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# **HOW TO GET WHAT YOU PAY FOR**

*The real, total cost of  
User Interfaces*

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## ***What is Total Cost of Ownership (TCO)?***

It is common practice for companies to strive for keeping their acquisition cost down, but at what cost to the organization as a whole? Every single aspect of developing a device costs money; every conference call, shipping delay, prototype, vendor qualification, design change, etc., increases the overall cost that goes into a finished product. When you put all the costs to the organization together, the sum is known as the Total Cost of Ownership (TCO).

### ***TCO Definition:***

*The sum of all the dollars spent to get reliable products in the hands of the end customer over the life of the product.*



### ***So what does this really mean?***

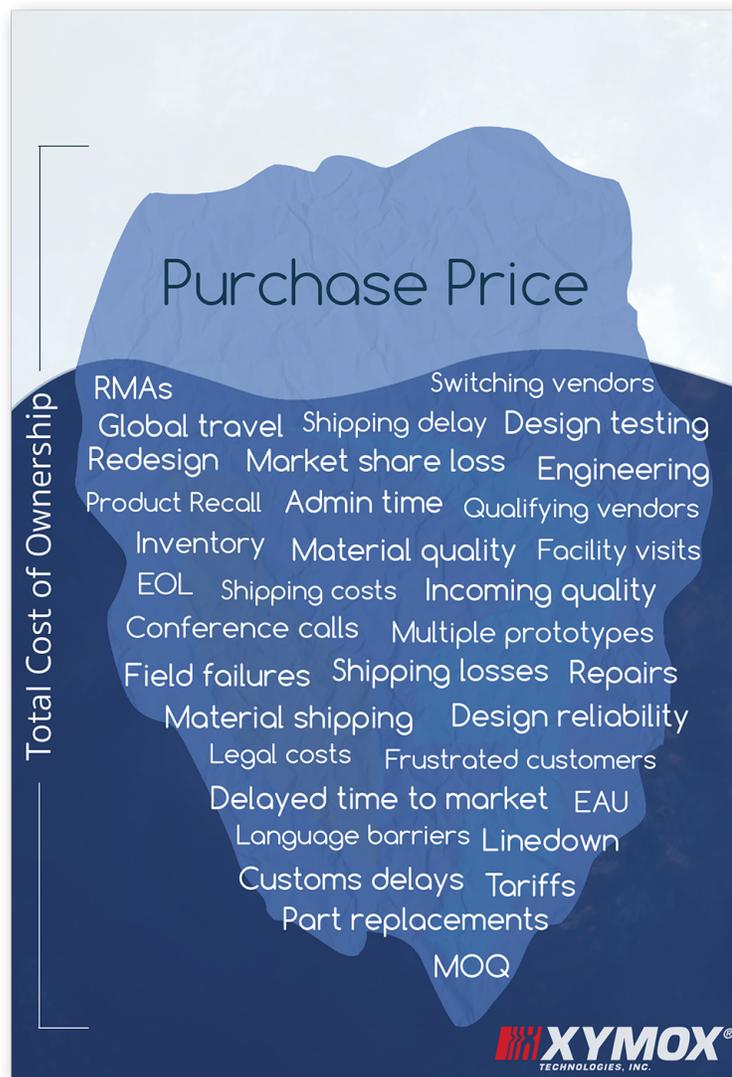
There are more costs to consider than just the purchase price. Everything can be broken down to an actual dollar amount, every meeting, factory visit, engineering redesign, field failure, RMA, etc.

In the next few pages we will look at the key things that need to be considered when evaluating the total cost of ownership of a User Interface (UI).

You may have an idea of what you'd like to spend per part but when you're looking at 2 quotes and pick the lowest because it aligns most closely to your goal cost, how do you know if you're getting a quality product or just getting "what you paid for"?

A purchase price never tells the whole story behind the critical parts that will end up being the primary communication point between your product and your end customer. Not every membrane switch or touch sensor is built the same, and there are significant differences between material choices, process capability, and product life. How you specify your product can significantly impact the price on the purchase order, but more important than price is the “total cost” to your organization.

You can also think of TCO like an iceberg—what you can see is the purchase price, but everything below the surface involves all other potential hidden and unforeseeable costs, each with numerous variables to consider.



***Everyone wants the price to be low, the quality to be high, and the service to be high.***

*You can only have 2, which two do you choose?*

High quality? High service? Low cost?

## ***Real World Example: Medical Device Interface***

A global OEM was developing a device that required it to be wiped down and cleaned several times a day. Two suppliers quoted this project; considering the end use of the device, Supplier X quoted a membrane switch that is properly sealed to avoid liquid ingress, Supplier Y did not include any special seal in the quoted design. With a 35% difference in the purchase cost per part, the OEM chose to source from Supplier Y, the lower cost option.

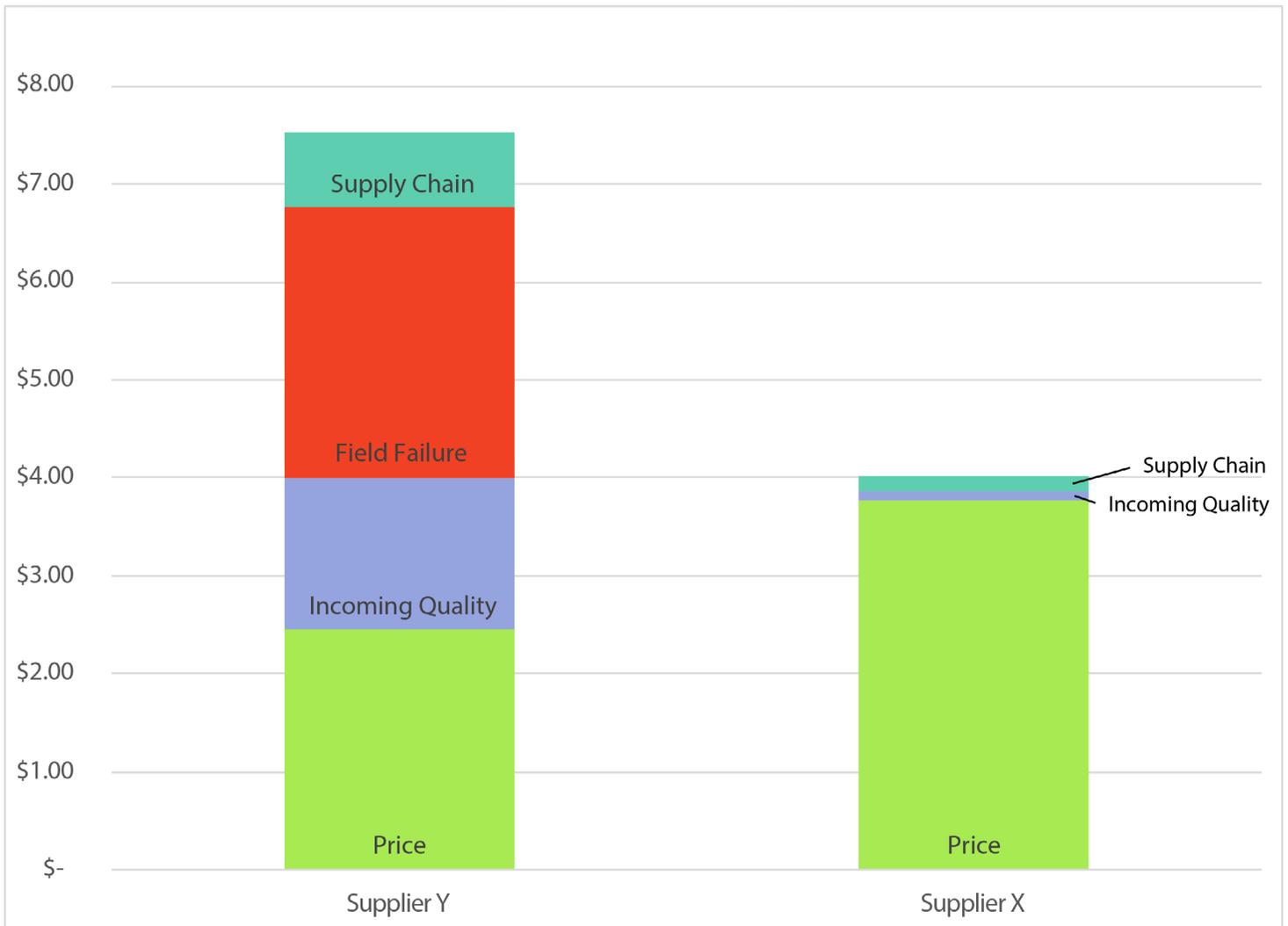
Once in production, problems arose right away. In the field, the part began to fail due to liquid ingress into the silver-printed tail and damaging the electronics of the product's circuit board.

Despite several iterations of technical discussions, the OEM remained committed to the lowest purchase price option. Within months, the field failures were so bad that the OEM was losing sales, and large customers were saying they didn't want their product anymore. All of this happened the same quarter that the OEM's biggest competitor launched a similar product. Meanwhile the OEM was incurring costs of global conference calls, visits to the component supplier to rectify the problem (not possible with the low cost design), QA audits, engineering studies, incoming inspection and testing, etc.

The total failure costs amounted to about \$75k/month, and once the OEM made the decision to proceed with Supplier X, it took about 4 months to test and qualify the new design. In total, costing the OEM about 8 months of issues and \$600k of added failure costs (not to mention loss of sales & market share).

## Medical Device Interface Supplier Comparison:

	Supplier Y	Supplier X
<b>Price</b>	\$ 2.45	\$ 3.77
<b>Incoming Quality</b>	\$ 1.55	\$ 0.10
<b>Field Failure</b>	\$ 2.76	\$ -
<b>Supply Chain</b>	\$ 0.76	\$ 0.15
<b>Total</b>	<b>\$ 7.52</b>	<b>\$ 4.02</b>



## ***Breakdown:***

As you can see, the purchase price with Supplier X is \$1.32 more per part – that is, undoubtedly, a significant increase in purchase price. However, when you take into account the added costs that are incurred with Supplier Y due to the lack of quality, the total cost ends up being closer to \$8.00 per part than the initial \$2.45.

***“The bitterness of poor quality remains long after the sweetness of low price is forgotten.”***

***– Benjamin Franklin***

Another factor to consider is End of Life (EOL) – this comes to play when purchasing an off-the-shelf solution. EOL is another way of saying the vendor finds no need to continue producing, selling, servicing, or sustaining a particular product. When the demand for the specific interface drops, the supplier may decide to cease production thus leaving some companies having to find an alternative solution or meet excessive MOQs.

- How long do you expect your product to last?
- Is the off-the-shelf solution in high demand – and what is driving that demand for the component?
- Is the demand high enough that it will still be in production even after your product goes EOL?

Off-the-shelf components have their perks, but a custom solution ensures you will never have to deal with parts going EOL, assuming you are sourcing from a stable supplier committed to the market.

## ***Something to think about:***

*User interfaces are often seen as a C item in an ABC priority system, but they shouldn't be.*



*Think of it like this:*

*Let's say the entire device costs \$73 to make, and a \$3.75 part is just one component, that's 5% of the total cost for one part. What many forget is that one part has to work perfectly, without failure, for the entire device to function properly.*

## ***Conclusion:***

Purchase price never tells the whole story – what do you want your story to be? The goal should be to reduce the total cost of the component you are purchasing – which is much more comprehensive than just the purchase price. Determine the risk of incurring “hidden costs” that impact your total cost of ownership. Complete the worksheet to understand your specific situation – and call Xymox for expert advice.

## ***Main Components of Total Cost:***

- ***Purchase price***
- ***Supply chain costs***
  - Travel costs to set up the supplier including visits, audits, etc.
  - “Hassle factor” of different time zones, language barriers when getting issues resolved or communicating needs/requirements
  - Will the supplier keep custom-engineered parts in inventory for a ‘just in time delivery’ to the OEM, or will you need to purchase large minimums and keep them in inventory?
  - What credit terms can/will the supplier extend to you, and what is the cost of this financing?
  - What amount of working capital can the supplier commit in terms of inventory and accounts-receivable to support supplying you with these components?
- ***Incoming quality costs:***
  - Inspection costs
  - Frequency of incoming quality issues
  - Internal time spent analyzing/reporting any issues
  - Conference calls & supplier visits to resolve
  - Production downtime waiting for replacement parts
  - RMA costs
- ***Field failure costs:***
  - Anticipated frequency of field failures
  - Cost to repair or replace your product in the field
  - Travel or shipping costs to address field problems
  - Product recall costs
  - Effect on your market share & competitive environment of a user-interface problem
- ***End of life component costs:***
  - What is the typical product life cycle of this component? What is the expectation for when the supply will need to be changed?
  - How stable is this supplier, and will they be in this business for the life of your custom-component needs?
  - What is the cost of qualifying a new supplier?
  - Will your firm have the engineering resources needed to qualify a new supplier if this component goes end of life?

# Total Cost of Ownership Worksheet

## Purchasing Basics

Number of parts purchased per year - EAU

Lead time for orders, weeks

Release order quantity

Price (per part)

Is this sourced from China? (Y/N)

Tariff

Freight cost/part

**Supplier A**

**Supplier B**

_____	_____
_____	_____
_____	_____
\$ _____	\$ _____
_____	_____
\$ _____	\$ _____
\$ _____	\$ _____

## Incoming Quality Costs

Field failure rate (ppm): How many failures per million parts should you expect?

cost.

If your production line is shut down while you troubleshoot incoming quality problems, what does that cost your factory?

_____	_____
\$ _____	\$ _____
\$ _____	\$ _____

## Field Failure Cost

What percent of incoming part failures will get to the field - to your customer?

What will a supplier visit cost to work through this issue? Number of people, travel cost, time cost.

If you have to recall your product, or repair it in the field, what will each unit cost?

_____ %	_____ %
\$ _____	\$ _____
\$ _____	\$ _____

## Engineering Design Time

Time & cost associated with design process.

IP risk - can you trust your supplier with your engineered details? (Y/N)

\$ _____	\$ _____
_____	_____

## Supply chain costs

Cost associated with vendor setup process.

Cost of supplier visits to qualify and conduct quality audits at the supplier's location.

\$ _____	\$ _____
\$ _____	\$ _____

## End of Life Costs

Percent probability of this part going end of life before the life of your product is complete.

New supplier qualification costs if another supplier change is required.

_____ %	_____ %
\$ _____	\$ _____

## Total Cost Summary

**Vendor Setup Cost**

**Part Purchase Cost**

**Incoming Quality Cost**

**Field Quality Cost**

**Ongoing Supply Chain Cost**

**End of Life Cost**

**Total Cost First Year**

**Ongoing Costs After First Year**

**First Year Total Cost Per Part Purchased**

**Subsequent Years Total Cost Per Part Purchased**

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Click here for the **full**, excel version, of this worksheet. You fill in your data and **all total costs will be automatically calculated!**



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