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Subject Notes

Open Elective CS803 (D) Managing Innovation and Entrepreneurship

UNIT II

Sources of innovation (push, pull, analogies), transfer of technology. Creative methods and approaches used in innovation management. Approaches to management of the innovation process (agile management, Six Thinking Hats, NUF test).

Sources of Innovation

Innovations that spring from a flash of genius, most innovations, however, especially the successful ones, result from a conscious, purposeful search for innovation opportunities, which are found only in a few situations. Four such areas of opportunity exist within a company or industry: unexpected occurrences, incongruities, process needs, and industry and market changes. Three additional sources of opportunity exist outside a company in its social and intellectual environment: demographic changes, changes in perception, and new knowledge. The sources of innovation are economic changes, technological changes, new knowledge, new markets, etc. These things make a person think of a new product, services or business process. Innovation helps organizations to be strong and be competitive in the industry. There is no risk involved in innovation.

Unexpected Occurrences

Consider, first, the easiest and simplest source of innovation opportunity: the unexpected. In the early 1930s, IBM developed the first modern accounting machine, which was designed for banks. But banks in 1933 did not buy new equipment. What saved the company—according to a story that Thomas Watson, Sr., the company's founder and long-term CEO, often told—was its exploitation of an unexpected success: The New York Public Library wanted to buy a machine. Unlike the banks, libraries in those early New Deal days had money, and Watson sold more than a hundred of his otherwise unsalable machines to libraries.

Push

Research and development in science and industry can lead to new discoveries, which can be used to improve existing products or develop new ones. This is known as technology push, and it happens before there is consumer demand for a product. Research and development are valuable for companies who are the first to introduce a new, innovative product. Smartphones are an example of a product developed due to technology push, where existing touch screen technology was used to improve the mobile phone market.

Pull

Pacifically requesting information from a particular source, Downloading Web pages via a Web browser is an example of pull technology. Getting mail is also pull technology if the user initiates a request to retrieve it.

It is when product ideas are produced in response to market forces or customer needs. Examples of this include the development of cameras, which have become smaller, more lightweight and higher performing as a result of customer needs.

Analogies

The ability to perceive similarities and analogies is one of the most fundamental aspects of human cognition. It is crucial for recognition, classification, and learning and it plays an important role in scientific discovery and creativity." In cognitive psychology analogies are used to describe and partially explain the nature of problem solving. It is assumed that a novel problem can be solved with the help of an already existing solution of an analogue problem two basic stages in this process of analogical transfer are the retrieval of a base analogue and the mapping of knowledge from the base domain into the target domain.

Transfer of Technology

Technology transfer (or tech transfer), in the context of research institutions, is the process by which new inventions and other innovations created in those institutions' labs are turned into products and commercialized. This is typically done in two ways: through licensing patented intellectual property to corporations, and the creation of start-up companies, which also often license the IP created by faculty.

A key role of technology transfer professionals is to protect the intellectual property associated with these valuable innovations so that they can be licensed and commercialized, and brought to the marketplace for society's benefit.

Successfully technology transfer has benefits for universities, companies, regional and national economies, and society at large.

For universities it can bring revenues that can be plowed back into research, as well as recognition of its scientists and their innovations – which in turn can help with faculty recruitment and grant funding.

For companies, benefits include the ability to tap into research advances without spending on internal R&D, and introducing new products that can drive the success of their businesses forward.

For regional and national economies, technology transfer is a key factor in growth through innovation, creating new ventures and stronger industries that create more jobs.

Creative Method & Approach for Innovation management

Creative thinking is integral to the problem-solving process. Employing creative thinking at work can make you a valuable team member since you'll generate ideas the company can use. Thinking creatively can also enable you to develop ideas that might lead you to come up with new innovations. Many great thinkers and entrepreneurs are or were creative thinkers who went independent routes and made some of the greatest discoveries and inventions of all time: Marie Curie, Steve Jobs, Nikola Tesla, Ada Lovelace...the list is endless. While many of these genius innovators had unorthodox ideas and methods that seemed odd to their contemporaries, their results speak for themselves; they made the modern world what it is.

1. Brainstorm ideas

Brainstorming sessions can go a long way in generating ideas. They can be especially effective if you have a large team because you'll be able to generate more ideas. Make sure to include all members of the group or team, even people who aren't directly involved in the project or whose jobs don't usually entail problem-solving. These members could have unique insights because they're coming from different perspectives and may have different ways of approaching the problem from your usual methods.

2. Role-play scenarios

Role-playing is a common training method in the military and emergency response groups. Some businesses have begun using the method to train new employees as well. Role-playing doesn't need to be limited to new employees, though. When you act out different situations and scenarios, you may develop new ways of looking at an issue and come up with potential solutions. You'll also help team members develop confidence and become more comfortable when dealing with unfamiliar situations since they'll need to respond quickly and think on their feet.

Role-playing involves two or more members of a group acting out a situation. It might concern dealing with a new client, giving a presentation, interviewing, or resolving conflicts. Essentially, you can role-play any situation that might be difficult and improved with rehearsal. When people are able to role-play a scenario before encountering the situation in real life, they'll have some practice developing resolutions quickly on their feet. You can also view the scenario in a different way and up with unique ways of solving problems.

3. Reframe the issue

Reframing a problem or situation can help you reinterpret it. When you present the issue in a new way, you'll open up different possibilities for how people react, feel, and examine the situation, which can ultimately lead to new solutions. Consider alternative meanings, contexts, and perspectives for the situation at hand. Also, think about what the problem can teach you.

Once you've examined these different angles, you might see the situation in a new light and discover a new approach. You might ask others to reframe the issue for you as well. This can increase the number of angles from which you'll be able to consider the problem and potential solutions.

4. Make the most of creative flow

When you become completely absorbed in a project to the point at which you're so fully immersed that you don't notice other distractions, you're in a state of creative flow. This state is correlated with strong creative performance, meaning you might produce some of your best ideas when you're immersed in it. While you can't induce flow, since there are actual changes the chemistry and activity of your brain while you're in this state, you can seek out experiences that will cause you to produce your best work.

Creative flow occurs when you're deeply involved in an activity that engages you and brings you pleasure, so if you're passionate about a project, you're more likely to find yourself in this state. Creative people make the most of the insights and ideas they develop while in a state of creative flow, so it can be an important part of your creative process. Your thoughts during this state could represent some of your greatest work.

5. Stay open-minded and flexible

One consistent quality of creative people is that they tend not to see boundaries where others might; boundaries only impede innovation. If you're constantly noticing the limitations of what you can do, you won't be able to develop solutions that are off the beaten path. That is, after all, what it means to think outside the box. Instead of limiting themselves to what the rules allow, people who are innovative thinkers don't see solutions as limited to what can happen within the confines of rules. Instead, they employ creative problem-solving skills to see the possibilities as virtually limitless.

If you want to improve your creative process and skills, be open-minded to solutions that may extend beyond the parameters with which you're familiar. Also appreciate the ideas of others, which may involve problem-solving processes that are unfamiliar or atypical for you and your team.

6. Keep your ego out of it

You may and likely will encounter setbacks in your career and life. Not all your ideas are going to pan out. What will set you apart is your ability to see failures as temporary, rather than permanent. If you keep trying, you'll eventually achieve success—you might just need to find a new approach to achieving it.

Approaches to management of the innovation process

Agile management

Agile management focuses on delivering maximum value against business priorities in the time and budget allowed, especially when the drive to deliver is greater than the risk. Principles include:

The project breaks a requirement into smaller pieces, which are then prioritized by the team in terms of importance.

The agile project promotes collaborative working, especially with the customer.

The agile project reflects, learns and adjusts at regular intervals to ensure that the customer is always satisfied and is provided with outcomes that result in benefits.

Agile methods integrate planning with execution, allowing an organization to create a working mindset that helps a team respond effectively to changing requirements.

It's useful for organizations to understand and see agile methodology examples and case studies, to understand if they need to consider this approach.

Long have the times passed where Agile was the sole domain of I.T. or the Tech industry.

Agile is now seen as the optimum business model methodology to adopt for most industries. Most industries or organizations are looking to create efficiencies. In their productivity, increased speed to market, and better employee empowerment and morale.

Who uses Agile Methodology?

ADAPTOVATE has worked with clients from every type of industry including:

- Intensive Capital Heavy Industry (Energy, Mining, Manufacturing etc.)
- Financial (Banking, Insurance, Loans etc.)
- Health (Pharmaceutical, Institutions, etc.)
- Government departments, agencies, lobby
- Human Resources
- Engineering
- Food & retail (Large chains, manufacturing)
- Not Profit sector

ADAPTOVATE will work closely with our client to best meet the outcome that they are looking for. It should be said that during our assessment we can determine that what a client 'thinks' they are looking for often turns out not to be what, in actual fact, is needed.

Agile Strategy examples

By undergoing these early discussions, we can determine the agile strategy that will be undertaken. Within ADAPTOVATE we have four key practices we initially operate under. After our assessment, we will undertake our work using one of the following or a combination of all.

- Agile Operating Model Delivery
- Agile Delivery Improvement & Scale
- Agile Business Design & Innovation
- Business Agility Consulting & Training

Agile Transformation

When embarking on an Agile Transformation of any kind, it's important to start off the right way. This doesn't mean, it needs to start big. In fact, often times, we may encourage pilot teams. If the organization is global, and is looking to roll a new business model across many teams and regions this can be useful. As business change can involve 1000's of people, pilot teams can be the way to start. Other times not. Have a look at our article on Top-down vs Bottom-up approaches.

Agile Methodology

The very term 'agile methodology' may be confusing, misleading or obstructive to some. Many times, we will engage with an organization, who have hired us to review their business model and are looking for a new business design to lead them into the future. 'Agile' may not even enter the conversation.

ADAPTOVATE believe that applying best practices that have formed the basis of Agile methodology, is always going to bring about positive change. However, sometimes it's useful, particularly when speaking to employees, not to start with the terminology. Change can be difficult. We recognize that, and are able to help leaders and their teams write the playbook of their future.

Six Thinking Hats

Six Thinking Hats or Edward de Bono's Six Hats is a good decision-making technique and method for group discussions and individual thinking. Combined with the parallel thinking process, this technique helps groups think more effectively. It is a means to organize thinking processes in a detailed and cohesive manner. Edward de Bono is the founding father of these six thinking hats technique and wrote a book about this called the Six Thinking Hats in 1985.

A thinking hat is a metaphor for a certain way of thinking. By mentally wearing different thinking hats people are forced to look at a problem from different perspectives. Thus, a one-sided way of thinking is excluded and new insights are created.

He distinguishes six different frames of mind in which the brain can become sensitive. Each of these frames of mind can be found in the brain and create conscious thoughts for certain aspects of the issues that are being discussed. With six hats thinking, you adopt a parallel thinking process that examines an issue from different angles. Each hat has a different color that represents a specific mindset.

In terms of hat sequences, it always depends on what we're trying to achieve, and we don't always use every hat. When we're brainstorming product launches, for example, we usually take the following approach:

Blue– to define the purpose of the meeting and get it started.

Green– to inspire the creativity needed to think of a new and exciting way to reach client audiences.

Red– to consider what emotions the various campaign possibilities would inspire.

The Six Thinking Hats is a role-playing model presented by Edward de Bono in 1986. It serves as a team-based problem solving and brainstorming technique that can be used to explore problems and solutions and uncover ideas and options that might otherwise be overlooked by a homogeneously thinking group.

The basic premise hinges upon the idea that most people think and reason in a specific way based on their personality type. This means that a more emotional person may generate ideas differently than a more analytical person, and vice-versa. Similarly, a pessimist will approach a situation very differently than an optimist.

Edward de Bono identified 6 types of one-dimensional personalities or "Thinking Hats". While the average person will often imbue qualities from several of these 6 types, the goal of the Six Thinking Hat model is to assign each member of the team a different, one-dimensional "Thinking Hat" for the duration of the problem solving or brainstorming session.

The 6 types or "Thinking Hats" are:

White Hat: analytical, objective thinking, with an emphasis on facts and feasibility. (How to remember White Hat - The color white is often associated with purity. Similarly, the White Hat has a clean perspective that is unadulterated by emotion or subjectivity.)

Red Hat: emotional thinking, subjective feelings, perception, and opinion. (How to remember Red Hat - Red is the color of rage and emotion. Red Hat allows emotion and subjectivity to dominate.)

Black Hat: critical, skeptical, focused on risks, and identifying problems. (How to remember Black Hat - Black, the color of gloom and pessimism. The Black Hat is the skeptic, and pessimist looking for the problems in everything.)

Yellow Hat: optimistic, speculative, best-case scenario. (How to remember Yellow Hat - Yellow Hat is the sunny one. They are happy and have a positive outlook on things, always expecting the best outcome.)

Blue Hat: structured thinking, high-level overview of the situation, the big picture. (How to remember Blue Hat - Blue is the color of the sky. Imagine the Blue Hat person has a 20,000-foot perspective on this. They can see everything from a distance and get the big picture view.)

Green Hat: creative, associative thinking, new ideas, brainstorming, out-of-the-box. (How to remember Green Hat - Green is the color of nature as capture by the artist. The Green Hat is creative and generates lots of new ideas without concern for feasibility.)

Since each member is assigned a single hat, you don't have to remember the characteristics of them all, only the hat which is assigned to you. With 6 team members working together from their one-dimensional point of view, problems and solutions can be worked and dissected from 6 very different perspectives leading to well thought out conclusions.

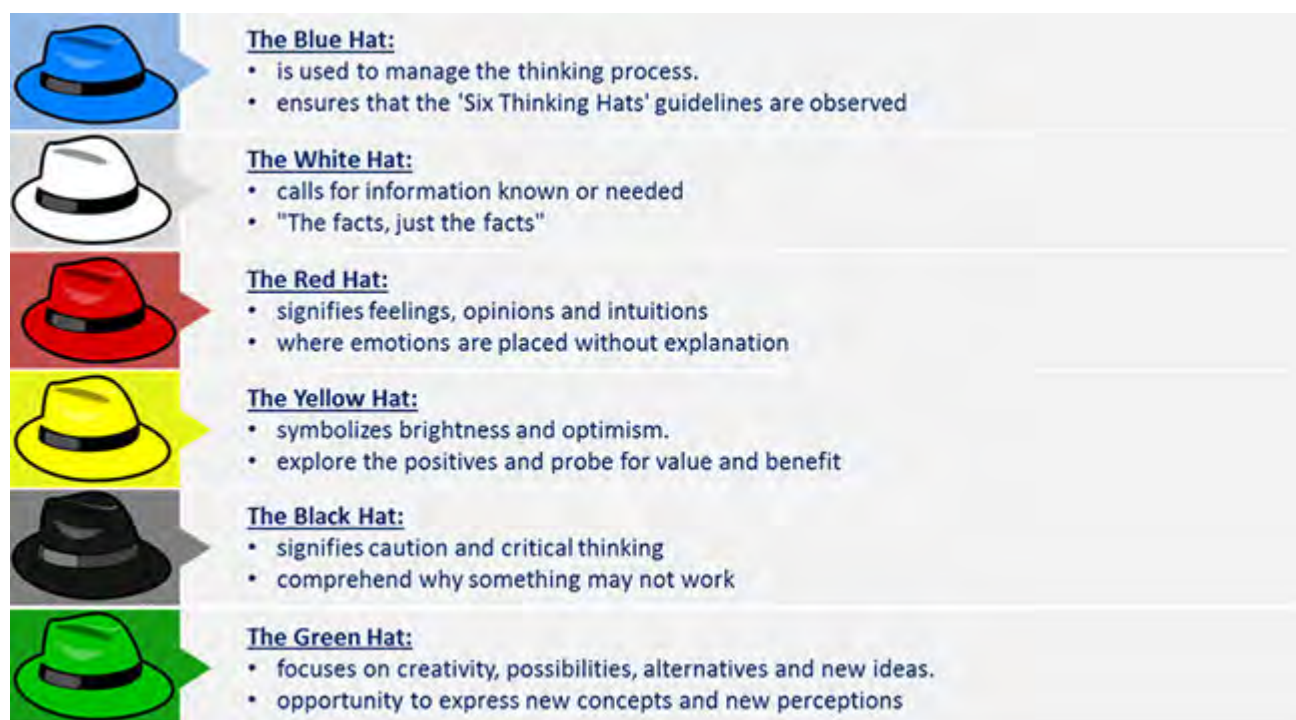


Figure 2.1: Thinking Hats

The Case Study – The Problem

Hewlett-Packard, one of the world's largest organizations, is a leading global provider of products, technologies, solutions and services to consumers and business. The May 2002 merger of Hewlett-Packard and Compaq Computer Corporation created a powerful team of more than 140,000 employees in 160 countries.

As you can imagine, along with the tremendous opportunity created by this merger came a lot of chaos. The enormous task of merging the two giants together without losing sight of the customer came down to the capability of individual teams working together to create plans in line with HP's corporate goals...fitting the pieces together. No easy task when performed in the midst of clashing corporate cultures and crushing morale problems.

You prepare a complete Process and Quality Management Network Storage Solutions, for the given task to organize the strategic planning and also present their business plan.

Using the creativity tools (Six Thinking Hats & Lateral Thinking)

The Six Thinking Hats of Exploratory Testing

In this era of increased speed-to-market where focus is more on Lean and Agile, exploratory testing has become more significant than ever. Testers frequently face the challenge of delivering results without having enough time to plan and design their tests. This leads to incomplete test coverage and defect leakage into production.

It would be of great benefit to have a fool-proof mechanism to help design the tests covering all aspects of a product or a project, thereby ensuring greater test coverage. This is where the six thinking hats of exploratory testing come in.

Applying Edward de Bono's six thinking hats principles to exploratory testing can work wonders and empower the testers by inspiring confidence in them with better test coverage.

Exploratory testing is a form of testing where one continuously refines their testing approach based on how the application under test responds.

It is arguably the most misinterpreted testing technique. More often than not, it is assumed to be a random or ad-hoc form of testing which lacks structure and planning; when in fact, exploratory testing should be performed as a well-thought-out process. Although testers typically learn the product, design the test cases and execute them, all at the same time, there ought to be an organized approach while doing so.

The flexibility of exploratory testing should be leveraged towards improving the overall product quality without falling for the chaos that unplanned, immature tests may bring. If planned well, exploratory testing can yield great results. Some benefits of this approach include continuous improvement of tests, uncovering of the not-so-obvious defects, and learning on the go. However, it is easy to go astray without direction and alignment of thoughts.

Session-based testing

There are various ways in which exploratory testing can be structured to achieve its intended results, session-based testing being the most popular practice. Session-based testing has been established on the fact that the human brain can only concentrate on one topic for a limited amount of time.

Splitting up the testing window into smaller sessions increases productivity and yields better results. One of the ideas that can further enhance these sessions of exploratory testing is applying Edward de Bono's famous lateral thinking technique known as "Six Thinking Hats".

Edward de Bono’s thinking hats

The Six Thinking Hats is a lateral thinking tool designed to provide structure to the thinking of an individual or a group. It was devised by Edward de Bono, who has always been an advocate of learning and adopting “thinking methods” to aid with decision making.

Six Thinking Hats is a parallel thinking technique which steers one’s thought process in a detailed and cohesive manner. The six hats represent six different focus areas of a problem or the subject in discussion. Switching the hats one by one ensures that all aspects of the subject have been considered and analyzed. By bearing in mind all alternatives, the probability of getting restricted to one perspective can be greatly reduced, if not eliminated.

The thinking hats principles can benefit the teams while making group decisions or even while working in silo. In the case of teams, it helps to have a coordinator to make sure that everybody in the team is wearing the same hat at any given point.

The Blue Hat

Blue hat is used to manage the thinking process. It represents the big picture, the overview. With the blue hat on, one can, for example, plan how much time should be spent on the other hats. Once all the other hats have been considered, one can take up the blue hat again for final decision making.

The White Hat

White hat represents facts and information. With the white hat on, one should focus on all possible information known about the subject in question. No assumptions, just facts. While this helps one understand, what is known about the subject, it also directs towards the unknown. With the right questions asked, useful information can come to light.

The Red Hat

Red hat represents emotions and feelings. One is allowed to echo their feelings without being judged or without having to give an explanation. The statements that result from putting the red hat on could be as strong as “I hate this UI” or “I think the stakeholders will love this!”

The Yellow Hat

Yellow hat denotes positivity and optimism. Focus is on the benefits and advantages of a particular approach or solution; just the bright side with no consideration of pit falls.

The Black Hat

The black hat is the “critique” with emphasis only on the negatives and finding out the reasons why an approach or a solution will not work. Failure to work could be due to cost, feasibility or associated risks. The idea is to expose all the loop holes that prevent the solution from achieving the desired result.

The Green Hat

The green hat signifies creativity and innovation, an out-of-the-box solution to a problem. By putting on the green hat, one can concentrate on ideas and solutions that may not have been considered with all the other hats. Green hat contributes towards uncovering unconventional approaches to problem solving.

The below table presents the essence of each of the six hats:

NUF Test

As a group is developing ideas in a brainstorming session, it may be useful to do a quick “reality check” on proposed ideas. In the NUF Test, participants rate an idea on three criteria: to what degree is it New, Useful, and Feasible

Set up the game by quickly creating a matrix of ideas against the criteria:

New: Has the idea been tried before? An idea will score higher here if it is significantly different from approaches that have come before it. A new idea captures attention and possibility.

Useful: Does the idea actually solve the problem? An idea that solves the problem completely, without creating any new problems, will score better here.

Feasible: Can it be done? A new and useful idea still has to be weighed against its cost to implement. Ideas that require fewer resources and effort to be realized will score better here.





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