead. Yes, it still lost money during low season, but the losses were sharply reduced, substantially increasing net profit for the year.

Producing a special product is one way of becoming a strategic supplier. At the high end of the product scale there are what the industry calls extremely complex products. These are products so bizarre that there are very few competent producers, with the result that if you are a customer importing one of the complex products, and you have a good supplier, the best and least expensive way of keeping that supplier is to guarantee steady business.

Here are some examples:

- Bridalwear: In the past, when couples got married the bridal gown was a major status symbol and designers piled on increasing layers of fabric, ornamental and embellishment. Very few factories could operate at the necessary level when designers were competing with one another to create the world's first totally unproduceable product.
- Bras: Imagine a product that requires three materials, two lace inserts, satin trim, a bow and two elastics. Everything must be dyed to match, then cut and sewn in 100+ sizes. That is what a bra factory must do.
- Girls' dresses 6-16: The CM on a girl's dress is about the same as a dress for her mother. But of course, the customer will not pay the same CM. Furthermore, where the woman's dress factory only has to produce and ship dresses, the importer of 6-16 girl's dresses requires much more: matching shoes, handbag and a letter of acceptance to a leading private elementary school.

Quality

Every customer says they want the best quality, but most have no idea what that constitutes and even fewer are willing to pay for it. Those factories at the very top of the quality tree are potential strategic suppliers.

In a sense we can understand why factories capable of dealing with the incredibly complex products, or those providing truly exceptional quality are entitled to special consideration. But those special factories account for, at best, 1% of all garment suppliers. The question remains, what can the other 99% due to join the strategic supplier elite.

Services

Where once garment factories were simply product makers, those at the cutting edge had to become service suppliers, and in doing so they created increased value, which entitled them to charge higher prices.

Table 30 Interim cost sheet

	No added services		**With added services**	
		Cost	Cost	
Fabric	60.0%	$6.00	$6.00	60.0%
Trim	10.0%	$1.00	$7.00	10.0%
CM labour	6.4%	$0.64	$0.64	6.4%
CM overhead	18.6%	$1.86	$1.86	18.6%
CM total cost	25.0%	$2.50	$2.50	25.0%
Total cost	95.0%	$9.50	$9.50	95.0%
Factory profit	5.0%	$0.50	$0.50	5.0%
Total FOB cost	100.0%	$10.00	$10.00	100.0%

Unfortunately, if you look at the Figures above with or without services, the numbers are exactly the same. Services are nowhere to be found in the basic cost sheet but are locked somewhere in overheads. This results in two serious problems:

- We do not know the cost of each service;
- The cost per unit for services is materially different to the cost per unit for labour or overheard.

Calculating the cost of added service

Every added service adds cost.

For example, customers increasingly want to move product development from their office to the factory. This is not an easy task, nor is it cost-free, because:

- You have two costs:
    - Capital expenses for new equipment;
    - Operating costs.
- To succeed, the customer's designer and other executives must be confident that the factory personnel has the necessary experience and skillsets:
    - Modelist: The person responsible for the new service. They are able to discuss problems with the customer's designer and organize the product development department.
    - Material sourcing specialist.
    - Production professional: This person ensures quality assurance and that the garment FOB price remains within the customer's target.
    - Sample department head: While the sample department was previously responsible for pre-production samples only, working to a series of designer samples requires greater skills.
    - Sample-makers: These people are able to sew a complete garment.
- Allocating costs on a per unit basis is complex. Again, there are two factors:
    - The cost of product development is not related to the size of the order, with the result that the per unit cost will change with the order size. As we saw previously, the cost of sample making for a particular style is $569.25 if done by the factory. Therefore, the cost per unit is inversely proportional to the size of the order: the cost per unit for an order of 1,000 pieces is 57¢, for 5,000 pieces 11¢ and for 10,000 pieces only 6¢.
    - Product development costs will differ from one customer to another. The customer whose designer will require four duplicates before style approval should pay more than the designer who requires but one sample.

These are substantial differences, which must somehow be reflected in the cost sheets. The benefit of value-added services offered by the supplier is so great to the customer and supplier alike that we must change our system of cost sheets to quantify both the costs and the value of each service. Most importantly, however, the total revenue received for product development must be at least equal to the total cost.

Reducing markdowns

Markdown is the difference between the price on the hangtag and the average amount that the store receives after all sales and discounts. Markdowns occur for the simple reason that not all goods sell. Some styles arrive at the store and sell out in a few days. Other styles don't sell at all. The blue and green sell but the red and the navy die. Sizes small and medium walk out of the store, while large and extra-large just lay there.

There are three major causes of markdowns:

- Systemic: The factory is excluded from markdown reduction strategy;
- Structural: The business model adopted by brick-and-mortar stores requires markdowns;
- Unaccounted soft costs: Soft costs are important factors leading to markdowns. Their exclusion from garment costing precludes any ability to reduce markdowns.

Systemic causes

Once again, this is to a large degree a costing problem. Because retailers and brands do not think of markdowns as a garment cost, markdowns do not appear on the cost sheet. They fail to recognize that not only are markdowns the single largest cost factor (more than twice total FOB), but that the factory can substantially reduce markdown costs. As we see in the cost sheet below, the markdown reduction on a garment with a $10.00 FOB price is $9.97 ($20.82 minus $6.31). It is as if rather than the consumer paying the factory $10.00, the factory is paying the consumer $4.51.

Markdowns are seldom the result of untalented designers or inexperienced merchandisers. The main cause is time. If lead times for product development are six months and production and post-production times adds another five months, markdowns are inevitable. Who is so talented that they can predict what the consumer will want to buy a year in advance?

There are a number of strategies available to reduce markdowns, but virtually all require speed-to-market. The most well-known approach is Zara's strategy of Design After Sales. If the factory has fast turn capability, with production lead times under seven days from fabric spreading to stock goods finished and ready for shipment, it can follow the Zara model.

In the final analysis, speed-to-market is the key element to markdown reduction:

- It allows the designer to carry out their work closer to in-store delivery. Let's face it, no designer can predict what consumer will want 40 weeks in advance.
- Trial orders: These are small quantities of multiple styles, produced and shipped by air in days. On receipt the retailer places the goods in pre-designated branch stores. If five styles sell well, the customer will place bulk orders for those five styles. If three styles sell, the customer will place bulk orders for three styles. If zero styles sell, the customer will redesign and place new trial orders. Risk is minimized and money is saved. (See also Appendices)
- Quick response: When producing bulk orders, the factory retains a portion of the fabric for re-orders. Once the customer has detailed sales information from all stores, they are able to determine which styles, which colours, and which sizes have the greatest sales. They can place reorders with the knowledge that within six days the goods will be ready for air shipment.

Of course, fast turn capabilities not only require new skill sets, but also often require a new factory layout. This is very costly both in time and capital, but the returns are truly impressive. In our cost sheet below, comparing costs when the factory does or does not offer markdown reduction services, such as transfer of product development and speed-to-market, net profit (after markdowns) increases by 41% ($25.24-$35.56) on the customer side. On the factory side net profit increases by 250% (from $0.50-$2.50 per unit).

As with all the cost sheets in this work, the important element is the methodology. The amounts, such as fabric cost and cost of markdown reduction services, are arbitrary.

Table 31 Full value costing: With or without markdown reduction services

		Normal markdown		Factory reduced markdown	
		Factors	Cost	Cost	Factors
1	Material		$6.00	$6.00	
2	Trim		$1.00	$1.00	
3	CM labour		$0.64	$0.64	
4	CM overhead		$1.86	$1.86	
5	Cost of service transfer product development		$0.00	$0.25	
6	Cost of service markdown reduction		$0.00	$2.00	
7	CM total cost		$2.50	$4.75	
8	Total factory cost		$9.50	$11.75	
9	Add profit markdown reduction		$0.00	$1.50	
10	Add profit transfer product development			$0.50	
11	Profit		$0.50	$2.50	
12	Total FOB cost		$10.00	$16.25	
13	Agent commission	5%	$0.50	$0.81	5.0%
14	Freight		$0.25	$0.25	
15	Duty	16.2%	$1.62	$2.63	16.2%
16	Clearance		$0.10	$0.10	
17	Local transport		$0.15	$0.15	
18	DDP		$12.62	$20.20	
19	Product development loading	20%	$2.52	$0.40	2.0%
20	Distribution centre loading	5%	$0.63	$0.63	
21	In-store		$15.78	$21.23	
22	Markup	75%	$47.33	$47.33	
23	Retail price		$63.10	$63.10	
24	Markdown	35%	$22.09	$6.31	10.0%
25	Net retail		$41.01	$56.79	
26	Net profit		$25.24	$35.56	$10.33

An explanation of the rows in the full value cost sheet:

- Line 5: assumes factory transfer product development services cost of $0.25 per unit;
- Line 6: assumes markdown reduction service $2.00;
- Line 9: assumes added factory profit for markdown reduction $1.50;
- Line 10: assumes added factory profit for product development service $0.50;
- Line 12: FOB cost including product development and markdown reduction services $16.25;
- Line 18: DDP cost including product development and markdown reduction services $20.20;
- Line 19: product development where factory provides service = $0.40;
- Line 20: where customer charges product development (PD) loading = $2.52[5]
- Line 21: cost in-store, where cost including product development and markdown reduction services $21.23;
- Line 23: retail price for both cases is the same = $63.10;
- Markup where factory provides MD reduction services is 69%;
- Markup where factory does not is 75%;
- Line 24: retail net profit when factory provides product development and markdown reduction services factory = $36.47. Without the factory services, retail net profit = $26.50;
- Customer's net savings when factory provides product development and markdown reduction services helps reduce MDs to $10.33.

[5] *The importer/customer does not know the actual product development. Therefore, they will use a loading, a percentage added to the cost of every imported garment, usually about 20% of DDP.*

Cost of added service: Markdowns

To provide reasonable markdown reductions, the factory's services must include product development, fast turn, quick response and trial orders. The minimum time required to develop the necessary skillset is about 6-12 months.

Determining the costs is very complex.

- Product development: since markdown requires the factory to undertake product development you must include this cost;
- Resetting the factory layout;
- Investment in new equipment;
- Worker advanced multitask training;
- Advanced training for supervisors, department heads and management;
- Real time data for schedules and capacity.

N.B: The work and training must be in-factory. Be very careful who is retained.

Structural causes

Fashion garment retail has only two basic models:

- Selling something to everybody

This is the general retailer and includes the major e-commerce operations such as Amazon, department stores and the mass market retailer.

- Selling everything to somebody

This is the specialist retailer. For example, if your business is 19th century German stamps, then you must meet the needs of all philatelists interested in 19th century German stamps.

As you can imagine, no retailer exists, regardless of size, that is capable of selling socks, baseball bats and 19th century German stamps.

Today, brick and mortar retail follow the something-for-everybody model. It is simply a question of geography. The retail store by definition has a fixed location. Its potential consumer base is limited to the distance a consumer will travel to get to it. A consumer might travel 50 miles to get to the store, but no one will travel 500 miles.

Success is based entirely on increased market share, the ability to draw the potential consumer away from other brick and mortar competitors. To maximize its consumer base, the store must sell fashion that appeals to the greatest number of potential consumers and at prices that will attract those consumers.

But reality is different. In fact, the something-for-everybody model defined as fashion-for-everybody strategy has put the major retailers in a hole for two reasons:

- To succeed, the retailer must reduce design to the lowest common denominator because the more individualized the design, the smaller the potential consumer base;
- To succeed, the retailer must have sufficient stock of every style, in every colour and every size to meet potential consumer demand. The retailer cannot afford to sell out of any style because every lost sale reduces market share.

In this regard, markdowns are not evidence of a failure of design, merchandising or sourcing skills, but rather the necessary result of the never-ending fight for lower costs. This in turn limits the ability of the designers to create the best designs, the sourcing specialists to work with the best factories and the merchandising executives to select the best style rather those with the lowest cost.

Markdowns will continue to grow with the result that retailers' profit will decline. This, in turn, will force retailers to increase retail prices. They will be forced into a pattern of ever-increasing retail prices to compensate for the declining profit. This situation will continue until brick-and-mortar retailers change their business model or are replaced by other retailers with a more rational business model.

Unaccounted soft cost causes

Soft costs come in two distinct types but have one thing in common: we can quantify the added cost but not the added value. For example, we can quantify the cost of higher quality both on the customer and the factory sides, e.g., using higher quality materials, better factories, etc. However, we cannot see the value until it is too late.

Box 13 A well-known industry story

A renowned fashion brand was once just a denim reseller until the owners brought in one of industry's most successful merchandisers and made him CEO.

The new CEO transformed the company. His vision was clothing with no interest in fashion, selling well-made and well-designed clothing at premium prices. Indeed, he created the concept of no-fashion, fashion.

The brand was unbelievably successful. In a few years the company grew from nothing to one of the largest clothing retailers in the USA.

For reasons that are not relevant here, the owners wanted to get rid of him. As a result, in 2002, when the brand showed its first loss, he was fired and replaced by a retail executive from the toy industry.

The new management decided to return to profit by reducing costs. Why produce a Rolls Royce when the consumer will buy a Ford? Sixteen years later and the brand has yet to recover from that decision.

Chapter 4
Technology and engineering

Much of this book deals with a single problem: why the decisions we make fail to deliver the solutions we expect.

Nowhere is this more evident than in our technology.

We assume that technology exists to open the door to progress. Unfortunately, much of our technology only serves to close the door to much needed change.

For example, why do we invest in computerized patternmaking? Why bother when we know that to date no computer can replicate, let alone improve on, the work of a master-patternmaker?

The simple answer is that we live in a world with very few master-patternmakers. The craft has all but died out in importers' home-countries and it is barely existent in our preferred, cheap-labour exporting countries.

We go to the computer because the computer is our only available option. The problem is that as a result of our reliance on computerized patternmaking we no longer train master patternmakers.

What is true of computerized patternmaking is equally true of much of our industry's technology. Because we work with factories where workers are at best semi-skilled, able only to sew a straight line, we develop hi-tech machines capable of sewing that straight line more efficiently.

Where once the factory operated to meet the needs of the designer, today the designer must operate within the limits of the factory.

That is our paradox.

In our effort to make our fashion garment industry better and more efficient, we have sacrificed design.

We see this in our failing retail stores where their stock consists almost entirely of lowest common-denominator, boring designs.

It is for this reason that pure-play, small e-commerce start-ups are eating our brick-and-mortar giant retailers for breakfast. Their success is due to the fact that they have taken a step backwards to the era of the small specialty operation, producing their goods in workshops employing skilled craftsmen.

The problem is not technology, but rather our use of technology coupled with our faith that technology always equals progress.

To move forward, we must recognize that technology should not replace the skilled worker but rather provide that skilled worker with the tools necessary to make greater use of their skills.

The next four chapters cover the role and use of technology in our industry.

Developing the SME e-commerce supplier sector

The global garment export industry is for the most part family-run and is now in its second generation. Even those running the largest billion-dollar transnational factory groups can remember how their fathers began their companies. In the early days, ours was an industry built by Asia-based, small and medium-size enterprises that enjoyed low capital investment requirements and relied on cheap, semi-skilled labour.

The advent of quota limitations on exports imposed by garment importing countries changed the garment export industry forever. The customers (importers and retailers) were forced to move production to quota-free countries. While at the same time factories located in quota-restricted countries were forced to open branches in these same quota free countries. This opened the door for SME factories located in quota-free countries. By the time quotas were phased out in 2005, a large number of countries and territories around the world had developed garment exporting industries

Eventually the tide shifted. With too many factories chasing too few customers, many factories, particularly SMEs, were driven out of business. At the same time, retail consolidation in garment importing countries drove their customers, the SME retailers, out of business. The cost of new technology coupled with customer demand for special services requiring additional, highly skilled technicians, made SMEs even less competitive. The end of quotas in 2005 seemingly brought a close to the era of SME factory start-ups worldwide.

But just as the SME factory sector was coming to an end, a new SME customer sector was coming into existence. This new sector would not only keep the small factories alive but could potentially make those factories the most successful sector in the global garment exporting industry. The new SME e-commerce start-ups need SME factory suppliers because their volumes are too small to work with the large factory groups. The collective model partnership ensures that the relationship between these customers and suppliers can thrive.

There is therefore an urgent need to develop SME factories to meet the special needs of the new emerging SME e-commerce sector, the fastest developing sector in the global garment industry. However, there are many obstacles to achieving this potential at the moment. Among the most serious is the inability of e-commerce companies to work effectively with factory suppliers, just as SME factories are unable to meet the needs of the potential SME e-commerce buyers. Any national industry capable of overcoming these obstacles will become the world leader in this important new sector.

The way forward is to create a national SME Centre that will provide the necessary services, assistance and training to allow both the SME factories and their potential SME e-commerce customers to flourish. The following section outlines the steps in the supply chain where the obstacles exist and how the national SME Centre can help remove those obstacles.

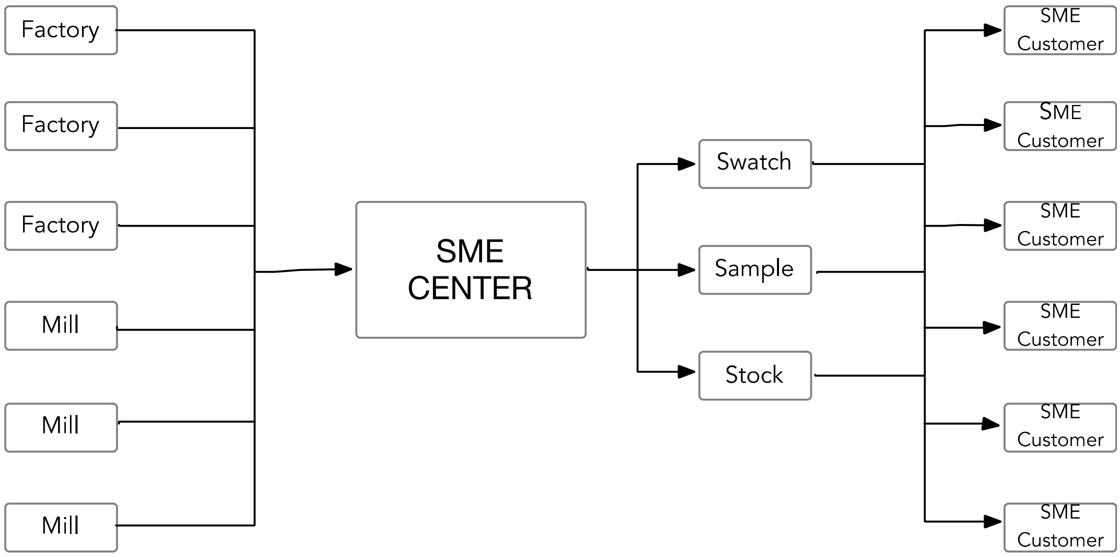
Fabric sourcing

Obstacle: The quantity of fabric required is too small to order directly from most mills. This leaves the SME e-commerce companies with only two alternatives: limit themselves to commodity fabric only or use the limited variety of fashion fabric available for which they must pay a hefty premium.

Solution: An almost inexhaustible quantity and variety of fashion fabric available at well below market price does exist. Every garment factory and every fabric mill have quantities of unused fabric, usually left over from orders previously shipped. Therefore, a market does exist, but there is no marketplace.

The national SME Centre would create a virtual online marketplace where fabric types categorized by product type – shirting, trouser weights, suiting – would be further cross divided by fibre - cotton, synthetic, wool. Customers could order swatches for a nominal fee, sample fabric of 5-10 m at a premium, and finally stock fabric at the best prices. The centre’s fabric marketplace would charge a small commission for each purchase.

Figure 28 Fabric virtual marketplace



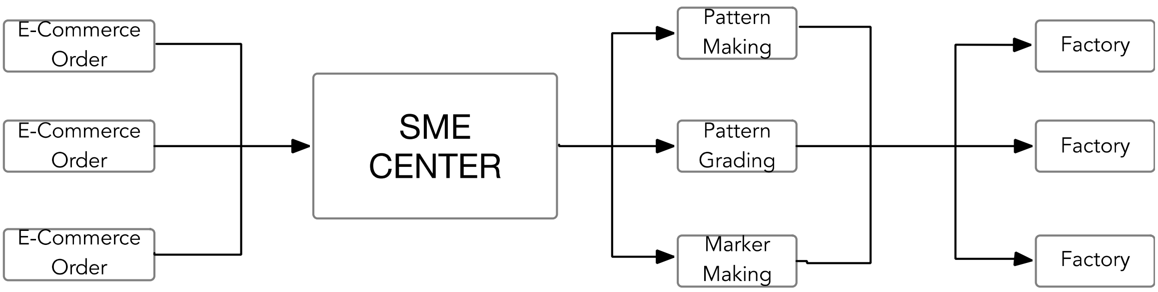
Source: Birnbaum on Strategy

Patternmaking, grading, and marker making

Obstacle: No SME factory has the in-house capacity to carry out patternmaking, grading and marker making based on 14 styles per day (with an average of two cuttings for each style). There are excellent high-speed computer systems that can produce the work efficiently and in large quantities, but the costs are beyond the means of any SME factory.

Solution: The SME Centre creates a sector-wide high-tech patternmaking, grading and marker making facility, which can carry out the work at a reasonable cost and send the results to each factory via the internet.

Figure 29 Patternmaking, grading and marker making facility



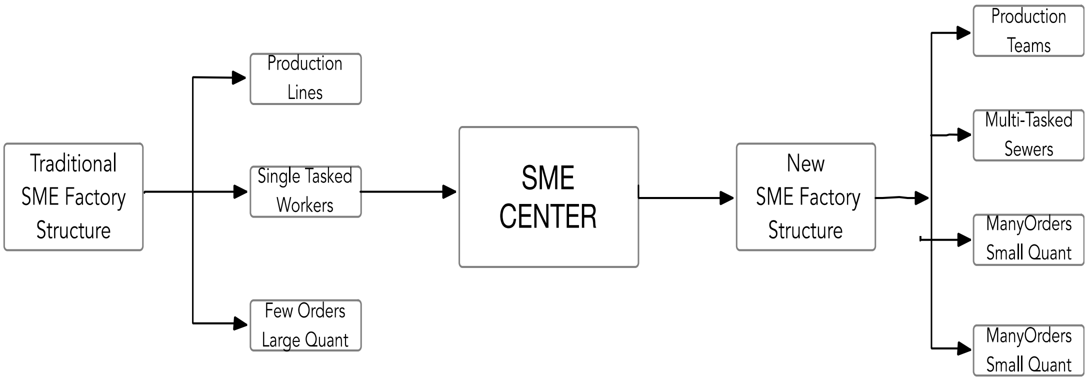
Source: Birnbaum on Strategy

Fast-turn production for small quantities

Obstacle: Most SME factories are currently geared to act as subcontractors, with workers divided into lines producing relatively large quantities of a few styles. Because of their factory structure and system, these factories are trapped at the very bottom. This is probably the greatest cause of sweatshop operations paying slave labour rates.

Solution: The national SME Centre would provide engineers to help transform the factory from lines using single-tasked, semi-skilled workers into teams employing multi-tasked sewers. Through the centre's work, the sweatshop factories can become totally compliant operations with the highest standards of sustainability and total transparency.

Figure 30 Engineering and training facility



Source: Birnbaum on Strategy

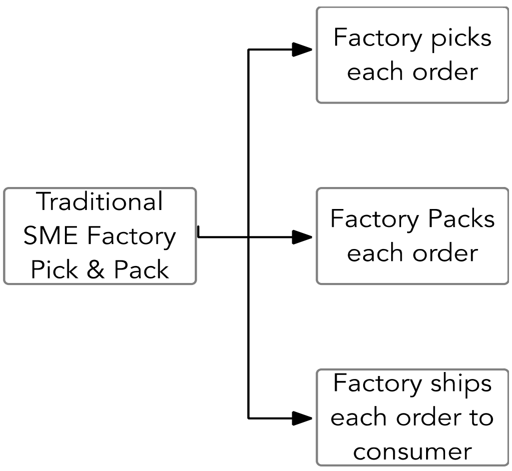
Pick & Pack consolidation and final shipment to the consumer

Obstacle: The logistics are extremely complex and do not work well in an SME operation.

- Pick & pack for 200-400 individual consumer orders daily is a very expensive proposition for an SME factory;
- Goods could be shipped from the factory directly to the consumer, but the cost would be prohibitive. To be cost-effective, shipments to individual consumers should first be consolidated and then shipped to four or five separate locations where the final Pick & Pack process takes place, with the orders sent on to each individual consumer;
- An SME factory does not have the facilities necessary to carry out the process.

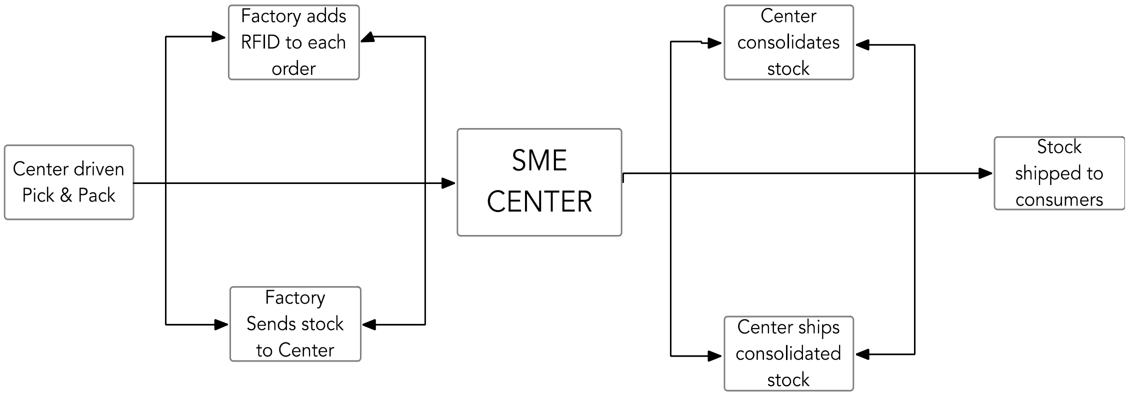
Solution: The national SME Centre creates a single automated facility to service the entire sector.

Figure 31 Traditional Pick & Pack



Source: Birnbaum on Strategy

Figure 32 New model Pick & Pack



Source: Birnbaum on Strategy

Pick & Pack: SME Centre

The move from the individual base, where factories and their e-commerce customers act as single entities, to the sector base where everyone acts together through the SME Centre, provides benefits to all.

- The SME factory benefits by concentrating on those operations best suited to them, while passing on all other operations to the SME Centre, thus increasing productivity. At the same time, the SME factory learns the techniques necessary to escape from the zero-service factory trap. The result is a larger customer base and substantially greater profit per unit.

- The SME e-commerce company benefits by limiting its work to original design and marketing, while at the same time reducing costs by passing on other operations to those more capable, more efficient and most importantly, more able to provide economies of scale. The result is less work coupled with greater profit.

- The national industry benefits. Where once the SME factory sector was forced to operate with poor compliance, lack of sustainability and zero transparency, the SME Centre is able to ensure that all participating SME factories meet the highest ethical standards. Most importantly, because of the growing number of SME e-commerce companies, this project is highly scalable.

- The SME Centre will be a profit-making operation, thus ensuring that outside funding will only be required for the initial investment.

The left side of the following comparison cost sheet shows costs for an e-commerce company producing in their home country and paying premium prices for fabric that they source on their own from limited local suppliers. On the right side, the e-commerce company shifts production to an offshore SME factory, which works with a national SME Centre that offers an online fabric marketplace of leftover fabrics sold at discounted prices and centralized Pick & Pack services.

Table 32 Pick & Pack by e-commerce company versus SME factory

	By e-commerce company		By SME factory	
Fabric		$6.00	$3.00	
Trim		$1.00	$1.00	
CM labour		$7.00	$0.64	
CM overhead	70%	$4.90	$1.86	290%
Cost of Pick & Pack service		$0.00	$0.10	
Total cost		$18.90	$6.60	
Service charge from SME Centre			$1.32	20%
Factory net profit			$3.00	
Total FOB		$18.90	$10.92	
Freight in		$1.00	$0.00	
Freight out		$2.00	$2.00	
Pick & Pack		$1.00	$1.00	
Cost shipped to consumer		$22.90	$13.92	$8.98

Source: Birnbaum on Strategy

The benefit to both sides is substantial: the customer's cost drops from $22.90 to $13.92 per unit, while the factory's net profit increases from $0.50 to $3.00. Of course, as shown above, developing the SME sector so that it can work efficiently with the new e-commerce sector customers will require some investment and substantial training in the factory suppliers' countries.

From analogue to digital solutions

An analogue is something parallel or comparable to something else, it is not the thing itself. The traditional watch, the sextant and the early computers are all analogues. The traditional clock consists of two or three hands that rotate within a circle. By locating the position of each hand within the circle, we can determine the time. The digital version is an object that shows the time, for example, 10:43.

A sextant is a device that measures the angle of the sun to the horizon, which together with an accurate clock will allow a sailor to determine the latitude location of the ship during daylight hours while at sea. The digital version is GPS, a Box connected to a satellite that gives the location of a person or a vehicle, anywhere and anytime. The early computers provided data in binary code, a series of 0s and 1s, which the user had to translate into usable data. The modern digital version provides data and written material directly onto the screen.

The move from analogue to digital has solved many of the inaccuracies and problems faced by the garment industry since it moved from bespoke to mass-produced products.

The first problem is garment size: S-M-L, 6-16, 46-56. Size is in fact based on three measurements:

- Shape: a person's actual body measurements, from which fit is derived;
- Fit: the garment measurements based on shape, from which size is derived;
- Size: an alphanumerical character based on fit, which allows the consumer to select the garment that correctly coincides with their body size.

These analogues are translated into the patterns, grading and markers necessary to physically cut the fabric into garment parts. From the dawn of the industry, garment professionals have been aware of the many serious shortcomings with the analogue-based sizing system:

- Every person has his or her unique shape, yet the entire sizing system worldwide, including men, women, boys, girls and infants has in aggregate perhaps 200 sizes. That means that in a world of 7.5 billion people, where each person's shape is unique, each person is shoehorned into a category of 37,500,000 people.
- Size differs with each brand. A size 10 at Ralph Lauren may be a size 8 at Target.
- Size between countries differ. A size 12 in the UK is approximately equivalent to a size 10 in the United States of America, while size 36 differs between Germany, France and Italy.

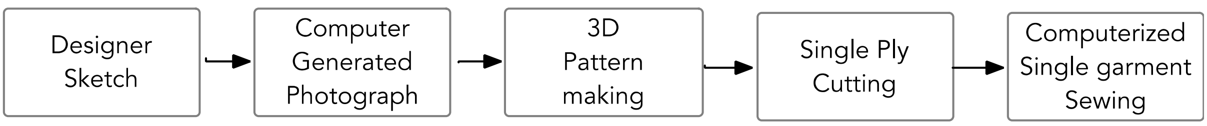
The second problem occurs when the factory is called upon to translate size into a pattern, which is required to cut the fabric into garment parts.

- A pattern is a two-dimensional object used to produce a three-dimensional garment. By its very nature the pattern is a poor representation of fit and shape.
- The pattern must take into consideration the fabric, for example, the drape. Two identical styles each utilizing a different fabric will require two separate sets of patterns. Where a fabric has a very soft drape, such as georgette or fine gauge single jersey, it becomes virtually impossible to create a pattern from the designer's sketch. In some cases, even the same fabric in different colours will have different drapes and require different patterns. In these instances, patternmakers must: cut the actual fabric into approximate pattern pieces; put the pieces together on a mannequin; see the degree to which the resulting sample is incorrect; recut the fabric to make the necessary corrections and repeat the process over and over again until the final basted sample correctly reflects the design.

A third problem is the transition from single pattern to the graded set. The difference between one size and another, as measured in centimetres, is not fixed. For example, the difference between size 4 and size 6 is less than the difference between size 10 and size 12, which in turn is less than between size 16 and size 18. At the same time, grading based on 5-10 measurements – for example, dress = chest, waist, hips, length, shoulder, cross back, etc. – will not deliver a good fit. At the end of the day, grading is a highly developed craft.

Today, as technology moves us from analogue to digital, we have new techniques.

Figure 33 New digital techniques



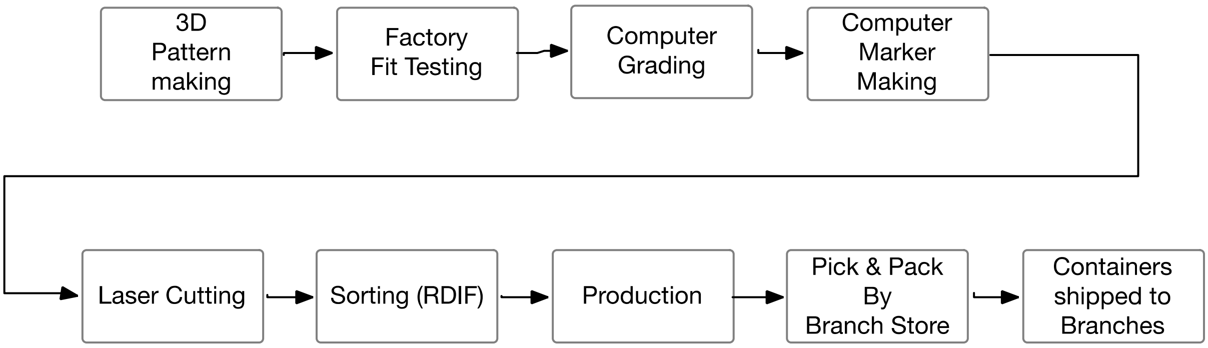
Source: Birnbaum on Strategy

We can now translate a designer sketch into a computer-generated photograph showing a model wearing the finished garment — in the correct fabric — allowing for the correct drape.

Using this photograph the computer can generate a three-dimensional pattern from which a single-ply cutter can provide the required garment parts and a computerized sewing machine can produce a single sample.

The same system can be adapted for bulk garment production, conceivably up to and including in-store delivery. Lead time from receipt of confirmed order, broken down by size/style/wash, to arrival of finished garments at each branch store, can be as fast as 20 days.

Figure 34 Digital supply chain from product development to in-store delivery



Source: Birnbaum on Strategy

The move from analogue to digital has created other advances, beginning with the problem of fit.

- Databases are now available to define shape for thousands of consumers in different countries, therefore permitting fit to relate more closely to shape.
- Databases exist to allow consumers to relate size from one brand to another, e.g. if you are size 10 at Marks & Spencer, the computer will tell you your size at Gap, Hilfiger, Primark or H&M.
- Computer systems currently exist to scan the individual to provide an eight-digit size that can be transferred to the factory's grading system, allowing for virtual customization.

Blockchain technology

Traditionally, if a retailer/brand wanted to trace the upstream materials that went into their products such as fabric, yarn and fibre, they had little choice. Either they worked with a vertically integrated supplier that carried out all manufacturing in-house, or they went to the old reliable method of dispatching people to check each production stage, including, in the case of cotton, into the field where it is grown. Blockchain changed everything by providing a third more reliable and less expensive alternative.

A blockchain is a growing list of records, called blocks that are linked using cryptography. Each block contains a code for the previous block. Material can be entered, but once entered cannot be altered. Together this forms a series of transactions, which allows the user to trace the steps in a supply chain. In 2016, Target used blockchain technology to trace the steps in various supply chains with unforeseen results.

Box 14 Welspun and Egyptian cotton bedlinen

For many years Target enjoyed a successful business selling bedlinen to their consumers. The quality was good, the prices competitive, and the sheets and pillowcases were made of Egyptian long-staple cotton.

All went well until in 2016, when Target began to employ blockchain technology to analyse upstream materials and discovered that the yarn produced by its major supplier was not of Egyptian origin. On 19 August 2016, Target notified all their customers who had purchased this bedlinen, ordering a recall and offering refunds, and of course severed all ties with its supplier.

Target's use of blockchain, together with their culture of total transparency allowed the company to face up to the problem without any loss of reputation. Consider what would have resulted otherwise. The situation would have continued unabated, with the supplier shipping faux-Egyptian cotton yarn until some doctoral student at North Carolina State University decided to write his thesis on DNA testing of percale yarns. The thesis would have been published and the student praised for his fine investigative work. Then, given the nature of society in the United States of America, a very large and drawn-out class action suit would have followed.

The loss of reputation aside, the estimated direct costs of such a class action suit would easily be hundreds of millions of dollars. This is but a simple example of how value-added services can be quantified.

Mass customization

Today, when we talk of mass customization, there are two separate strategies. Both are included in the collective model because both require a partnership between the customer (importer, retailer and/or brand) and the supplier (factory). In some cases, the collective model relationship occurs when the customer and supplier become one-and-the-same; for example, when factories open their own retail or e-commerce outlets, or the two recognize that one cannot exist without the other.

Small mass customization is when the consumer can buy custom made suits, jeans and shirts made exactly to his size using 3D fitting, 3D patternmaking, single-ply computerized cutting and single-piece robotic sewing. A customer for such services would likely have previously purchased bespoke jeans at Barney's for anywhere from $800-$1,500.

Big mass customization is where the factory can provide:

- 1 million jeans
- In 1,000 sizes
- In 14 days
- At no increased price

The consumer goes into a Walmart equipped with 3D fitting machines. Gone are the S-M-L-XL-XXL sizes. The consumer is given an eight-digit number for his size. To ensure that his jeans will be the right fit, Walmart staff are constantly following up previous orders of customized product.

The consumer chooses one of three models, each available in three washes, meaning there are a total of nine possibilities. The factory receives the individual orders in real time. The computer generates the size breakdown for all individualized sizes per style at the same time, but each cutting will only include 12 sizes based on the maximum size of the marker. Each cutting will therefore include the 12 greatest selling sizes. As new sales Figures come into the computer, new markers are generated based on the greatest selling sizes and the date of order receipt.

Assuming the factory has 20 tables each cutting four times a day: 48,000 pieces could be cut in a day and one million pieces in a 20-day month. Given Walmart's scale, sales of 48,000 pieces a day is quite conservative. Bear in mind there is no total order size. Sales come in every day for each model/wash permutation available.

The move from analogue to digital customization is still in its nascent form. It is too early to determine where this will lead, and which system will become the industry standard.

Soft technology alternatives

Our industry is in the midst of a technological revolution. This presents two serious problems. Where is it taking us? Do we want to go there?

We have been brought up to believe that we are in the midst of a second industrial revolution when workers will once again be replaced with more productive machines. It is true that the first industrial revolution was based on textile machinery such as the Spinning Jenny, the Flying Shuttle and Crompton's Mule, which were not only more efficient and more cost-effective but also produced a higher quality product than handmade goods.

However, what was true in the 18th century is not true today. We might think that if we assume that industry operates best when workers have been turned into machines, and if that is true then it follows that the machine must be better than the worker. But there is another way to look at things. Technology works best when it is not the driving force, but rather the tool of an educated and well-trained worker. Technology has brought many advances to the garment industry, and it will certainly bring many more in the future.

It is possible that within our lifetime artificial intelligence will be able to predict what styles consumers want. At that point brands and retailers need no longer take enormous risks producing goods that consumers will not buy. This in turn will markedly reduce the markdowns that have plagued our industry.

It is possible that within our lifetime, computer-driven machinery together with sophisticated software will reduce product development from six months and more, to two to three days. It is possible that with highly sophisticated software, computers will be able to create true 3D patterns that will mirror shape and fit. It is also possible that computerized machinery and sophisticated software will eventually allow factories to increase productivity, replace workers and finally put an end to wage inflation.

We are not there yet, but based on the latest advances, the technology that only a few years ago would have been considered impossible has now become a certainty – at some point in the future. All that is required is time, effort and money. Which leaves us with but one question: why bother?

In all seriousness, why are we trying to predict what consumers want to buy when 40 years ago Inditex developed a fool proof six-step method to do a near perfect job? Zara literally designs after sales! They operate under trial orders, which works like this:

- Take one factory with speed-to-market capability;
- Produce limited quantities of multiple styles;
- Ship the trial orders to designated target stores;
- Wait five days;
- Determine which styles sell and which do not;
- Order bulk production of the bestseller styles.

Why are we trying to invent complex and costly computerized hardware, and sophisticated software to reduce product development, when 40 years ago the same Inditex developed another fool proof six-step method to reduce product development lead times? Zara carries out most of the product development work before there is even a product to develop. Their approach works as follows:

- Go to a computer – all new fashion exists on the internet, shows, store windows, etc.
- Download the most interesting designs;
- Produce patterns and knit specs for all downloaded designs;
- Select the best designs for the particular fabric;
- Wait for the sample fabric to arrive;
- Produce the sample in two to three days.

Why are we investing large sums of money in the hope that expensive machinery will improve productivity, when in most garment producing countries even the best and most efficient machines are not cost-effective? Even in industrialized high-labour rate countries computerized machinery is at best an important tool for well-educated, highly trained workers.

For many years, the best factory executives have recognized that worker training is the best and by far the most cost-effective method to increasing productivity. Indeed, worker training and worker empowerment is at the centre of contemporary manufacturing systems. The data and results are so clear that we must assume that factories and national industries that fail to rely on worker training must have priorities other than success and added profit.

There is one possibility that might explain both the success of worker training and the failure of some to move in that direction. All worker training whether it be teams, lean manufacturing or modular systems, depend on worker empowerment. Those that fear worker empowerment will not accept worker training as a means of increasing productivity, even if it means the factory will not increase profits.

The problem is that while engineers can provide the necessary training, they cannot create worker empowerment. For this we have to look to soft technology.

Box 15 BF Skinner and Rosie the Riveter

When the United States of America entered World War II, the country faced a serious problem. Their armed forces required a large number of men. Many of the best men were working in heavy industry. Clearly before they could be taken away from their jobs, replacements would have to be found. The obvious choice was women. But in 1941 the idea that the "little woman" could move from baking cakes at home to producing tanks, artillery, war ships and bombers in large-scale factories seemed impossible.

The behavioural psychologist BF Skinner had the answer. It was all a question of changing behaviour. Whereas previously women involved in manual labour were thought to be part of the uneducated and poor lower-class, women relatively quickly began to recognize they were the equal of their men fighting for the country. As a result, women not only joined the workforce but developed a sense of accomplishment in their work.

In today's machine-driven technology, we have forgotten that productivity is based on how workers feel about their work.

Together with our workers, it is possible to develop an environment of worker empowerment where productivity rises to unequalled levels.

It is all about people.

Towards a comprehensive integrated technology

We tend to see new technology as a step forward, an improvement on the past. In many cases, technology is at best a solution to a problem we have created.

For example, because we are working in countries with no qualified patternmakers, or we have lost our own skilled craftsmen patternmakers, we have developed computerized pattern making. However, it remains the case that computer-generated patterns are not as good as the old manually cut patterns, although computer-generated patterns are better than no patterns at all.

More to the point, technological development has been piecemeal, breaking the process down in discrete steps, rather than looking at the process as a whole. The reality is that the whole is more than the sum of all steps.

For example, whether specialized computerized robotic sewing machines are helpful depends on what you are producing. Robotic sewing machines are good if you are producing shirts or trousers but fail if you are producing blouses or skirts. This is because, from the production point of view, all shirts and all trousers are the same, while each blouse and skirt is different.

Finally, as with all innovation, the value of technology is not an incremental improvement of the old but rather the ability to create something that has never been possible before. There are a few technology companies around today looking at such comprehensive development. One of the most interesting efforts is the combination of on-demand cutting and the micro-factory.

This is a holistic solution. Where others are moving to replace people with machines, the goal of this and other similar innovations is to provide people with better tools. Rather than break down the process into discrete steps, the on-demand micro-factory also sees the entire supply chain brought together into a single room.

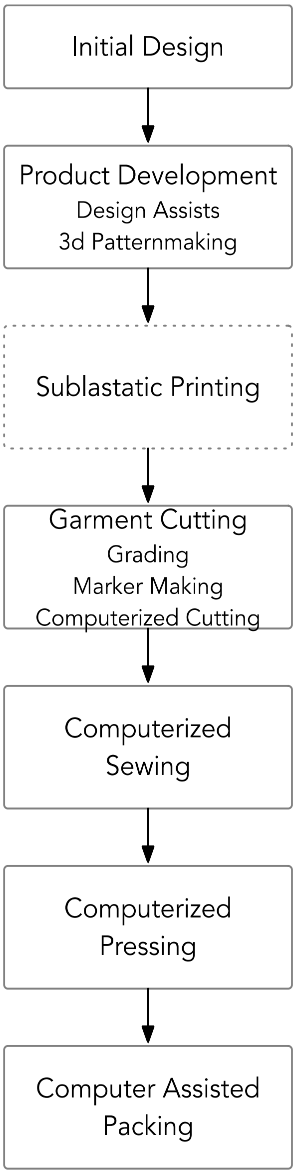
This is also an ongoing process and there are, of course, problems. But working to solve those problems will bring the system closer to reality.

The on-demand micro-factory has four interrelated goals, all of which seek to reduce costs on both the customer and factory/supplier sides. They are:

- Shift product development from the customer to the supplier;
- Ensure factory fast turn and quick response capability;
- Reduce lead times to the point where the factory can produce both first orders and re-orders immediately after receipt of the customer's order;
- By ensuring the above, markdown can then be reduced to a point approaching zero.

The operation includes a number of variations and modules, depending on the customer's needs, but the process always begins with the same first step: **customer's designer provides initial design**. After that, the factory takes over. Here's the flow of steps involved:

Figure 35 Micro-factory



Source: Birnbaum on Strategy

Product development includes converting the designer's sketch into a computer-generated photograph in the right fabric worn by a model, followed by a 3D pattern. From there, if required, the on-demand micro-factory can produce actual samples.

If required, the system is equipped with an on-demand digital printing module that permits the widest range of designs and colourways to be added to the fabric in minutes. This is particularly useful for plaids, engineered patterns and other prints that require vertical and horizontal matching.

Garment cutting includes computer-generated grading, computer-generated marker-making and computer-generated cutting. One important factor is the system's ability to grade a large number of sizes. For example, instead of only 32-34-36 trouser waist sizes, the factory can provide 30-31-32-33-34-35-36 at no extra cost to their retailer customer. The same occurs with inseam measurement. As a result, the retailer can offer a much wider range of sizes and has a much higher probability of being able to give the consumer their exact size, without any need for alterations.

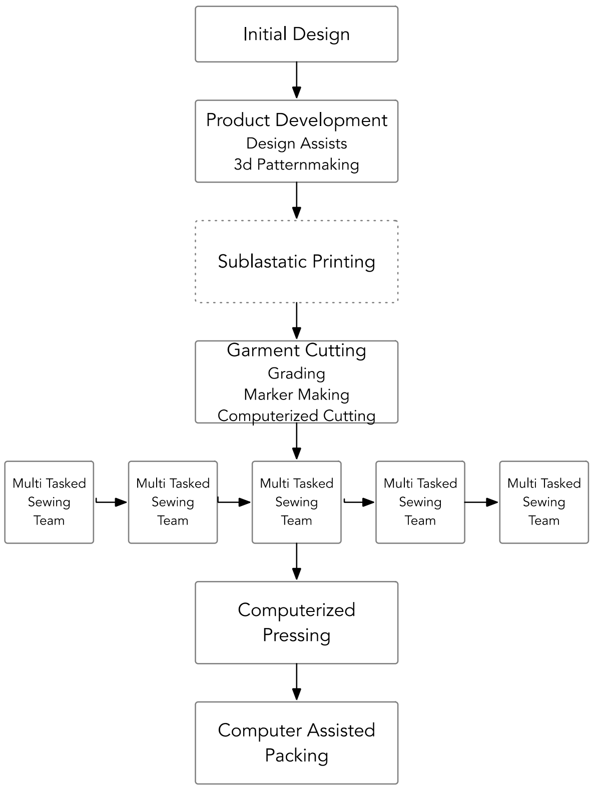
This is where technology can provide what is known as disruptive innovation. When we combine virtually infinite sizing with speed-to-market, production can, for the first-time, truly follow daily retail sales. The consumer receives the closest thing to a bespoke garment on a timely basis, while the retailer carries zero inventory.

Once the fabric is ready, the on-demand micro-factory allows for at least two important variations in **computerized sewing**, depending on the product. For simple styles such as shirts, trousers and skirts, very fast production coupled with worker training can take place in a very short period of time.

For more complex designs and production of products such as dresses, coats and jackets, sewing teams with highly skilled, multi-tasked sewers are used instead of computerized machinery. The sewing teams are more flexible than computerized machinery, allowing for increased production without major capital outlays. The problem here is that while the computerized machine operator can be trained in a matter of days, training of multi-tasked sewers may require 12-18 months.

However, the problem of multi-tasked worker training time could be solved by using existing tailors who are becoming unemployed as customers shift from bespoke to branded label clothing.

Figure 36 Micro- factory with multi-tasked sewers



Source: Birnbaum on Strategy

On-demand micro-factory

The on-demand micro-factory offers total multi-dimensional flexibility.

- The system operates equally effectively in factories producing as few as 250 garments per day and as many as 5,000+ per day.
- Because of the great cost savings (as we will see below), the factory can be located anywhere in the world and can ship everywhere in the world. The cost savings are so great that airfreight costs are easily absorbed.

In the real world, innovation, no matter how exciting and alluring, will not be accepted until the benefits can be quantified. So, let’s look at the following cost-to-value cost sheet.

Table 33 Cost-to-value cost sheet: On demand micro factory

		I No product development No markdown reduction		II Product development + markdown reduction	
Item		**Factors**	**Cost**	**Cost**	**Factors**
1	Material		$6.00	$6.00	
2	Trim		$1.00	$1.00	
3	CM labour		$0.64	$0.64	
4	CM overhead		$1.86	$1.86	
5	Cost of service: Product development		$0.00	$0.25	
6	Cost of service: Markdown reduction		$0.00	$1.00	
7	CM total cost		$2.50	$3.75	
8	Total factory cost		$9.50	$10.75	
9	Added value product development		$0.00	$0.50	
10	Added value markdown reduction		$0.00	$2.00	
11	Net factory profit		$0.50	$3.00	
12	Total FOB cost		$10.00	$13.75	
13	Agent commission	5.0%	$0.50	$0.69	5.0%
14	Freight		$0.25	$0.25	
15	Duty	16.2%	$1.62	$2.23	16.2%
16	Clearance		$0.10	$0.10	
17	Transport		$0.15	$0.15	
18	Total DDP		$12.62	$16.67	
19	Product development loading	20.0%	$2.52	$0.83	5.0%
20	Distribution centre loading	5.0%	$0.63	$0.83	5.0%
21	In-store		$15.78	$18.33	
22	Markup	75.0%	$47.33	$47.33	69.0%
23	Retail		$63.10	$63.10	
24	Markdown	33.0%	$20.82	$3.16	5.0%
25	Net retail		$42.28	$59.95	
26	Net retailer profit		$26.50	$41.61	$15.11

An explanation of the rows in cost-to-value cost sheet:

Item 5: Cost of product development service:

- $0.00 – no added cost;
- $0.25 – while the factory can quantify the total cost of product development, it is impossible to determine the cost per unit until the factory knows the size of the order. The $0.25 assumes a total cost of $500 for an order of 2,000 pieces.

Item 6: Cost of markdown reduction service:

- $0.00 – no added cost;
- $1.00 – this is calculated directly on a per unit basis.

Item 9: Added value product development service:

- $0.00 – no added value;
- $0.50 – this is an arbitrary, but based on experience not unreasonable, amount.

Item10: Added value markdown reduction service:

- $0.00 – no added value;
- $2.00 – this is an arbitrary, but as we will see below a not unreasonable, amount.

Item 11: Net factory profit:

- $0.50 – normal net profit of 5% of FOB;
- $3.00 – this is initially $0.50 profit + $0.50 added profit for product development services + $2.00 added profit for markdown reduction services.

Item 19: Product development loading:

- $2.52 – few if any retailers or brands calculate the actual per unit cost of product development. The best they can do is calculate aggregate cost of product development as a percentage of total DDP cost, and take that result as a loading of usually 20% of DDP.
- $0.83 – the customer's designer does carry out some portion of the work (see above Initial Design in table 33). The 5% is purely an estimate, probably in excess of actual costs.

Item 21: In-store cost. This is the total of the garment costs up to the point when it arrives at the store.

- $15.78 (sum of items 18-20);
- $18.33 (sum of items 18-20).

From this point forward, calculations are based on the retailer's pricing decisions. While the in-store cost of I (No Service) is $4.05 less than II (Factory provides services), management is aware that once markdown costs have been factored in, factory services will provide a substantial cost saving. The question that remains is, what is to be done with this saving?

The range of possibilities extends from: the retailer retains 100% of savings as added profit, to the retailer retains 0% of savings giving 100% of the benefit to the consumer in the form of a reduced retail price.

For the purpose of this exercise, we will assume that the retailer retains 100% of the savings.

Therefore, the explanation of the rest of the cost-to-value cost sheet runs as follows:

Item 22: Markup:

- $47.33 – the customer works on 75% gross markup;
- $47.33 – the customer adds the same amount in order to retain 100% of the cost savings.

Item 23: Retail price (sum of items 21 + 22):

- $63.10
- $63.10

Item 24: Markdown:

- $20.82 = 33% of retail. Given the current retail environment this is a not unreasonable amount;
- $3.16 = 5% of retail. Although the initial concept is to move to 0% markdowns, we should allow for some problems.

Item 25: Net retail price (item 23 less item 22):

- I: $42.28
- II: $59.95

Item 26: Net retailer profit (item 24 less item 23):

- $26.50
- $41.61
- $15.11: Net retailer savings from factory services ($41.61 less $26.50).

What the cost-to-value cost sheet shows us is that this is a true win-win situation for both the factory and the customer.

- The factory's profit increases from 5% to 30% of FOB;
- The customer saves $15 on a garment with an FOB price of $10. It would be as if the factory were paying his customer $5 for the privilege of making his garments.

This then takes us back to the original thesis of the cost-to-value concept. The cost of any product is really irrelevant to the customer. The customer mainly cares about value.

Engineering

This is a very complex subject, where often the simplest issues require deep understanding

For example, consider factory layout. Most garment factories have identical operational sections: cutting-bundling-sewing-pressing-packing. They should all follow the same general layout. And so, they do. However, some years ago the buying office of a well-known brand/retailer sent their own engineers into a major garment supplier. They discovered that while the factory followed the same general layout each garment travelled one kilometre from cutting to packing, resulting in serious increased lead times.

One of the most important areas of engineering is calculating minutes per unit

Calculating minutes per unit

Style XYZ requires 38.4 sewing minutes per piece. This is an important piece of information.

From the factory side it is necessary to determine:

- Garment cost;
- Changes in productivity;
- Factory schedule and capacity.

To calculate the minutes per piece we require the following information:

- Number of machines in the line;
- Number of working days factoring in overtime;
- Number of pieces in the order.

Table 34 Calculating minutes per piece

Days	Hours	Minutes	Line	Units
20	8	60	40	10 000
	160	9 600	384 000	38.4

A 40-machine line requires 20 days at average eight working hours per day = 38.4 minutes.

However, there is one more factor: downtime due to line balancing. An assembly line reduces production into a series of discrete steps. The goal is to have a steady flow without bottlenecks and/or stoppages. Because the number of minutes required differ from one step to another, we cannot simply allocate one worker to each step. For example, step A requiring two minutes requires four-times the work of step B, requiring half a minute. To keep a steady flow the line manager must stop work to balance the line while machines are changed, and workers assigned. Typically, a factory will plan to start producing a new style at a point coinciding with normal operation stoppages – after lunch or another break, or most often at the beginning of the workday. A well-run factory will require half a day or less for line balancing. As we can see from the table below, the time lost for a 10,000-piece order is slightly less than one minute per unit, or 2.5%

Days	Hours	Minutes	Line	Units
20.5	8	60	40	10 000
	164	9 840	393 600	39.36

Let us consider the downtime loss for a smaller order, bearing in mind that line balancing remains unaffected by order size. From the table below, we can see that the same style XYZ will require three days to produce 1,500 pieces at the rate of 38.4 minutes per piece.

Days	Hours	Minutes	Line	Units
3	8	60	40	1 500
	24	1 440	57 600	38.4

When we add the downtime, the results are very different. Where the 10,000-piece order loses less than one minute or 2.5%, the 1,500-piece order loses 6.4 minutes or 16.7%.

Days	Hours	Minutes	Line	Units
3.5	8	60	40	1 500
	28	1 680	67 200	44.8

There are other hidden factors:

- Introducing a new style in a line does not mean that 40 machines start work all at once. Work begins at Step 1 and over a period of time moves through the line to the point where all 40 machines are operating.
- The learning curve: sewers need time to adapt to the new style during which productivity is reduced.

Once again, the actual time lost is unrelated to the size of the order.

One point is clear, we cannot effectively produce 1,500 garments in a 40-machine line. Not only are the costs prohibitive, but also, as we will see below, line balancing may no longer be possible.

Line balancing

Let us return to line balancing. How do we balance the line?

100 years ago, line balancing simply meant adding a more sewers to the difficult operations. In the example above, Step A would require four sewers while Step B would require a single sewer. This required the ability to determine the time required for each operation. Not only was this inefficient, but it also failed to take into consideration the hidden factors listed above.

Today, successful factories no longer think of their sewers as automatons, but rather as people. Line supervisors categorize their sewers into A-B-C classifications. Rather than throwing four bodies at Step A, the supervisor will allocate two Class A sewers. The best line supervisors will also provide on-the-job training to raise the standards of their line.

Management will bring in qualified engineers to introduce new production techniques to train both workers and also supervisors for the entire factory. Almost all contemporary production techniques are based on worker empowerment.

All of this brings us to the point where line balancing becomes impossible. As a factory trades up from commodities to fashion goods and lower value-added to higher value-added products, the size of the orders diminishes and with that so do the sizes of the line. At some point, usually at about 20 machines, the line ceases to be balanced because we cannot assign one and a half sewers to an operation. Or can we?

The short answer is yes, we can assign half a worker. This is called multi-tasking, where each sewer carries out several steps. At this point the single tasked line is replaced by a multi-tasked team, where over 25 operations are carried out by 8-12 sewers. But this team can only operate effectively when they are completely empowered.

In successful operations the team itself decides which operations are carried out by each worker, because they recognize that people are individuals with different skill sets. The team will place each worker on operations they are most qualified to carry out. In a sense, the team becomes an independent contractor that makes best use of the factory space and equipment. No more line supervisors because there are no more lines. The factory only cares about quality.

From line to lean

As the industry moved from large order basic commodity garments, to small order fashion goods, the line proved to be increasingly unworkable.

New systems for sewing were developed to meet the needs of the changing industry.

Among the most important was Lean Manufacturing.

The semiskilled single-tasked sewer was replaced by a multiskilled crafts person. The line was replaced by the team. While the traditional factory was based on a series of operational departments, lean put them together in a single team — a number of small-scale operations.

As the team develops, it becomes a semi-autonomous operation where the role of factory management is reversed. Rather than a bunch of employees, the team becomes a subcontractor that uses the factory facilities to carry out its work.

The factory needs no longer make an effort to manage or to increase productivity. Factory management, rather than supervising the team's work, acts as it would when working with any subcontractor, ensuring standards and levels of quality are maintained.

The team hires and fires itself. If a team member is sick, the team must work to maintain production. If a team member is found to be lazy or unqualified, the team replaces that person. Where the traditional line-driven factory required 30-45 day to complete an order, the lean-based operation requires 4-7 days. The ultimate goal is to have zero work in process at the end of the working day.

One of the most remarkable and remarkably misunderstood factors of modern garment factory engineering is its dependence on well-trained, highly qualified, motivated workers.

Non-professionals believe that progress is based on technology to replace skilled craftspeople with semiskilled workers. Qualified engineers realize the opposite is true.

You cannot breakout of the mass market commodity garment business, into the better-quality fashion sector without trained workers who can not only do the work, but who can also take responsibility for that work. This is the essence of what engineers' term worker empowerment.

A factory can train a single-tasked machine operator in 3-6 weeks. Training the single-tasked machine operator to rise to the level of multi-tasked craftsperson capable of working in a lean team requires 12 months.

This change creates overwhelming obstacles for factories basing their production on mass-market commodities dependent on cheap labour.

Firstly, because in these factories workers are considered easily replaceable, worker attrition can be as high as 10% per month. As a result, 6-12 month's training becomes impossible. Even if the worker stayed for the necessary period, the moment training had been completed they would leave for a better, higher paying job. It makes little sense for management to pay for and make the effort to assist its competitors.

Secondly, modern sewing systems depend on worker empowerment. In countries with inexpensive labour worker empowerment is often challenging.

Industry trends

At a time when our industry is undergoing strategic change, not preparing ourselves for the new post-pandemic world is the same as believing there will be no new post-pandemic garment industry.

The first step change required is to base decision-making on a 360-degree visibility of <u>all</u> costs factors and the value it can bring to the factory and the client.

Box 16 The women's ready-to-wear clothing industry

In the United States of America, the women's ready-to-wear clothing industry began at the end of the 19th century. Up to that moment, women's clothing was either produced by professional dressmakers or was homemade.

The new industry began with factories mass-producing waists. At the same time, the department store came into existence and so the waist factories had a natural market. In the early 1920s the waist factories decided to move into dress production.

In their first stage of existence, the factories hired professionals to provide design and marketing.

In the second stage they went into partnership with an external designer/marketer as the outside man and the factory as the inside man. In this relationship, the inside man was the senior partner because he had the capital necessary to buy the material, pay the sewers and, most importantly, to provide the credit demanded by the department store.

In the third stage, the banks changed the relationship between the outside and inside men by offering factoring services, whereby once the order had been shipped to the store, the bank would make immediate payment to the shipper.

In the fourth stage, the outside man, no longer needing capital from the factory, became the dominant partner.

In the final stage, the inside man ceased to be a partner. The factory became an outside contractor while the designer/marketer became the "manufacturer" despite the fact that the manufacturer no longer carried out the manufacturing process.

As recently as 2013, the US government accepted that in the case of the garment industry the manufacturer was no longer defined as the one carrying out the manufacturing process.

When we consider that the future, post-pandemic garment industry will be different, with its own structure, operating system and its own definitions, factories, agents, and retailer/brand will cease to function in the same way as they do today.

Source: The Pittsburgh Press, September 16, 1906

The second step is to recognize that strategic change on this level has occurred before. Perhaps here we can learn from the past.

The third step will be to embrace changes in consumer buying practices.

Consumer buying is based on three factors:

- Functionality: workwear, uniforms, sports clothing;
- Aesthetics: fashion and personal taste;
- Status: the perception of personal value.

Functionality and aesthetics are limited to garments. The consumer wishing to buy tennis clothing may decide on one brand over another but will not buy a tennis racket in lieu of tennis shorts. Likewise, the women buying a dress may change from one designer brand to another, but will not buy a vase in lieu of the dress.

Status is different because it is not limited to a single product or even product type. A woman who last year bought a $15,000 handbag, might decide to buy a pedigree dog or pay for a personal trainer this year. To a large degree, much of consumer buying is related to status. This is not just about the $15,000 handbag and other top-of-the-range products; it is also about fast fashion, Instagram and other areas of instant gratification.

The net result will be a decrease in garment retail sales.

There are other factors that may result in a new and smaller industry:

- Consumer patterns are changing. People will be spending less on clothing and more on experiences, such as travel, restaurants and other social events.
- Consumers will be increasing purchases of vintage (pre-loved) clothing.
- Consumers will be renting rather than buying.

There are also factors that will dramatically change buying patterns:

- The growth of pure play e-commerce fashion will take a greater market share from brick and mortar;
- Existing export factories currently cannot meet the needs of the pure play sector.

The result will be that there will be greater pressure on the traditional retailers, brands and factories — too many factories chasing too few retailers and brands that are in turn chasing too few consumers.

Difficult times are also times of great innovation. To survive in this new era, retailers, brands and factories cannot return to doing things the way they did it before, if only because the past has shown us that in times like these, you cannot rely on the past.

We definitely do not know what the future holds. We only know that there will be a future and that the future will be very different.

Appendices

Appendix I Manual of services that factories can develop

Fabric sourcing: The ability to provide the customer with new and interesting fabrics

This is the first step in the manufacturing process. Traditionally, fabric-sourcing specialists working in the customer's home office designated the mill and the factory simply paid for the fabric. Increasingly that process is being shifted from the customer's home country to the supplier's country.

Material sourcing is a difficult service, requiring much more than technical knowledge of textiles. It also takes a long time for the customer´s designer to have sufficient confidence in its supplier and its supplier´s designated mills. Even the best mills must expect that two out of every three fabric samples will be rejected. But every mill knows that once the supplier develops a material sourcing relationship with the customer, the designated mill inevitably gets the order for the stock fabric.

Fabric sourcing follows two patterns depending on who initiates the process.

Customer-initiated material sourcing

In this scenario, the customer's designer locates the desired fabric and provides a swatch to the supplier´s sourcing specialist whose job is to:

- Ensure the fabric swatch is correct, i.e., can be produced commercially at a mill;
- Ensure the fabric will produce the required garment style, i.e., correct drape, texture, etc.;
- Ensure the cost of the garment produced from this fabric will fall within the customer's target range;
- Calculate for cost and FOB price;
- Send a counter sample for customer approval.

Box 17 Material sourcing

You are the material sourcing manager for Schmidlap Design's Hong Kong buying office. You are in New York meeting with Schmidlap's designer to discuss the new season´s fabric. The designer takes out a swatch and asks if you can source the fabric in Asia.

You examine the swatch, pull out some fibres and declare with some certainty, "No problem. This looks like 70% wool, 20% polyester, 10% nylon. I can find an exact match."

Thirty days later, you are back in the designer's New York office where you proudly pull out a half-metre sample. The designer takes the fabric and asks, "What is this? I did not want this. I want what I asked for."

Somewhat disconcerted, you declare, "This is precisely what you asked for — 70% wool, 20% polyester, 10% nylon. This is identical to the swatch you showed me."

At this point, the door opens and another sourcing specialist walks in and hands the designer a swatch of 50% wool 50% rayon. The designer grabs the swatch, turns to you and says, "This is what I want. This is what I asked for."

How did this happen? The short answer is that the designer cares less about contents or construction. The designer prioritizes the feel and drape.

At the very outset, having received the original swatch the professional sourcing specialist will have asked the designer to sketch a garment to be made from that fabric. As a professional, he would have begun the all-important dialogue between designer and fabric sourcing specialist:

Specialist: This fabric will not make that garment. The fabric only appears to be soft because 50 people have handled the swatch. You should have something with a much softer hand and a better drape.

Designer: What would be best?

Specialist: 100% wool challis would be beautiful, but your boss will never agree. At $9.50 per yard, the fabric alone would run to $20 and FOB to at least $25.00. The retail price would have to be $150-$200.

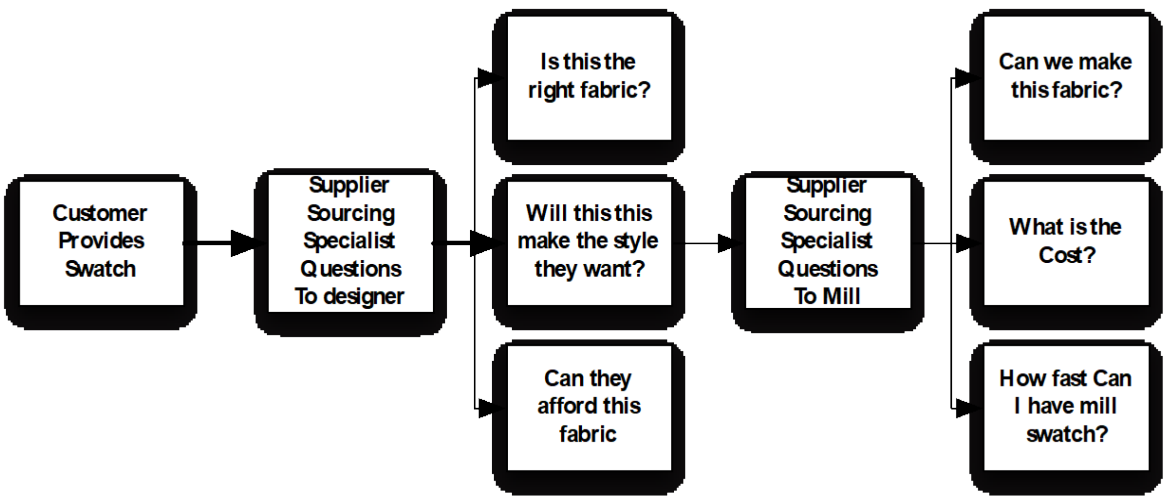
Designer: You are right. My boss would discard the style at once. What do you suggest?

Specialist: There are some good wool/rayon blends. I will come back with a few five-yard pieces. You can make up some samples and decide for yourself.

Designer: Thank you so much. I have finally met someone I can work with.

And so, that is how designer/middleman relationships are formed.

Figure 37 Customer-initiated material sourcing



Source: Birnbaum on Strategy

Supplier-initiated material sourcing

Here the supplier side develops its own fabrics to show to customers' designers. The steps are:

Determines fashion direction:

- Attends Première Vision and other international fabric exhibitions;
- Subscribes to a variety of design and colour services;
- Employs fabric designer or retains freelance designer.

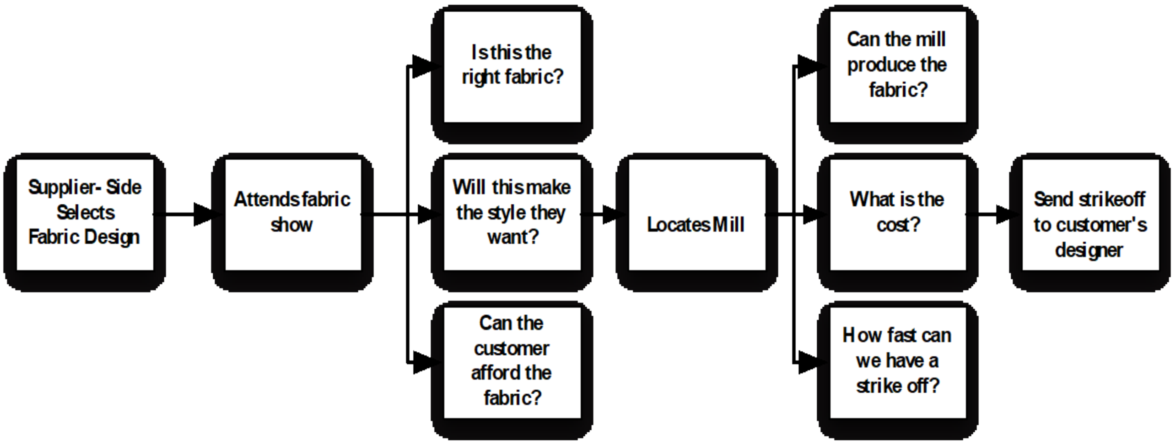
Determines if fabric is right for customer:

- If the fabric swatch is correct, i.e. it can be produced commercially by regional mills;
- If the fabric will produce the required garment style, i.e., correct drape, texture, etc.;
- If the cost of the garment produced from this fabric will fall within the customer's target range.

Determines feasibility:

- If the mill can produce the fabric commercially;
- Calculates cost and FOB price;
- Determines lead time to counter sample delivery;
- Produces sample fabric.

Figure 38 Supplier initiated material sourcing



Source: Guide to agents and buying offices

Ultimately, independent sourcing is of greater value than customer-initiated sourcing to both the supplier factory and the customer. Designers are always looking for new fabric ideas and will appreciate the supplier who can assist in this effort. But developing a relationship based on independent sourcing requires substantial time, effort and cost. Success is based on the fabric sourcing specialist understanding the customer's designer's needs and tastes, and on being able to collaborate effectively.

Original fabric design: Prints, jacquards, yarn-dyed patterns

Products such as woven and knit shirts/blouses, dresses and sleepwear often require prints, jacquards or yarn-dyed patterns. For these products, original fabric design assists will be required. Retailers and some wholesale customers will find the supplier's original fabric design input to be at least beneficial and often preferential.

Here again, work can be initiated either by the supplier or the customer.

Supplier-initiated fabric design

In this instance the supplier works with the customer's designer and provides fabric design:

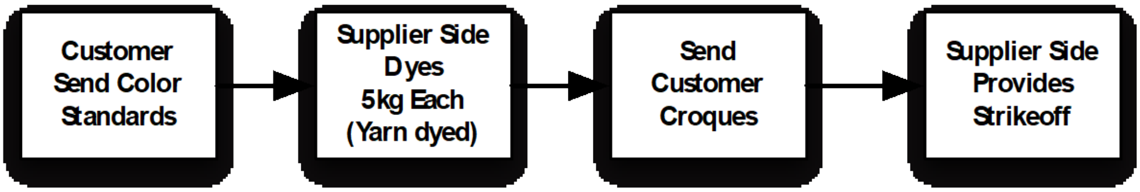
- Before the design process begins, colours must be selected and colour standards provided:
    - Supplier offers colours to the customer's designer, or
    - Customer selects own colours.
- Colour standards are sent to the supplier. If the pattern is yarn-dyed, the mill will dye five kilos of each selected colour in advance. (For major customers this could involve 50 kilos or more for each colour).
- Supplier then starts the design process with inputs collected previously from a variety of sources:
    - Fabric shows
    - Design and colour services
    - Freelance fabric designers retained by the supplier factory
- Croquis sent to the customer.
- Customer makes selection.
- Supplier provides strike offs.

Customer-initiated fabric design

The steps here are similar:

- Colours are selected;
- Colour standards are sent to supplier;
- Customer sends design croquis to supplier;
- Supplier provides customer with strike offs.

Figure 39 Customer initiated fabric design



Source: Guide to agents and buying offices

That a supplier provides print and yarn-dyed design assists is not only an important service, but also a crucial step in being able to develop fast turn. When the customer's designer provides the original fabric design, the supplier must work to achieve precisely what that designer wants. This can be a long and arduous task. But when the supplier´s factory/mill provides this design assistance, customer acceptance occurs immediately, obviating the need for endless rounds of time-consuming design modifications and strike offs.

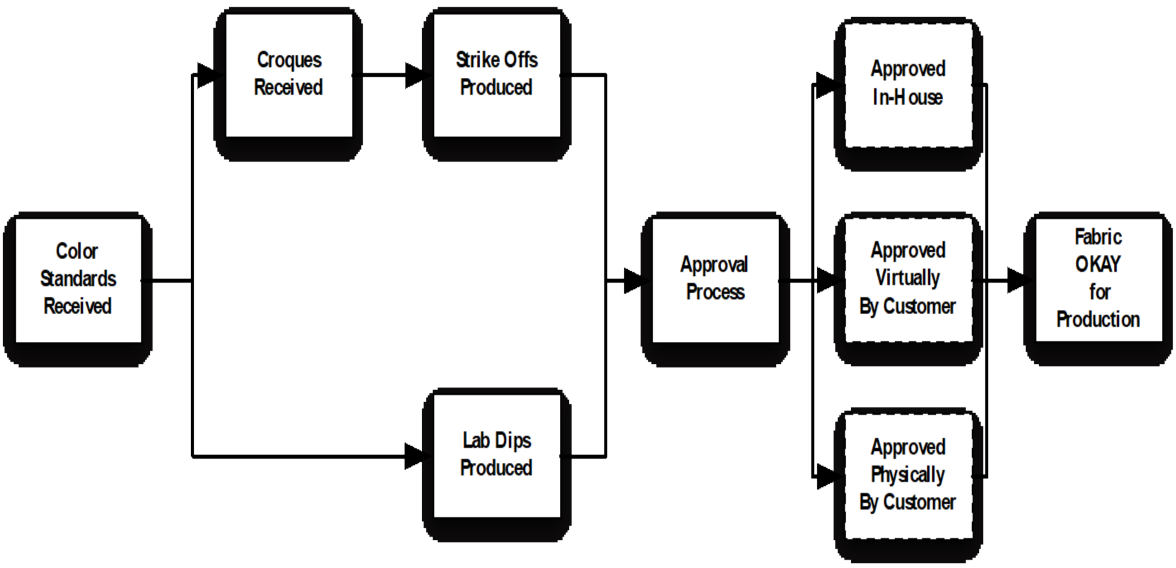
Lab dips and strike offs

The key element to consider here is time, because with this process, and all its steps and back and forth, approvals often require 28 days (or longer).

The steps are as follows:

- Supplier receives colour standards (for both patterned and piece-dyed fabrics);
- Supplier receives croquis (patterned fabric only);
- Supplier provides fabric samples:
  - Lab dips for solid goods;
  - Strike offs for patterned goods.
- Fabric samples can be approved in one of three ways, each requiring different timings:
  - Supplier approves the lab dip or strike off in-house, independently of the buyer. This is the fastest method. Five years ago, this approach was unheard of, but as customers place greater value on speed-to-market, this is becoming a preferred method.
  - Customer approves the lab dip or strike off virtually by computer. New software programs have made this method more feasible.
  - Factory/mill sends the customer a selection of actual lab dips and strike offs from which the customer selects the best (or as is often the case, rejects them all and requires the factory/mill to repeat the process). This is the most time-consuming method (requiring as much as 12 days and sometimes more). The factors used to decide approvals/rejections are subjective and often arbitrary.

Figure 40 Lab dips and strike offs



Source: Guide to agents and buying offices

Salesman fabric samples: Required for all wholesale import customers

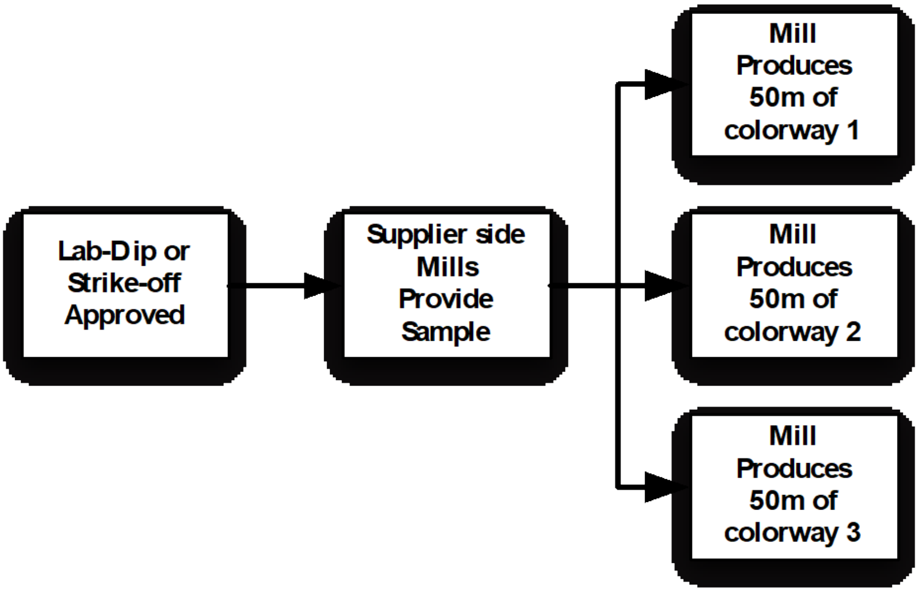
All customers can be divided into two types:

- The retailer who sells his goods directly to the consumer.
- The wholesaler who sells his product to the retailer, who in turn resells the product to the consumer.

The needs of each are different to some degree. The greatest of these differences is the need for salesman samples. The wholesaler employs salesmen. Each salesman must have a sample line. In most cases the sample line must include one piece of each style, in each colour or colourway. Once again, the key consideration is time. The steps are:

- Customer approves lab dips or strike offs;
- Supplier provides approximately 50 metres of each colour or colourway.

Figure 41 Sample fabric



Source: Guide to agents and buying offices

The need for salesman samples is so important to wholesale importers of products such as men's and boys´ shirts, that the customer will often select the garment factory based on its proximity to a mill capable of producing salesman sample fabric.

Furthermore, delivery dates for salesman fabric samples are matters of life or death. A stock order delivered three or four days late will only annoy the customer. The customer might send a nasty e-mail and in extreme cases put in a claim. But if the customer receives late delivery of salesman samples, they will often cease all future business with that factory.

This is understandable. Garments are most often sold on a seasonal basis, with a specific sales period (often one week) for each season. The sales period will open simultaneously throughout the country or the region. If the salesman sample has not arrived at each specified location prior to the opening of the sales period, that style will not be sold, and all the efforts up to that point will have been wasted.

Blocking mill space

In the traditional industry, either the garment factory would place fabric orders based on their customer requirements, or the customer would place the order and then instruct the garment factory to buy the fabric. In both cases fabric lead times were based on the current order position at the mill. During busy periods, fabric lead times increased, often to 45-60 days. Even in slow times, they rarely fall below 28 days.

Consequently, lead times had nothing to do with actual weaving, dyeing, and finishing, but rather the availability of looms (or knitting machines), dyeing vats and stentering machines.

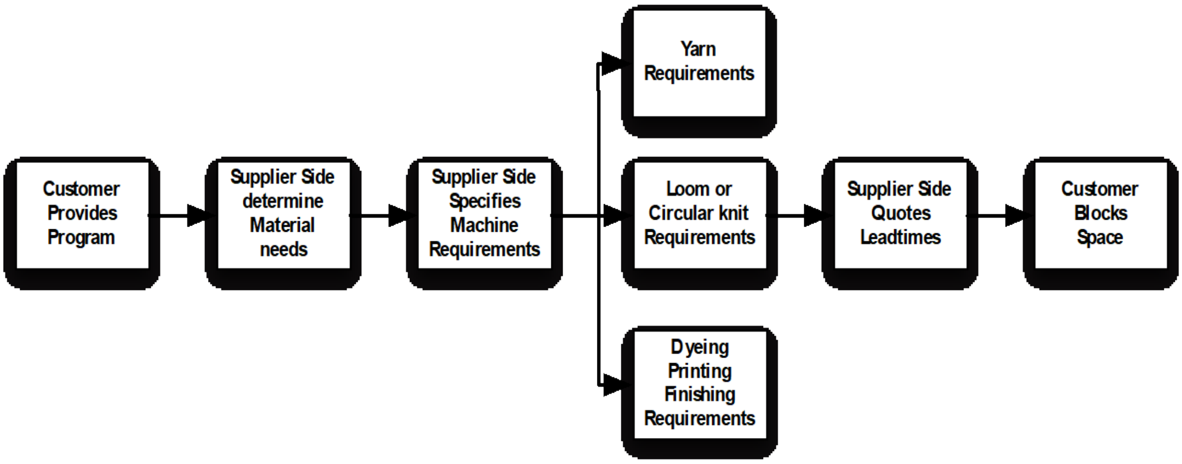
In a true speed-to-market process, when total production lead times – including fabric time – are often 30-60 days, the fabric lead time needs to be 10-14 days.

The only solution here is to block space with the mill. Rather than placing individual orders, the supplier guarantees to utilize X number of looms for a designated period, usually about 4-6 months. This guarantees the mill consistent business, while at the same time assuring speed-to-market for the customer.

The steps are as follows:

- Customer provides a program for garment production. This is not a series of specific orders but rather a guarantee to place a series of specific orders (all relating to a designated group of fabrics) in accordance with a pre-agreed schedule.
- Factory supplier determines the material needs, i.e., the number of yards required for each time period.
- Factory supplier determines the machine and material requirements to produce that fabric:
    - Quantity of yarn;
    - Number of looms (or circular knitting machines);
    - Number of dyeing vats and finishing machine time requirements.
- Factory supplier will then quote lead times.
- Based on the above data, the customer will agree to block space.

Figure 42 Blocking mill space



Source: Guide to agents and buying offices

Original garment design (Supplier provides first designer sketch)

As suppliers move from simple product makers to more sophisticated service suppliers, we reopen the great design debate once again.

About 20 years ago, the industry finally woke up to the fact that design is not an item but a process. And, like any other process, design can be broken up into a series of specific steps, some of which can indeed be transferred to the supplier. A designer in New York could, for example, draw a sketch, make up a spec sheet and then a tech sheet, provide sample fabric and send the entire package to the factory. The supplier could make a first sample, which in turn could be sent back to the designer for corrections against which the factory could produce a corrected duplicate. This process would undoubtedly be long and tedious, but the customer enjoyed a considerable cost savings since it allowed him to close his sample department in New York.

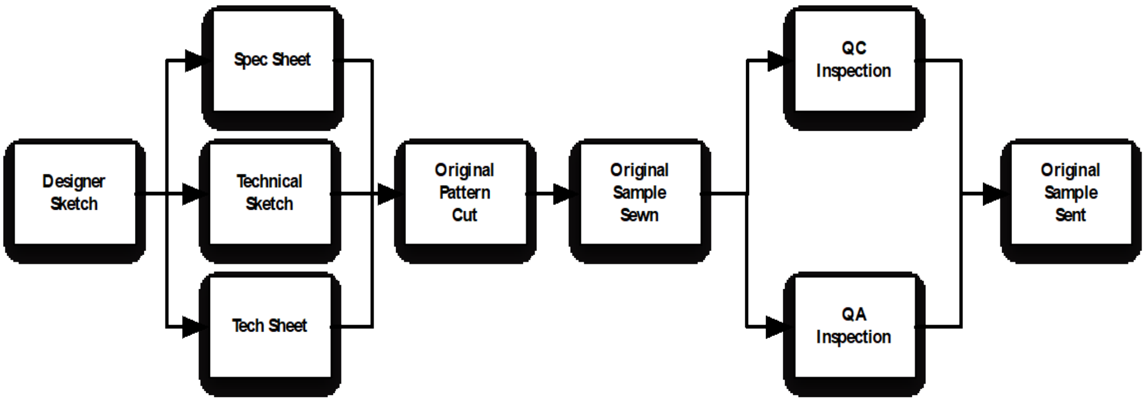
Over the years, as the better suppliers developed their skills and services, they were able to take over an increasingly greater portion of the design process. Today, some customers limit their design work to the original sketch, leaving the balance of the design process in the hands of the supplier, while a growing number now leave the entire design process in the hands of the supplier.

Designer assists: Customer provides first designer sketch; supplier provides some or all of following steps

In the past, the customer's design room and/or import department was required to provide the factory with all information and material, including the following:

- Technical sketch showing style details, particularly various placements;
- Spec sheet giving detailed measurements and seam allowances;
- Tech sheet giving garment-making details;
- Sample pattern;
- Original garment sample.

Figure 43 Design assists



Source: Guide to agents and buying offices

Many customers are increasing their efforts to upgrade their suppliers to provide more and better designer assists. Transferring this process from customer to supplier gives several important advantages – providing the supplier has the skills necessary to carry out the work correctly:

- Customer costs are reduced, not only because salaries and wages are lower in the factory than in the customer's home country, but more importantly, what was once an overhead now becomes a direct unit cost.
- The designer enjoys greater flexibility because they can use the factory facilities as a designer sample room.
- Lead times are reduced, not only because the supplier works faster than a designer sample department, but also because the process requires less to-ing and fro-ing.
- The customer can be assured that the supplier has carried out quality assurance and therefore will be more likely to maintain design integrity – the stock will look like the sample, just as the sample looked like the sketch.

The move towards supplier-delivered designer assists is still very much a work-in-progress. In many cases, its success is very much dependent on the product. For some products, knit-to-shape items for example, the supplier has been responsible for designer assists for many years. In other products – particularly those where fit and shape are important – the factory plays a secondary role.

Whatever the particular position, one thing is clear: lead time reductions will remain limited unless the supplier plays a greater role in the designer assist process.

Designer assists: Sample/duplicate corrections

Regardless of who develops the original design, or at what point the supplier enters into the design process, the supplier is responsible for providing an acceptable duplicate and ensuring that the factory is able to reproduce the style in stock production.

To a large degree the measure of a supplier is their ability to ensure that an acceptable duplicate is provided in a timely fashion. In this regard the role of the middleman in the factory selection process becomes crucial. Factories can be divided into three groups:

- The zero-service factory: This is the low-end factory, dealing mostly with basic commodity garments, whose only value is its low CM. This factory may require three or more efforts, taking well over six weeks, before the customer is willing to accept their duplicate. Often the customer must simplify the style in order to meet the factory's low standard of competence.
- The normal-service factory: This factory is able to provide a reasonable duplicate in a timely manner. The factory's goal is to duplicate the customer's sample in every detail. The apocryphal story of the factory that provided a duplicate with a cigarette burn because the customer's sample maker had inadvertently damaged the original garment refers to the normal-service factory.
- The full-service factory: This maker has the capability to examine the customer's sample to both:
    - Try to understand the underlying design;
    - Recognize and avoid future production problems.

In this sense the full-service factory enters into a three-way relationship of equals consisting of customer, middleman, factory and has an important role in several areas:

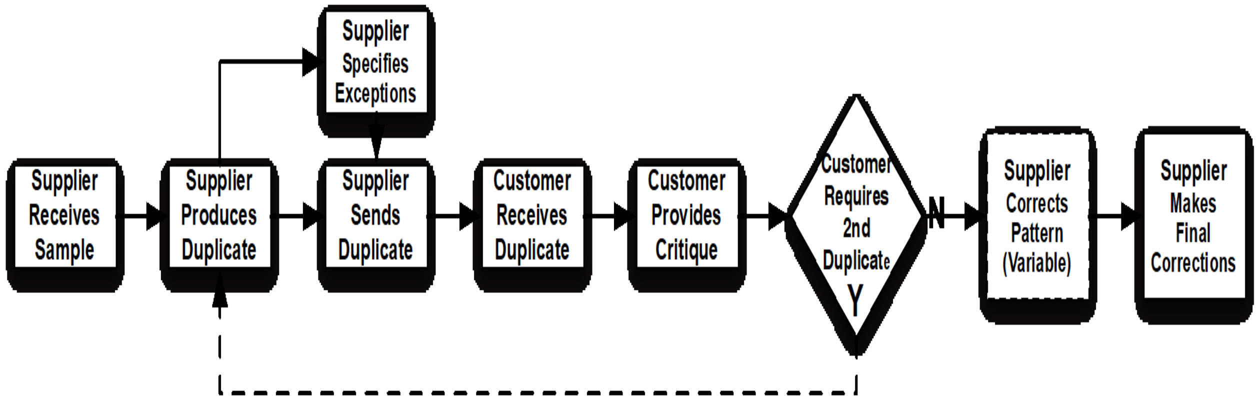
- Design Issues: The full-service factory produces duplicates that closely follow the designer's original concept. Sometimes the sample reflects the customer's sample department's lack of necessary machinery and the lack of availability of specialized sub-materials, rather than the inherent design concept. For example, the hem may be hand-basted because the customer does not have a blind-stitch machine; or the interlining used to produce the red sample may be grey because the customer did not know that a similar interlining is available in a choice of 12 colours.

- Quality Assurance (QA): The full-service supplier recognizes that the entire design effort will be useless if the sample cannot be reproduced by the factory at a reasonable cost. QA is the process whereby the supplier will recommend alternative steps in production, which will maintain the integrity of design while at the same time ensuring efficient production.

Any changes or corrections made by the factory not specifically requested by the customer or the middleman will be specified on a large hangtag attached to the duplicate. These will include any intentional changes made to improve the garment as described above. They will also include minor errors in the duplicate of which the factory is aware. Notifying the customer in advance of errors not only maintains the customer's confidence in the factory, but more importantly saves time.

If the duplicate is 1 cm shorter than the original, a note on the hangtag shows the customer that the factory has seen the problem and will rectify it in production. Without this note the customer might well ask for a second duplicate, requiring a further 5-7 days. The goal is to avoid the customer's demand for second duplicates, a time-consuming and often counter-productive event.

Figure 44 Quality assurance



Source: Guide to agents and buying offices

Design integrity

Simply stated, a style is said to have design integrity when the sample looks like the sketch and the stock looks and fits like the sample.

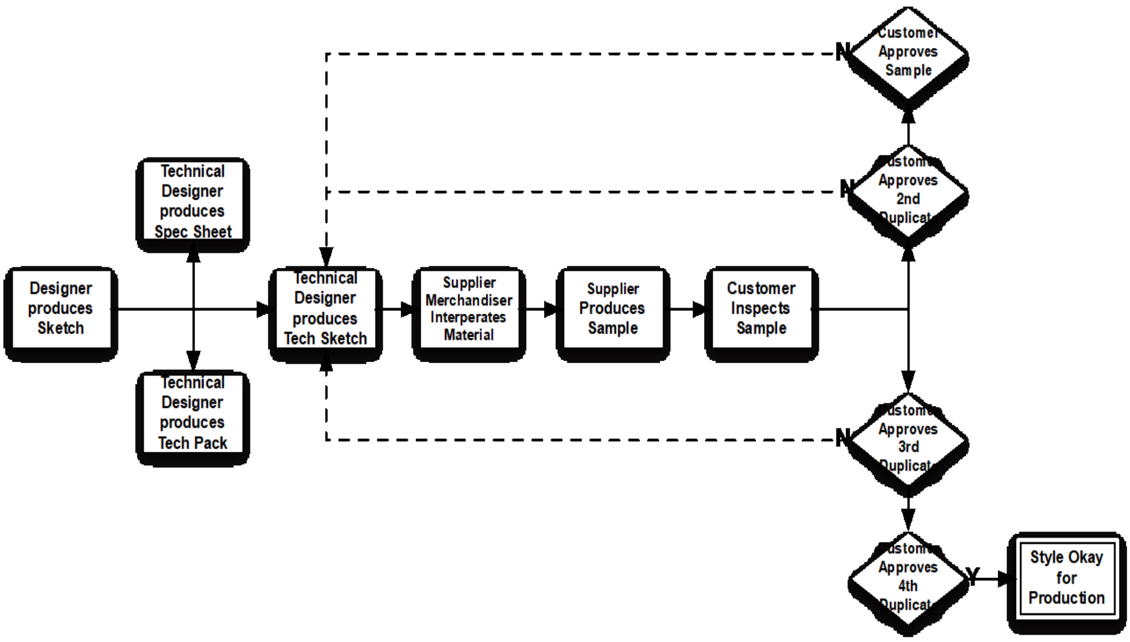
In our design-driven industry, we could argue that design integrity is of primary importance. And so it is. Operation management has gone through great expense, effort and time to ensure that the sample does look like the sketch and that the stock does look like the sample. Unfortunately, despite our enormous efforts, all too often the sample does not look like the sketch and the stock does not look like the sample. Great expense, effort and time has been wasted. In fact, it is the very system under which we operate that has made things worse.

Traditionally, the customer's designer creates the original concept and produces the designer sketch. At that point, the work is taken over by others:

- A technical designer takes that sketch and produces a series of instructions to the overseas supplier, including:
    - A technical sketch that corresponds to a blueprint of the style;
    - A spec sheet that has all size and seaming instructions;
    - A tech pack that has all the production instructions, together with descriptions and/or samples of all sub-materials.

- The package is sent to the factory.
- The factory produces a sample, which is sent back to the customer for inspection.
- If the customer approves the sample, all is well and the style is approved for later production.
- More often than not, the style is not all right. The customer requests corrections and insists on a new duplicate, which is sent back to the technical designer. The technical designer in turn has more corrections and insists on a new duplicate, which is sent back to them.

Figure 45 Design integrity 1



Source: Guide to agents and buying offices

The minimum turn time for a sample cycle is seven days (assuming the factory can make the correction and produce the duplicate all in one day). More often than not turn times are ten days. Four cycles require 20-28 days – these are lost days.

What went wrong? Customers blame their staff for not providing more accurate instructions. They blame the factory for not understanding the customer and the customer's market.

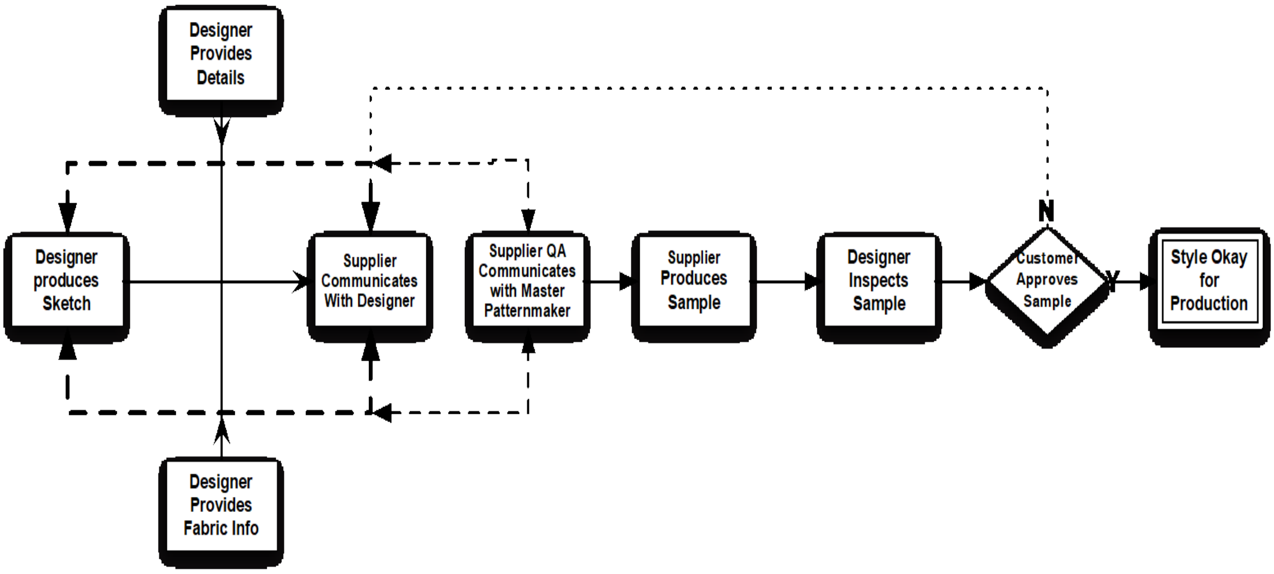
Actually, the problem is more fundamental. The conversation between customer and factory is all one-way (the arrows all point right). The only time the arrow moves left is when the factory sends the sample (or duplicate) to the customer, who of course rejects the sample and repeats the one-way conversation.

Moving the design assists to the supplier both reduces cost and provides greater design integrity. The one-way instructions need to become a two-way conversation:

- The factory master patternmaker receives the designer's package and begins his conversation by videoconference and e-mail. The conversation continues until the factory master patternmaker understands precisely what the designer wants.
- Enter the quality assurance (QA) specialist. The QA specialist is responsible for ensuring that the style can be produced in the factory and can be delivered at a reasonable price. If there is a problem, the factory master patternmaker must go back to the designer to ask for changes. (You will note we are changing the entire costing paradigm. In the past, the customer negotiated the price after receipt of the sample, but here the sample is being engineered to conform to a target price).

- The sample is then produced.
- The sample is returned to the designer.
- The designer approves the sample.

Figure 46 Design integrity 2



Source: Guide to agents and buying offices

There are many advantages to this way of working, including:

- The designer actually receives what he or she asked for;
- The sample is often better than the original concept because the designer is part of the supplier design assist team and because the factory has a real contribution to make;
- The new method is faster, more cost-effective and far more efficient.

Quality assurance (QA) versus quality control (QC)

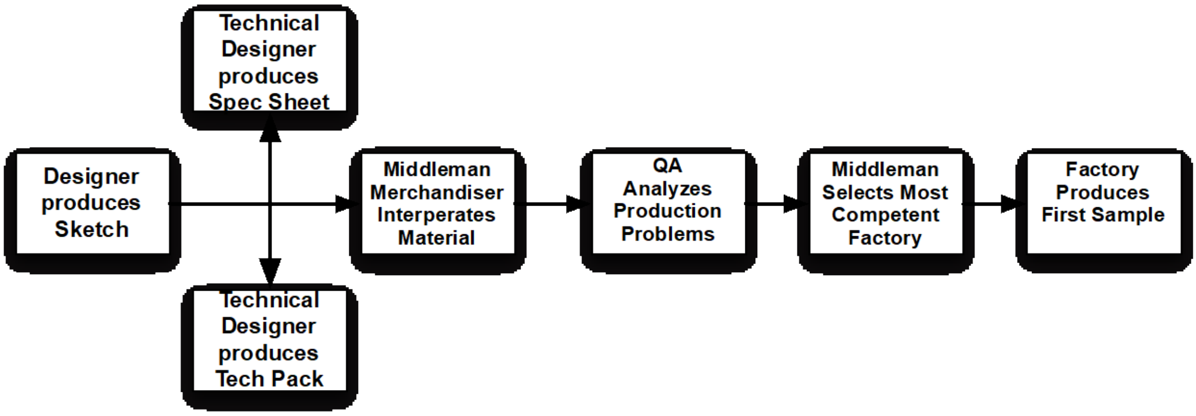
It makes little sense to go through the entire product development process only to discover that the factory cannot produce the order. It makes even less sense to discover the problem only when the middleman's quality control (QC) team has inspected the completed order.

Quality assurance (QA), the ability to understand and avoid the production problems in advance, has become increasingly important as the industry moves to lower labour cost countries.

The process begins before the first duplicate is made. The QA specialist analyses the designer's sketch together with the tech sheets. From this the QA specialist can offer a range of conclusions. Among these are:

- Good for production;
- Move order to better qualified factory (or a more qualified country);
- Duplicate sample to incorporate changes required to ease production difficulties.

Figure 47 Quality assurance (QA) versus quality control (QC)



Source: Guide to agents and buying offices

Determining trim and packing materials

There are two issues here:

- Ordering the correct materials;
- Ensuring the materials arrive on time.

We think that ordering the correct materials and ensuring on-time delivery are simple tasks requiring only patience and attention to detail. While those characteristics are indeed important, the actual work requires a great deal more thought.

In true speed-to-market operations – where the supplier is well-engineered, and management is professional and works closely with the customer – the ability to achieve speed-to-market often turns on trim. Full-service operations are often stymied because of a missing label or a trim item provided by a supplier designated by the customer.

Too often customers and suppliers concentrate on the primary material. They forget that while it is true that you cannot make a garment without fabric, it is equally true that you cannot make a garment without thread, buttons, interlining, labels or any of the 10-30 sub-materials that go into any garment.

One of the greatest problems is customers' reliance on designated trim suppliers. Here the middleman plays an important role in the original factory selection process. When customers work with unqualified zero-service factories, they must designate trim suppliers. Likewise, a customer must be careful about handing out their brand labels, in case a zero-service factory uses those labels to produce and sell counterfeit goods.

In the end, however, the problem is not trim or labels, but rather the choice of factory. A zero-service factory survives because of cheap labour. It is not afraid of losing its reputation because it has no reputation to lose. The use of sub-standard materials is just one of the hidden costs of working with a low-cost factory.

The first step towards achieving speed-to-market is to leave as much of the responsibility as possible in the hands of the factory. Trim is no exception.

The second step is to differentiate between materials that are available in the spot market and those that require special orders, and to ensure that special order trim is kept to an absolute minimum. Here too the middleman's role is crucial. It is their responsibility to ensure that all trim arrives on a timely basis.

Box 18 Buying the best Box

You are an engineer employed by Schmidlap Global Sourcing, the buying office of a major brand importer. You are sent into factories to increase efficiency and reduce costs.

Most of your time, particularly in the early days, is spent on the big items — increasing productivity, reducing lead times and installing systems. You really do not have time for the small stuff. Until. . .

One afternoon, you wander into a room you never knew existed. The room is enormous and filled from floor to ceiling with new never-used flat cartons. If the government of Egypt decided to ship the great pyramid from Giza to Crown Heights, Brooklyn tomorrow, they could do no better than come to this room for their carton requirements. Not only is the total beyond counting, the number of sizes is beyond belief. Where did these come from and why are they still here?

You go outside and grab the guy who orders the trim. He has a simple explanation. "When folded, different products and styles have different measurements. We must take those measurements into consideration when ordering cartons. We do try to keep the number of carton sizes to a minimum. We are currently down to 55 different carton measurements."

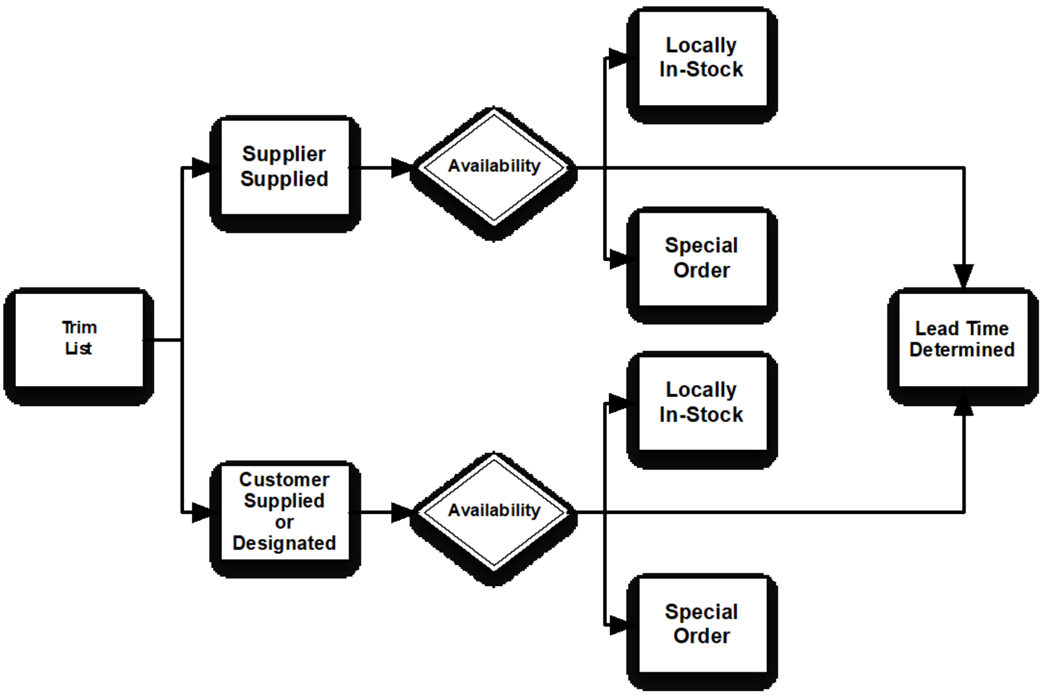
You call the team together and read to them the rules of cartons:

Rule I: Carton sizes are determined by the need to ensure that the maximum number of cartons fit into a container.

Rule II: Carton sizes are limited the smallest reasonable number, perhaps 6-8. Garments are folded to meet carton measurements, not visa-versa.

Can somebody please telephone Egypt to see if they are interested in buying cartons at a reduced price?

Figure 48 Ensuring on-time delivery



Source: Guide to agents and buying offices

Ornamentation: Beading, appliqué, embroidery

If the customer needs these embellishment services, they are tied to using suppliers that can provide them. Likewise, if a garment product requires embellishments, the middleman must have the means to find and provide them. In some cases, the ornamentation is ubiquitous to the product, e.g. all jeans factories have Tajima (or the equivalent) computerized embroidery sets. At the other extreme, designers requiring special ornamentation will be forced to go to suppliers that can provide that ornamentation.

Ornamentation begins with the original design, which can be provided by the factory, the customer or a combination of both:

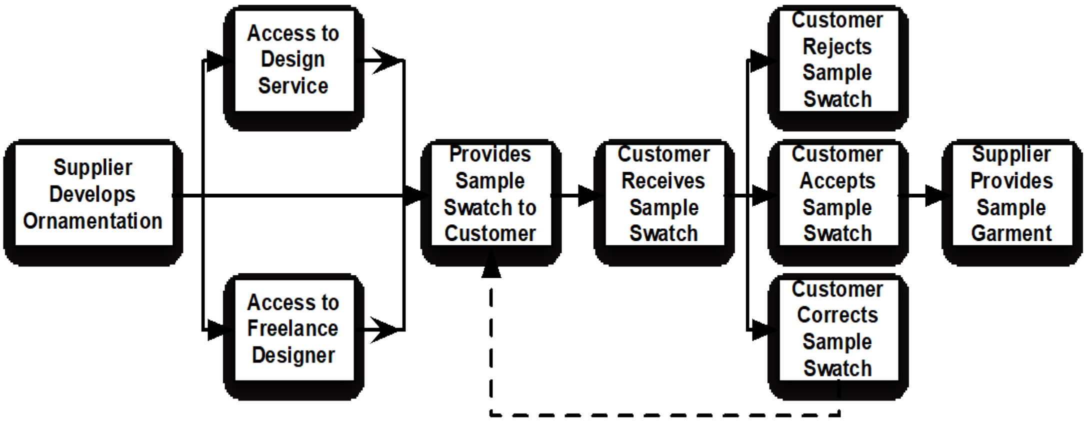
- Factory designs ornamentation: From age-old handwork to cutting-edge computerized techniques, ornamentation comes in an infinite variety of types and processes and that infinite number grows daily.

Factories with special equipment and skill sets would do well to inform their customers' agents and/or buying offices of their abilities. But simply giving machine specifications or product descriptions is not useful. Designers want to see and physically handle product. Factories offering ornamentation are advised to develop new samples every few months.

The development process begins with new design:

- Factory must have access either to ornamentation design services or a freelance designer. Both are available in Europe and the United States of America at a relatively nominal cost.
- Factory makes up swatch and sends to customer.
- Customer receives swatch and has three choices:
    - Customer may reject swatch altogether;
    - Customer may accept swatch;
    - Customer may like the design but ask for changes.
- Once a swatch is accepted, the factory will provide the sample garment made to the customer's design.

Figure 49 Ornamentation: Supplier developed 1



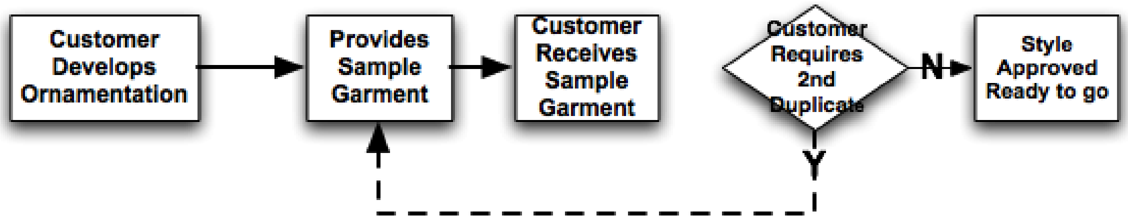
Source: Guide to agents and buying offices

As with any effort at original design, success requires time, effort and perseverance. Once achieved, success leads to the partnership arrangement that full-service factories rely on to become strategic suppliers.

- Customer developed ornamentation: Customers requiring ornamentation will often select suppliers almost completely on their ability to provide that ornamentation. The world is filled with blouse factories but those with access to broderie anglaise (Schiffli) are few and far between. Likewise, people rush to work in India because local factories are able to do complex hand beading at relatively low cost.

Again, those factories with special machines and skill sets must let their customers' middlemen know what they have. They must also constantly upgrade their skills and services.

Figure 50 Ornamentation: Supplier developed 2



Source: Guide to agents and buying offices

Research and development

The textile industry is known for its research and development (R&D) and technical innovation. We were all taught that the industrial revolution began with the 18th century UK textile industry. Some of us may even recall those terms we were forced to learn all those years ago at high school — Spinning Jenny, Flying Shuttle, Crompton's Mule. Although we never did quite understand what these things did, or who Crompton was and just how his mule got mixed up in these momentous events.

It is not surprising that today textiles remain in the forefront of innovation, expanding product development to areas completely unrelated to the garment industry. We are told that new materials and products such as nano-fibres and sophisticated industrial textiles will bring us to a new scientific plateau, while at the same time state-of-the-art high-speed computerized machinery is increasing productivity exponentially.

Regrettably, we do not normally associate the garment industry with R&D. Many of the materials we use today, such as cotton and linen, date back to the Stone Age, and wool originates from the time when mankind first domesticated animals. Our tools, such as needles, have been found in the caves inhabited at the end of the last Ice Age. The words we use are the stuff of philologists' dreams, derived from long dead languages. For example, the word linen comes from the Ugaritic.

Styles change, but the articles of clothing remain the same. Hemlines may rise and fall but the skirt dates back 6,000 years. Trousers go back to the Stone Age but did not become truly fashionable until as recently as the 6th century BC when they were introduced to the West by marauding Persians.

Much of our machinery appears to be electrified versions of 18th and 19th century models. In 2019, you could visit a workshop in Yangon where women were operating treadle sewing machines virtually identical to Isaac Singer's 1856 model.

Innovation in the garment industry

Yet there are exceptions, products where special materials and machinery have been developed and where innovation trumps fashion.

Box 19 19th century technology and modern engineering

Jackets

Have you ever wondered how the roll of the lapel on your finely tailored man's jacket maintains its roll? Squeeze it, rub it, hit it on rocks, the fabric may become tattered, the sleeves may fall off, but the lapel will maintain its roll to the bitter end.

The lapel of a fine jacket maintains its roll for the same reason a woman's hairdo once given a permanent wave will keep its curls. Hair, when curled or twisted then raised to a temperature of 180° C, will maintain that shape. Your bespoke jacket is interlined with a fabric containing 17% horsehair – 19th century technology at its best.

Corsets

Two centuries ago, women's fashion was curvilinear and women resorted to the corset, a most terrible contraption reminiscent of medieval torture devices. Rigid stays made from bone or wood maintained the shape. In the mid-19th century, the latest fashion dictated ever narrower waists. The demands were so extreme that the pressure needed to achieve the desired hourglass Figure caused the very fabric to tear. Consequently, the corset itself had to be reinforced. Steel wire was often used for this purpose, but the very best material proved to be baleen, a material found in whales, used to filter material for suction feeding.

All things considered; men's jacket styles have not changed much in the past century. But the manufacturing technology has evolved to a point beyond recognition. A 19th century time-travelling English tailor visiting a modern bespoke tailoring workshop located in London's Savile Row would feel completely at home. But move that same tailor to the Peerless factory in Montreal and he would not believe his eyes. Where once tailors spent hours shaping jacket fronts – using a hand iron and hand-picking interlining – Peerless now uses giant machines that stamp out the same fronts the same way the Ford Motor Company stamps out body parts.

Few women wear corsets today. The closest they come to is the bra, which brings shape without torture. Manufacturing the contemporary bra, on the other hand, brings its own special torture. A single style may be offered in what would appear to be an infinite number of sizes. To make matters worse, as size increases, the design must undergo subtle changes to ensure the look remains the same.

Contemporary bra designers and technicians are more apt to have degrees in construction engineering than design. The great paradox is that machinery, materials and methods must be constantly updated in an ongoing effort to achieve a natural look.

We do not think of long-term R&D in the garment industry. Why would anyone invest years to develop a new product in an industry dominated by short-term changes in fashion? Yet R&D is an important factor in bras. The company that invested six years to develop a liquid-filled bra cup showed a good return on that investment, just as the same company did well by developing a better shaped and constructed elastic to bring greater comfort to their customers.

R&D, whether it be innovation in materials, machinery, or systems, is an area of growing importance. For some products, such as men's jackets and women's bras, it is of crucial importance. The question is who will carry out the R&D work. In our garment industry the best and possibly only answer is: the middleman.

R&D must take place on the supply side. The customer might suggest areas for innovation, but the actual changes must occur in the factories where the goods are produced. The factories will not and cannot make the necessary investment without some guarantee that they will recover their costs. Who will pay if they fail to achieve the required results? Who will pay if they do achieve the required results, but having achieved success they discover that the customer is no longer interested?

In the real world, the customer looking for product innovation can expect the factory to offer some assistance, but the heavy lifting falls on his middleman.

Appendix II Production stock, order ready-to-ship

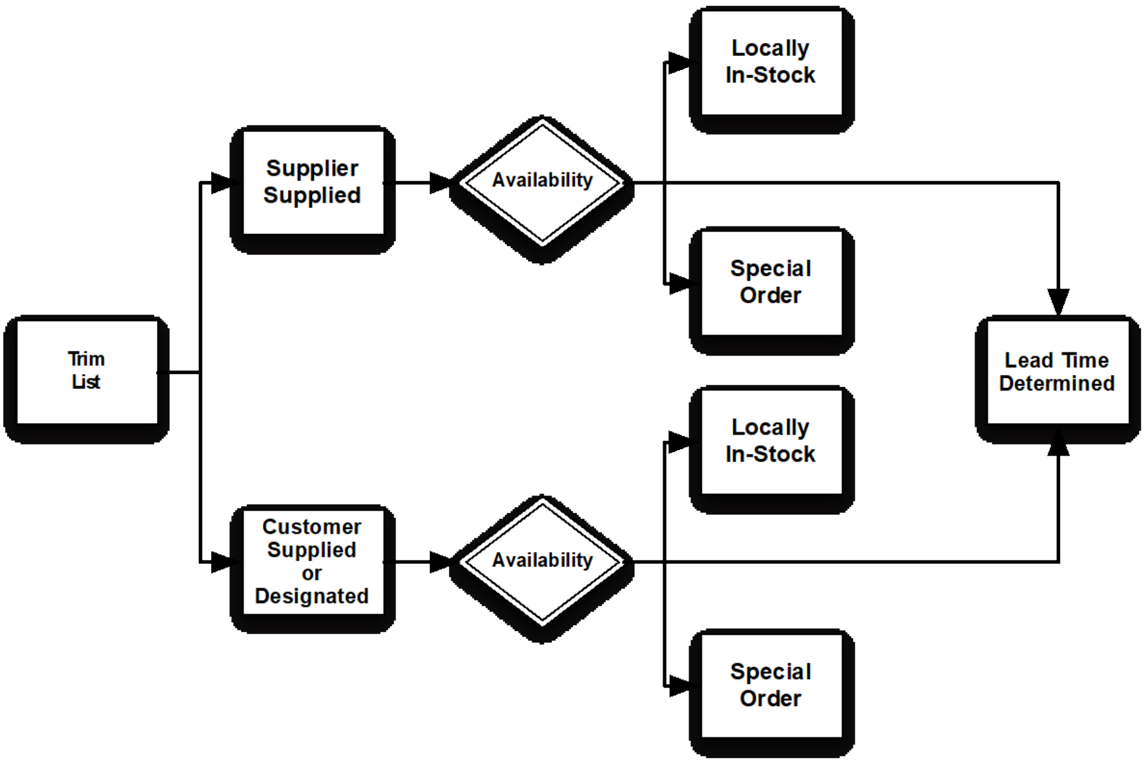
Production planning and tracking

Trim order

Supplier responsibilities require more than good engineering and management. They also require the assurance of on-time delivery of all materials, including the all-important sub-materials. Special consideration must be given to trim suppliers who actively work to ensure the fast flow of materials. Those who cannot meet shortened deliveries must be replaced by those who will. Designated suppliers must provide service or lose their monopoly status. Customers cannot insist on fast delivery while at the same time insisting on retaining slow suppliers.

At the same time, the customer and factory must always examine relative costs. Ordering trim in advance may result in a loss. But shipping late will result in a much greater loss. Being stuck with shoulder pads for 5,000 jackets may result in a loss of $3,000 but shipping 5,000 jackets late will result in a far greater loss.

Figure 51 Ordering trim



Source: Guide to agents and buying offices

Garment making: increasing efficiency

Production efficiency involves two different processes, each is important in its own way, and both include many of the same steps. Both involve the middleman, but the processes are different as are the goals.

Fast turn

We all know the numbers. A shirt requires 22 minutes to sew; a pair of five-pocket jeans takes 15 minutes; a T-shirt 8 minutes. Yet the factory delivery dates for these products range from 17 to 30 days.

The benefit of fast turn comes from reduced costs on the customer side. Moving goods faster means reduced markdown rates, while at the same time customers are able to reorder the best-selling styles with the assurance that replenishment will arrive on a timely basis. Most importantly, fast turn allows for trial orders, which let customers design more interesting styles with minimal risk (see section on Trial orders below).

The methods for reducing lead times are also well known. We all know about lean manufacturing; we all know about modular systems; and we all know about teams. Yet despite the many claims to the contrary, surprisingly few factories have effectively implemented any of these systems. Hordes have gone to the lectures. Many have retained specialist engineers. Some have certificates hanging on their walls. Lectures, specialist engineers and hanging certificates notwithstanding, a factory that requires 25-30 days for garment delivery (after receipt of fabric) is not employing lean manufacturing.

The true fast turn target (after receipt of fabric) is 3-10 working days depending on the product – three days for a woven shirt or T-shirt, 10 days for a man's suit.

Increasingly, the customers' agent or buying office is playing an important proactive role in this process. Where once customers relied on ineffectual demands to force their factory suppliers to move to fast turn, the current trend among the more professional middlemen is to send their own engineers into the factory to work directly on the factory floor to implement lean manufacturing and other fast turn production systems.

Productivity

While fast turn reduces costs on the customer side, increased productivity reduces costs on the factory side as well. Here too the role of the middleman is paramount. A new generation of engineers has revolutionized productivity in Asian factories. Where once 25% increases on the order - from 30 to 24 standard minutes per piece – were considered to be excellent results, new systems and more qualified specialists are now achieving 50% increases – from 30 to 15 standard minutes per piece.

Much of these increases are due to advances on the technical side, such as better worker training, the introduction of more efficient systems and investments in new capital equipment. At the same time, the introduction of better relationships between management and workers has also played a key role by reducing worker attrition.

While productivity is the single most important factor determining the success or failure of factory operations, its importance is also one of the most misunderstood areas in garment production in the developing world. There are two reasons for this:

- Most garment industry professionals have been brought up and educated in the industrial countries of the West where wages are high and overheads are relatively low. In these countries overhead equals 70% of labour, with the result that the main value of increased productivity is to lower the unit cost of labour. As such, most increases in productivity do not go to the worker but rather to increased profits or lower unit costs.
- Contrast this with the developing world where wages are low and overheads high, and where overhead equals 400%-600% of labour. In these countries the main value of increased productivity is lower per unit overhead, with the result that even when wage rises are directly proportional to productivity increase, the reduction in total costs remains considerable.
- Productivity calculations are counterintuitive. In the West, we applaud a mere 3% increase in productivity. In Southeast and South Asian countries, the introduction of better systems and standards brings increases of 50% and more. Yet, a productivity increase of 25% reduces costs by 25¢ per unit, while the labour cost remains the same even after wages have risen 25%.

The role of the middleman is crucial to increasing productivity. By its very nature the agent and/or buying office is imbedded in the local culture. Its employees are a mix of locals and expatriates, who by working together create a synergy that allows the middleman not only to introduce methods to increase productivity, but also to facilitate acceptance of these methods in the local factory culture and conditions.

Trial orders

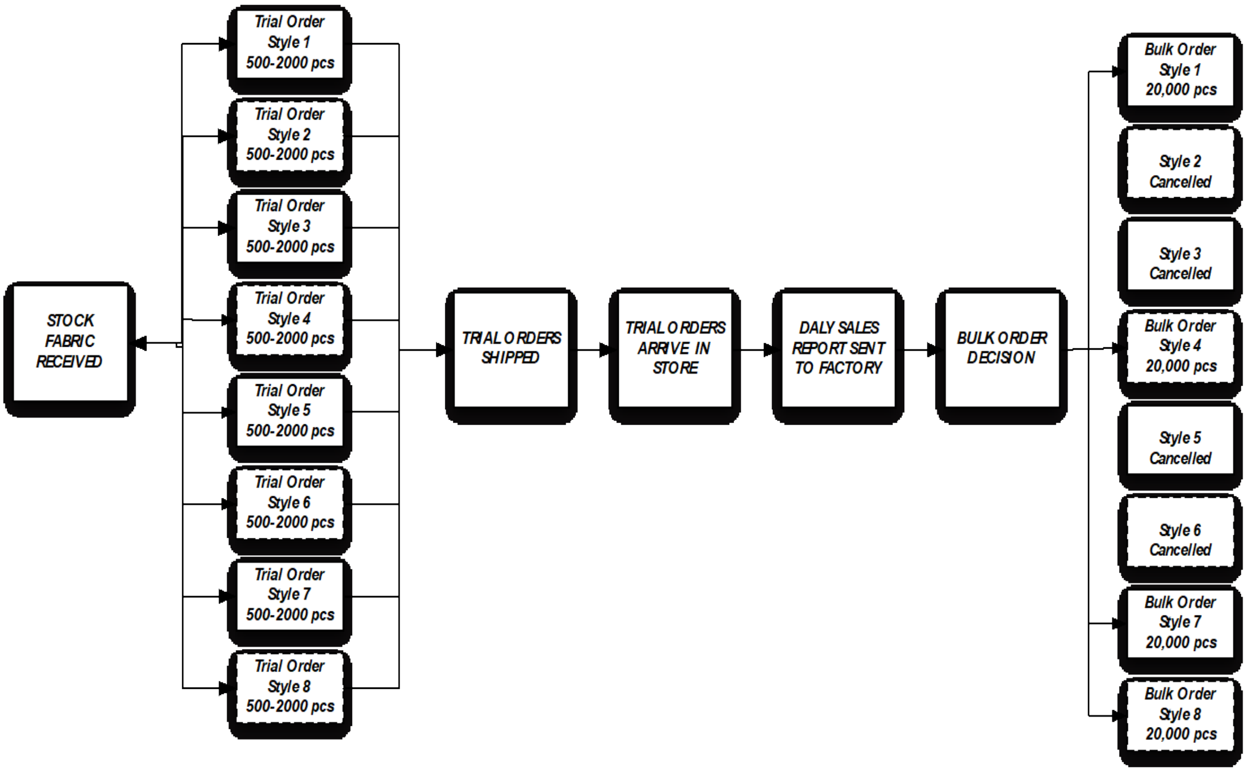
For the fashion-orientated brand importer or retailer, trail orders is the holy grail of the supply chain. All fashion-oriented customers face a paradox. To survive the customer must consistently bring new designs to the market. The paradox is that the more interesting the new design, the greater the risk that it will not sell.

We live in a consumer-driven consumer society. There was a time when retailers could decide what people would buy, when success depended more on advertising than on product. That era has gone. Today the consumer tells us what they want and to succeed the supplier must meet consumers' demands. The problem is that we must wait for the consumer to tell us what they want, but the consumer does not know what they want until they see it in the store. In a world where lead times (from first design to in-store delivery) could be as long as 48 weeks, customers simply could not risk more interesting design. No one could predict 11 months in advance what would be marketable. As a result, customers moved to relatively risk-free, lowest-common-denominator, cookie-cutter design.

But as the role of the contemporary middleman moved from product maker to service provider, their goals shifted towards fast turn and greater product integrity. In a broader sense, these goals allow buyers to achieve a greater success — to deliver the latest, most interesting designs and items, risk-free.

Enter the trial order. Take one fabric, design 10 styles, ship 500 pieces of each style by air, see which ones sells, cut the balance of the fabric into the best-selling styles.

Figure 52 Trial orders



Source: Guide to agents and buying offices

Creating systems where trial orders become possible is a very complex and difficult task. Both the customer and factory must effect radical changes in their structures and systems. Once again, the role of the middleman in making this work is crucial. The middleman must have complete access to customer's data, particularly financial information. The move to trial orders works best when the middleman is also owned by the customer, that is, the customer´s own buying office.

Appendix III Post-production order shipped to delivery, duty paid and beyond

Delivery Duty Paid (DDP)

In the past, factories shipped goods on FOB terms. Today, the customer demands Delivery Duty Paid (DDP) to the customer's warehouse. There are good reasons for this change:

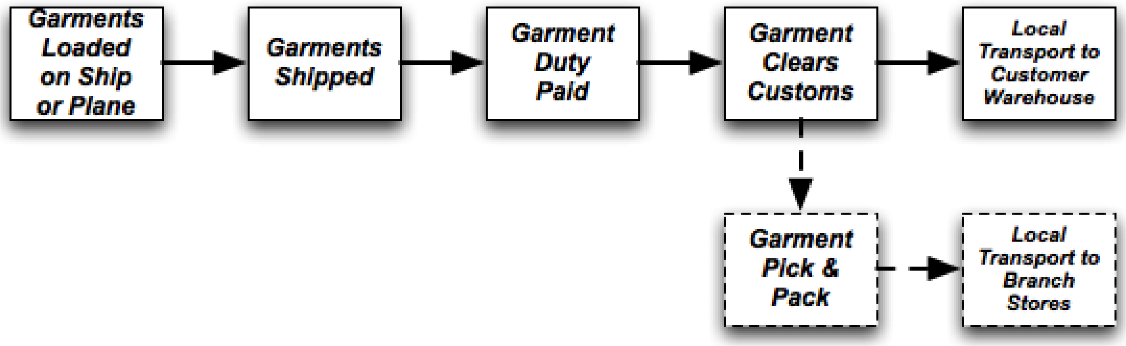
- The supply chain has one less link because the customer is no longer involved in customs clearance.
- Delays resulting from poor documentation on the part of the supplier are the responsibility of the supplier.

The new garment paradigm calls for more air shipment. Time was when the further away the factory was located from the customer, the longer the lead time. This fell apart when fast freighters became able to move goods from Shanghai to the West Coast of the United States of America in 12 days. Suddenly Mexico, located literally across the street from the United States of America, saw its lead time advantage cut from 20 days to less than 10 days.

Geography is no longer measured by time. It is a cost. Flying the goods from Mauritius to New York takes only a few hours longer than taking goods from Los Angeles to New York.

The cost of airfreight is not weight but volume: airlines calculate 198^2 inches = 1 pound. Freight on a T-shirt flown halfway around the world costs about 40¢. Vacuum pack anything and airfreight becomes cost-effective.

Figure 53 Logistics



Source: Guide to agents and buying offices

Open account

Time was when customers paid for orders by letters of credit (L/C) issued in advance of production. Factories would use these L/Cs as collateral for loans to purchase raw materials.

Even in those good old days, the system was badly flawed. An L/C is a commitment between two banks, where one bank guarantees to transfer a specific sum of money to another bank on receipt of specific documents listed in the L/C. The problem was that these documents were so precise that few shippers were ever able to meet the terms of the L/C. Without all the correct documents, the payment guarantees were automatically voided.

In order to receive funds from his bank to pay for the raw materials on the order in question, the beneficiary (factory) would then issue a letter of guarantee to his bank, stating that should his bank eventually be notified of non-payment on the L/C, he would repay the full amount he received from his bank by the end of that working day.

Hence the L/C was seldom a guarantee of payment. It was simply a statement that on the date of issue the customer had sufficient funds to pay for the goods but there was no real guarantee that the factory would receive payment from the customer. The factory's bank was lending funds (to pay for materials) based only on the reputation of the factory. So, the L/C was not really collateral at all.

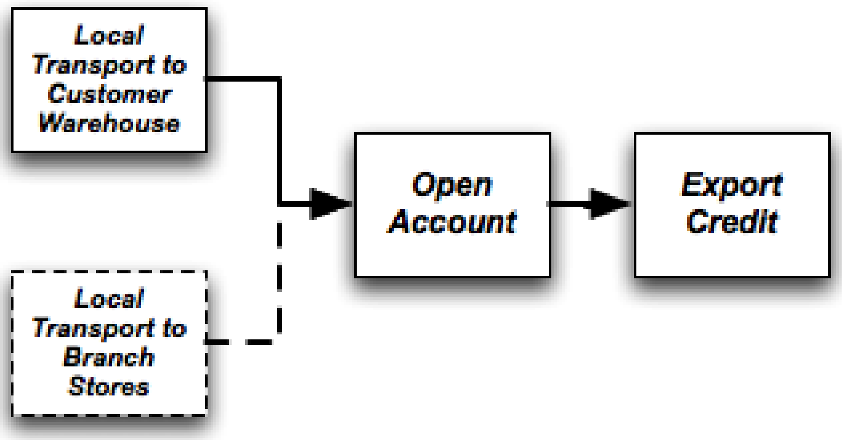
These days, major customers increasingly expect open account payment terms once they have established relationships with their suppliers.

Export credit

From open account terms 30-90 days credit is the logical next step for customers. Since the supplier's bank accepts the invoice based on the reputation of the supplier, it makes little difference between payment in three days or three months. The only consideration is that the size of the banking facility (loan) for three months is 30 times greater. But in many cases the interest rates are well below prime, particularly if the factory is a member of an export-credit insurance scheme.

Customers always want credit. Export credit from suppliers is not only attractive, but also often more readily available, since in many cases the factory enjoys a better credit rating than the customer. Even in the best of times, the ability to provide open account export credit is a plus. In the current climate, when even the best customers find their credit severely restricted, credit provided by the factory is a major advantage.

Figure 54 Open account



Source: Guide to agents and buying offices

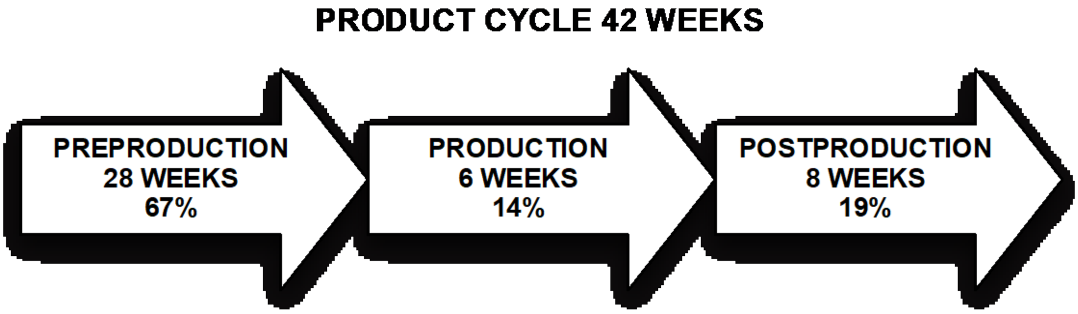
Delivery duty paid (DDP), open account and export credit are all great advantages to the customer. There is a strong argument that factories must provide these facilities just to retain their customer.

Appendix IV Comprehensive strategies: Speed-to-market

Speed-to-market is the reduction of lead times from first designer sketch to in-store stock garment delivery. By definition it is a comprehensive strategy because it includes the entire product cycle from pre-production (product development), production to post-production.

As you can see from the Figure below, the average product cycle requires a lead time of 42 weeks. Of this period 28 weeks (67%) is pre-production, 6 weeks (14%) is production and 8 weeks (19%) is post-production.

Figure 55 Traditional lead time



Source: Guide to agents and buying offices

The purpose of speed-to-market is to reduce markdown – the difference between the retail price listed on the hangtag and the average price after all sales and discounts – which is the single greatest garment cost factor.

Markdowns occur because the good styles, the good colours and the good sizes sell out, leaving the unsellable bad styles, bad colours, and bad sizes. The retailer faces two problems:

- The current product cycle does not allow for timely reorders, as the 14 weeks (3½ months) necessary to produce and ship any reorder would arrive too late for the season.
- The current product cycle does not allow for effective design. Given the product cycle of 42 weeks no designer, regardless of talent, can guess what consumers will want to buy 10 months down the line.

The reorder problem can be minimized by fast turn, which would reduce six weeks of production time to one week; and reduce post-production from eight weeks to three weeks by using air shipment. Total savings: 10 weeks (14 weeks to 4 weeks).

But effective design is also based on the ability to reduce pre-production time, this in turn is made possible when product development is completely shifted from the customer's home country to the supplier's home country. To do this efficiently requires total cooperation between customer and supplier with the agent/buying office as the facilitating entity.

In the past, speed-to-market failed to materialize because of the inability of the customer and the factory to form a cooperative relationship. It is the new model buying office that has made cooperation possible and this will now lead to the greatest cost reduction in the history of the post-war global garment industry.

Glossary

3D pattern making	Because the human body is a 3-dimensional object and a garment pattern is a two-dimensional object traditional patternmaking is never accurate. Sophisticated computer modelling seeks to overcome this difficulty.
501 Jeans	5-pocket jeans. Levi Strauss' signature product.
Agent	An independent company, which oversees production on behalf of import customers and is paid on a commission basis, typically between 5%-15%.
Analogue	A term describing something comparable to something else. A traditional clock with hour and minute hands is an analogue, as opposed to a digital clock that shows the time in hours, minutes and seconds.
Ancillary services	These are design assists such as producing colour standards to send to the factories, producing spec sheets, tech sheets, style reviews, sample fabric production, lab-dip and/or strike off approvals, etc..
Artificial intelligence (AI)	An IT term defining a computer that is able to "learn" from experience.
Basic cost sheet	A list of garment costs traditionally limited to what was thought to be the areas involving the factory: fabric, trim and CM (labour, overhead, profit).
Bespoke clothing	A garment that has been produced to meet the specific requirements of an individual consumer, including fabric, design and fit.
Brand importer	A company that designs and arranges for overseas production for its own account. The styles are wholesaled to retailers under the importer's own label. Typically, markups are in the order of 55%.
Branding	A process where an object, a process, or an operation such as a factory is redefined and shown to the public as something of value.
Brick and mortar	A classic shop with a physical location as opposed to an e-commerce retailer where the sales location is virtual.
Buyers' market	A situation where the customer is the dominant force determining the success or failure of a product, a company or an industry.
Buying	The process whereby the customer purchases a product, and the supplier provides all materials including fabric and trim (see Sourcing).
Buying office	A wholly owned subsidiary of an importer or retailer, which carries out the same functions as an independent agent to oversee production. Typically, the importer/retailer pays a percent commission.
Capacity	The total number of units that a factory is capable of producing in a specified period of time.
CEO	Chief Executive Officer.
Collaborative model	The third trend in the relationship between the customer and the supplier, wherein they form a partnership that allows both sides, working together, to do things not previously possible.

Competitive model	The first trend in the relationship between the customer and the supplier wherein the relationship is totally confrontational. The customer cares only about negotiating the lowest FOB price. By definition a zero sum game.
Compliance	Ethical standards defining the employing company's relationship with its workers, including wages, working hours, days off, worker safety and worker rights.
Cooperative model	The second trend in the relationship between the customer and the supplier, wherein both sides work together to increase profit on both sides for the most part through product cost reduction.
Coordination department	A cross-discipline section within a factory responsible for providing the following: real time information of work in process for each order; communication between operational departments and related parties such as merchandising, logistics etc.; notification on a timely basis to the relevant parties of any delays.
Cost	The amount the supplier pays for a specific product or service (see Price).
Costing	The sum total of all costs related a specific order. The costing exists within itself, even when the company does not know all cost factors, fails to list specific cost factors or lists them incorrectly.
Cost sheet	The list of costs prepared by the company.
CSR	Corporate Social Responsibility: typically including compliance, pollution and sustainability.
Customer care team	A cross-discipline section within a factory consisting of merchandisers, designers, patternmakers, QA, QC etc., where everyone is dedicated to a single (or small number of) customer/s (see Chapter 11).
Customer side	A group including importers, retailers and brands. One of three groups constituting those responsible for the traditional supply chain.
Cut & Make (CM)	The making price of the garment including factory labour, overhead and profit.
Cut Make & Trim (CMT)	The price of the garment less the main fabric, but including all sub materials and making costs.
Delivery Duty Paid (DDP)	The price of the product up to and including delivery to the customer’s warehouse or distribution centre, including total garment cost, overseas freight, insurance, import tariff, customs clearance charges and inland freight.
Design integrity	The situation whereby the sample follows the designer's concept as reflected in the sample and where the stock coincides with the sample
Digital	A term in information theory describing a discrete and discontinuous representation of information or works.
Diocletian	Roman Emperor (244-311). Relevant to the garment industry for having introduced the first textile quota.
Discontinuity	A step in the manufacturing process carried out without sufficient information of the steps that have gone before. For example, a technical sketch is drawn from the designer’s sketch without complete understanding of the actual design concept. The result is that every subsequent step takes the style further away from the original design (see Chapter 11).

Disruptive innovation	A new concept or product, so different that it displaces the pre-existing market.
Distribution centre	A term in retail logistics defining a location where an order imported in bulk is broken down to be reshipped to individual branch stores.
Duplicate	In the product development process, the first piece is termed "sample" while all further interactions are termed "duplicates". In practice the term is modified so that while the designer may go through several duplicates before finally approving the design, the last and accepted duplicate becomes the same.
Dynamic cost sheet	Where costs not traditionally listed on a cost sheet affect listed costs. For example, for products made in countries with free trade agreements (FTA) with higher fabric prices, while raising FOB price actually reduce cost when local fabric is required for duty free access.
E-commerce	Products sold via the internet as opposed to brick and mortar stores.
Extrinsic cost	An important factor in the cooperative model, whereby investments and efforts on one side provide reduced costs on the other side. For example, product development carried out by the factory leads to reduced costs on the part of the customer.
Fast fashion	A term often misused to define styles provided quickly by stores to be first with the latest item.
Fast turn	A system to markedly reduce factory production lead times.
Fit	Garment measurements that relate to body shape.
Flying shuttle	An 18th century innovation to provide faster and higher quality weaving. One of the first innovations in the industrial revolution.
FOB	Free on board. An invisible line from the ship’s railing defining the limits of supplier responsibility. When the goods cross the invisible line, responsibility shifts to the customer.
Full value cost	The total cost of the garment up to and including the markdown.
Full value cost sheet	The list of costs up to and including the markdown.
Gap	A necessary step in the manufacturing process not carried out at all. For example, samples are sent to the customer without a costing. The result is that should the sample be accepted by the customer, radical design changes might be required to fit the style into the customer’s target price range (see Chapter 11).
Garment buying	The early method of garment purchase, whereby the customer informs the supplier and the supplier provides all components including fabric and trim.
Garment sourcing	The later method of garment purchase, whereby the customer negotiates directly with the fabric and trims suppliers and having reached an agreed price passes the name of the designated suppliers and the prices onto the supplier, who pays for the materials.
Garment	Garment industry jargon for an industry professional.
GPS	Global Positioning System: Satellite navigation system to determine the location of any object, at sea or on land in real time.
Greater China	China, Hong Kong and Macao.

Hit rate	The percentage of orders generated from styles designed by the factory.
Horizontal integration	The entire process required from pre-production, production, and post-production a specific product, i.e. from first designer sketch to stock garment arrival at the customer's designated location.
HTS	Harmonized Tariff Schedule: A universal system to define products for import tariff purposes. Chapter 61 = knit garments; chapter 62 = woven garments.
ILO	International Labour Organization: A United Nations organization set up to cover all areas involving workers (40 branches).
Import office	A division of a retail company where in-house private label processes are carried out. This includes design, sourcing, logistics, etc..
Influencer	A person who with established credibility and audience can persuade others by virtue of their trustworthiness and authenticity, and is able to affect the purchasing decisions of potential consumers.
Innovation	A new idea, method or product.
Instagram	An online photo-sharing application and social network platform that is a favoured venue for influencers.
Intrinsic cost	An important factor in the cooperative model, whereby investments and efforts on one side provide reduced costs for themselves. For example, increased productivity.
Job costing	The list of total costs for a specific order calculated after shipment to ensure accuracy.
Joint cost problem	A series of costs for a number of related products all developed simultaneously and that therefore cannot be broken down separately.
Lab dip	A fabric swatch submitted by the supplier for piece dyed colour approval.
Landed Duty Paid (LDP)	The price of the product up to and including customs clearance, including total garment cost, overseas freight, insurance, import tariff, and customs clearance charges.
LDP	Landed Duty Paid: includes FOB + Freight + Import duty.
Lean manufacturing	A methodology to reduce waste and lead times, by working with multi-tasked teams rather than traditional assembly lines, characterized by zero work in progress at the end of each working day.
Loading	A percentage added to each unit to cover a specific cost. The 5% buying office commission and the 20% for the retailer's import office are both loadings, so too are wholesalers' mandatory contributions for retailers' advertising.
Low season	The period in a seasonal industry with reduced demand.
Marker	An arrangement of patterns used in cutting to ensure the most efficient use of fabric.
Mass customization	The ability to produce large quantities in large numbers of sizes quickly, through computerized systems and with little or no increased costs.
MBA	Master of Business Administration: a graduate university degree for business professionals.
Merchandise manager (Retailer)	The person responsible for ensuring that each department meets its goals with regard to volume and profit. Usually the buyer's boss.

Merchandiser (Factory)	The person responsible for all communications between the customer and the factory.
Merchandiser (Importer)	The person responsible for ensuring that the style designs meet the needs of the target customer. Usually the designer's boss.
Modelist	Traditionally part of a two-person design team, where the designers (stylist) create the design concept and the partner (modelist) develops that concept into the sample garment.
Money-in-the-pocket principal	A methodology common in the early years of the global garment industry where the supplier (factory) adds an amount to every cost item to allow for forced reductions during negotiations with the buyer.
Monopsony	A market in which there is only one buyer.
Multi-tasked	A special skill set factory sewer, rather than being limited to a single operation is able to carry out multiple operations. This allows for smaller, higher quality orders.
Negative value	A term used in cost to value analysis where a particular service does not reduce costs relative to value but where it is nevertheless necessary. For example, sustainability does not add value because the consumer will not pay more for a sustainable product. Sustainability rather has a negative value because the consumer may not buy a product that lacks sustainability.
Net profit	Profit that remains after allowing for all costs including overhead.
Net retail	The price after allowing for markdowns.
No-bottom-price principal	A methodology common in the early years of the global garment industry where the customer would not accept any price regardless of amount until they were confident that the factory would not make further price reductions.
On demand cutting	A system of garment cutting that allows for cutting against the order, even when the order is but one piece.
Open data	A methodology where the supplier provides the customer with an accurate detailed cost sheet, including net profit, and will not negotiate. Open data is limited to strategic suppliers. Its purpose is to allow the customer to estimate the FOB price during product development.
Open Sourcing	A methodology where the customer is able to calculate all cost factors, thus reducing the variables solely to the number of minutes per unit, with the result that the customer negotiates cost-per-minute for all orders placed in a set period of time.
Overhead	Ongoing business expenses unrelated to materials and direct labour and therefore non-variable.
Parallax Gap	An astronomical term describing the apparent change in position of an object when it is in fact due to the change in position of the viewer.
Pattern	A model that is used as a guide to produce a garment from a piece of textile material.
Pick & Pack	An important operation in e-commerce logistics where a bulk shipment is broken down and repackaged for individual customers.
Price	The amount the customer pays for a specific product or service (see Cost).

Private label importer	A company that designs and arranges for overseas production on behalf of retailers. Each style is imported exclusively for a specific retail customer and is sold under the retailer's label. Typically, the wholesale mark markup is in the range of 30%.
Product development	The process from first designer sketch to final sample approval.
Productivity	The number of units produced within a specific length of time with the same number of workers.
Products from hell	The most difficult items to produce, includes bridalwear, fashion bras, and girls 6-12 dresses.
Quality assurance (QA)	The process that takes place before garment making commences to ensure that the style can be produced by the factory correctly, efficiently and at a reasonable cost.
Quality control	The process that takes place during the garment making process to ensure that the materials are correct and that the garment is produced to the correct quality standard and quality level.
Quality level	One of two facets of quality. The degree to which each operation in the garment making process is carried out correctly. The higher the quality standard, the more difficult it is to maintain quality level.
Quality standard	One of two facets of quality. The specified steps for each operation in the garment making process. The higher the quality standard, the more difficult it is to maintain quality level.
Quick response	The ability of the factory to provide re-orders with short lead times.
Quota	Quantitative import (or export) limitation.
RFID	Radio Frequency Identification
SAM	Standard allowed minutes. Traditional method to calculate number of minutes required to sew a specific garment.
Sell through	The degree to which a style is sold to the end consumer at the full retail price.
Shape	Body measurements (see Fit).
Size	Alphanumeric term classifying rang of fits (S-M-L, 4-14 etc.).
Skillset	Term defining job specifications based on specific knowledge and abilities
SME	Small and medium enterprises.
SME centre	A structure designed to provide assists for a national e-commerce factory sector.
Soft cost	In cost to value analysis cost factors that are by definition difficult to quantify in dollars and cents: quality, reliability ethical behaviour, etc..
Solidarity	The international arm of the United States of America labour union AFL-CIO.
Sourcing	The process whereby the customer negotiates the price for all materials (fabric and trim) and then designates the suppliers, leaving the factory to pay for the materials so that it can then include them in their FOB price.
Space time continuum	An Einsteinian concept that in the universe neither space nor time are fixed. Both are interrelated factors. What is true of the universe is equally true of the garment industry where everything, cost, price, profit and success are all related to lead times.

Speed-to-market	Factory system to reduce total lead time.
Standard Garment Sourcing Model (SGSM)	The traditional paradigm for garment sourcing, first created 60 years ago.
Static cost sheet	Traditional cost sheet typically including FOB (material, trim, CM).
Strategic supplier	Factory of great importance to customer.
Strike off	A fabric swatch submitted by the supplier for print or yarn dyed approval.
Structural	The organisation of a company including machinery and employees (see Systemic).
Subcontractor	Factory employed by another primary factory to produce goods for the primary factory on behalf of a customer.
Supplier side	Typically includes factories (see Customer side).
Supply chain	A list of steps in a process, typically including product development, production and post-production.
Sustainability	Production process that concentrates on the avoidance of the depletion of natural resources in order to maintain an ecological balance.
Sweatshop	A pejorative term for a factory that has poor compliance.
Systemic	The method by which the company structure is utilized (see Structure).
Tariff	A tax placed on imports.
Top fabric	The outer fabric as opposed to interlining and lining.
Trading company	An independent company performing a wide range of services on behalf of the customer, including overseeing production on behalf of import customers whose fees are paid in the form of a commission by the customer, the factory, included in the garment price or a combination of some or all of the above.
Transparency	A situation where business is carried out openly to ensure that buyers and consumers can be assured that they can trust the company involved.
Trial orders	Part of speed-to-market, whereby the factory produces small quantities of style to allow the customer to measure retail consumer reaction.
Trim	Generic term including sub materials.
Twitter	A microblogging and social networking service on which users post and interact with messages known as "tweets".
Universal factory supplier	A factory capable of supplying product both competitively and to the customers' needs anywhere.
Vertical integration	The entire process, beginning at material production through to garment making, i.e. from spinning to finished garment.
Vintage clothing	Used clothes, particularly fashion, resold.
Waist	A blouse popular in the 19th and early 20th century, characterized by a high neck, leg-o-mutton sleeves and ending at the waistline.

Work in process	The cost and percent of clothing completed at each stage in the production process.
Work in progress	The cost and percent of clothing completed.
Zero sum game	A term used in game theory where the total amount won equals the total amount lost. FOB price negotiations between customer and factory are a zero sum game.

References

Birnbaum, D. (2015). Birnbaum's Global Guide to Agents and Buying Offices. New York.

Birnbaum, David. (6th Printing, New York, 2010). Birnbaum's Global Guide to Winning the great Garment War.

Birnbaum, David and Birnbaum, Emma. November 6, 2020. Birnbaum on Strategy: The Guide to Cost-to-Value Analysis. FashionDex, Inc.

Birnbaum, David. (New York 2008). Crisis in the 21st Century Garment Industry and Breakthrough Unified Strategies.

Ram Sareen, Tukatech

https://www.Trademap.org/

https://otexa.trade.gov/

Printed by ITC Digital Printing Service.

A free pdf is available on ITC's website at:
www.intracen.org/publications.

International
Trade
Centre