Q!. What Challenges Does a Company Face When Developing New Products in the Global Economy?

Historically, a company creates a product to fill a need or want in its immediate marketing area. As the company grows, it expands the marketing area until the product is marketed nationally. After a product reaches national distribution, the company typically decides to either expand internationally or develop other products and remain a national distributor. With the growth of the global economy in recent years, even start-ups now build eventual international distribution into their initial business plans. Companies now need to consider the challenges of international distribution in the initial product

**Social Challenges**

Products are developed to meet a specific need or want. Just because we have a need or want in the U.S., doesn’t mean that need or want is universal. Different countries are at different stages of economic development, and the need or want we have might not have developed in enough other countries to create a viable target market. Other countries have different cultures and different food preferences, grooming habits, living quarters, recreational opportunities, lifestyles and clothes. English speakers might be few. Brand names may not translate appropriately. Countries may have no interest in a particular good or service that is selling well in America.

**Technical Challenges**

American companies have done a good job of standardizing technology, but so have other countries, and those standards don’t always match. Standard electrical voltage differs from country to country, so products must be designed to run on different voltages, and they need different plugs to fit different receptacles. Local water pressure might be different. Lettering on dials, knobs, levers or buttons might need to be in different languages. Some use Fahrenheit systems to measure temperature while others use Celsius. Some use metric measurements, while some use other measurement systems. Raw materials readily available in America might not be available in other countries. Phone, radio, television and ISP signals might be totally different from country to country

## Legal and Regulatory Challenges

Some countries prohibit the importation of certain items to protect domestic industries. Others might require government approval to operate or require you work with local partners. Trademark, copyright and patent protection laws might be nonexistent. Different environmental regulations might have to be observed. Certain products might be banned for political or religious reasons. Permits or licenses might be needed to perform basic activities. You may not be able to overcome some of these challenges, so it is important to understand them before you invest resources.

## Distribution Challenges

In America, if you can get Wal-Mart and Target to carry your product, you have instant national distribution. Most other countries don’t have that type of national distribution available to them. You have to work with dozens of regional chains, distributors and independent stores. Many countries, such as India, have large outlying areas that are served by thousands of small mom-and-pop stores or retail trucks. It can be a real challenge to get your product from the import docks to a place where a customer can buy it.

## Promotional Challenges

In America, we have a variety of effective methods to promote a product and communicate with our customers. We can use television, radio, direct mail, magazines, social media, billboards, telemarketing and product placement in movies. Many other countries just don’t have these promotional methods, certainly not to the extent we have here. You may have to use a grass roots approach, which is much harder. In addition, there may be cultural limitations. Our promotions tend to have a sexual orientation. The beautiful model as spokesperson, shot in reveling swimwear or with plunging neckline might be taboo in many companies. You may find you have to use methods with which you have no experience. You might have to completely redo packaging or promotional materials at

OR

1. Identification risk areas
2. Time estimation of product

Ensuring that adequate and timely risk identification is performed is the responsibility of the owner, as the owner is the first participant in the project. The sooner risks are identified, the sooner plans can be made to mitigate or manage them. Assigning the risk identification process to a contractor or an individual member of the project staff is rarely successful and may be considered a way to achieve the appearance of risk identification without actually doing it.

It is important, however, that all project management personnel receive specific training in risk management methodology. This training should cover not only risk analysis techniques but also the managerial skills needed to interpret risk assessments. Because the owner may lack the specific expertise and experience to identify all the risks of a project without assistance, it is the responsibility of DOE’s project directors to ensure that all significant risks are identified by the integrated project team (IPT). The actual identification of risks may be carried out by the owner’s representatives, by contractors, and by internal and external consultants or advisors. The risk identification function should not be left to chance but should be explicitly covered in a number of project documents:

* Statement of work (SOW),
* Work breakdown structure (WBS),
* Budget,
* Schedule,

Bottom of Form

* Acquisition plan, and
* Execution plan.

### **METHODS OF RISK IDENTIFICATION**

There are a number of methods in use for risk identification. Comprehensive databases of the events on past projects are very helpful; however, this knowledge frequently lies buried in people’s minds, and access to it involves brainstorming sessions by the project team or a significant subset of it. In addition to technical expertise and experience, personal contacts and group dynamics are keys to successful risk identification.

Project team participation and face-to-face interaction are needed to encourage open communication and trust, which are essential to effective risk identification; without them, team members will be reluctant to raise their risk concerns in an open forum. While smaller, specialized groups can perform risk assessment and risk analysis, effective, ongoing risk identification requires input from the entire project team and from others outside it. Risk identification is one reason early activation of the IPT is essential to project success.

The risk identification process on a project is typically one of brainstorming, and the usual rules of brainstorming apply:

* The full project team should be actively involved.
* Potential risks should be identified by all members of the project team.
* No criticism of any suggestion is permitted.
* Any potential risk identified by anyone should be recorded, regardless of whether other members of the group consider it to be significant.
* All potential risks identified by brainstorming should be documented and followed up by the IPT.

The objective of risk identification is to identify all possible risks, not to eliminate risks from consideration or to develop solutions for mitigating risks—those functions are carried out during the risk assessment and risk mitigation steps. Some of the documentation and materials that should be used in risk identification as they become available include these:

* Sponsor mission, objectives, and strategy; and project goals to achieve this strategy,
* SOW,
* Project justification and cost-effectiveness (project benefits, present worth, rate of return, etc.),
* WBS,
* Project performance specifications and technical specifications,
* Project schedule and milestones,
* Project financing plan,
* Project procurement plan,
* Project execution plan,
* Project benefits projection,
* Project cost estimate,
* Project environmental impact statement,
* Regulations and congressional reports that may affect the project,
* News articles about how the project is viewed by regulators, politicians, and the public, and
* Historical safety performance.

The risk identification process needs to be repeated as these sources of information change and new information becomes available.

There are many ways to approach risk identification. Two possible approaches are (1) to identify the root causes of risks—that is, identify the undesirable events or things that can go wrong and then identify the potential impacts on the project of each such event—and (2) to identify all the essential functions that the project must perform or goals that it must reach to be considered successful and then identify all the possible modes by which these functions might fail to perform. Both approaches can work, but the project team may find it easier to identify all the factors that are critical to success, and then work backward to identify the things that can go wrong with each one.

Risk identification should be performed early in the project (starting with preproject planning, even before the preliminary concept is approved) and should continue until the project is completed. Risk identification is not an exact science and therefore should be an ongoing process throughout the project, especially as it enters a new phase and as new personnel and contractors bring different experiences and viewpoints to risk identification. For this reason, the DOE project director should ensure that the project risk management plan provides for periodic updates.

## 2 he aim of effective project management is to bring the project to completion on time and on schedule. Estimating project duration is a key function of scheduling. Individual activities make up the schedule, and the estimates of their duration determine the project timetable. The accuracy of the overall schedule depends on the accuracy of these estimates. While project managers can't know the actual time it will take to complete an activity, there are six methods they can use to obtain reliable estimates. Work Breakdown Structure

Dividing the project into smaller tasks lets a project manager get an overview of duration and cost. One method that accomplishes such a simplification is the work breakdown structure. It guides a project manager through a structured process by starting with the whole project on the top level. The project manager divides the project into several sections on a second level. These sections can overlap but represent separate activities. Typical project parts for the second level are planning, purchasing equipment, production, shipping and commissioning. On a third level, the project manager further divides the sections. Purchasing equipment can become a list of the equipment he has to purchase. The project manager adds levels until he has tasks and activities for which he can assign an accurate cost and duration.

## Once he has broken the project up into small tasks, the project manager can assign costs. For equipment that he has to purchase, he can contact suppliers to get accurate estimates. For other tasks, he can estimate the number of hours and use an hourly rate. Another method of assigning costs is to use historical data. If the company has completed a similar project, the cost of equipment may be available. Finally, the project manager can estimate overhead by applying Activity Durations

The project manager can use the same method as he uses for costs to assign activity duration. He can check with suppliers to get delivery times and use historical records to estimate how long a task takes. For common tasks, such as pouring concrete or paving a parking lot, he can use industry norms to derive duration, based on the cubic feet of concrete or the square footage of the parking lot. For labor-intensive, non-standard activities, he can check with the people who will carry out the wor

percentage based on how much overhead costs such projects typically generate

**Q2. Describe the system and subsystem specification for a production planning**.

Subsystems can be used in a number of complementary ways, to partition the system into units which

* can be independently ordered, configured, or delivered
* can be independently developed, as long as the interfaces remain unchanged
* can be independently deployed across a set of distributed computational nodes
* can be independently changed without breaking other parts of the systems

Thus, subsystems are ideal for modeling components - the replaceable units of assembly in component-based development - that are larger than a single design class.

In addition, subsystems can

* partition the system into units which can provide restricted security over key resources
* represent existing products or external systems in the design.

### Identifying Subsystems

A complex analysis class is mapped to a design subsystem if it appears to embody behavior that cannot be the responsibility of a single design class acting alone. A complex design class may also become a subsystem, if it is likely to be implemented as a set of collaborating classes.

Subsystems are also a good means of identifying parts of the system that are to be developed independently by a separate team. If the collaborating design elements can be completely contained within a package along with their collaborations, a subsystem can provide a stronger form of encapsulation than that provided by a simple package. The contents and collaborations within a subsystem are completely isolated behind one or more interfaces, so that the client of the subsystem is only dependent upon the interface. The designer of the subsystem is then completely isolated from external dependencies; the designer (or design team) is required to specify how the interface is realized, but they are completely free to change the internal subsystem design without affecting external dependencies. In large systems with largely independent teams, this degree of de-coupling combined with the architectural enforcement provided by formal interfaces is a strong argument for the choice of subsystems over simple packages.

The design subsystem is used to encapsulate these collaborations in such a way that clients of the subsystem can be completely unaware of the internal design of the subsystem, even as they use the services provided by the subsystem. If the participating classes/subsystems in a collaboration interact only with each other to produce a well-defined set of results, the collaboration and its collaborating design elements should be encapsulated within a subsystem.

This rule can be applied to subsets of collaborations as well. Anywhere part or all of a collaboration can be encapsulated and simplified, doing so will make the design easier to understand.

#### Hints

Once the design has been organized into subsystems, update the use-case realizations accordingly.

### Modeling Subsystems

Design Subsystems are modeled using UML components. This construct provides the following modeling capabilities:

* can group classes to define a larger granularity part of a system
* can separate the visible interfaces from internal implementation
* can have execution at run-time

Some other considerations are:

* Each Design Subsystem must be given a name and a short description.
* The responsibilities of the original analysis class should be transferred to the newly-created subsystem, using the description of the subsystem to document the responsibilities

Note: UML 2.0 also defines a stereotype for component named <<subsystem>>, indicating that this may be used, for example, to represent large scale structures. A RUP Design Subsystem may or may not be a large scale structure; both are Design Subsystems from the RUP perspective. This is an issue for the software architect to decide (whether to choose for example to label components that are composed of components as <<subsystem>>).

### Subsystems That Represent Existing Products

Where an existing product is one that exports interfaces, i.e. operations (and perhaps [**receptions**](http://www.michael-richardson.com/processes/rup_for_sqa/core.base_rup/guidances/termdefinitions/reception_E5EE6A47.html)), but otherwise keeps all details of implementation hidden, then it may be modeled as a subsystem in the logical view.  Examples of products the system uses that you may be able to represent by a subsystem include:

* Communication software (middleware).
* Database access support (RDBMS mapping support).
* Application-specific products.

Some existing products such as collections of types and data structures (e.g. stacks, lists, queues) may be better represented as packages, because they reveal more than behavior, and it is the particular contents of the package that are important and useful and not the package itself, which is simply a container.

Common utilities, such as math libraries, could be represented as subsystems, if they simply export interfaces, but whether this is necessary or makes sense depends on the designer's judgment about the nature of the thing modeled.  Subsystems are object-oriented constructs (as they are modeled components): a subsystem can have instances (if the designer so indicates). UML provides another way to model groups of global variables and procedures in the [utility](http://www.michael-richardson.com/processes/rup_for_sqa/core.base_rup/guidances/termdefinitions/utility_5BFC0972.html), which is a stereotype of class - the utility has no instances.

When defining the subsystem to represent the product, also define one or more interfaces to represent the product interfaces.

### Subsystem Dependency Restrictions To top of page

Design Subsystems (modeled as UML components) differ from packages in their semantics: a subsystem provides behavior through one or more interfaces which it realizes. Packages provide no behavior; they are simply containers of things which provide behavior.

The reason for using a subsystem instead of a package is that subsystems encapsulate their contents, providing behavior only through their interfaces. The benefit of this is that, unlike a package, the contents and internal behaviors of a subsystem can be changed with complete freedom so long as the subsystem's interfaces remain constant. Subsystems also provide a 'replaceable design' element: any two <<realization>> components that realize the same interfaces (or <<specification>> component) are interchangeable.

In order to ensure that subsystems are replaceable elements in the model, a few rules need to be enforced:

* A subsystem should minimize exposing of its contents. Ideally no element contained by a subsystem should have 'public' visibility, and thus no element outside the subsystem depends on the existence of a particular element inside the subsystem. Some exceptions are as follows:
* When a subsystem's externals are not UML interfaces, it is often helpful to have a diagram (for example named "External View") that shows the visible elements of the subsystem.
* A subsystem should define its dependencies on subsystem interfaces (and publicly visible elements of subsystem in the exceptional cases described above). In addition, a number of subsystems may share a set of interfaces or class definitions in common, in which case those subsystems 'import' the contents of the packages which contain the common elements. This is more common with packages in lower layers in the architecture, to ensure that common definitions of classes which must pass between subsystems are consistently defined.

An example of Subsystem and Package dependencies is shown below:



Subsystem and Package Dependencies in the Design Model

### Subsystem Specification and Realization

#### DefinitionTo top of page

The UML ([[UML04](http://www.michael-richardson.com/processes/rup_for_sqa/core.base_rup/customcategories/references_56F06DFD.html#UML04)]) states:

A number of UML standard stereotypes exist that apply to component, e.g. <<specification>> and <<realization>> to model components with distinct specification and realization definitions, where one specification may have multiple realizations.

A Component stereotyped by <<specification>> specifies a domain of objects without defining the physical implementation of those objects. It will only have provided and required interfaces, and is not intended to have any realizing classes and sub components as part of its definition.

A Component stereotyped by <<realization>> specifies a domain of objects and that also defines the physical implementation of those objects. For example, a Component stereotyped by <<realization>> will only have realizing classes and sub components that implement behavior specified by a separate <<specification>> Component.

The separation of specification and realization essentially allows for two separate descriptions of the subsystem. The specification serves as a contract that defines everything that a client needs to know to use the subsystem. The realization is the detailed internal design intended to guide the implementer. If you wish to support multiple realizations, create separate "realization" subsystems, and draw a realization from each realization subsystem to the specification subsystem.

#### When and how to use

If the internal state and behavior of the subsystem is relatively simple, it may be sufficient to specify the subsystem by its exposed interfaces, state diagrams to describe the behavior, and descriptive text.

For more complex internal state and behavior, analysis classes can be used to specify the subsystem at a high level of abstraction. For large systems of systems, the specification of a subsystem may also include use cases. See [Developing Large-Scale Systems with the Rational Unified Process](http://www.michael-richardson.com/processes/rup_for_sqa/core.base_rup/guidances/whitepapers/developing_large-scale_systems_with_the_rational_unified_process_7AA2AF65.html).

Providing a detailed specification separate from the realization tends to be most useful in the following situations:

* the subsystem realization's internal state or behavior is complex - and the specification needs to be expressed as simply as possible in order for clients to use it effectively;
* the subsystem is a reusable "assembly component" intended for assembly into a number of systems (see [Concept: Component](http://www.michael-richardson.com/processes/rup_for_sqa/core.base_rup/guidances/concepts/component_A2E2B3B1.html));
* the subsystem's internals are expected to be developed by a separate organization;
* multiple implementations of the subsystem need to be created;
* the subsystem is expected to be replaced with another version that has significant internal changes without changes to the externally visible behavior.

Maintaining a separate specification takes effort, however - as one must ensure that the realization of the subsystem is compliant with the specification. The criteria for when and if to create separate specification and realization classes and collaborations should be defined in [Work Product: Project Specific Guidelines.](http://www.michael-richardson.com/processes/rup_for_sqa/core.base_rup/workproducts/rup_project_specific_guidelines_8DC8DA32.html)

#### Dependencies

A specification should define its dependencies. These are the interfaces and visible elements from other subsystems and packages that must be available in all compliant realizations of the subsystem.

A realization may have additional dependencies, introduced by the designer or implementer. For example, there may be an opportunity to use a utility component to simplify the implementation - but the use of this utility component is a detail that need not be exposed to clients. These additional dependencies should be captured on a separate diagram as part of the realization.

#### Relationship to Implementation

A fully detailed specification defines everything a client needs to use the subsystem. This means refining the exposed interfaces and any publicly visible elements so that they are one-to-one with code. Analysis classes introduced to specify the subsystem behavior should remain as high level abstractions, since they are intended to be independent of any subsystems realizations.

The realization elements of a subsystem should align closely to the code.

#### Modeling

Design subsystems may be modeled as either components or subsystems. These constructs provide almost equivalent modeling capabilities like modularity, encapsulation, and instances able to execute at run-time.

Some additional considerations about these modeling options are: .

However, by and large, these notations can be used interchangeably. Whether to represent Design Subsystems as

#### Subsystem Dependency Restrictions

The same dependency restrictions and discussions mentioned in the section titled [Subsystem Dependency Restrictions](http://www.michael-richardson.com/processes/rup_for_sqa/core.base_rup/guidances/guidelines/design_subsystem_B26FD609.html#Subsystem Dependency Restrictions) also apply for design subsystems being modeled as UML 1.5 subsystems.

An example of Subsystem and Package dependencies in UML 1.5 is shown below:



Subsystem and Package Dependencies in the Design Model

#### Subsystem Specification and Realization

**OR**

Q2.Describe in detail the process to review a product design from manufacturing point "View ?

Organizations can profit from learning to think in terms of Lean, a philosophy that aims to eliminate waste (in Japan, where Lean was developed, the term is muda). Lean attacks waste mainly by shortening the time between the customer order and shipment. Based on a customer-focused view, six steps can provide a strong foundation for any organization that wants to incorporate Lean into its operating philosophy. These steps in Lean thinking can be best evaluated at the producer end by verifying and reviewing each step one at a time.

1. Value
2. Value stream
3. Flow
4. Pull
5. Perfection
6. Replication

Lean thinking can best start by giving due consideration to value, which ultimately is the customer’s requirement. The value of any product (goods or services) is defined by customer needs and not by any non-value-added activity at the supplier or producer end. That is, the customer is prepared to pay for operations by producers or their suppliers that transform the product in a way that is meaningful to the customer. Customers do not want to pay for waste at the producer end.

### 1. Value (Specifying)

Value is determined by the customers who want to buy the right product with the right capabilities at the right price. That is, the product must be “right” every time – from design to manufacture, from delivery to error-free operation. Lean companies work on making their processes right by eliminating waste – something no customer wants to pay for.

While linking the term “value” generally with customer requirements, the following questions can be asked to review the value for the customer as it relates to any specific product issue:

* What is the problem that impacts the customer?
* What is the problem that the team is going to take action on?
* Why is the project so important that the organization should address it?
* Why is the project being done?
* Do all the stakeholders understand and agree to the problem and its impact on business? Do they all agree that fixing it is critical for the business? Do they all support the project?
* Are the roles and responsibilities of the project team members clearly defined?
* Are the needs of the customers clearly identified?
* What’s in it for the customers? How do they benefit?
* What’s in it for the business? How does the business benefit?
* Were the key parameters or the most important thing to be fixed identified?
* Does everyone describe what will be measured in the same way?
* Can the primary metric be manipulated? How does it drive the right behavior?
* What can go worse as a result of the project?
* Where does the problem occur? Did the team identify it correctly? Did the team work on this particular issue to completion?
* What does success look like? How will success be quantified?

### 2. Value Stream Mapping (Identifying)

Once value is specified by the customers, the next Lean step is to identify the right process – a process that only adds value to the product, in other words, a waste-free process. The value stream for a product has three categories of activities:

**1. Process steps that definitely create value:** In any manufacturing process, the steps that are actually transforming the fit, form or function of the raw material, and bring it a step closer to the finished product.

**2. Process steps that create no value but are necessary, due to current state of the system:** In any manufacturing process, activities like inspection, waiting and some transportation steps.

**3. Process steps that create no value and can be eliminated:** Any activity that does not fall into the above two categories.

While the parts of a process that create no value should be eliminated, any action or activity that is recognized as non-value-added but currently necessary should be targeted for improvement. At this point a detailed process flow diagram should be generated for each product or product category. To ascertain which steps in the process are unnecessary, an intense questioning and re-examining method (Japanese term is kaikeku) is applied to every aspect of the process under consideration.

The review points at this stage are:

* Does the team understand how the whole process works?
* Did the team manage to complete a detailed process flow diagram at this stage?
* Did the team identify the waste in the process?
* Did the team follow kaikeku – the radical improvement approach?
* Were there any particular processes that did not support the customer need?
* Did the team make use of the knowledge and experience within the business to establish this?
* What constraints/flow problems exist in the process that are hurting the business?
* Can the team quantify any difference in people, shifts and days causing hidden constraints/flow problems?
* Does the team know the causes of the constraints/flow problems?
* What impact on the business and customers are these constraints/flow problems causing?
* When will the team have enough information/data about the issues that could be causing the problem?
* Does the information reveal anything new about the problem?
* Did the team understand the type of problem that is being faced?
* Can the team state what the current performance of the process is?
* Is it clear yet what the business entitlement is from the process?
* Is there a need to go back and refine or change what was learned in the two value steps?

### 3. Flow

This Lean step focuses on rapid product flow (RPF). The specific process waste is identified at each stage of process flow and is eliminated. The team involved in Lean will physically walk the process and write down the distance the product travels during its process flow. The non-value-added distances are eliminated by physical layout change, which involves both human and machine. Factory floors are laid out in cells rather than in functional groupings, which reduces the distance the parts travel in the process flow.

It is at this point that the Lean enterprise implements 5S, a tool developed for reducing the slack hidden in manufacturing processes. 5S is the basis for Lean manufacturing and the foundation for a disciplined approach to the clean workplace. The five steps of 5S are (in Japanese and English):

1. **Seiri/Sort:** Meaning sorting or segregating through the contents of the workplace and removing all unnecessary items.
2. **Seiton/Straighten:** Meaning putting or arranging the necessary items in their place and providing easy access by clear identification.
3. **Seiso/Shine:** Meaning cleaning everything, keeping it clean and using cleaning to inspect the workplace and equipment for defects.
4. **Seiketsu/Standardize:** Meaning creating visual controls and guidelines for keeping the workplace organized, orderly and clean, in other words, maintaining the seiso, or shine.
5. **Shitsuke/Sustain:** Meaning instituting training and discipline to ensure that everyone follows the 5S standards.

Questions to be asked at this point are:

* How is the impact of customer demand on the process being translated or understood?
* Did the team physically visit the process to realize the process steps?
* Did the team identify the non-value-added distances traveled by parts?
* Did the team identify the movements and transportations?
* Have the hot spot(s) that are constraining the process been identified?
* What steps have been initiated to stabilize the constraints before the main improvement is made?
* Has the Lean team done enough to build 5S culture in the organization?
* Has the team taken the right steps to close the loop of each 5S step?

### 4. Pull

The benefits of Lean Steps 1, 2 and 3 allow a company to produce more than before and in a way that value is added at every step in the production process. The fourth Lean step can be directed toward either removing excess capacity (inventory) or increasing the rate of pull.

Lean, which identifies the seven deadly wastes as defects, over-production, transportations, waiting, inventory, motion and processing (or the acronym, DOTWIMP), lists inventory as a source of waste. Hence, producing anything that is not sold immediately and is waiting at any point of time for delivery is waste. A pull system, which on the production side is making a product at the same rate at which it is being sold, also is a waste-eliminating step. On the supply side, a pull system is flowing resources into a production process by replacing only what has been consumed.

The review points here are:

* Did the Lean team define the sequence of operation?
* Did the team manage to achieve the balance of operation times?
* What can be put in place to support the customer supply needs?
* How will this be managed through the business?
* How will the internal inventory needs be managed?

### 5. Perfection

This Lean step emphasizes that continuous improvement has to be a part of the organization and is always possible. This is the desired state of any change in any environment. The organization should always try to achieve what is the perfect system for that kind of operation and should aim at continuously improving the present system. The word for this in Japanese is Kaizen.

Questions to be asked here are:

* Have all stakeholders acknowledged and accepted that the process has been improved?
* What process will be put in place to further improve the process?
* What risk is there that these causes will come back and disturb the process again?
* Did the team document the project in a form that anyone can understand?
* Has the team identified the next stage of continuous improvement?

### 6. Replicate

This Lean step is a confirmation of the system implemented and improvements achieved, and determining that these same system procedures, tools and techniques can be deployed anywhere in the operation or in any business process. The main benefit of this step is that any time spent in analysis is reduced.

Now is the time to ask these questions:

* How will the team ensure that the business learns from its experience?
* Can this process improvement be replicated in other parts of the business?
* Is the control set true enough for a similar type of operation?

### Q3Describe the steps for detail design process for a component

Before solving complex design problems you need to understand the basic components of design at your disposal. Much as a musician seeks to understand pitch and rhythm, melody and tempo, a designer should seek a greater understanding and control over:

* [Unity](http://www.vanseodesign.com/web-design/design-unity/)
* [Gestalt](http://www.vanseodesign.com/web-design/gestalt-principles-of-perception/)
* [Space](http://www.vanseodesign.com/web-design/whitespace/)
* [Dominance](http://www.vanseodesign.com/web-design/dominance/)
* [Hierarchy](http://www.vanseodesign.com/web-design/visual-hierarchy/)
* [Balance](http://www.vanseodesign.com/web-design/web-design-balance/)
* [Color Part I: Color Theory](http://www.vanseodesign.com/web-design/color-theory/)
* [Color Part II: How to Use Color](http://www.vanseodesign.com/web-design/color-meaning/)

Through learning these 7 components of design, the whole of your designs will become more than the sum of their elements and you’ll be better able to [communicate your ideas](http://www.vanseodesign.com/web-design/web-design-harmony-concept-conveyance-and-theme/).

I’ve written in greater detail about a few of these components and in the coming weeks I’ll write more detailed posts about the rest. Consider this post an introduction.

Also note that there are many ways one can break down and organize [design principles](http://www.digital-web.com/articles/principles_of_design/). The 7 components described here are as organized by Alex White in [*The Elements of Graphic Design.*](http://www.amazon.com/gp/product/1581152507?ie=UTF8&tag=the0d9-20&linkCode=as2&camp=1789&creative=9325&creativeASIN=1581152507)

## Unity

[Unity exists when your design elements are in agreement](http://www.bluemoonwebdesign.com/art-lessons-9.asp); when they belong together and aren’t arbitrarily placed or added to the design. Agreement can be either visual, conceptual or both.

The 4 basic design principles of [contrast](http://www.vanseodesign.com/web-design/design-basics-contrast/), [repetition](http://www.vanseodesign.com/web-design/design-basics-repetition/), [alignment](http://www.vanseodesign.com/web-design/design-basics-alignment/), and [proximity](http://www.vanseodesign.com/web-design/design-basics-proximity-to-know-what-belongs-with-what/) can be used to gain visual unity over your design. Elements that are aligned, repeat some basic characteristic like size, or are located in proximity to each other will appear to belong together. The last principle, contrast, is used to add variety.

Unity imparts order, but too much order can be dull and static. Variety adds interest, but too much can lead to a chaotic design. The key is to find a balance between unity and variety so as to have a well ordered design that is also visually interesting.

Elements can be conceptually unified

## Gestalt

Gestalt is a German word for form and shape and here refers to the human mind’s ability to visually organize forms and shapes into a unified whole. When first looking at a design we see the whole instead of the parts. When someone says “this design works” it’s because gestalt is at play.

By controlling design elements and how each element affects those around it you affect the cumulative perception of the viewer. A small change in one element affects how the other elements in your design are perceived. This cumulative perception is gestalt.

We can manipulate gestalt through the same 4 basic principles mentioned above as well as through:

* **figure/ground** – the relationship of a subject to its surrounding space
* **closure** – the viewer’s tendency to complete unfished forms
* **continuation** – the arrangement of elements to lead the eye across the page and create flow in your design

Gestalt helps communicate your message through the cumulative perception of all your design elements.

Andy Rutledge has written a great series of posts on Gestalt principles which I encourage you to read

* [Figure Ground Relationships](http://www.andyrutledge.com/gestalt-principles-1-figure-ground-relationship.php)
* [Similarity](http://www.andyrutledge.com/gestalt-principles-2-similarity.php)
* [Proximity, Uniform Connectedness, and Good Continuation](http://www.andyrutledge.com/gestalt-principles-3.php)
* [Common Fate](http://www.andyrutledge.com/common-fate.php)
* [Closure](http://www.andyrutledge.com/closure.php)

## Space

[Whitespace](http://www.vanseodesign.com/web-design/whitespace/) or negative space is the space between design elements. It’s just as, if not more, important than the space you fill and is one of the most neglected components of visual design.

Day only exists in comparison to night and in much the same way your positive space (where design elements are located) only exist in comparison to the empty space around them. Without whitespace, designs become crowded and chaotic. There’s no flow of movement from one element to the next.

Space is the context in which your message is perceived. Without ample space communication is difficult. Imagine a piece of music where every note in the piece was played by every instrument at the same time. The result would be noise and not music. Music needs space (time) between notes in order to build rhythm and melody. Visual design needs space between elements in order to effectively communicate.

## Dominance

Dominance is contrast taken to the extreme. By creating one element to dominate other elements on the page, you create an area of interest and a focal point to your design. Dominance gives viewers a way into your design. It lets them know right away where to look and from there you can [guide them through the rest of your design](http://www.vanseodesign.com/web-design/does-your-design-flow/).

Without dominance your visitors have to think about where to look first. Don’t make me think. Make it clear where I’m to look first. Give me an easy way to enter your design and begin to look about.

You can create dominance through manipulation of:

* size
* position
* color
* style
* shape

You can have more than one area of interest in your design, though one should be dominant. One should be the primary area of interest and be dominant over everything else.

## Hierarchy

While one element should be dominant you can create a hierarchy of dominance in order to guide people through your design. By creating a [visual hierarchy in your design](http://www.vanseodesign.com/web-design/visual-hierarchy/), you enable your page to be scanned and communicate the relative importance of different parts of the whole.

Which of the two layouts above is easier to read? The one without a clear hierarchy on the left or the one with a hierarchy on the right?

Once again the [basic design principles](http://www.vanseodesign.com/web-design/basic-design-principles/) help us create a hierarchy and help us move the eye from most important to least important elements. Contrast to make clear what’s most important and repetition, alignment, and proximity to lead the viewer across a single level of hierarchy and into the next.

Try not to create too many levels of hierarchy. It’s easy to discern most and least, but what’s in between tends not to be so easy to distinctly separate. Aim for 3 levels of hierarchy if you can, most important, least important, and everything else.

## Balance

Balance is a state of equalized tension. It’s important for achieving gestalt. A [balanced design](http://www.vanseodesign.com/web-design/web-design-balance/) is a more unified design.

Designer’s use visual weight to control design balance. Through the use of things like size, color, space, and density your design elements can visually balance each other to create a pleasing whole.

There are 4 types of balance, 2 of which are more important.

* Symmetrical – formal or static balance
* Asymmetrical – dynamic balance
* Radial – elements radiating from a central point
* Mosaic – balanced chaos lacking hierarchy and focal point

Symmetrical and asymmetrical balance are the two more important types of balance, with asymmetrical balance being the more interesting of the two. Kandinsky’s Composition #8 below is a good example of asymmetrical balance and dominance

## Color

Color aids organization through contrast and repetition. A good use of color in your design will help visitor comprehension of your overall message. Color provides direction as it relates elements to each other.

Random color choices negatively affect your message. A color scheme affects your message positively by helping achieve unity. You should plan for color early when creating a new design or your colors will end up being cosmetic and somewhat random.

[**Color theory**](http://www.worqx.com/color/) defines [classic color schemes](http://www.color-wheel-pro.com/color-theory-basics.html) as:

* Monochomatic – different shades and tints of a single color
* Analagous – colors adjacent on the color wheel
* Complementary – colors at opposite ends of the color wheel
* Split complementary – a main color and 2 addtional colors next to the complementary of the main color
* Triadic – 3 colors equally spaced around the color wheel
* Tetradic – 2 complimentary color pairs

Color evokes emotions. Psychology and cultural differences influence the way people react to and interpret color.

Darker colors are seen before lighter colors. Warmer colors move elements forward while cooler colors make elements recede into the background.

Q3.Explain Design of manufacturing (DFM) Method

**Design for Manufacturing - Guidelines**

Design for Manufacturing (DFM) and design for assembly (DFA) are the integration of product design and process planning into one common activity. The goal is to design a product that is easily and economically manufactured. The importance of designing for manufacturing is underlined by the fact that about 70% of manufacturing costs of a product (cost of materials, processing, and assembly) are determined by design decisions, with production decisions (such as process planning or machine tool selection) responsible for only

20%.

The heart of any design for manufacturing system is a group of design principles or guidelines that are structured to help the designer reduce the cost and difficulty of manufacturing an item. The following is a listing of these rules.1

**1. Reduce the total number of parts.** The reduction of the number of parts in a product is probably the

best opportunity for reducing manufacturing costs. Less parts implies less purchases, inventory, handling, processing time, development time, equipment, engineering time, assembly difficulty, service inspection, testing, etc. In general, it reduces the level of intensity of all activities related to the product during its entire life. A part that does not need to have relative motion with respect to other parts, does not have to be made of a different material, or that would make the assembly or service of other parts extremely difficult or impossible, is an excellent target for elimination. Some approaches to part-count reduction are based on the use of one-piece structures and selection of manufacturing processes such as injection molding, extrusion, precision castings, and powder metallurgy, among others.

2. **Develop a modular design.** The use of modules in product design simplifies manufacturing activities such as inspection, testing, assembly, purchasing, redesign, maintenance, service, and so on. One reason is that modules add versatility to product update in the redesign process, help run tests before the final assembly is put together, and allow the use of standard components to minimize product variations. However, the connection can be a limiting factor when applying this rule.

3. **Use of standard components.** Standard components are less expensive than custom-made items. The high availability of these components reduces product lead times. Also, their reliability factors are well ascertained. Furthermore, the use of standard components refers to the production pressure to the supplier, relieving in part the manufacture’s concern of meeting production schedules.

4. **Design parts to be multi-functional.** Multi-functional parts reduce the total number of parts in a design, thus, obtaining the benefits given in rule 1. Some examples are a part to act as both an electric conductor and as a structural member, or as a heat dissipating element and as a structural member. Also, there can be elements that besides their principal function have guiding, aligning, or self-fixturing features to facilitate assembly, and/or reflective surfaces to facilitate inspection, etc.

5. **Design parts for multi-use.** In a manufacturing firm, different products can share parts that have been designed for multi-use. These parts can have the same or different functions when used in different products. In order to do this, it is necessary to identify the parts that are suitable for multi-use. For example, all the parts used in the firm (purchased or made) can be sorted into two groups: the first containing all the parts that are used commonly in all products. Then, part families are created by defining categories of similar parts in each group. The goal is to minimize the number of categories, the variations within the categories, and the number of design features within each variation. The result is a set of standard part families from which multi-use parts are created. After organizing all the parts into part families, the manufacturing processes are standardized for each part family. The production of a specific part belonging to a given part family would follow the manufacturing routing that has been setup for its family, skipping the operations that are not required for it. Furthermore, in design changes to existing products and especially in new product designs, the standard multi-use components should be used

6. **Design for ease of fabrication.** Select the optimum combination between the material and fabrication process to minimize the overall manufacturing cost. In general, final operations such as painting, polishing, finish machining, etc. should be avoided. Excessive tolerance, surface-finish requirement, and so on are commonly found problems that result in higher than necessary production cost.

7. **Avoid separate fasteners.** The use of fasteners increases the cost of manufacturing a part due to the handling and feeding operations that have to be performed. Besides the high cost of the equipment required for them, these operations are not 100% successful, so they contribute to reducing the overall manufacturing efficiency. In general, fasteners should be avoided and replaced, for example, by using tabs or snap fits. If fasteners have to be used, then some guides should be followed for selecting them. Minimize the number, size, and variation used; also, utilize standard components whenever possible. Avoid screws that are too long, or too short, separate washers, tapped holes, and round heads and flatheads (not good for vacuum pickup). Self-tapping and chamfered screws are preferred because they improve placement success. Screws with vertical side heads should be selected vacuum pickup.

8. **Minimize assembly directions.** All parts should be assembled from one direction. If possible, the best way to add parts is from above, in a vertical direction, parallel to the gravitational direction (downward). In this way, the effects of gravity help the assembly process, contrary to having to compensate for its effect when other directions are chosen.

9. **Maximize compliance.** Errors can occur during insertion operations due to variations in part dimensions or on the accuracy of the positioning device used. This faulty behavior can cause damage to the part and/or to the equipment. For this reason, it is necessary to include compliance in the part design and in the assembly process. Examples of part built-in compliance features include tapers or chamfers and moderate radius sizes to facilitate insertion, and nonfunctional external elements to help detect hidden features. For the assembly process, selection of a rigid-base part, tactile sensing capabilities, and vision systems are example of compliance. A simple solution is to use high-quality parts with designed-in-compliance, a

rigid-base part, and selective compliance in the assembly tool.

10. **Minimize handling** . Handling consists of positioning, orienting, and fixing a part or component. To facilitate orientation, symmetrical parts should be used when ever possible. If it is not possible, then the asymmetry must be exaggerated to avoid failures. Use external guiding features to help the orientation of a part. The subsequent operations should be designed so that the orientation of the part is maintained. Also, magazines, tube feeders, part strips, and so on, should be used to keep this orientation between operations. Avoid using flexible parts - use slave circuit boards instead. If cables have to be used, then include a dummy connector to plug the cable (robotic assembly) so that it can be located easily. When designing the product, try to minimize the flow of material waste, parts, and so on, in the manufacturing operation; also, take packaging into account, select appropriate and safe packaging for the product.

OR

# Q4 Discuss in detail strategies involve in project execution and product evaluation Project planning and evaluation

## Introduction

This guidance document aims to help you build a viable project plan for a crime prevention project.

Projects need to demonstrate clear goals, objectives and viability - with measurable outcomes and indicators. This document provides you with the preliminary planning framework to help you build such a project.

There are essentially three phases in a project lifecycle:

* Phase 1 - Needs assessment
* Phase 2 - Project planning
* Phase 3 - Implementation

While not a separate phase, evaluation (which includes ongoing, mid-term, and final evaluation) is an essential part of the cycle, occurs throughout the life of the project, and informs all phases.

### Phase 1: Needs assessment

Your group knows there are some crime problems/issues in the community, but you do not know how big the problems are, whom they affect or what should be done about them. This is the very beginning of the project lifecycle, Needs Assessment, and it could be the focus of a project.

### Phase 2: Project planning

Your community has already identified the specific crime or victimization problem/needs in your community and now wants to plan specific crime prevention activities to address those issues. This is the second phase of the project lifecycle, Project planning, and it could be the focus of a project.

### Phase 3: Implementation

Your group knows the problems/issues in your community, you have consulted the community and developed a project plan with specific crime prevention activities to address those problems/issues and you are ready to start the project. This is the third phase of the project lifecycle, Implementation, and it could be the focus of a project.

## Phase 1 - Needs assessment

This part of the project lifecycle focuses on the community and identifies the specific crime-prevention issue, problem or need to be addressed. It aims to also identify the risk factors that help to explain why a problem exists and the protective factors that can contribute to the solution. (for definitions and examples, see the Risk and Protective Factors fact sheet, which can be found in the Applicants Guide.)

The following are questions that you will need to answer in order to build a plan and submit a project proposal for this phase. By answering the questions you will give structure to your project objectives and determine the necessary inputs and activities.

On what specific crime or victimization issue in your community will this project focus?

* How was the issue first identified? (Who noticed it? When? Why?)
* How do you know there is a need to develop a project to respond to this issue?
* What are some of the risk factors and protective factors linked to this issue?
* Which of these risk factors do you think you can change?
* Upon which of these protective factors do you think you can build?
* Who can you contact or where can you go to get information, feedback or suggestions to develop project ideas or activities?

## Phase 2 - Project planning

This part of the project lifecycle builds on what was discovered in the first phase. It focuses on what your crime prevention project is actually going to do and how it will address the problem/needs identified in your community. You will need to answer the following questions before assembling the comprehensive project plan:

* Who will be the focus of the project (e.g. youth, women)?
* What is the overall goal of your crime prevention project ? What do you want to change?
* What are possible solutions to address the identified issue, need or problem in your community?
* Which solutions seem most realistic and suitable?
* What are the objectives of your crime prevention project? What type of activities would achieve your objectives? What are the different steps you will have to take?
* What products, goods or services do you expect to produce or deliver as part of your project (e.g. training sessions, manuals, pamphlets, curriculum, CD/DVD, video, database, website, reports, etc.)?
* What will be the short-term results or outcomes of your activities? These will in turn contribute to achieving your objectives and overall goal(s).

After you identify what your crime prevention project could do, make a plan to put it into action:

* When will you do what? (Draw up a schedule of activities with start and end dates for each.)
* Where will the activities take place?
* Who will participate in each activity? How many? How will you get people to participate?
* What resources will you need (e.g. staff, volunteers, work space, photocopying, advertising, supplies, phone, computer equipment, transportation, etc.)? (These resources will need to be listed in your budget; see the Budget guidance document which can be found in the Applicants Guide.)
* How will you get these resources (e.g. donations of products or services, financial support)?
* How will you get the community (and in particular, members of the priority group) involved in developing the project?
* How will you find partners? Who will be your partners? What will they contribute (e.g., money, materials, volunteers, training, etc.)?
* How will you share information about your project? With whom? How will the community learn about it?
* What is your evaluation plan? How will you monitor the progress of your project? How will you collect information? (See explanation under Evaluation later)
* What are some possible challenges you might face in doing your project? How will you deal with them?

## Phase 3 - Implementation

This is the phase of the project lifecycle where your crime prevention project comes to life.

How will you start the project?

1. Do you have a clear project work plan (see [Phase 2 - Project planning](https://www.publicsafety.gc.ca/cnt/cntrng-crm/crm-prvntn/tls-rsrcs/prjct-plnnng-en.aspx#phase_2)
2. Is everything accounted for in your budget?
3. Do you have things in place to carry out, monitor and evaluate your project?

## How to develop your project plan

Using your answers to the questions in the first part of this guidance document, you are now ready to build your project plan. The steps described demonstrate how you would go about developing your project plan.

1. Identify your project **goal**and who you intend to serve.
2. Identify the **objectives** that will lead to your goal.
3. Establish what the **components** of your project will be - that is, your broad strategies or service areas.
4. Describe the project **inputs**. Who and what will be required to operate your project?
5. For each component, describe your **activities**. Who will do what, and when?
6. Identify the **outputs** of your activities. How many participants do you expect? What (and sometimes, how many) tools, materials, or events will be produced?
7. Identify the **outcomes** linked to these activities. Remember that outcomes represent changes you hope to see result from your activities; they are not just the delivery of the activities themselves. You will want to mention the short-term and intermediate outcomes of your activities, making sure that these in turn link to your overall goal(s).

**More about objectives and outcomes**

When you identify your own objectives and outcomes, be sure they are **"SMART"**:

* **Specific**
* **Measurable**
* **Achievable**
* **Relevant (and realistic)**
* **Trackable**

Objectives and outcomes should be described with action words that indicate the direction of change. Words such as "increase", "improve" or "reduce" are good examples. Saying that a project objective is "to provide recreational opportunities" does not tell us anything about the purpose of those recreational activities or the changes they are expected to bring about. Programs or projects are developed to make change. They are not developed simply for the sake of delivering products or services alone. Saying that these recreational opportunities are going to increase teamwork and leadership skills or reduce vandalism in the after-school hours makes them into **SMART** objectives.

## Evaluation planning

Evaluation planning comes down to two questions:

* What are the desired outcomes of your project?
* How will you measure them?

It is about building benchmarks and accountability into your plan, and using them to evaluate the plan as you go and after the project is finished. It gives your project a more strategic structure, provides evidence for your results and, importantly, contributes to the knowledge base about effective crime prevention.

### Valid and reliable measurement tools

Valid measurement tools provide information that is a good reflection of what they are trying to measure. For example, if you wanted to measure the extent to which people were victims of a certain type of crime, you might want to look at more than just the number of reports to police since we know that many crimes are unreported.

Reliable instruments provide information that is likely to be consistent over time. It will not be affected by small changes in such things as the mood of people who respond to a survey or other circumstances unique to the day on which they complete the survey.

### Quality and consistency

Quality evaluations also use consistent data collection procedures. For example, interview questions should be asked to all participants in the same way, and interviewees should be careful to record the same information at every session.

Where possible, collect data before and after a project. When data is collected only at the end of the project, you can't tell whether there was actually any change that occurred.

Good evaluations require resources - that is, time and money. Some evaluation-related activities may be carried out by project staff (for example, questionnaires can be administered by a project coordinator), research assistants (for example, students may compile and analyse data) or by people with special expertise (for example, an evaluation consultant might draft your questionnaire).

**Be realistic when establishing the outcomes you choose to measure**
Your project goal might be to reduce the number of a certain type of crime in your community. This may require the modification of behaviour in a community that takes place over five to ten years to achieve any reduction. To measure those long-term trends may not be realistic. In this case, you should focus on some short- and medium-term outcomes.

## How to develop your evaluation plan

The steps described demonstrate how you would go about developing your evaluation plan.

1. Determine what information you will need to collect:
	* To see how your project is doing day to day (on-going monitoring)
	* To see if you are on track to achieve your intended results, if you are on time and if you are using resources as planned mid-way through your project (mid-term evaluation), so that you may make adjustments as needed
	* To see if the overall changes you were trying to achieve actually happened by the end of the project (final evaluation) and identify what you learned.
2. Determine your information sources/data collection methods. Sources of information may include project staff, other agencies, participants and their families, members of the public and the media. Information may be collected via a variety of methods, including:
	* Project records such as project activity log/daily journal: A book where you write down what happens each day. It is a useful source to document many of your indicators and will be helpful to you when writing the final project report.
	* Number and type of documents produced during the project (tools, flyers, advertisements, media coverage of your event/project, curriculum, etc)
	* Information collected about your participants related to the project (number attending sessions, information about who they are - age, gender, education, background, culture, etc)
	* Data from official sources (e.g. school records, census data, health data)
	* Questionnaires or surveys
	* Interviews or focus groups
	* Observation of project activities or locations in the community (e.g. track graffiti, condition of playground, activity in public spaces, etc)
3. Determine the frequency of the data collection and who will collect the information.
4. Finally, determine how you will analyse your data and report your findings to funders, your community and your project partners and stakeholders.

Q4. Discuss the challenges faced by the management in launching the new product using suitable examples

**Concept**

The first challenge you face when developing new products is choosing a concept that has potential. A good idea is only a first step and often isn't viable because of cost, production difficulties or regulatory limitations. Your new product development company can only take on projects for which it can establish a reliable path through development, and your team has to learn to recognize such products.

**Financing**

Developing new products is expensive and risky. A new product development company has to make sure it will receive compensation in line with the risk it is assuming. Common models range from a low-risk one where an inventor pays the company a fee for the development, to one where the company arranges financing with its own resources or with outside investors and receives a share of the profits.

**Team**

You probably have a permanent team made up of people with varied expertise to evaluate and choose projects, but you need specialists once you are developing a particular product. Assembling a team that can handle the design, create the production drawings, set up manufacturing and identify the target markets for a specific product is challenging. While the work is interesting, long-term planning is difficult, because the success of the project is not certain.

**Design**

To ensure a successful product development, your team has to design a product that has functionality foreseen by the inventor and attractive to the target market. You must be able to manufacture the product at a reasonable cost, and it has to meet safety regulations. The challenge is for the designers to keep all these aspects in mind while creating a product that will sell.

**Production**

Your new product design company has to establish limits to its involvement. New product development usually does not include manufacturing products for sale but does include help with setting up the production line and preproduction validation of the design. You have to show that your product can be built for the cost you estimated and that it will work as planned. You may also develop customer documentation and instruction manuals.

**Marketing**

While you may help with identifying target markets, establishing possible marketing concepts and test marketing, carrying out the marketing plan is usually the job of your client company or the company that will handle the developed product. Your involvement normally ends with a successful product launch, although you may continue to act in an advisory capacity, especially if your compensation includes a share of the future profits