

Chapter I

Introduction

AUTO-ID TECHNOLOGIES

This study is concerned with the automatic identification (auto-ID) industry which first came to prominence in the early 1970s. Auto-ID belongs to that larger sector known as information technology (IT). As opposed to manual identification, auto-ID is the act of identifying a living or nonliving thing without direct human intervention. Of course, the process of auto-ID data capture and collection requires some degree of human intervention, but the very act of authenticating or verifying an entity can now be done automatically. An entity can possess a unique code indicating personal identification or a group code indicating conformity to a common set of characteristics. Some of the most prominent examples of auto-ID techniques that will be explored in this book include bar code, magnetic-stripe, integrated circuit (IC), biometric and radio-frequency identification (RFID). The devices in which these techniques are packaged include a variety of form factors such as labels and tags, card technologies, human feature recognition, and implants. Generally the devices are small in size, not larger than that of a standard credit card. There has been a visible trend towards miniaturization through the development of mini-cards and tiny RFID tags (some even as minute as pinheads).

Auto-ID Applications

Traditionally auto-ID has been synonymous with bar code labels on supermarket store items, financial transaction cards (FTCs) used to withdraw money from automatic teller machines (ATMs), and subscriber identity module (SIM) cards in mobile phones. Today auto-ID devices are being applied in very different ways to what they were originally intended. For instance, frequent air travelers can bypass immigration queues using their biometric trait, prisoners can serve their sentences from home by wearing electronic tags and animals can be identified by implanted transponders. While the nature of auto-ID is one that is innately compatible to mass market diffusion, it does also accommodate well for niche applications where for instance security is paramount and access is limited to only a few authorized persons. Auto-ID has also become an integral part of electronic commerce (EC) applications, particularly those related to e-government. Increasingly we are seeing bar code scanners and RFID readers integrated onto mobile devices.

The Significance of Auto-ID

Prior to the 1970s who could have envisaged that every packaged item sold on a supermarket shelf would be equipped with a bar code label. And that by the early 1990s the majority of the population in more developed countries (MDCs) would be carrying a magnetic-stripe or smart card to conduct financial transactions, without having to visit a bank branch. And furthermore, by the turn of the twenty-first century that it would be enforceable by law to implant domesticated animals with a microchip. These examples not only indicate the pervasiveness of auto-ID but also how reliant the world has become upon the technology, including public and private enterprise. The impact of auto-ID is irreversible, an essential part of life. It is interwoven in a highly structured manner with the way we live and work and is a seamless part of our day-to-day routine activities. The technology is so widespread and diffused that it seems to possess an almost omnipresent quality.

Auto-ID Innovation

Auto-ID technologies are complex artifacts. In their natural state they are simply inventions seeking an economically significant purpose. Only when the devices are applied to a given context as part of an information system (IS), and they achieve a desired result, can they be considered product innovations. For example, a plastic card with a magnetic-stripe is quite useless unless it grants the cardholder the ability to make an EFTPOS (electronic funds transfer point-of-sale) transaction at a restaurant to pay for a meal. Furthermore, one need only consider just how complex an auto-ID system is: first cards need to be produced by a manufacturer based on a common set of standards; second the cards need to be acquired by a financial institution and set up with the appropriate parameters; third an end-user with that financial institution must adopt the card and be inclined to make an EFTPOS transaction; and fourth the merchant must accept EFTPOS payments and have predefined agreements with the appropriate financial institutions to enact a valid transaction. The auto-ID innovation process requires that there be dynamic interaction among numerous stakeholders including technology providers, service providers and customers. All too often studies will only focus on the first of these, neglecting to understand that the other stakeholders are equally important to the innovation process. It is the premise of this book that the citizen perspective not be ignored; citizens must be active participants in the design of systems related to e-government (Kumar & Vragov, 2009).

LOCATION-BASED SERVICE

Location-Based Services (LBS) is a branch of m-Commerce that has revolutionized the way people communicate with others or gather timely information based on a given geographic location. Everything living and nonliving has a location on the earth's surface, a longitude and latitude coordinate that can be used to provide a subscriber with a wide range of value added services (VAS). Subscribers can use their mobile phone, personal digital assistant (PDA) or laptop to find information relating to their current location. Commercial applications that utilize positioning technologies are diverse and range from child monitoring devices used to ensure safety to care-related devices for Alzheimer's sufferers who may lose their way. Typical LBS consumer applications include roadside assistance, who is nearest, where is, and personal navigation. Humans are not the only living recipients of positioning technolo-

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