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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]**

**QUESTION #01**

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

**Introduction**

In today's engineering environment, innovation and entrepreneurship are major drivers, and there is a greater demand than ever for sustainable goods, services, and technology. Many people, from multinational organizations to tiny businesses, local governments to local governments, are keep discovering long-term answers to critical problems.

As construction and infrastructure projects get more complicated, and the business climate becomes more competitive, Robert Plana of multinational engineering company Assystem believes that embracing innovation will be critical to enhancing efficiency, lowering costs, and reacting to change.

**Engineers are essentially inventors for the future**

In today's engineering environment, innovation and entrepreneurship are critical, and the quest for sustainable goods, services, and technology is more important than ever. Many people are looking for sustainable solutions to tackle serious environmental concerns, from big corporations to small enterprises, national governments to municipal governments. Because innovation has such a large impact on the growth and survival of today's engineering world, it's critical that higher education institutions devote time and resources to teaching innovation and entrepreneurship.

**Innovations**

For a long time, product manufacture and technical advancements were the focus of innovation, while facilities and engineering were not a big element of the value offering. However, due to our highly competitive market and the increased complexity of infrastructures connected with new environmental policies and tougher safety and security laws, this tendency is reversing. The significance of engineering and infrastructure in the global value chain is growing, necessitating the incorporation of innovation as a business enabler.

**Importance Of Innovation**

The capacity to quickly absorb new technology, processes, and uses has a considerable influence on the area of engineering and infrastructure. Attracting youthful talent has become a strategic goal. This is accomplished by putting young engineers on complicated projects with challenging, exciting tasks and by implementing new, more collaborative modes of working, such as hackathons, employing agile and creative approaches. This will open a new path for firms to become more dynamic and long-lasting. Businesses may use innovation to adapt to changes in the environment, market, and customer needs. Engineering and construction companies have a significant problem in competing in a saturated market. Embracing innovation, on the other hand, may help businesses discover a new way to join the market and stay competitive while also expanding their global and local reach.

**The Benefits of Innovating**

For businesses that choose to embrace innovation, there are a plethora of benefits. The most significant being:

**Increased Efficiency**

Innovation boosts productivity. Businesses must run effectively to be successful in the engineering and construction sector. Using the most powerful artificial intelligence technology, for example, will allow an organization to better estimate a project's delivery model and increase the availability of the infrastructure in use.

**Cost**

Innovative and developing technologies like BIM and Digital Twin may help businesses save money and increase revenue.

**Market**

Businesses may be more adaptable and adapt their strategy to shifting market needs thanks to innovation.

**Adapt**

Businesses may use innovation to adapt to technological change and participate in the digital economy and the Internet of Things.

**Workforce**

Through new professions like data scientist and BIM manager, organizations can build and keep a talented staff. The industry will be able to fill new roles in a variety of fields, as well as propose innovative approaches to system engineering.

**Innovation In practice**

It's critical for organizations to innovate and turn to new technologies as project owners are requested to design structures that are becoming increasingly complicated and with greater performance requirements. BIM is one of the cutting-edge digital technologies now transforming the engineering business.

Through the digital twin concept, organizations may achieve cost and time savings of 10%, a 90% decrease in project information handover time, and a 20% efficiency savings across the asset lifespan by deploying BIM effectively.

**Staying Ahead**

Innovation is becoming increasingly important as engineering projects become more complicated and expensive. It reduces costs, shortens processes, and increases efficiency, as well as providing businesses with hitherto unseen prospects.

**Develop your Career**

Summer school is one option to improve your qualifications and grow your knowledge and abilities. The EIT Raw Materials Academy's master's programmed in advanced materials for innovation and sustainability has its own summer school, which is held in a different location throughout Europe each year and is the cornerstone of their master's programmed.

The program's main goal is to address the most pressing concerns regarding the substitution and replacement of crucial and harmful ingredients to improve product performance. Students will attend lectures, presentations, and can participate in practical activities and corporate visits as part of the summer school programmed.

As they work alongside industry partners' representatives, students will get the opportunity to work in diverse teams, cultivate their entrepreneurial attitude, and learn how to bring a product or service to market that has promise. As you get a better understanding of and appreciation for all facets of the engineering profession, your chances of landing a top post-graduation position will skyrocket.

**QUESTION #02**

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

**Motivation Theories**

Motivation is a state of mind that is characterized by energy and passion that pushes a person to operate in a certain manner to attain desired outcomes. Motivation is a force that drives people to work with a high degree of dedication and attention, especially when things aren't going their way. Motivation leads to a specific type of human conduct. In a nutshell, motivation is the power that propels human behavior.

Our motivations are guided and directed by a variety of influences. It is critical to guarantee that every member of a company's team is motivated and that the project management bottom line is met. Numerous psychologists have investigated human behavior and structured their results into various motivational theories. These motivational theories provide light on why individuals behave the way they do and what drives them.

**Maslow’s Theory of Hierarchy of needs**

A person will be motivated, according to Abraham Maslow, when all 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 individuals are driven, 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 until these lower-level requirements are met, individuals will not work toward meeting the higher-level demands.

**Hierarchy of needs**

**Physiological needs**

Air, sleep, food, water, clothes, and shelter are all essential survival necessities.

**Safety needs**

Threats, deprivation, and other perils are all avoided (e.g., health, secure employment, and property)

**Social needs**

The desire for connection, companionship, and other forms of socialization.

**Self-esteem needs**

The requirement for respect and acknowledgement.

**Self-actualization needs**

Possibility for personal growth, learning, and enjoyable/creative/challenging work. Self-actualization is the highest amount of need that a person may have.

The leader must first determine where the team members are currently at, then seek out ways to assist them in meeting those needs and work to meet those needs. This will enable team members to perform better and drive the project forward. In addition, when their requirements are met, team members will begin to perform until they are ready to consider meeting the next higher degree of need in the pyramid.

**Hertzberg’s Two-Factor Theory**

Hertzberg divided the requirements into two categories: hygienic requirements and motivational requirements:

* Poor hygiene variables may detract from motivation, but changing them will not, in most cases, boost team motivation.
* Hygiene considerations alone are insufficient to encourage individuals; motivator components must also be present.

**Motivation Factors**

Motivation variables, according to Herzberg are required to promote job satisfaction. According to Herzberg, these motivators are fundamental to the profession and lead to job satisfaction by satisfying demands for growth and self-actualization.

**Advancement**

Advancement, according to Herzberg, is a person's upward and positive status or position in the job. A negative or neutral work status, on the other hand, denotes a lack of development.

**The work itself**

Employees might be affected positively or negatively by the substance of their duties. The complexity of the job and the amount of participation can have a significant influence on workplace satisfaction or unhappiness.

**Possibility of growth**

Possibilities for growth are like Maslow's concept of self-actualization in that they are possibilities for a person to achieve personal growth and advancement at work. Professional development, increasing opportunity to acquire new skills and procedures, and obtaining professional knowledge can all arise from personal growth.

**Responsibility**

The term "responsibility" refers to the individual's obligations as well as the authority given to them in their job. When people are given the duty and authority to make decisions, they feel fulfilled. A mismatch between responsibility and authority, on the other hand, has a detrimental impact on work satisfaction.

**Recognition**

Employees are recognized when they are praised or rewarded for achieving goals at work or generating high-quality work. Negative recognition entails making complaints or assigning blame for a task well done.

**Achievement**

Completing a challenging assignment on time, overcoming a job-related challenge, or witnessing positive outcomes from one's labor are all examples of positive accomplishment. Failure to make progress at work or bad job-related decision making are examples of negative accomplishment.

**Hygiene Factors**

The variables that reduce job unhappiness are known as hygiene factors. "Medical hygiene...[which] functions to remove health threats from the environment," according to Herzberg, Mauser, and Snyderman.

According to Herzberg, hygienic elements are unrelated to the job and serve the "desire to avoid discomfort".

**Interpersonal relations**

Personal and professional interactions between an employee and his superiors, subordinates, and peers are referred to as interpersonal relationships. This may be seen in both the workplace and during casual break periods, for example, in job-related conversations and social talks.

**Salary**

Wage and salary increase, as well as unmet wage and salary expectations, are included in pay.

**Working conditions**

Finally, working circumstances refer to the job's actual surroundings and whether they are excellent or bad. The quantity of work, space, ventilation, tools, temperature, and safety are all factors that might contribute to a good or bad workstation.

**McClelland’s Theory of Needs**

According to McClelland, we all have three motivational drives that are independent of our gender or age. In our actions, one of these impulses will take precedence. Our primary motivation is influenced by our life experiences.

**The three Motivators are**

**Achievement**

A desire to achieve and display one's own expertise. People who have a strong desire to succeed choose assignments that allow them to take personal responsibility and produce outcomes based on their own efforts. They also desire immediate feedback on their development.

**Affiliation**

A desire for affection, acceptance, and belonging. Being liked and accepted by others motivates those with a high need for connection. They are more likely to attend social events and may be wary of conflict.

**Power**

A desire to exert control over one's own or others' work. People who have a strong thirst for power seek for settings in which they may exert control and influence over others. They seek to positions of prestige and power, and their degree of influence is more important to them than good work performance.

**Vroom’s Theory of Expectancy**

According to Vroom's expectancy theory of motivation, an individual's motivation is influenced by their future expectations. According to him, a person's motivation is influenced by —

**Expectancy**

The notion is that putting in more effort will result in better results, i.e., if I work more, I will get better results. This is influenced by factors such as:

* Having the necessary resources on hand (e.g., raw materials, time)
* Having the necessary managerial abilities to complete the task
* Having the necessary resources to complete the task (e.g., supervisor support, or correct information on the job)

**Instrumentality**

The premise here is that if you do well, the outcome will be beneficial to me. i.e., there is something in it for me if I do a good job. This is influenced by factors such as:

* Clear awareness of the link between performance and results - for example, the reward 'game' rules
* Have faith in the individuals who will decide who receives what outcome.
* Who receives what outcome is determined by the level of transparency in the process.

**Valence**

Is the weight that an individual attaches to the predicted outcome. If someone is motivated by money, for example, he or she may disregard offers of extended time off.

**Conclusion**

Motivation is the state of mind that drives all humans to reach their full potential while maintaining a happy attitude. The many motivation theories discussed above assist us in determining what elements influence motivation. A leader's role is to make sure that everyone on the team and in the company is motivated and inspired to do their best work. This is neither quick nor simple, but the benefits of happy employees greatly surpass the time and effort spent encouraging them in the long run!