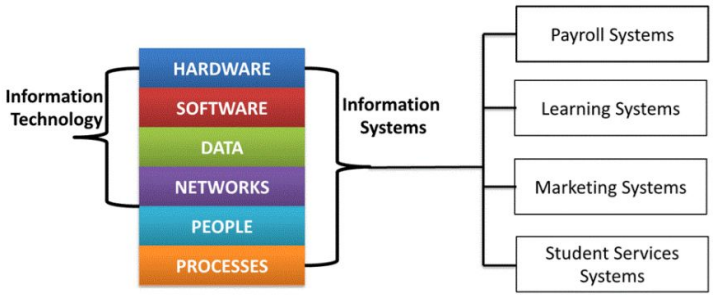
Information Technology Module 1

Week 1

Jan 8, 2020

Information Systems Basics

- **Information Systems (IS)**
  - Computer-based tools that are used to work with *information* and support the information and needs of an organization.
  - Main purpose to provide accurate, timely and useful information.
  - Include: Hardware, Software, Trained personnel, Policies & Procedures & Security and Ethical measures.
- IS is an *enabler* of business success and innovation.
- **Information technology (IT)**
  - The acquisition, processing, storage, and distribution of voice, graphics, text, and numbers and other information by a combination of computers and telecommunications networks.
- **Management Information Systems (MIS)**
  - The function that plans, develops, implements, and maintains IS hardware, software, and applications that people use to support the goals of an organization.
  - MIS is a business function, similar to Accounting, Finance, Operations, and Human Resources.



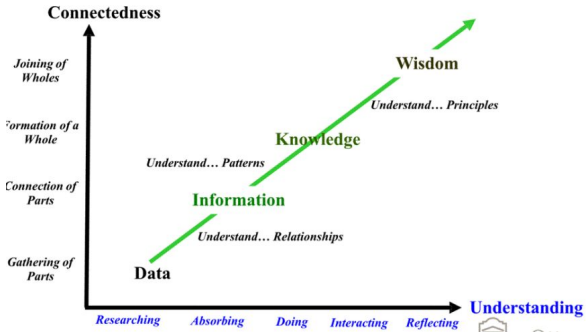
- IS existed long before IT
  - Before IT, using books and ledgers, hotels were able to
    - Take reservations
    - Check guests in and out
    - Keep track of room status
    - Manage inventory

- **Data, Information, BI & Knowledge**

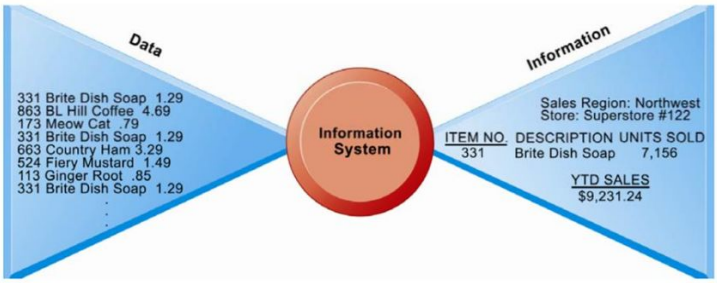
Data →	**Information →**	**Business Intelligence →**	**Knowledge →**
Raw facts that describe the characteristics of an event or object.	Data converted into a meaningful and useful context.	Information collected from multiple sources, that analyzes patterns, trends and relationships for strategic decision making.	The skills, experience, and expertise, coupled with information and intelligence ,that creates a person's intellectual resources.

- Order date - Amount sold - Customer member - Quantity ordered	- Best-selling product - Best customer - Worst-selling product - Worst customer	- Lowest sales per week compared with the economic interest rates. - best-selling product by month compared to sports season and city team win.	- Choosing not to fire a sales representative who is underperforming knowing that person is experiencing family problems. - Listing products that are about to expire first on the menu or creating them as a daily special to move the product.

- **Abstraction Level**



- **Information Systems Elements: Data & Information**



- **Data examples: Row of Data**

Order Date	Product Name	Quantity	Unit Price	Total Sales	Unit Cost	Total Cost	Profit	Customer	Sales Rep
04-Jan-10	Mozzarella cheese	41	24	984	18	738	246	The Station	Debbie Fernand
04-Jan-10	Romaine lettuce	90	15	1,350	14	1,260	90	The Station	Roberta Cross
05-Jan-10	Red onions	27	12	324	8	216	108	Bert's Bistro	Loraine Schultz
06-Jan-10	Romaine lettuce	67	15	1,005	14	938	67	Smoke House	Roberta Cross
07-Jan-10	Black olives	79	12	948	6	474	474	Flagstaff House	Loraine Schultz
07-Jan-10	Romaine lettuce	46	15	690	14	644	46	Two Bitts	Loraine Schultz
07-Jan-10	Romaine lettuce	52	15	780	14	728	52	Pierce Arrow	Roberta Cross
08-Jan-10	Red onions	39	12	468	8	312	156	Mamm'a Pasta Palace	Loraine Schultz
09-Jan-10	Romaine lettuce	66	15	990	14	924	66	The Dandelion	Loraine Schultz
10-Jan-10	Romaine lettuce	58	15	870	14	812	58	Carmens	Loraine Schultz
10-Jan-10	Pineapple	40	33	1,320	28	1,120	200	The Station	Loraine Schultz

- **Information example: Data converted into a meaningful and useful context**

OrderDate	Product Name	Quantity	Unit Price	Total Sales	Unit Cost	Total Cost	Profit	Customer	SalesRep
15-Feb-10	Chicken	41	36	1,476	25	1,025	451	Smoke House	Roberta Cross
19-Feb-10	Chicken	50	36	1,800	25	1,250	550	Smoke House	Roberta Cross
03-Mar-10	Chicken	64	36	2,304	25	1,600	704	Pierce Arrow	Roberta Cross
12-Apr-10	Chicken	2	36	72	25	50	22	Laudisio	Roberta Cross
08-Jul-10	Chicken	94	36	3,384	25	2,350	1,034	Pierce Arrow	Roberta Cross
20-Nov-10	Chicken	15	36	540	25	375	165	Two Bitts	Roberta Cross
28-Nov-10	Chicken	6	36	216	25	150	66	Laudisio	Roberta Cross
30-Nov-10	Chicken	51	36	1,836	25	1,275	561	Pierce Arrow	Roberta Cross

- **Business Intelligence & Knowledge example:**

Distribution Analysis		
Question	Name	Total
Who is Bob's best customer by total sales?	Pierce Arrow	$ 56,789
Who is Bob's worst customer by total sales	Smoke House	$ 3,456
Who is Bob's best customer by profit?	Laudisio	$ 45,777
Who is Bob's worst customer by profit?	Carmens	$ 4,555
What is Bob's best selling product by total sales?	Chicken	$ 34,234
What is Bob's worst selling product by total sales?	Black olives	$ 567
What is Bob's best selling product by profit?	Peppers	$ 22,444
What is Bob's worst selling product by profit?	Red onions	$ 2,443
Who is Bob's best sales representative by profit?	Loraine Schultz	$ 98,989
Who is Bob's worst sales representative by profit?	Roberta Cross	$ 4,567
What is the best sales representative's best selling product (by total profit)?	Red onions	$ 24,343
Who is the best sales representative's best customer (by total profit)?	Flagstaff House	$ 1,234
What is the best sales representative's worst selling product (by total profit)?	Romaine lettuce	$ 45,678
Who is the best sales representative's worst customer (by total profit)?	Bert's Bistro	$ 5,678

Why Study Information Systems?

- **In today's workplace, it is imperative that IS work effectively and reliably.**
  - Use of technology applications across the organization,
  - Data entry, reporting, searching, organizing, etc.
  - End-user development:
    - Specific / advanced form of end-user computing
    - Development of functional applications by end-users (non IT-specialists) by using light-weight programming tools or multi-purpose and end-user applications.
  - IS managers DO NOT only work with the IT dept.:
    - IS will be part of your job in other business functions such as Marketing, Operations, HR, Finance, Accounting, etc.
  - AS an IS manager for your business function, you will play a vital role in the implementation and administration of technology within your divisions and for the benefit of your organization.
    - You will plan, coordinate, and direct research on the computer-related activities of firms.
    - You will consult with other managers, help determine the goals of an organization and then implement technology to meet those goals.
    - You will coordinate with pertinent people about the technical aspects such as software development, network security, and internet operations.

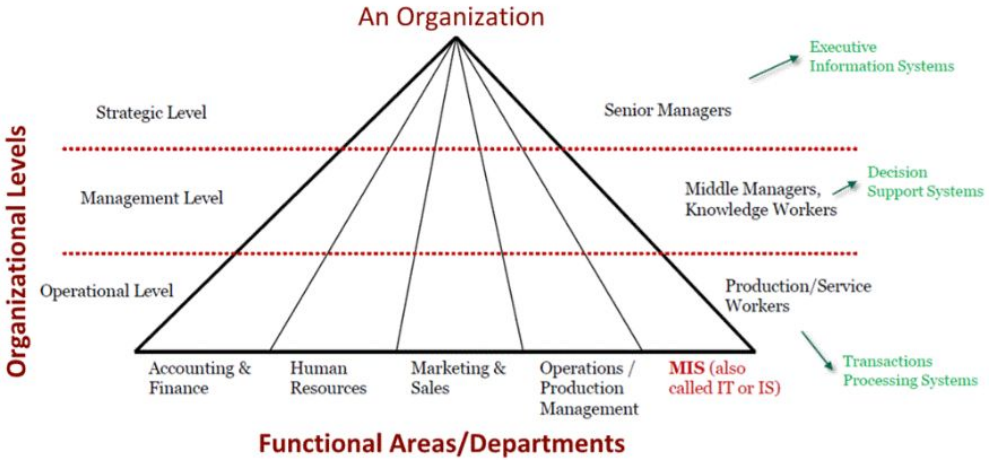
IS Career Why?

- **Report from Information and Communication Technology Council**
  - By 2021, approximately 216,000 new MIS/ICT (digital talent) will need to be filled.
  - MIS/ICT occupations with labour shortage/in high demand.
    - Computer and Information Systems Managers

        - Information Systems Analyst and Consultants
        - Database Analyst and Database Administrators
    - Priority given to individuals with a combination of business and ICT skills
    - Average weekly wage rate
        - 2015: $1451 ($75452 per annum)
        - 2016: $1500 ($78000 per annum)

Information Systems' Impact on Business Operations

- **Marketing Working with Other Organizational Departments**
    - Organizations typically operate by functional areas or "silos".
    - Departments must function interdependently to share common information.



Lecture 2

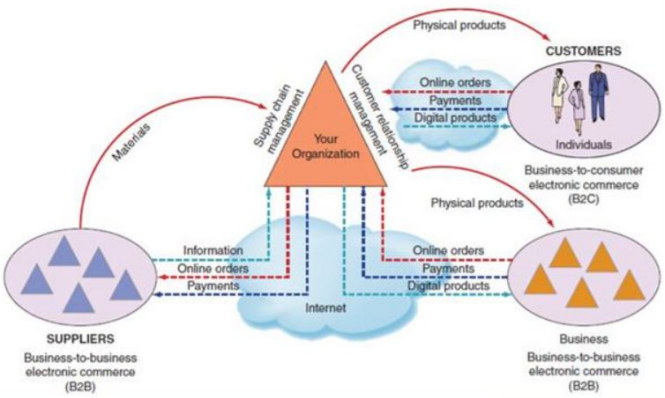
Jan 10, 2020

Socio-Technical View of Information Systems

- **Socio-Technical View of Information Systems:**
    - Includes issues and insights contributed from technical and behavioural disciplines.
    - **Technical Approach:**
        - Emphasizes mathematically based models.
        - Computer science, management science, operations research.
    - **Behavioural Approach:**
        - Behavioural issues (Strategic business integration, implementation, etc.)
        - Psychology, Economics, Sociology.

Types of Information Systems

- **Intra-organizational and Inter-Organizational Information Systems**



TYPE OF SYSTEM	FUNCTION	EXAMPLE
Functional area IS	Supports the activities within specific functional area	System for processing payroll
Transaction processing system	Processes transaction data from business events	Walmart checkout point-of-sale terminal
Enterprise resource planning	Integrates all functional areas of the organization	Oracle, SAP system
Office automation system	Supports daily work activities of individuals and groups	Microsoft® Office
Management information system	Produces reports summarized from transaction data, usually in one functional area	Report on total sales for each customer
Decision support system	Provides access to data and analysis tools	"What-if" analysis of changes in budget
Expert system	Mimics human expert in a particular area and makes decisions	Credit card approval analysis
Executive dashboard	Presents structured, summarized information about aspects of business important to executives	Status of sales by product
Supply chain management system	Manages flows of products, services, and information among organizations	Walmart Retail Link system connecting suppliers to Walmart
Electronic commerce system	Enables transactions among organizations and between organizations and customers	Payment processes at *www.dell.com*

Three Major Classes of IS

- **Transactions processing systems**
  - Handles data for the operational level
  - Performs CLAP for transactional data
    - examples : Payroll and order entry
- **Decisions Support Systems**
  - Models data and information to support managerial decisions
  - Performs CLAP

- **Executive Information Systems**
    - Highly aggregated data for strategic decisions
    - Dashboards

Social Media and Business Strategy

- Social Media platforms and applications have changed how we communicate, socialize, access and use information, and shop.
- But… these tools are the means to doing things and not the ends.
- As business managers we need to know how to leverage their potential to achieve strategic advantage.

What is Social Media?

- Social media is a group of internet-based applications that build on the ***ideological and technological foundations of Web 2.0***, and that allow the creation and exchange of User Generated Content. (Kaplan & Haenlein, 2010)
- **Web 2.0**:
    - Term first used in 2004 software as a continually-updated service that gets better the more people use it, consuming and remixing data, from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an architecture of participation. (O'Reilly, 2005)
- **User-Generated Content:**
    - Term popularized in 2005
    - Various forms of media content that are publicly available and created by end-users.
    - 3 basic requirements for UGC: (OECD, 2007)
        - Needs to be published either on a publicly accessible website or on a social website or on a social networking site accessible to a selected group of people.
        - Needs to show a certain amount of creative effort.
        - Needs to have been created outside of professional routines and practices.

The move from Web 1.0 to Web 2.0

Web 2.0

Economic, social, and technology trends forming the basis for the next generation of the internet

- Refers not to a new WWW but to how it will be used by software developers and end users
- Changes initiated by
    - Billions of people which have access
    - more mobile devices than laptops
    - Wide variety of devices

Web 1.0

- The user is not involved
- Special skills and tools needed to author websites
- Brochure service
    - Small number of companies and advertisers
    - Services created for the user

Web 2.0

- The user is involved

- Authoring tools for websites readily available.
- Companies built around user-generated content
    - Harnesses collective intelligence
    - Company provided

Web 1.0 vs web 2.0

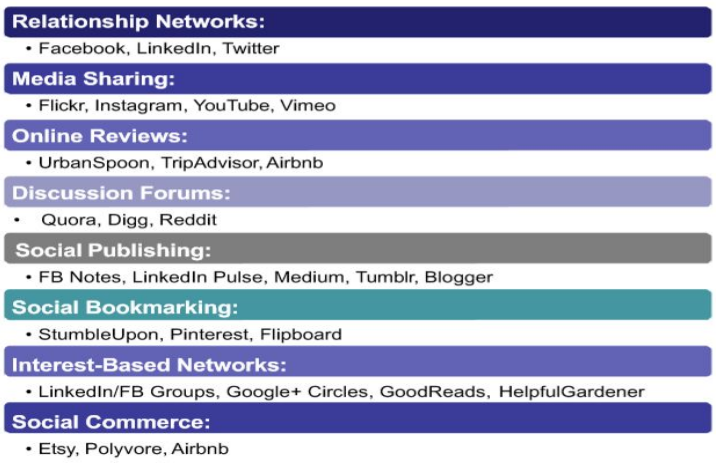
- Static vs dynamic
- read-only vs read/write
- Letter vs blogs
- Isolated vs interactive

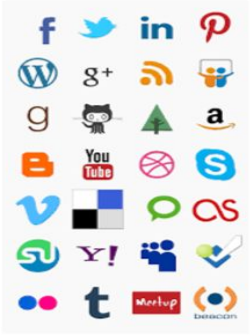
Aspects of Web 2.0

- Concepts: participation, reputation, syndication
- Approaches: web as a platform, services instead of products, radical decentralization.
- Business models: reinvented and futuristics

Web 1.0	Web 2.0
Doubleclick	Google adsense
Ofoto	Flickr
Akamai	bittorrent
Mp3.com	Napster
Britannica online	Wikipedia
Personal websites	Blogging
Evite	upcoming.org and EVDB
Domain Name Speculation	Search Engine Optimization
Page Views	Cost Per Click
Screen Scraping	web services
Publishing	Participation
Content Management Systems	Wikis
Directories (taxonomy)	Tagging (“Folksonomy”)
Stickiness	Syndication

Types of Social Media





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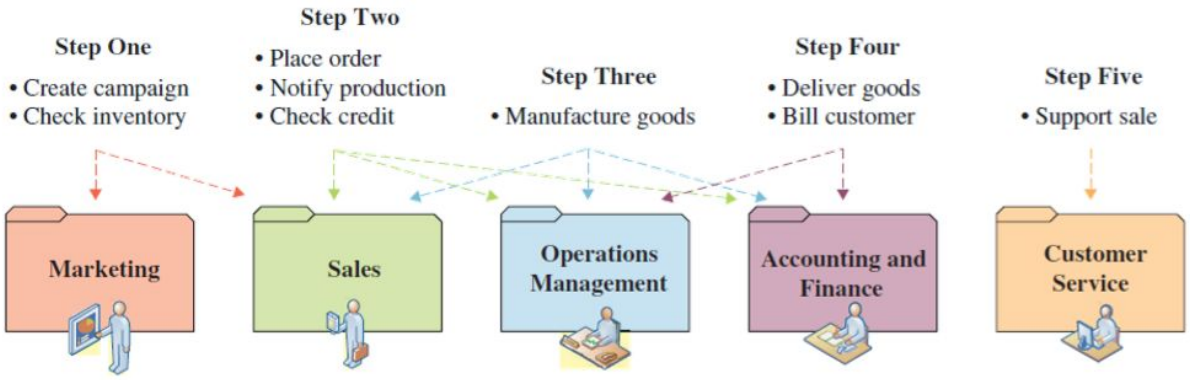
Lecture 3
Jan 15, 2020

The Generic Business Process



Social Media & Business Strategy

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- But…. these tools are the **means to doing things** and **not the ends**
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Social Media Implications for Business

Trend:

- Social media has led to the convergence of information and communication

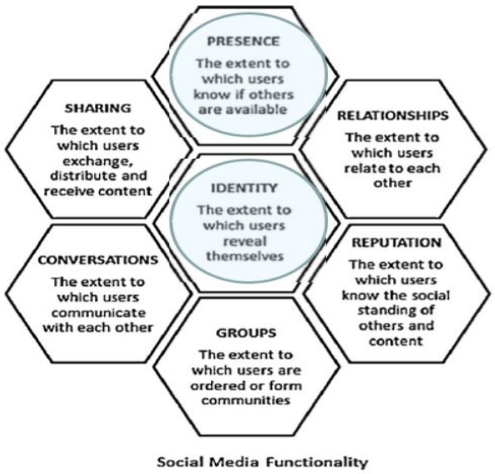
Implications for Business:

- Reach out and engage with customers, prospects, partners, and your network
- Create opportunity by communicating and sharing information
- Manage your reputation and discover new business through monitoring information

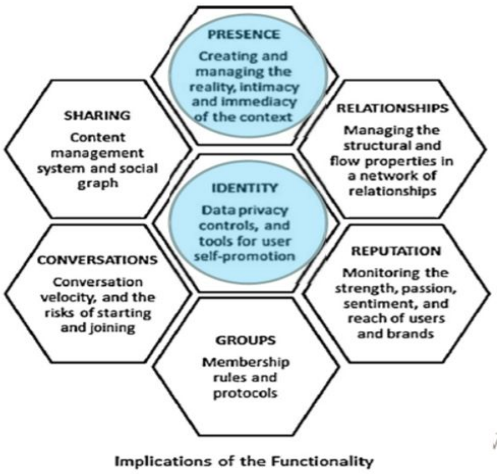
Adopting a social business aptitude:

- Maximize the potential of social media by using it across business functions
- Rather than using social media as an inside-out promotional medium, leverage the outside-in conversations as well
- Harness big social data to glean insights for product research, competitive analysis and prediction of customer needs.
- Update corporate governance policies and guidelines

Social Media Strategy: Criterion based Selection of Tools

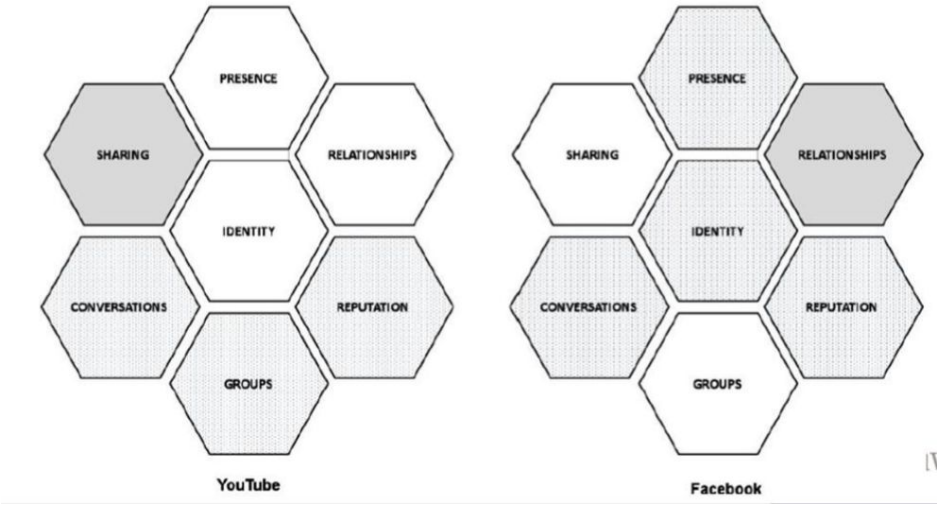


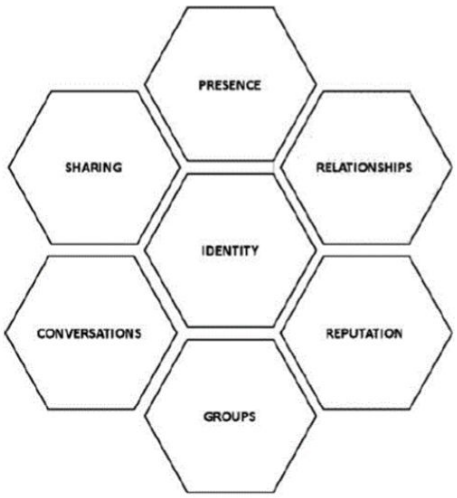
Social Media Functionality



Implications of the Functionality

How would you describe Snapchat using the Honeycomb framework?





Social Media & Big Data

Structured vs Unstructured Data:

- Structured data refers to information with a high degree of organization, such that inclusion in a relational database is seamless and readily searchable by simple, straightforward search engine algorithms or other search operations
- Unstructured data is essentially the opposite\
- The lack of structure makes compilation and analysis a time and energy-consuming task.

Traditional approach

- Business Users
    - Determine what question to ask.
- IT
    - Structures the data to answer that question.

Big Data Approach

- IT
    - Delivers a platform to enable creative discovery

- Business Users
    - Explores what questions could be asked

Challenges to overcome

- The 4 Vs
- Volume
    - Data at scale
        - Terabytes to petabytes of data
- Variety
    - Data in many forms
        - Structured, unstructured, tect, multimedia
- Velocity
    - Data in motion
        - Analysis of streaming data to enable decisions within fractions of a second
- Veracity
    - Data uncertainty
        - Managing the reliability and predictability of inherent imprecise data types

Social Network Analysis (SNA)

- The mapping and measuring of relationships and flows between people, groups, organizations, computers, or information or knowledge processing entities.
- The nodes in the network are the people and groups, whereas the links show relationships or flows between the notes.
- SNA provides both visual and mathematical analyses of relationship

Lecture 4
Jan 17, 2020

Social Media Strategy: Key Consideration

Social Media is always in a flux due to 3 factors

- End-users
- Use cases
- Functionality

Implications

- Strategies and tactics used to manage social media have to adapt

Social Commerce

Social Commerce

- Use of social computing by business in innovative ways
- Delivery of electronic commerce activities and transactions through social computing
- Social interactions and user contributions allow customers to participate actively in the marketing and selling of products and services in online marketplaces and communities
- Individuals can collaborate online, get advice from trusted individuals, and find and purchase goods and services

Social Media Strategy:Key Considerations

- Strategy needs to be formulated in terms of objectives, tactics, and metrics
- Corporate governance issues such as policies and guidelines need to be considered

Social Media Strategy: Components

Components of a social media strategy

- Objectives, Tactics, metrics

PDCA Framework:

- **Plan:**
  - Creating a social media strategy
- **Do:**
  - Implementing tactics and campaigns aligned with the social
- **Check:**
  - Regular review of metrics created as part of the strategy to determine if business ROI in social media has been sufficiently achieved or not.
- **Act:** (or Adjust) Fine-tuning the social media strategy, tactics, plans for campaigns, and even potentially refining or changing metrics or how measurements are performed.
  - It is a never-ending cycle because of the changing nature of social media sites and services, and how we use them

Objectives

- Link to corporate strategy
- Ways to extend brand's strengths online
  - **Classic objectives**
    - Increase sales, decrease expenses, improve ROI
  - **Social objectives**
    - Engagement, influence, advocacy, personalization

Customers

- Target demographic group and focus
- Assess type of users

Sharing

- What social tools will be used
- What type content will be shared

Who

- Who will lead the effort

Brand Alignment

- Guidelines, Tone of voice, Media usage

Monitor

- Listening to customers, Activities monitoring, Measuring success

Social Media Metrics

Example of Social Media Strategic Metrics:

- Customer Dialog Metrics:
  - Genuine Dialog provides the basis for building awareness and word of mouth

Strategic Social Media Management: Key Success Factors

Strategy
- A comprehensive, company-wide social strategy, and all functions and business units adhere to a uniform set of strategic directives

Organization
- Employ dedicated FTEs in different functions and set aside budgets specifically for social media activities.

Criteria-based platform selection
- Select appropriate social media platforms based on clear criteria to match social media strategy

Integration:
- Integrate and leverage social media activities along the entire value chain

Awareness
- Created a significantly higher awareness for social media throughout the company

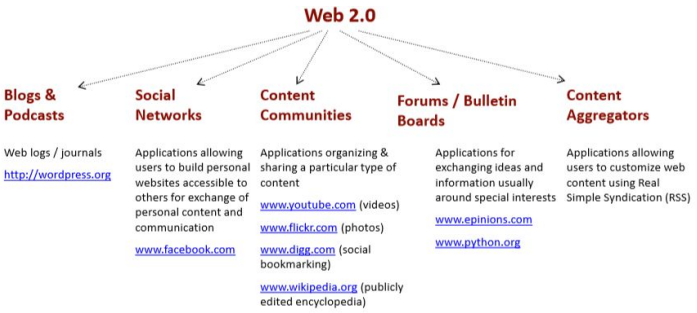
Leadership
- Make social media activities a priority for top management and ensure senior executives are highly involved

Lecture 5
Jan 22, 2020

Web 1.0 vs. Web 2.0

Web 1.0	Web 2.0—the Social Web
Static pages	Dynamic pages
Author controlled content	User controlled content
Computers	Computers, cell phones, televisions, PDAs, game systems, car dashboards
Users view content	Users create content
Individual users	User communities
Marketing goal: *influence*	Marketing goal: *relationships*
Data: single source	Data: multiple sources, e.g., mashups

Web 2.0 and Beyond



Web 2.0 Applications

Table 1. Comparison of Web 2.0 and related legacy technologies.

Web 2.0 service	Related legacy service	Revolutionary?
Blogs	Bulletin board systems (BBS) and threaded news groups	Not particularly; however, greater ownership and easier use are possible.
Image sharing (such as Flickr)	Image sharing Web sites	No, but many more images are available now and it's arguably easier to search for them.
Wikis	Personal Web sites	Somewhat. Wikis may be useful in work groups and other moderated environments.
Really simple syndication (RSS)	None	Yes, due to RSS' ability to deliver granular news on demand.
Social networks	Personal Web sites	Not particularly. Admittedly, contemporary social networks are more user friendly.
Mash-ups	None	Yes, because of their ability to combine content to form new content.
Podcasts and vodcasts	File servers with Web-exposed content	Somewhat, because of their ability to subscribe to chosen granular content.
Folksonomies	Legacy search engines (such as Webcrawler)	Yes, because of the power to find new information based on other users' searches.

Web 2.0 and rich Internet Applications

Rich internet applications are a predominant feature of web 2.0

- Attributes
  - Web applications that have many of the characteristics of desktop software
    - Powerful interfaces that provide the responsiveness of traditional desktop applications
  - Typically delivered either through specialized browsers, browerse3 plug-ins, or client virtual machines
- Uses
  - Rendering multiple forms of content (text, audio, video etc) in an integrated fashion
  - Engaging users via interactive user-friendly interfaces
  - Performing complex data visualization, including dynamic charting or graphical presentation of data
- Example of an enabling technology
  - AJAX (Asynchronous JavaScript & XML)

Enterprise 2.0 Tools

Enterprise 2.0 refers to Web 2.0 technologies used for some business purpose

- Promote collaboration and knowledge exchange among employees, consultants and company partners

Business use of Web 2.0 technologies

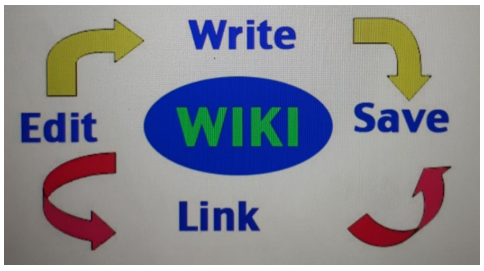
- Recruiting and professional networking
- Marketing, promotion, and sales

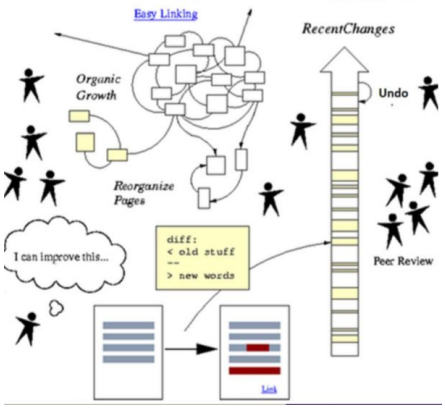
- Internal collaboration and communication
- Supply chain management 2.0

Web 2.0 Technologies: Wikis

- Wiki means quick or fast in the Hawaiian language
- Wiki-Wiki is the name of the bus line at Honolulu Intl Airport
- A wiki is a website or similar online resource which allows users to add and edit content collectively
- Example: www.wikipedia.com
- Collectively share and edit a body of knowledge
- Ongoing process of creation and collaboration
- Knowledge management (wikipedia, enterprise wikis)
- Wikis are collaboration tools
    - Blogs and chats are more turned towards conversation
- Wikis are intended to maintain a series of unique documents as their content evolves
- Wikis have built-in control
    - No changes can be made without creating a record of who made those changes
    - Reversion to an earlier version is always possible
- **A dynamic, collectively authored set of web pages**
- **Invented in 1995 by Ward Cunningham to facilitate online collaboration**
- **Characteristics of a Wiki application**:
    - Web-based
    - Interactive
    - Collaborative
    - Iterative
- **Wiki have been considered to be enabling technology for knowledge contributions, storage and exchange**
    - Sometimes interpreted as bakronym for “what I know is…”

- **Functions & Features:**





Web 2.0 Technologies: RSS Feeds

- **RSS (rich site summary) (really simple syndication)**
    - A standardized data format to publish frequently updated works such as blog entries and news deadlines
    - Website material is made available to end-users or other sites through web feeds

        - A web feed (or news feed) is a data format used for providing users with frequently updated content
        - Content distributors syndicate a web feed, thereby allowing users to subscribe to it.
        - RSS (web) feeds are usually accessed through an aggregator tool
    - Making a collection of web feeds accessible in one spot is known as aggregation, which is performed by an aggregator
    - An aggregators can be scheduled to check for new content periodically. Web feeds are an example of pull technology, although they may appear to push content to the user.

<u>Web 2.0 Technologies: Web Widgets</u>

- **Widgets:**
    - Mini web applications or Web add-ons
    - When embedded in other websites, they allow those websites to access content or functionality from other widget provider website (third-party site).
    - Snippets of code from third-party sites are included on your own website or web application
    - Examples:
        - Weather Information Widget
        - Calculator Widget
        - Currency Converter Widget

Lecture 6
Jan 29, 2020

<u>What are Mashups?</u>

- **The word "Mashup" originated in the music industry, where a mashup was a combination of two or more songs to create a new experience**
    - Typically, the vocal track of one song was combined with the instrumental backgrounds of another in this process

- **The technology industry extended this definition to encompass a new class of applications that described the combination of two or more sources into an integrated application**
- A mashup is a web application that combines data or functionality from more than one source into a single integrated interface or tool
    - Application or interfaces generated by combining content, presentation, or application functionality from disparate sources.
- **Content used in mashups is typically sourced from a third party via public interface or API (Application Programming Interface):**
    - API (Application Programming Interface):
        - An abstraction that defines and describes an interface for interaction with a set of functions used by components of a software system
        - Abstraction is the process of taking away or hiding or removing characteristics from an object in order to reduce it to a set of essential characteristics
        - For the consumer or user, abstraction helps focus on the essential elements with unwanted detail omitted
        - Examples: https://www.padmapper.com and http://portwiture.com

- **Mashups are applications generated by combining content, presentation or application functionality from disparate sources**
- Web mashups are usually *composite web applications* partially constructed from the services and content from other web sites.
- Mashups have an emphasis on GUI and *programming-less specification*
    - The concept of mashups originated from the understanding that the number of applications available on the web and the needs to combine them to meet user requirements are growing very rapidly
- **Some Mashups may not be characterized as Composite Applications:**
    - Mashups may also be used to access a single resource to mine data or migrate content (repurpose existing data and information according to your need)
- **Creating mashups is all about finding data, functionality, and services and using them to both solve problems and create opportunities**

Mashups and Web 2.0

- **Mashups have been regarded disruptive technology**
    - Mashups will be a major force in the next few years…
    - The disruptiveness comes in the end-user environment, where business users with little technical ability will be able to create their own mashups and assemble them in dashboards. This will introduce security and privacy challenges for the IT industry.
- **Mashups provide immediate benefit at little cost**
- **Mashups encourage re-use of data and services:**
    - Why reinvent the wheel when someone else has implemented it and provided an API?
- **Mashups offer a faster time-to-market when building new applications**
- **Mashups are about *simplicity, usability, and ease of access*. This simplicity has the upper hand over feature completeness or full extensibility**
- **The tools for constructing mashups have begun to reach a level of usability where even non-technical users can build their own solutions**