

# NEW PRODUCT DEVELOPMENT PROCESS FOR SMEs BUYING IN CHINA

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The Road Map on New Product Development  
That All SMEs can use

**Written by Sofeast Engineering Team**



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# Objective and Introduction

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What this e-book provides is the simplified NPD process that every SME can follow without getting tied up in process 'red tape' and unnecessary meetings, a process that is easy to follow and which should provide results.

## What is this eBook all about?

With this e-book, you, as manager in a SME or an entrepreneur, will be able to obtain an understanding of a simple but effective New Product Development (NPD) process that your company can use.

We will walk you through the absolute minimum steps that are needed in the NPD process to allow for a successful product launch. And it sheds light on the few key factors that are critical production is subcontracted to a China manufacturer.

What will the result be?

**Benefit 1** – Having a structured NPD process in place that is not a drain on management time and at the same time retains the entrepreneurial spirit that most SMEs thrive on.

**Benefit 2** – Provides the key steps required for a successful product launch without the heavy paperwork that is commonly associated with the more formal NPD process.

# The SME NPD Process – Product Idea

Having knowledge of why the majority of new products fail will help when it comes to understanding what is required of a new product development process. The main causes of project failures for most SMEs are:

- Products don't fulfil a real need or want
- Over estimation of the market size
- Design problems that compromise functionality
- Incorrect plans regarding Product, Pricing, Promotion, Place (also known as the 4 Ps)
- Idea is pushed despite poor marketing research findings
- Development costs go over budget

These can be grouped into two main categories, **Research** and **Testing**, so by power of deduction we have just established what the most critical top-level steps of the NPD process are. However, it is not as simple as having just two steps – there has to be some granulation within these two steps.

If we take Research as the first step and break that down into the absolute must have actions, we can start to build the ideal NPD process for SMEs.

## RESEARCH

### Product Idea

Every product starts with an idea, but how that idea germinates and grows will determine the shape and future of the product. With the wrong initial information feeding into the product idea stage, the product might be developed and launched into the market where it does not fulfil the end users requirements and therefore the project fails.

The critical step here is to get the right information feeding into the idea generation stage. For the SME, the easiest way to get that information is by understanding 'what the customer needs'. This is often referred to as understanding the 'voice of the customer'.

The Voice of the Customer is a market research approach that produces a detailed set of customer wants and needs, organized into a hierarchical structure and then prioritized in terms of relative importance and satisfaction with current alternatives that provide similar solutions.

# The SME NPD Process – Product Idea Continued

From a SME's view-point, gaining an understanding of the customer's wants and needs can be a time-consuming and frustrating process if a formal methodology is used. The best way to approach this would be to follow these simple steps:

- Use the knowledge from the Sales and Marketing team. They interact with current customers all the time, therefore you can easily obtain the wants and needs from this accessible source of information.
- Ask for information using simple tools such as 5 Ws and the 1 H:

**What** problem do you need to resolve?

**Why** is it a problem for you?

**Who** would benefit from a solution?

**Where** is the problem most seen or experienced?

**When** does it occur?

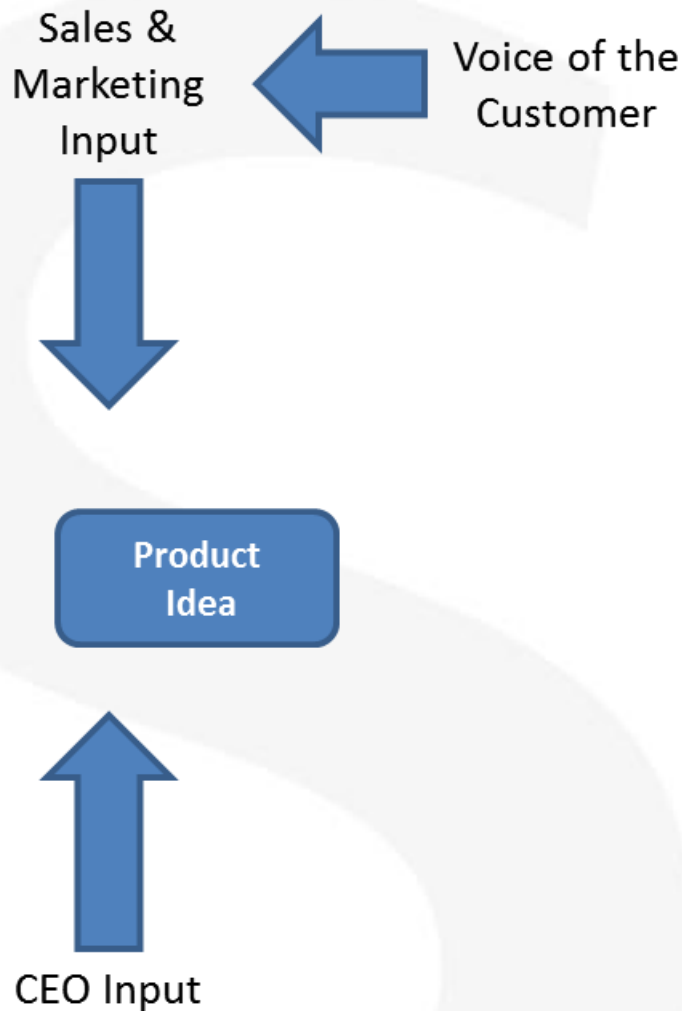
**How** would you like us to solve the problem?

- Conduct research on the internet (trends, blogs, forums, and groups...).
- Networking, meet-up groups, exhibitions and seminars are great places to interact with customers and competitors as well as potential subject matter experts and like-minded individuals that could be willing to share information.

With multiple sources of information feeding into the 'Product Idea' section and all the information coming from credible sources while at the same time not being slowed down or held up with formal processes, the SME now has the right information to start coming up with credible and focused product ideas.

The actual process of generating product ideas would be the same for both SMEs and larger organizations. There has to be some sort of method used to come up with different product ideas but at least now, the SME would have the right information to be included for idea generation. The topic of idea generation methodologies has been discussed [here](#).

# The SME NPD Process – Product Idea Continued



Once the idea generation process has been carried out and a number of good solid product ideas have been identified, the next step is to filter or screen those ideas, allowing one or two ideas to move forward. The screening process would be the same for both SMEs and larger organizations; the only difference would be for the SME to be more dynamic and flexible in the decision making period. The formal aspect of screening ideas has been written about [here](#).

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# The SME NPD Process – Sales Forecast

## Sales Forecast

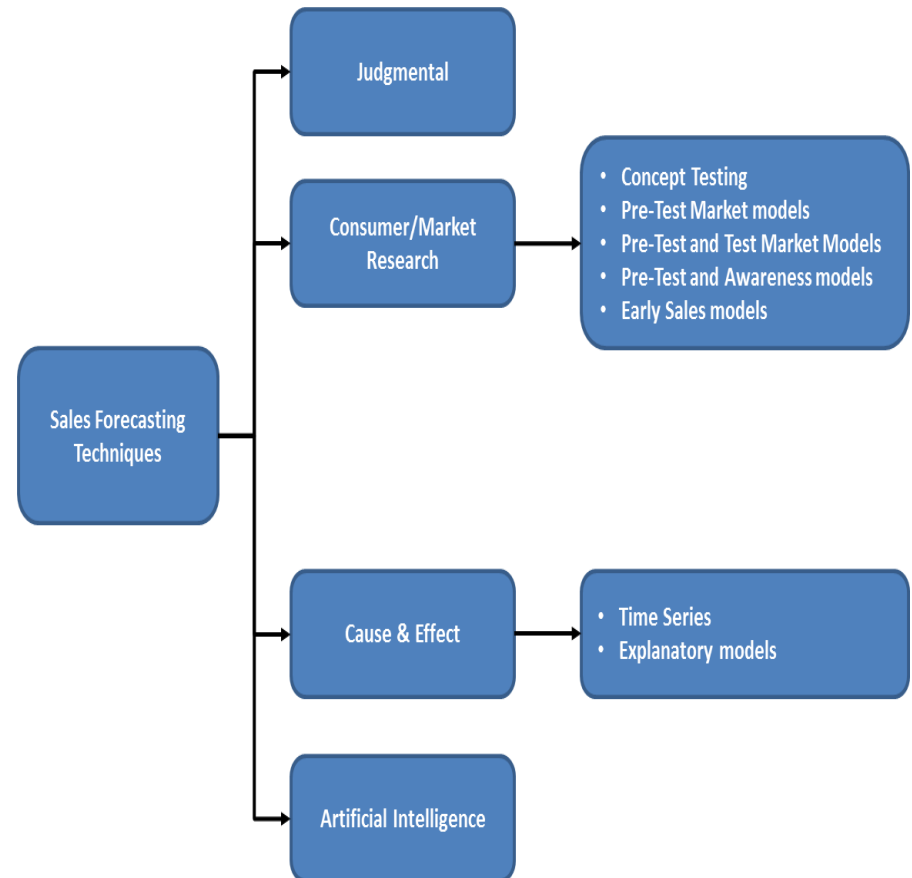
Sales forecasting by nature is a difficult activity for most companies but forecasting for a new product is even more difficult as there is no history of previous sales performance or trends to reference against.

New product sales forecasting has to deal with major hurdles such as lack of any type of data as well as the uncertainty of how new technology will be accepted by consumers.

There are a number of different forecasting methods available, each with its own attributes and idiosyncrasies. The key thing for all SMEs is to select a number of these methods and to be flexible in the approach when it comes to forecasting new products.

Some of the best methodologies and techniques to be used for sales forecasting have been suggested to be the model shown in Figure 2 shown on the right of this page (source: Mas-Machuca, Sainz, and Martinez-Costa 2013).

We will not go into any detail here as this is a subject in its own right; however, we have already discussed some of the techniques before and can be read in our blog post [here](#).



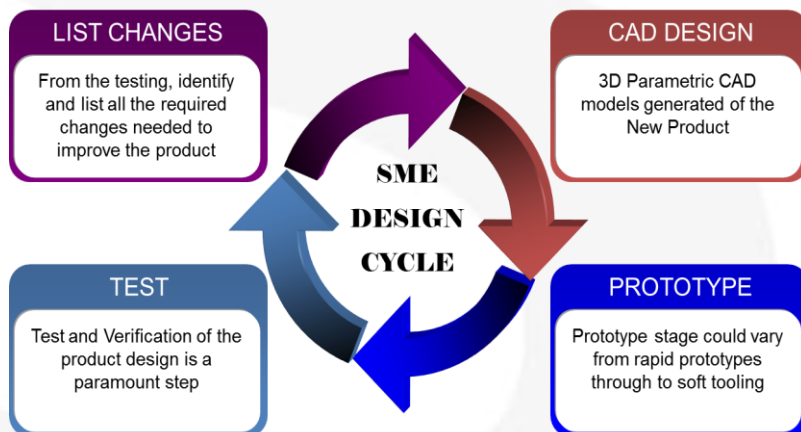
# The SME NPD Process – Design & Prototype

## TRANSITION - RESEARCH to TEST

### Design Activity / Prototype & Test

The design cycle has one foot in the Research Phase and one foot in the Test Phase. The reason for the split is that research would be carried out on what materials to use, what standard products are available, what testing should be carried out and what regulations need to be applied if applicable to the new product.

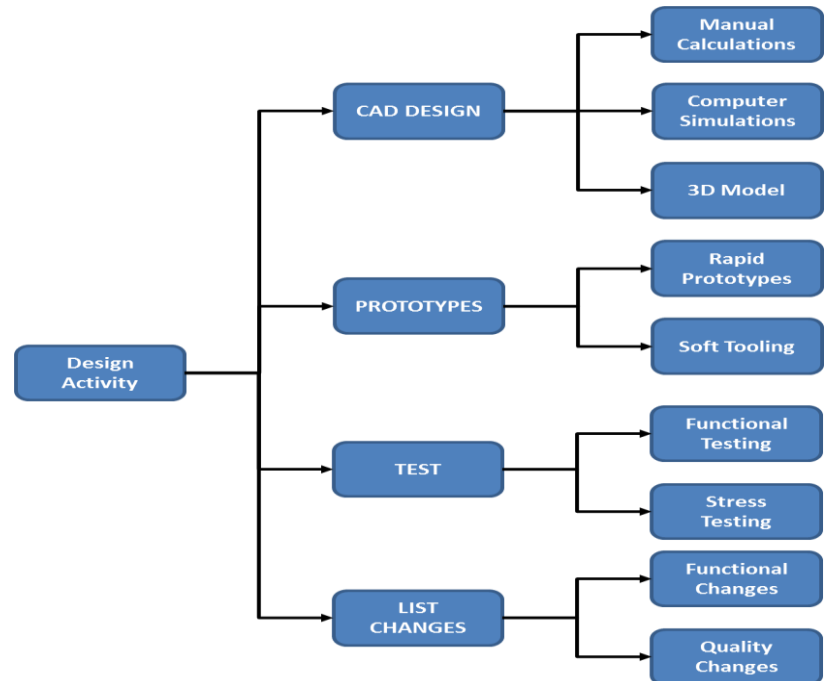
The second part of the process is clearly in the Test Phase, where prototypes are made and tested with data being analyzed and used to validate the product design. The design cycle would look something like this:



Each of the phases of this design cycle would include a number of separate elements that would allow the Engineering team to work through the process of product design with a structure in place that allows rapid flow and flexibility at the same time.

### The SME Design Cycle

The breakdown of elements within the SME Design Cycle would look something like the chart below:





# The SME NPD Process – Design & Prototype Continued

## CAD Design Element

**Manual Calculations:** - It is important to carry out some initial calculations on the design such as stress and strain, bending forces, torsional stress, deflection, and even centrifugal and centripetal forces. All of which would depend on your product functionality and use.

**Computer Simulations:** - Computer simulation can be in the form of Finite Element Analysis\* on product designs, air flow effects and aerodynamics, friction forces and many other simulations that allow the designer to check the design without the need of producing physical products.

- ❖ *\* FEA is a good choice for analyzing problems over complicated domains (like cars and oil pipelines), when the domain changes (as during a solid state reaction with a moving boundary), when the desired precision varies over the entire domain, or when the solution lacks smoothness. For instance, in a frontal crash simulation it is possible to increase prediction accuracy in "important" areas like the front of the car and reduce it in its rear (thus reducing cost of the simulation).*

**3D Modelling:** - Computer software allows designs to be generated in 3 dimensional forms; this is known as 3D CAD (Computer Aided Design) and allows the designer to create a product in its true form. CAD software replaces manual drafting with an automated process.

## Prototypes

**Rapid Prototypes:** - There are different kinds of prototypes; some are more like rough drafts and some are like the final design. Certain 3-D computer-aided design software programs can help create more realistic-looking prototypes when you're dealing with complicated designs. Plus, the computerized prototypes are easy to pass along to the Chinese manufacturer you will work with. Eventually, you or the factory will have to create a physical prototype of your product either through rapid prototyping or through a painstaking process of handmade perfectionism. A full article has been written about prototypes [here](#).

# The SME NPD Process – Design & Prototype Continued

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**Soft Tooling:** - For example, if we consider a product that has injection molded components, there are a number of different approaches to achieving pre-production parts; the direction you opt for will partly be driven by your budget. If you are looking to launch your product on a limited budget, then full production tooling may be cost prohibitive, and therefore 'soft tools' would be ideal in this case. You can read more about soft tooling options [here](#).

## Test

**Functional Testing:** - Once you have produced your working prototype you need to test it against the product specification in order to verify that the design meets the project expectations and the business objectives. More details on functional testing can be found [here](#).

**Stress Testing:** - highly accelerated life testing (HALT) and highly accelerated stress screening (HASS) quickly uncover problems associated with product design and production. You might have to work with a well-equipped manufacturer or with a testing laboratory to conduct such tests.

In HALT, which would apply to the initial product testing stages prior to production, temperature and vibration stress conditions are used during product development to find weak spots in the product design and its planned fabrication processes. Other test stimuli may include humidity, thermal cycling, burn-in for a specified period of time, over-voltage, voltage cycling, and anything else that could logically expose defects. This requires only a few units and a short testing period to identify the fundamental limits of the technology being used. Generally, every weak point must be identified and fixed (redesigned) if it does not meet the product's specified limits.

In production, HASS employs high stress, frequently well beyond the qualification level, but not at the extreme stress levels conducted in HALT tests. Appropriate proof-of-screen techniques must be used to protect good product, and HASS usually is not possible unless comprehensive HALT was done earlier (because fundamental design limitations will tend to restrict HASS stress levels).

*(Source of HALT/HASS information: Keithley Instruments, Inc.)*

# The SME NPD Process – Update

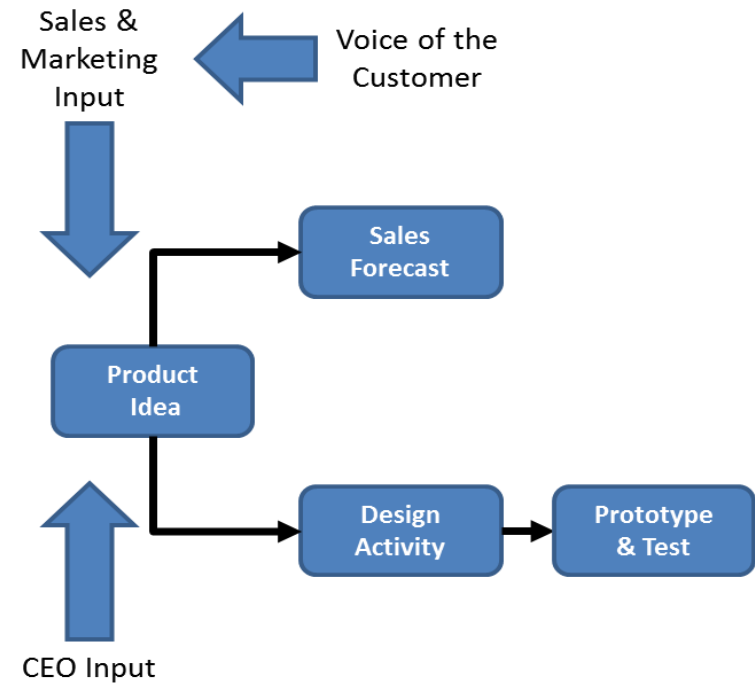
## List Changes

**Functional Changes:** - Once a design has been tested for functionality, any issues that require a design change need to be identified and listed out so they can be analyzed and prioritized with respect to implementation into the 3D CAD model or if possible implemented directly on the prototype under test.

**Quality Changes:** - During the prototype and testing stages, all quality issues also need to be highlighted and implemented into either the the 3D CAD model or the prototype under test. These quality issues could be used as part of the product specification if there is a potential for them to come out during mass production.

## SME NPD Process Update

So we are getting a picture of what the SME NPD process should start to look like:



Once the product has been designed and tested, the SME would then move directly into manufacturing. Assuming that some or all of the production would be outsourced, supplier selection and qualification would be the next logical step.

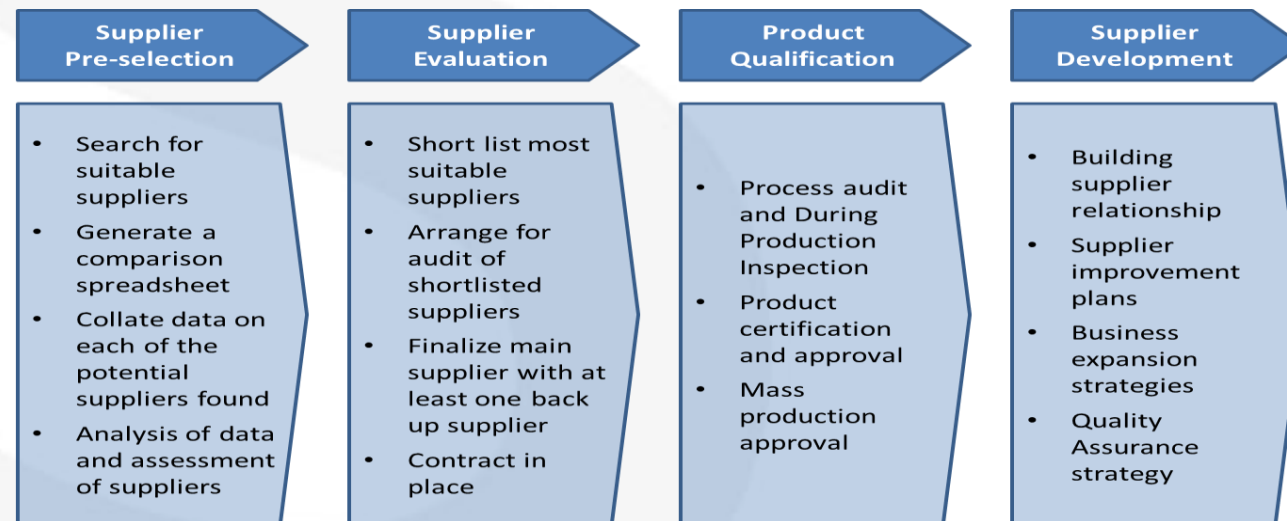
# The SME NPD Process – Supplier Qualification

## PRODUCTION

### Supplier Qualification

To start with, you need to establish where they are looking to outsource production (from a geographical point of view). Many SMEs will select China for the low cost opportunities that are available – if this is the case, there are many attributes to take into consideration with respect to finding a suitable supplier and making sure they are a good match to the individual SME requirements.

Attributes to take into consideration are shown in this chart:



The SME should carry out their own due diligence of suppliers to ensure a suitable supplier is selected to complete each specific element of the product during manufacture.

A simple method of working out how suppliers compare to each other is to use a decision matrix analysis. This process allows you to add weighted factors depending upon the importance of each factor. This method also allows the SME to focus on each of the factors which can be taken from attributes in the previous chart, or a totally different set of factors that would suit the individual organization.

# The SME NPD Process – Supplier Qualification Continued

An example of a simple decision matrix analysis table is show below:

<b>DECISION MATRIX ANALYSIS</b>						
<b>Factors:</b>	<b>Cost</b>	<b>Quality</b>	<b>Location</b>	<b>Reliability</b>	<b>Payment Options</b>	
Supplier 1	2	4	5	4	5	
Supplier 2	5	2	4	3	4	
Supplier 3	3	3	4	3	3	
Supplier 4	1	5	5	4	4	
Supplier 5	4	4	2	2	2	
Rank each supplier for every feature on scale from 1 to 5 (1 = very poor, 2 = poor, 3 = average, 4 = good, 5 = very good)						
<b>Factors:</b>	<b>Cost</b>	<b>Quality</b>	<b>Location</b>	<b>Reliability</b>	<b>Payment Options</b>	<b>TOTAL</b>
Weighting	4	5	1	2	3	
Supplier 1	8	20	5	8	15	<b>56</b>
Supplier 2	20	10	4	6	12	<b>52</b>
Supplier 3	12	15	4	6	9	<b>46</b>
Supplier 4	4	25	5	8	12	<b>54</b>
Supplier 5	16	20	2	4	6	<b>48</b>

Once you have a definitive shortlist of Chinese suppliers identified for each element, the next logical step in the supplier qualification process is for an on-site audit.

# The SME NPD Process – Audits

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## Supplier Audits

At Sofeast, the three types of audit we perform most often in China are listed below:

**Technical & Quality Audit (TQA)** — for an in-depth evaluation of the manufacturer's capability and reliability. It is the "standard" type of audit. Elements covered in this audit are; the factory profile including staff count and type of products manufactured, observation of one production line: process steps, type and number of machines, in-depth audit of the quality systems in place, evaluation of internal procedures, sub-supplier qualification, a quick overview of personal safety and work environment as well as photos of factory, production areas, workshop, offices and warehousing and licenses.

**Initial Factory Evaluation (IFE)** — this is relevant for small factories (below 300-400 workers) and for buyers with a small budget. Elements covered in this evaluation are: factory profile including staff count and type of products manufactured, observation of one production line: process steps, type and number of machines, an overview of the organizations quality system and the equipment condition, as well as photos of factory, production areas, workshop, offices and warehousing and licenses.

**Social Compliance Audit (SCA)** — for an in-depth evaluation of social compliance issues. This can be based on our standard checklist, or on Walmart standards, etc. Elements covered in this audit are; the factory profile including staff count and type of products manufactured, in-depth audit of social policy: child labor, forced labor, number of hours worked, an in-depth audit of the safety policy: fire prevention, evacuation plan, chemical hazards, protective equipment, an evaluation of health and safety in workshops, canteens, and all areas used by workers, an assessment of the environmental policy as well as photos of factory, production areas, workshop, offices and warehousing and licenses.

Feel free to [contact us](#) for more information on these services, or about our other types of factory audits.

# The SME NPD Process – Audits Continued

## Summary Page of a Technical & Quality Audit Report



### TECHNICAL & QUALITY AUDIT REPORT

GENERAL INFORMATION			
Service number	S130518C1	Date	23 May 2013
Supplier name	[Confidential]	Factory name	[Confidential]
Factory address	[Confidential]	Supplier contact	[Confidential]
Supplier tel. No.	[Confidential]	Supplier email	[Confidential]
Nearest international shipping port	Shanghai port	Nearest international airport	Shanghai airport
Main products	Shower Door & Mirror Cabinet		

RELIABILITY EVALUATION (BASED ON THE FACTORY'S QUALITY SYSTEM)		
<input checked="" type="checkbox"/> POOR RELIABILITY (0 - 59)	<input type="checkbox"/> AVERAGE RELIABILITY (60 - 79)	<input type="checkbox"/> GOOD SYSTEM (80 - 100)

OVERALL EVALUATION FROM AUDITOR			
General organization, housekeeping, and working environment	Grade:	9	/15
Understanding the buyer's requirements	Grade:	3	/10
Suppliers of materials / components	Grade:	3	/5
Incoming quality control (IQC)	Grade:	4	/10
Organization of in-house production	Grade:	3	/5
In-process quality control (IPQC)	Grade:	6	/10
Subcontracted production, if any	Grade:	3	/5
Final quality control (FQC)	Grade:	5	/10
Instruments & machines	Grade:	0	/10
Prevention of problems	Grade:	3	/10
Personal safety	Grade:	8	/10
<b>TOTAL</b>	<b>Grade:</b>	<b>47</b>	<b>/100</b>

# The SME NPD Process – Manufacturing

## PRODUCT MANUFACTURE

So now you have selected your manufacturer or set of manufacturers to make your product, the next step is to ensure you communicate all the correct information to those suppliers. This is initially carried out with good Design Files which should include the following as headings, and each heading should have full details associated with it:

- Product Description
- Product Functionality
- 3D CAD Files
- 2D Technical Drawings
- Test Requirements
- Certification Requirements
- Inspection Pass Criteria

When generating your design files, do not take shortcuts. Make sure all the information required to produce your product is included within the design file. Include additional notes to help explain key areas of importance and critical-to-quality aspects. Do not be shy to ask and ask again to ensure your supplier understands each and every detail.

If you have a complete and comprehensive design file, you make the job easier for the manufacturer to produce your product right the first time round.

A full detailed explanation of what should be included in these main headings can be found in an article [here](#), and a Design File Template can be found [here](#).

If you feel lost in this process, [we can help](#).

### Quality Assurance During Production

If you don't keep an eye on what happens during production, you are running high risks. The steps to follow are detailed in another e-book that can be found [here](#).

### Legal Documentation

The other very important piece of the puzzle that ALL SMEs should take action on is the legal agreements between themselves and the supplier. The main document that needs to be in place is the “OEM Agreement”. It has to call for litigation or arbitration in China (China might not enforce decisions from a court or justice in your country).



# The SME NPD Process – Manufacture

Dan Harris from Harris & Moure states that they favor putting clients' OEM contracts in Chinese for reasons that can be found [here](#).

To protect your intellectual property, we also advise you to consult with a lawyer about trademark registration and using a non-disclosure/non-use/non-circumvention agreement (NNN). Do NOT use templates or contracts that were created for use outside of China.

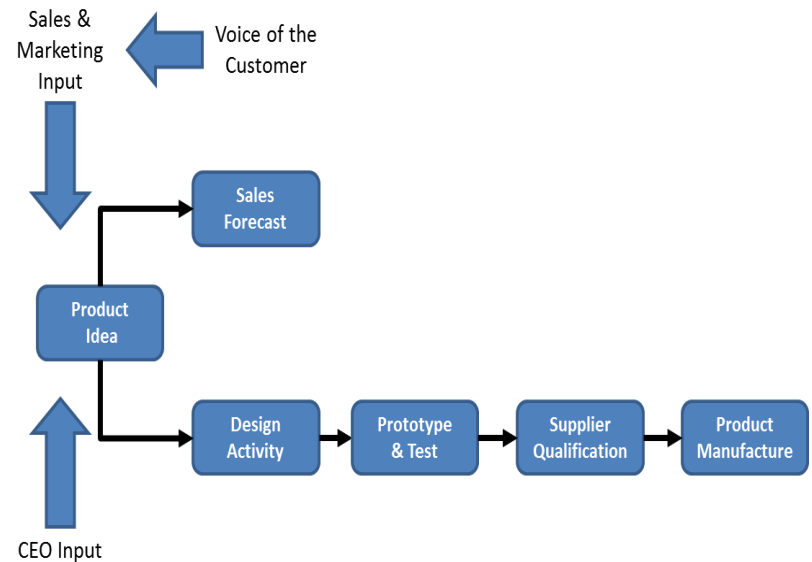
## Ensure you have a Full Business Model

As part of your manufacturing documentation, you really need to ensure that you have a Full Business Model in-place so that you understand the true cost of manufacturing in China.

For more details on what should be included in your business model, check this [article](#) which covers the minimum requirements of what you need to include.

## From Concept to Product

So now we have a NPD Process for SMEs that is almost complete. We have covered inputs to the Product Idea step which leads into both the Sales Forecast and the Design Activity. The Prototype and Test element has been discussed along with the Supplier Qualification and the Product Manufacturing elements. Now the process is complete.



# The SME NPD Process – Business Case & Budgets

## BUSINESS CASE

The underpinning pillar to all the actions within the NPD process is the product's Business Case. The business case holds the entire process together and should be supported by senior management, driven by the senior Project Team, and have the buy-in from all those working on the project.

The Business Case is an ever-evolving document that flows with the progress of the product development and should be updated on a regular basis to reflect current project situations as well as future developments.

The primary elements of a Business Case should include the following:

- Product definition and analysis results
- Legal and regulatory requirements
- Safety, health and environmental considerations
- Assumptions made to draw the conclusions you have, and why you believe they are valid and reasonable
- Out-of-bounds criteria that indicate certain changes or events which will mandate an emergency business case review

## BUDGET & APPROVAL

The overall NPD process should have a Project Budget Review and Approval system that has constant input and feedback at every stage of the process. This ensures that as an SME you are able to understand the cost implications throughout the development of the new product.

Each organization will have its own unique process and procedures to follow with respect to budget setting, monitoring and approval, but the key attribute is that you are in control at all times with the attentiveness of the reviews and each required approval.

# The SME NPD Process – Product Launch

## PRODUCT LAUNCH

The last activity for every new product development program is the Product Launch or commercialization of the product. The commercialization stage of any New Product Development process is where the 'rubber meets the road' and the product you are manufacturing gets introduced into the market.

Commercialization is broken into phases, from the initial introduction of the product through its mass production and adoption. Considerations should be made for production methods and volumes, what distributions channels will be used, what marketing techniques will be implemented, as well as reviewing the sales and customer support requirements.

It is not a case of just launching a product and hoping for the best. There has to be a structured plan — a strategy that has been clearly thought out and can be implemented in a controlled environment.

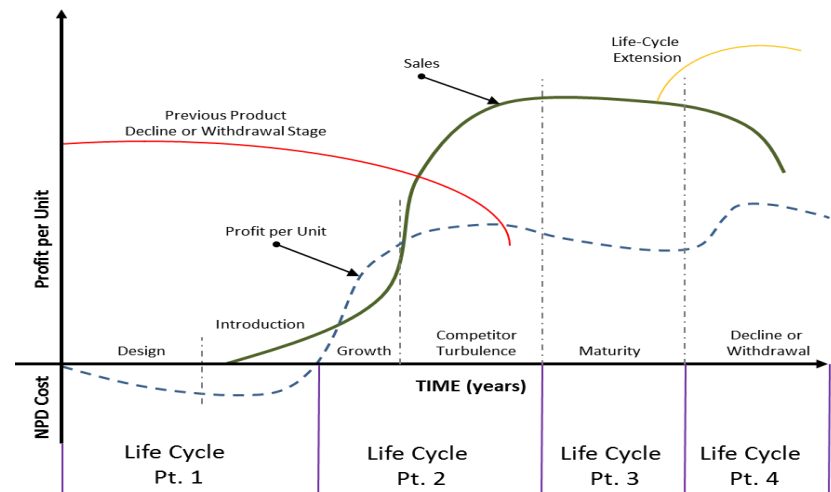
You can read more details about the Product Launch or commercialization stage of the new product development process in [this article](#).

## Product Life Cycle

Every product has a life cycle. This NPD process has focused on the first part of the life cycle.

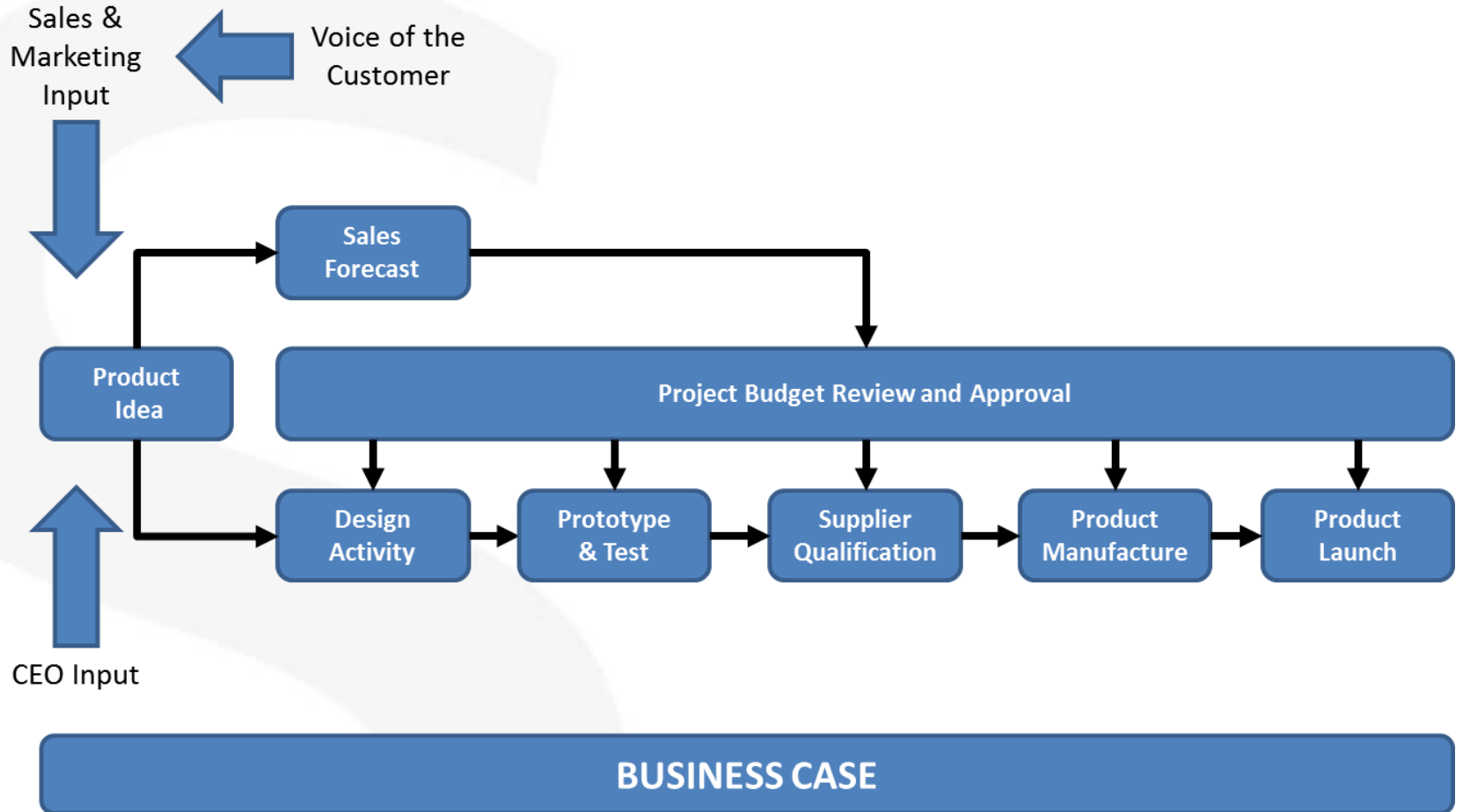
A full product lifecycle is broken down into a number of different stages, as shown in the model below:

### Product Life Cycle with Financial Model



For more information on product life cycle, you can read [this article](#).

# THE FINAL SME NPD PROCESS



# The SME NPD Process – Conclusion

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## CONCLUSION

The main issues SME's have with following a formal New Product Development process is that a formal process can be very time-consuming and resource-dependent, and this is something that most SMEs want to avoid when developing a new product.

The SME usually has entrepreneurial spirit and drive. Being able to develop new products in a fluid and flexible way allows the owners and senior staff within SMEs to make decisions on the fly without feeling as if they are skipping process steps.

The best results however, when developing new products, comes when SMEs actually follow some sort of NPD process.

So now you have a simplified, flexible, but structured process for developing new products. You can feel confident that your next product can be developed in the knowledge that you have followed the minimum steps to ensure success and to be able to drive the time to market without cutting or missing out critical steps within the development process.

If this e-book has been helpful, we'd love to hear from you!

# The SME NPD Process – Resources

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## RESOURCES

If you are looking for more information on importing products from China, consider signing up for our [15 lessons for importers](#), ranging from supplier selection to payment terms and quality control.

You can also [visit our blog site](#) where we share general advice for importers, with a special focus on quality management. The aim here is to help small and medium sized buyers understand their suppliers better, adopt the right strategies, and use the right tools.

If you need any assistance we can help you follow up on the development of a new product, from factory qualification to prototypes through to process audits and production quality inspections. Just visit our website and complete the contact form [here](#).

Good luck with your next New Product Development project!

# Contact Information

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