



## ENGINEERS PROVE BETTER MANAGERS WHEN MANAGEMENT IS SCIENCE

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### **Abstract**

*Engineers make the world and managers manage it successfully. Then what does techno managers does? The answer could be, he is a blend of sound knowledge of technology and management principles. Leading to well refined decision making ability on a practical problems. Engineers are those who analyse the problem and work on the possible technical solutions through experience and knowledge on the other hand managers coordinate and integrate the activities in an organisation leading to achievements of goals and objectives. Most engineers enter in the shoes of managers, unprepared and unaware for the transition. This brings the role conflict. Engineers always prefer to work with the establish norms strictly and so enjoys working with material and machines rather than involving themselves in managing people with the complex mix with attitude, perception, behaviour, emotions, motivations etc.*

**Keywords – Techno Managers, Transition, Complex Mix.**

### **INTRODUCTION**

#### **What makes Engineers better Managers?**

Engineers can prove a good manager as long as they are keen in looking beyond their technical and academic studies. Professional engineers willing to enter in the managerial world of corporate should broaden their understanding and vision on various human resource administrative skills, financial skills and psychological issues. (Manufacturing Engineering Magazine Feb 2008). Researchers have recognised few must have managerial skills for engineers to excel in management career.

1. Cultural understating,
2. Human behavioural study,
3. Effective lateral thinking,
4. Group dynamics,
5. Conflict management,
6. Ability to evaluate the risk,
7. Presentation skills,
8. Awareness about the management tools.

History speaks loud and clear on engineers do extra ordinary well in to roles of managerial responsibilities and capabilities. It was a young engineer Mr Kiichiro Toyoda, 75 years ago founded a company Toyota Motor company. Then Toyota Motor company and today's giant Toyota Production system, the journey of 75 years speaks strong on the management philosophies, philanthropies and strategies. It also speaks the success of engineers as managers.

### **LITERATURE**

Engineers are really perfect candidates for management positions because of their penchant for problem solving. Those who are able to master management skills and maintain focus on technical processes will have no trouble merging into an engineering management career.

Once you've moved into an engineering management career, you have additional opportunity for further advancement within your company and industry. At each stage, technical engineering knowledge is still highly valued because of the ability it gives you to communicate effectively with your team, other departments in the organization, and your clients. Two of the greatest strengths for engineering managers are communication skills and technical knowledge (Bureau of Labor Statistics).



An engineer's fundamental skills, such as logical thinking, problem-solving and strong numeracy, are highly desirable in many other business sectors. IT, banking, finance and consulting are just a few of the options. However, you don't have to leave engineering to explore commercial, financial and management opportunities. Many larger engineering employers run programmes that focus on these areas of their business, for example operations management, commercial management, technical sales, finance, procurement and purchasing, supply chain management and logistics. Read on to research a selection of your options.

#### **a) Logistics**

Logistics covers the physical movement of materials – the transfer of raw materials to manufacturing facilities or the distribution of products to customers – as well as all the planning and financial transactions involved in these operations. The aim is to move things around at the lowest possible cost. It covers processing and tracking orders, working with planning departments to check availability of products, forecasting to meet changes in the market, and dealing with contracted services such as shipping.

- As a logistician, you will apply your problem-solving and logical-thinking skills to problems and situations as they arise.
- Every situation also requires a cost-benefit analysis. You need to consider the impact of your decisions on the business as a whole, so it's important to be able to see the bigger picture.
- Good communication skills are essential. You have to be clear and accurate in what you say to colleagues and customers, particularly when you meet resistance to changes in procedures.

#### **b) Operations Management**

Operations management is a crucial link between the different parts of the manufacturing process and the business side of a manufacturing organisation. The role is often based around the supply chain – operations managers can be involved in anything from buying raw materials to the logistics of delivery to customers. The aim is to assess and improve the day-to-day running of, for example, a manufacturing plant, by implementing systems to increase productivity and reduce costs. You also need to plan ahead and put strategies in place for future development. Communication and interpersonal skills are invaluable: you will have to work with people running the systems and processes and find quick solutions to problems based on the information you receive. You will use your analytical thinking to get the most from the data, and learn how to deal with problems that can have a huge impact on how processes work. Operations management is good for people who like to look at the business as a whole.

#### **c) Patent Law and Intellectual Property**

A patent attorney is a specialised legal professional who is qualified to write, obtain and advise clients about patents and to protect the intellectual property (IP) rights in commercial products or processes. A legal background is not required, however: the essential requirement for patent law is technical expertise. Patent attorneys may deal with patents, which protect technological innovations, and with other types of IP such as registered and unregistered designs, which protect the shape and appearance of products. A patent attorney can work for a private firm or an organization's in-house patent department.

- In addition to a good degree and broad-based interest in engineering, excellent communication skills are essential, particularly written skills.
- You need to be comfortable dealing with clients, working to tight deadlines and handling several projects at once.
- There is a long training period followed by exams – it may take from three to five years to qualify.

#### **d) Procurement, Purchasing and Buying**

Procurement is the process of buying equipment and parts for projects at the right price and quality, so that they can be delivered to where they need to be at the right time. As such, procurement careers cover a wide range of activities, including: drawing up lists of preferred suppliers; choosing suppliers based on quality, price and schedule; checking progress and quality; and working with logisticians to ship the equipment to site.



- A wide range of skills are required to be successful. Orders can be worth millions of pounds, so buyers have to cost equipment accurately.
- Selecting a suitable vendor can involve negotiation so excellent communication skills are vital.
- Timescales are tight, so you have to think on your feet and understand what's going on in all departments.
- An engineering background means you'll have a technical understanding of the equipment you're buying, so you can better estimate timescales and the impact of any changes.
- You may also be required to inspect equipment.

#### **e) Supply Chain Management**

Supply chain management involves managing raw materials, production lines, manufacturing processes and logistics to maintain a supply of high-quality products to customers. It's all about perfecting the processes in the chain to provide the best service for customers, while at the same time minimizing costs and ensuring the safety of employees. It can be quite complex, especially within a large organization where you could be working with people from business managers to technicians, so good interpersonal skills are essential. To improve processes and act as a link between different parts of the process, you will need to understand the functions of other teams, and other people's roles.

- Analytical and investigative skills are also important for seeking out new opportunities and proposing new schemes to make the business more profitable.
- An engineering background may make it easier to pick up technical knowledge, which will help when making business decisions.

Graduates working in supply chain roles:

#### **f) Teaching, Academia and Lecturing**

Many people are first attracted to engineering because they like applying science and using their problem-solving skills. Why not use your knowledge of these processes to help train others and turn young scientists into budding engineers? Teaching an engineering related subject enables you to look at the creative aspects of engineering and help students to develop their own problem-solving skills. You can use real-world examples from your degree and any time spent in business to bring technical and scientific concepts to life. You will need some experience of working with children, enthusiasm for your subject, and strong communication skills.

- You could also use your engineering background to stay in academia and become a higher education lecturer, specializing in a particular area.
- You will need in-depth technical knowledge of specialist areas, as well as the ability to communicate this to others clearly using tutorials, lectures, and practical laboratory work.
- You may also carry out personal research.

#### **g) Technical Consulting**

Technical consultants help organizations to solve their business problems. This could cover anything that might impact on the profitability of an organization so, if you are interested in the broader world of business, this may be the option for you. As a new graduate, you could expect to work as part of a team, initially focusing on research. You will then use data analysis and statistical modeling to come up with creative solutions to business problems. You will need excellent analytical and communication skills to present complex information and results to clients, who will often include top management.

- As a trained engineer it will be easier to back up your opinions with technical knowledge and analysis.
- Your logical reasoning and problem-solving skills will be invaluable, and you will need to be comfortable dealing with numbers and large volumes of data.
- You may also need your technical knowledge to advise on the implementation of specialist technology or equipment.



#### **h) Technical Sales**

Technical sales involves using your engineering knowledge to win future business. You will need to draw on your organization's expertise and skills to present innovative ideas that meet your clients' requirements. For this, you'll need a solid understanding of both the business and the needs of its clients. A strong engineering background is essential to be credible in technical sales – you need to understand any technical issues and challenges, and advise the client on how your organization can help them. You will need to work with people across your organization, including those in research, development, design and purchasing, to ensure you have a full understanding of the product or service.

- Being disciplined and having a positive outlook will take you far in a sales environment.
- Most importantly, you need to be good at listening to the client, absorbing and interpreting information and then communicating it to others.
- Winning new business is what makes technical sales people tick.

#### **i) Technical Training**

Businesses need to ensure their employees can use, sell, install and operate complex equipment and technological systems. For this, technical trainers are key – they have the technical expertise and communication skills to train workforces on topics such as technical standards, company-specific software packages, manufacturing equipment and health and safety processes.

- You may work for an agency, or be part of an internal human resources and development team.
- You will need to analyze the training needs of the organization, and then develop technical training courses and materials suitable for all levels, from those with the most basic technical or IT knowledge, to those with high-level technical skills and engineering backgrounds.
- You will need strong presentation and organizational skills, and the ability to communicate with people of all levels.
- You will also need to keep on top of industry developments and potentially work with course providers and examining bodies to ensure the appropriate accreditation.

Following list is the assimilation of data from various reputed magazines like Business Today, Business India and Out Look.

#### ***Top 5 Industries Employing the Highest Number of Engineering Managers***

1. Architecture, Engineering, and Related Services
2. Navigational, Measuring, Electro medical, and Control Instruments Manufacturing
3. Scientific Research and Development Services
4. Electronic Component Manufacturing
5. Management of Companies and Enterprises

#### ***Top 5 Highest Paying Engineering Management Industries***

1. Spectator Sports
2. Oil and Gas Extraction
3. Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)
4. Scientific Research and Development Services
5. Professional and Commercial Equipment and Supplies Merchant Wholesalers

#### **RESEARCH METHODOLOGY**

The researcher took a step up to understand the perception and the reality on engineers turning up a successful manager. Researchers being the professors in the management organisation with a rich alumni data working all around the globe had an upper age in carrying out this research. Techno managers from the data base were



randomly chosen for the study. The primary data was collected from the aluminise who were engineer and earned post graduate management degree for the organisation, currently working at various positions from executive trainings to CEO. Personal interactions, observations, interviews were the tools used to collect a primary data along with the structure and validated questionnaire through SPSS.

The study is conducted at one of the leading education institute at Pune in India. 12000 working Management professional pass out form the institute were taken as the universe spread around the world form engineering background.

### **Data Collection**

Variables considered for the study where ability to deal with challenges, taking responsibilities, team management, correlating the necessary engineering principles in managing job profiles, leadership skills. In order to keep alpha and beta values in limits larger sample size was chosen (12000+ aluminise are the corporate citizens all around the world).

### **Data Analysis**

The sample has the A Gender ratio of 40%: 60% was (Boys, Girls) that shows engineer girls take the career in management more often compare to the boys. This leads us to comprehend the techno managerial jobs are softer compare to hard-core engineering jobs on the other hand girls in born attributes of sincerity and honesty is favoured by corporates. Majority of the girls were found working in extremely challenging roles in the early age of their career reveals the Y generation techno managers are more attracted by challenges and change.

Technical knowledge in the early days of career in management helps in conceiving the mission, vision and objectives of the organisation as the technical candidate has better way and approach and analyse in any given situation it is confirmed through the studies that they reach better and faster to the root cause of the problem ultimately helping the management resolve the issues smarter ways.

Out of all the functions in management, engineers performance in technical functions have always been beyond the standard set this makes engineers more responsible towards the functions like Quality management, material handling, logistics management, inventory management, etc.

As per as training and development of employees engineers proves fast learners by the virtue of curriculum they studied. Technical people with background of machines operations and systems have proved assets to the organisation in long run. Their decision making abilities is always better and applicable the hypothesis designed that engineers or techno managers grow slow compare to non-technical manager is finally rejected.

### **Data Analysis and Findings**

The graph shown in table 1, above give qualitative and quantities picture of the analysis and survey in the real corporate world. It helps us interpret that most of the engineers are well placed in either top level or at least middle level management. Next column throws the light on the domain knowledge and the use in the career graph. Those with the basic technical knowledge always felt easy in management applications and grow at faster rate. This over all makes techno manager remain two steps up when compared with non-technical managers.



Table 1: Data showing the dominance of Technical Knowledge in overall growth

<p>At which level you are in your Profile / Role?</p>	<p>Which knowledge is complementary to what?</p>	<p>Do you feel techno manager grow faster than other managers?</p>	<p>Do engineering conceptual knowledge helps in easy and matured decision making?</p>
<p>21, 72</p>	<p>74, 26</p>	<p>93, 7</p>	<p>95, 5</p>





<p>A bar chart with five categories on the x-axis: Strongly Agree, Agree, Don't Know, Disagree, and Strongly Disagree. The y-axis represents the number of responses. The bars show approximately 37 for Strongly Agree, 42 for Agree, 63 for Don't Know, 37 for Disagree, and 36 for Strongly Disagree.</p>	<p>A bar chart with two categories on the x-axis: Yes and No. The y-axis represents the number of responses. The bars show 63 for Yes and 37 for No.</p>	<p>A bar chart with three categories on the x-axis: Analysis, Calculative, and Research. The y-axis represents the number of responses. The bars show 36 for Analysis, 14 for Calculative, and 50 for Research.</p>
<p>What do you feel on, engineering knowledge is must to make use of management knowledge? 37, 42</p>	<p>Should Quality Testing be given to engineers only? 63, 37</p>	<p>What characteristics of engineers make growth faster in career? 36, 14, 50</p>

Table 2: Data showing the dominance of Engineers in Quality function

When investigated, the profile of engineers, at micro level, it was found that Quality functions are carried out in most of the companies by engineers. Not just that but most of the functions like Operations, Supply Chain Management, Logistics, Inventory Management, Material Handling, Maintenance are found to be the technical persons territory.

### CONCLUSION/ RESULT

The study conducted on the engineering back ground techno managers from all over the world (Organisational alumni's), the Hypothesis that they are better than non-technical managers is proved right. Also it is found that sound technical knowledge is the need of an hour for every manager. Organisations must carry out crash courses to see to it that the technical knowledge's are continuously updated. Employees who can learn and unlearns should only be considered asset to the organisation. Continues training and development is the key to success. Companies can send their employees for higher technical education and qualification to bring advanced knowledge to the organisation.

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