Preface

Businesses come back to the basics irrespective of whatever innovative applications are developed, and whatever they promise. The bottom line is to calculate ROI or payback period before making any financial commitment toward the latest technology. Pervasive computing has also not been spared by financial business analysts. They are not looking for projects with merely positive ROI but with the prospect of highest ROI. Returns or gains can be maximized by developing stronger and better relationships with the customers, which in turn can be achieved by providing quality, timely, simple and omnipresent services and communication, providing value for their money, and managing supply chains and operations efficiently. Strategic deployment of Pervasive Computing applications promises these outputs as long as proper platform is chosen.

ROI is directly affected by business intelligence and the increased power of employees and customers in decision-making. Forget about fancy uses. Pervasive business intelligence is must to perform fundamental functions of management such as predictive analysis, planning, implementing, organizing, and controlling costs, and quality of processes, products and services. Pervasive devices are used in collecting and organizing data, and in various financial, analytical and forecasting tools that help businesses to improve their operational performance and profitability. We do not often realize that behind these simple helpful tools there are extremely sensitive devices collecting contextual information, using complex algorithms for processing data, and flexible systems.

Flexible systems are useful not only in business intelligence but also in competitive manufacturing environment where thrust is on efficiency, collaborative activities, integrating processes, ever increasing flexibility of quantity, capability, personalization of operations. Pervasive manufacturing utilizes miniaturized robots, numerically controlled and sensor embedded instrumentation devices, susceptible inspection machines, real-time data oriented activities, representation on Semantic Web and inference engines. Capabilities of collecting real-time machining data, instrument messages, operation status, monitoring and real-time analysis using correlations, regressions, and trends make decision-making in manufacturing more informed and intelligent. Pervasive manufacturing not only increases efficiency but also helps in tackling issues of Six Sigma and achieving other standards.

An integrative approach has led Manufacturing to achieve a new paradigm by allowing all the participants sharing a common single fact sheet. The common fact sheet when extended to the full supply chain members gives them access to planning and optimizing resources, inventory control, committing orders, sourcing and purchasing, process and product tracking, inspecting, and scheduling. Pervasive devices such as RFIDs, WAP phones, and near frequency devices help in inventory control, buffer management, just-in-time manufacturing, lean manufacturing, flexible and reconfigurable manufacturing, etc. Chapter 3 in this book looks at the role of latest technologies including pervasive computing

technologies in improving the usage of lean manufacturing in SMEs and discusses the implementation of lean manufacturing in terms of its three important elements–buffer management, work practices and human resource management. Chapter 4 of this book is concerned with production of highly customized products with shorter life cycles that need shift from mass production techniques in manufacturing systems to flexible automation techniques and intelligent reconfigurable manufacturing systems. All these are possible through pervasive devices, which introduce intelligent manufacturing systems that are capable of maintaining effective and efficient manufacturing operations with minimum downtime under conditions of uncertainty. They also help with tackling various research issues related to the development of reconfigurable manufacturing systems with pervasive computing such as structural design of reconfigurable machines, manufacturing process and simulation machines, micro electro-mechanical devices for sensors, etc.

Excited marketers who have been treated as being guilty of pushing their products without the need of the market are finding pervasive technology more effective and more rewarding. Humanoid robots are helping marketers in interactive advertising, providing uninterrupted services including entertainment to customers. Pervasive marketing is the integration of customer needs and supplier's capabilities to make progression towards real time interactive personalized product development, pricing, and distribution for achievement of satisfaction of customers and suppliers. Pervasive marketing not only helps advertisers to pervade into the eyes and ears of the people, but also helps people to convey their requirements anytime and anywhere without efforts and receiving timely services. Examples of Pervasive marketing would include sensing the need of interpretation and translation services when user a is in a meeting with somebody not speaking the same language (translation services anywhere and anytime using pervasive devices such as mobile phone), booking and payment services depending upon the location of the user (for movies, travel tickets, courses, restaurant seats, etc), personalized answers to missed telephone calls, categorizing and diverting telephone calls and messages based on the priorities, urgencies or any other criteria, personalized content, etc. Attracting attention has been traditionally the first and foremost step of advertising, which is possible with pervasive advertising. The next step is to engage people in the product and then selling the product. These two steps can easily be implemented with the help of interactive environment created by pervasive computing but not through traditional advertising. The level of attention gained by large visual advertisements is definitely different from the level of attention gained by the tiny pervasive devices. It is worth examining the effect of ever decreasing size and dissolving nature of pervasive media. As the characteristics of pervasive advertising are somewhat different from traditional advertising, the effect of using animation, emotion, repetition, etc. is also different. Chapter 1 looks at the impact of repetition and attention on the recognition of different types of online ads such as horizontal and vertical ads appearing in both animated and static forms.

Pervasive computing enables little and tiny devices and sensors to capture information, emotion and expectation of individuals to provide different services. It not only translates speech and expressions to text but it also synthesizes speech from text to provide services such as reading stories to children or reading novels to old people and entertaining them, reading emails to professionals while they are exercising, etc. This book includes a chapter on composition of Text-to-speech synthesis system which is a complex combination of language processing, signal processing and computer science. Expressions and emotions are integral part of our speech. These systems try to yield emotional speech that suits the context of the text. The second chapter of the book discusses application of variations in the prosody of the speech that yields the emotional aspects (anger, happy, normal) in Text to Speech Synthesis System.

There is an increased need for making manufacturing environments and products more energy ef-

ficient, safe and environment friendly. The use of Pervasive computing and humanoid robots in creating smart assembly and manufacturing environments allows safe quality control of processes and products even in hazardous and harmful manufacturing environments. Using sensor enabled robots in assembly and quality control is not only cost efficient but is also more productive and flexible. Cooperative robots are specialized intelligent robots dedicatedly inspecting the quality and continuously looking after the related production processes to detect any abnormalities. Chapter 5 of this book recognizes the need to integrate the real time information to help timely decision making and presents an adaptive quality assurance system to facilitate decision making in a timely manner in the context of the entire supply chain.

Broadband wireless access, Wi-Fi, Wi-Max, Wireless DOCSIS, 3G, 4G, 802.22, etc are the various wireless standards that increased the quality and effectiveness of Computer-Mediated Communication (CMC) that initially included emails, chat rooms, blogs, instant messages, bulletin-boards, list-servs, e-learning tools etc, and were concerned with the study of group dynamics and effects of interaction with computers on humans. With the use of sensor networks and pervasive devices, the scope of CMC increased. Now it also includes effects of interaction with pervasive devices on humans. Where CMC benefits users in different ways, it also brings with it cheating, frauds, lying behavior, and deception. Computer-Mediated Communication also helps in real-time auditing and accounts maintenance in business and non-business organizations. Chapter 6 draws attention on the Egyptian auditing scenario and discusses the use of CMC to enhance the audit quality and effectiveness of FTF meetings. It identifies the most effective CMC mode, its effect on the participant's satisfaction and explains how Computer-Mediated Communication can enhance the auditor performance in auditing firms.

We cannot forget the fact that Pervasive computing and devices are in their infancy. Many pervasive technology factors are still immature. Trustworthy security provisions, wireless and wired network integration, network topologies, wireless multimedia services, reliable physical layer transmission, radio technologies, and safe Near Frequency Technologies are required to provide quality services. Response time, interruptions, continuity of services, 24 hours help service, delays, errors, etc. are some of the important factors that determines the quality of experience and therefore determine the quality of service in Pervasive computing environment. Chapter 7 of this book is based on services provided by a Turkish firm. It evaluates Web-based service quality and identifies six Web-based service quality dimensions: information quality, responsiveness, Web assistance, tangibles, empathy, and call-back.

Pervasive computing supports typical human resource management processes such as recruiting, interviewing, giving remote self service access, employee e-training, etc. and enables the human resource department to be innovative in creating new functions and processes such as pervasive knowledge discovery and knowledge creation. Quality of human resource management processes determine the human resource administration effectiveness, employee motivation, professional development, morale of the employees, and overall culture and productivity of the organization. Chapter 8 of this book examines the implications of ISO 9000:2000 and EQA on HR issues in the context of Greek industrial organizations while improving quality. Chapter 9 focuses on the importance of planned organizational change when the technology is changing rapidly and so is the speed of technology adaptation. Based on a Croatian study, this chapter conceptualizes organizational change in terms of changes in technology, organizational structure, organizational culture, strategy, changes in employees' structure and changes in products and services. It also discusses various forms of organizational control: (1) control by one dominant shareholder; (2) control by coalition of several large block-holders and (3) managerial control and explains the influence of ownership concentration on the performance of a company. Chapter 10 of this book further looks at the importance of strategic human resource management and its effect on

organizational performance. It explains the dynamic nature of business environment and its effects on human resource functionaries and the changing role of human resource management.

The movement of data from stand alone databases to integrated relational corporate database has opened the way to simplified and real-time accounting services and financial reporting for the organization, departments and cost centers. Indirect cost allocations and cost negotiations have become easier. Integration of sales and distribution, materials management, online payment, payroll, and other processes allow real-time data access and real time financial decisions, and allocation of resources. Various kinds of financial systems are being introduced to cater for different needs of different organizations. In this book, chapter 11 discusses the lifecycle design of an Automatic Trading System. It describes the investment decision making process, Futures Market Environment, various trading states, and various fundamental and technical indicators for price forecasting for decision making, commissions and slippage barrier. Chapter 12 of this book looks at providing examples of the contextual features of firms adopting Activity-Based Costing (ABC) compared to those not adopting ABC. In the context of Bahrain, it discusses the organizational and business environment variables which appear to have influenced the adoption of ABC including computing usage. Chapter 13 describes various innovative ways in which financial institutions and corporations cope with credit risk since the advent of credit derivatives. It also discusses advanced computerization as the most important factor for the wide use of credit derivatives and its benefits to banks, such as more efficient loans portfolio management, further business expansion and confidentiality, etc. Chapter 14 identifies the direct relationship between the flow of FDI and economic development and analyses the existence and nature of causalities, between FDI and economic growth in India since 1990. Based on the research, this chapter indicates that there is a strong correlation between FDI inflows and GDP in India and there is also unidirectional causal relation between FDI and GDP. Chapter 15 of this book further presents disparity between states in India and a shift from primary and secondary sectors to tertiary sectors and pervasive computing areas. It identifies that Foreign Direct Investment (FDI) is the most important source of finance in the last two decades and is, therefore, becoming increasingly important in the developing world.

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