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|  | **BAHRIA UNIVERSITY, (Karachi Campus)**  *Department of Software Engineering*  **Assignment 1 - Spring 2022** |  |



COURSE TITLE: Engineering Management COURSE CODE: **MGT-423**

Class: **BSE-IV (B)** Shift: **Morning**

Course Instructor: **Engr. Talha Bin Saeed** Time Allowed:  **3 Week**

Submission Date: **23/04/2022** Max. Marks:05

**[CLO1: 5 Marks]**

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**QUESTION #01**

Discuss how engineers can play a significant role in driving innovations that will benefit customers and increase profits for the firm?

**Solution: -**

**Innovation Process: -**

Engineers drive innovations by following a process known as innovation process. This is a 5-step process which helps us in translating new/existing ideas/solutions into production-level solutions. The 5 steps in the innovation process are as follows:-

1. **Idea Generation and Mobilization: -**

During the idea generating process, Engineers generate new ideas. When an idea is mobilized, it is transferred to a new physical or logical place, such as an outside firm or another department. An enhancement on an existing idea or something entirely new can provide inspiration to an engineer for a new idea. For example, According to The Atlantic, Apple waited three years after the introduction of MP3 players to build the iPod, which was beautiful, intuitive, and could hold up to 1,000 songs. An example of a new idea for innovation is agricultural drone. Agricultural drones are used by farmers to monitor issues with soil and crops in a cheap cost as compared to manually checking crops or by a manned aircraft. These ideas are generated to solve an issue of mankind (for example, weight lifting robots, computers etcetera) or to provide luxury to mankind (for example, iPod, social media etcetera).

1. **Advocacy And Screening: -**

Some ideas aren't worth pursuing. Advocacy and screening aid in the evaluation of a concept and the assessment of its possible benefits and drawbacks. From there, a decision on an idea's future can be made. Refinement is one of the most significant benefits of the combined advocacy and screening processes. Discussions and disagreements might assist to improve an idea if it has potential. This step, according to a study published in Innovation: Management, Policy, and Practice, prepares a concept for senior management, which may necessitate a different strategy. Managers dealing with idea generators can enable, encourage, and support the person because idea generators don't necessarily have the abilities to advocate for their ideas. An example of a failed innovative product on which advocacy and screening would not have been done properly is google glass. Google Glass was a good technology as it was offering a lot of smartphone features in a normal glass but it was to much costly for a normal consumer which was 1500$. High cost was the reason for its doom. Had they properly analyzed their audience and reduced their price, their product could have been much popular.

1. **Experimentation: -**

The experimentation step involves putting an idea to the test, such as through a prototype or a pilot test. "Experimentation does not evaluate an idea's objective qualities, but the fit for a given organization at a particular time," according to researchers in Innovation: Management, Policy, and Practice. Some ideas "may be ahead of their time or beyond the company's current capacity... they may be saved in an idea bank or idea library for subsequent development.”[1]

As proponents and screeners reevaluate an idea, experimentation can continue or occur in bursts.

Experimentation can sometimes lead to new ideas as a result of data obtained from the outcomes and the general practicality of the original concept. In this process, time is key; subjects must be given enough time to complete the studies. They must be given adequate time to reflect on the experiments while improvements and evaluations take place. An example of a successful experimentation phase leading to a successful product is Amazon Fresh. Amazon's grocery delivery service was trialed in a few Seattle suburbs. Following this successful pilot, Amazon Fresh expanded to Los Angeles, San Diego, and New York City. the most recent destinations Amazon has targeted are New Jersey and the United Kingdom.

1. **Commercialization: -**

The goal of commercialization is to give an idea market value by focusing on its potential impact. This step makes the idea interesting to the audience by combining it with other ideas, emphasizing how and when the idea may be used, and demonstrating benefits with data or prototypes from tests. Establishing the parameters of any given idea is a vital aspect of commercialization. Researchers noted in Innovation: Management, Policy & Practice, "The promises and potentials of earlier stages of innovation must be discarded so that the actual benefits of the new innovation can be understood and articulated.". Once an idea has been polished, it can be targeted and tailored to the audience's needs. The focus moves from development to persuasion during the commercialization stage of the invention process.

It will be ready for dissemination and implementation after the idea has been clarified and a business strategy has been developed. An example of prominent failure of this stage is google glass which is mentioned above in second step.

1. **Diffusion And Implementation: -**

Researchers wrote in Innovation: Management, Policy & Practice that "diffusion and implementation are two sides of the same coin." Diffusion is the widespread adoption of a creative idea within an organization, while implementation is the process of putting everything in place to develop, use, or create the invention. Diffusion occurs at all levels of a company. Expertise brokers are typically helpful in this process, since they may effectively communicate an invention by using their knowledge of "the precise content and application into which an idea, product, or service might be inserted." As a result, knowledge brokers can help with quick deployment. By the end of this stage, the innovation's usage or application, as well as its acceptance, should be demonstrated.

It will take the right resources, a customer marketing plan, and an open culture with strong advocacy for the innovation to flourish. Future ideas are also vital to diffusion and implementation; this final stage allows the company to define the next set of customer needs. Receiving feedback, as well as indicators for success measures and other benchmarks, allows the organization to re-energize the innovation process.

**Conclusion: -**

The above process is mostly used by engineers to drive innovation from a new idea or an existing idea. It involves all areas of requirements gathering, development, maintenance etc. So, this is a generalized process for driving innovations.

**References: -**

1. <https://www.rivier.edu/academics/blog-posts/cultivating-a-robust-organization-5-stages-of-the-innovation-process/>

**QUESTION #02**

From your observations provide some examples of motivational theories that are being used  
by engineers in different firms?

**Solution: -**

There are 3 motivational theories which are used by engineers. The 5 theories along with their examples are as follows: -

1. **Maslow Hiearchy of Needs: -**

According to Abraham Maslow, a person is motivated when all of his needs are met.People labor not for the sake of security or money, but to contribute and put their abilities to use. He illustrated this by drawing a pyramid to indicate how people are motivated, noting that **one cannot ascend to the next level unless lower-level needs are met**. Basic needs are at the bottom of the pyramid, and unless these lower-level requirements are met, people will not work toward meeting the higher-level demands.The 5 heiarchies of needs are as follows:-

1. **Physiological needs (These** are basic needs for survival.An example of this need for the engineers is the salary which is paid to the engineers while doing their work in their respective companies**).**
2. **Safety needs (**A need for a safe physical and psychological environment.An example of this need for the engineer is the security and medical money being given by the organization to cover up the medical loss of the employee).
3. **Social needs (Needs relating to a specific area of human life are referred to as social needs.The urge for love and affection is one of them, and it is influenced by one's peers.An example of this need for the engineer are the good coworkers and supervisors which help them in doing projects).**
4. **Esteem needs (Self-respect, self-confidence, and a sense of personal worth are all aspects of the Esteem requirements.An example of this need for the engineer is the promotions which means the increase in the position, salary and dignity of the engineer).**
5. **Self-Actualization needs** (Self-actualization is the process of being aware of oneself. Many people reach a point in their lives when they begin to wonder what is expected of them in their lives.An example of this need for the engineer are the challenging projects which challenge the engineers and an opportunity for the innovation).

1. **Hertzeburg Two Factor Theory**

Herzberg's two-factor theory is a job satisfaction hypothesis based on an extension of Maslow's Hierarchy of Needs theory. It says that some circumstances in the workplace cause job satisfaction, while another set of factors causes unhappiness, all of which act independently of one another.The idea (also known as Herzberg's motivation-hygiene theory or dual-factor theory) is based on a large body of empirical evidence, notably the principles that individuals are motivated toward what they like and away from what they don't like. Through this theory, He arrived to the conclusion that there were two types of motivational elements that contributed to job satisfaction.

1. **Hygienic Factors: -**

The Hygiene Factors (also known as dissatisfiers or job-context factors), which are Maslow's lower requirements, are a sort of extrinsic job conditions that, when absent, cause employee discontent. They alleviate discomfort or discontent when they are present and hence improve mental health, but they do not contribute to high job satisfaction on their own. Examples of this factor in real life are salary and allowances, physical working conditions etcetera.

1. **True Motivators: -**

Motivators are a sort of intrinsic element known as satisfiers, and they are linked to job content and the reward that comes from doing good work.

They are thought to make the worker feel good or have a positive mindset.

They inspire people to strive for higher levels of performance, as well as a desire for new challenges, growth, and development. Examples of this factor in real life are organization culture(means not to treat as a slave),continuous learning opportunities etcetera.

1. **McClelland’s Theory of Needs**

In 1961,David McClelland provided his theory on the basis of maslow hierarchy of needs which is known as McClelland theory of needs. He identified three motivators that he believes we all have: a desire for accomplishment, affiliation, and power. According to McClelland, these motivators are taught (which is why this theory is sometimes called the Learned Needs Theory). According to McClelland, we all have three motivating drivers, one of which will be our main motivator, independent of our gender, culture, or age.Our culture and life experiences have a big influence on this primary motivator.The three motivating factors are as follows:-

1. **Need for achievement** (The need to achieve something in what you do is referred to as the need for achievement. It is a person's desire to achieve a goal that motivates them to work and even battle for it. People with high accomplishment demands strive to be the best at whatever they do, avoiding low-reward low-risk scenarios and difficult-to-achieve high-risk situations in particular. An example of this need for the engineer is when they try to complete a challenging project which is beyond their skills).

1. **Need for power** (The urge to exert control and authority over another person in order to influence and change their decisions in accordance with one's own needs or desires is known as the need for power. These individuals are motivated by a desire to boost their self-esteem and reputation, and they want their ideas and opinions to be accepted and implemented above those of others. An example of the need for the engineer is to manage a challenging project in a team of several developers).
2. **Need for affiliation** (The need to have interpersonal and social relationships with individuals or a certain group of people is known as the need for affiliation. They desire to collaborate in groups and build positive, long-term bonds.They desire to be loved by others as well.They like to collaborate with others rather than compete with them, and they avoid high-risk situations and ambiguity as much as possible. An example of the need for the engineer is to work with good coworkers and supervisors).

**Conclusion: -**

Motivation is the key to success for successful projects. Engineers uses different motivational theories to motivate themselves which are mentioned above. These theories are used to motivate the engineers in conducting their jobs successfully.

**References: -**

1. <https://ifioque.com/miscellaneous/Herzberg%E2%80%99s_two-factor_theory/>