

# e-Business



**Robert P Batzinger**



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Robert P. Batzinger

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# Preface

Advances and developments in Computer Science (CS) are driven by the need to create more effective applications to answer real world problems. The most significant advancements have emerged as a result of breakthrough in understanding the nature of the problem domain. Making end users part of software development teams has been a standard principle in software engineering. As a CS instructor, it is important to recognize the fact that our CS graduates will go on to develop applications and solutions for clients who did not major in CS. In keeping with the principles of liberal arts education, I feel the best way I can prepare my students for their professional careers is by helping them explore and understand the basic issues of their chosen problem domain.

To this end, our department has launched a course to introduce CS students to e-Business. The course had the following course description and was taught in Thai using English based resources.

**CS340 ธุรกิจอิเล็กทรอนิกส์:** หลักการการดำเนินธุรกิจโดยใช้สื่ออิเล็กทรอนิกส์ การวางแผนทรัพยากรขององค์กร การบริหารความสัมพันธ์ลูกค้า และการสื่อสารผ่านโซเชียลมีเดียทั้งภายในและภายนอกองค์กร

**CS340 E-BUSINESS.** Principles of business operations using information technology. This includes a discussion of Enterprise Resource Planning (ERP), Customer Relationship Management (CRM) and the use of social media to communicate both within and outside the organization.

This book is the product of that course and had its humble beginnings as a collection of class slides, notes and exercises. The basic design of the course is as follows:

**Unit 1: General principles.** A discussion of the key principles that define and characterize business both in the real world and in cyberspace.

**Unit 2: Business modelling.** A discussion of leading method to model in software the key transactions and activities that take place in businesses.

**Unit 3: e-Business systems.** A survey of the concepts and functions of key business systems that have open-source solutions. Each system will be studied to determine how mission critical questions can be answered using the data resources created.

**Unit 4: Emerging Technologies.** A discussion of futuristic e-Business technologies that have already had an impact on how business is conducted world-wide.

# I GENERAL PRINCIPLES



Key components of a good business

# 1. Essentials of Business

Business is a network of transactions attempt provide fair compensation for goods or services rendered in the most effective and efficient manner.

Business is a sustainable set of interactions between individuals in which goods and services are provided and the provider is compensated.

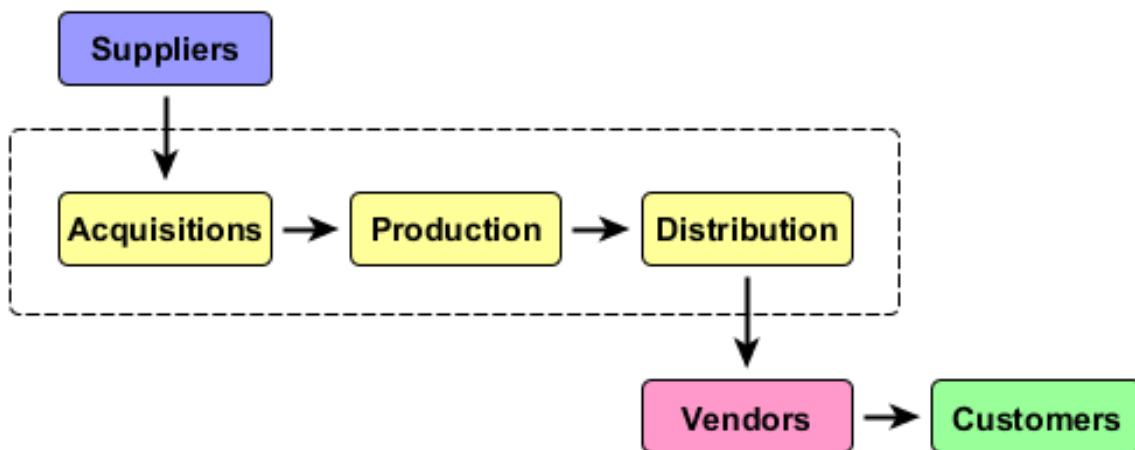


## Nature of Business

If businesses were found on the following premises, discuss the expected differences in the nature, success, and longevity of the businesses that would arise based on these principles.

1. Business is all about making lots and lots of money quickly by any means possible.
2. Business is a sustainable series of transaction that provide fair compensation for goods or services rendered in the most effective and efficient manner.

Individual businesses are always centered around a core set of goods and services as a commodity that creates value. The key to business success is to minimize material, production, and distribution costs while increasing the value of the commodity to the customers. This is achieved through a network of contracts and business transactions with suppliers and distributors.



Key Business Processes



## Match market principles to market characteristics

Principle	Characteristics
(A) Access to market	— Consumer preference
(B) Customers	— Dependable supply of raw materials
(C) Investment capital	— Distinctive goods and services
(D) Marketable goods and services	— Investors and line of credit
(E) Resources	— Right location
(F) Value	— Steady market demand

## 1.1 Core Activities of a Business

To achieve efficiency and effective on a large scale, business is conducted as coordinated teamwork of specialists in various departments within the organizational chart.

- **Finance:** mid-term and long-range financial planning to ensure that there is an adequate supply of money available to
- **Accounting:** record of financial commitments and compensations for the purpose of tracking movement of value across the organization and throughout the production process
- **Marketing:** getting groups of potential customers and consumers interested in products and services.
- **Sales:** selling products and services to customers maintain records to assist forecasting future demand and market growth
- **Operations:** systems to acquire resources, produce, package and deliver products
- **Management:** sets the direction and pace of business endeavors

## 1.2 Support functions:

As businesses grow in size, various support functions are required to keep the core business running at their optimal levels of production. These functions include the following:

- **Management Information Systems:** collect, analyze and distribute mission critical information to key administrators
- **Human Resources:** attract, hire, train and retain effective employees
- **Legal Department:** ensure compliance with laws and regulations
- **Investor Relations:** communications with shareholders to attract support and investments
- **Customer Relations:** after sales care of customers and encouragement of brand loyalty
- **Facilities Management:** maintenance of facilities and equipment to maximize the utility and value of capital investments in equipment and infrastructure.



### Key concepts:

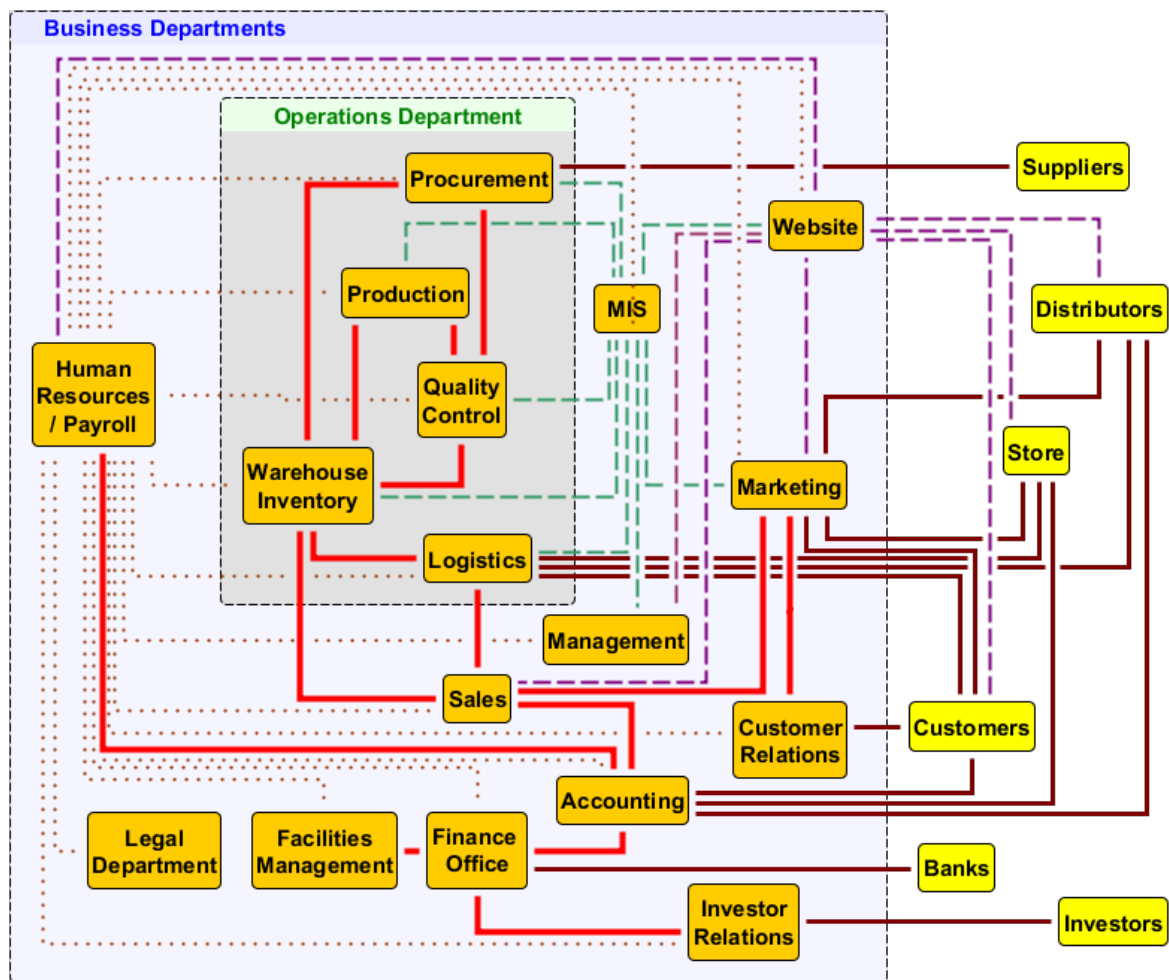
Create a mindmap that illustrate the relationship between the following sets of terms, along with their Thai translations.

- **Key business components:** Access to market; Resources; Value; Investment capital; Marketable goods and services; Customers
- **Core business activities:** Finance; Accounting; Marketing; Sales; Operations; Management.
- **Support functions:** Management information systems; Human resources; Legal department; Investor relations; Customer relations; Facilities management

## 1.3 Software to facilitate business interactions

As the business grows, so does the complexity of the interactions between the departments as shown in the following diagram:





Interactions between business departments

As implied by the multitude of lines, there are numerous interaction within a business organization giving rise to various disciplines of study. Management studies focuses on the control, operation and development of a business. Financiers study how to use investments to maximize opportunities to grow the business. But the key concern for IT-related majors is the nature and volume of information to be analyzed, shared and communicated in a timely fashion.

Even with over 50 years of intensive commercial and propriety software development to reduce the complexity of business, new software tools and apps to support specific business functions are still emerging at an astounding rate. The following sections attempt to classify common software systems found in medium to large size enterprises.

## ERP: Enterprise Resource Planning

- CMS: CONTENT MANAGEMENT SYSTEM
  - Collections of guides, rulebooks, forms and procedure guidelines
  - Blogs, newsletter, announcements
  - Catalogues, pricelists
- PIM: PRODUCT INFORMATION MANAGEMENT
  - Manual, troubleshooting guides
  - Parts list, equivalences
  - Price lists and stock inventory

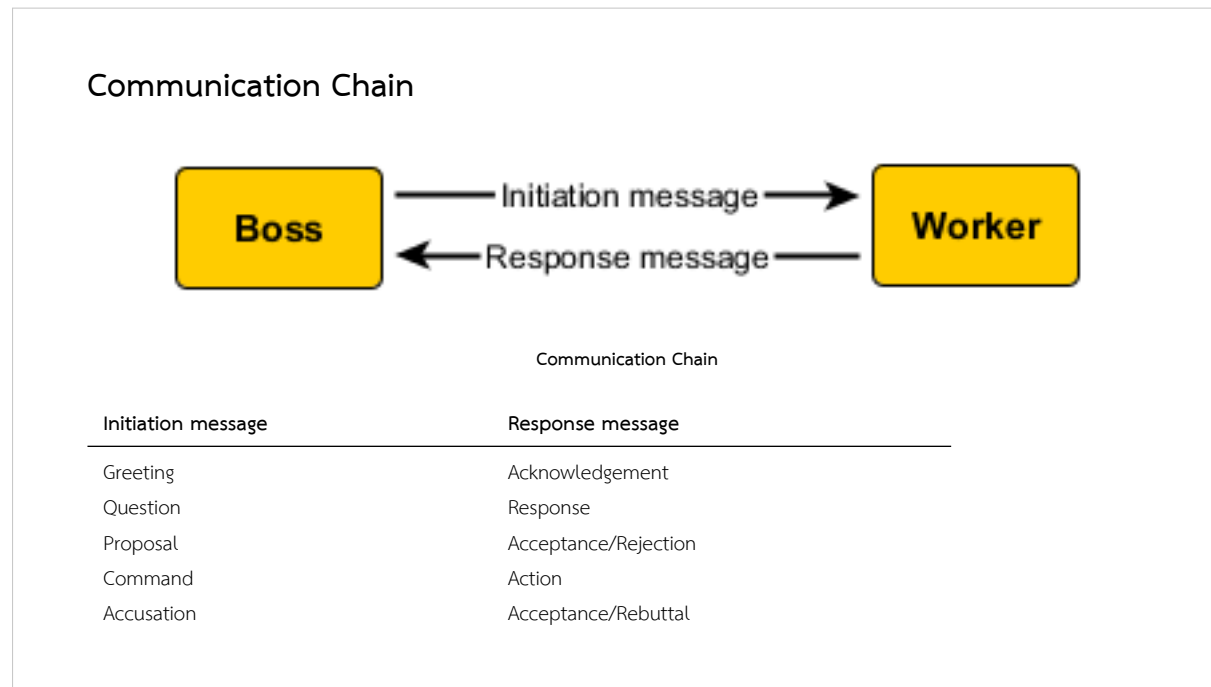
- Photos and promotional materials
- AIS: Accounting Information System
  - Revenue: cash inflow (sales)
  - Expenditure: cash outflow (payroll, equipment)
  - Conversion: work-in-progress transactions (raw material, precursor inventory)
  - Administrative: reporting (income statement, balance sheet, cash flows)

## **ERM: Enterprise Resource Management**

- B2B: Business-to-business software that manages work flow with suppliers and partners
  - Directory of suppliers and products
  - Social media confirmation of quality
- B2C: Business-to-consumer software to serve your customers in terms of order status and billing information
  - Online store
  - Product manuals, product information
  - Delivery tracking
- HRM: Human Resources Management
  - Work experience, Performance appraisal, skill tests
  - Flight risk, employee satisfaction
  - Education, training
  - Payroll, bonuses, raises
- MAP: Marketing Automation Platform
  - CRM: Customer Relationship Management - purchase history, rewards, interests,
  - MCP: Marketing Campaign Planning - Ad words, analytics, costs, contracts, effectiveness

## 2. Essentials of Business Quality Management: (ISO9001)

Business communications are built around active communication chain. Teamwork and management requires effective communication. However, communication breaks down when the communication chain is interrupted.



ISO 9000 was first published in 1987 by the International Organization for Standardization (ISO) and was designed as a family of quality management systems standards to help organizations manage the meeting of the needs of customers and while meeting statutory and regulatory requirements related to a product or service.<sup>1</sup> The standards provide guidance and tools for companies and organizations who want to ensure that their products and services consistently meet customerâ€™s requirements, and that quality is consistently improved.

- **Point 1: Clear customer understanding** of the goods or services offered
- **Point 2: Verification of intended results**
- **Point 3: Prevention undesired effects**
- **Point 4: Improve performance** based on the information gathered

### An example of an ISO9001 compliant transaction

1. The customer enters a restuarant and is given a menu with pictures of the food. (P1)
2. The waiter takes the order and repeats the order back to the customer for confirmation. (P1)
3. The waiter brings the food and doubles check that the order is complete. (P2)
4. The waiter comes back to check if everything is okay. (P2)
5. The cashier checks that all was well when the bill is paid. (P3)
6. The whole transaction is recorded and the receipt gives a website for feedback. (P3)

<sup>1</sup>International Organization for Standardization, 2015. ISO 9001:2015(en) Quality management systems. Available online at <https://www.iso.org/obp/ui/#iso:std:iso:9001>

7. The customer's feedback on the website is analyzed for patterns of service that could be improved. (P4)



## ISO9001 and MacDonalds

Worldwide MacDonald is a successful multinational enterprise run by staff most of which are under the age of 21 and yet it is a certified ISO9001 company. When a customer orders food at any MacDonald outlet in the world, the interaction between the customer and the counter staff is the same. Create a swim lane workflow diagram to describe the information flow in the conversation between the customer, the counter staff, the kitchen staff, the accounting system and the point of sale computer system. Discuss how this illustrates the basic principles of ISO9001 principles for quality management.

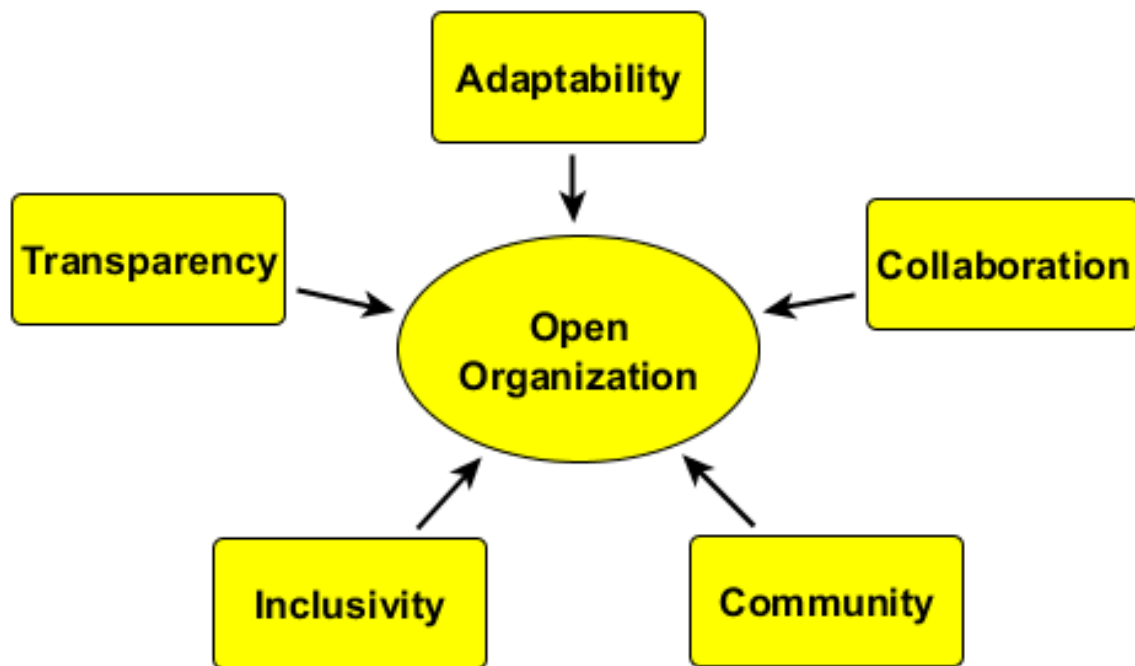
Since ISO 9000 was first published in 1987, it has been followed by a long list of international standards that define and specify how various aspects of business, hardware and software are to be implemented. Each new standard builds on the principles already established in other standards. These developments lead Jim Whitehurst to realize that “the best practices in creating open source software also translate well into managing an entire company.” By embracing open source values, he showed how leaders can successfully create “a rebooted, redesigned, reinvented organization suitable for the decentralized, empowered, digital age.”<sup>2</sup>

As organizations embrace the concept of open organizations they recognize that openness as a necessary orientation toward success and pursuing openness in organizations can lead to 3 possessive outcomes:<sup>3</sup>

- **Greater agility:** resulting from the synergy that arises when members share a common vision and work together toward common goals.
- **Faster innovation:** because ideas from both inside and outside the organization receive more equitable consideration and rapid experimentation
- **Increased engagement:** as members clearly see connections between their particular activities and an organization's overarching values, mission, and spirit.

<sup>2</sup>Jim Whitehurst, 2015. The Open Organization: Igniting Passion and Performance. Harvard Business Review. Available online at <https://opensource.com/open-organization/>

<sup>3</sup>The Open Organization Ambassadors, 2017. The Open Organization Definition. 2nd Edition. Available online at [https://opensource.com/sites/default/files/gated-content/openorg\\_definition\\_ebook.pdf](https://opensource.com/sites/default/files/gated-content/openorg_definition_ebook.pdf)



Core elements of open organizations

Although every open organization is unique, there is a common core of elements that characterize an open organization. Each core element is composed of a different dataset of information to be gathered and distributed so to allow these elements to be combined in powerful and productive ways.

- **Transparency:** Workers have access to all pertinent information and willingly disclose and discuss their work. People affected by decisions can access and review the processes and arguments that lead to the decision and are free to comment and respond to them. Successes and failures are both valued for the lessons they provide.
- **Inclusivity:** Protocols and procedures are in place to encourage constructive inclusion of diverse perspectives. Leaders are conscious of voices not present in dialog and actively seek to include them. People work transparently and use technical standards to ensure and encourage access to discussion forums.
- **Adaptability:** Feedback mechanisms provide access for suggestions from members of the organizations and outside members.
- **Collaboration:** People ascribe to the principle that working together produces better results from the very beginning of the project. Products of development are made available to other projects to use creatively.
- **Community:** Shared values and principles that guide decision making are clear and obvious to members of the organization. All levels of workers are encouraged and empowered to make meaningful contributions to collaborative work. Leaders mentor others and demonstrate strong accountability to the organizations by modelling shared values and principles.

## 3. Understanding the role of IT in business

### 3.1 Enterprise Architecture

As IT Departments become more receptive to business strategy and play a transformative role in the nature of the business, Enterprise Architecture will emerge along the following evolutionary steps.<sup>1,2</sup>

#### Establishing an IT department

1. Understand the business strategy
2. Translate into an IT strategy
3. Create transparency
4. Define IT target picture
5. Define the roadmap
6. Harmonize and govern
7. Obtain feedback and refine
8. Coach and mentor

#### Approaches to understanding the business

Architecting the Business	Reverse-Engineering the Organization
* Growth areas	* Divisions / business lines
* Profitability	* Group level vs divisions
* Geographic/demographic opportunities	* Reportings lines
* Geopolitical aspects	* Matrix organizations
* Acquisitions and divestitures	* Hidden org chart/loyalties

### 3.2 Business views of IT

#### Different business views of IT

	Cost Center	Asset	Partner	Enabler
Focus:	Cost	Return on investment	Business value	Speed & Innovation
CIO Reports to:	CFO	COO	CDO	CEO
Common strategy:	Outsource IT	Harmonize/ Rationalize	Insourcing IT	IT = business

<sup>1</sup>Gregor Hohpe, 2017. 37 Things One Architect Knows About IT Transformation: A Chief Architect's Journey. Available online at <https://leanpub.com/37things>

<sup>2</sup>Gregor Hohpe, 2017. Enterprise Architecture = Architecting the Enterprise? YOW! Conferences and Workshops for Developers by Developers. Keynote presentation at [YOW! 2017 Conferences](http://yowconference.com.au) <http://yowconference.com.au>



## Different business views of IT

	Cost Center	Asset	Partner	Enabler
Levers:	Cost cutting	Economies of scale	Economies of Efficiency	Economies of Speed

IT Strategy provides a road map of where IT developments and operations are going. This is derived from an understanding of the nature of the business and is not restricted by current realities. The IT strategy is as much a definition of what IT intends to do as well as what it will not do. Above all, an effective IT Business strategy does not conform to a vendor's product road map. However, successful strategies must recognize the IT Operating Model that the business gives to IT.<sup>3</sup>

## IT Operating Models

Integration	Minimal Standards	Highly Standardized
High	<b>Coordination</b> <ul style="list-style-type: none"> <li>* Unique business units</li> <li>* Examples: Merrill Lynch, Toyota</li> <li>* Key IT capability: <ul style="list-style-type: none"> <li>* access to shared data</li> <li>* standard technology interfaces</li> </ul> </li> </ul>	<b>Unification</b> <ul style="list-style-type: none"> <li>* Single business with global standards</li> <li>* Examples: Delta Airlines, Pepsi</li> <li>* Key IT capability: <ul style="list-style-type: none"> <li>* enterprise systems to reinforce standards</li> <li>* provide access to global data</li> </ul> </li> </ul>
Low	<b>Diversification</b> <ul style="list-style-type: none"> <li>* Independent business units</li> <li>* different customers/expertise</li> <li>* Examples: Johnson &amp; Johnson, GE</li> <li>* Key IT capability: <ul style="list-style-type: none"> <li>* provide economies of scale</li> <li>* do not limit independence</li> </ul> </li> </ul>	<b>Replication</b> <ul style="list-style-type: none"> <li>* Independent but similar business units</li> <li>Example: Marriott, CEMEX</li> <li>* Key IT capability: <ul style="list-style-type: none"> <li>* provide standard infrastructure and apps</li> <li>* maximize global efficiencies</li> </ul> </li> </ul>

<sup>3</sup> Jeanne W. Ross, Peter Weill and David C. Robertson, 2006. Enterprise Architecture as Strategy: Creating a foundation for business execution. Harvard Business Review Press

## 4. Changing nature of business

### 4.1 Emerging role of brick and mortar shops

It is clear that the retail companies in rapid growth are those who are able to upgrade the services of the traditional storefront into a more convenient, efficient and user-friendly setting that compliments the services available online. Banks have moved their services online and to ATM to increase the convenience of handling money while lowering operating costs. Online companies like Amazon have teamed up with traditional shopping chains like Target to allow customers the opportunity to compare, touch and feel products before purchasing them either in the shop or online. Online orders can be delivered to shops to reduce shipping costs. Amazon has even integrated such high tech features as AI, face recognition and sensor to change the user shopping experience.<sup>1</sup> Technology plays a critical role in all of these developments.



#### New generation 7-11 (Seven Eleven)

View this news clip about a new Seven Eleven outlet that opened in Pattaya with a new look that is in keeping with the era of Thailand 4.0. The store is full of sensors, monitors and systems to create a modern, futuristic, efficient shopping and eating environment complete with innovations to improve energy-saving and user convenience. Watch the video<sup>2</sup> and list the number of ways computers have been used to change the user experience.

### 4.2 Nature of Online Commerce

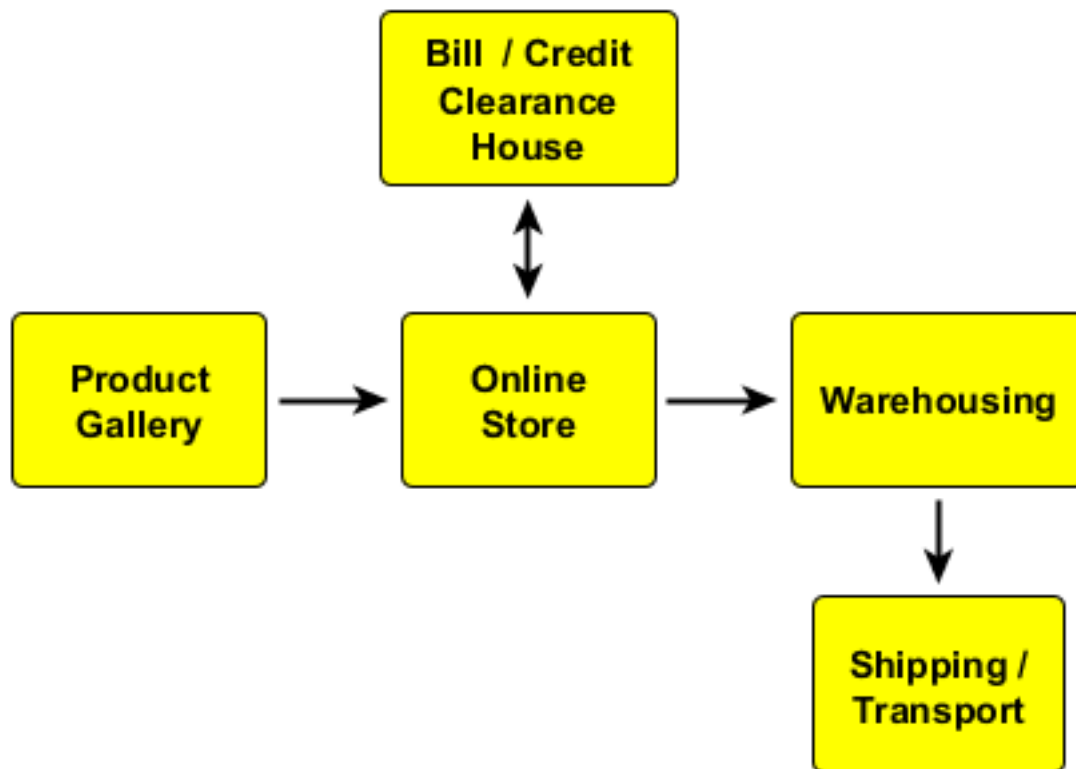
With the launch of the Internet in the 1990s followed by the development of the world wide web in the 1990s, online commerce has gained advantage over corresponding brick and mortar firms for the following reasons:

1. The customer has access to more information to make better purchasing decisions
2. The customer can shop 24x7
3. The customer can track the progress of order fulfilment.
4. Customers can provide feedback verified through social media.
5. The functions of e-commerce can be purchased and updated to keep development costs low and to maximize economies of scale

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<sup>1</sup> Amazon.com, 2016. Introducing Amazon Go and the world's most advanced shopping technology. Available online at <https://youtu.be/NrmMk1Myrxc>

<sup>2</sup> Thekkit Chat Suriyawong, 2018. 7-11 (Seven Eleven) with new generation 4.0 high tech. Channel 3 News. aired Monday, January 8, 2018 Available online at <https://youtu.be/XL3rEUbpgsE>



Business Functions of E-Commerce

### The e-shopping experience

Customer Experience

Stage	Brick and Mortar	Electronic world
Customer finds the store.	Ads and billboards	Google and Facebook Ads; Referrals from blogs
Customer shops for items of interest	Window shopping	Search the website
Customer searches for information on the products	Check packaging and sales staff	Internet searches and social media recommendations
Customer chooses items for purchase	Places them in a cart or shopping basket	Virtual transfer of items to an electronic shopping cart
Customer check outs the selected items for purchase	The customer takes the shopping cart to the check out counter	The virtual cart is checked out creating a preliminary bill complete with shipping information
The financial institution identifies and authenticates the payer	The customer swipes a credit card or ATM card	The customer logs into to e-banking, e-payment or credit card services
The customer transfers funds to the vendor.	The customer signs the electronic receipt or pays cash	The customer verifies and authorizes payment
The financial institution send payment verification.	ATM or Credit card service authenticates the transaction or the cashier	The financial institution sends a secure memo to the e-store that payment was made.
The vendor sends a pick-list order to the fulfillment center.	The store keeper faxes the order to the warehouse	The fulfillment center is notified of the order and its payment and picks the items
The fulfillment center sends the goods to shipper.	The items are boxed and set aside for pickup	The items are boxed and sent to the shipper.
The fulfillment center updates the order status	The customer is called to pick up his order.	The online system is updated and the customer can track its location.
The shipper delivers the goods.	The counter staff check the delivery items and turns them over to the customer.	The shipper delivers the goods.
The customer signs for goods and the vendor system is updated.		



## Hybrid businesses

Online shopping giant Amazon has recently merged with Target a traditional department store chain. Explain why this merger is a good idea and what benefits the customer gains from it.

### **Approaches to marketing online**

1. Search engine ads based on topics being searched
2. Social media ads based on shared views and ideas
3. Personal profiling to drive the user experience at a website based on specific interests and preferences expressed

### **Impact of Social Media on Brand and Product Marketing**

1. Word of mouth referrals from trusted acquaintance are powerful endorsements and attractions.
2. Customer testimonials are often decisive in purchasing decisions.
3. Community discussion of a product underdevelopment increases trust
4. False testimonies are a problem: fakes entries will attempt to over sell a product and grumbling customers will attempt to destroy a company

## II BUSINESS SOFTWARE MODELS



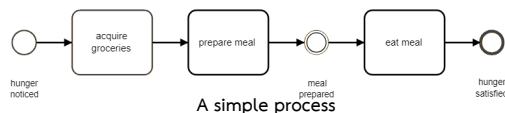
## 5. Business Process Model (BPM)

There are many good reasons for using BPMN.<sup>1</sup>

- **Recognized Standard:** BPMN is owned by an institution and is supported by many software products. Third party BPMN editors are available in the form of desktop apps like yEd<sup>2</sup> or online services like Camunda.<sup>3</sup>
- **Simplicity:** BPMN is based on a system of graphic symbols that easy to learn.
- **Power of expression:** BPMN reduces descriptions of complex process work flows to a graphic model that is easy to grasp.
- **Implementation in IT:** BPMN was developed to support technical implementation of processes (“Process Automation”). The more important IT becomes in a company, the more helpful BPMN can be, especially when process changes can be accomplished by a simple change of line.

### A simple example

The idea of a BPMN model is to model a process from the beginning to the end.



Naming conventions help to improve the readability of the process:







- **Tasks:** described as a [verb] + [object]: Acquire groceries is better than *first take care of shopping for groceries*
- **Events:** should be described as something that has already happened hunger noticed is better *when I begin to feel hungry*



### 5.1 Notation

<sup>1</sup>Camunda, 2018. BPMN Tutorial. Available online at <https://camunda.com/bpmn/>

<sup>2</sup>yWorks, 2018. yEd Graph Editor. Available online at <https://www.yworks.com/products/yed?>

<sup>3</sup>Camunda, 2018. BPMN Editor. Available online at <https://camunda.com>

Symbol	Description
 Start event	Start Event: Start of the process chain
 End event	End Event: The end of the process chain
 Message Intermediate Catch Event	Event Message Catch: wait for a message event
 Message Intermediate Throw Event	Event Message Throw: sending a message event
 Task	Task: Work to be done
 XOR Gateway	XOR Gateway: choice of a action stream

Symbol	Description
 <p>Parallel Gateway</p>	Parallel Gateway: initiate simultaneous action stream
 <p>Parallel Gateway</p>	Swim lanes: separate the process by roles or actors

### Symbol palettes:



yEd BPMN Symbol Palette

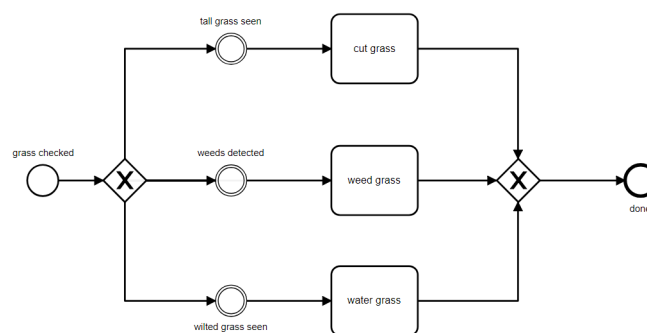


Cawemo BPMN Symbol Palette

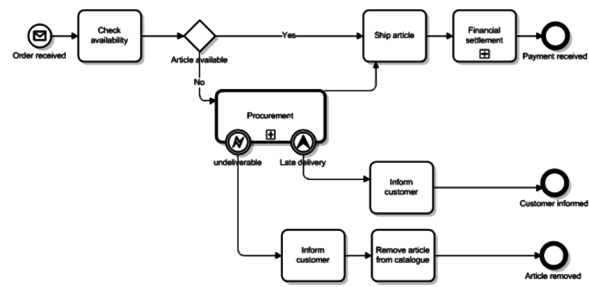


### Correcting a bug in process flow

Identify and correct the flaw in this process so that grass can be weeded, cut and watered in that order but only as required.



Grass maintenance process



Order Fulfillment Processing

## 5.2 Sample Business Process Models

## 6. Enterprise Resource (ERP)

## Building Blocks ## Sample ERP Systems

### III BUSINESS SOFTWARE SYSTEMS



## 7. Online Store

## 8. Customer Relations Management

## 9. Human Resources Management

### 9.1 Assessing Personal Temperment

Every person is unique and represents a unique set of strengths and weaknesses. At the same time the every job requires different set of characteristics. The role of HR is to attempt to collectin information meant to measure and ascertain how suited an applicant is for a job opening. In theory the goal is to play the right person in the job. However as implied by the following word cloud, fitness of applicants for a job has many dimensions and is hard to measure accurately.



Characteristics of a Good Employee



## Employee selection criteria

x> For each of the following job descriptions what would be the top 4 characteristics would you choose to identify a suitable candidate:

1. **Software Developer:** At XXX, we pursue greatness for our clients while reaching our own potential as well. To achieve this, we are building a team of people who can work independently, who push themselves to find creative solutions, who collaborate naturally, and who, above all, value doing good work. We are looking for new members for our team who can craft web and mobile applications that fit inside a larger communications, business, and product strategies. We focus on the problems to be solved instead of lists of functional requirements. The applications we develop are always part of larger strategy and help us foster close partnerships with our clients and the users of our applications. Together we work to amplify the effectiveness of our clients and accelerate their growth.
2. **Data scientist:** At YYY, we work closely with business users to identify business problems and develop solutions using data science techniques. To this end, we design and implement data models to explain and solve critical problems using such techniques as data mining, statistical modeling, and machine learning. We are looking for a worker who can provide insightful visualization and explanation of trends in client data and recommend the next course of action to be taken by decision makers and their colleagues.
3. **Robotics Engineer:** We are seeking a Robotic Engineer with technical leadership expertise to optimize the expansion of our paint robot program by improving the efficiency, productivity and quality of our program. You will be responsible for program operation, fault recovery procedures, troubleshooting and all around leadership of a state-of-the-art program to triple the paint volume of our previous model. In addition, you will contribute to improvements in Robot Safety, graphic user interface, electrostatic paint application, robot pathing, robotic fluid delivery systems, and the training of the next generation of program operators.
4. **Solutions Architect:** At WWW, we are looking for someone with a passion to help customers design large distributed systems using the world's most advanced cloud computing technologies. This job requires someone who can communicate, consult, and provide leadership while helping to guide major projects to success. We are hiring a Solutions Architect who can think strategically about business, product, and technical challenges and who will own technical engagement with customers on projects, working cross-organizationally to facilitate adoption and use of the cloud platform. At the same time, the job will involve developing a deep expertise in the cloud technologies and contributing to the know-how in the construction of applications and services on the cloud platform.

## 9.2 Belbin Team Roles

Research showed that the most successful teams were made up of a diverse mix of behaviours; they had access to all nine Belbin Team Roles. A Team Role was defined by Dr Meredith Belbin as "A tendency to behave, contribute and interrelate with others in a particular way". The value of Belbin Team Role theory lies in enabling an individual or team to benefit from self knowledge and adjust according to the demands being made by the external situation.

The concept was derived from a study of successful and unsuccessful teams competing in Business Games at Henley Management College, England. Managers taking part in the exercise were given a battery of psychometric tests and put into teams of varying composition. As time progressed different clusters of behaviour were identified as underlying the success of the teams. These successful clusters of behaviour were then given names. Hence the emergence of nine Team Roles shown with the distribution among British managers:<sup>1</sup>

<sup>1</sup>S.G. Fisher, TA Hunter and WDK Macross, 1998. The distribution of Belbin team roles among UK managers. Personnel Review, Vol. 29 Iss 2 pp. 124 - 140

Roles		Belbin Types	
Action-oriented:	Shaper 2.3%	Implementer 11.4%	Completer Finisher 3.6%
People-oriented:	Co-ordinator 26.2%	Teamworker 18.2%	Resource Investigator 33.2%
Thinking-oriented:	Plant 3.7%	Monitor Evaluator 0.5%	Specialist 0.8%

This doesn't mean that every team requires nine people! Most people will have two or three Team Roles that they are most comfortable with. Team Roles develop and mature. These may change with experience and conscious attention. Different Team Roles may come to the fore in response to the needs of particular situations.

Role Description	Strengths	Allowable weaknesses	Concerns
<b>Resource Investigator:</b> Uses their inquisitive nature to find ideas to bring back to the team.	Outgoing, enthusiastic. Explores opportunities and develops contacts.	Might be over-optimistic, and can lose interest once the initial enthusiasm has passed.	They might forget to follow up on a lead.
<b>Teamworker:</b> Helps the team to gel, using their versatility to identify the work required and complete it on behalf of the team.	Co-operative, perceptive and diplomatic. Listens and averts friction.	Can be indecisive in crunch situations and tends to avoid confrontation.	They might hesitate to make unpopular decisions.
<b>Co-ordinator:</b> Needed to focus on the team's objectives, draw out team members and delegate work appropriately.	Mature, confident, identifies talent. Clarifies goals.	Can be seen as manipulative and might offload their own share of the work.	They can over-delegate, leaving themselves little work to do.
<b>Plant:</b> Tends to be highly creative and good at solving problems in unconventional ways.	Creative, imaginative, free-thinking, generates ideas and solves difficult problems.	Might ignore incidentals, and may be too preoccupied to communicate effectively.	They could be absent-minded and forgetful.
<b>Monitor Evaluator:</b> Provides a logical eye, making impartial judgements where required and weighs up the team's options	Sober, strategic and discerning. Sees all options and judges accurately.	Sometimes lacks the drive in a dispassionate way. and ability to inspire others and can be overly critical.	They could be slow to come to decisions.
<b>Specialist:</b> Brings in-depth knowledge of a key area to the team.	Single-minded, self-starting and dedicated. They provide specialist knowledge and skills.	Tends to contribute on a narrow front and can dwell on the technicalities.	They can overload colleagues with technical information.

Role Description	Strengths	Allowable weaknesses	Concerns
<b>Shaper:</b> Provides the necessary drive to ensure that the team keeps moving and does not lose focus or momentum.	Challenging, dynamic, thrives on pressure. Has the drive and courage to overcome obstacles.	Can be prone to provocation, and may sometimes offend people's feelings.	They could risk becoming aggressive and bad-humoured in their attempts to get things done.
<b>Implementer:</b> Needed to plan a workable strategy and carry it out as efficiently as possible.	Practical, reliable, efficient. Turns ideas into actions and organises work that needs to be done.	Can be a bit inflexible and slow to respond to new possibilities.	They might be slow to relinquish their plans in favour of positive changes.
<b>Completer Finisher:</b> Most effectively used at the end of tasks to polish and scrutinise the work for errors, subjecting it to the highest standards of quality control.	Painstaking, conscientious, anxious. Searches out errors. Polishes and perfects.	Can be inclined to worry unduly, and reluctant to delegate.	They could be accused of taking their perfectionism to extremes.

### 9.3 Big 5 Behavioral Types

Behavioral Characteristic	Low end	High end
<b>Openness to experience:</b> Appreciation for art, emotion, adventure, unusual ideas curiosity, variety of experience and intellectual curiosity, creativity and a preference for novelty and variety.	consistent, cautious (Accountants)	inventive, curious (Artists)
<b>Conscientiousness:</b> A tendency to be organized and dependable, show self-discipline, act dutifully, aim for achievement, and prefer planned rather than spontaneous behavior.	easy-going, careless, sloppy. (Graffiti artist)	efficient, organized, stubborn. (Engraver)



Behavioral Characteristic	Low end	High end
<b>Extraversion:</b> Energy, positive emotions, surgency, assertiveness, sociability and the tendency to seek stimulation in the company of others, talkativeness and is often perceived as attention-seeking and domineering.	solitary, reserved, shy, introvert. (Hermit)	outgoing, energetic, boisterous, extravert. (Cheerleader)
<b>Agreeableness:</b> A tendency to be compassionate and cooperative rather than suspicious and antagonistic towards others. It related to a trusting and helpful nature.	challenging, detached, rigid. (Prosecutor)	friendly, compassionate, helpful. (Social worker)
<b>Neuroticism:</b> Neuroticism identifies certain people who are more prone to psychological stress and a tendency to experience unpleasant emotions easily.	confident	secure, cool (Air traffic controller)
		sensitive, nervous, explosive. (Drug addict)

## 9.4 Myers Briggs Test

The 16 personality types that were developed by Isabel Briggs Myers and Katharine Cook Briggs, which was built on the work of Carl Jung in the early 1900s. Based on the 4 dimensions of Carl Jung's theory of personality types:

Dimension	Extremes
Energizes	Extroversion (E) vs Internal (I)
Perceives information	Sensing (S) vs Intuitive (N)
Decision making	Thinking (T) vs Feeling (F)
World view	Judging (J) vs Perceiving (P)

Myers Briggs Test has been administered to a large number of people helping to validate the value of this instrument for a number of applications. Generally successful workers tend to gravitate to specific careers based on their personality profile as shown in the next sections.<sup>2</sup>

<sup>2</sup>Paul D. Tieger, Barbara Barron, Kelly Tieger, 2014. Do What You Are: Discover the Perfect Career for You Through the Secrets of Personality Type. Little, Brown and Company, 5th edition.

### Analysts:

- **INTJ** (2.1%) - The Mastermind/The Scientist – Independent, original, analytical, and determined with an exceptional ability to turn theories into solid plans of action. Creative perfectionists who prefer to do things their own way, INTJs perform well in non-social roles that require them to think theoretically. Common careers: Investment banker, Personal financial advisor, Software developer, Economist, Executive
- **INTP** (3.3%) - The Thinker – Logical, original, creative thinkers. Can become very excited about theories and ideas. Independent and creative problem-solvers, INTPs gravitate toward roles that require them to be theoretical and precise. Common careers - Computer programmer, software designer, Financial analyst, Architect, College professor, Economist
- **ENTJ** (1.8%) - The Commander – Assertive and outspoken - they are driven to lead. Excellent ability to understand difficult organizational problems and create solid solutions. Natural leaders who are logical, analytical, and good strategic planners, ENTJs gravitate toward authoritarian roles that require them to be organized and efficient. Common careers: Executive, Lawyer, Market research analyst, Management consultant, Venture capitalist
- **ENTP** (3.2%) - The Debater – Creative, resourceful, and intellectually quick. Good at a broad range of things. Enterprising creative people who enjoy new challenges, ENTPs excel in risky roles that require them to be persistent and non-conformist. Common careers: Entrepreneur, Real estate developer, Advertising creative director, Marketing director, Politician/political consultant

### Diplomats:

- **INFJ** (1.5%) - The Counselor/The Protector – Quietly forceful, original, and sensitive. Tend to stick to things until they are done. Thoughtful, creative people driven by firm principles and personal integrity, INFJs do well in behind-the-scenes roles that require them to communicate on a personal level. Common careers: Therapist/counsellor, Social worker, HR diversity manager, Organization development consultant, Customer relations manager
- **INFP** (4.4%) - The Idealist – Quiet, reflective, and idealistic. Interested in serving humanity. Sensitive idealists motivated by their deeper personal values, INFPs excel in roles that require them to be compassionate and adaptable. Common careers: Graphic designer, Psychologist/therapist, Writer/editor, Physical therapist, HR development trainer
- **ENFJ** (2.5%) - The Giver – Popular and sensitive, with outstanding people skills. Externally focused, with real concern for how others think and feel. People-lovers who are energetic, articulate, and diplomatic, ENFJs excel in cooperative roles that require them to be expressive and logical. Common careers: Advertising executive, Public relations specialist, Corporate coach/trainer, Sales manager, Employment/HR specialist
- **ENFP** (8.1%) - The Champion/The Inspirer – Enthusiastic, idealistic, and creative. Able to do almost anything that interests them. Curious and confident creative types who see possibilities everywhere, ENFPs perform well in expressive roles that require them to be alert and communicative. Common careers: Journalist, Advertising creative director, Consultant, Restaurateur, Event planner

### Sentinels:

- **ISTJ** (11.6%) - The Inspector/The Duty Fulfiller - Serious and quiet, interested in security and peaceful living. Hard workers who value their responsibilities and commitments, ISTJs excel in behind-the-scenes roles that require them to be reliable. Common careers: Auditor, Accountant, Chief financial officer, Web development engineer, Government employee
- **ISFJ** (13.8%) - The Nurturer/ – Quiet, kind, and conscientious, puts the needs of others above self-interest. Modest and determined workers who enjoy helping others, ISFJs do well in roles that require them to provide services to others without being in a position of authority. Common careers: Dentist, Elementary school teacher, Librarian, Franchise owner, Customer service representative

- **ESTJ** (8.7%) - The Supervisor/The Guardian – Practical, traditional, and organized. Likely to be athletic. Realists who are quick to make practical decisions, ESTJs perform well in social roles that require them to lead. Common careers: Insurance sales agent, Pharmacist, Lawyer, Judge, Project manager
- **ESFJ** (12.3%) - The Provider/The Caregiver – Warm-hearted, popular, and conscientious. Tend to put the needs of others over self-interest. Gregarious traditionalists motivated to help others, ESFJs gravitate toward social roles that require them to care for the well-being of others. Common careers: Sales representative, Nurse/healthcare worker, Social worker, Public relations account executive, Loan officer

### Explorers:

- **ISTP** (5.4%) - The Craftsman / The Mechanic - Quiet and reserved, interested in how and why things work. Straightforward and honest people who prefer action to conversation, ISTPs perform well in utilitarian roles that require them to make use of tools. Common careers: Civil engineer, Economist, Pilot, Data communications analysis, Emergency room physician
- **ISFP** (8.8%) - The Composer/The Artist – Quiet, serious, sensitive and kind, avoids conflict. Warm and sensitive types who like to help people in tangible ways, ISFPs do well in roles that require them to be sympathetic and attentive. Common careers: Fashion designer, Physical therapist, Massage therapist, Landscape architect, Storekeeper
- **ESTP** (4.3%) - The Doer – Friendly, adaptable, action-oriented. focused on immediate results. Pragmatists who love excitement and excel in a crisis, ESTPs excel in high-stakes roles that require them to be resourceful. Common careers: Detective, Banker, Investor, Entertainment agent, Sports coach
- **ESFP** (8.5%) - The Performer – People-oriented and fun-loving, they make things more fun for others by their enjoyment. Lively and playful people who value common sense, ESFPs gravitate toward roles that require them to be expressive and interact with others. Common careers: Child welfare counselor, Primary care physician, Actor, Interior designer, Environmental scientist

## 9.5 Hofstede survey on cultural dimensions

By studying expat workers work performance in large multinational corporations, Hofstede was able to identify key cultural differences in the way people approach work.<sup>3</sup>

- Power distance: perceived ability to make a difference
- Individualism: individual vs collective: tendency to think in terms of I vs We.
- Gender balance: masculinity vs femininity
- Avoidance of Uncertainty: tolerance of risk
- Long term orientation: perception of urgency
- Indulgences vs restraint: attitude towards acquired wealth

## 9.6 Job appraisal

### Performance Appraisal

Performance Appraisal is the systematic evaluation of the performance of employees and to understand the abilities of a person for further growth and development. Performance appraisal is generally done in systematic ways which are as follows:

- The supervisors measure the pay of employees and compare it with targets and plans.
- The supervisor analyses the factors behind work performances of employees.
- The employers are in position to guide the employees for a better performance.

<sup>3</sup>Geert Hofstede, Gert Jan Hofstede, Michael Minkov, 2010. Cultures and Organizations: Software for the Mind, Third Edition. McGraw-Hill.

## Objectives of Performance Appraisal

Performance Appraisal is done with following objectives in mind:

- To maintain records in order to determine compensation packages, wage structure, salaries raises, etc.
- To identify the strengths and weaknesses of employees to place right men on right job.
- To maintain and assess the potential present in a person for further growth and development.
- To provide a feedback to employees regarding their performance and related status.
- To provide a feedback to employees regarding their performance and related status.
- It serves as a basis for influencing working habits of the employees.
- To review and retain the promotional and other training programmes.

## Advantages of Performance Appraisal

It is said that performance appraisal is an investment for the company which can be justified by following advantages:

1. **Promotion:** Performance Appraisal helps the supervisors to chalk out the promotion programmes for efficient employees. In this regards, inefficient workers can be dismissed or demoted in case.
2. **Compensation:** Performance Appraisal helps in chalking out compensation packages for employees. Merit rating is possible through performance appraisal. Performance Appraisal tries to give worth to a performance. Compensation packages which includes bonus, high salary rates, extra benefits, allowances and pre-requisites are dependent on performance appraisal. The criteria should be merit rather than seniority.
3. **Employees Development:** The systematic procedure of performance appraisal helps the supervisors to frame training policies and programmes. It helps to analyse strengths and weaknesses of employees so that new jobs can be designed for efficient employees. It also helps in framing future development programmes.
4. **Selection Validation:** Performance Appraisal helps the supervisors to understand the validity and importance of the selection procedure. The supervisors come to know the validity and thereby the strengths and weaknesses of selection procedure. Future changes in selection methods can be made in this regard.
5. **Communication:** For an organization, effective communication between employees and employers is very important. Through performance appraisal, communication can be sought for in the following ways:
  - Through performance appraisal, the employers can understand and accept skills of subordinates.
  - The subordinates can also understand and create a trust and confidence in superiors.
  - It also helps in maintaining cordial and congenial labour management relationship.
  - It develops the spirit of work and boosts the morale of employees.

All the above factors ensure effective communication.

1. **Motivation:** Performance appraisal serves as a motivation tool. Through evaluating performance of employees, a person's efficiency can be determined if the targets are achieved. This very well motivates a person for better job and helps him to improve his performance in the future.

## 9.7 Goals of HR

- Employee retention
- Job performance appraisal
- Employee development
- Job-Employee fit: Right person for the job



## Product Review: OrangeHRM - Human Resource Management Web Site

- Home page: <https://www.orangehrm.com/>
  - Demo: <https://orangehrm-demo-6x.orangehrmlive.com/>
1. Login as admin to the online demo and determine the amount of information that is management by this system by answering the following for the Webmaster of the corporation:
    - Name and name of spouse/children
    - Name of supervisor
    - Level of salary
    - Results of last appraisal
  2. Login as employee and determine what information is available to employees and what updates they can make online.
  3. What are the benefits and dangers of having such information online?

HR data generally holds a wealth of information that can be used to predict employee retention, turnover and satisfaction. However this information must be mined from the data by applying data science and machine learning techniques.



## Prediction of Employee Churn

Apply trend line analysis in Excel on the data in the training set to develop a model to predict the employees in the test set who are most likely to resign. The following files are provided to you.

- HR.csv - the training set
- HR\_evaluate.csv - the test set

### Data fields

- id - Anonymous ID number for each employee
- satisfaction - Employee satisfaction level
- last\_evaluation - Last evaluation score
- number\_project - Number of projects assigned to
- average\_monthly\_hour - Average monthly hours worked
- time\_spend\_company - Time spent at the company
- Work\_accident - (1= Yes, 0 = No) - Whether they have had a work accident
- left - Whether or not employee left company (1 = Yes, 0 = No)
- promotion\_last\_5year - (1 = Yes, 0 = No) - Whether they have had a promotion in the last 5 years
- sales - Department name (not just sales)
- salary - Salary category

This exercise was adapted from a 2017 Kaggle Competition<sup>4</sup>

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<sup>4</sup>Kaggle, 2017. Employee Churn Prediction: Determining what factors predicts an employee leaving his/her job. Available online at <https://www.kaggle.com/c/employee-churn-prediction/data>

## 10. Operations Management

### 10.1 Measures of Association Rules

$$Productivity = \frac{Output}{Input}$$

$$Efficiency = \frac{100 \times ActualOutput}{StandardOutput}$$

$$Support(X,Y) = \frac{|t(X,Y)|}{|t|}$$

$$Confidence(X,Y) = \frac{Support(X,Y)}{Support(X)}$$

$$Lift = \frac{Support(X,Y)}{Support(X) \times Support(Y)}$$

$$Conviction = \frac{1 - Support(Y)}{1 - Confidence(X,Y)}$$

$$Leverage = Support(X,Y) - Support(X) \times Support(Y)$$

### 10.2 Logistics

- Crazy processing machine 2018 | Hydroponics Factory <https://www.youtube.com/watch?v=7sxrLxr6VpA>
- Krispy Kreme Donut Machine <https://www.youtube.com/watch?v=Rn0XsW2l4d4>
- Fulfillment Center: How Amazon Receives Your Inventory <https://www.youtube.com/watch?v=dAXdeqcHBp4>

The Gigantic Grocery Warehouses Built like Living Organisms [https://www.youtube.com/watch?v=\\_psDSX-7P1s](https://www.youtube.com/watch?v=_psDSX-7P1s)

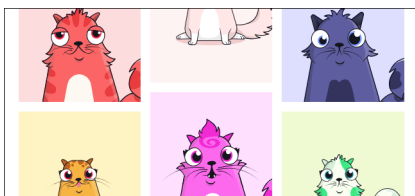
## IV Emerging Technologies

## 11. Business Intelligence and Data Analytics



## 12. Cryptocurrencies

### The Crazy Expensive CryptoKitties



CryptoKitties

CryptoKitties is a “blockchain game”.<sup>a</sup> It involves collecting, trading, and breeding CryptoKitties with “cattributes.” These kitties are actually tokens stored on a blockchain. A CryptoKitty is a unique digital asset that’s stored as a token stored on the Ethereum blockchain.<sup>b</sup> Each CryptoKitty has a combination of cattributes that make it unique. These features come together to give each CryptoKitty a unique look. Some CryptoKitties have mewtations, which are rare cattributes. These CryptoKitties can be traded, sold, and purchased like any other digital asset. They can also be bred with another CryptoKitty to create a new kitty. On the surface, CryptoKitties is just a game that involves collecting digital cat pictures, breeding them to make new cat pictures, and trading cat pictures. The first CryptoKitty was born on December 2, 2017. Since then, a new Generation 0 cat has been born every fifteen minutes. In November 2018 (one year after the game launch), the last Generation 0 cat will be born. All new kitties will be produced through breeding after that point. As collectibles, they have rarity: each CryptoKitty is unique. The most expensive CryptoKitty ever purchased sold for \$110,707 to a willing buyer. People have spent over \$24 million on CryptoKitties, and the project has received \$12 million in venture capital funding.<sup>c</sup>

<sup>a</sup><https://www.cryptokitties.co/>

<sup>b</sup>The CryptoKitten Team, 2018. CryptoKitties: Collectible and Breedable Cats Empowered by Blockchain Technology. Version 2.0 Available online at [https://drive.google.com/file/d/1soo-eAaJHzhw\\_XhFGMUp3VNCQoM43byS/view](https://drive.google.com/file/d/1soo-eAaJHzhw_XhFGMUp3VNCQoM43byS/view)

<sup>c</sup>Chris Hoffman, 2018. What is a CryptoKitty? Published as a blog article on <https://www.howtogeek.com/354535/what-the-is-a-cryptokitty/>

## 13. Open Source Solutions

In 1983, Robert Stallman wrote the core concepts that would eventually become the GNU Manifesto as an means to initiate a movement committed to creating and distribution open and free software.<sup>1</sup> The Free Software Foundation grew out of these developments and granted users the following four freedoms, many of which require access to the source code.<https://www.gnu.org/philosophy/free-sw.html>

- **Freedom 0:** The freedom to run the program, for any purpose.
- **Freedom 1:** The freedom to study how the program works, and adapt it to your needs. Access to the source code is a precondition for this. Access to the source code is a precondition for this.
- **Freedom 2:** The freedom to redistribute copies so you can help your neighbor.
- **Freedom 3:** The freedom to improve the program, and release your improvements to the public, so that the whole community benefits. Access to the source code is a precondition for this.<sup>2</sup>

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<sup>1</sup> Stallman, 1985. The GNU Manifesto. Available online at <https://www.gnu.org/gnu/manifesto.html>

<sup>2</sup> Free Software Foundation, Inc., 2018. What is free software? Available online at <https://www.gnu.org/philosophy/free-sw.html>

## 14. Thailand 4.0

Thailand 4.0 is an economic model that aims to unlock the country from several economic challenges resulting from past economic development models which place emphasis on agriculture (Thailand 1.0), light industry (Thailand 2.0), and advanced industry (Thailand 3.0). These challenges include economic conditions that create 3 traps:

- **A middle income trap:** where opportunities for wealth accumulation is restricted.
- **An inequality trap:** where wealth is not acquired fairly based on gender, ethnical background and other socio-political issues.
- **An imbalanced trap:** where the gap between the rich and the poor widens especially based on geographic location and urban vs rural settings.

The Thai government has committed itself to invest into several areas of innovation that would stimulate the economy, such as robotics/internet of things, agriculture/biotechnology, biofuels/biochemicals and smart electronics. The intention is to create the environment for transformation and resulting sea-changes in such areas as farming, business development, skilled labor and technological development. The four objectives of this strategy are listed below:[^thai4.0]

1. **Economic Prosperity:** to create a value-based economy that is driven by innovation, technology and creativity. The model aims to increase Research and Development (“R&D”) expenditure to 4% of GDP, increase economic growth rate to full capacity rate of 5-6% within 5 years, and increase national income per capita from 5,470 USD in 2014 to 15,000 USD by 2032.
2. **Social Well-being:** to create a society that moves forward without leaving anyone behind (inclusive society) through realization of the full potential of all members of society. The goals are to reduce social disparity from 0.465 in 2013 to 0.36 in 2032, completely transform to social welfare system within 20 years and develop at least 20,000 households into “Smart Farmers” within 5 years.
3. **Raising Human Values:** to transform Thais into “Competent human beings in the 21st Century” and “Thais 4.0 in the first world. Measures under Thailand 4.0 will raise Thailand HDI from 0.722 to 0.8 or the top 50 countries within 10 years, ensure that at least 5 Thai universities are ranked amongst the world’s top 100 higher education institution within 20 years.
4. **Environmental Protection:** to become a livable society that possesses an economic system capable of adjusting to climate change and low carbon society. The targets are to develop at least 10 cities into the world’s most livable cities, reduce terrorism risk, and increase the proportion

## Bibliography

- Efraim Turban, Judy Whiteside, David King and Jon Outland, 2017. Introduction to Electronic Commerce and Social Commerce. 4th Edition, Springer Texts in Business and Economics, Springer International Publishing. ISBN 978-3-319-50090-4
- Gary P. Schneider 2015. Electronic Commerce. 11th Ed, Cengage learning

## Software used in this course

Orange HR

Sugar CRM

Power BI

Bonita BPM

Online Store

ERP - Odoo

Logistics

- <https://flightaware.com/live/airport/KJFK>