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Business Applications of Information Technology in Dairy Industry

R. S. Walse,
Assistant Professor & Head, Department of Computer Science, Statistics and Mathematics, College of Dairy Technology, Warud (Pusad), Maharashtra Animal and Fishery Sciences University

Abstract: The revolution in business caused by the Internet and its related technologies demonstrates that information systems and information technology are essential ingredients for the success of today's internetworked business enterprise. Therefore, as tomorrow's manager's, entrepreneurs, and business professionals, business students must learn how to use and manage a variety of information technologies to revitalize business processes, improve managerial decision making, and gain competitive advantages. Thus this text demonstrates how the Internet, Intranets and extranets, and many other information technologies, can give a business a strategic technology platform that supports electronic commerce and enterprise collaboration among the internetworked enterprise in today's global business environment.

The US dairy industry has realized tremendous improvements in efficiencies and milk production since the 1940s. During this time, farm and total cow numbers have decreased and average herd size has increased. This intensification, combined with the shift to a largely urban public, has resulted in increased scrutiny of the dairy industry by social and environmental movements and increased concern regarding the dairy industry's sustainability. In response to these concerns, a group of scientists specializing in animal welfare, nutrient management, greenhouse gas emissions, animal science, agronomy, agricultural engineering, microbiology, and economics undertook a critical review of the US dairy industry. Although the US dairy system was identified as having significant strengths, the consensus was that the current structure of the industry lacks the resilience to adapt to changing social and environmental landscapes. We identified several factors affecting the sustainability of the US dairy industry, including climate change, rapid scientific and technological innovation, globalization, integration of societal values, and multidisciplinary research initiatives. Specific challenges include the westward migration of milk production in the United States (which is at odds with projected reductions in precipitation and associated limitations in water availability for cattle and crops), and the growing divide between industry practices and public perceptions, resulting in less public trust. Addressing these issues will require improved alignment between industry practices and societal values, based upon leadership from within the industry and sustained engagement with other interested participants, including researchers, consumers, and the general public.

Key words: environment, social, economic, public attitude

Framework for Business End Users to establish of Dairy plant as a Business End User:

The field of information systems encompasses many complex technologies, abstract behavioral concepts, and specialized applications in countless business and non business areas. As a manger or business end user you do not have to absorb all of this knowledge. Illustrates a useful conceptual framework that organizes the knowledge in this text and outlines what end users need to know about information systems. It emphasizes that you should concentrate your efforts in five areas of knowledge:

1. Foundation concepts: Fundamental behavioral and technical concepts that will help you understand how information systems can support the business operations, managerial decision making, and strategic advantage of business firms and other organizations.
2. Technology: Major concepts , developments, and management issues in information technology that is, hardware, software, networks, database management, and other information processing technologies.
3. Applications: The major uses of information systems for the operations, Management, and competitive advantage of an enterprise, including electronic commerce and collaboration using the Internet.
4. Development: How end users or information specialists develop information systems solutions to business problems using fundamental problem-solving and developmental methodologies.
5. Management: The challenges of effectively and ethically managing the resources and business strategies involved in using information technology at the end user, enterprise, and global levels of a business

The Ethical Dimension of IT

As a prospective managerial end user and knowledge worker in a global society, you should also become aware of the ethical responsibilities generated by the use of information technology. For example, what uses of information technology might be considered improper, irresponsible, or harmful to other individuals or to society? What is the proper use of an organization's information resources? What does it take to be a responsible end user of information technology? How can you protect yourself from computer crime and other risks of information technology? These are some of the questions that outline the ethical dimensions of information systems that we will discuss in this text.

Why information technology development projects succeed or fail:

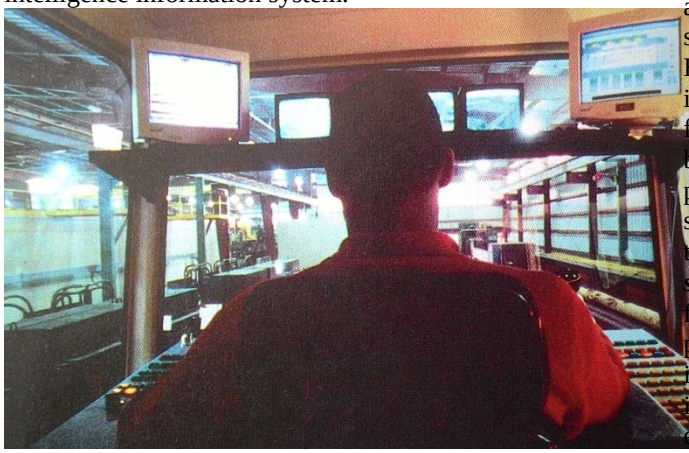
Top five reasons for success:	*Top five reasons for failure:*
User involvement	Lack of user input
Executive management support	Incomplete requirements and specifications
Clear statement of requirements	Changing requirements and specifications
Proper planning	Lack of executive support
Realistic expectations	Technological incompetence

Use o f MIS for establishment of Student Training Dairy Plant

Business Information System:

There are many ways to use information technology in business as there are business activities to be performed, business problems to be solved, and business opportunities to be pursued. As a business end user, you should have a basic understanding and appreciation of the major ways information systems are used to support each of the functions of business. Thus, in this review, we will discuss business information systems, That is a variety of types of information systems (Transaction processing, Management information, decision support, etc) that support the business functions of accounting, finance, marketing, operations management, and human resource management.

Read the real world case on Gulf states Dairy production and dairy products. Machine vision systems are a key technology contributing to increased profitability and improved product quality and safety at Gulf States Dairy Industries or Dairy Product production, like Almarai etc many other companies. For example, sophisticated computer based technology enabled Gulf state dairy industries to measure and analyze each log so that it is cut to provide the most profit in the current lumber market. The computer based facilities at their new industries provide a safe working environment during the automated milking or diary product process. The dairy industry produces good quality products to meet changing market conditions, based on information provided by the company's market intelligence information system.



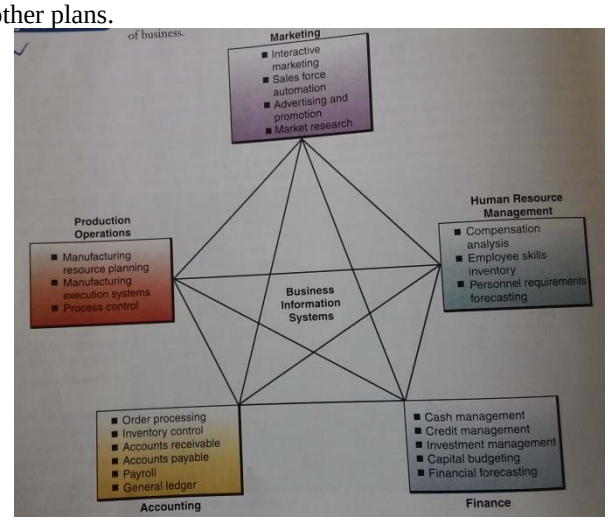
(Machine vision systems in manufacturing)

With vigilance and accuracy that humans cannot match, tireless electronic eyes are inspecting and guiding an ever-widening array of industrial processes. Machine vision systems, the technology that joins these unblinking eyes to computers that interpret what they see, not only steer robots placing doors on car bodies but also cull blemished vegetables from frozen-food processing lines and make sure that drug capsules go into correctly labeled packages.

Cross Functional Information Systems:

As a business end user, it is important that you have a specific understanding of how information systems affect a particular business function-marking, for example – or a particular dairy industry that is directly related to your career objectives.

For example- someone whose career objective is a marketing position in Establishment of Dairy Farming or Establishment of new Dairy plant should have a basic understanding of how information systems are used in Dairy Farming or Establishment in Dairy Plants and how they support the marketing activities of dairy farming and other plans.

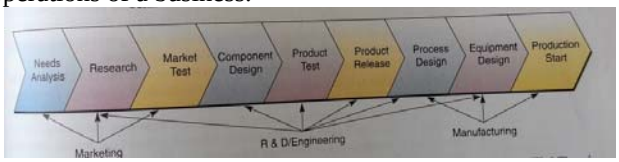


In above graphs illustrates how information systems can be grouped into business function categories. Thus, information systems in this section will be analyzed according to the business function they support to give you an appreciation of the variety of business information systems that both small and large dairy business may use.

However, as we emphasized in above, information systems in the real world typically are integrated combinations of functional information systems. Such systems support business processes, such as product development, production, distribution, order management, customer support, and so on. Many Industries are using information technology to develop ***cross-functional information systems*** that cross the boundaries of traditional business functions in order to reengineer and improve vital business processes. These organizations view cross-functional information systems as a strategic way to use IT to share information resources and improve the efficiency and effectiveness of business processes, thus helping a business attain its strategic objectives. DAIRY INDUSTRIES are turning to Internet technologies to integrate the flow of information among their internal business functions and their customers and suppliers. Dairy industries are using the World Wide Web and their intranets and extranets as the

technology platform for their cross-functional and inter-organizational Information Systems.

In addition, many *Dairy Industries, Dairy Farms, Dairy Plants* have moved from functional mainframe legacy systems to cross-functional client/server network applications, remote access, CAD, CAM, Macromedia flash. This typically has involved installing enterprise resource planning (ERP) or supply chain management (SCM) software from SAP focusing on the information processing requirements of business, ERP software focuses on supporting the supply chain processes involved in the operations of a business.

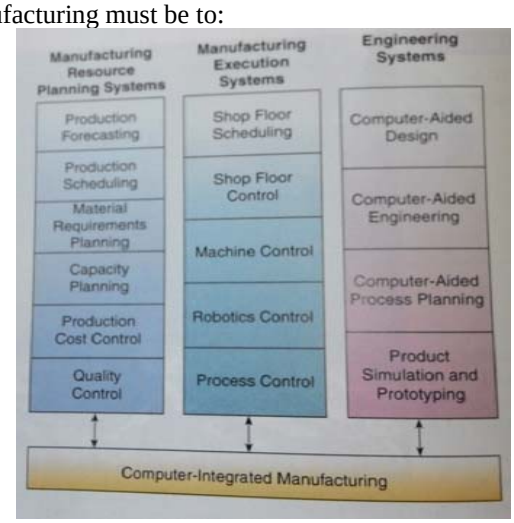


Manufacturing Information Systems:

Manufacturing information systems support the production/ operations function that includes all activities concerned with the planning and control of the processes producing goods or services. Thus, the production/operations function is concerned with the management of the operational processes and systems of all business firms. Information systems used for operations management and transaction processing support all firms that must plan, monitor, and control inventories, purchases, and the flow of goods and services. Therefore, firms such as dairy products transportation companies, milk transportation companies, dairy farmers, dairy industries etc.. must use production/operations information systems to plan and control their operations. Therefore in this article, we will concentrate on computer-based manufacturing applications to illustrate information systems that support the Manufacturing Information System.

Computer Integrated Manufacturing:

A types of manufacturing information systems are used to support computer-integrated manufacturing (CIM), the following diagram CIM is an overall concept that stresses that the objectives of computer-based systems in manufacturing must be to:



Simplify: Production processes, dairy product designs, and dairy industries as a vital foundation to automation and integration.

Automate: Production processes and the business functions that support them with computers, machines, and robots.

Integrate: all production and support processes using computers, telecommunications networks, and other information technologies

The overall goal of CIM and such manufacturing information systems is to create flexible, agile, manufacturing processes that efficiently produce products of the highest quality. Thus, CIM supports the concepts of flexible manufacturing systems.

Manufacturing information systems help companies simplify, automate, and integrate many of the activities needed to produce products of all kinds. For example computers are used to help engineers design better products using both computer aided engineering and computer-aided-design , and better production processes with computer-aided process planning. They are also used to help plan the types of material needed in the production process, which is called material requirement planning (MRP), and to integrate MRP with production scheduling and shop floor operations, which is known as manufacturing resource planning.

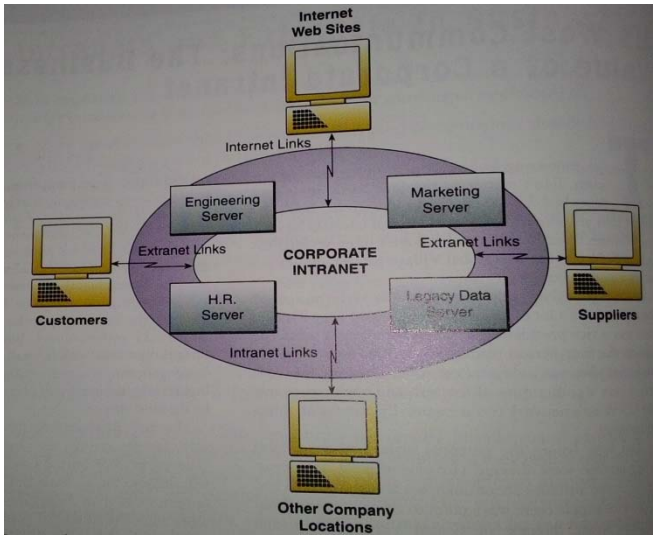
***Computer** -aided manufacturing (CAM) :* system are those that automate the production process, for example, this could be accomplished by monitoring and controlling the production process in a factory through manufacturing execution system, or by directly controlling a physical process (process control) , a machine tool.

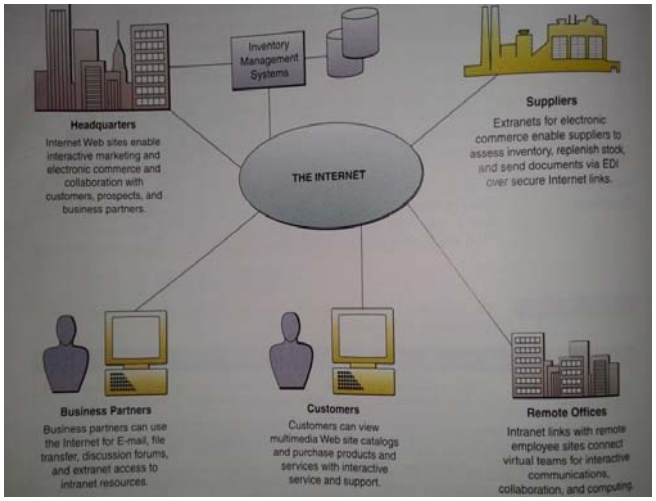
Manufacturing execution systems (MES) are performance monitoring information systems for factory floor operations. They monitor, track , and control the five essential components involved in a production process: material, equipment, personnel, instructions and specifications, and production facilities, MES includes shop floor scheduling and control, machine control, robotics control, and process control systems. These manufacturing system monitor, report and adjust the status and performance of production components to help a company achieve a flexible, high-quality manufacturing process

Benefits of CIM in Dairy Industry: Computer-integrated ,manufacturing systems can provide major benefits to manufacturing companies. First up all, CIM enables flexible production process that produce high-quality products to quickly meet changing market and customer demands. CIM gets these results through work simplification and automation, better production capacity. There is improved utilization of production facilities, higher productivity, and better quality control resulting from continuous monitoring, feedback, and control of factory operations, equipment, and robots. In addition, CIM results in reduced investment in production inventories and facilities through work simplification, just-in-time inventory policies, and better planning and control of production and finished-gods requirements.

Collaborative Manufacturing Networks: (Use of Internet) : → Manufacturing process like computer-aided engineering

and design, production control, production scheduling, and procurement management typically involve a collaborative process, Increasingly, this involves using the *Internet, intranets, extranets and other networks* to link the workstations of engineers and other specialists with their colleagues at other sites. These collaborative manufacturing networks may link employees within a company, or include representatives from a company's suppliers or customers wherever they may be located. For example automated dairy industry/ automated dairy farming systems uses the Internet, intranets and other networks to link the workstations.



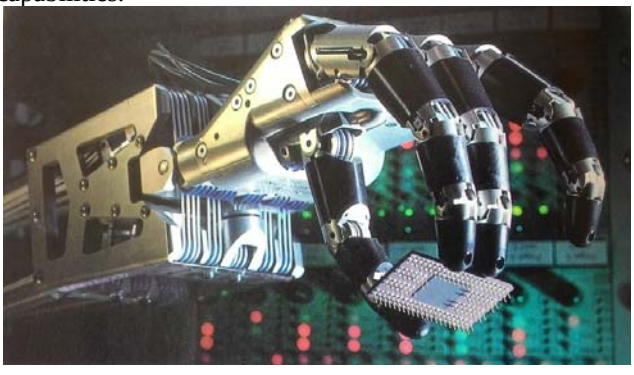


Process Control : *Process control* is the use of computers to control an ongoing physical process. Process control computers control physical processes in dairy industry, dairy farming, student in-plant training centre, milk collection centre, chilling centre and dairy production related companies. Many process control computers are special purpose minicomputers systems. A process control computer system requires the use of special sensing devices that measure physical phenomena such as temperature or pressure changes. These continuous physical measurements are converted to digital form by analog-to-digital converters and relayed to computers for processing.

Process control software uses mathematical models to analyze the data generated by the ongoing process and compare them to standards or forecasts of required results. Then the computer directs the control of the process by adjusting control devices of dairy industries machine parts such as *thermostats, valves, switches, and so on.* The process control system also provides messages and displays about the status of the process so a human operator can take appropriate measures to control the process. In addition, periodic and on-demand reports analyzing the performance of the production process can be produced.

Machine Control Machine Control is the use of a computer to control the actions of a machine. This is also popularly called numerical control. The control of machine tools in factories is a typical numerical control application, though it also refers to the control of typesetting machines, weaving machines, and other industrial machinery. Machine control may involve the use of special-purpose microcomputers called programmable logic controllers (PLCs). These devices operate one or more machines according to the directions of a numerical control programme.

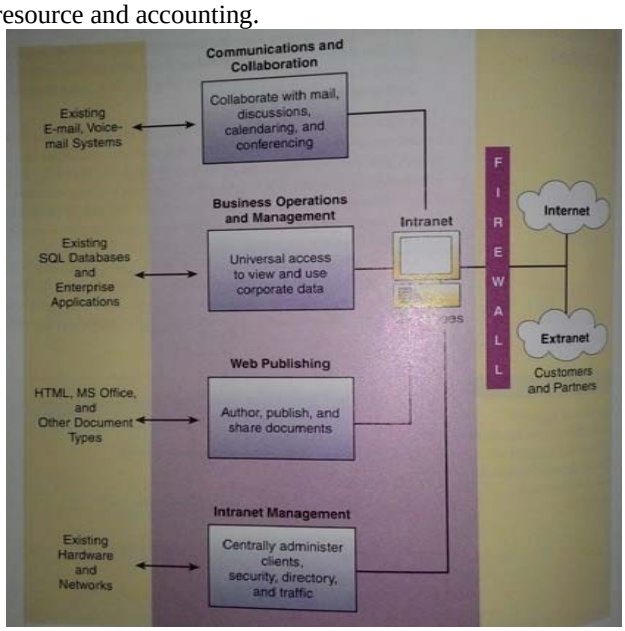
Robotics An important in machine control and computer-aided manufacturing is the creation of smart machines and robots. These devices directly control their own activities with the aid of microcomputers. Robotics is the technology of building and using machines (robotics) with computer intelligence and computer-controlled human like physical capabilities.

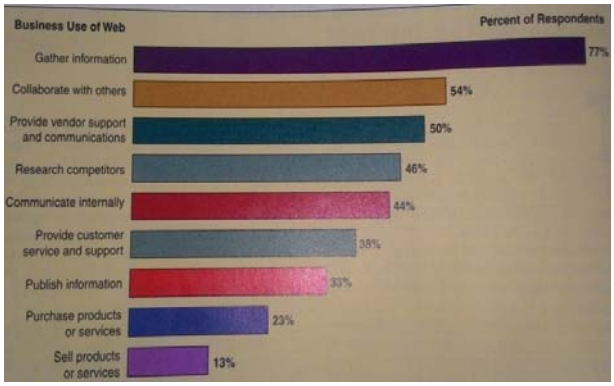


Robotics are used as "Steel-collar workers" to increase productivity and cut costs. For example, a robot might assemble compressor valves with 12 parts at the rate of 320 units per hour, which is 10 times the rate of human workers. Robots are also particularly valuable for hazardous areas or work activities. Robots follow programs distributed by servers and loaded into separate or on-board special-purpose microcomputers. Input is received from visual and/or tactile sensors, processed by the microcomputer, and translated into movements of the robot.

The Internet and business:

Business use of the Internet: The business use of the Internet is moving from an electronic information exchange to a broad platform for strategic business applications. Notice how applications like collaboration among business partners, researching competitors, providing customers and vendor support, and buying and selling products and services have become major business uses of the Internet. Other studies of leading corporations and organizations show that they are using internet technologies primarily for marketing, sales and customer service applications. However, these studies also show the strong growth of cross-functional business applications, and the emergence of applications in engineering, manufacturing, human resource and accounting.





(Source: Adapted from "Online: What's Small Business Doing on the Web?" Pro Business, Published by Inc.,Winter 96/97,p.4.)

Communication and collaborations: The Internet, intranets, and extranets support real-time global communications and collaboration among employees, customers, suppliers and other business partners. Interactive websites, E-mail, bulletin board systems, discussion groups, audio-and videoconferencing, and other Internet features enable internal and external business information to be researched. Solicited, disseminated, and shared. This enables members of different organizations and people at different locations to work together as members of virtual teams on business projects to develop, produce, market, and maintain products and services.

Interactive Marketing: Because of the internet, Marketing a company and its products and services has become an interactive process. A company's Web site can now offer more than hyperlinked multimedia product catalogs and promotional material. The Internet and the Web enable companies to create a dialog with customers through online discussion groups , bulletin boards, electronic questionnaires, mailing lists, newsletters, and E-mail exchanges. Thus, customers can be interactively involved in the development, marketing, sales, and supports of products and services, along with a company's market researchers, product designers, marketing and sales staff, and support specialists.

CONCLUSIONS AND FINAL THOUGHTS

We have identified and presented several major factors affecting the future sustainability of the US dairy industry, including climate change, rapid scientific and technological innovation and advances, globalization, failure to integrate societal values, and lack of multidisciplinary research initiatives. We also argued that sustainability is more than economic profitability; it also relates to environmental and societal concerns, including the quality of life of workers and the animals in dairy farms. Public input regarding the acceptability of practices, including new technologies, is required. Sustained engagement between and among producers, various sectors of the industry (e.g., processors and producers), consumers, and citizens will be essential to recognize and implement more sustainable practices. We recognize that this will require a major paradigm shift on the part of the US dairy industry to collaboratively develop a path to ensure the long-term future sustainability of the industry.

Clearly, much work remains to be done, particularly in identifying mechanisms that enable US dairy producers to voice their concerns independent of other sectors of the industry that may have competing demands or agendas. An example of this exists just north of the US border. The Dairy Farmers of Canada (DFC) is an organization run by producers for producers, with elected producer representatives from each of the provinces. This organization provides leadership in funding research; DFC commits approximately $750,000 per year to production research (pre-farm gate) and typically leverages this investment by demanding that applicants seek matching

funds. This commitment to research has resulted in a large body of published literature that provided much of the science cited in the recently published Code of Practice for the Care and Handling of Dairy Cattle. This science-based document describes best practices agreed upon by diverse stakeholder groups, including the dairy industry, government, grocery chain distributors, and the Canadian Federation of Humane Societies (see NFACC, 2009).

In contrast, a significant portion of the agricultural research undertaken by US research institutions is sponsored by corporations and, as such, is typically focused on measures of immediate economic interest typically hinging on increased animal or farm productivity and efficiency. Although check-off dollars from milk sales from US dairy farmers are collected by Dairy Management Inc. (Rosemont, Illinois), these funds are used for demand-related research and marketing and not for dairy production practices research. This leaves an important gap in the funding of research that addresses the growing public concerns about dairy cattle Agricultural Research Institute (Chazy, NY), Elanco Animal Health, and the Dairy Innovation Center for providing the meeting places that allowed this group to meet face to face.

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