



MANAGEMENT FOR CHEMICAL ENGINEERING (0905401)
02 – GENERALITIES AND HISTORY

ALI KH. AL-MATAR (aalmatar@ju.edu.jo)

Chemical Engineering Department, University of Jordan
Amman 11942, Jordan

Outline

- Management
- Capitalism
- Entrepreneurship
- Purpose and Structure of a Company
- Product/Market Relationship
- Evolution of the (Western) Company Over Time
- Taylorism, Fordism, Fayolism



Management

- Process of achieving organizational goals by working with and through people and organizational resources.



Capitalism

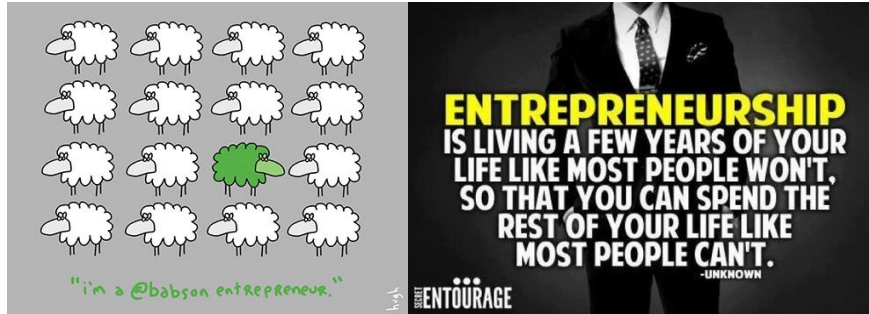
- Existing enterprises in liberal countries, or even countries that claim to represent socialist systems such as China, have very common characteristics due to their structure, mode of organization, and operation; these enterprises are based on capitalism that can be defined as:

a system “based on individual investments to produce marketable goods”



Entrepreneurship

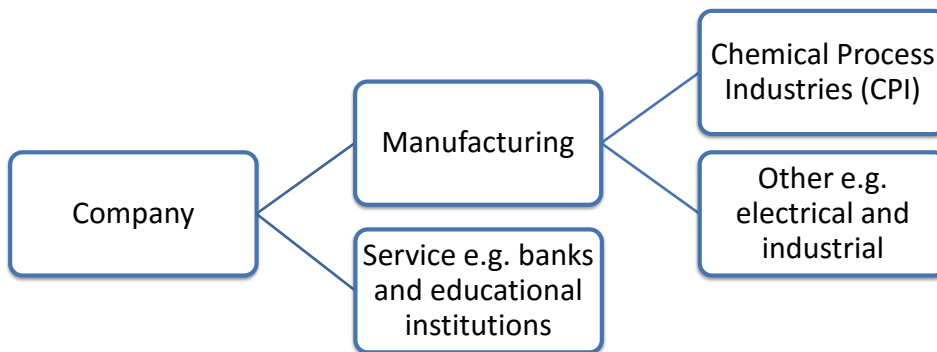
- The 18th Century witnessed the birth of the entrepreneur who **risked his capital in the hope of achieving profit.**



Purpose and Structure of a Company

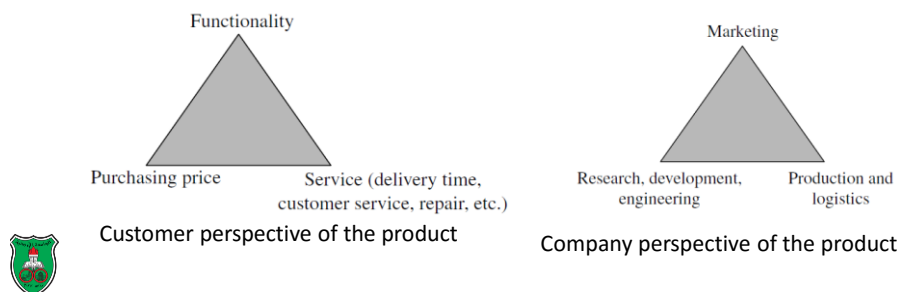
- The purpose of the industrial company is to satisfy customers by
 - selling them products coming from manufacturing tools,
 - sometimes with services required for their use:
 - after-sale customer service,
 - technical support,
 - possible reclamation after the use of by-products generated by the process if they are chemical products.
- Two types of companies
 - Manufacturing (including chemical process industries CPI)
 - Service companies (such as banks and education institutions)



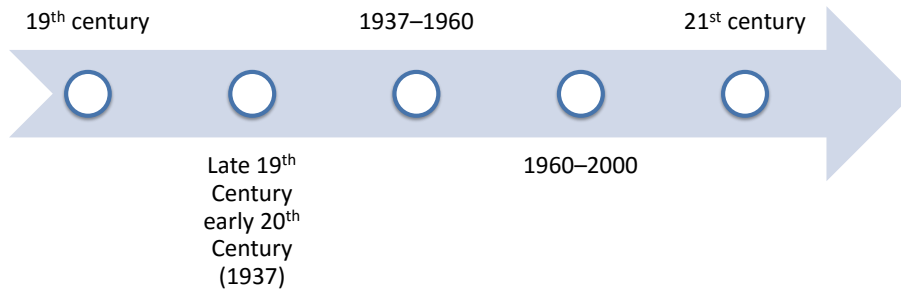


Product/Market Relationship

- The concept of product/market relationship is currently the very basis of the economic concept.
- The product is what the company offers on determined markets where it will face competition.
- What the customer wants is a product that meets his requirements, this is its functionality.



Evolution of the (Western) Company Over Time



Period	Highlights	The company as an organization	The individual in the company	Socio-political environment	Breakthroughs New management methods
19th Century	Industrial Revolution Colonization	Manufacturing: emergence of the company replacing craftsmanship Huge concentration of capital, machinery, men The factory	Foremen and laborers Birth of the engineer	Capitalism American Civil War–1st Industrial War (1861–1865) Marxism	Steam engine Mines, steel industry Cotton in the U.S. Chemical industry (dyes, explosives) Electricity
Late 19th Century early 20th Century (1937)	Productivity revolution	The company is a closed system Profit maximization F. W. Taylor (<i>Scientific Management</i> , 1909). Taylorism: study of tasks H. Fayol (Industrial and General administration, 1916)	Strong hierarchy, unity of command Work broken down into specialized tasks Scientific management Control, centralization, organization by departments	World War I (1914–1918) The Popular Front (France) (1936) Fascism The New Deal (USA) Marxism-Leninism	Assembly line (Ford) Petroleum Applied Research (Thomas Edison) Volkswagen Socio-technological giants (TVA project in Tennessee)
		Fayolism: definition of functions H. Ford, Fordism: assembly lines (1913) (assembly-line work)	Motivation by money		

Period	Highlights	The company as an organization	The individual in the company	Socio-political environment	Breakthroughs New management methods
1937–1960	Study of the psychology and behaviour of employees (Hawthorne Plant) Behaviorism	The company is considered to be an open system Beginning of decentralization Objective-based management	Man is no longer considered to be 100% rational Money is no longer the only motivation Birth of communication	World War II (1939–1945) Production economy The Glorious 30 years in France: 1945–1973	Sulfamids, penicillin Nylon Nuclear energy (Hiroshima, 1945) Computers United States: – Value Analysis (1942); – project-based management (1960); – strategic management (1960).

1960–2000	IT Revolution Consultants (management breakthroughs)	Matrix management Supply Chain (customer-supplier reconciliation) Computers invade the company Internationalization Computer engineering Telecommuting Product/market relationship Product Life Cycle Re-engineering	<i>Beginning of period</i> The individual is considered to be preponderant, it is mollycoddled Continuing education Expatriation Need for adaptation and flexibility <i>End of period</i> Unsecured job (employability) Loss of references	R. Carson, <i>Silent Spring</i> (1962) Market economy Globalization Free trade against protectionism Global competition Rich countries against poor countries 1973: first oil crisis Industrial disasters: Seveso-Bhopal ... 1989: fall of communism Management by finance Customer is king	Tarnishing the image of chemistry Genetic engineering Space Exploration Electronics, Internet Quality (TQM) Process Analysis Pension funds lead the world Company concentration (by sectors)
-----------	---	--	---	--	---

Period	Highlights	The company as an organization	The individual in the company	Socio-political environment	Breakthroughs New management methods
21st Century	Knowledge management New production concepts Companies based on knowledge	Matrix management Customer-supplier partnership Subcontracting, distribution Company-society relationship: – corporate citizen – redefinition of work – Consideration of the concept of sustainable development	Need for reconsideration (adaptation) Loss of reference (loss of fidelity to the company) The company turned over to financial power Participation in the company (stock options)	Unpredictable world Technological revolutions every 10 years Sustainable development Product safety Emerging countries: China Poor countries against rich countries The employee capitalizes Media hype	Genetics (hopes and concerns) GMO Digital Revolution Continues

Taylorism, Fordism, Fayolism

- In the late 19th and early 20th Century, Frederick Taylor and Henri Fayol provided the traditional company with the form that we know today.
- Taylor invented the analysis of the actions needed to accomplish a task: this forms the basis of scientific management.
- Henry Ford adopted Taylorism to the letter. He invented the assembly line in 1913 for the assembly of magnetos which reduced the time required for their production from 15 to 5 minutes.
- Fayolism refers to the management of the company, whereas Taylorism refers to the factory. Fayolism classifies the set of operations in the company into six main functions: technical, commercial, financial, accounting, administrative, and safety.



F. W. Taylor and Scientific Management

- Born near Philadelphia, to a very wealthy Quaker family. He passed the entrance test at Harvard, gave up his studies and became a simple worker in a small pump plant and then joined a steel plant, the Midvale Steel Co., where he worked for 12 years.
- He became a foreman and then a mechanical engineer by taking correspondence courses. He also held the post of accountant before finishing as chief engineer. Taylor became a specialist in metal working, with many patents, which made him rich and famous. He established himself as a consulting engineer in 1893.
- Taylor invented the **job analysis technique**, whose most obvious manifestation is **the timing of tasks**.
- His book, **The Principles of Scientific Management** (1911), applies Taylorism and forms the basis of **scientific management**.



Frederick Winslow Taylor
1856-1915



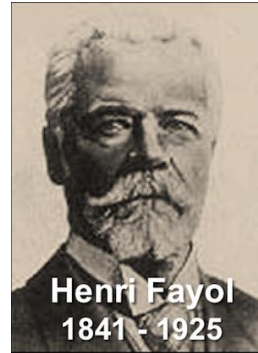
Many followers: Henry Ford, Louis Renault, Lenin, and many others.



“In the past the man has been first; in the future the system must be first... The first object of any good system must be that of developing first class men.”

H. Fayol and Administrative Theory

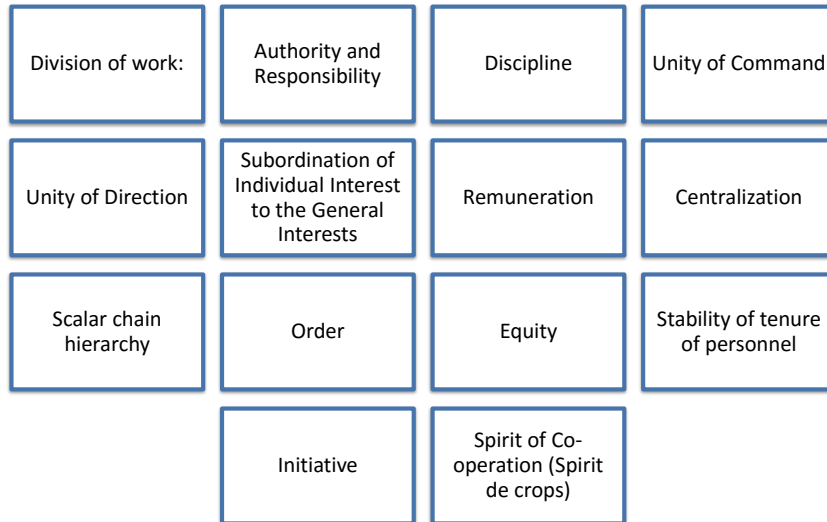
- A French Engineer, graduated from the School of Mines of Saint- Etienne (France). He was the director of the Commentry mine for 30 years. He became the CEO of the Company “Société de Commentry, Fourchambault, Decazeville”, a post from which he retired at the age of 77.
- Fayol laid the foundations of “**administrative theory**”.
- His major work, **Administration industrielle et générale**, was published in 1916. He is considered to be one of the pioneers of management.



Without a plan, there is no commitment, hence no accountability.

Fayol's Principles of Management

- Managerial excellence is a technical ability and can be acquired.



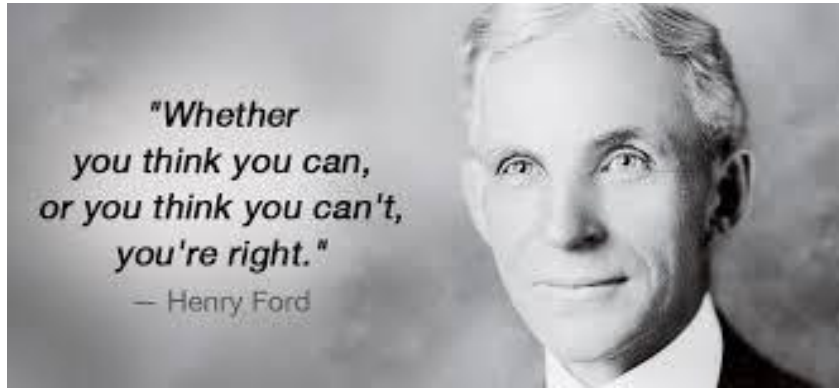
H. Ford and the Assembly Line

- Son of a farmer, was the pioneer of the American automotive industry. An eccentric and visionary, he invented the standardization of major parts and assembly line work in his plants at Detroit.
- He fervently adopted Taylorism: everything was timed. Assembly line work was used for the first time in 1913 to manufacture magnetos. Applied to the manufacture of the famous Model "T", it reduced the assembly time from 13 hours to one and a half hours.
- The Model "T" was the first car available to the average American.



Henry Ford
1863-1947





يحكى ان رجلا كان يركب بالونا هوائيا ..لاحظ انه قد ضل الطريق...فهبط قليلا حتى اقترب من الارض..واذ رأى سيدة فى الاسفل فنادى عليها بصوت عال: "اريد ان اسالك سؤالا..فلقد قطعت وعدا لأحد زملائى بانى ساقبله وتاخرت عن موعدى ساعة كاملة..وانا لا اعلم اين انا ..يبدو اننى تهت ..فهل يمكنك ان تخبرينى اين انا الان؟؟؟؟

رفعت السيدة راسها واجابت: "حسنا .انت الان فعليا داخل بالون يعلو عن سطح الارض 10 امتار..وجغرافيا بين 40 و41 درجة شمال عرض ..و 59 و 60 درجة غرب طول. فصاح الرجل: "ما هذا الذى تقولينه..فانا لم افهم شيئا".....فأجابت: " انظر الى المؤشرات الموجودة فى البالون وستفهم..."

فنظر الرجل ..وقال لها.. "حسنا هذه الارقام موجودة بالفعل..هل انت مهندسة؟؟"

...فأجابت: "نعم ..كيف عرفت؟؟"

فرد قائلا: " لان المعلومات التى اخبرتنى بها صحيحة..ولكنها غير مفيدة..فأنا لا اختبر قدراتك الهندسية..إنما اريد ان اعرف اين انا...ارجوك...الا تستطيعين الاجابة عن هذا السؤال البسيط دون استعراض او تظاهر بالذكاء؟؟؟؟؟

نظرت اليه السيدة وقالت: "هل انت مدير؟؟"

فأجابها الرجل: "بالفعل..كيف عرفت؟؟"

قالت: لانك لا تعلم اين انت ولا الى اين انت ذاهبولانك لم تصل مكانك الا بفعل قليل من الهواء الساخن..ولانك قطعت وعدا على نفسك ولا تعلم كيف ستفى به..ولانك تتوقع ممن هم تحتك ان يطيعوك ويحلوا لك مشكلاتك....

راعي أغنام فوجئ بسيارة بي إم دبليو جديدة تفق قريبا من قطيعه ويخرج منها شاب حسن الهندام كل شيء على جسمه من فيرساتشي ويف سان لوران وغوتشي، ويقول له: إذا قلت لك كم عدد البهائم التي ترعاها هل تعطيني واحدا منها ؟

أجاب الراعي بنعم، فأخرج الشاب كمبيوترا صغيرا وأوصله بهاتفه النقال ودخل الإنترنت، وانتقل إلى موقع وكالة الفضاء الأمريكية، حيث حصل على خدمة تحديد المواقع عبر الأقمار الصناعية (جي.بي.إس) ثم فتح بنك المعلومات وجدولا في إكسل وخلال دقائق كان قد حصل على تقرير من 150 صفحة، ثم التففت نحو الراعي وقال له: لديك 1647 رأسا من البهائم، وكان ذلك صحيحا فقال له الراعي تفضل باختيار الحروف الذي يعجبك. فنزل الشاب من سيارته وحام بين القطيع ثم حشر الحيوان الذي وقع عليه اختياره في الصندوق الخلفي للسيارة، عندئذ قال له الراعي: لو استطعت أن أعرف طبيعة ونوع عملك هل تعيد إلي خروفي؟

وافق الشاب الكشخة فقال له الراعي: أنت مستشار ، فدهش الشاب وقال: هذا صحيح ولكن كيف عرفت ذلك؟

فقال له الراعي: بسيطة، فقد أتيت إلى هنا دون أن يطلب منك أحد ذلك، ثم سعبت لنيل مكافأة بإجابتك على سؤال لم أطرحه عليك بل وكنتُ أعرف إجابته سلفا بينما لم تكن أنت تعرف الإجابة بل ولا تعرف شيئا عن عملي.

على كل حال أرجو أن تخرج كلبتي من شنطة سيارتك فإنه ليس خروفا !



شكرا لحسن الاستماع