



International Association of Innovation Professionals
Study Guide to the
Foundation Level Certification Exam
Rev 4

This document supports the IAOIP Foundation Level Certification Exam. This Professional Level examination is intended to determine if you have the broad range of knowledge to be able to understand the science of innovation, to function as a knowledgeable professional in the practice of the science of innovation, and to be able to support innovation efforts of more senior innovation professionals in completing projects with a focus on innovation content.

This exam is designed to test your knowledge about the science of innovation and is not intended to test your ability to actually be innovative. The actual process of innovation can be simple to very complex and is subject to a wide range of circumstances. We believe, as do many professional organizations, that being knowledgeable is the first step to be better at doing a task or performing a function. In this exam we take the approach that you are best able to promote and complete innovation projects if you start with a broad range of knowledge about the field, its tools and methodologies, and main challenges. Other IAOIP certifications focus on specific subject areas and in more depth.

This document is a condensation of key material taken directly from the *Global Innovation Science Handbook* (1st Ed). It reviews each applicable chapter for the main points and condenses the information into a quickly readable format. This guide is intended to help qualified and knowledgeable individuals study for and successfully pass the Foundation Level Certification Exam. The examinees should be able to quickly scan this document and identify areas where they feel they are sufficiently competent without further study, and identify areas that will require additional work to master before taking the exam.

This guide is not intended to be a complete representation of the body of knowledge that supports the science of innovation. The science of innovation is both broad in subjects with many areas further developed into areas of specialization. While this guide will help you, the innovation professional, to pass an exam, it is not a substitute for the continuous learning of the subjects within the science of innovation.

We welcome comments, criticisms, concerns or compliments. If you feel a subject should be included, or one should be removed, let us know by contacting the committee chairperson at dana@iaoip.org.

Good luck to each of you as you develop your career and obtain the professional recognition that comes from a certification in science of innovation.

Basic Study Guide Format

This Study Guide is a condensed version of the body of knowledge that best reflects innovation science. Using the GISH Table of Contents the following chapters are used for the Foundation Level Certification.

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GISH-Chapter -- 3 -- The Culture for Innovation

Terms and Definitions:

Culture: Is all about how people behave, treat each other, and treat customers.

Myers-Briggs (MBTI). This is a survey-style measurement instrument used in determining an individual's social style preference.

Key Points:

1. Culture is like a glue that holds people and things together.
2. Every organization has a culture. It may be written or hung on a wall. Or it may be *just the way we work here* and never written down—just passed on informally in new employee training or by hand-holding by senior people in the organization.
3. A culture can have characteristics including, but not limited to:
 - a. Creating and nurturing collaborative teams
 - b. Providing rewards and recognition that focus on a specific area such as innovation
 - c. Allowing for and supporting a self-managing culture
 - d. Displaying curiosity, courage, and level of risk allowed
4. An organization that realizes it needs to change its culture cannot simply fire everybody one day and instantly replace everyone with the right people the next day, even if it knows exactly what kind of people it needs. Culture change and adjustment takes time and patience. The last thing an organization should do is to make a speech discussing the need for new behaviors and then expect the culture to change overnight.

GISH-Chapter -- 4 -- Leading Innovation: Ten Essential Roles for Harnessing the Creative Talent of Your Enterprise

Terms and Definitions:

- Futurist: Looks toward the future, scouts new opportunities, helps everyone see their potential. Enables people throughout the organization to discover the emerging trends that most impact their work.
- Direction setter: Creates and communicates vision and business strategy in a compelling manner, and ensures innovation priorities are clear.
- Customer advocate: Keeps the voice of the customer alive in the hearts, minds, and actions of innovators and teams.
- Architect: Designs (or authorizes others to design) an end-to end, integrated innovation process, and also promotes an organization that is “*designed for innovation*”, where each function contributes to innovation capability.
- Venture capitalist: Secures funding for innovation, evaluates and selects projects to receive resources, and guides implementation.
- Mentor: Coaches and guides innovation champions and teams.
- Barrier buster: Helps navigate political landmines and removes organizational obstacles.
- Networker: Works across organizational boundaries to engage stakeholders, promotes connections across boundaries, and secures widespread support.
- Culture creator: Ensures that the spirit of innovation is understood, celebrated, and aligned with the strategy of the organization.
- Role model: Provides a living example of innovation through attention and language, as well as through personal choices and actions.
- Integrated innovation system: covers the full end-to-end innovation process, and ensures the practices and tools are aligned and flow easily from one to the other.

Key Points:

1. A frequently quoted statistic about the connection between leadership and organizational creativity comes from Goran Ekvall, Professor Emeritus of Organizational Psychology at the University of Lund in Sweden. Ekvall, found that *67 percent of the variance in the creativity within an organization was directly related to leaders' behaviors.*
2. Often the processes organizations use to pursue innovation can actually erode their capability to innovate. Systems built on stages and reviews can create a dry and bureaucratic process. Such processes can also limit the potential for breakthrough thinking and deflect attention from the customer experience. Other times, by limiting responsibility for innovation to a specific department, these organizations actually underutilize the creative capabilities of employees.

3. Leaders now have powerful online innovation tools to support their disciplined practices. Companies can now scale their innovation activities to match the size of the problems they are tackling or the opportunities they are chasing.
4. Essentially any element of the organization (IT, HR, Manufacturing, etc.) can play its part in making innovation possible and more probable.
5. Leaders who can play all 10 of these roles will accelerate the development of a vibrant innovation culture that provides:
 - a. Infinite sources of value-creating ideas
 - b. Speed and agility of implementation
 - c. Continuous performance improvement
 - d. Employee engagement and satisfaction
 - e. Delighted and loyal customers
 - f. Competitive advantage
6. It is difficult to impossible to have a strong innovation effort without strong leadership.

GISH-Chapter – 5 -- Creating Creativity: Personal Creativity for Personal Productivity

Terms and Definitions:

Creativity: often defined as the mental ability to conceptualize or imagine new, unusual or unique ideas; to see a new connection between seemingly random or unrelated things.

Divergent thinking: coming up with many ideas or solutions to a problem.

Convergent thinking: vetting the various ideas to identify the best workable ideas/solutions.

Key Points:

1. Although creativity and innovation are often used as interchangeable terms, one way to differentiate between the two is to understand creativity as the mental precursor to innovation. Creativity is about imagination and ideas, whereas innovation is about action and process. *Innovation requires creativity, but creativity does not always lead to innovation.*
2. The process of personal creativity can be honed through practice. The process may feel intuitive and organic to some, and it may feel unnatural and uncomfortable for others. But the output from the process is creative regardless of how the process is internalized.
3. Researchers have discovered that the diversity of perspectives engaged in the understanding of creativity must be recognized in order to capture the variance in how creativity is understood, inspired, and executed.
4. The combination of divergent and convergent thinking allows for the unrestrained brainstorming of ideas, and this unstructured brainstorming funnels into the structured vetting process where ideas are analyzed, vetted, and approved for eventual use.
5. When an individual begins with diverse inputs, the variety of perspectives informing their thinking leads to increased generation of different ideas in the divergent phase (the art of creativity), and better vetting in the convergent phase (the craft of creativity). This enhanced thinking occurs regardless of the context for the creativity, especially if the diversity of perspectives accounts for diversity within the specific context.
6. The most common barriers to effective personal creativity are unconscious barriers that live and thrive in our own minds. We are born to be creative, to imagine new things, and create new connections between existing ideas; yet, we erode this innate ability slowly as we unwittingly allow the unconscious but real barriers to take root in our minds.

7. Seven key barriers to personal creativity:
 - a. Perceived definitions of creativity
 - b. Presumed uses for creativity
 - c. Overdependence on knowledge
 - d. Experiences and expertise
 - e. Habits
 - f. Personal and professional relationship networks
 - g. Fear of failure
8. Proactive strategies to be especially effective in increasing the originality and effectiveness of personal creativity:
 - a. Self-trust
 - b. Open up
 - c. Clean and organize
 - d. Make mistakes
 - e. Get angry
 - f. Get enthusiastic
 - g. Listen to hunches
 - h. Subtract instead of adding
 - i. Physical motion
 - j. Question the questions
 - k. Pump up the volume
 - l. Read, read, read

GISH-Chapter – 6 -- The Creative Corporation

Terms and Definitions:

Effectuation: is taking action toward unpredictable future states using currently controlled resources and with imperfect knowledge about current circumstances.

Abstract rules: are those unarticulated, yet essential guidelines, norms, and traditions that people within a social setting tend to follow.

Spontaneous order: is a term that Friedrich Hayek uses to describe what he calls the Open Society. It is created by unleashing human creativity generally in a way not planned by anyone and, importantly, could not have been.

Affordable Loss Principle: stipulates that entrepreneurs risk no more than they are willing to lose.

Lemonade Principle: is based on the old adage that goes, “If life throws you lemons, make lemonade.” In other words, make the best of the unexpected.

Crazy Quilt Principle: is based on the expert entrepreneur’s strategy to continuously seek out people who may become valuable contributors to his or her venture.

Pilot in the Plane Principle: is based on the concept of *control* using effectual logic and is referred to as *non-predictive control*. Expert entrepreneurs believe they can determine their individual futures best by applying effectual logic to the resources they currently control.

Key Points:

1. Creativity plays a role in innovation to the extent that innovation requires insight into how a problem can be solved in a new way.
2. Some factors that seem to be part of any creative moment:
 - a. Creativity is evidenced by novelty.
 - b. Creativity often involves combining well-known particulars in a new way.
 - c. Creativity usually occurs only after hard work or lengthy preparation.
 - d. Creativity often produces unusable or worthless outcomes.
 - e. Creativity can come from anyone.
 - f. Creativity is more likely under duress, stress, or scarcity.
 - g. Creativity can involve luck and unpredictable contingencies.
3. There is ample research into factors that are vital to fostering a creative climate in the organizational setting. Ekvall’s model of the creative climate identifies ten factors that need to be present:
 - a. *Idea time*: People need time to think and to develop new ideas. Creative ideas need time to incubate.

- b. *Risk taking*: People need to be able to make decisions within acceptable risk boundaries. Most organizations don't articulate risk boundaries clearly enough for people to feel comfortable in their decision making.
 - c. *Challenge*: People need to feel challenged within their own areas of expertise.
 - d. *Freedom*: People need to express their talents, make mistakes, learn from mistakes, and grow within their field of expertise. Some managers have a tendency toward "too-soon" interventions and tend to thwart the essential learning and unlearning that only comes from experience.
 - e. *Idea support*: People need to feel that their ideas are aligned with the interests of the organization. Organizations should establish clear objectives and clear contact points for individuals to discuss their ideas.
 - f. *Conflicts*: People need to be able to defend their creative ideas within the organization's *marketplace of ideas*. *Ideas must live or die based on their relative merit within the marketplace*. People should be empowered with business case development and presentation skills that enable them to adequately articulate their creative insights within the context of the idea marketplace.
 - g. *Debates*: People should be engaged in debates about the merits of their creative ideas. Debating serves two primary purposes:
 - i. It forces the creator to think hard about possible objections or problems with their creative ideas.
 - ii. It introduces incremental improvements to ideas from those who are party to the debates.
 - h. *Playfulness, humor*: People often develop better ideas and do so more quickly when they are allowed to play with concepts in a non-threatening way.
 - i. *Trust, openness*: People function at their best within a context of trust and openness.
 - j. *Dynamism, liveliness*: Organizations that foster open spaces, free-flowing conversations, impromptu chat sessions, and favor a lively workplace buzz are the norm among today's most creative companies.
4. Friedrich Hayek provides an insightful and carefully analyzed review of abstract rules. His most trenchant analysis of the phenomenon of *rule-governed social behavior* identifies rule-following as a phenomenon that lies between what he categorizes as *instinct* and *reason*.
5. The creative corporation will only result from careful cultivation of the conditions under which creativity can naturally emerge. A strong impediment to creativity and innovation is the presence of *organizational silos* where groups do not communicate with each other.
6. Key Chapter conclusions:
- a. Train employees in effectual logic.
 - b. Provide clear decision or resource rights.

- c. Reward unexpected results and positive returns.
- d. Accept failure as a step in the creative process.
- e. Take charge of the abstract rules.

GISH-Chapter – 10 -- Innovation Benchmarking

Terms and Definitions:

Benchmarking: is a form of comparison where we sometimes include all major players to define a best practice, usually on an international scale as markets have become truly global.

Key Points:

1. Innovation benchmarking is not just another benchmarking exercise, but primarily another approach to benchmarking. In innovation benchmarking, we want to identify the factors behind the benchmark's success.
2. These are factors that are not always measurable, so we need to go by some other variables first. Afterwards we want to try to adapt and apply these factors to our own company.
3. There is overlapping research between benchmarking and related areas such as knowledge management (KM), asserting the notion that the knowledge-based perspective is the main source of competitive advantage. Organizational learning (OL), especially in knowledge-intensive industries (KII), not only leads to organizational innovation, but is the only sustainable competitive advantage in the long run.
4. Most companies start by benchmarking inside their own company (internal benchmarking) and then move on to their competitors (external benchmarking).
5. Three types of benchmarking:
 - a. Process benchmarking: which involves identification of best practices
 - b. Strategic benchmarking: which involves identifying emerging trends
 - c. Comparative benchmarking: which is more result oriented
6. There is a difference between *innovation benchmarking* and *benchmarking innovations*. Benchmarking innovation can be seen as a form of contradiction. If we are doing something completely new—applying an invention in a new way—it means that others are not doing the same thing. Thus there is nothing to benchmark. Innovation benchmarking, on the other hand, can be understood as how to become or stay “innovative”.
7. The challenge in benchmarking is to find the right metrics. These metrics should fulfill the following criteria:
 - a. They must be understood by the user
 - b. They must be (easily) available
 - c. They must be the best measures we can find for a given variable we want to measure
 - d. They must be comparable and preferably quantifiable
8. One-third of all Fortune 1000 companies have a set of formal innovation metrics in place. The most prevalent metrics include:

- a. Annual R&D budget as a percentage of annual sales
 - b. Number of patents filed in the past year
 - c. Total R&D headcount or budget as a percentage of sales
 - d. Number of active projects
 - e. Number of ideas submitted by employees
 - f. Percentage of sales from products introduced in the past x year(s)
9. Both input metrics and output metrics are essential for ensuring measures that drive resource allocation and capability building as well as return on investment assessment. The three categories contain the following metrics portfolio:
- a. Return on investment metrics (ROI)
 - i. ROI metrics address two measures, resource investments and financial returns. ROI metrics give innovation management fiscal discipline and help justify and recognize the value of strategic initiatives, programs, and the overall investment in innovation.
 - b. Organizational capability metrics
 - i. Organizational capability metrics focus on the infrastructure and process of innovation. Capability measures provide focus for initiatives geared toward building repeatable and sustainable approaches to invention and reinvention.
 - c. Leadership metrics
 - i. Leadership metrics address the behaviors that senior managers and leaders must exhibit to support a culture of innovation.
10. There are three steps to successful benchmarking:
- a. Selecting key performance drivers or KPIs
 - b. Selecting companies to benchmark
 - c. Allocating resources to the best value-added areas identified

GISH-Chapter -- 11 -- Process, Practice, and Innovation

Terms and Definitions:

Process: To take one or more inputs, perform specified operations or routines on those inputs, and produce outputs.

Practices: To look at all the inputs that we have available for selection and all the available operations or routines that we can perform on those inputs, then to select those inputs and operations that will give us our desired results.

Rote Practice: Those activities where it looks like people are engaged in finding the right routines and inputs to obtain the desired result, but are just going through the motions.

Bureaucratic Process: Occurs where the inputs are defined and a specific routine is performed, but the desired output is obtained only by random chance.

Key Points:

1. Processes are intended to give us lean results in our organizations, while practices are intended to get us innovation.
2. Process versus Practice Characteristics:

<i>A Process tends to:</i>	<i>A Practice tends to :</i>
Seek lean outputs	Seek innovative outputs
Results tend toward the predictable	Results tend to be more unpredictable
Input, Routine Driven	Goal Seeking
Can often be more precise	Is more often fuzzy in nature
Codeable/Calculable	Arguable/Negotiable
Drives more toward efficiency	Looks to find effectiveness
Goal is to optimize	Goal is to satisfy
Can be implemented in a frictionless manner	Often displays friction in the conduct
People can be trained	People generally require more education content
Often requires minimal data	Often requires maximum Information

3. Once the desired method is analyzed, formalized, defined, and implemented in a repeatable way, what was once a practice becomes a process.

GISH-Chapter – 13 -- Creativity Tools: Develop Creative Solutions to Problems and Opportunities

Terms and Definitions:

Tools are defined in the body of this section.

Key Points:

1. The five steps for improving creativity in any organization are:
 - a. Preparation
 - b. Incubation
 - c. Insight
 - d. Evaluation
 - e. Elaboration
2. Step 1 (*Preparation*): Finding Opportunities and Problems to Solve
 - a. Tool 1: The Quickscore Creativity Test
 - i. A 3-minute test that helps assess and develop business creativity skills.
 - b. Tool 2: Kano Analysis
 - i. The Kano Analysis model evolved based on the premise that a product or service can have three types of attributes or properties:
 1. Threshold attributes: which customers expect to be present in a product.
 2. Performance attributes: which are not absolutely necessary, but which are known to increase the customer's enjoyment of the product.
 3. Excitement attributes: which customers don't even know they want, but are delighted when they find them.
 - c. Tool 3: Nominal Group Technique
 - i. A powerful and time-tested group ideation and problem-solving technique involving the so-called triple crown of problem identification, creative solution generation, and decision making. It can easily and consistently be used in groups of many types and sizes—groups or teams who want to make their decision quickly by voting— but who want at the same time everyone's input and opinions taken into account.
 - d. Tool 4: Synectics
 - i. Synectics combines a structured approach to creativity with the freewheeling problem-solving approach used in techniques like brainstorming. It's a useful technique when simpler creativity techniques like SCAMPER, brainstorming, and random input have failed to generate useful ideas. It uses many different triggers and

- stimuli to jolt people out of established mind-sets and into more creative ways of thinking.
- e. Tool 5: Brainstorming or Operational Creativity
 - i. Brainstorming combines a relaxed, informal approach to problem solving with lateral thinking. In most cases, brainstorming provides a free and open environment that encourages everyone to participate. While brainstorming can be effective, it's important to approach it with an open mind and a spirit of non-judgment. Otherwise, people clam up, the number and quality of ideas plummets, and morale can suffer.
 - ii. Basic Rules for Tool Use
 - 1. Rule 1: Prepare the group
 - 2. Rule 2: Present the opportunity
 - 3. Rule 3: Guide the discussion
 - f. Tool: Six Thinking Hats
 - i. This technique is used to look at decisions from a number of important perspectives. This forces you to move outside your habitual thinking style and helps you to get a more rounded view of a situation.
3. Step 2 (*Incubation*): Gathering and Reflecting on Information
- a. Tool 7: Attribute Listing, Morphological Analysis, and Matrix Analysis
 - i. These techniques are good for finding new combinations of products or services. We use attribute listing and morphological analysis to generate new products and services. Matrix analysis focuses on businesses. It is used to generate new approaches using attributes such as market sectors, customer needs, products, promotional methods, etc.
 - b. Tool 8: Storyboarding
 - i. This tool stretches the mind to forge new connections, think differently, and consider new perspectives. It combines brainstorming and lateral thinking with a studio-type system for developing film plots. The facilitator brings along a flipchart and corkboard, thumbtacks, and a good supply of 5×8in blank index cards. The facilitator asks a series of idea-generating questions. If necessary, the facilitator can use several question formats to break established thought patterns to:
 - 1. Challenge assumptions
 - 2. Reword the problem
 - 3. Think in reverse
 - 4. Express yourself through different media
 - c. Tool 9: Absence Thinking
 - i. This involves training the mind to think creatively about what it is thinking and not thinking. When you are thinking about a specific

something, you often notice what is not there, you watch what people are not doing, and you make lists of things that you normally forget. Both individuals and groups can use this technique when stuck and unable to shift thinking to other modes.

4. Step 3 (*Insight*): Opportunity Exploration
 - a. Tool 10: Breakdown (Drilldown) Tree Diagram
 - i. A technique for breaking complex opportunities and problems down into progressively smaller parts. Start by writing the opportunity statement or problem under investigation down the left-hand side of a large sheet of paper. Next, write down the points that make up the next level of detail a little to the right of this. These may be factors contributing to the issue or opportunity, information relating to it, or questions raised by it. For each of these points, repeat the process. This process of breaking the issue under investigation into its component part is called “drilling down”.
 - b. Tool 11: Lotus Blossom
 - i. This technique is based on the use of analytical capacities and helps to generate a great number of ideas that will possibly provide the best solution to the problem to be addressed by the group. The six major steps:
 1. Draw up a lotus blossom diagram made up of a square in the center of the diagram (the pistil) and eight circles (petals) surrounding the square.
 2. Write the central idea or problem in the center of the diagram.
 3. Look for ideas or solutions for the central theme. Then write them in the flower petals.
 4. These ideas are then written in the circles around the main square. Each idea written in one of the circles becomes the central theme of a new lotus blossom central square.
 5. Follow step 3 with all central ideas
 6. Continue the process until all ideas have been exhausted.
 - c. Tool 12: TRIZ Analysis (see also the TRIZ chapter for more detail)
 - i. TRIZ is a problem-solving methodology based on logic and data to solve problems creatively. As such, TRIZ brings repeatability, predictability, and reliability to the problem solving process with its structured and algorithmic approach.
 - ii. Three primary findings of the last 65 years of research are as follows:
 1. Problems and solutions are repeated across industries and sciences. By classifying the contradictions in each problem, you can predict good creative solutions to that problem.

2. Patterns of technical evolution tend to be repeated across industries and sciences.
 3. Creative innovations often use scientific effects outside the field where they were developed.
 - d. Tool 13: SCAMPER
 - i. This tool helps you generate ideas for new products and services by encouraging you to think about how you could improve existing ones.
 - ii. SCAMPER is a mnemonic that stands for
 1. Substitute
 2. Combine
 3. Adapt
 4. Modify
 5. Put to another use
 6. Eliminate
 7. Reverse
 - iii. You use the tool by asking questions about existing products, using each of the seven prompts above. These questions help you come up with creative ideas for developing new products and for improving current ones.
 5. Step 4 (*Elaboration*): Implementation
 - a. Tool 14: Mind Mapping
 - i. Mind maps are a creative approach to note-taking. By using mind maps, you can quickly identify and understand the structure of a subject. You can see the way that pieces of information fit together in a format that your mind finds easy to recall and quick to review. (See more in the Mind Mapping chapter below.)
 - b. Tool 15: Affinity Diagram
 - i. A technique for organizing a variety of subjective data into categories based on the intuitive relationships among individual pieces of information. It is often used to find commonalities among concerns and ideas. It lets new patterns and relationships between ideas be discovered.
 - c. Tool 16: Force Field Analysis Diagram
 - i. A visual aid for pinpointing and analyzing elements that resist change (restraining forces) or push for change (driving forces). This technique helps drive improvement by developing plans to overcome the restrainers and make maximum use of the drivers.
 - ii. A problem may be thought of as resulting from a number of pressures and influences acting upon the individual, group or organization in question. These numerous influences, called *forces*, may be both external to and internal to the person or situation in question. There are two kinds of forces:

1. Driving or facilitating forces that promote the occurrence of the particular activity of concern
 2. Restraining or inhibiting forces that inhibit or oppose the occurrence of the same activity
- iii. Once the problem has been recognized, and commitment is made by the appropriate stakeholders to change the problem situation, there are four basic steps used in the force field analysis activity to analyze the problem:
1. Define the problem and propose an ideal solution.
 2. Identify and evaluate the forces acting on the problem situation.
 3. Develop and implement a strategy for changing these forces.
 4. Reexamine the situation to determine the effectiveness of the change and make further adjustments if necessary.

GISH-Chapter – 15 -- Unlocking Your Creativity Using Mind Mapping

Terms and Definitions:

Mind Mapping: a method that starts with a main idea or goal in the middle and diagrams ideas out from this one main subject.

Key Points:

1. There are many different types of mind maps, but they all follow some general guidelines. Most people use appropriate software for ease of use, data storage and recall.
 - a. Start in the center: Having the main idea to focus on stated in the center is important because it allows people to branch off in any direction, allowing for sufficient room for multiple ideas on a single map.
 - b. Use colors with meaning: Most mind maps will have at least three different colors, each with a specific meaning. The meaning can represent anything from level of importance to type of task.
 - c. Shapes and images: Adding different shapes or images around an idea is a great way to make further categories on mind maps. It can be especially effective to have an image placed along with the center idea to invoke both the visual centers of the brain and those that are used for reading.
 - d. Easy to follow lines: There should be clear lines from one area to each sub-area to ensure it is simple to follow the train of thought, as well as allowing for more ideas to be added. Some suggest having thicker lines at first and slowly making them thinner as the map branches out. This is a simple visual representation of the natural flow of ideas from the center concept out toward those further out along the map.
 - e. Radial organization: Ideas should be organized radially off of each other to keep them organized. In addition to allowing for the best use of space on the mind map, it also forms an accurate picture of how the brain processes such thoughts.
 - f. Custom styles: Each individual can come up with their own style for mind mapping that works best for their specific purposes which makes this technique extremely flexible.
2. Mind mapping organizes information in the same way in which the human mind works. People don't think in lists or sentences. Mind mapping allows the brain to work in a way that allows people to quickly come up with new creative ideas, and still document them in a logical fashion to ensure they are useful to the end goal of the project.
3. Creating a mind map for the first time:
 - a. Write down the main overarching idea that will define the project in the center area where it will stand out against the rest of the page.

- b. Create first level ideas that can be directly tied to the main word in the center in a clear and obvious way.
 - c. Create second level ideas off of the first level ideas that will be specific instances of whatever the first level idea was.
- 4. There is no limit to the depth a mind map can go; there can be any number of levels.
- 5. For projects that require a lot of new and innovative ideas, it is best to combine mind mapping techniques with some other proven triggers for creative thought.
- 6. Benefits of mind mapping throughout a project:
 - a. Once the mind map is filled out with dozens or even hundreds of different ideas about a particular subject, it is time to begin putting those ideas to use. The specifics of how this will work will vary greatly from project to project. The map can help with:
 - i. Assigning responsibility
 - ii. Scheduling
 - iii. Project completion and error checking

GISH-Chapter – 16 -- Social Networks

Terms and Definitions:

Social media: refers to using social technologies as media in order to influence large audiences.

Social business: is the practice of using social technologies to transform business.

Emergent collaboration: is a social network activity where a shared perspective emerges from a group through spontaneous (unplanned) interactions.

Key Points:

1. Collaboration on social networks can be spontaneously discovered by colleagues who may learn from and reuse advice and ideas without even contacting the participants of that collaboration. The act of social collaboration has become the engine of differentiation in the knowledge economy.
2. People are accustomed to asynchronous communications like email, but social networks take them to a whole new level. Since they are almost instant, social network communications can grow quickly and enable each person to participate when it is most convenient and the cost is lowest.
3. Most leaders have limited experience with emergent collaboration. They trust the organization and processes that have made them successful in the past. To many managers/leaders, the newer forms of social network interactions feel chaotic.
4. Social technologies and social networks are examples of the knowledge economy's means of production.
5. Industrial versus Knowledge Economy success factors:

Industrial Economy Success Factors	Knowledge Economy Success Factors
Deliver vast quantity and low prices to relatively few broad demographics	Deliver unprecedented choice to many narrow customer segments; low prices table-stakes
Tightly integrated command and control organization	Loosely coupled collaborative-networked organization
Failed new offering launches are the rule because it's a low-velocity, internally focused research-produce-sell process	New offering launch processes are high velocity and feature customer input and collaboration with external specialists

Off-line consumers are isolated and passive, buying decisions usually made using company-influenced information, consumers can't easily find consumer product information	Online customers validate each other's interests and influence purchases, creating micro-markets with unique demands; this will be the rule in emerging markets, where online is the default for new middle classes
Focus on product or service features	Focus on customer experience

6. Success factors of planning and mounting your own initiative while significantly mitigating risks.

Strategy	Execution	Expansion
Focus on people <ul style="list-style-type: none"> • Throw product-thinking away • External & internal diligence • Minimize risk with strategy 	Use an agile approach <ul style="list-style-type: none"> • Grow by pilots • Learn and build teams • Scale gradually 	<i>Lead with sociality</i> <ul style="list-style-type: none"> • <i>Build on trust</i> • <i>Focus on community</i> • <i>Practicing social</i>

7. Chapter conclusions: Social networks transform innovation at two levels:
- They make communication free, so collaboration is an order of magnitude less costly and much faster. Social technologies change the guts of innovation because collaboration is their core activity.
 - In the knowledge economy, innovation carries most of an organization's value. Most organizations are accustomed to the industrial economy's long product life cycles, which required intermittent innovation. Social networks allow things to happen faster.

GISH-Chapter – 17 -- Innovation Combination Methods

Terms and Definitions:

Innovation: an advancement that transcends a limiting situation within the system under analysis. Another way to describe these limiting situations is to refer to them as contradictory requirements within a system.

Innovative problem solving: a subset of problem solving in that a solution must resolve a limitation in the system under analysis in order to be an innovative solution.

Problem solving: generating a workable solution.

Administrative process: specifies what tasks need to be done and the order in which they should be accomplished, but does not give any, or at least very little, insight as to how those tasks should be realized.

Technical process: specifies not only what needs to be done, and in what order, but also provides specific details of *how* to execute the various tasks.

Functional model: a structured representation of the functions (activities, actions, processes, operations) within the modeled system or subject area.

Systems engineering, system analysis: a technique to ensure that full system effects, impacts, benefits, and responses are understood when looking at changes or problems within a system.

Contradiction analysis: the process of identifying and modeling contradictory requirements within a system, which, if unresolved, will limit the performance of the system in some manner.

Technically focused brainstorming: the use of standard brainstorming methods bounded by certain acceptable solution concept conditions and guided by the attainment of an *ideal solution*.

Ideal Final Result: states that in order to improve a system or process, the output of that system must improve (i.e., volume, quantity, quality, etc.), the cost of the system must be reduced, or both.

Key Points:

1. There are numerous paths through which problem solving and innovation can be pursued. Depending on the needs and goals of any particular analysis, different methodologies can be used to take advantage of differing system and process attributes and approach solution generation from different angles.
2. Many organizations use the terms *problem solving* and *innovation* interchangeably, as if the solving of a problem automatically results in an innovation. This is not the case, as innovation requires a solution type not created by most problem-solving efforts.

3. Most organizations prefer problem-solving methodologies for use within their operations. The methods that have been previously accepted by an organization have the obvious benefit of already being familiar to, and in use within, the organization. Additionally, the wide variety of problem-solving methods in use today can provide unique capabilities and insights to the problem solver.
4. Utilizing a purposefully sequenced combination of multiple analysis and problem-solving methods is typically the best way to create effective and actionable results in today's complex world of business and technology.
5. Two distinct categories of methods: administrative processes and technical processes. Problem-solving methodologies, such as those categorized as administrative, will often benefit from having technical methodologies inserted into their processes. The combining of administrative and technical methodologies can result in not only a comprehensive and well-ordered set of *what to do* instructions, but also simultaneously provide the problem solver with detailed *how to* directions.
6. Popular problem-solving methodologies:
 - a. Plan-Do-Study-Act:
 - i. A generally administrative process used to understand how changes made to a system, how to affect that system and the guided response to the measurement of the change effect.
 - b. Six Sigma
 - i. A method designed for the reduction of variation in processes. The general steps used within the DMAIC (define, measure, analyze, improve, and control) and DMADV (define, measure, analyze, develop, and verify) methodologies are mostly administrative in nature. Combining Six Sigma with other tool sets pushes the process strongly toward the technical end of the scale.
 - c. Root Cause Analysis (RCA)
 - i. A graphical and textual technique used to understand complex systems and the dependent and independent fundamental contributors, or root causes, of the issue or problem under analysis. This is generally a technical process.
 - d. Functional Analysis
 - i. A graphical and primarily qualitative methodology used to focus the problem solver on the functional relationships (good or bad) between system components.
 - ii. Functional modeling provides specific direction as to how to execute a method.
 - e. Systems Engineering
 - i. These methods are more technical than administrative processes as they are fairly specific as to how to create and utilize the various systems engineering models.

- ii. However, these methods guide the problem solver's understanding that full system analysis is necessary in creating truly effective solutions. Therefore, these methods may be more administrative in nature than technical.
 - f. Contradiction Analysis
 - i. If a limiting system contradiction is resolved with the application of a solution, then that solution can be considered an innovative solution.
 - ii. The method is a technical process as the requirements for creating and solving contradiction models is very specific.
 - g. Technically Focused Brainstorming
 - i. This methodology guides the generation of solution concepts by ensuring that those solution concepts support the resolution of contradictory requirements of the system under analysis and renders that system to be of higher value than it was before the solution was applied. It is mainly an administrative process as it instructs the problem solver as to what the goals of the process are but generally leaves it up to the problem solver to devise how to accomplish the directives.
7. Methodology Merger:
- a. Each methodology brings with it certain strengths and weaknesses which serve to fulfill specific steps and activities represented on the problem-solving pathway. When combined together and properly utilized, these methodologies create a very effective and useful outcome.

Combination methods summary chart

		Transitional Methodologies for:				
LI #	Problem Solving Focus	Standardize	Generalize	Solve	Specify	Confirm
1	Innovation with Change Control	PDSA	Contradiction Analysis	Contradiction Analysis	Technically Focused Brainstorming™	PDSA
2	Innovation in Variation Reduction	Six Sigma	Contradiction Analysis	Contradiction Analysis	Technically Focused Brainstorming™	Six Sigma
3	Innovation in Waste Reduction	Lean	Contradiction Analysis	Contradiction Analysis	Technically Focused Brainstorming™	-
4	System Innovation	RCA	Contradiction Analysis	Contradiction Analysis	Technically Focused Brainstorming™	-
5	System Innovation	Functional Analysis	Contradiction Analysis	Contradiction Analysis	Technically Focused Brainstorming™	-
6	Variation Reduction	Six Sigma	-	-	Six Sigma	Six Sigma
7	Waste Reduction	Lean	-	Lean	Brainstorming	
8	Change Management	PDSA			Brainstorming	PDSA

GISH-Chapter -- 18 -- Market Research in the Process of New Product Development

Terms and Definitions:

Market research: is the systematic and objective identification, collection, analysis, dissemination, and use of information to improve decision-making related to identifying and solving problems or opportunities.

Innovation management: is the collection of ideas for new or improved products and services and their development, implementation, and exploitation in the market.

Primary data: is data collected from the field or expected customer.

Secondary data: is data collected through in-house (desk research).

Experiments: in this context represents a mixture of surveys and observations in an artificial setting and can be summarized as test procedures.

Observation: in this context means the recording of behavioral patterns of people, objects, and events in order to obtain information.

Qualitative research (survey): represents an unstructured, exploratory research methodology that makes use of psychological methods and relies on small samples, which are mostly not representative.

Quantitative research (survey): can be seen as a structured research methodology based on large samples. The main objective in quantitative research is to quantify the data and generalize the results from the sample, using statistical analysis methods.

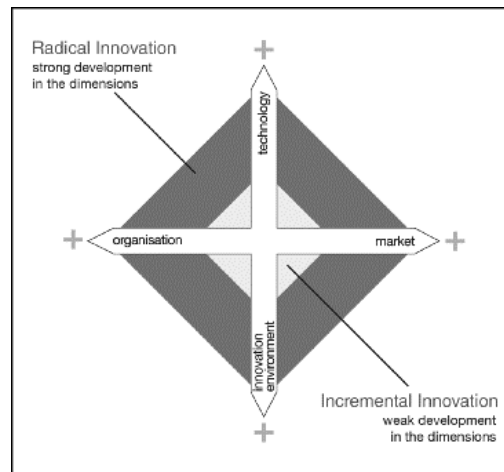
Probability sampling techniques: use samples randomly drawn from the whole population.

Non-probability sampling techniques: use samples drawn according to specific and considered characteristics and are therefore based on the researcher's subjective judgment.

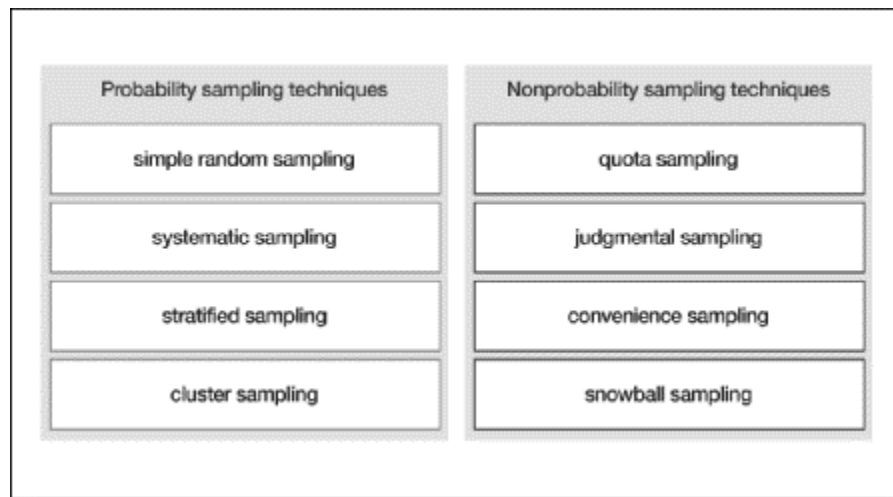
Key Points:

1. Customer focus is central to product development as the final decision about whether to purchase the product rests with the customer. Market research plays an important role in innovation management as it enables the company to look into the customers' minds, to detect and satisfy their latent needs, and to bring successful products onto the market.
2. The identification and satisfaction of various customer needs represent a major goal of marketing.
3. Four dimensions of innovation:

- a. Technology: technical uncertainty of innovation projects
 - b. Market: targeting of innovations on new or not previously satisfied customer needs
 - c. Organization: the extent of organizational change
 - d. Innovation environment: impact of innovations on the innovation environment
4. Radical innovations (high degree of novelty) are marked by a high level of activity in all four dimensions, while incremental innovations (low degree of novelty), are only weakly to moderately developed in the four dimensions.



5. There are a variety of concepts for the structuring of innovation processes that strive to make the entire innovation process manageable and controllable. Generally, these process models include a *front end stage* (trends scoping, idea generation, idea evaluation, concept generation, and concept evaluation), a *central stage* (development, evaluation, and testing) and a *launch phase*, which is the final or back end of the process.
6. In order to be effective, marketing research should follow a systematic, predictable path and a planned process. Market research:
- a. Begins with identification or definition of the research problem followed by formulation of the research design and determination of the data collection methods to be used.
 - b. Sampling and questionnaire development represent the next phases of a market research process.
 - c. The data are collected, prepared, analyzed, and interpreted.
 - d. Finally, the results are presented to the decision makers.
7. Market research distinguishes two possibilities with regard to data collection: the collection of primary data (field research) and the collection of secondary data (desk research). Sampling techniques are shown below:



8. The willingness of respondents to participate is essential for quality and relevance of the results of any study. Significantly higher response rates can be achieved by a high involvement of respondents, clever design of incentive structure, and a sophisticated questionnaire.
9. In *qualitative research*, gathered data is transcribed, and single cases are analyzed and compared in order to find similarities and differences to enable the researcher to gain deeper insights into the subject of interest. In *quantitative research*, the data preparation step contains the editing, coding, and transcribing of collected data. Here the completeness, readability, comprehensibility, comparability, consistency, and reasonableness of responses are checked and the responses are converted into numbers (coded) for standardized entry into an analysis (most often statistical) application.
10. The systematization of market research yields five tool clusters:
 - a. *Aim of research*: Market research has two major aspects, which often go hand in hand:
 - i. research to identify problems
 - ii. research to solve problems
 - b. *Phase of the innovation process*(that is, are you at the beginning of creating something, in the stage of development or in delivery)
 - c. *Web application*: online research is increasingly popular. Online research has time and cost advantages compared with off-line research. It is important to differentiate between instruments that can only be carried out in traditional ways, tools where online and off-line versions exist, and new tools that can only be used online.
 - d. *Nature of research*: qualitative or quantitative
 - e. *Degree of innovativeness*: level of novelty of a product or service.
11. Useful tools for market research:

- a. Analysis of Customer Complaints
- b. Brainstorming
- c. Contextual Inquiry, Empathic Design
- d. Cross-Industry Innovation
- e. Crowdsourcing
- f. In-depth Interview
- g. Lead User Technique
- h. Listening-In Technique
- i. Netnography
- j. Outcome-Driven Innovation
- k. Quality Function Deployment
- l. Sequence-Oriented Problem Identification, Sequential Incident Technique
- m. Tracking, Panel
- n. Analytic Hierarchy Process
- o. Category Appraisal
- p. Concept Test, Virtual Concept Test
- q. Conjoint Analysis
- r. Store and Market Test
- s. Free Elicitation
- t. Information Acceleration
- u. Information Pump
- v. Kelly Repertory Grid
- w. Laddering
- x. Perceptual Mapping
- y. Product Test, Product Clinic
- z. Virtual Stock Market, Securities Trading of Concepts
- aa. Zaltman Metaphor Elicitation Technique
- bb. Customer Idealized Design
- cc. Co-development
- dd. Expert Delphi Discussion
- ee. Focus Group
- ff. Future Workshop
- gg. Toolkit

GISH-Chapter – 19 -- Lead User Analysis

Terms and Definitions:

Lead Users: members of a user population who display two key characteristics: (1) they have strong needs that are not met by existing market offers, and (2) they are at the leading edge of important trends in a given marketplace.

Trends: those dimensions on which lead users are far ahead of the mass market.

Pyramiding: a search technique in which the searcher simply asks an individual (the starting point) to identify one or more others who he or she thinks has higher levels of expertise of the sought-after attribute—or better information regarding who such people might be.

Key Points:

1. A number of empirical studies have demonstrated that user innovation is both a frequent and important phenomenon. A second strand of studies investigated the economic value of user innovations. The stable finding in numerous industries such as petroleum processing, scientific instruments, windsurfing, skateboarding, and many others is that many of the most important innovations were originally developed by users.
2. Producer innovations are being advertised and marketed to as many potential users as possible—after all, the producer wants to sell them. User innovations by contrast are being developed for the users' own use, thus often not very many other people get in contact with them. Users simply have a lower incentive of popularizing their achievements among the mass of users.
3. The lead user construct is a characteristic that is distributed over a continuum, such as intelligence, creativity, or technical skill. There is no natural borderline that objectively distinguishes lead users from non-lead users. Thus an individual can be a lead user with regard to safety equipment, for example, and have an extremely low level of lead user behaviors with regard to most other trends.
4. The lead user method is a managerial tool that allows companies to benefit from the creative potential of lead users. It is situated in the early stages of new product development.
5. Ask these questions to determine if a lead user project makes sense:
 - a. Is there a need for radically new product ideas and concepts in the company?
 - b. Is it worth investing in this fuzzy front end—or does an improved input of ideas and concepts make no difference in your company or industry?
 - c. Are user innovations possible? Is there room for innovation at all?

- d. Is the lead user method more effective and efficient than alternative methods, such as crowdsourcing or toolkits for user innovation and design?
- e. Does the company culture embrace necessary values such as openness to external ideas and the willingness to discard familiar and long-held beliefs and traditions? Or is there a strong not-invented-here attitude?
- f. Are there prohibitive problems with secrecy or social desirability?
- 6. The lead user method can be described in four phases.
 - a. Phase 1: Getting Started
 - i. Checklist: How to Organize the Starting Phase of a Lead User Project
 - 1. Define search field clearly--complexity and vagueness will reduce efficiency considerably.
 - 2. Collect and prepare existing company knowledge--what do you already know about the problem? Which ideas, complaints, etc. are known? There is no use reinventing the wheel.
 - 3. Did you make a deliberate decision for either a focused problem definition (with the advantage of much more efficiency) or a wide problem definition (with the advantage of not excluding potentially interesting scope from the outset)?
 - 4. Did you define constraints of the project (budget, time, production, corporate strategy, supply chain, etc.)?
 - 5. Did you include three to five company employees from all relevant functional areas (such as marketing, R&D, and production)?
 - 6. Did you ensure top management support (in case of some not-invented-here conflicts)?
 - b. Phase 2: Identification of Major Needs and Trends
 - i. Trends are those dimensions on which lead users are far ahead of the mass market. The function of the trends in the lead user method is to narrow the problem and to allow a systematic search for lead users.
 - ii. In most lead user projects, it pays to devote time and effort in a separate outside search for trends.
 - iii. Checklist: Identifying Needs and Trends Within a Lead User Project
 - 1. Narrowing the selection of trends will inevitably reduce the solution space. Make sure that you do not pick the wrong trends or save effort in a shortsighted way.
 - 2. Even if you think that you already know what the most important trends are, consider at least some additional external information.

3. In most cases, market trends (aggregated customer needs) are most important. But do not forget technology trends.
4. Make sure that you also analyze related or analogous markets. Only looking at the target market can be quite myopic.
5. Ensure that other interesting information gathered during the interviews is stored.
6. Usually, you will find many important trends. Ending with over 30 trends is not a rare figure. Select the most important three to five trends—not more.
- c. Phase 3: Identification of Lead Users
 - i. A broad search for individuals who are far ahead with regard to the trends identified and have high personal benefits from innovations.
 - ii. In earlier applications of the lead user method, usually a mass screening approach was employed.
 - iii. Use the pyramiding method (defined above) to expand the lead user pool. Unlike screening, it is not restricted to a pre-specified population.
 - iv. Systematic searches within online communities through social networks.
- d. Phase 4: The Lead User Workshop
 - i. Once the lead users are identified, they are invited to a 2- or 3-day workshop in which company members from different functional areas also participate.
 - ii. Checklist: Organizing a Lead User Workshop
 1. Choose a nice, remote, easily accessible hotel. Do not use your firm's facilities.
 2. Plan a duration of 2 to 3 days.
 3. Ensure that IP is owned by the company.
 4. Consider participation motivations and fairness issues, and address them. Work on the sensation of a common mission. Establish norms of openness, sharing of ideas, creativity, and constructive critique.
 5. Alternate small group work with plenary presentations and discussions. Establish structure and time management.
 6. Progress from brainstorming of many ideas to elaborating the few most promising new product concepts.
 7. When the project is over, it is not yet over. Build a relationship with lead users. They might be beneficial in many ways in the future.
7. There are no objective criteria or clear decision rules as to how can one recognize a lead user. It is a matter of subjective assessment.

8. A full scale lead user project as described earlier takes considerable time. Often, four to eight months is common, sometimes even longer.
9. Variants of, and Alternatives to, the Lead User Method
 - a. Crowdsourcing: where innovation-related tasks like new product ideation is outsourced to crowds outside the company. Firms issue open calls online for new ideas and solutions, and they offer rewards to those who submit the best ones.
 - b. A toolkit for user innovation and design is a coordinated set of design tools that allows individual users to self-design their own product according to their individual preferences and give visual and informational feedback on (virtual) interim solutions. If the customers like what they design, they can order their products. The toolkit provider in turn will produce them according to their individual design specifications.

GISH-Chapter -- 20 -- Managing Development of Innovation Ideas

Terms and Definitions:

Thrashing: a term used to describe ineffective human workgroup activity; effort lost in unproductive work.

Key Points:

1. According to Booz & Company's 2012 annual R&D spending study, only one quarter of the Global Innovation 1000 companies thought they were effective in generating ideas and then converting the ideas into development efforts. Less than half of these innovative companies rated themselves as highly effective at generating innovation ideas and less than one-third consider themselves effective in converting ideas into product development projects.
2. Factors that limit the acquisition and development of viable innovation ideas:
 - a. *Scarcity of innovation opportunities*: Some markets have matured into commoditized exchanges.
 - b. *Permeability to innovation idea sources*: Information and idea seeking differs greatly among companies.
 - c. *Communication of innovation information*: Employees vary greatly in their ability to evaluate potentially significant market information and convey qualified information to pertinent receivers in the product development stream.
 - d. *Organization internal boundaries*: Employee silos often isolate chains of command and communication, which can impede the progress of a valuable idea through product development.
3. Pete Drucker reported that few of the successful innovators he had worked with in his career had an obvious entrepreneurial personality. Instead, he said, their only commonality was a commitment to the systematic practice of innovation. In his advice on maximizing innovation development, he underscored the interplays of human ingenuity and knowledge, and inspiration for hard, focused, purposeful work.
4. Failure is an inevitable concern in innovation development. Some project failures are temporary delays in product design, others are due to market changes, and still others are only detected after deployment.
5. To maximize innovation success, organizations institutionalize innovation process into company leadership, the organizational structure and culture, management processes, metrics, and training.
6. Questions to assess a company's innovation capability:

- a. Do you have clear innovation accountabilities that impact your compensation, that are part of your key performance indicators, with things that are clearly measurable?
 - b. How many innovations has your unit generated? What is the average quality of those ideas and how innovative are they? And how fast are they moving through the pipeline?
 - c. How many people have been trained as innovators?
 - d. What proportion of your time are you spending mentoring those innovation teams?
7. Using a systematic and repeatable process to find what we are looking for is much more effective than nonsystematic search strategies.
 8. Drucker suggests seven areas of potential opportunity for innovation ideas:

Sources Within the Business or Industry	Changes Outside the Enterprise or Industry
Unexpected Successes and Unexpected Failures	Changes in Demographics
Incongruities	Changes in Meaning and Perception
Process Needs	New Knowledge
Changes in Industry and Market Structure	

GISH-Chapter – 21 -- Quality of Ideas

Terms and Definitions:

Idea Priority Index: prioritizes ideas based on the potential cost-benefit analysis, associated risks, and likely time to commercialize the idea.

Key Points:

1. Because of higher expectations for innovation, coupled with shortened product life cycles, there is a constant demand for new products or services, which is challenging most organizations' existing infrastructure for new product or service development.
2. Innovation begins with ideas. Ideas generated for a known opportunity is one approach; but continual generation of ideas that intersect with continually arriving opportunities can lead to breakthrough or dramatically innovative solutions. Thus, there is tremendous opportunity for improving methods for generating, evaluating, and managing ideas – especially ideas that could be considered of high quality.
3. Progressive organizations will create or purchase a platform where anyone can easily contribute ideas; i.e., employees, customers, users, suppliers, or stakeholders.
4. Engaging people with diverse levels of experience can offer the best opportunity for generating useful creative ideas. Less experienced people tend to be bold, risk taking, and impetuous, while the more experienced people tend to think of more rational and knowledge-based ideas. In other words, less experienced people generate more ideas while experienced people contribute a higher quality of ideas.
5. Methods for Generating Ideas:
 - a. Brainstorming is the most commonly used method for generating ideas.
 - b. Thinking Innovatively – soliciting ideas from everyone – is a challenge. There is a need for training people in asking questions, thinking of ideas, and articulating their ideas in words or graphics.
 - c. Online Collaboration - Instead of organizing a group in a room together, one can convene an online brainstorming or idea generation session within minutes so members can participate remotely.
6. Evaluating Ideas
 - a. The first evaluation of an idea is the human response. If, after listening to an idea, the person becomes disinterested, the conversation is over. If enough people who hear the idea show no interest, then the idea needs to be rethought or reformulated—or discarded. If enough people were excited about the idea, then you may want to consider it for further

evaluation. It's not the quality of the generic idea but the quality of the best idea that matters.

- b. Key attributes to evaluate an idea include impact, sponsor, value, trade-off, usability, and cost.
- c. Idea priority index (IPI).
 - i. The IPI prioritizes ideas based on the potential cost-benefit analysis, associated risks, and likely time to commercialize the idea, using the following relationship:
 - 1. Annualized potential impact of the idea = (\$) × probability of acceptance
 - 2. IPI = Annualized cost of idea development (\$) × time to commercialize (year)

GISH-Chapter – 22 -- Idea Evaluation and Management

Terms and Definitions:

Primary sources: are gathered directly from the source. For instance, if new customer opinions were required to justify a new product, then customer interviews, focus groups, or surveys would suffice.

Secondary data sources: involve evidence gathered from someone other than the primary source of the information. Most media outlets, magazines, books, articles, trade journals, market research reports, or publisher-based information are considered secondary sources of evidence.

Key Points:

1. The idea evaluation process tasks are more frequently performed incorrectly and are most often mismanaged due to a number of factors, namely: lack of training on proper idea selection and evaluation methods, an over-reliance on market evidence, an underuse of direct customer evidence, poor selection of evaluation tools, miss-categorization of ideas, typical psychological decision biases, and a lack of an idea evaluation process.
2. The first idea screen should occur upon receiving the idea, which is usually conducted by employee(s) formally tasked with overseeing the ideation process. The first screen is useful in that it eliminates ideas having low market value or that would not fit the business' core competencies; yet, it can also be extremely harmful if setup wrong, in that it might weed out potentially valuable ideas, creating a self-reinforcing view that closes the organization to new ideas.
3. Successful companies and entrepreneurs only place barriers to ideas where they actually exist, not those based on biases in the minds of strict managers trying to keep their organization on a predictable track.
4. After an idea passes the first screen, it then goes into a repository where it may be selected to move forward in the idea management process. The final screen of ideas is much more rigorous in nature and uses the gathered evidence and analysis results to make an informed decision with respect to the ideas; whereas, the first screen is almost a totally uninformed decision with very little or no information.
5. Criteria and methods for conducting idea screening:
 - a. Theme criteria: Multiple themes to determine if an idea fits into those predetermined themes, such as: operational improvements, branding improvements, revolutionary products. Can be used when an organization wants to focus on a few core areas. Themes have to be aligned with strategic goals.

- b. Exclusion or inclusion criteria: Multiple general inclusion criteria (10 or more) that should be set carefully and only around the values of the company.
 - c. Grouping or tiers: Groups can be helpful in evaluation of tiers like top ideas, or worst ideas. Both grouping and tiers are only useful in a batch evaluation process, not a continuous process.
 - d. Idea sponsor: A person can decide to sponsor an idea. The number of ideas they can sponsor can be limited based on fairness or resource limitation. This allows executives to push ideas they see as valuable.
 - e. Checklist or threshold: An individual idea's list of attributes must match the preset checklist or threshold in order to pass (e.g., be implemented in 6 months, profit at least \$500,000, and require no more than two employees).
 - f. Personal preference: A manager, director, line-employee, or even expert is used to screen an idea based on his or her own preferences.
 - g. Voting: Individual(s) can vote openly or in a closed ballot (i.e., blind or peer review). Voting can be weighted or an individual, such as expert, can give multiple votes to a given idea.
 - h. Point scoring: Uses a scoring sheet to rate a particular idea on its attributes (e.g., an idea that can be implemented in 6 months gets +5 points, and one that can make more than x dollars gets +10 points). The points are then added together and the top ideas are ranked by highest total point scores.
 - i. Rating scales: An idea is rated on a number of preset scales (e.g., an idea can be rated on a 1 to 10 on implementation time, any idea that reaches a 9 or 10 is automatically accepted).
 - j. Ranking or forced ranking: Ideas are ranked (#1, 2, 3, etc.)—this makes the group consider minor differences in ideas and their characteristics. For forced ranking, there can only be a single #1 idea, a single #2 idea, and so on.
- 6. The theme criterion is the most simple and valuable method for conducting a first screen. In this method, a number of themes are proposed that align with the organization's strategic aims.
 - 7. There are a number of common problems that occur with the first screening of ideas, usually around the submission of an idea, the individuals performing the first screen, the first screen methods, and methods for storing ideas for future evaluation.
 - 8. During the evidence-gathering phase, additional considerations should be given to how much of the evidence and subsequent analysis might be needed during future phases. Oftentimes, data created via first screen processes provide vital insights during later phases. However, if organizations are not purposeful in capturing and storing these additional data points, they may be unavailable for

future phases, thus precluding other decision makers from making fully informed decisions.

9. When venturing to gather evidence, the first distinction needing to be understood is that between primary and secondary sources of evidence.
10. Evidence analysis is vital and required for drawing out insights, key statistics, and conclusions from the gathered evidence. When analyzing the evidence, innovation managers must select and apply the appropriate analytical methods, of which there are a great number; so care must be taken in preselecting and deploying the methods.

GISH-Chapter – 23: -- Types of Innovation

Terms and Definitions:

Process innovation: is the innovation of internal processes. New or improved delivery methods may occur in all aspects of the supply chain in an organization.

Functional innovation: involves identifying the functional components of a problem or challenge and then addressing the processes underlying those functions which are in need of improvement. Through this process, overlaps, gaps, discontinuities, and other inefficiencies can be identified.

Design innovation: focuses on the functional dimension of the job-to-be-done, as well as the social and emotional dimensions, which are sometimes more important than functional aspects.

Product innovation: is a multidisciplinary process usually involving many different functions within an organization and, in large organizations, often in coordination across continents.

Service innovation: is not substantially different than product innovation in that the goal is to satisfy customers' jobs-to-be-done, wow and retain customers, and ultimately optimize profit.

Business model innovation: changes the method by which an organization creates and delivers value to its customers and how, in turn, it will generate revenue (capture value).

Co-creation innovation: is a way to introduce external catalysts, unfamiliar partners, and disruptive thinking into an organization in order to ignite innovation. The term co-creation innovation can be used in two ways: co-development and the delivery of products and services by two or more enterprises; and co-creation of products and services with customers.

Open innovation: makes use of external ideas and technologies to enhance the enterprise's internal technology base, reduce the cost of R&D and time to market, and achieve superior product, service, or process innovations. At the same time, unused intellectual property and technology—latent internal intellectual capital--is made available for other firms to license and use.

Key Points:

1. Most organizations rely on their traditional attempts at innovation — improvements to business-as-usual -- to provide security, and hope they might

stumble upon a disruptive innovation, if they are lucky. This is not a formula for longevity.

2. Successful companies incorporate processes for generating both sustaining and disruptive initiatives for their innovation pipeline. The majority of organizations may never achieve a radical innovation, yet they are able to remain viable and profitable. This is because they have adopted change as a fact of life and are engaged in more than one type of innovation.
3. Several types of innovation are available, as listed above.

GISH - Chapter – 24 -- TRIZ: Theory of Solving Inventive Problems

Terms and Definitions:

TRIZ: is the anglicized acronym for the Russian phrase, *theory of solving inventive problems*.

Ideal final result (IFR): is an implementation-free description of the situation after the problem has been solved.

Function Analysis: a standard method of systems engineering that has been adapted into TRIZ. The subject-action-object method is most frequently used now.

Zones of conflict: refers to the temporal zone and the operating zone of the problem—loosely the time and space in which the problem occurs.

ARIZ (Algorithm for Creative Problem Solving): a procedure to guide the TRIZ student from the statement of the IFR to a redefinition of the problem to be solved and then to the solutions to the problem.

System Operator: (also called *9 windows* or *multiscreen* method) is a visual technique that is used frequently in the initial stages of TRIZ as part of problem definition.

Mini problem: is one that is solved without introducing new elements. We have to understand resources, since the emphasis is on solving the problem without introducing anything new to the system.

Contradictions: TRIZ defines two kinds of contradictions, physical and technical.

Technical contradictions: are the classical engineering and management trade-offs. The desired state can't be reached because something else in the system prevents it. The TRIZ patent research classified 39 features for technical contradictions.

Physical Contradictions: are situations where one requirement has contradictory, opposite values to another.

Principles of Invention: A set of 40 principles from a variety of fields such as software, healthcare, electronics, mechanics, ergonomics, finance, marketing, etc., used to solve problems.

Key Points:

1. TRIZ was developed in the post-WW II period of 1946 to 1985 in the former Soviet Union by Genrich Saulovich Altshuller (1915–1998) and his research colleagues.

2. Altshuller's insight was that global patents demonstrated repeated patterns of problems and solutions whereby categories of problems were solved by groups of solutions and historical patterns of problems were matched by historical patterns of solutions.
3. TRIZ is an analytical and data-based system in which the practitioner analyzes the situation, matches the type of innovation called for with standard patterns, and then applies the solution techniques that have a strong history of creative solutions to similar situations.
4. TRIZ is helpful during all stages in the development process.
5. TRIZ research began with the hypothesis that:
 - a. Somebody someplace has already solved this problem (or one very similar to it).
 - b. Creativity is finding that solution and adapting it to this particular problem.
6. A basic principle of TRIZ is that systems evolve toward increased ideality, where ideality is defined by the value equation (borrowed by TRIZ from value engineering in the early 1950s):

$$\text{Ideality} = \frac{\sum \text{Benefits}}{(\sum \text{Costs} + \sum \text{Harm})}$$

7. IFR has the following four characteristics:
 - a. Eliminates the deficiencies of the original system
 - b. Preserves the advantages of the original system
 - c. Does not make the system more complicated (uses free or available resources)
 - d. Does not introduce new disadvantages
8. Start your problem solving by formulating the IFR. It will help you:
 - a. Encourage breakthrough thinking
 - b. Inhibit moves to less ideal solutions (reject compromises)
 - c. Lead the discussions that will clearly establish the boundaries of the project
9. TRIZ defines the resources of a problem in a very comprehensive way: Material Resources, System elements, Time Resources, Information Resources, People Resources, Energy in the system, Energy in the environment, Space Resources, and Function Resources.
10. ARIZ (Algorithm for Creative Problem Solving) is outlined in the following steps:
 - a. What is the final aim?
 - b. What is the IFR?
 - c. What is the obstacle to this?
 - d. Why does this interfere?
 - e. Under what conditions would the interference disappear?
 - f. What resources are available to create these conditions?

11. The System Operator is developed with the construction of a 3×3 matrix, with the rows labeled as the system, subsystem, super system; and the columns labeled past, present, and future.
12. When using TRIZ research findings, in general the most comprehensive solutions come from using the physical contradiction formulation, and the most prescriptive solutions come from using the technical contradiction. In terms of learning, people usually learn to solve technical contradictions first, since the method is very concrete; then they learn to solve physical contradictions; then they learn to use both methods interchangeably, depending on the problem.
13. The 76 standard solutions of TRIZ were compiled by G. S. Altshuller and his associates between 1975 and 1985. This list was developed from referenced works and published in a comparison with the 40 principles to show that those who are familiar with the 40 principles will be able to expand their problem solving capability. They are grouped into five categories as follows:
 - a. Improving the system with no or little change 13 standard solutions
 - b. Improving the system by changing the system 23 standard solutions
 - c. System transitions 6 standard solutions
 - d. Detection and measurement solutions 17 standard
 - e. Strategies for simplification and improvement 17 standard solutions
14. TRIZ will continue to evolve and change, to enable people to innovate in a changing world.

GISH-Chapter – 25 -- Brinnovation (Breakthrough Innovation)

Terms and Definitions:

Gupta's Einsteinian Theory of Innovation (GETI) states: Thus, every idea must have some energy associated with it that is an outcome of effort and the speed of the thought. Expressed as:

$$\text{Innovation Value} = \text{Resources} \times (\text{Speed of Thought})^2$$

where the speed of thought can be described by the following relationship:

$$\text{Speed of Thought} \equiv \text{Function} (\text{Knowledge, Play, Imagination})$$

Key Points:

1. The four categories of innovations are the following:
 - a. Fundamental: Fundamental innovation is a creative idea that leads to a revolution in thinking. Such innovations are based on extensive research and are extremely knowledge driven, are theoretically proven, and lead to follow-up research and development.
 - b. Platform: is defined as one that leads to the practical application of fundamental innovations. Such innovations normally are launching pads for a new industry.
 - c. Derivative: a secondary product or service derived from the platform innovation.
 - d. Variation: is the tertiary level of innovation that requires much less time and is a slight variation of the next-level products or services based on derivative innovations.
2. The following steps summarize the basic innovation process to realize breakthrough solutions through innovative thinking:
 - a. Understand the need for innovation and its purpose.
 - b. Research a topic individually, collectively, or through networked resources, and gain a deeper understanding of the subject. Do not immediately solve the problem without proper research and knowledge.
 - c. Identify the potential variables affecting the problem. Make the list as long as possible and expand it using creativity tools, such as benchmarking, brainstorming, mind-mapping, and TRIZ.
 - d. Test “what-if” scenarios to isolate unlikely combinations of variables and identify likely combinations of variables. The objective is to remove obviously unrelated variables and retain related innovative solutions.
 - e. Establish the dimension of improvement or the performance characteristic(s).

- f. Investigate likely combinations that could improve the performance characteristic(s).
 - g. Extrapolate the dimensions of interest and validate potential outcomes.
 - h. Expand your thinking by applying appropriate TRIZ-like principles to explore potential innovative solutions for generating significant change, thus making innovation obvious or disruptive.
 - i. Continue to explore and formulate alternative solutions. Select a solution that produces expected breakthrough improvement for further validation, optimization, and implementation.
- 3. The TEDOC Methodology (target, explore, develop, optimize, and commercialize)
 - a. TARGET: Defining an opportunity for innovation is critical because a business needs to know what to innovate by looking at existing needs, documenting the key benefits of the solution to be innovated, and determining the key measures of its success.
 - b. EXPLORE: Innovation teams can identify and research keywords associated with the opportunity for innovation, generate new ideas, answer questions, discover new questions, and produce more new ideas. These ideas are then combined, filtered, analyzed, and prioritized, where the output serves as input to the solution to be developed. Tools in this phase may include creativity, research, brainstorming, affinity diagrams, failure mode and effects analysis (FMEA), and process thinking.
 - c. DEVELOP: Develop alternate solutions that affect the performance of the desired features by a significant factor (such as 2x better, bigger, smaller, etc.).
 - d. OPTIMIZE: A good design alone does not provide a significant return on innovation. The optimize phase focuses on maximizing the economic benefit of the innovation.
 - e. COMMERCIALIZE: The commercialization of a solution converts creativity into innovation. Every innovator, therefore, must learn the process of commercialization and develop the knowledge necessary to create value. In the commercialization phase, an innovation team must practice strategic thinking about methods of pricing a solution, messages of value proposition, viral marketing, business planning, and making deals for licensing or selling the breakthrough solutions.
- 4. Commitment to continual innovation requires a good understanding of theory, practice, and the results of the innovation methods. The scattered and successful application of innovation methods demonstrates that the innovation process is more than random creativity.

GISH - Chapter – 26 -- Crowdsourcing: Tapping Into the Talent of the Crowd

Terms and Definitions:

Crowdsourcing: A term for a varied group of methods that share the attribute that they all depend on some contribution from the crowd. According to Howe, it is the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an *open call*.

Diversity Trumps Ability Theorem: states that a randomly selected collection of problem solvers outperforms a collection of the best individual problem solvers.

Crowd funding: the collective effort of individuals who network and pool their money, usually via the Internet, to support efforts initiated by other people or organizations.

Key Points:

1. Crowdsourcing operates on two fundamental bases: the assumption that there is a global pool of talent that can be effectively tapped and the acknowledgment of the community allowing genuine meritocracy.
2. New and evolving technology has been a primary driver in the media market, making everything faster and cheaper to create through reduced hardware costs and the emergence of incredibly powerful but user friendly software. Expanding Internet access became a tipping point for the emergence of a vast pool of enthusiastic amateurs creating and sharing their knowledge within and among communities.
3. Crowdsourcing generally displays:
 - a. A clearly defined crowd
 - b. The existence of a task with a clear goal
 - c. A way of compensating the crowd for its input
 - d. The crowd-sourcer or the firm who initiates the crowdsourcing process
 - e. A clearly defined gain for the crowd-sourcer
 - f. An online process, using the Internet
 - g. Based on an open call
4. Crowdsourcing and open innovation are similar but not the same:
 - a. Open innovation is focused on the innovation process itself, while crowdsourcing is targeted to many other fields and applications.
 - b. Open innovation is more related to knowledge flows between businesses, while crowdsourcing has a wider approach including the crowd as an undetermined group of individuals. Following the crowdsourcing approach, the crowd itself becomes a knowledge supplier for the firm.
5. When developing a crowdsourcing strategy, critical success factors include the careful identification of:
 - a. The objective

- b. Target participants
 - c. Methodology and required resources
 - d. Timeline for completion
 - e. Incentives and compensation for participants
6. Crowdsourcing is a rapidly growing method of organizing relationships among organizations and individuals to create new synergies. The main challenge of a crowdsourcing initiative is finding and optimizing the dispersed talent of the crowd to establish new ways to organize production, enhance creativity, and create value.

GISH - Chapter – 27 -- Open Innovation

Terms and Definitions:

Collective effectiveness: In a complex and highly competitive business environment, it is hard to sustain support R&D and innovation expenses. Networking allows firms access to different external resources like expertise, equipment, and overall know-how that has already been proven with less cost and in a shorter period.

Collective learning: Networking not only helps firms gain access to expensive resources like machinery, laboratory equipment, and technology, but it also facilitates shared learning via experience and good practice sharing events. This brings new insight and ideas for a firms' current and future innovation projects.

Joint risk taking: Since innovation is a highly risky activity, it is very difficult for a single firm to undertake it by itself and this impedes the development of new technologies. Joint collaboration minimizes the risk for each firm and encourages them to engage in new activities. This is the logic behind many precompetitive consortia collaborations for risky R&D.

Intersection of different sets of knowledge: Networking creates different relationships to be built across knowledge frontiers and opens up the participating organizations to new stimuli and experiences.

Key Points:

1. Open innovation has two types of benefits to the firm:
 - a. The spin-off, licensing strategies, and the selling of business units or new ideas that do not fit the strategic interest of the firm will increase the revenues of the firm.
 - b. Firms can reduce the internal cost and risks of development. They are open to a broader scope of opportunities and speed up their learning processes about new technologies and thereby make significant progress in the learning curve.
2. Tidd and Bessant formulated four main arguments pushing for a higher level of networking for innovation:
 - a. Collective effectiveness
 - b. Collective learning
 - c. Joint risk taking
 - d. Intersection of different sets of knowledge

GISH - Chapter – 28 -- Systematic Innovation

Terms and Definitions:

Stage Gate Process: first introduced by R. G. Cooper in 1986 in his book *Winning at New Products*.

Key Points:

1. Examples of innovation given by Joseph Schumpeter in the 1930s:
 - a. The introduction of new goods or qualitative changes in an existing product
 - b. Process innovation new to an industry
 - c. The opening of a new market
 - d. Development of new sources of supply for raw materials or other inputs
 - e. Changes in industrial organization
2. The scientific method is one of the keystones to systematic innovation methods. It is based on testing and observations. It is reported to have originated over 1000 years ago and basically involves the following steps:
 - a. Formulating a question that needs answering based on experience and available data
 - b. Formulating a hypothesis that can explain the behavior and that can be shown to be false
 - c. Prediction of the consequences of the hypothesis
 - d. Testing that can show the predictions are true or not false and therefore that the hypothesis is not false
 - e. Analysis of the results to determine if the hypothesis is verified and determine a modification of the hypothesis if it was not verified.
3. Tools useful to systematic innovation include:
 - a. Analogical thinking and mental simulations; using past successes applied to similar problems by mental simulations and testing.
 - b. Theory of inventive problem solving (TRIZ).
 - c. Scientific method: A classical method that uses a hypothesis based on initial observations and validation through testing and revision if needed.
 - d. Edison method: Consists of five strategies that cover the full spectrum of innovation necessary for success.
 - e. Brainstorming: Recording many ideas without initial criticism that could solve a problem, followed by organization and evaluation. This is one of the most used methods and several versions have been developed.
 - i. Osborn method: Original brainstorming method developed by Alex F. Osborn by primarily requiring solicitation of unevaluated ideas (divergent thinking), followed by convergent organization and evaluation.

- ii. Six Hats: Structured method of brainstorming through different roles, to control thinking and emotions that can speed up the process of brainstorming
- iii. Problem detection and affinity diagrams: Focus groups, mall intercepts, mail and phone surveys that ask customers what problems they have. They are all forms of problem detection. The responses are grouped according to commonality (affinity diagrams) to strengthen the validity of the response. Developing the correct queries and interpreting the responses are critical to the usefulness of the method.
- iv. Explore unusual results: Unusual results can be investigated for how they occurred and what problems they could solve.
- v. Ethnography: Observing and recording what people do to solve a problem and not what they say the problems are. It is based on anthropology but used on current human activities. It is based on the belief that what people do can be more reliable than what they say.
- vi. Function analysis and fast diagrams: Analyzing a system for the different functions by which it operates is believed to generate more ideas than focusing on the physical part.
- vii. Kano method: Based on the idea that features can be plotted using axes of fulfillment and delight. This defines areas of: must haves, more is better, and delighters. The latter is used to excite the customer and close a sale.
- viii. Abundance and redundancy: Based on belief (not necessarily factual) that if you want a good invention that solves a problem, you need lots of ideas.
- ix. Hitch-hiking: When a breakthrough occurs, it is a fertile area for innovators. They should hitch-hike on the breakthrough to create new applications and improvements that can be inventions.
- x. Kepner Trego: This method is very useful for processes that were performing well and then developed a problem. It is a good step-by-step method that is based on finding the cause of the problem by asking what changed since the process was working fine.
- xi. Quality function deployment (QFD), *aka* the house of quality. This creates a matrix that looks like a house that can mediate the specifications of a product or process. There are subsequent derivative houses that further mediate downstream implementation issues.
- xii. Design of experiments: This method is a statistically based method that can reduce the number of experiments needed to establish a mathematical relationship between a dependent variable and independent variables in a system.

- xiii. Failure mode effects analysis: A matrix-based method used to investigate potential serious problems in a proposed system prior to final design. It creates a risk priority number that can be used to create a ranking of the biggest risks and then ranks the proposed solution.
- xiv. Fishbone diagrams, *aka* Ishikawa diagrams: A mnemonic diagram that looks like the skeleton of a fish and has words for the major spurs that prompt causes for the problem.
- xv. Five whys: A simple but effective method of asking five times why a problem occurred. After each answer, ask why again using the previous response. It is surprising how this may lead to a root cause of the problem, but it does not solve the problem.
- xvi. Medici effect: The book by this name describes the intersection of significantly different ideas that can produce cross-pollination of fields and create more breakthroughs.
- xvii. Technology mapping and recombination: a matrix-based method that lists the various technologies that can perform a function and then examines combinations that have not been tried to see if there is enhanced performance or features.
- f. Trial and error: Attempts at successful solutions to a problem with little benefit from failed attempts. This is not a good method.
- 4. Systematic Innovation can be viewed as occurring in stages:
 - a. Concept stage
 - 1. It includes problem identification, problem dissection into smaller problems, ideation for potential solution of the smaller problems, and combinations of these potential solutions into concepts that could solve the larger problem.
 - 2. Documentation in the form of a witnessed lab notebook, information disclosure sheet (IDS), etc.
 - b. Feasibility stage
 - i. Prototypes of key subsystems or theoretical validation of a solution to the main problem. They should be adequate to establish a preliminary basis for technical feasibility.
 - ii. Assessment of patent potential and patent infringement. The results may indicate the need to submit a provisional patent to establish the date of invention or submit a patent application, an analysis of a preliminary business plan (preliminary versions of market size estimation, capital expenditure plan, resource plan, project schedule, risk abatement recommendations, financial plan).
 - c. Development Stage
 - i. Generally the stage with the largest financial commitment.
 - d. Execution Stage, preparation for production

- i. The marketing plan is further developed with a launch strategy; facilities are readied for tooling; reviews are conducted and sought (aesthetics, internal safety, agency approvals, and quality in the form of overall design conformance, vendor part approvals, and reliability); preproduction trials run; final bills of materials released; and a production plan developed.
 - e. Production Stage
 - i. The first production of units for sale.
 - f. Sustainability Stage
 - i. The maintenance of the product in use via service personnel, customer support (mail, web and telephone lines), warranty, customer assurance, monitoring of field performance, and recycling.
- 5. Chesbrough identifies the elements of the business model as:
 - a. Value proposition to the target audience
 - b. Target audience who will purchase the product
 - c. Value chain that describes where the company resides and what value it brings in the chain that delivers the product to the customer
 - d. How the company will collect money
 - e. Cost and margins that are required to make the product or process profitable
 - f. Value network of ancillary suppliers that enhance the product but may not be in the direct chain to the customer
 - g. Competitive strategy that will give the company longevity

GISH - Chapter – 29 -- Eureka! What Insight Is and How to Achieve It

Terms and Definitions:

Non-algorithmic interactions: actions with cognitive and physical materials of a project whose results you can't predict for certain, those results you don't know.

Insight: a linking or connection between ideas in the mind. The connections matter more than the pieces.

Indexing: providing a tag for a fact, piece of information, or experience, so that you can retrieve it when you want it.

Key Points:

1. Insight depends on recalling a piece of information from memory and adapting it to the current situation.
2. Debunk the myths (things that are not true about insight):
 - a. That an insight arrives complete and whole, out of nothing
 - b. That a single trigger event magically spawns the creative accomplishment. In this myth, a single event plays the culminating role because it causes all the other pieces fall into place.
3. You can increase your insight by taking steps such as:
 - a. Keeping a notebook (on paper or online) of your ideas, observations, and readings. Making daily entries.
 - b. Sketching or listing the relationships between the players or parts, or listing alternative solutions, playing with them, and experimenting.
 - c. Commenting on your own comments, working through the implications, and reflecting on our work.
4. The implications of research on insight are that experience, involvement, and interaction with the problem's elements help us get insights.
5. When you engage in non-algorithmic interactions, you're asking yourself questions all the time. Questions like, What happens if I do this? What happens if I add that? How strong is this material? How far can I change this factor before it all collapses? Your questions are both attribute-based (to discover the properties of the objects or ideas) and goal-based. Goal-based questions include, Where else can I use that? and What problems could this solve?
6. To create insights, you need to:
 - a. Have a need, goal, or curiosity to look for some explanation that's not readily apparent.
 - b. Accumulate knowledge and experiences to recall and work with (whether it's sticks to reach a banana or math to compute an orbit) so that you have elements to connect.

- c. Reinterpret or adapt things you know to fit the new situation or purpose.
- 7. You can improve your insights by using questions to explore a problem and remind you of other related key ideas or memories.
 - a. Questions based on attributes are ones in which you look for a specific attribute of an object or idea.
 - b. Goal-based questions pose the end goal without specifying the means or locking you into particular attributes.
 - c. Era-based questions require that you put yourself in the position of thinking about a question in a different time or place from the one you are currently in. For example, instead of asking yourself the general question, Have I ever seen a situation like X before? -- ask yourself if you have ever experienced anything like X when you were in a different town or when you were in school.
- 8. Indexing
 - a. By attributes: to identify what the attributes of an object, situation, or idea consist of.
 - b. By your experiences: ask yourself, What goal could this example accomplish? When could it be useful? Indexing by goals can be tricky, because there are two opposite problems to be aware of.
 - i. On one hand, experiences labeled too specifically and narrowly limit their recall for other situations.
 - ii. On the other hand, solutions that are too general don't include enough detail to indicate when to apply them. For example, the advice *look before you leap* warns you to pause before rushing into something, but it doesn't contain enough detail about when to apply the advice—or when *he who hesitates is lost* would be the more appropriate attitude.
 - c. Some of the other categories for indexing might include
 - i. Backgrounds or preconditions (what caused a situation)
 - ii. Side effects (both positive and negative)
 - iii. Results (what happened)
 - iv. Tradeoffs
 - v. Roles people play
 - vi. Problems encountered in route to a goal
 - vii. Examples that illustrate a situation (like examples of a good customer mix or a good interview)
 - viii. Alternatives
 - ix. Warnings or indicators (what to watch out for)
- 9. Adapting the old to create the new – to make connections between elements that don't seem obviously connected – start by identifying and labeling more attributes and goals of the object, idea, or situation. The more attributes and goals you can identify, even non- or only partially related, the more potential connections you can make.

GISH-Chapter – 30 -- Stage-Gate

Terms and Definitions:

NPD: New product development

Probe-and-learn strategy: Where non-working prototypes are developed in rapid succession, tested with potential customers, and feedback is sought on each prototype.

Key Points:

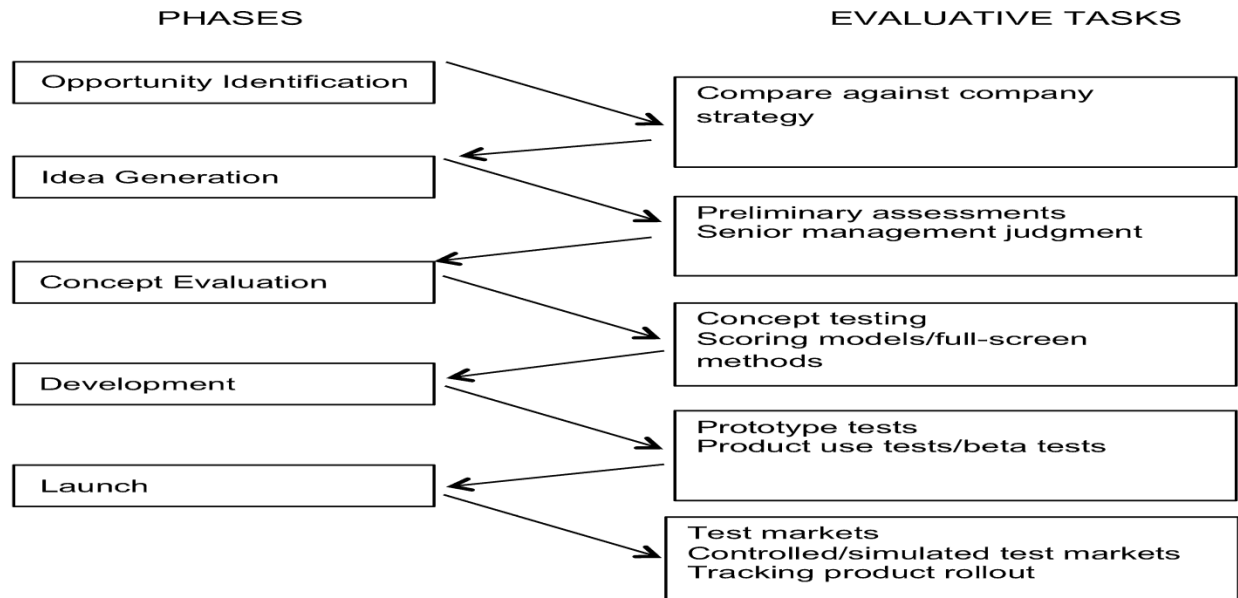
1. In order to deal with the risks and uncertainties inherent in new product development (NPD), many firms have implemented formal procedures to identify new product opportunities, and to take these from the idea stage through launch and beyond. Firms that are the most successful in NPD have implemented phased review processes.
2. Over 65 percent of the best firms have some kind of phased review process, while less than 45 percent of the rest have one. Additionally, almost half of the firms studied had some kind of clear evaluative tasks after each phase. About 40 percent of firms assigned a process manager to supervise the implementation of the phased review process.
3. Objectives of a phased review process.

Focus the new product team on quality new product development efforts.
Prioritize the new product team's efforts.
Encourage parallel processing and accelerate time to market.
Ensure cross-functional interaction on the new product team.
Ensure that the voice of the customer drives new product development.
Require that technical and commercial assessments are done early, and well.
Assess the product's competitive advantage throughout the development process.

4. A firm employing a phased review process views NPD as a series of phases and evaluations steps. The number of phases and evaluations will vary; in its very simplest form, one could consider a simple three-phase process consisting of predevelopment (or fuzzy front end), development, and launch activities. Most textbook references include five or more phases, and in actual practice there can be any number of phases or sub-phases, depending on the needs of the firm.
5. Typical Phase Process
 - a. Phase 1: Opportunity Identification
 - i. Occurs even before the product planners begin to search for ideas, as it is essentially a step that defines where they should begin

looking and to help direct the activity of the new product team, once it starts looking for ideas.

- b. Phase 2: Idea Generation
 - i. Ideas can come from just about anywhere: customers in focus groups and interview settings, marketing and sales employees, engineers working in R&D, senior management, designers, suppliers, distributors, government or university laboratories, competitors, and many others.
 - c. Phase 3: Concept evaluation
 - i. Concepts are assessed, weaker ones are thrown out, and good ones are improved.
 - ii. The concept evaluation phase ideally contains two parts: concept testing and scoring.
 - iii. At early concept evaluation, the hurdle rates are kept reasonably low. One does not want to risk killing a concept with high potential. Later in this phase, however, it is critical that the hurdle rates are set much higher.
 - d. Phase 4: Development
 - i. This is where the product concept takes form. The marketing plan for the new product is fleshed out; R&D and engineering personnel may be developing early prototype versions of the product, even non-working ones, to gauge customer interest and guide further development; development personnel may be working here to match product specifications, which are supported by market research; further business analysis review into the financial and sales forecasts are further refined.
 - e. Phase 5: Launch
 - i. Occurs when the product is commercialized. New product personnel, however, view launch differently, as a phase that starts with that day, and continues until the product, hopefully, reaches its sales and profit targets.
6. A phased process showing phases and evaluative tasks:



Source: Adapted from Crawford and Di Benedetto (2011).

GISH-Chapter – 31 -- Design Innovation

Terms and Definitions:

Balanced breakthrough model: suggests that successful new products and services are desirable for users, viable from a business perspective, and technologically feasible.

DVF model (desirable, viable, feasible): Another name for the balanced breakthrough model.

Four-Square Model for Design Innovation: is composed of two sets of polar extremes: understand-make and abstract-concrete.

Key Points:

1. Designers tend to think about and act on problems differently compared to engineers, scientists, and people with traditional business training. The results of design-driven projects tend to be more creative (providing a large set of non-obvious, elegant solutions) and empathetic (aligned with the needs and behaviors of the target user group) compared to other approaches. This does not mean that the design approach is in any way superior to other methods.
2. Companies naturally get better at knowing how to make things, but, due to the focus on operations, actually get worse at knowing what things to make. This phenomenon was observed and named the Innovation Gap.
3. The balanced breakthrough model is helpful both in synthesis (to create ideas that balance all three criteria), and analysis (to prioritize and evaluate using the three criteria).
4. Four-Square Model for Design Innovation
 - a. Composed of two sets of polar extremes: understand-make and abstract-concrete.
 - i. Understanding includes research and critical thinking.
 - ii. Making includes finding non-obvious connections, abdicative thinking (which is a fancy way of saying guessing), and actually making things like models, drawings, prototypes, and communications.
 - iii. Abstract thinking focuses on ideas and concepts, not just real objects.
 - iv. Concrete thinking to make something real and feasible.
 - b. The four-square model is a process with five steps:
 - i. Problem framing: identify what problem we intend to solve and outline a general approach for how we will solve it.
 - ii. Research: gather qualitative and quantitative data related to the problem frame.
 - iii. Analysis: unpack and interpret the data, building conceptual models that help explain what we found.
 - iv. Synthesis: generate ideas and recommendations using the conceptual model as a guide.

- v. Decision making: conduct evaluative research to determine which concepts or recommendations best fit the desirable, viable, and feasible criteria.

GISH-Chapter – 32 -- Service Innovation: Introduction, Methodologies, and Key Findings

Terms and Definitions:

NSD: New Service Development

Key Points:

1. Service innovations are focused on developing and marketing new services to meet customers' needs.
2. Most service innovations can be categorized into one of the following groups:
 - a. Incremental or radical, based on the degree of new knowledge
 - b. Continuous or discontinuous, depending on its degree of price performance improvements over existing technologies
 - c. Sustaining or disruptive, relative to the performance of the existing products
 - d. Exploitative or evolutionary, innovation in terms of pursuing new knowledge and developing new services for emerging markets
3. Five dimensions of a service innovation model have been identified where each of these may further undergo radical or incremental innovation:
 - a. Organizational
 - b. Product
 - c. Market
 - d. Process
 - e. Input
4. Service innovation could take place along multiple dimensions, for example, by offering new services, by providing existing user new channels, or by using a new service delivery model. Managers at service firms face additional challenges in terms of management of service innovation, since patents cannot be granted for most service innovations.

GISH-Chapter – 33 -- Social Innovations: post-Fordist Globalization and New horizons

Terms and Definitions:

Post-Fordist: companies after the Henry Ford efficient production era where managers wielded inordinate responsibility for profit and loss, and the new postmodern leaders of the global economy, who are responsible for developing talented teams.

Key Points:

1. Fundamentally, social innovation is an intangible, tacit experience temporally located and embedded in those spaces—physical or virtual—where social actors meet.
2. Defining social innovation and its social networking tools is more cumbersome as more experts ponder the nuances of innovation. Simply put, the literature is overwhelmed with descriptions that link social innovation to creative ideas designed to address societal challenges—cultural, economic, and environmental issues—that are no longer simply a local or national problem but affect the well-being of the planet's inhabitants and ultimately, corporate profits and sustainability.
3. Social innovation occurs because actors develop rational methods to evaluate their social exchanges in changing circumstances. Social networks in and of themselves are of little value unless the participants are acting on goal-directed behaviors. Increasing the productivity of work groups and thus social innovation requires a freeing of interaction among players who can discover among themselves the relevancy of their contexts.
4. The book *The Wisdom of Crowds* by James Surowiecki is an explication of the process of Bayesian knowledge generation from distributed diverse crowds of people. Social media are an enabling technology for accessing the wisdom of crowds. Social media allow us to discover knowledge that we hold collectively but each of us cannot know in total. This is a spur to innovation because the knowledge is tacit, not explicit. Social media make tacit knowledge explicit and allow us to access the ideas that we know collectively but cannot know individually.

GISH-Chapter – 34 -- Nonprofit Innovation: Rethinking Value Creation for the Social Sector

Terms and Definitions:

Nonprofit: an organization specifically formed to provide a service or product on a not-for-profit basis as determined by applicable law.

Key Points:

1. The nonprofit sector is a large and growing component of most economies around the world. Despite growth in the sector, however, nonprofits face increased challenges as they compete for funding. To offset these challenges, nonprofits have become more innovative, identifying new ways to maximize the power of corporate donors, foundations, and smaller, individual contributors.
2. Nonprofits are impacted by the same market forces that affect financial performance of for-profit companies. What sets nonprofits apart from their profit-driven counterparts is the difficulty in measuring and quantifying success. As a result, innovative leaders in the nonprofit realm are beginning to use the language and tools of traditional businesses to align not-for-profit objectives with outcomes and results.
3. Four areas stand out as promising opportunities for nonprofit innovation:
 - a. Business model innovation is transforming the connections between donors and recipients, using direct, tangible economic incentives to drive symbiotic relationships between donors and recipients. Social entrepreneurs, philanthropy-capitalists, micro-lending organizations, and socially responsible peer-to-peer lending networks, are examples of innovative business models that blend social responsibility and business-oriented financial objectives. These new business models also leverage technology, data, and collaboration to empower individuals and organizations to impact the lives of others in tangible and direct ways.
 - b. Innovative uses of technology in social media in fund-raising are revolutionizing the ability of nonprofits to energize and supercharge the global funding power of small donors. Moving beyond email marketing campaigns, nonprofits have pioneered a range of innovative fund-raising solutions that leverage mobile phone technology, social networks, and innovative payment solutions. These innovations make it easier to facilitate instant donations by individuals, while also reducing the friction for nonprofits to accept electronic donations.
 - c. Innovative cost reductions that expand nonprofit access and reach are proliferating as innovators use technology to remove cost and geographic barriers. Innovators have transformed entire sectors with compelling, low-cost solutions for underserved segments. Remote healthcare delivery, mobile banking, online encyclopedias, and free educational institutions are examples of nonprofit innovations that used innovative cost models to

- serve populations that had previously been out of economic and/or geographic reach.
 - d. Innovation in measurement has brought greater quantitative accountability to nonprofits, improving overall results and ROI. Significant progress in this area has been driven by strong leadership from several large, innovative foundations. In particular, newer foundations run by entrepreneurs and business leaders are introducing consistent, metric-driven criteria into the grant-making process, encouraging new generations of nonprofit professionals to focus on measurement and effectiveness. Building on past nonprofit measurement activities focused on efficiency, recent innovations have helped crystallize methods for introducing quantitative metrics focused on nonprofit results.
4. Non-profit innovation best practices:
- a. Drive to make meaningful change
 - b. Cultivate market knowledge
 - c. Harness technology
 - d. Use data as an innovation tool
 - e. Collaborate to drive better outcomes

GISH: Chapter – 35 -- Cross-Industry Cooperation as a Key Factor for Innovation

Terms and Definitions:

Cross-Industry Innovation: refers to innovations stemming from cross-industry affinities and approaches involving transfers from one industry to another.

Key Points:

1. Some of the best sources of both incremental and disruptive innovation may derive from beyond the regular spheres of company contact and even from beyond its own industry. Cross-industry innovation, beyond incorporating external knowledge into the company itself, may also be deployed as a tool for transferring company-owned technology and patents to industries on an international scale.
2. Various empirical research projects have confirmed that face-to-face contacts and geographic proximity are important factors in spreading innovation. Specific forms of exchanging knowledge in cross industry activity include: (1) dominant suppliers; (2) intensive-scale companies; (3) science-based companies; and (4) specialist equipment suppliers.
3. When seeking to identify the ways in which service innovations take place, the following types should be taken into consideration: (1) product innovations deriving from innovation processes and very often corresponding to demand-side requests; (2) process innovations, especially those stimulated through new technologies; and (3) delivering innovation through the application of new resources and methods, such as support structures for interactions between service companies and their clients.
4. The distinction between product innovation and process innovation (though it remains a common distinction in the literature) makes little sense to the extent that the different forms of innovation are inherently interrelated and, in the majority of cases, the innovation emerging is characterized by the existence of strongly varying and different facets.

GISH: Chapter – 36 -- The Innovation Radar and Enterprise Business System: Innovation in Five Nordic Countries and Beyond

Terms and Definitions:

Disruptive innovation: a process where a product or service takes root initially in simple applications at the bottom of a market and then relentlessly moves upmarket, eventually displacing established competitors.

Key Points:

1. Innovation is a relatively new faculty compared to disciplines like accountancy, economics, or organizational theory. This is also reflected in the hierarchy within companies and other organizations where it is rare to see the title Innovation Manager among board members or at the C-level.
2. As of 2014, various studies have cited that nearly 96 percent of all innovation attempts fail to beat targets for return on investment; and there is no relationship between R&D spending and the primary measures of economic or corporate success, such as growth, enterprise profitability and shareholder return.
3. Entrepreneurial activity has only two functions: to create a customer, which is marketing; and to keep the customer, which is innovation.
4. Companies that take a business model perspective on innovation outperform companies that focus more narrowly on just product or process innovation.
5. Within the Innovation Radar framework, innovation is defined as an initiative in any dimension(s) of the business system, to create substantial new value for customers and the firm.
6. A company can innovate along any of 12 different dimensions shown in the innovation radar graphic (see below).

Innovation Radar Framework

Offering	Development of new products or services
Platform	Use of common new components or building blocks to create derivative offerings.
Solution	Creation of integrated and customized offerings that solve end-to-end Consumer problems.
Customer Needs	Discover unmet customer needs or identify underserved customer segments.
Customer Experience	Redesign of interactions that customers have with the company in order to build customer loyalty based on positive emotional response.
Marketing Communication	Implementation of creative marketing communications to position, promote, or brand products and services.
Process	Redesign of core operating processes to improve efficiency and effectiveness.
Value Capture	Creation of new ways to get paid for products and services.
Management	Invention and implementation of a significant change in organization structure or management methods to further organizational goals.
Supply Chain	Thinking differently about sourcing and fulfillment.
Channel	New routes to the marketplace or innovative points of presence for customers to find and buy products and services.
Ecosystem, Partnerships	Creation of innovative partnerships and collaborative relationships with suppliers, partners, vendors, resellers, etc. to create joint offerings.

GISH-Chapter – 37 – Innovation Measures and Indices

Terms and Definitions:

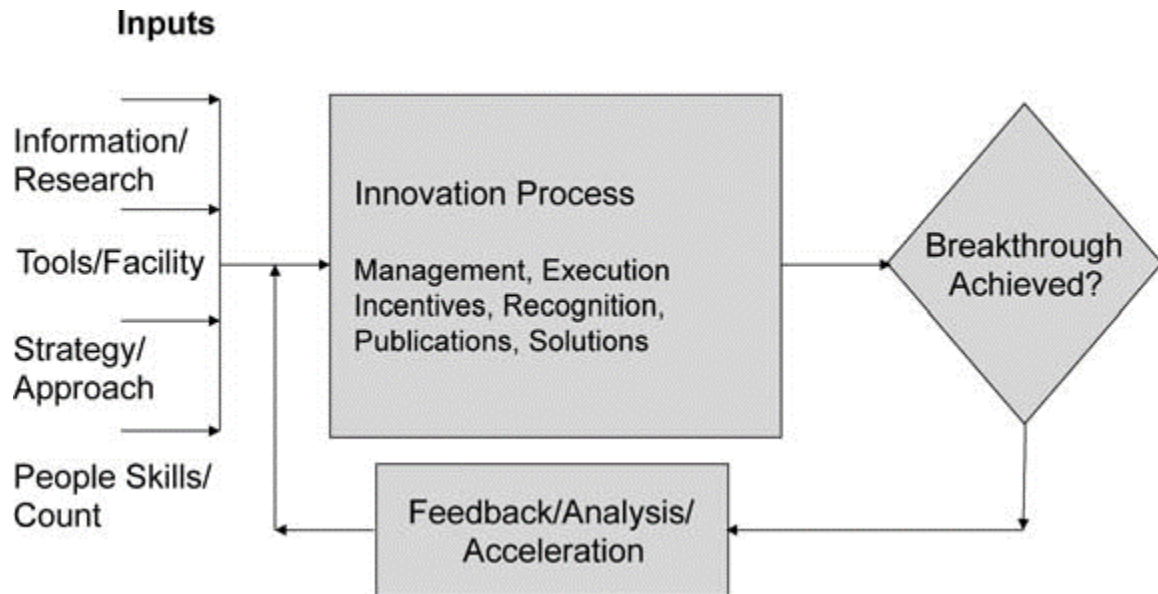
SIPOC: is an acronym for *Supplier, Input, Process, Output, and Customer* model

Key Points:

1. Innovation, being a complex and unknown process, proves to be a challenge when defining clear and correlating measurements. Experience shows that measurements do not correlate to the innovation activity; financial and count-type measurements include product- or service-specific sales or revenue growth, and count-type measurements include items like the number of patents, trademarks, articles, and product or service versions produced; therefore they should not be used as a business measure of performance.
2. Corporations implement innovation through network-centric, pipeline-fed, and opportunity-driven approaches.
 - a. Network-centric approach is taught in colleges and based on collaborative brainstorming. The concept is that more minds are better than one at a given time.
 - b. Pipeline model as driven by chance or innate genius, is a somewhat common perception of the innovation process. Inventors who work in research drive the pipeline model and development environment on a specific topic, explore new ideas, and develop new products and services.
 - c. Opportunity-driven model is more representative of street-smart individuals who take an idea at the right time and the right place, devise a solution, know how to market it, and capitalize on their breakthrough. They also appear to be lucky, which is defined as an intersection of continual preparation and opportunity.
3. Peter Drucker's process, detailed in his book *Innovation and Entrepreneurship*, identifies various phases of innovation, including the phases of opportunity identification, analysis, acceptability, focusing on core idea, and leadership. The act of innovation, though, is still not clearly explained. Measuring innovation effectively is contingent on understanding details of the innovation process, its inputs and outputs, and its controls.
4. State of Measures of Innovation
 - a. The Creative Problem Solving Group: Data shows that innovative companies outperform in the areas of risk taking, play or humor, challenge or motivation, and idea support. The most significant factor that differentiated an organization for innovation is risk taking. Innovative companies that encourage risk taking by their employees included the following nine criteria to evaluate the link between climate and organizational innovation:
 - i. Challenge, motivation

- ii. Freedom
 - iii. Trust
 - iv. Idea time
 - v. Play and humor
 - vi. Conflicts
 - vii. Idea support
 - viii. Debates
 - ix. Risk taking
- b. PA Consulting Group cited measures such as speed of development processes, competency metrics, and number of patents. They have identified nine dimensions, which the consulting group uses itself, to measure an organization's innovativeness:
 - i. Committed leadership
 - ii. Clear strategy
 - iii. Market insights
 - iv. Creative people
 - v. Innovative culture
 - vi. Competitive technologies
 - vii. Effective processes
 - viii. Supportive infrastructure
 - ix. Managed projects
- c. Tim Stud, in an editorial in *R&D Magazine*, explored the measures of innovation topic. Key components of successful innovation include:
 - i. Funding for innovation
 - ii. Trained and educated staff
 - iii. Collaborative environment
 - iv. Key individuals
 - v. Corporate infrastructure
 - vi. Strategic planning
- d. The European Business School and Arthur D. Little jointly developed The Innovation Scorecard for creating value through innovation management. The scorecard measuring innovation performance is driven by the following elements:
 - i. Innovation strategy
 - ii. Organization favoring innovation
 - iii. Innovation process
 - iv. Innovation culture
 - v. Resource deployment
- e. Kellogg School of Management presented Innovation Radar, which is designed to create a holistic framework to visualize, diagnose, benchmark, and improve the innovation process. An initial set of measurements incorporated in the innovation radar include:
 - i. What (offerings), brand, networking
 - ii. Where (presence), supply chain, organization

- iii. How (process), value capture, customer experience
- iv. Who (customers), solution, and platform
- 5. Many of the above have a core set of questions:
 - a. What data to collect
 - b. How to collect data
 - c. How to analyze the data
 - d. How to interpret the data
 - e. How to drive improvement
- 6. Paul H. Jensen and Elizabeth Webster of the Melbourne Institute of Applied Economic and Social Research (MIAESR) identified four specific dimensions to the problem of measuring innovation. They are as follows:
 - a. The innovation process may take years from concept to commercialization.
 - b. In the narrow sense of innovation, the novelty of products or services is difficult to benchmark, and the process measurements are difficult to adjust.
 - c. Time carries an important economic value for the innovation process. Therefore, innovation measures must have some way to adjust for value over time.
 - d. Much of the innovation activity is categorized as unobservable and is not reported in conventional methods.
- 7. The authors, Jensen and Webster, identified three main characteristics of innovation measures: type of innovation, stage of pathway, and firm characteristics. The measures of innovation in their reported research included patent applications, trademark application, design application, expert assessment, journal counts, and survey of managers. A challenge exists in identifying a complete list of innovation measurements.
- 8. Mark Rogers of Melbourne Institute at the University of Melbourne has attempted to establish measurements of innovation at the corporate level. Rogers also identified input and output measures of innovation, along with their descriptions and, more importantly, the source of data collection. Each measure of innovation has some validity, but none can be used as a stand-alone measure of innovation. However, combining various measures to develop an index of indicators must consider tangibles and intangibles, economic and noneconomic measures of innovation-related resources, processes, deliverables, and value.
- 9. Understanding measures of innovation:



10. The SIPOC (Supplier, Input, Process, Output, and Customer) model can be used for analyzing the innovation process. The analysis of the innovation process shows many process steps and dozens of measures that can be used for monitoring innovation. Most management people would like to identify some measures, set targets, provide incentives, and start monitoring them.

11. A Process for Developing Measures of Innovation:

- a. The GQM approach consists of the following conceptual, operational and quantitative level understandings of processes. In order to identify innovation measures, understanding the purpose of innovation, its environment, and the input, in-process, and output parameters is essential.
 - i. Goal is defined as an intent or conceptual understanding in terms of products or outputs, processes or activities, or resources or inputs.
 - ii. Questions provide an operational understanding of measurements that can be used to assess realization of goals and objectives.
 - iii. Metrics represent the data that provide a quantitative understanding of the answers to the questions in assessing performance against goals. The data can be objective or subjective, or the object itself along with the viewpoint from which the data are taken.

12. Following is a list of steps used to establish measures for a process or an activity:

- a. Define the purpose of innovation in the organization.
- b. Establish expected deliverables (basic and specific) and their contribution to business performance, including growth and profitability.
- c. Determine the measures of success of key deliverables.
- d. Identify challenging opportunities for improvement in the innovation process.

- e. List activities that must be performed to accelerate innovation.
- f. Identify input, in-process, and output variables that are critical to the success of innovation in the organization. If these variables are not monitored and managed effectively, the innovation outcomes will be adversely affected.
- g. Establish an Innovation Index and determine the data collection capability for selected measures of innovation.
- h. Establish reporting and communication methods, and monitor (levels and trends) critical and practical measures of innovation to drive business growth and profitability.

13. Measures to Consider for Innovation Index:

Industry Innovation	Indicators Innovation Index Measures	Process Innovation Measures
Innovation funding, including R&D	Resources: funding, culture of risk taking, rewards, tools	Excellence in research, innovation management, time allocation (%)
New products, services, or solutions	Activities: targets for innovation, process of innovation, extent of institutionalization, idea management, internal and external publications, knowledge management, internal and external collaboration, recognition	New idea deployment; extent of improvement or change; degree of differentiation, disruption, or innovativeness; time to innovate
Market capitalization	Outputs: patents; new products, services, or solutions; sales growth; market position or ranking; customer perceptions	Rate of innovation, savings, opportunities

14. Some CEOs may assume an adverse relationship between investment in innovation and corporate performance. Such an incorrect perception of

innovation by executives may contribute to the confusion concerning the topic of innovation, as well as for the lack of commitment to systematic innovation. The best way to sustain innovation is to ensure there is a return on it.

- a. The return on investment (ROI) in innovation can be calculated as a ratio of profit increase divided by the investment in R&D and innovation (RDI). In other words, if a company invests \$4 billion dollars in R&D and innovation, and increases profit by \$400 million, one can say that ROI in innovation is \$400 million/\$4 billion, or 10 cents on a dollar.
- b. Another approach could be to calculate ROI on various types of innovation separately. In other words, ROI on short term and long-term innovations would have different goals as well as performance.

GISH-Chapter – 38 – Inspiration for Innovation

Terms and Definitions:

Inspiration: the word inspiration is from the Latin word *inspire*, meaning “to blow into.”

Key Points:

1. It is essential to understand the following: (1) where you are as a company, your expectations, the composition of your current team, and future talent needs, and 2) the motivational frameworks along with tools for inspiring and structures for rewarding innovation.
2. Innovation is creating new value. That’s a broad definition, which can be viewed on a continuum from optimizing the existing business, to developing new products and services for known needs, to the discovery and formulation of entirely new models to serve currently unknown customer and user needs.
3. There is a need to clearly distinguish between: (a) the optimization team whose focus is to optimize core capabilities to out-execute the competition, (b) the product development team that develops new products and services for known consumer needs, and (c) the discovery and formulation team that seeks entirely new needs and related business models.
4. Organizations need to clearly define their goal for innovation. Understanding the status of your company and the state of your industry is the key in determining where to begin. For example, are you in start-up, turnaround, or realignment mode or simply striving to sustain your success and leadership position? Is your industry mature? Is it in growth mode or in decline?
5. A successful innovation process needs to be managed with the same rigor, accountability, and attention to detail as any other work being done in the company. As mentioned earlier, however, innovation spans a broad spectrum, which can make it difficult to develop a process for it.
6. There are many models out there for design thinking and innovation process. The four-quadrant framework by Beckman and Barry is :
 - a. Understand—observing to understand the market and the user needs
 - b. Frame—extracting insights and framing the challenge
 - c. Create—developing ideas that satisfy the frameworks
 - d. Deliver—building the ideas into experiences to test and then deliver value
7. The word inspiration is from the Latin word *inspire* are, meaning “to blow into,” as in to instill something into the heart and mind of someone. When people talk of being inspired this essence seems to come from within them.
8. Motivation is different from inspiration, as its source is external and it is often used as a means to use external influence to tap into personal ambitions and values. It is often expressed as an exchange.

9. Motivational Drivers as defined by Nutria, Grasberg, and Lee, present a new model for employee motivation based on cross-disciplinary research from the fields of neuroscience, biology, and evolutionary psychology.
 - a. The Drive to Comprehend - These people want to be challenged by their jobs, to grow and learn.
 - b. The Drive to Bond – The need for common kinship bonding to larger collectives such as organizations, associations, and nations.
 - c. The Drive to Acquire (*aka*, the carrot) – The drive to acquire tangible goods such as food, clothing, housing, and money, but also intangible goods such as experiences, or events that improve social status.
 - d. The Drive to Defend (*aka*, the stick) - Includes defending your role and accomplishments. Fulfilling the drive to defend leads to feelings of security and confidence.
10. Butler and Waldron describe the impact of DELIs or *deeply embedded life interests*. The authors describe that DELIs are not the same as hobbies, nor are they the objects or topics of enthusiasm. Rather, they are defined as long held, emotionally driven passions, and they impact the type of work people seek, much more strongly than the topic of the work. They define eight DELIs as:
 - a. Theory Development and Conceptual Thinking - These people love thinking and talking about abstract ideas. They love the *why* of strategy more than the *how*. They may enjoy business models that explain the reasons behind the competitive position of a business. In an innovation process, these people are likely to gravitate to the front end, thriving on uncovering insights, finding problems, and framing the innovation pursuit.
 - b. Creative Production - These people love beginning projects, making something original, and making something out of nothing. This can include processes or services as well as tangible objects. They are most engaged when inventing unconventional solutions. In an innovation process, these people may thrive on the ideation phase, creating multiple solutions to the identified problems.
 - c. Application of Technology - These people are intrigued by the inner workings of things. They may be engineers, but even if not, they like to analyze processes, get under the hood, and they like to use technology to solve problems (business or technical). Like those engaged by creative production pursuits, those intrigued by the application of technology are often also found in the problem-solving, ideation, and solution-selecting end of the process.
 - d. Quantitative Analysis - These people love to use data and numbers to figure out business solutions. They may be in classic quantitative data jobs, but may also like building computer models to solve other types of business problems. These people can fall into two camps: (1) descriptive and, (2) prescriptive.
 - e. Influence through Language and Ideas - These people love expressing ideas for the enjoyment of storytelling, negotiating, or persuading. This

can be in written or verbal form, or both. They also enjoy thinking about their audience and the best way to address them. In an innovation process, these people can be very valuable in engaging consumers with stories and depictions of what is possible to gather new insights. On the optimization end of existing business operations, those engaged in influencing through language and ideas can be found in all forms of deal making from sales, negotiations, and even legal.

- f. Counseling and Mentoring - These people love teaching, coaching, and mentoring. They like to guide employees, peers, and even their clients to better performance. It is ideal to have the innovation leaders have some passion for this interest as it will help them develop the team through the ambiguous process of innovation, garnering the best performance out of the collective raw talent of the team.
 - g. Managing People and Relationships - Unlike counseling and mentoring people, these people live to manage others on a day-to-day basis. They are less interested in seeing people grow, and more interested in working with them to achieve the goals of a business.
 - h. Enterprise Control - These people love to run projects or teams and control the assets. They enjoy owning a transaction or sale, and tend to ask for as much responsibility as possible in work situations.
11. Fitting the right people to the challenge of innovation:
- a. Revolutionary Innovation: Discovery and Formulation - When discovering the unknown, people are motivated by life interests based on inquiry and discovery. On the formulation end of the innovation spectrum it is best to engage team members with life interests in theory, conceptual development, creative production, and applications of technology with the drive to comprehend. Those with interests in quantitative analysis can be very helpful if the analysis uncovers new opportunities. Similarly those with interests in language and persuasion can be instrumental.
 - b. Evolutionary Growth: Development - In evolutionary innovation, you are often solving known problems with new solutions. Those with life interests in creative production are often happy in product or service development as are those with interest in applications for technology and persuasion with language and ideas. The drive to comprehend, bond, and often acquire are found here as well.
 - c. Incremental Improvements: Optimization - If optimization is the pursuit of improving your existing business offering with a faster, cheaper, stronger, better form of your existing product or service solution, it is often easier to understand success and failure. As a result it is often easier to tangibly reward performance around management, enterprise control, mentoring and counseling, and the aspects of quantitative analysis that improve existing performance, as well as the use of language and persuasion in the known, such as in selling existing products and services.
12. Tools and Resources to Inspire Innovation

- a. Descriptive Tools for Mapping What Exists
 - i. Business Model Generation Canvas - The business model canvas is a strategic management and entrepreneurial tool comprising the building blocks of a business model. The business is expressed visually on a canvas with the articulation of the nine interlocking building blocks in four cluster areas: offering—value proposition, customer—customer segments, customer relationships, infrastructure—distribution channels, key resources, key partnerships, key activities, value—cost structure and revenue model. Essentially, we think these nine blocks represent four clusters of consideration, answering the fundamental questions every business should thoroughly understand, notably, (1) What problem are you solving (offering)? (2) For whom are you solving it (customers)? (3) How are you solving it (infrastructure)? Why are you solving it (value/return)?
- b. Prescriptive Tools for Need Finding: Mining for Insights
 - i. Customer Profile—Empathy Map is a technique for creating a profile of your customer beyond the simple demographics of age, gender, and income that has been in use for some time.
 - ii. Journey Map and Experience Evaluations is a diagram that illustrates the steps your customer(s) go through in engaging with your company, whether it is a product, an online experience, a retail experience, a service, or any combination of these. Sometimes customer journey maps are cradle-to-grave, looking at the entire arc of engagement. At other times, journey maps are used to look at very specific customer-company interactions.
 - iii. Time of Day - developed as a unique twist on the day-in-the-life tool of journey or experience mapping. This tool focuses the participants not on a task or an experience, but rather what happens or doesn't in 2- to 4-hour chunks in a person's day and what opportunities may appear.
 - iv. Emotional Rollercoaster: a notion, similar to journey mapping that identifies areas of high anxiety in a process and, as such, exposes opportunities for new solutions.
 - v. 7-14-28 Processes is a task-analysis assessment that involves breaking a process down into 7 tasks, then breaking it further into 14 tasks, and then another level further into 28 tasks. This exercise forces the participant to break down the components of a task until it becomes possible to see which tasks could be decoupled to form an improved process or where clear opportunities exist for new products or services.
 - vi. Live-ins, Shadowing, and Immersion Labs resemble the retail or home environment and gather extensive information about product purchase or use. These labs are used to both test the known,

- launch new product, and to observe user behavior to find new opportunities for products, services, or systems.
- vii. Moccasins: If short on resources to create full immersion labs, you can gather a lot of information from assuming the role of your user by *walking in their shoes*.
- c. Ideating Tools
 - i. Associative or Mind Mapping is a simple process of visually articulating the relationship between bits of information, namely concepts.
 - ii. Image Board, Storyboarding, Role Playing are collections of physical manifestations (image collages or product libraries) of the desirable (or undesirable if you are using that as a motivator) to help generate ideas, or to facilitate conversations with users about what they want.
- d. Evaluation Tools: Assessing the Opportunity
 - i. AEIOU - The AEIOU framework for observations stands for activities, environments, interactions, objects, and users. It serves as a series of prompts to remind the observer to record the multiple dimensions of a situation with textured focus on the user and their interactions with their environment.
 - ii. PESTEL Frameworks is similar to a SWOT analysis. Whereas a SWOT analysis focuses on the strengths, weaknesses, opportunities, and threats that impact a specific business or market, the PESTEL framework focuses on the macroeconomic factors that influence a business. These factors are:
 - 1. Political factors: These refer to government policy such as the degree of intervention in the economy.
 - 2. Economic factors: These include interest rates, taxation changes, economic growth, inflation, and exchange rates.
 - 3. Social factors: Changes in social trends can impact the demand for a firm's products and the availability and willingness of individuals to work.
 - 4. Technological factors: New technologies create new products and new processes.
 - 5. Environmental factors: Environmental factors include the weather and climate change. Changes in temperature can impact many industries including farming, tourism, and insurance.
 - 6. Legal factors: These are related to the legal environment in which firms operate.

GISH - Chapter – 41 – Journey to Innovation Excellence

Terms and Definitions:

Breakthrough, disruptive, new-to-the-world innovation: paradigm shifts that reframe existing categories. Disruptive innovation drives significant, sustainable growth by creating new consumption occasions and transforming or obsolescing markets.

Substantial platform, transformational, adjacencies innovation: Innovations that deliver a unique or new benefit or usage occasion, within an existing or adjacent category.

Core or line extensions, renovation, sustaining close-in innovation: extends and adds value to an existing line or platform of products via size, flavor, or format. It is incremental improvement to existing products.

Top-Down Planning for innovation: generally a revenue goal-driven process that is usually set from the top by the senior leadership team. It is usually a dollar revenue goal or a percentage of revenue target from innovation.

Bottom-Up Planning for innovation: a process where innovations are described in portfolio requirements to meet business objectives.

Platform: a consumer need-based opportunity that inspires multiple innovation ideas with a sustainable competitive advantage to drive growth.

Business Case: the insight-driven marketing opportunity that leverages sound business logic.

Portfolio Management: the ongoing management of innovation to ensure delivery against stated goals and innovation strategy.

Key Points:

1. Key enablers for successful innovation:
 - a. Discipline in building the right foundation
 - b. Innovation strategy development
 - c. Portfolio strategy and management
 - d. Prioritization and focus
 - e. Process and executional excellence
 - f. People and capabilities
 - g. Culture of innovation and commitment
2. To build the right foundation for innovation:
 - a. Define what innovation means to the organization
 - b. Develop an innovation strategy
 - c. Establish innovation metrics
3. The innovation strategy should be :
 - a. Company-wide

- b. Clear, cascaded, and energizing
 - c. Tied to corporate, brand, and portfolio strategies with technology enablers
 - d. Based on insights
- 4. An innovation strategy should answer
 - a. How much innovation is needed
 - b. Metrics
 - c. Desired type, mix, and size of innovation, portfolio mix
 - d. Where you will innovate (strategic focus areas)
- 5. There are two approaches for determining how much innovation you need: (a) Top-down and (b) Bottom-up
- 6. Business case should answer several key questions:
 - a. Key Elements of the Platform:
 - i. What is the hypothesized sustainable point of difference and how will it win?
 - ii. What is the need or unmet need?
 - iii. What is the market situation and competitive assessment?
 - b. Size of Prize
 - i. What is the quantified size of the opportunity?
 - c. Risk Assessment and Mitigation
 - i. What will be the fact-based approach to identifying challenges and uncertainties?
 - ii. What are the risk mitigations and probabilities?
 - 1. Timing—Risk of not meeting, in particular, a launch date
 - 2. Project cost—Risk of exceeding costs in terms of investment and resources required
 - 3. Technical execution—Risk of the product not meeting the defined concept and specs
 - 4. Product Cost—Risk in product costs, higher cost of goods sold (COGS), risk to P&L
 - d. Fit to Strategy
 - i. How does the project fit in the strategy?
 - 1. Business unit (BU) or brand strategy?
 - 2. Portfolio strategy?
 - e. Consumer Insights
 - i. What specific needs and trends can be identified in the market, relevant to the platform?
 - f. Which targets do you have for consumer attributes (including price)? What are the results so far on consumer feedback? Example metrics are:
 - i. Purchase interest
 - ii. Frequency
 - iii. Value
 - iv. Meets a need
 - v. Is seen as unique or different, better
 - vi. Incrementality or cannibalization

- g. Competition
 - i. What is the market landscape, what competition do you face?
- h. Go to Market Strategy
 - i. How will the product be marketed?
- i. Capabilities
 - i. What are the manufacturing platforms required to produce the product?
 - ii. What is the manufacturing strategy? Define the strategy including internal versus external manufacturing, both short and long term.
 - iii. What are the technical hurdles and what is the approach to overcome these?
 - iv. What are the capital requirements?
 - v. What is the buildup of COGS including ingoing assumptions like line capabilities and commodity prices?
- j. Investment
 - i. What capital investment is required?
 - 1. Manufacturing equipment
 - 2. Packaging equipment
 - 3. Change parts
 - ii. What go-to-market investment is required?
 - 1. Trade, Customer Investment
 - a. Slotting fees for distribution
 - b. Trade spending
 - 2. Consumer Investment
 - a. Advertising dollars (creative development, media spend)
 - b. Promotional programs
 - c. Digital, social media
- 7. A good portfolio strategy should enable prioritization and focus, be able to proactively and realistically manage risk, and have the right measures in place to ensure overall objectives are being met.
- 8. There are several ways to look at a portfolio strategy:
 - a. By business unit—is there a particular business unit you want to focus your innovation efforts on?
 - b. By category, segments—are there particular categories or segments that you want to focus your innovation on where there is high growth potential?
 - c. By brand—are there brands in your portfolio that have more opportunities than others?
- 9. The role of portfolio management is to maximize value while managing risk to achieve your innovation goals.
- 10. Effective portfolio management should enable you to objectively screen ideas and projects, and enable formal measuring and monitoring of performance. It should answer several key questions:
 - a. How will you evaluate innovation? This includes *go* or *no-go* criteria

- b. How will you measure innovation program effectiveness? What are the key performance indicators (KPIs)?
 - c. How will you resource the work?
- 11. Ruthless prioritization of projects is critical to ensure you appropriately focus your resources, both people and financial, on the right things.
- 12. Determine an effective way to sort and prioritize projects to ensure bad ideas are killed. Establish a defined process and set of criteria for evaluating and prioritizing projects.
- 13. The following maintenance or change management activities are *not* types of innovation:
 - a. Cost savings
 - b. Ingredient or product changes
 - c. Regulatory change
 - d. Label change
- 14. When it comes to innovation, there is a definite need for improved and distinct innovation competencies. Not all great managers make great innovators—they need to be comfortable with risk, ambiguity, and a lot of change.
- 15. It is important to have a defined process for evaluating and funneling ideas. The common industry best practice is the use of stage-gating. It is important the process to manage innovation is flexible and set up for speed; however it still requires guardrails to prioritize and focus initiatives.
- 16. It is important to drive a shared behavioral mind-set and common understanding.
- 17. Key elements for a successful innovation culture include:
 - a. Continuous learning
 - b. Patience, and acceptance of risk and failure
 - c. Accountability
 - d. Time
 - e. Commitment
- 18. Perhaps one of the biggest barriers to achieving breakthrough innovation is the lack of a culture that promotes patience and *successful failure*. Patience to let ideas properly incubate and to take the time to do the up-front due diligence will increase chances of success and save time in iterating.

GISH-Chapter – 42 – Culture for Innovation

Terms and Definitions:

Business Innovation Maturity Model (BIMM): Offers a road map to innovation management maturity.

Performance engine project: A project that seeks to improve a current level of performance and not to create a new value proposition.

Key Points:

1. For the purposes of deploying a culture of innovation, invention is viewed as the conversion of cash to ideas, while innovation is the conversion of ideas to cash.
2. This chapter focuses on how to successfully align the accountable organizations' attitudes, feelings, values, and behaviors with the needs of an innovation project.
3. Whenever you have the idea that you want to convert to a successfully commercialized innovation, you need to evaluate your culture against the alignment of your people (skills), processes, tools, metrics, stakeholders and sponsors, management model, organizational structure, and reward and recognition mechanisms.
4. The main reasons change initiatives fail are:

70% of Change Initiatives Fail due to	90% of Innovation Initiatives Fail due to
Lack of alignment with strategic priority Insufficient reasons for change No financial estimate Can't be completed on predicted schedule	Lack of alignment between business and innovation strategy No budget allocation to future problems
No clear & measurable goals Not staffed with the right people or enough	No concise & shared problem statements Not staffed with the right people or enough time
Key stakeholders unwilling to try new solutions Key stakeholders and managers not committed	Key stakeholders risk averse Key stakeholders invent themselves
Starting projects with no understanding of risk Ignoring early red flags	Starting projects with no understanding of competitive landscape

	Ignoring early red flags— litigiousness of competitors
Lack of understanding of customer experience and needs	Lack of understanding of variety of customer perspectives & issues, functional perspective lacking

5. Four key categories of activities in culture change are Vision, Motivation, Skills Development, and Implementation.
6. The four key categories can be made into a matrix by coordinating with the phases of technology delivery known as initiate, customize, fan-out, and institutionalize.

GISH: Chapter – 44 – Intellectual Property for Innovations

Terms and Definitions:

Trade Secrets: essentially refers to the legal protection often granted to confidential information having at least potential competitive value.

Trademarks: words or logos that are used by someone to identify their products or services and distinguish them from the words or logos of others.

Patents: a government-granted right that literally and strictly permits the patent owner to prevent others from practicing the claimed invention.

Copyrights: legal protection of original works of artistic authorship

Key Points:

1. Four of the more common intellectual property rights (IPRs) important to innovation are:
 - a. trade secrets
 - b. copyrights
 - c. patents
 - d. trademarks
2. Trade secrets are specifically addressed by statutes (on either a national or regional basis) and sometimes they are protected by courts in the absence of statutes on a common law basis. In the United States, many trade secret protections are handled on a state-by-state basis.
3. Generally speaking, one need not apply to any government or governmental agency in order to perfect a claim to a trade secret, although one must often rely on a local judiciary to enforce such rights when a misappropriation occurs. Instead, at least to a very large extent, the creation, maintenance, and perfection of a trade secret right rests on the party claiming to own that right.
4. Ensuring the enforceability of a trade secret does not usually require withholding the secret from all other parties. Instead, trade secret laws will typically permit disclosure of the protected information from one person to another provided those disclosures occur in a manner that preserves the confidentiality of the agreement. The non-disclosure agreement (NDA) is the typical legal vehicle by which one can clearly evidence this kind of control.
5. The scope of protection provided to a given trademark depends in part on where the trademark falls on the spectrum of protection. Trademarks can be categorized by the nature of the mark compared to the products or services. Thus a mark having no relevance to the corresponding product can receive a broad scope of protections.
6. A trademark is defined by the products or services that it serves, to distinguish from the products and services of others.

7. Because of the value of this reputation, it is incumbent upon the owner of the brand to protect that reputation. One of the vehicles for protecting a brand's reputation is to enforce the brand against infringement and dilution. These are two separate issues within the area of trademark law that provide different protections for brands.
8. Protection against infringement generally prevents the use of confusingly similar brands by others. In that regard the confusing similarity is in the eye of the relevant consumers.
9. Patents are the end result of a formal, complex, and typically expensive acquisition process. Patents are granted by individual countries and, in some cases, by authorized regional authorities. A patent for a given country typically only provides protection within that country and will not provide the patent owner with rights to prevent parties in other countries from practicing the claimed invention absent a relevant patent in that country as well.
10. Generally speaking, a person is an inventor if they conceived and contributed to anything that appears in any of the claims of the patent. There is no requirement that each inventor contribute in like substantive manner as compared to one another and there is no requirement that all of the inventors work together or even necessarily know one another.
11. Complicating the situation, at least in the United States, is the notion of so-called shop rights. Generally speaking, if an employee invents something that they are not obligated to assign to the enterprise, but they use enterprise resources to reduce the invention to practice, the enterprise may have a shop right in the invention that permits the enterprise to use (though not own) the invention without further payment to the employee.
12. Copyrights protect original works of artistic authorship. These artistic works must be fixed in a tangible media, but various forms of media are accommodated. For example, copyright extends to textual works, recorded-performance works, sculptural, and many others. Protection can also extend to certain technical works such as computer software, technical manuals, and the like. There are also a variety of separate provisions for other creative works such as those that provide copyright protection for architectural works.
13. The general universal rule is that all of these works are entitled to protection the moment they are recorded in a fixed media. Thus, the author of a book has initial protection of the very first draft of their book.
14. It is important to understand that what is being protected by copyright is the precise expression contained within the fixed work itself. This is not a protection for the idea or concepts contained within the work. Furthermore, a mere recitation of fact, *scenes a faire*, and purely functional components of useful articles are usually not entitled to protection by copyright laws. There are time limits governing the protection of that work.
15. A copyright owner can also license the use of the work to others as well as outright transfer of ownership of the work.

16. A common misunderstanding related to copyright ownership concerns physical possession. Just because one is in physical possession of the work that is the subject of copyright, that does not also place the legal copyright ownership in that possessor (as in a software purchase).

List of Appendix

- A. Terms and Definitions
- B. Culture of Innovation
- C. Types of Innovation
- D. Methods and Tools
- E. Process of Innovation

Appendix A

List of Terms and Definitions

Key to the establishment of any science is agreement on key terms and their definitions. You should scan this list and for any term you either do not recognize or feel unsure about, go to the cited pages in the *Global Innovation Science Handbook* (GISH) and look up the definition. You will notice that in some rare cases there may slightly different definitions in various chapters of the book. We will use the definitions found on the cited pages as shown below for the purposes of the exam.

Table 1 Terms and Definition Reference

<i>Term</i>	<i>Reference</i>	<i>Term</i>	<i>Reference</i>
Abstract rules	GISH:p88-89	functional innovation	GISH:363
Abstraction	GISH, pp515-516	functional model	GISH: 272
Affordable Loss Principle	GISH, p 91	futurist	GISH: 52
Agile Development	GISH, pp260-261	fuzzy front end	GISH: 465
Algorithm for Inventive Problem Solving (ARIZ)	GISH, pp388-389,381	Direction setter	GISH:52
Attribute -Based Questions	GISH:484-485	Customer advocate	GISH: 52
Attribute Listing	GISH:190,191	Architect	GISH:52
Balanced Breakthrough model	GISH:512-513	Barrier Buster	GISH:52
Biomimetic	GISH:121-123	Goal-based question	GISH:485
bottoms-up approach	GISH:683-684	Goal-Question-Metrics(GQM)	GISH:610
bounded spontaneous order	GISH:92	“How Might We” statement	GISH:522
brainstorming	GISH: 188-189	Idea evaluation	GISH:339
breakthrough innovation process (aka brinnovation)	GISH:p419-422	Idea innovation	GISH: 785
bubble diagrams	GISH:766	Idea management	GISH:339

Business Case	GISH:656-666	Ideal final result	GISH:383
Business Innovation Maturity Model (BIMM)	GISH:786-787	Inclusive thinking	GISH:74
Business Model Canvas	GISH:371	Incremental innovation	GISH:597
Business Model	GISH:370	Incubation	GISH:190
Business Model Innovation	GISH:371	indexing	GISH:488
Capability Maturity Model	GISH:785	Innovation benchmarking	GISH:141
Co-creation	GISH:372	Innovation blueprint	GISH:14
Co-creation Innovation	GISH:372	Innovation champions	GISH:30
collective intelligence	GISH:438	Innovation cycle	GISH:611
commercialization	GISH:421	Innovation drivers	GISH:628
Benchmarking		Innovation gap	GISH:511
Innovation Benchmarking	GISH:144	Innovation index	GISH: 605
concept evaluation	GISH:504	Innovation mind-set	GISH:105
concept stage	GISH:466	Innovation process	GISH:627
confirmation bias	GISH:327	Innovation radar	GISH:584
context articulation	GISH:75	Innovation skills	GISH:112
contradiction analysis	GISH:273	Innovation strategies	
contradiction model	GISH:267	Innovation definition	GISH:423
convergent thinking	GISH:766	Innovative thinking	GISH: 424
corporate creativity	GISH:87	Integrated innovation system	GISH: 56
Ekvall's Model of the Creative Climate	GISH:87-88	invention	GISH:143

cradle-to-cradle principles	GISH:22	Matrix analysis	GISH:190
crazy quilt principle	GISH:92	Attribute listing	GISH:190
critical success factors (CSF)	GISH:764	Morphological analysis	GISH:190
cross-industry innovation	GISH:559	Mind-mapping	GISH:198
crowd sourcing	GISH:315	Creativity	GISH:88
Culture	GISH:37	Non-profit innovation	GISH:549
customer journey	GISH:519	Non-profit innovation	GISH:549
derivative innovations	GISH:471	Nominal Group Technique (NGT)	GISH:185-186
design thinking	GISH:219	Crowd sourcing	GISH:427
disruptive innovations	GISH:682	Crowd funding	GISH:432
divergent thinking	GISH:76	Partnership innovation	GISH:597-598
drilldown tree-diagram	GISH:193	performance attributes	GISH:185
effectual logic	GISH:91	Phase model	GISH:285
empathy map	GISH:521	Physical and technical	GISH:391
evolutionary potential diagram	GISH:402	platform innovation	GISH:417
excitement attributes	GISH:183	Fundamental innovation	GISH:417
execution stage	GISH:471	derivative innovation	GISH:417
external analysis	GISH:259	variation innovation	GISH:417
failure (acceptance thereof)	GISH:691	Portfolio strategy	GISH:687
fast-track innovation development	GISH:326	Practice Model Methodology	GISH:163-164
feasibility stage	GISH: 466	process	GISH:163
financial innovations	GISH:797	Qualitative Research	GISH:289
first level ideas	GISH:234-235	Quantitative Research	GISH:289

force field analysis diagram	GISH: 199	Radical Innovation	GISH:596
four square model	GISH:513	Revolutionary Innovations	GISH:628

Appendix B

List of Methods and Tools

There is no innovation without getting something delivered to a customer and this always requires some form of practice generally referred to as a tool or methodology. There are many tools that can be applied to the general cases of innovation activity and the list seems endless when we consider special cases. The list below shows the common names for the tools we feel are most used by professional innovators around the globe. Many of these tools are discussed in this study guide or other specialized references. Scan the list and for any tool for which you feel you do not have a basic understanding, go first to the GISH and look up the general information and or to a specialized reference.

- | | |
|---|---|
| 1. 5 Why questions | 30. Mind mapping |
| 2. 76 standard solutions | 31. Nominal group technique – (GISH tool 3) |
| 3. Absence thinking – GISH tool 9 | 32. Online idea platforms/innovation platforms |
| 4. Affinity diagram | 33. Open innovative platforms act – (GISH Tool) |
| 5. Attribute listing | 34. Outcome driven innovation |
| 6. Biomimicry | 35. Patent analysis |
| 7. Brain-writing 6-3-5- | 36. Plan-Do-Check-Act (GISH Tool) |
| 8. Business case development | 37. Potential investor presentations |
| 9. Combination methods | 38. Project Management Act – (GISH Tool) |
| 10. Competitive analysis | 39. Quickscore creativity test – (GISH Tool 1) |
| 11. Comparative analysis | 40. Reengineering/Redesign |
| 12. Concept tree (concept map) | 41. Robust design |
| 13. Consumer co-creation | 42. S-Curve Model |
| 14. Consumer journey mapping | 43. Scamper |
| 15. Contingency planning | 44. Scenario Analysis |
| 16. Costs analysis | 45. Simulations |
| 17. Creative problem solving model | 46. Six thinking hats |
| 18. Creative thinking | 47. Social Networks |
| 19. Ethnography | 48. Solution Analysis Diagrams |
| 20. Focus groups | 49. Stakeholder analysis |
| 21. Force field analysis (GISH tool 16) | 50. Statistical Analysis |
| 22. Generic creativity tools | 51. Storyboarding (GISH tool 8) |
| 23. Imaginary brainstorming | 52. Surveys |
| 24. Kano Analysis – (GISH tool 2) | 53. Systems thinking |
| 25. Knowledge management systems | |
| 26. Lead user analysis | |
| 27. Lotus Blossom (GISH tool 11) | |
| 28. Market research | |
| 29. Matrix diagram | |

54. Synectics (GISH Tool 4)
55. Tree diagram (GISH Tool 10)
56. Value analysis

57. Value propositions
58. Visioning

Appendix C

Exam Alignment with the Body of Knowledge Documents

Terms and Definitions	IAOIP Glossary
Culture of Innovation	Study Guide/GISH Chapter - 3, 4, 42
Types of Innovation	Study Guide/GISH Chapter – 23, 25, 26, 27, 28, 31, 32, 33, 34
Methods and Tools	Study Guide/GISH Chapter – 10, 11, 20, 24, 37
Process of Innovation	Study Guide/GISH Chapter – 16, 17, 18, 19, 30, 35, 36, 41, 44
Creativity, Ideas and Ideation	Study Guide/GISH Chapter – 5, 6, 13, 15, 21, 22, 29, 38